GEAR PRO
FOR UNIX

User Manual

Disclaimer

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GEAR UNIX

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Welcome to GEAR Pro for UNIX

Welcome to GEAR Pro for Unix, the professional caliber CD/DVD-Recordable software by GEAR Software. This GEAR manual is relevant for the following GEAR for Unix programs:

- GEAR Pro 4.1 for Unix - Command Line Interface
- GEAR Pro 4.1 for Unix - Graphical User Interface

This introductory chapter contains the following sections:

- What Does GEAR do?
- Supported Recording Formats
- Graphical User Interface
- Supported SCSI Drivers
- About this Manual
- GEAR Command Structure
- Minimum System Requirements

What Does GEAR do?

GEAR is a CD/DVD recording and pre-mastering software package that supports various phases of compact disc authoring and production. GEAR 4.1 now offers you the following:

- A new Graphical User Interface for Solaris Sparc/x86, SGI Irix, IBM AIX, HP-UX and Linux. The GUI supports easy drag and drop of files and directories into the GEAR image.
- Creation of DVD volumes in ISO 9660 + Rock Ridge format for recording to DVD-R(W) drives and DVD-RAM drives up to 4.7 GB.
  Currently supported DVD-R(W) recorders:
  Pioneer DVR-S101   (Max 3.95 GB, external SCSI drive)
  Pioneer DVR-S201   (Max 4.7 GB, external SCSI drive)
  Pioneer DVD-R7211 (Max 4.7 GB, internal SCSI drive)
  Pioneer DVR-A03   (Max 4.7 GB, internal IDE/Atapi drive)
  Panasonic DVD-R SW-9501 (Max 4.7 GB, external SCSI drive)
  Currently supported DVD-RAM drives:
  Creative DVD-RAM RAM1216S
  Hitachi DVD-RAM GF-2000
  Hitachi DVD-RAM GF-2050
  Hitachi GF-1000
  Hitachi GF-1050
  Hitachi GF-C100
  Panasonic DVD-RAM LF-D200
  Panasonic PD-2 LF-D100
  Panasonic PD-2 LF-D110
  Toshiba DVD-RAM SD-W1101
  Toshiba DVD-RAM SD-W2002
  •NOTE: For IDE/Atapi devices the Unix system must have an IDE/ Atapi bus.
- Creation of CD volumes for CD-ROM ISO 9660, Rockridge, CD-ROM XA, CD Audio and Mixed-mode formats. File names up to 256 for Rockridge and up to 64 for ISO 9660. Directory nesting up to 24 levels.Rock Ridge support for links, pipes, device special files, etc with permission and group handling.
- Powerful virtual image building requiring less than 5% of total CD

image size to record. Allows recording directly from the virtual image.

- Write a compact disc on any available CD-R(W) recorder from Sony, Philips, Kodak, Pioneer, Panasonic/Matsushita, Plextor, Ricoh, Mitsumi, Teac, Sanyo, JVC, Yamaha, and almost every OEM recorder. The CDs you produce with GEAR will be fully compatible with standard CD-ROM drives. A list of additional hardware devices supported by GEAR is listed in the GEAR ReadMe file.
- Up to date CD-R and CD-RW recorder support. Powerful recorder configuration: track-at-once, disc-at-once, test write, Burnproof, Justlink, fixation, multi-session and verify after write. Separate read and write speeds for DVD, CD-R and CD-RW.
- Read back CD tracks or a complete CD image of any type of CD (CD-ROM, CDROM-XA, Audio, CD-I, Video CD, etc.) onto the hard drive and subsequently write the image to a CD-R disc (CD copying).
- COPYCD function for easy copying of CDs (CopyCD button available in the GUI).
- Appending data to multi-session CDs with session selection. Full Orange Book multi-session support.
- In most cases GEAR will now also be able to recognize your CD-ROM drive for DISCINFO, READTRACK and READCD commands to extract data and digital audio tracks.
- Support for batch files for unattended operation and ability to generate log files that can be reused as batch files.
- Support for miscellaneous jukeboxes and media changers of Pioneer, K&S/Grundig, ASM, DSM, JVC, etc. to write multiple copies of CD-Rs automatically or to control the place of CD or CD-R media in the jukebox.
- Pre-master tape output in DDP (Disc Description Protocol) format for mastering.

Supported Recording Formats

GEAR Pro for Unix can create CD/DVD images in the following formats:

- DVD-ROM, ISO-9660
- CD-ROM, ISO-9660
- ISO-9660 with Rockridge extension (default enabled)
- CD Digital Audio (Red Book)
- CD-ROM Mixed Mode (data + audio tracks)
- CD-ROM XA
- Multi-Session
- CD Extra (Enhanced Music CD)

If you're looking to use CD-ROM or DVD-ROM as a distribution and storage medium for your information, GEAR is the product you want producing it. For more than a decade, GEAR had bridged the gap between applications and data on hard drives and CD-ROM.

in addition to the above, GEAR Pro for Unix also supports recording of authored (physical) CD images and CD copying of the following CD types:

- Non ISO-9660 CD-ROM (Native file systems like Apple HFS or Unix native file systems)
- Photo CD
- Video CD
- CD-I
- Proprietary video game authoring (3DO, Nintendo, Sega, CD Karaoke, and other game titles)
- Commodore CDTV
- Electronic Book (XA)
- Compressed and encrypted file formats
- Custom-generated images

Please keep in mind that the files contained in the proceeding formats must first be authored using their corresponding external editing package (For example, a game design engine). However, once their creation is complete, GEAR provides the perfect solution for testing and mastering your files.

For CD copying GEAR supports an easy CopyCD function to copy almost any type of disc, including the above formats.

Notification

Any time you want to copy a CD, make sure you are allowed to make a copy. Many CDs are protected by copyright laws. This usually means you cannot

make a copy at all (as is the case with most audio CDs, video CDs 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.

Supported CD Recorders

GEAR Software has a proud history of supporting the latest developments in CD-R and DVD-R technology on various operating system platforms. With the new GEAR Pro for Unix, the list of supported recorders is very up to date and the method for adding support for new recorders has been greatly improved. Visit our website at www.gearcdr.com for an up-to-date listing of all currently supported recorders for GEAR Pro for Unix.

Graphical User Interface

The new GEAR Pro for Unix is available with a Graphical User Interface and a Command Line Interface, for most platforms In the GUI it is also possible to enter GEAR commands, like in the Command Line Interface. Some chapters in this manual refer to using the Graphical User Interface, and some chapters refer to using GEAR commands in the Command Line Interface. To start the GUI please run the 'geargui' startup script in /usr/geargui. To start the Command Line Interface please run the 'gear' script.

Supported SCSI drivers

This version 4.1 of GEAR for UNIX has the ability to use either standard

platform SCSI drivers or third party SCSI drivers from Caldera Graphics or Tracer Technologies. On most Unix systems the standard platform SCSI driver will the defaults choice, and no third party drivers are required. On platforms where there is no standard driver available (Solaris and AIX), the Caldera driver will be the default choice. The Caldera driver is then part of the 'Required Packages' and will be automatically installed. Therefore, GEAR Pro for Unix by default does not require a Tracer Driver nor a Tracer Driver key to run, like version 3.51 does. However it is still possible to use the Tracer Driver.

The SCSI driver can be changed in the .gearrc file or in the program itself with the new SETCDRDEFAULTS command:

      SETCDRDEFAULTS CDRInterface <value>.

<value> determines which type of SCSI driver is used:
1) Tracer Technologies SCSI device driver (special file at 'SCSIPath1').
2) GEAR/Standard SCSI device driver (special file at 'SCSIPath2').
3) Caldera SCSI device driver (special file at 'SCSIPath3').

NOTE: To use the Tracer SCSI driver, an additional license key is required.

If the driver from Tracer Technologies (gd driver) has been installed you'll need to run the license manager to determine if your system has been licensed.

Important Notice

Please take notice of the following information regarding your installation when you use the SCSI drivers from Tracer Technologies. To use a third party SCSI driver like Tracer Technologies, an additional license key is required. The key supplied by Tracer is only valid for one specific Unix system. Once the gd driver from Tracer Technologies has been installed, you'll need to run the license manager to determine if your system has been licensed. A fee of currently $ 99 will be required if you need to request another unlock key for any reason. This applies if you wish to move the product to another computer or if you need to re-install. This is the result of the licensing arrangement with Tracer for the GD drivers.

Please contact us for a 30 day demo key to test the functionality of the software and to ensure that your recordable drive and our software works correctly in your system. Once you are satisfied, please contact us for your permanent key.

Once the demo key expires it will look as if the software no longer recognizes your recordable device. You should either request another demo key or move over to the permanent key

In order to get your license validated we will need you to send the following information to support@gearcdr.com:

Please refer to the chapter *Installing GEAR* for more information on running the Tracer License Manager.

About this Manual

- Special information will be denoted as NOTE, IMPORTANT, or WARNING.
- New terms that you might not be familiar with will appear in italics.
- Commands as they should be entered appear in boldface.

GEAR Command Structure

GEAR commands can be executed for the Command Line Interface and from the Graphical User Interface of GEAR Pro for Unix. For your convenience, a standard format can be applied for using GEAR commands. This standard format includes the command name followed by any additional parameters that are appropriate. GEAR commands may be included in the construction of batch files or used as individual instructions from the command line. To use any GEAR command, it must be entered in the following format:

COMMAND_NAME <parameter> [options]

A parameter enclosed in angular brackets (< and >) is a required parameter. A parameter enclosed in square brackets ([and]) is an optional parameter. A bar (|) between two parameters indicates that a choice must be made between two or more pre-set variables for that given parameter.

Special keys, such as Escape and Return, are abbreviated and enclosed in angular brackets—<ESC>, <RETURN>.

If you do not specify a required parameter, you will be prompted for the missing value. The default value for the specific parameter will be displayed between brackets and may be selected by pressing <ENTER>.

Commands can be interrupted by pressing <ESC>. A short time may expire before the command execution halts as system resources are released.

Minimum System Requirements

System requirements are included for the following:

- Sun Solaris SPARC 2.6, 2.7 or 2.8
- Sun Solaris x86 2.6, 2.7, or 2.8
- HP-UX 10.20 or 11.0
- Silicon Graphics IRIX 6.2 or 6.5
- Linux 2.x
- IBM AIX 4.1 or 4.3
- Digital Unix 4.0

Check web site for additional OS support.

Solaris Sparc

- SPARC station IPX
- Solaris 2.6 or later
- A minimum of 25 Mb of free hard drive space
- A fast hard drive with an average access time of 12 ms or faster

Solaris X86

- Pentium PC
- Solaris 2.6 or later
- A minimum of 25 Mb of free hard drive space
- A fast hard drive with an average access time of 12 ms or faster

HP Unix

- HP 9000/700 series or HP 9000/800 series
- HP UX 10.2 or HP UX 11
- A fast hard disk with average access time of 12 ms or faster

SGI Irix

- SGI workstation/server
- IRIX 6.2 or 6.5
- A fast hard disk with average access time of 12 ms or faster
- Hard disk and recorder unit connected to separate SCSI controllers (recommended)

Linux

- Pentium PC
- Linux 2.x kernel
- A minimum of 25 Mb of free hard drive space
- A fast hard drive with an average access time of 12 ms or faster

IBM AIX

- AIX 4.1 or 4.3
- A minimum of 25 Mb of free hard disk space
- A fast hard disk with average access time of 12 ms or faster

DEC Unix

- DEC Alpha workstation/server or compatible
- Digital Unix 4.0
- A minimum of 25 Mb of free hard disk space
- A fast hard disk with average access time of 12 ms or faster

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CD-R and DVD-R: The Basics

This chapter will introduce the general concepts behind CD-R and DVD-R technology. It contains the following sections:

- CD and DVD
- DVD: The Next Generation
- CD-Rewritable
- Disc Images
- Constructing a Disc
- Recording Methods

CD and DVD

Mass Produced Discs

A mass produced DVD/CD such as an audio CD or a CD-ROM (recognizable by its silver color), is a non-magnetic polished polycarbonate disc with a micro thin metal layer on it which is used to store digital information. During the recording process, tiny indentations are pressed into the disc called pits. These pits represent the information stored on the disc. Because these pits reflect light differently from the rest of the surface, a disc drive is able to interpret them as binary information. Information on such a disc is read only - no data may be added or removed once it has been created. Essentially, a mass produced disc is a permanent, read only storage medium.

CD/DVD Recordable Discs

Conversely, CD-R is a more dynamic storage medium where users can both read from and write to disc. A recordable disc is significantly different from a mass produced CD or DVD. A recordable disc has a layer of organic dye that has been applied atop a perfectly smooth reflective surface. Once in the DVD/CD recorder, a laser beam burns a pattern in the organic dye during the recording process, this pattern is likenable to the pits on a manufactured disc as described earlier. These burns cause changes in the reflectivity of the disc's surface, so when it is placed in a CD-ROM or DVD drive, the pattern is recognized as binary information just like the pits on a manufactured disc would be. Therefore, any DVD/CD drive can read information written on a recordable disc.

IMPORTANT: Unless you have a Re-Writable drive and media, once the burns on a CD-R or DVD-R disc have been written they cannot be deleted. Therefore, each part of a recordable disc can be used only once.

CD/DVD Rewritable Discs

CD-RW, DVD-RW and DVD-RAM discs can be reused hundreds (if not thousands) of times by erasing the data previously recorded on it, then re-recording to the disc. The surface of rewritable discs can be smoothed by means of a separate, high intensity laser beam inside the rewritable recorder. Employing this laser erases all previously recorded information from the disc, but allows the disc to be reused. While CD-RW discs may be used in a multisession mode as regular CD-R discs, when erasing data from a RW disc it is necessary to erase all contents from the disc. So, before a rewritable disc can be reused, it must be made blank again via the erase command.

DVD: The Next Generation

The continually expanding need to store growing amounts of data on durable and portable media has recently led to the development of the Digital Versatile Disc (DVD). A DVD, though the same size as a standard CD, can hold 4.7 to 17 GB of data. When you compare that to the 650 MB that a standard CD holds its easy to see why DVD is becoming widely regarded as the successor to the CD.

DVD storage capacity

The increased storage capacity of DVD is possible because of the enhanced density of the disc which increases total disc capacity to 4.7 GB. The DVD technology also supports double sided and dual layer media which will provide some truly impressive storage capacities - in some cases, as large

as 17 GB per disc.

<div align="center">

Table 2.1: Recordable Disc Capacities

	Single Sided	**Double Sided**
Single Layer	4.7 GB	9.4GB
Dual Layer	8.5GB	17GB

</div>

DVD Recorders currently support writing only one layer, which offers a recording capacity of 4.7 GB at maximum. 8.5 GB DVD implies writing two layers, and 17 GB implied writing two sides and two layers. Creating these media is only possible with DVD mastering by means of a pre-master tape. At this time of writing GEAR does not support DVD dual layer and dual side.

Application

Even in it's current phase of development, it is apparent to that in the near future DVD can become the standard format for:

Video:
DVD-Video discs can hold a 133 minutes movie and it's sound track, with superior image resolution than the current S-VHS standards.

Audio:
DVD-Audio even with the limited existing DVD capacities, this format can easily store 6 times more music than the conventional 650 MB/74minute CD. Future developments in DVD technology will push the capabilities of this media even further with the digital sound quality CD consumers have been enjoying for years.

Multimedia:
DVD-ROM will facilitate the use of genuine video clips, high resolution graphics and full interactivity in multimedia productions by essentially removing size restrictions in the design and distribution to such applications.

DVD-R

DVD-Recordable (DVD-R) is poised to be the next generation in optical storage with the coming proliferation of DVD-R drives. DVD-R will be fully compatible with the DVD-Video and DVD-ROM formats, with a beginning disc capacity of 4.7 GB. This should make DVD-R a leading choice for archival/backup purposes and the creation of multi-media productions. Two types of DVD recordable media are available, Authoring Media and General Media. A DVD recorder usually supports only only type of media. Please take care you are using the correct media for your DVD recorder.

Universal Disc Format (UDF)
Universal Disc Format is a standardized file system used to organize data on a CD and DVD media, ensuring that the exchange of data between multiple operating platforms will be possible. It is the successor of ISO 9660, the commonly used file system used to store data on CD media. ISO 9660 has some limitations with respect to the maximum file name length and character sets, that UDF overcomes. UDF supports Unicode. Furthermore, UDF is better equipped for incremental writing purposes. Different version of the UDF file system have been defined: version 1.02, version 1.50, version 2.00 and version 2.01.
For maximum compatibility, it is possible to combine ISO 9660 and UDF on a ISO/UDF hybrid disc.
At this moment of writing GEAR Pro for Unix does not support UDF. However with the Rock Ridge extensions to ISO 9660 that GEAR does support, a lot of the limitations of ISO 9660 are overcome, especially for Unix.

CD-Rewritable

GEAR Supports CD-Rewritable (CD-RW) and DVD-Rewritable (DVD-RW) technology which enables users to rewritable media. Rewritable media is written to in a similar fashion as regular CD-R/DVD-R media. However, if the user chooses to, an RW disc may be erased and reused to store different information. Most CD recorders currently on the market can write both CD-

RW discs and conventional CD-R. However, only the CD-RW discs can be erased and written to again.

To read any CD-RW disc in a CD-ROM drive you need a CD-RW recorder or a multi-read CD-ROM drive, which is capable of reading CD-ROM, CD-R and CD-RW discs.

Disc Images

Think of an image as a complete picture of the disc you want to create, a blueprint that includes every file (and the proper version of each of those files). In essence, an image is really your disc, before it is a disc. An image is the backbone of what GEAR is designed to record, representing a file or collection of files. With GEARs powerful recording engine, images can be created in two ways: Virtual Image or Physical Image

Virtual Image

Whenever you create a project in GEAR, a virtual image is created. This is an administration file containing necessary information about the files you plan to store on disc. Included in this file will be the directory structure to be used on the disc and the location of the data files on your hard disk(s). When you start copying your data to disc, the virtual image will moderate the actual recording process by loading the appropriate files from your hard drive(s) in their correct order and writing each file to its assigned place on the disc.

A virtual image is really like a file or an electronic table of contents that contains an alias for every file you're planning on recording to disc. It doesn't contain your actual files, but it knows where they all are and the order in which to record them.

Physical Image

A physical image on the other hand, contains actual bit-to-bit copy of the track that will be recorderd on the disc, and therefore contains copies of all the files you loaded into the virtual image. The physical image is usually one complete file. Consequently, a physical image can be very large. Despite it's size, a physical image is sometimes very useful. If when attempting to record your data to disc you encounter frequent failures due to low data transfer rates, you should consider using this image type. A physical image is also appropriate to use when the transfer rate for recording has to be increased from it's normal level on your system (for example, when recording a large number of small files).

A physical image will take significantly more hard drive space than it's virtual counterpart. However, since all the required files for recording your disc are already present in a physical image, it will transfer data between your computer and CD-R/DVD-R drive much faster.

External or Foreign Image

With GEAR's extensive capabilities you can also write external or foreign images to CD/DVD. An external or foreign image is a physical image file produced by some software tool other than GEAR (for example, a video game authoring engine).

Furthermore, with some CD formats GEAR must use foreign images because GEAR is not designed to create images for the following CD formats: CD-I CDTV, HFS and 3DO. These disc types can only be processed by means of an external/foreign image.

Constructing a Disc

Two concepts are important in understanding how to create a disc: Tracks and Sessions.

Tracks

Data is written to DVD/CD in tracks and each track contains a separate set of data. For example, a track on a CD-ROM usually consists of different files while an audio track will always contains one single audio file.

NOTE: The maximum number of tracks a CD-R can contain is 99, regardless of the number of sessions or the type of tracks on the disc. DVD media only support one track.

Track types in GEAR

For the multiple CD-formats that GEAR supports, a few basic track types are used:

> ***ISO***   A track type eminently suited for recording computer data (CD-ROM) with the ISO 9660 file system, optionally extended with Rock Ridge. This format will consist of a single track unless you record in a multi-session mode.

> ***XA***   A track type used for CD-ROM XA, EB, Photo CD, Video CD and multi-media applications. This format will consist of a single track unless you record in a multi-session mode.

> ***DA***   A track type for digital audio. This format can accommodate anywhere from 1 - 99 tracks. Please note that if audio tracks are combined on a disc with either an ISO or XA track, a maximum of 98 audio tracks can be used (see Combining Track Types below).

Combining Track Types

When you combine different track types in one recording session, you are creating a Mixed Mode disc. The following combinations are possible:

- 1 ISO track and up to 98 Audio tracks

- 1 XA track and up to 98 Audio tracks

- 1 - 99 Audio tracks

The first and second combinations above can be repeated in multiple recording sessions on a multi-volume or multi-session discs, although the total number of tracks for an entire disc still cannot exceed 99.

About audio tracks

When recording only audio tracks do *not* create a multi-session disc. If you add an audio track to a multi-session disc, only a multi-session player can play the track. Most conventional audio CD players cannot handle multi-session audio discs. To circumvent this problem, you can use a hybrid disc structure called Extended CD or CD Plus. The first session of such discs have multiple audio tracks while subsequent sessions are used exclusively for data. An audio player can only recognizes the first session of such a disc (i.e. the audio tracks) whereas a multi-session CD-ROM player will recognize both the audio and data tracks.

Sessions

Each time you write to a CD is considered a session - as in writing session. There are two ways to employ sessions in recording your discs: single session and multi-session. As the names indicate, a single session disc is written to once, while a multi-session disc may be written to multiple times, or until the disc reaches it's maximum storage capacity.

A session is a recorded segment of a compact disc that contains one or more tracks (data or audio). These segments are always preceded by a lead-in and closed by a lead-out file. The lead-in and lead-out files contain information about the recorded data, such as a table of contents.

The session method you choose to use will depend on your recording requirements and the amount of disc capacity you wish to use.

Single Session

Single Session recording makes the most efficient use of available disc space, so more data can be stored on a disc using single session than multi-session. A single session disc contains data written during one (and only one) session. Once all the tracks have been written, the disc undergoes a process called *fixation* where the lead-in and lead-out are written. Once a single-session disc has been completed, you can never add more data to the disc. The following illustrates the file structure of a single session CD.

Table 2.2: Single Session Track Structure

Lead in (TOC	Track 1	Track 2	. . .	Track 23	Track 24	Lead out

Multi-Session

If you want to record data to the same disc over the course of time you should consider creating a multi-session disc. Data recorded in each session is linked, permitting subsequent recording sessions to refer to data from previous sessions. The term for adding a session to a multi-session disc is *append.* When you append a session, GEAR will read the previous session on the disc and create a virtual image of it - remember from earlier, a virtual image is like an address book that contains the location of your files. By this token, references to your previously recorded files are incorporated with the new files you are appending in a single table of contents (TOC) which resides on the disc.

IMPORTANT: One drawback to using multi-session is the disc space required as overhead for each append session you conduct. On average, each time you append to a disc, an additional 15 MB will be needed to create session buffers and the new lead out and lead in files which include the TOC.

It's through the TOC that a computer is able to locate information on a disc. If information is present on a disc, but not it it's TOC, it is inaccessible. If you ever choose to delete information from a session, the old data will not actually be erased, instead the reference to that data will be removed from the new TOC so the old file can no longer be read. The structure of a multi-session disc will look similar to this:

Table 2.3: Multi-Session Track Structure

Session 1	Session 1	Session 1	Session 2	Session 2	Session 2
Lead In	Track 1-X	Lead Out	Lead In	Track 1.1-X	Lead Out

A true multi-session CD-ROM drive will automatically skip to the most recent session and present all linked sessions as one. As the user you will never be aware that multiple sessions exist on the disc. This makes multi-session particularly well suited for document archiving or regular file updates of catalogs.

About Fixation

Fixation allows you to read a CD in a CD-ROM drive because fixation entails the creation of the TOC. A major difference between single and multi-session CDs is that a multi-session disc will have a link block available at the end of the TOC which allows subsequent recording sessions to be integrated with the previous contents of the disc.

Recording Methods

When a recorder writes data to a disc, it must receive a constant stream of data from your computer. CD-R and DVD-R devices contain a physical memory buffer internally to temporarily store your data after it has been transferred from a computer, but before it has been recorded to disc. The buffer is like a limbo area where your data remains queued for recording so it can flow at a steady pace. If at any point during the recording process the data buffer of your recording device is empty, it will produce a *buffer underrun* error. A buffer underrun error will immediately terminate the recording process and usually results in an unusable disc.

IMPORTANT: The data transfer rate is one of the most important (and most problematic) variables in recording CD/DVDs, should you encounter this error during a recording session please consult the later section in this manual specifically concerning improving system performance to minimize the likelihood of buffer underruns.

There are certain recording methods where you are able to stop the transfer of data to the recorder - but this occurs at specific points only. These points are determined by the method being used to create the disc (i.e: disc-at-once, track-at-once, or incremental write). Only at the following points: End of disc, end of track, or end of packet can the recorder finalize the written data allowing you to resume writing at a later time.

Track at Once and Disc at Once

Nearly every CD recorder on the market supports writing CDs in a Disc at Once and Track at Once mode. When using track-at-once, the recorder first writes the track(s) and then finalizes the disc by writing the lead in and lead out. Track-at-once is necessary for appending higher sessions to a CD.

When using disc-at-once, the recorder will write the lead in, the track(s), and then the lead out (in that order). Consequently, disc at once is useful for producing exact copies of original discs or audio only discs because there are no interruptions between the tracks and lead in/lead out. These interruptions can sometimes produce minor audio interference during playback.
When recording disc-at-once to a blank disc, some recorders still allow the disc to be closed as appendable (multi-session). This feature is sometimes called 'session-at-once'.

Incremental Write

Unlike 'at once' recording, incremental writing (or packet writing) is a recording method which allows data tracks to be divided up into small chunks called packets (typically 64 Kb - 1 Mb in size). Each packet can then be written separately to the disc, with interruptions if necessary. Each packet uses an additional amount of disc space as overhead in addition to it's required amount of space. This overhead is typically 15% of the size of the packet itself.

Between the writing of packets, there are virtually no data rate constraints. This means that writing can be interrupted for an unlimited amount of time, which reduces the risk of buffer underruns when writing large amounts of data to CD.

Incremental write modes can be used in different ways:

- On the logical level, fixed packet writing can be combined with UDF

which is eminently suited for incremental writing, or it can be combined with another file system such as ISO 9660 or even a combination of both.

- On the physical level, the Orange Book standard offers the option to use either a fixed or variable packet size. The advantage of a fixed packet is that they eliminate the risk of buffer underruns. Variable packet size, in which packets differ with the size of the files to be written, offers more backwards compatibility. Fixed packet writing can also be used in combination with multi-session writing.

IMPORTANT: A special driver is required to read incrementally written discs. Currently, most CD-ROM readers on the market cannot read incrementally written discs. This means that a disc written in fixed packets can only be read with a similar recorder type to the one that was used to write it.

3

Hardware Devices Configuration

This chapter contains information about the configuration of the SCSI Drivers and Devices supported by GEAR UNIX. It contains the following sections:

- Supported CD Recorders
- Recorder Device Types
- Medium Changers
- Configuring Your Hardware

Supported CD Recorders

GEAR supports CD recorders from the following distributors and manufacturers:

Acer
Actima
AOpen
Axtrate
Backpack
BTC
Caravell
Creative
Delta
Dysan
Goldstar
Grundig
Hewlett Packard
Imation
Iomega
JVC
Kodak
LG
Lite-on
Matsushita
Memorex
Memtek
Mitsubishi
Mitsumi
NEC
Nomai
Olympus
Optima
Philips
Pinnacle
Pioneer

Plasmon
Playwrite
Plextor
QPS
Ricoh
Samsung
Sanyo
Smart & Friendly
Sony
Taio Yuden
TEAC
Traxdata
USDriver
Waitec
Wearness
Yamaha

Please refer to the readme file for a list of recorders sopported with this GEAR release.

For the most up to date listing of recorders supported by GEAR and recorder updates, please visit our web site at www.gearsoftware.com

Recorder Device Types

This section includes important information specific to each CD recorder GEAR supports. Please reference your hardware documentation for specific information about setting up your CD recorder.

Type 4 Device: CD Recorder

In the past most CD recorders were built as 'SCSI type 4' devices. Type 4 stands for a 'WORM device' (write once read many), according to the SCSI standard. The following (old) CD-R drives are examples of type 4 devices:

- 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

Type 5 Device: CD-ROM/CD Recorder

All CD recorders that have been shipped by the hardware manufacturers for the last 2-3 years are 'SCSI type 5' devices. Type 5 stands for a 'CD-ROM device' (read only direct access), according to the SCSI standard. This means that these recorders are compatible with CD-ROM devices. CD recorders with an IDE/Atapi (not SCSI) interface are always 'type 5'.

Medium Changers

GEAR Pro for Unix supports medium changers from several manufacturers like Pioneer, JVC, Cygnet, ASM, DSM, Grundig. GEAR can use a medium changer for automatic loading and unloading of recordable discs

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IMPORTANT: The .gearrc file entry UseMediumChanger must be set to True if you are planning to use a medium changer. Refer to your hardware documentation for specific information about setting up your medium changer.

Configuring Your Hardware

This section includes information for connecting a CD recorder.

We recommend you connect the recorder close to the SCSI Controller. The SCSI cable should be no longer than 3 feet in length (or 1 meter). The shorter the cable, the less chance that signal interference may interrupt your data transmission.

Be sure to terminate both ends of the SCSI chain properly. All SCSI units are susceptible to signal degradation, which can cause a loss in data integrity or the reporting of strange errors. An unterminated SCSI chain is a much more likely candidate to become a victim of signal degradation.

It is not necessary to connect the recorder on the fastest available controller. In some cases, faster controllers can cause miscompares between the recorder and your original files during recording which can make your CD-R unusable.

NOTE: If your system mounts a type 5 CD-R device automatically, disable the automounter feature so that device is not mounted.

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.

Connecting your Recorder

For connecting your CD-R(W) recorderer please keep the following points in mind:

- Terminate the SCSI chain properly. SCSI units are susceptible to signal degradation, which can cause a loss in data integrity or the reporting of strange errors. An unterminated SCSI chain can cause significant degradation.

- Most recorders have a jumper to enable or disable the SCSI termination by the drive.

- The recorder's SCSI ID must be different from the other SCSI devices connected to the bus. Normally, you can set the SCSI ID to 5,but if another device has an ID of 5, change the SCSI ID to an one that is not in use.

To connect your CD recorder:

1. Shut down your computer and connect the recorder to the SCSI bus.

2. Restart your computer with the recorder turned on.

NOTE: If your installation was successful, you should see the recorder attached during your boot sequence.

4

Installing GEAR

This chapter provides information about installing GEAR UNIX. It contains the following sections:

- Installing GEAR UNIX
- Important Notice
- De-Installing GEAR

Installing GEAR UNIX

After the GEAR CD has been mounted and the mount directory has been made the current directory, two files and one directory will be visible: install, deinstall and the directory pltfrms. By typing **./install** the installation process will start and performs a platform-detection. After this the main menu is shown. Select the first menuitem 'Start installation' to start the actual

installation of GEAR Pro for Unix.

When the Install Menu appears there are two actions you can perform: 'install required packages' and 'install optional packages'. The **required packages** are vital for the functioning of GEAR. The installscript will first detect already installed components and if they are present the user is attended that these must be removed in order to succeed the installation of GEAR. The further installation of the required packages is automatically done by the installscript and when it is finished it wil return to the Install Menu.

On the other hand, the **optional packages** are not required and the user may decide whether these are to be installed. For example the Adobe Acrobat Reader is only needed if you want to read the online manual but it is not essential for the workings of GEAR UNIX itself. The installscript will return to the Install Menu if you installed any of the optional packages.

Unlike the previous 3.51 version, this version 4.0 of GEAR for UNIX is configured to use the standard SCSI drivers on most platforms and drivers from Caldera Systems, instead of the Tracer Technologies SCSI drivers (gd drivers). GEAR is configured to use the standard platform SCSI drivers on the following platforms: SGI Irix, HP-UX, Digital Unix and Linux. On Solaris and AIX, GEAR is configured to use Caldera drivers, being part of the required packages.

IMPORTANT: To use third party SCSI drivers from Tracer Technologies, an additional license key is required. If the gd driver from Tracer Technologies has been installed you'll need to run the license manager to determine if your system has been licensed.

Installing GEAR on Solaris 2.x

On Solaris 2.x, the install file will show the following options:

1) Start installation
2) Show package status
3) View installation log
q) Quit

Option 1 will provide the following choice:

1) Install Required Packages
2) Install Optional Packages
q) Return to Main Menu

NOTE: On Solaris 2.x GEAR requires the Caldera SCSI driver. The Required Packages contain the Gear CDR-Mastering Softwar and the Caldera driver. If there already is a version of GEAR installed, you will be prompted for removal. After the installation is completed you will need to reboot your system before the device driver can be used. The default directory for the installation of GEAR is: /usr/geargui. However, It is possible to specify a different directory if you choose to. On Sun Solaris, there is a daemon running which monitors devices like CD-ROM drives trying to mount newly inserted media (vold). This program may interfere with GEAR if a type 5 CD-Recorder is being used. We recommended that CD-Recorder monitoring be disabled. When you exit install, you will be prompted if monitoring should be turned off.

IMPORTANT: If monitoring is turned off by install, it will be turned off for all CD-ROM devices, including ordinary CD-ROM drives. To selectively turn off monitoring of CD-ROM devices, reply n to this prompt and edit the configuration file (/etc/vold/conf) manually. A log file of the installation process is maintained in the file /tmp/gearinstall.log. It can be viewed by typing log when install is running, or using any suitable text editor after installation is complete.

Installing GEAR on IRIX 6.2 and 6.5

 On IRIX 6.2 and 6.5 the install file will show the following options:

1) Start installation
2) Show package status
3) View installation log
q) Quit

Option 1 will provide the following choice:

1) Install Required Packages
2) Install Optional Packages
q) Return to Main Menu

The Optional Packages contain the Tracer license manager and Tracer device driver. GEAR will use the standard platform SCSI drivers by default on Irix. If the Tracer driver is installed it is always possible to switch between the standard SCSI driver and back again within GEAR. During installation this can also be done by issuing the select command. After installation the script select_driver can be used (refer to the section: Switching between drivers).

NOTE: The Required Packages contain the Gear CDR-Mastering Software and the Optional Packages contain the Tracer License Manager and the Tracer Device Driver. If there already is a version of GEAR installed, you will be prompted for removal. If the Device Driver is installed, your computer system must be rebooted. Some CD Recorders may cause problems on the SCSI bus. To solve this, the file "/var/sysgen/master.d/wd93" or the file "/var/sysgen/master.d/adp78" must be changed. Some parameters in this file will be adapted so the CD-Recorder will work correctly. To do this, you will be prompted for the SCSI bus to which the CD-Recorder is connected and the SCSI-ID assigned to it. If you have just installed GEAR you can try to run GEAR with the SCSI bus parameters left unchanged by typing "n" or RETURN. If this doesn't work you can change the parameters later by running the script "patchscsi" in the directory "pltfrms/irix" on the GEAR installation cdrom. On IRIX, a daemon which monitors devices such as CD-ROM drives is running which may interfere with GEAR if a type 5 CD-Recorder is being used. We recommended that CD-Recorder monitoring be disabled

Installing GEAR on HP-UX 10.20 and 11.0

On HP-UX 10.20 and 11.0 the installscript will show the following options:

1) Start installation
2) Show package status
3) View installation log
q) Quit

Option 1 will provide the following choice:

1) Install Required Packages
2) Install Optional Packages
q) Return to Main Menu

Choose 'Install Required Packages' to install GEAR and other required packages. The installscript is very intuitive and reports every step it takes. After the installation a post-installationscript will be run, in this case the configuration of the SCSI special device files and/or kernel. You must be absolutely sure that you only recompile a kernel on a 800-series HP9000. If you are uncertain, please contact our email unix-support for more information.

The GEAR installationscript will default to the standard HP-UX SCSI driver which is available on all HP9000 systems. The kernel needs to be reconfigured in order to access the SCSI device when you are utilising the standard SCSI driver.

NOTE: If a (800 series) kernel is configured to allow GEAR access to, for instance, a tape
         drive, standard HP-UX tools like tar of wxinstall cannot use it anymore. To allow
         these tools to use such a device the kernel must be reconfigured once again, denying
         GEAR access to the device (see also: Accessing SCSI devices on a HP 9000/800
         series).

Installing GEAR on Linux with Kernel 2.0, 2.2 or 2.4

 On Linux the installscript will show the following options:

1) Start installation
2) Show package status
3) View installation log
q) Quit

Option 1 will provide the following choice:

1) Install Required Packages
2) Install Optional Packages
q) Return to Main Menu

Please select 'Install Required Packages' to install GEAR on your linux system. The installationscript will ask for confirmation of every action it takes so that the installation will complete succesfully.

There are some requirements that your linux system should meet, the following kerneloptions must be enabled:
1. SCSI support (as module or in the kernel)
2. An appropiate lowlevel SCSI Adapter driver (as module or in the kernel)
3. SCSI Generic (as module or in the kernel)
(this requires a kernelreconfiguration and therefore you should read the Kernel-HOWTO thoroughly, information can be found on the internet
http://www.linuxdoc.org/)

Furthermore, special SCSI device files should be created with the command **'cd /dev ; ./MAKEDEV sg'** in the /dev directory. If you compiled the kernel options as modules, please refer to the documentation of your particular linux distribution how to load the these modules at boot-time automatically.

Installation of GEAR on AIX 4.x

When the install script is started on AIX 4.x, it will show the following options:

1. Start installation
2. Show package status
3. View installation log
q. Quit

Option 1 will provide the following choices:

1. Install Required Packages
2. Install Optional Packages
q. Return to Main Menu

NOTE: The Required Packages contain the Gear CDR-Mastering Software and the Caldera
        SCSI driver. The Optional Packages contain the Tracer License Manager and the
        Tracer Device Driver.

Installation of GEAR on Digital Unix

When the install script is started on Digital Unix, it will show the following options:

1. Start installation
2. Show package status
3. View installation log
q. Quit

Option 1 will provide the following choices:

1. Install Required Packages
2. Install Optional Packages
q. Return to Main Menu

NOTE: The Required Packages contain the Gear CDR-Mastering Software. The Optional Packages contain the Tracer License Manager and the Tracer Device Driver.

Important Notice for using the Tracer Driver

Please take notice of the following information regarding your installation when you use the SCSI drivers from Tracer Technologies.
To use a third party SCSI driver like Tracer Technologies, an additional license key is required. The key supplied by Tracer is only valid for one specific Unix system. Once the gd driver from Tracer Technologies has been installed, you'll need to run the license manager to determine if your system has been licensed. A fee of currently $ 99 will be required if you need to request another unlock key for any reason. This applies if you wish to move the product to another computer or if you need to re-install. This is the result of the licensing arrangement with Tracer for the GD drivers.

Please contact us for a demo key to test the functionality of the software and to ensure that your recordable drive and our software works correctly in your system. Once you are satisfied, please contact us for your permanent key.

Once the demo key expires it will look as if the software no longer recognizes your recordable device. You should either request another demo key or move over to the permanent key.

Obtaining a key for the Tracer Driver

If the gd driver from Tracer Technologies has been installed and you want to use it, you'll need to run the license manager to determine if your system has been licensed for the Tracer drivers. The license manager package includes demo keys, which allow the Tracer gd driver to operate for 15 days. Once the demo period expires, you must obtain a permanent license key to continue to use the Tracer driver.

1. To obtain a license key, type: **cd/etc/gear_license**

2. Type: **./license gear**

A menu-driven program appears:

```
*****************************************************************
License Manager Copyright (c) 1995 GEAR Software
*****************************************************************
Current Licensing info for "gd":
***
Demo license expires on Fri Nov 4 09:27:55 1995
***
Product option:Driver for CD-recorder Drives
***
Your code: 87E2-00D7-E7A2-00D7-E88E-200D-4014-5E48-03
*****************************************************************
Please choose one of the following:
(c)hange product options
(d)elete all product options
(h)elp with the license manager
(s)ave current licensing information
(un)lock the license
(q)uit
>
```

3. Cut and paste the code into an email message or text file, then send it and the additional information mentioned below via email, phone or fax

to:

GEAR Software
Attn: UNIX Registration Dept.
Phone: (561) 575-4327
Fax: (561) 575-3026
Email: unixregistration@gearcdr.com

Please be sure to include the following information in addition to your code:

- Name
- Company
- Address
- Phone
- Operating system and version
- Recorder make and model
- Registration/Serial number

IMPORTANT: We cannot process keycodes without this information.

---

4. Type 'q' to quit.

5. When you receive your keycode, repeat steps 1 and 2, then type 'u' to unlock your license.

6. Type 's' to save the code.

7. Type 'q' to quit.

NOTE: If you try to use the driver and get a connection refused error message, it means you have a licensing problem. You may have failed to obtain a keycode before the expiration of your demo period . If you suspect a different reason, please contact your software vendor.

De-Installing GEAR

To de-install GEAR, run the dinstall script from your GEAR Unix program CD.

5

Using Your CD-R Drive as a Reader

This chapter contains information about using your CD-R drive as a CD-ROM reader. It contains the following sections:

- Using a CD-Recorder as a CD Reader
- Device Driver Keycodes

Using a CD-Recorder as a CD Reader

In most cases your CD recorder will be recognized by the oprating system as a regular CD-ROM drive, and you will be able to mount your CD using the Unix mount command on the standard device special files your system is using for CD-ROM devices. All CD recorders that have been shipped by the hardware manufacturers for the last 3 years are 'SCSI type 5' devices. Type 5 stands for a 'CD-ROM device' (read only direct access), according to the SCSI standard. This means that these recorders are compatible with CD-ROM devices. CD recorders with an IDE/Atapi (not SCSI) interface are always 'type 5'.

Some rather old CD-Recorders might be recognized by the operating system as a WORM (Write Once Read Many) device. This means that the recorder is seen as only a write device - NOT a reader. However in most cases it will be possible to manually issue a Unix mount command to use the recorder as a reader.

Mounting a CD-ROM drive with the Unix mount command usually works as follows:

mount -r <mount_options> /dev/dsk/<special_file> /cdrom

If you are using the Tracer Technologies SCSI driver (gd driver), it is recommended to mount your recorder using the device special files for this driver.

Solaris

On Solaris you can issue the following mount command to mount your CD in the recorder:

mount -r -F hsfs /dev/dsk/c1t5d0s2 /cdrom

The c1 and t5 in the above command refer to the controller number and SCSI ID of the CD recorder and should be changed accordingly.

IMPORTANT: On Solaris OS, a CD is read with a block size of 512 bytes. Some recorders provide a jumper on the device to enable the 512 blocksize selection as default. Recorders that do support a 512 block size are: Pioneer, JVC, Pinnacle, TEAC, Olympus, Matsushita, Acer, Sony, Yamaha. Please refer to the hardware manual of your CD recorder for information on the block size jumper.

Digital Unix

On Digital Unix you can issue the following mount command to mount your CD in the recorder:

mount -r -t cdfs -o rrip /dev/sd5c /cdrom (Standard)

mount -r -t cdfs -o rrip /dev/gd5c /cdrom (Tracer)

The d5 refers to the ID of the CD-Recorder and should be changed accordingly.
DEC systems may tend to have difficulties with some type 5 recorders. If possible, you should switch the recorder to be recognized as a WORM device type.

SGI

On SGI Irix you can issue the following mount command to mount your CD in the recorder:

mount -r -t iso9660 /dev/scsi/sc0d5l0 /cdrom (Standard)

mount -r -t iso9660 /dev/rgd/c0t5l0s2 /cdrom (Tracer)

The c0 and d5/t5 refer to the controller number and SCSI ID of the CD-Recorder and should be changed accordingly.

IBM AIX

On IBM AIX you can issue the following mount command to mount your CD in the recorder:

mount -r -v'cdrfs' /dev/cd5 /cdrom (Standard)

mount -r -v'cdrfs' /dev/gd5c /cdrom (Tracer)

The d5 refers to the ID of the CD-Recorder and should be changed accordingly.

HP UX 10 + 11

On HP UX you can issue the following mount command to mount your CD in the recorder:

To mount a CD with Rock Ridge support enabled, type:

pfs_mount -t rrip /dev/dsk/c0t5d0 /cdrom (Standard)

pfs_mount -t rrip /dev/gd/c0t5l0s2 /cdrom (Tracer)

The c0 and t5 refer to the controller number and SCSI ID of the CD-Recorder and should be changed accordingly.

NOTE: The pfs daemons must be activated before pfs-mount can be used (see the pfs man page)

To mount a CD <u>without</u> Rock Ridge support enabled, type:

mount -F cdfs /dev/dsk/c0t5d0 /cdrom (Standard)

mount -F cdfs /dev/gd/c0t5l0s2 /cdrom (Tracer)

6

Getting Started with GEAR PRO for UNIX GUI

This chapter helps you to get started with GEAR and provides concise step-by-step instructions for working with various types of projects in GEAR using the GEAR GUI (Graphical User Interface).

In this chapter you can read about:

- Starting GEAR
- Create your CD
- The GEAR toolbar
- How to create a specific type of CD

Starting GEAR

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

1. Locate GEAR PRO for Unix in the /usr/geargui/bin directory.

2. Use the *geargui* script to start the GEAR GUI application. The main screen with the menu bar appears and you can create a new project, open an existing project or copy a CD. The new project is saved in a *GEAR volume file (.vol extension).* A GEAR volume is a file that contains all the information of your virtual CD/DVD image for recording to a CD/DVD disc or pre-master tape.

Create your CD

When creating a disc, there are five basic steps to follow:

1. Select the type of GEAR project to be created.

2. Set the appropriate parameters in the project.

3. Select the data you want to write to disc. You can use drag and drop.

4. Select the appropriate recording media device.

5. Test and write the project.

The GEAR Menu

GEAR PRO has a main menu and a toolbar. The menu consists of the following:

1) The File menu includes New, Open and Close Project, appending of sessions and Delete Project, Generate Log File, Run Batch File, Run GEAR Command and lastly, Exit.

2) The Edit menu allows you to create new folders, rename,delete, select all, restore files/dirs and copy selection to project.

3) The View menu gives you the choice of File explorer or Disc explorer views.

4) The Project menu gives you access to the Volume Porperties, Current Track Properties, defines actions to be applied to tracks and physical images and allows you to Verify the volume or track

5) The Recorder menu allows you to eject the media, close the tray, gives you access to the Copy CD function, the CD-R(W) device, information about the media and to execute commands like write, test, erase. It also contains the settings dialog for the recorder.

6) The Tape and Juke box menus are disabled. If the tape and jukebox modules have been purchased, these menus will be displayed.

7) The Options menu lets you change the preferences and Harddisk information.

8) The Window allows you to select which windows are actively displayed during the use of the program.

The GEAR Toolbar

The GEAR toolbar contains the following buttons:

new project

Append to existing CD-R

Close a project

Burn a CD-R

Test write

Erase CD-RW

Explorer View

Track view

Open a project

Get Disc Information

Disc copy

Delete a project

Tape control

Juke box control
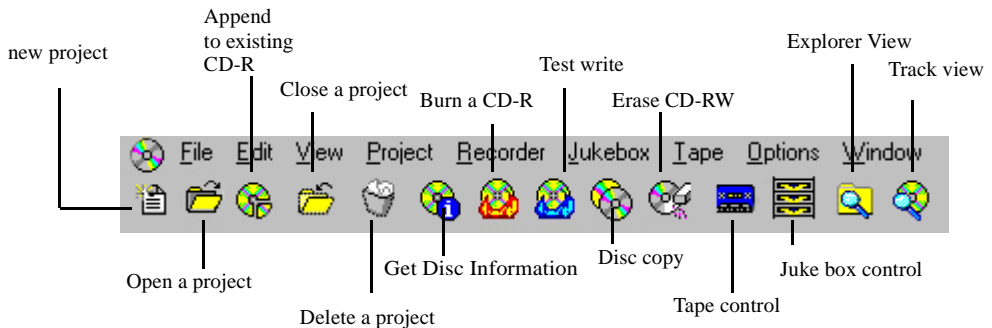
How to ...?

The following paragraphs contain specific instructions for the creation of different CDs types.

How to create a CD-ROM or DVD-ROM (ISO 9660 + Rock Ridge)

The ISO CD-ROM type is most suited for the creation of CDs containing normal files for storage/archiving. Rock Ridge extensions are switched on by default in GEAR foir Unix.

NOTE: To create a DVD-ROM please select the project type 'DVD-ROM (ISO)'

To create an ISO CD/DVD project:

1. Select New CD-ROM (ISO) or New DVD-ROM (ISO) on the GEAR project panel.

2. Click the Create button to the right of the panel. The Create project window appears.

3. Select the appropriate project size in the Disc Size panel.

4. Enter a name for the project. Note that the Project name will become the volume label for the disc.

5. Click Save. An 'Explorer' view of your computer will be displayed at the top half of your screen. The bottom half displays the view of the GEAR volume you just created. The first branch in the tree view shows a data track.

6. You can now drag files and/or folders from the 'Explorer' view into the empty ISO track view. As you do so, the statistics such as date and start sectors will be displayed. If the log view is enabled, you can monitor the actual copying.

7. If you select Settings next to the close button on the GEAR Project panel line, you can set the media catalog code for CD media (UPCEAN) by changing the volume settings (Optional, normally used by publishers).

8. Once you have completed the copying of all files onto the track, select a device to write the project to from the Output Device panel at the bottom of the window.

9. Click the Settings button in the Output Device panel if you need to change any of the settings of the CD/DVD recorder device.

10. Click the Test button to test-write the project to the CD/DVD recorder. GEAR will ask you if you want to write immediately after a successful test.

11. Click Yes. GEAR starts testing and writing. If there are any problems, GEAR will notify you and give you the opportunity to solve the problem.

12. Close the project by clicking on the Close button next to the GEAR Project panel.

How to create a CD-Tape

If your version supports Tape you can use the following steps to create a CD-Tape.

1. Create an ISO project as described above.

2. Select a tape device in the device panel.

3. Click Settings to check the tape settings.

4. Click Write.

5. A dialog prompts you with instructions for preparing the tape unit for recording. When the unit is ready, click OK.
   When GEAR has finished writing, a premaster tape is ejected. The tape can now be sent to a CD mastering and replication plant.

GEAR Software

How to erase a CD or DVD Rewritable

GEAR supports the creation of CD Rewritable discs. CD Rewritable (CD-RW) is a CD technology which enables you to erase recorded information and write new data in its place. You can use a CD-RW recorder to write both CD-RW discs and CD-R discs. Only CD-RW discs can be erased, however.

To erase a CD-RW or DVD-RW:

1. Insert the RW disc in the recorder.

2. Click the Erase CD button in the toolbar.

There are two options, Total erase and Quick erase. In the case of Total Erase, the complete CD-RW will be erased. Quick Erase only erases the Table Of Contents of the disc, saving a lot of erase time. In either case you can now reuse the CD-RW for new projects.

Warning! Be sure you do not need any of the data on the CD-RW before erasing it. Erased data cannot be recovered. If you start to get read/write errors, try to do a Total Erase to see whether it will correct the problem.

How to create a CD-ROM (XA)

Basically, you create CD-ROM and CD-ROM XA projects in the same way. The main difference is that in a CD-ROM XA project the files have to be pre-interleaved.

1. Select "New CD-ROM XA" in the DVD/CD GEAR Project panel.

2. Click Create. The Create project window appears.

Enter a name for your new XA project
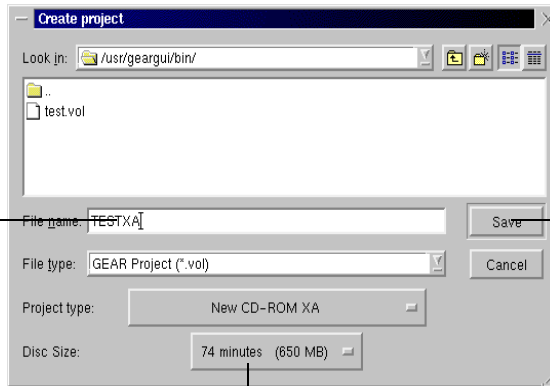
Click here to create your new project

Choose the disc size

3. Enter a name for the project. GEAR automatically provides the extension. Remember that the Project name becomes the CD volume label.

4. Select the maximum size of the project according to your CD-R disc size.

5. Click Create to close the dialog and create the new project. A valid ISO name may consist of up to eight alphanumeric characters and underscores (_). For information about valid ISO-9660 names, see the File and Directory Naming section in the Appendix D.

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

6. In the GEAR Explorer view drag the files and folders from the computer view into the volume view (from top right panel to bottom right panel in the explorer view). Continue to select and load files for the project until your project is finished.

Choose the drive you want to load files from
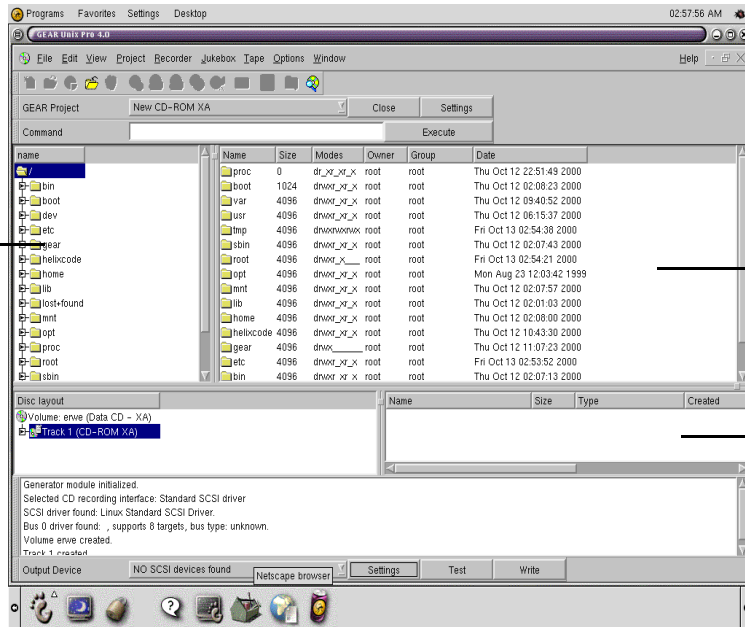
In the Drive window, locate and select the files...

... then drag them to the volume window

7. Select the device you wish to write to in the output device panel. You may modify the settings as desired or required. You are now ready to write the project to the media.

8. Click Test to make sure no buffer underrun will occur during the actual writing. Gear will ask you if you want to write immediately after a successful test. (If you have successfully made a disc before, you may want to skip the test phase and click instead on Write).

9. Click Yes to write after testing the project.

10. Click on Close nect to the GEAR Project panel.

How to extract tracks from the recorder to the hard disk

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

Note: *Not all recorders support copying digital audio tracks. Only tracks can be ripped. For more information, visit our website www.gearsoftware.com*

1. Insert a CD in your CD recorder.

2. In the main toolbar, click the Disc/Track View button to display a window containing information about the CD, such as the track types used. (You can also use the disc info icon to get the track information. Select the track to be copied, then right click and select "Copy Track(s)". A window will pop up and prompt you for a destination to store the track onto the hard disk.).

3. Choose the track you want to copy and drag it into the volume window. A window will pop up and prompt you for a destination to store the track on the hard disk.

4. Continue until all tracks are copied into the Volume window.

5. Select the device you wish to write to in the output device panel. You may modify the settings as desired or required. You are now ready to write the project to the media.

6. Click Test to make sure no buffer underrun will occur during the actual writing. Gear will ask you if you want to write immediately after a successful test. (If you have successfully made a disc before you may want to skip the test phase and click instead on Write).

7. Click Yes to write after testing the project.

8. Click on Close next to the GEAR Project panel.

How to make a copy of your CD/DVD disc

GEAR Software
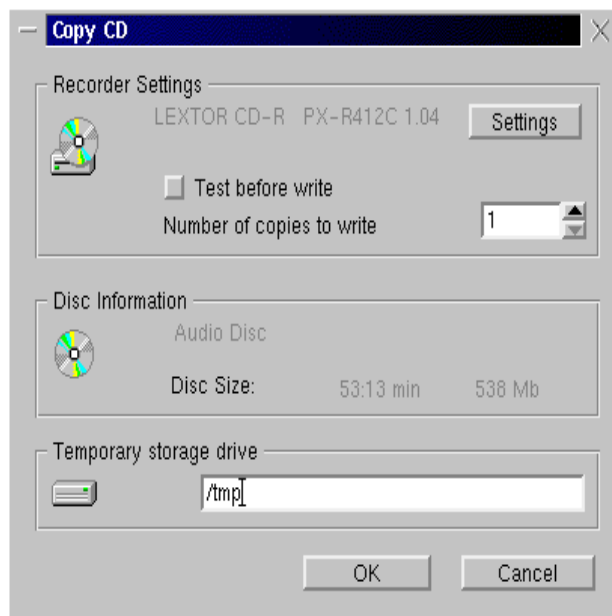
Copying a CD or DVD using the "Copy CD" button from the recorder menu or menu bar is very simple. Just insert the source disc to be copied into the recorder. Then click the Copy CD button, and the Copy CD dialog will appear. Just click OK to start the copying process. The recorder is used as both reader and writer. When all data are read you will be asked to insert a blank disc in the recorder to continue with the writing process. The temporary storage will be freed up when the copy completes.

Copying DVD media is possible if you have a DVD recorder and the DVD disc is not copy protected by DCSS. Most DVD-Video discs are copy protected. On some platforms there may be problems with creating a DVD image file over 4.2 GB, due to of limitiations in the operating system to create create files larger than 4.2 GB (because the number of bytes then exceeds a 32 bit integer value).

You have to make sure that you have enough temporary storage to copy the source disc to your hard drive first. This temporary storage will be used to build the image file for the destination disc.

How to create an Audio CD

Th following procedure explains how to create an Audio CD from wave files and/or Audio tracks. Use a CD track list to create an Audio CD from Audio Tracks only. One of the advantages of using a CD track list is that you can specify the pause between the tracks.

1. Select CD-Audio as Type in the Project panel.

2. Click Create to create a new project. You will prompted to enter a project name and for a directory to store the project into.

3. Enter a name for the new project. GEAR automatically provides the extension.

Enter a name for your new Audio project

Click here to create your new project

Choose the disc size
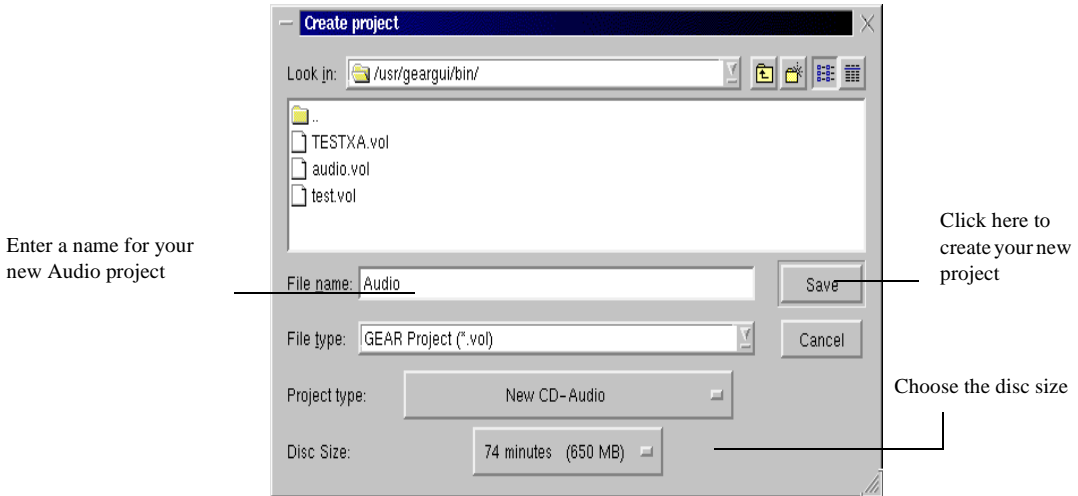
4. Choose the appropriate project size.

5. Select the directory and drive where you want to save the new project file

6. Click Save to close the dialog and create the new audio CD project. The Explorer view appears.

7. In the Drive Window, locate and select the files you want to load, then drag them to the Volume window. You will see that a new Audio track is created automatically for each file you drag into your Volume/Track window.

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

- *Click the Disc/Track View button in the menu toolbar. A CD information window appears with information about the audio CD.*

- *Click on session 1 in the device window (top left). The top right window will display all the tracks on the CD.*

- *Then drag and drop the tracks you want to copy from the CD information window to your Volume/Track window. GEAR will create a physical image on your hard disk of all these tracks (You will be prompted for a destination on the hard disk for each track).*

8. Continue to select and load tracks or files for the project until your Audio CD is finished.

Disc/track View button

Choose the drive and files or CD and session you want to load tracks from
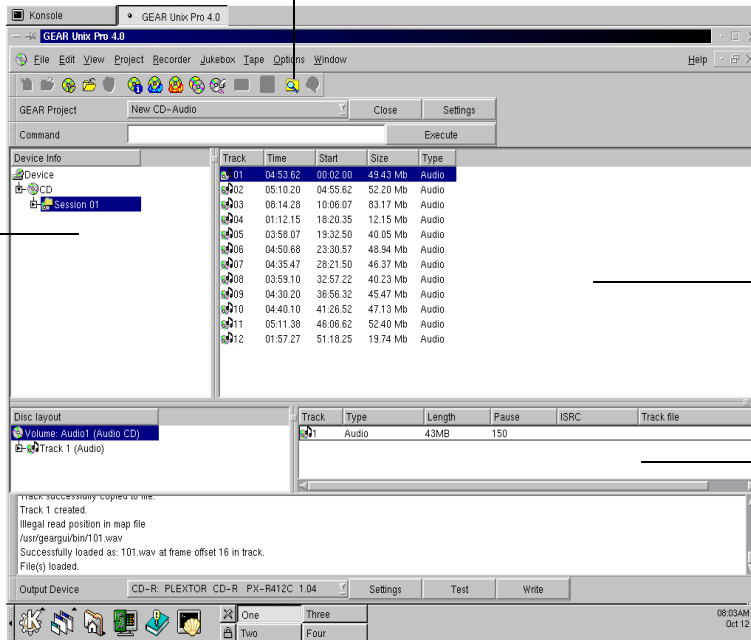
In the Drive window, locate and select the tracks or files you want to write to CD ...

... then drag them to your Audio track window

9. Select the device you wish to write to in the output device panel. You may modify the settings as desired or required. You are now ready to write the project to the media.

10. Click Test to make sure no buffer underrun will occur during the actual writing. Gear will ask you if you want to write immediately after a successful test. (If you have successfully made a disc before you may want to skip the test phase and click instead on Write).

11. Click Yes to write after testing the project.

12. Click on Close next to the GEAR Project panel.

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

Writing your Audio CD in several sessions

Audio CDs should be single-session discs because CD players are single-session readers, which means you cannot finalize an audio CD until you have loaded all the audio files for all the tracks. You must therefore un-click/disable the "Close disc as Multi-session" and Fixation options in the Device panel until the last track has been recorded to CD-R. The CD-R cannot be played in a CD-ROM or CD player until it has been fixated, but you can click the Disc Info button to see what is already on the disc.

Note: *Writing Track At Once can result in an Audio CD with sharp clicks between the tracks. You should only write in more than one session if you do not have enough hard disk space for all the tracks.*

1. Start with selecting "New CD-Audio" from the GEAR Project panel.

2. Load the Audio tracks as described above. You cannot change the pause with Track-At-Once writing (standard 2 second pause between tracks).

3. In the CD recorder settings, disable the Multi-session and disc fixation options and choose Track-At-Once.

4. Write the audio tracks to CD-R.

5. Repeat steps 1 to 4 until you have recorded all the Audio tracks.

6. Once you have finished adding Tracks or the CD is full, select Fixate disc in the Tools menu to manually fixate the disc. This turns the CD-R into a normal audio CD which can be played in any player.

How to create a Multi-session CD

You create a multi-session disc the same way as you would create a CD-ROM, but with one exception: "Close as Multi-session" must be enabled in the Recorder/device Settings.

1. Create a CD-ROM project as described in the procedure earlier this chapter.

2. In the Output Device panel, click Settings. The CD Recorder Settings window appears.

3. Set the Recording Method field to Track-at-Once.

4. Enable the "Close as Multi-session" checkbox.

5. Enable fixation (if you want to be able to read the CD between adding/appending sessions.

6. Click OK. The Explorer view reappears.

7. Click Test to start testing and writing. GEAR will ask you if you want to write to CD-R(W) after the test has been successfully completed.

8. Click Yes. Once the writing session has been completed, the Mult-session CD-R(W) can be used in a CD player capable of reading Multi-session CDs. You can add new data by appending a new session to the disc.

How to change the append mode

Proceed as follows to change the append mode:

1. Choose Preferences in the Options menu.

2. Select the Append tab in the Preferences dialog.

3. Select an Append mode and click OK.

How to append data to a multi-session CD

The procedure described below is based on use of Automatic Append mode. Where relevant, details on the other append modes will be added.

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.

To append data to a multi-session disc:

1. Insert a multi-session capable disc into the recorder.

2. Select "Add new session to CD" in the GEAR Project panel. The button immediately next to the panel changes to Append. Alternatively you may use the File/Append session option from the main menu.

3. This step applies to manual append mode only or if the setting is "append new". Click Append. The AutoAppend Track window appears. The last recorded session is automatically selected. You will be prompted for a new Volume name and to select Data 1,2 or Audio type of session to append.

4. Make your selection according to the type of CD you wish to create and Click OK.

   Note: *If the same recorder has been used to create or append to the disc, it could be that the image file still exists. In that case GEAR will display a message.*
   Click Yes to overwrite the volume.

The GEAR information window appears. Note that the buffer indicator in this window will only be active if cyclic buffers are used.
GEAR will now read the track data.

You are now ready to select the files you want to add and/or remove. Be aware that by removing a file, you only delete the entry. Although the data is not erased, it can no longer be retrieved.

After selecting the session contents, you can proceed to Test and Write. 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*. Once you have completed the operation you may select Close in the GEAR Project panel to close the project.

Appending manually

If the append mode is set to AutoAppend, GEAR automatically selects the last session/track on the CD to append the new data to. In order to be able to select the appropriate session/track yourself, you must set the append mode in the GEAR Options/Preferences/Append to Manual Append.

To select a session/track:

1. Insert a multi-session capable disc in the recorder.

2. Select "Add new session to CD" in the GEAR Project panel.

3. Set the Append mode to manual under the Append Tab in Options/Preferences.

4. Click on the Append button in the GEAR Project panel.

5. Select the track/session to append to. If you delete any of the original files, the data will become inaccessible once the new track/session has been completed.

6. In the explorer view drag the files to the volume window.

7. You can now start Testing and Writing.

How to create a CD with an external image

Although you cannot edit external images with GEAR, you can use GEAR to write them to CD-R.

To create a CD with an external image:

1. Select "Open external physical image" in the GEAR Project panel.

2. Click on Open next to the GEAR Project panel.

3. The Open External image dialog appears.

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

5. Choose the appropriate format from the Image Type drop-down list.

6. Click OK. The Explorer view appears.
   Now you can test and write the project to the CD-R(W).

How to create a premaster tape

To create a premaster tape (requires Tape option):

1. Open a project.

2. Select a tape drive in the Output Device panel

3. Click Settings to check the tape recorder settings. The Tape settings dialog will appear. This dialog has tabs for CD mastering, as well as tabs for General, customer and SCSI settings. You may need to confirm certain settings with the person or company doing the actual mastering of your image. The deaulf it DDP format.

4. Click the Write button.

5. A dialog prompts you with instructions for preparing the tape unit for recording. When the unit is ready, click OK.

How to create a physical image of a project

To convert a project you must:

1. Select "Open existing project" from the GEAR Project panel.

2. Click on Open next to the GEAR Project panel. Select the project from the list.

3. In the menu bar select Project and then "Convert Volume to Physical" or Convert Current Track to Physcal".

   The progress of the conversion process is displayed in the GEAR information window.

   On some platforms there may be problems with creating a DVD image file over 4.2 GB, due to of limitiations in the operating system to create create files larger than 4.2 GB (because the number of bytes then exceeds a 32 bit integer value).

4. If physical files already exist for the project, you are prompted to overwrite them. GEAR displays a message once the physical image has been successfully created.

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Working With Projects (GUI)

This chapter provides detailed information about working with GEAR CD/DVD projects and writing them to CD-R. This chapter handles the following topics:

- General information about projects
- Creating and opening a project
- Editing the project contents
- Changing project settings and preferences
- Using a physical image
- Recorder Settings
- Testing and Writing to the recorder

About projects

GEAR projects contains all the information needed to create a CD. When you create a new project, a number of administration files are created in the current working directory:

- a volume administration file with the extension *.vol*

- track administration files with the following extensions *.mxx, .ixx, .fxx, and .vxx,* where *xx* stands for the track number.

Together the administration files described above form the *virtual image*. GEAR uses this image during the writing of a disc. Administration files are deleted automatically when you delete the associated image.

Note: *You should never edit, delete or otherwise modify the administration files manually. This will result in a corrupted and thus useless project.*

Hard Disk Space Required

You *must* have at least 25 Mb of free disk space available to create a CD-R project.

If you use a physical image file to solve writing problems (see page 100), the entire CD contents is stored on hard disk. In that case you may need up to 807 Mb of free disk space. On page 84 you will find a table of disc capacities

GEAR preferences

The GEAR preferences can be found under the Options menu and are saved in the configuration file gearrc. They will be the default values for each new project you will create. You can edit the following settings:

- Project defaults; settings used when loading files. Please note that this version of GEAR PRO supports Rockridge extensions so you can also read the CDs on Unix systems.

- Default CD label settings; project information that can be written to CD-R(W).

- Working directory; directory where the project file is saved.

To change the GEAR Preferences, you must

1. Select Preferences from the Options menu to display the Preferences dialog. The Preferences dialog appears.

Change these settings before creating a project
Max Dir nesting level lets you specify up to 24 levels of nested directories you can have on the CD

When this is turned on, GEAR loads into the project files that have the archive bit set.

…when this is turned on, GEAR resets the archive bit after the file is successfully loaded

geargui.1 ✕

| File and directory defaults | Default CD Label | Append | Options |

GEAR project defaults
Maximum directory nesting level   24
Maximum number of directories   2048

UDF version for UDF tracks   Version 1.02
UDF version for DVD–Video   Version 1.02
☐ Add Unix Rockridge information
Non ISO name handling
Do not translate names, length up to 64

Source files
☐ Load hidden files
☐ Load system files
☐ Only load files with archive–bit
☐ Reset archive–bit after copy
☐ Make files hidden on the disc
☐ Ask start sector for each file

OK

This lets you specify how invalid ISO names will be handled for the project

This lets you hide the directory in the GEAR window

2. Make all the changes you want, then click OK to save the preferences to the gearrc file.

Opening a project

There are two ways to start a project:

- Create a new project
- Open an existing project

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GEAR Software

Creating a new project

When you start GEAR, the main menu, toolbar and Project panel appear.

You can create a new project as follows:

1. Select the appropriate type in the GEAR Project panel, the default is "New CD-ROM (ISO)".

Choose the
Project/CD type

2. Click Create. The Create Project window appears.

Enter a name for
your new project

Click here to
create your new
project

Choose the disc size
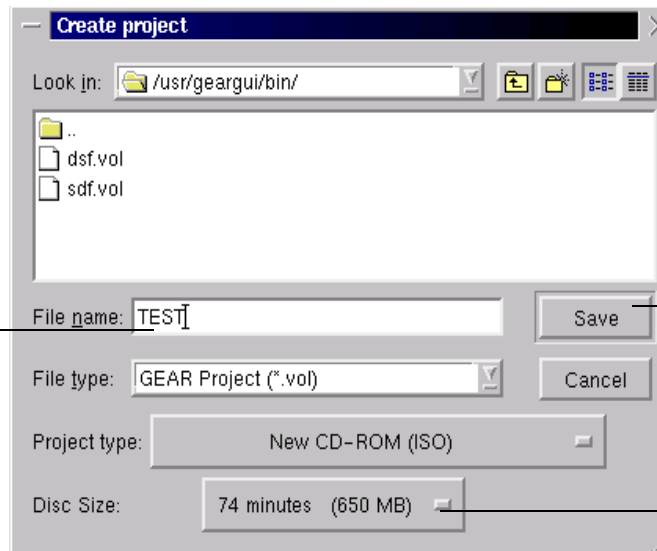
3. Enter a name for the project. GEAR automatically adds the extension.

    Note: .*A valid ISO name may consist of up to eight alphanumeric characters and underscores (_).*

4. Select the maximum size of the project according to disc size and track type:

Data Capacity & Disc Size				
Type		ISO	XA	CD Audio
CD-R(W)	18 min.	158 Mb	158 Mb	181 Mb
CD-R(W)	63 min.	553 Mb	553 Mb	653 Mb
CD-R(W)	74 min.	650 Mb	650 Mb	746 Mb
CD-R(W)	80 min.	703 Mb	703 Mb	807 Mb
DVD-R	428 min.	3.95 GB		
DVD-R	509 min.	4.7 GB		

5. Click Create to close the dialog and create the new project.
   You are now ready to start loading the contents of the project using the Explorer view.

Opening an Existing Project

To open an existing project:

1. Before you open a project, you must first close any open project.

2. Click the Open CD Project button in the toolbar.
   The Open Project dialog appears.

Locate and select the project you want to work with ....
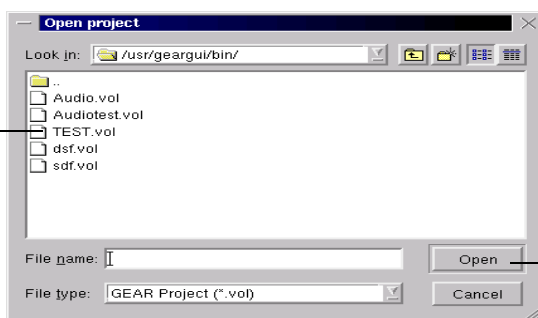
... then click Open

3. Locate and double-click the project you want to open. The Explorer view will be displayed.

   The selected project is expanded to the maximum free space available. This space is determined by:
   • The appropriate disc size specified when the project was created

- The amount of space required by the other tracks within the same project

An existing project can be one of the following:
- A GEAR project file, which can be edited in GEAR and written to CD-R(W).
- An external image file, which *cannot* be edited, but only written to CD-R(W).

Things to remember

As you create your new project, 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 project can have *only* one ISO *or* XA track; it may not have both types of tracks.

- CD projects can contain up to 99 tracks. DVD projects only contain one ISO track.

- If you create a CD Enhanced, first create a CD with all the Audio tracks and make sure it is closed as appendable (mumti-session), then append a second session with either an XA track. The audio player will ignore the data track and the CD-ROM player will ignore the audio tracks.

- When you create a new track, it is automatically assigned the maximum available space in the project.

Project Contents

Loading files

You can load the data for your project by selecting files in Your Drive window and dragging them to your Volume/Track window. To increase CD-ROM access time, limit the number of directory entries to 50.

To load files you must:

1. Open or Create the project you want to edit.

2. Click on the Explorer or Disc/Track view button to open the appropriate windows.

   The Explorer view window appears.

3. In the Drive Window, locate and select the files you want to load, then drag them to the Volume/Track window.

Choose the drive you want to load files from
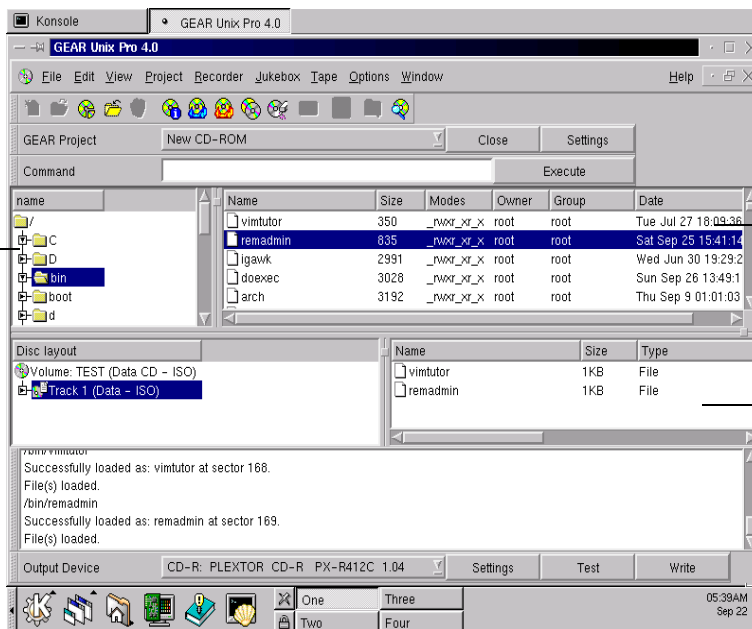
In the Drive window, locate and select the files you want to write to CD ...

... then drag them to your Project window

File name handling

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. 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 menu under the "Project/Current Track Properties/Files and Directories" tab. See the File and Directory Naming section in Appendix D for more information on ISO standards.

Note: *Use the option 'Translate to Uppercase only' when you want to be able to read the file names under DOS and Windows 95/NT.*

Editing the project contents

You can edit a selected project in the following ways:

• Create a new directory/folder on the track
• Rename a file or directory on the track

- Delete selected files and directories from the track
- Restore from the project directory.

First, however, you will find information on

- Selecting and deselecting files and directories
- Loading hidden files.

Selecting and Deselecting Files and Directories

In the Volume window you can select one file or directory, or you can select multiple files and directories to rename or delete.

To do this…	Do this…
Select one file/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.
	You can also select multiple files with Ctrl+click.
Deselect selected files or directories	Click on the selected file or directory

Loading Hidden Files.

To load hidden files:

1. Turn on the Load Hidden files check box in Options/Preferences/File and Directory Defaults.

2. Select the files and directories you want to load and drag them to your GEAR Volume/track window.

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

Creating a New Directory

To create a new directory:

1. Open the project you want to edit by selecting "Open existing GEAR Project" in the GEAR Project panel.

2. Click Open. The Project selection window appears. Select the project you wish to edit and click on Open. The Explorer view will appear.

3. Move the mouse in the Volume/Track window and right click. A dialog will pop up giving you several options, including "New Folder". Click on New Folder.

4. In the dialog that appears next to the folder icon, 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 the File and Directory Naming section in the Appendix.

5. Press the Enter key to complete the entry.

   The new directory appears in the working window.

Renaming Files and Directories

1. In the Volume/Track window select the file or directory you want to rename.

2. Right click and click on Rename in the dialog box.

3. In the dialog that appears next to the file or folder icon, enter a new name for the specified file or directory, then press Enter to complete the entry.

4. Repeat for each selected file or directory if you wish to rename.

Deleting Files and Directories

1. In the Volume/Track window select the files and directories you want to delete.

2. Right click and click on Delete in the dialog box.

3. Repeat for all the files and folders you wish to delete.

Changing the Project and Recorder Settings

Before you proceed to test and write your project, you are advised to check the settings relevant to your project.

Project Settings

You can edit the settings for the currently selected project. The default values are specified in the geargui.l file and can be changed using the tabs under Preferences in the Options menu.

- You can edit the CD label for the currently selected project. The default CD label is the name the project received when created.

- You can edit the File and directory defaults

- You can indicate the Append mode, if applicable

- Under Options, you can change the working directory for projects

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

To change the project settings:

1. Select Options/Preferences. The four tabs in the Preferences menu appear. Select Default CD Label..
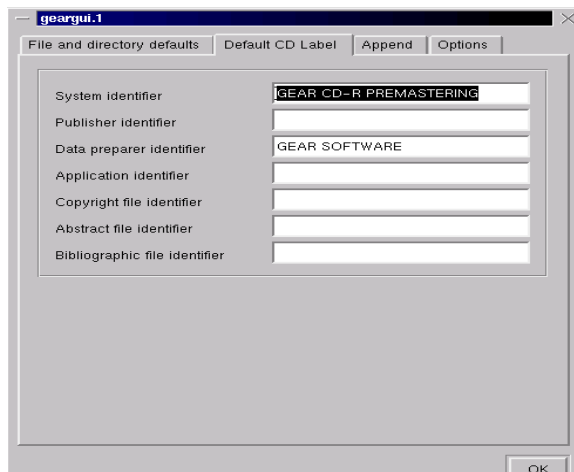
2. Enter the information you want to save with the project in the Current CD Label and click on OK.

3. Select the settings for the loading of files in the Project Defaults.

4. Click OK to close the Preferences menu and return to the main menu screen.

Recorder Settings

You can specify the types of settings appropriate for your CD recorder using the Recorder/Settings menu or the Settings button in the Output Device panel. There are three types of settings:

- CD Settings
- Advanced
- SCSI

To change the recorder settings:

1. Click the Settings button in the Output Device panel or Recorder/Settings menu. The CD Recorder Settings dialog appears.

2. Select the recording settings you want to use.

3. Click OK. The dialog box closes and you return to the main screen.

CD Settings

In the CD Settings, you can do any of the following:

- Select a recording method: disc-at-once or track-at-once, other methods depend on your recorder model.

  Disc at once means your recorder writes the lead in, then the track data, then the lead out in one continuous flow. This method is especially suited for Audio recording. Track at once means your recorder first writes the track data, then finalizes the disc by writing a lead in and lead out. With track-at-once, the writing is not sequential and contains certain interruptions (link areas).

  You cannot use disc-at-once recording to append to multi-session disc. In this case GEAR will automatically switch to track-at-once. When writing disc-at- once (to a blank disc), some recorders allow the disc to be closed as multi-session. This feature is sometimes called 'session-at-once', and is supported by GEAR.

- Specify the speed at which you want to record: 1x, 2x, etc. depending on your recorder model. You may select separate speeds for Audio reading. Quite often a lower Audio read speed results in better quality.
- Verify the data after writing your project to CD-R(W).

- Use a physical image file for recording. A physical image is a bit-by-bit copy of the CD-ROM you are about to create. (See page 80 for a description of a physical image). 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 Close as Multi-session option. If you want to be able to append other sessions to your CD-R(W) you will also have to choose Track at Once recording and enable Fixate disc.
- 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

Important: *Some of the older CD-ROM players do not support the reading of multi-session discs.*

Advanced Recorder Settings

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

• Enable writing past 74 minutes. This option can be used with either 74 or 80 min. media. Most media has some additional space available for a few extra sectors of Data or minutes of Audio.

• Eject the disc on completion of the writing process.

• You can manipulate the write and read buffer sizes by moving the sliding buttons. Depending on the speed of your computer, recorder and hard disk. .

• Select the number of copies you wish to write of the same image.

• Select the number of sub writers (for Sony CDW900 only)

.

Recorder Settings	☒
CD Settings	Advanced	SCSI

☐ Eject the disc after writing

☐ Allow writing beyond the disc capacity

Buffer size for readii [slider] 128

Buffer size for writin [slider] 128

Number of copies to write [1]

Number of sub writers (for Sony CDW [▾]

OK   Cancel
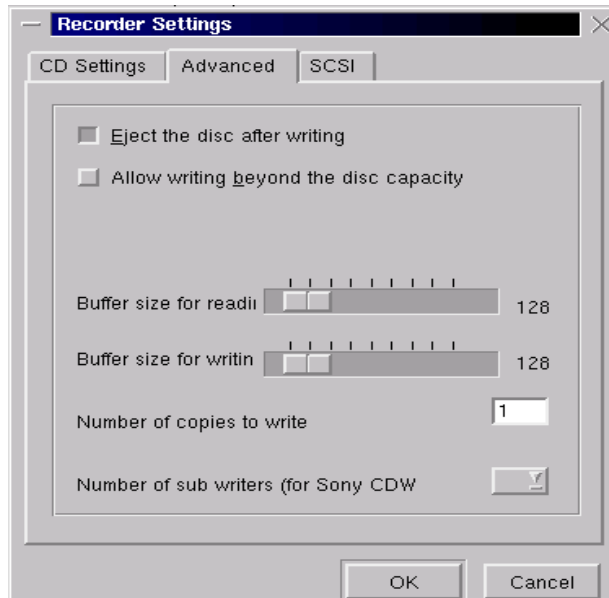
SCSI Settings

In the CD Recorder Setting dialog for SCSI Settings, you can specify the Interface driver and buffering settings. When you change the SCSI settings GEAR may prompt you to reset the SCSI bus. Click OK to reset the SCSI bus. The maximum transfer block or buffer size for SCSI is a little less than 64 KB.
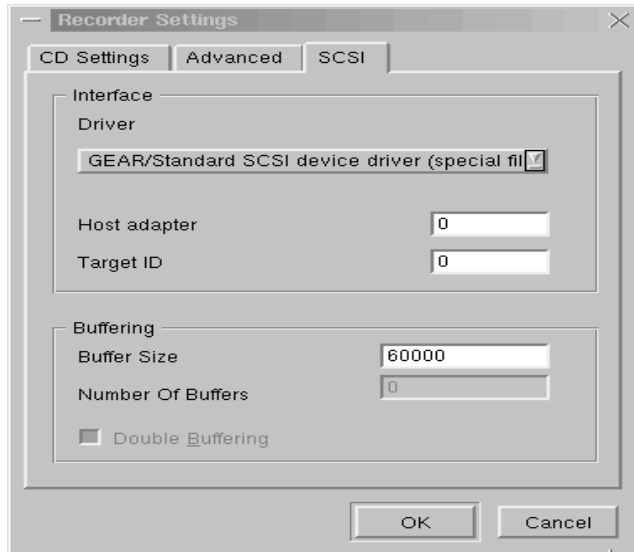
GEAR user one of the available drivers. You can chose from Standard, Tracer and Caldera SCSI drivers. Depending on the platform you may only be able to use a particular driver and the other choices will not be displayed.

The Host adapter and TargetID are set by the system.

The buffering concept is explained in the next section. The default settings have been tested with a wide variety of drives and computers. You may however experiment with different settings if you encounter problems writing discs.

Testing and Writing

About Data Transfer

The writing of a CD-R(W) is a continuous process in Disc at Once and Track at Once modes. Therefore the system has to maintain a high data transfer rate to the recorder. If the transfer rate cannot be maintained, the writing will fail. CD-R(W) discs can be written at different speeds, DVD-R discs are typically only written at 1x 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 for CD media:

	1x	2x	4x	6x
CD-ROM 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 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.

DVD media always use 2048 bytes per sector, but operate at a much higher speed level that CD media. 1x DVD speed is equal to about 9x-10x CD speed. Writing a DVD disc therefore demands a lot from the system with respect to data transfer rate. If the required transfer rate cannot be maintained, a buffer underrun error will occur.

Buffering

GEAR creates the virtual image of the project that is written to CD-R(W) 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(W). To ensure a steady flow of data GEAR fills buffers with data. As GEAR writes data to the CD-R(W), the GEAR information window provides you with information on the percentage of each track written to CD-R(W) and the percentage of data remaining in the buffer. The read and write buffer size ranges typically from 256 KB to 1 MB. The read buffer is filled from the SCSI buffer in blocks of its size. A similar process applies to the write buffer, in this case the SCSI buffer is filled from the write buffer and then written to the CD or DVD.

Testing

Before you start recording your disc there are several tests you can perform to ensure successful writing:

- Verifying your project
- Testing transfer rate
- Test-mode recording

Verifying a project

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

GEAR automatically verifies a project before starting the writing of the disc. However, you can always verify a project manually:

1. With the project you want to verify open, choose Verify Volume from the Project menu.

2. If verify reported that files and/or directories have changed since being loaed into your project, update the project by reloading the reported files and directories.

   As GEAR verifies the track or project, 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 disc against the project on hard disk.*

Test write GEAR Project

You are advised to check your system's performance before you start writing, especially for the first few discs you will write. GEAR tests whether it can read all the information from your hard disk and write it to the CD recorder. The data is not actually written to the disc.

To test the transfer rate:

1. Open the project you want to test

2. Click on Test next to the Output Device panel at the bottom of the main screen or select Test Write from the Recorder menu. A GEAR dialog appears

where you can choose to write the CD-R(W) immediately after a successful test.

No data is transferred to the recorder during this process. If parts of the image cannot be read fast enough, GEAR warns you. For tips on improving your system's performance see *Improving System Performance* on page 99.

Note: *Some recorders do not support test-mode recording.*

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. e.g. Anti-virus software, screen savers, or any other software that may attempt to access the hard disk while GEAR is recording.
- 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.

Note that the performance of a system for writing a CD-R(W) 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(W) disc, it may result in a data transfer problem.

7

Using a Physical Image

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

To convert a project you must:

1. Open the project you want to create a physical image for.

2. Select Convert Volume to Physical from the Project menu.

3. If physical files already exist for the project, you are prompted to overwrite them.

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

Before you create a physical image, GEAR verifies the project. If the file is not up to date, the physical image is not created. You can update the project 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 project. Subsequent changes you make to the project do not affect the current physical image.

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

Writing the disc

Writing the disc)

Use the Ouput Device panel to choose the output device to write to and to select the Recorder Settings

| Output Device | CD-RW: hp   CD-Writer+ M820 1.23 | ▼ | Settings | Test | Write |
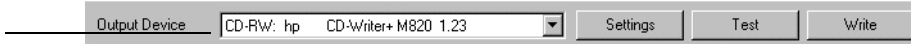
To write the project to the recorder:

1. If necessary open the project you want to test by selecting "existing GEAR project" and by clicking on the Open button GEAR Project panel.

2. Choose your CD/DVD recorder from the pull-down menu in the Output Device panel.

3. Click Write in the Output Device panel. When writing is complete, the disc is ejected automatically (if the eject checkbox is checked). Your disc is ready for reading in any CD-ROM drive!.

Files Created After Writing

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

• wo_ident

The wo_ident file contains the table of contents (TOC) and some customer information that is written to the CD recorder. The customer information is read from the gearrc file.

Using a jukebox

Tape and Jukebox are an add-on options for GEAR PRO.

A jukebox or medium changer is a robotic unit that can store and automatically load CDs into a CD-ROM player or a CD Recording unit.

GEAR Software

To load a CD from the Jukebox:

1. In the GEAR main menu, select Jukebox Control. The Jukebox Control
    window appears (If a jukebox is present in your system).
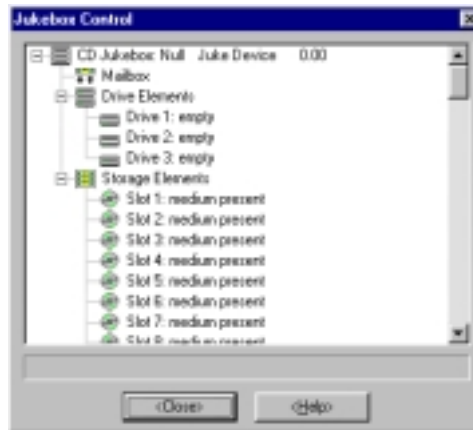
2. To load a new disc into the jukebox drag the mailbox icon to an empty slot or
    empty drive. You will be prompted to insert a disc. After the disc has been
    inserted it will be transported to the destination slot or drive.

3. Start recording.

If you want to use a jukebox to write several CD-Rs unattended, make sure they are
loaded consecutively, beginning in slot 1.

To unload a disc, drag the filled slot icon or filled drive icon to the mailbox. You
will be prompted to remove the CD from the jukebox.

To move a disc within the jukebox system, drag the filled icon or filled drive icon
to an empty slot or drive.

You may also use the right-click function to perform some of these operations. Just
follow the instructions displayed in the pop-up dialog box.

The jukebox Settings dialog allows you set various options, depending on the type of jukebox being used.
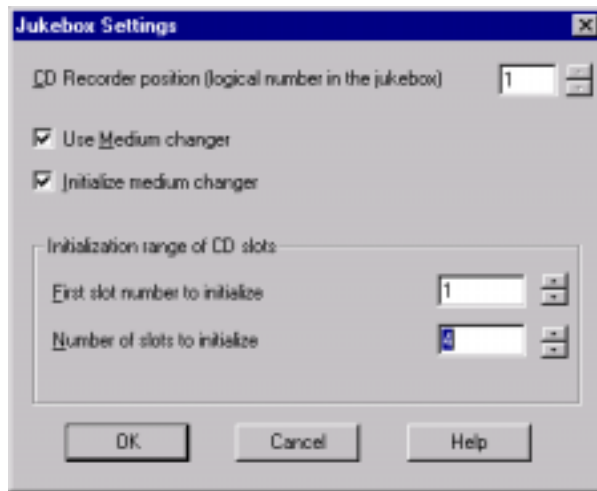
Most Jukeboxes allow you to specify the position of the CD Recorder in the box. If more than one recorder is present, select the one you wish to use. At this time GEAR only supports write operations to one device at the time.

You can also manipulate the media changer and select the slots to use.

For a list of supported jukeboxes please visit our website at www.gearsoftware.com.

7

Writing to CD Premaster Tape

For the production of CDs in a mastering and replication plant a premaster tape is used. Mass-produced CDs can be made from either a CD-R disc or a premaster tape. GEAR lets you create both. The most common format is the Disc Description Protocol (DDP) format.

GEAR supports most tape units that provide a SCSI interface. The preferred configuration is with an EXABYTE tape unit, a Hewlett Packard DAT unit, or a DEC DLT unit. Visit our website at www.gearsoftware.com for an updated list of supported tape recorders. If no tape is attached, the Output Device panel will display something like: "Tape : Null Tape device 0.00". If you select that device no ouput will be written.

Writing a CD project to tape

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. Before you proceed write your project, you are advised to check the tape recorder settings. Under NT you may have to temporarily disable the tape service to allow GEAR access to the tape device. If so, remember to re-enable the service after you exit GEAR.

Tape recorder Settings

You can specify the types of settings appropriate for your tape recorder using the Settings button in the Output Device panel. There are five types of settings, details on these tabs and options can be found in the GEARGUI.L file description in Appendix C:

• CD Mastering

• General

• Customer

• SCSI

To change the tape settings:

1. Select your tape drive in the Output Device panel.

2. Click the Settings button in the Output Device panel or Tape/Settings menu. The Tape Settings dialog appears.

3. Select the settings you want to use and click OK to return to the main screen. You may need to consult the person or company doing the mastering of your image to verify some of the settings.

CD -mastering Settings

In the CD-Mastering dialog, you can do any of the following:

• Check the Write in DDP format (most common standard used for mastering).

• Set the tape file strategy. This depends on the selected mastering process. Options include; Tracks in separate files, Same type tracks in one file and One contiguous file.

• set the CD-ROM parameters.

7
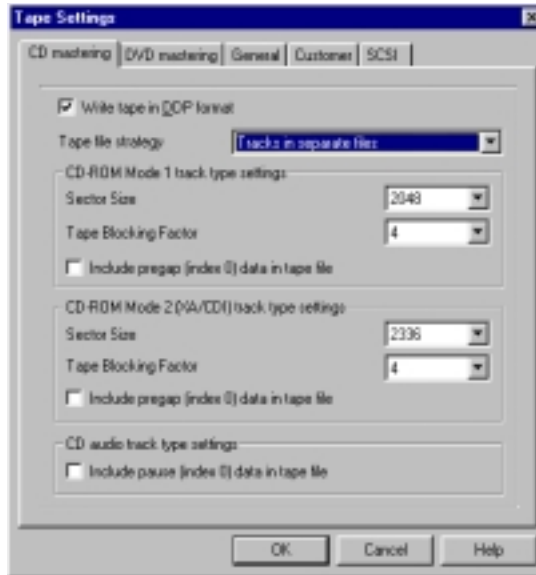
General Settings

In the General Settings, you can select whether the Ident.txt file will be written to the tape. This file is sometimes required in the mastering process. You can also select to Verify the tape after writing and/or to eject the tape once the writing process completes.
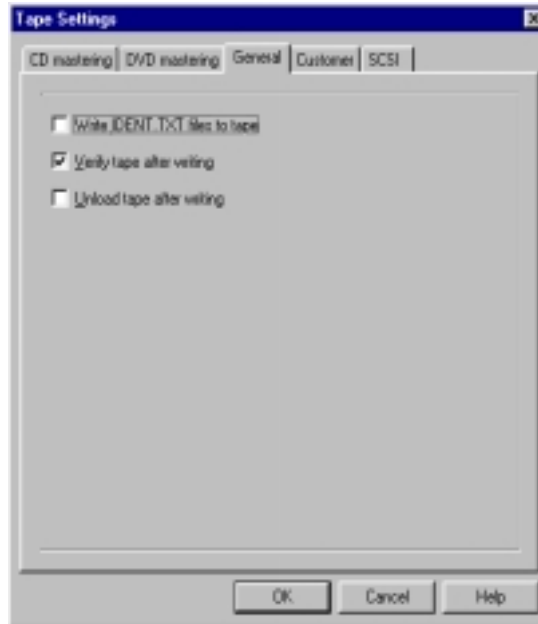
Customer Settings

In the Customer Settings, you can enter the information that is written to the tp_ident file. Some mastering and replication plants ask you to supply this information.

SCSI Settings

In the SCSI Settings, you can specify the driver and buffer settings. The Null device driver can be used for testing purposes. Other options include the use of double buffering or the NT Miniport driver (NT only).

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

Note: *There is an extra tab in the tape settings which allows you to configure the DVD Lead In Control data. This is required for DVD master production companies to ensure a proper image conversion from tape to DVD discs. Please consult with your production company before you modify any of these parameters.*

Writing a Premaster tape

Use the Ouput Device panel to choose the medium to write to and to select the Recorder Settings

Output Device	Tape : Null Tape Device 0.00 ▼	Settings	Test	Write
Ready				
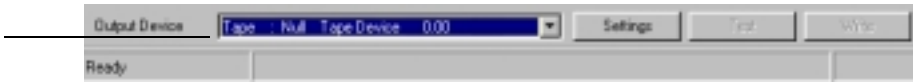
To write the project to Tape:

1. If necessary open the project you want to test by selecting "existing GEAR project" and by clicking on the Open button GEAR Project panel.

2. Choose your Tape device from the pull-down menu in the Output Device panel.

3. Click Write in the Output Device panel.

4. When writing is complete, the tape is ejected automatically (if the eject checkbox is checked). Your tape is ready for delivery to the mastering plant!

Note: *If you want GEAR to verify if the tape has been written correctly, you must enable Verify after Write in the Tape Settings (see page 93).*

Files Created After Writing to Tape

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

- tp_ident
- tpresult
- DDPID
- DDPMS
- PQDESCR

The tp_ident 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 Tape Recorder Settings as previously described.

Using Logs and Batch Files

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

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 is 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 reference to create batch files, or sometimes you can edit the log file and use it as a batch file. 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 Create.

   If you select the option Show log in the Window menu, you will 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 are finished, un-check 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 emacs or vi 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.
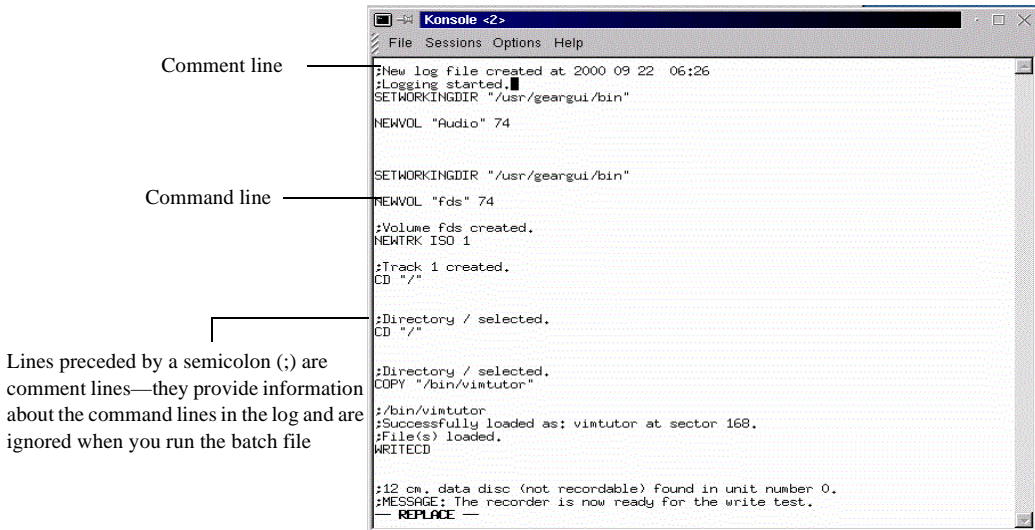
Comment line

Command line

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).

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 batch file dialog.

2. Locate and choose the log or batch file you want to use, then click Open.

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 batch as a startup-option

To run a batch file automatically when you start GEAR, you must run the following command:

GEARCLI <batch file> /A /X

(where <batch file> stands for the path and filename of the batch file, /A enables the automated mode and /X exits GEAR after completion of the batch.

Please note that the batch file needs to be initiated from the GEAR software directory, because the program relies on several files in that directory. Failing to do so will result in errors.

Running a GEAR command

You can execute GEAR commands from the File menu using "File/Run GEAR Command". Whenever you execute a command and you have the log view/ window enabled (if supported, see Window menu), you will see the result on the screen and/or log window.

8

Starting GEAR Pro for UNIX (Command line Interface)

This chapter provides information about starting GEAR UNIX. It contains the following sections:

- Starting GEAR
- Running GEAR as a non-root User
- Switching Between Drivers

Starting GEAR

GEAR can be started from the command line (e.g. in a xterm session) by typing **gear**. GEAR will first look for it's configuration file (.gearrc) in the current directory. If a .gearrc file is not found in the current directory, the user's home directory will be searched. If there is no .gearrc file there as well, the file /usr/gear/.gearrc (the master configuration file) will be copied into the users home directory. Consequently, any time a different driver is selected all .gearrc files should be updated of removed (except /usr/gear/ .gearrc, thereby forcing GEAR to make a copy of /usr/gear/.gearrc).

For further information on selecting another driver, please refer to the section Switching between drivers.

NOTE: To start GEAR with a batch file in automated batch mode type: gear <batch_file> -a.

To read the electronic manual, type: **gearhelp**. This will start the Adobe Acrobat Reader which will open the GEAR manual. Gearhelp has a configuration file /usr/gear/bin/.gearhelprc with the following entries:

> READER /usr/bin/acroread
>
> HELDIR /usr/gear/help
>
> HELPFILE manuallg.pdf

The first line instructs gearhelp as to where the Adobe Acrobat Reader is located. The second line gives the location of the GEAR manual. In the last line, either U.S. Legal format (manuallg.pdf) or European A4 format (manuala4.pdf) can be specified.

If gearhelp is unable to find the Acrobat Reader or the GEAR manual check the file /usr/gear/bin/.gearhelprc to ensure that the settings are correct. All other .gearhelprc files should be deleted. Users can switch between Legal (U.S.) and A4 (European) format by typing **gearhelp a4** or **gearhelp legal**. Your selection will be stored in a copy of the /usr/gear/bin/.gearhelprc file located in the users home directory.

On CDE platforms, Sun Open Windows, and IRIX a script called gearapp is available which opens the GEAR application folder. From this folder GEAR can be opened by clicking on the GEAR icon.

The GEAR administration folder can be opened by typing **gearapp sys**. From the administration folder, various administrative tasks with respect to GEAR can be performed. For further information, please refer to the subsections Starting GEAR from the Common Desktop Environment, Starting GEAR from the IRIX Desktop, or Starting GEAR from Open Windows.

NOTE: No Common desktop is available on Sun OS or HP-UX 9 platforms. For these environments, GEAR must be started from the command line.

Starting GEAR from the Common Desktop Environment

The Common Desktop Environment (CDE) is available on Sun Solaris 2.x, HP-UX 10.x, AIX 4.x and Digital Unix 4.x (formerly known as DEC OSF 4.x).

In CDE, the Application Manager will show two new Folders: GEAR and GEAR Administration. In the GEAR folder there will be three icons:

gear   Double clicking on this icon will open a dialog window prompting for the target directory where your disc images must be created (the default is your home directory).

GEAR manual Double clicking this icon starts the Adobe Acrobat Reader with the GEAR manual. (Not present in the GEAR version for Solaris X86).

READ ME   Double clicking opens a window showing the release notes.

In the GEAR Administration folder there are three icons:

gearkey
For obtaining and entering Tracer driver license info.

gearuser
For changing the permissions of special device files GEAR uses (to allow non root users to use GEAR). On HP-UX 10.x this icon will be called driver. With it, you can select the SCSI drive to use and change the permissions of the special device files used by GEAR.

deinstall
A script which removes GEAR, the Tracer driver, license manager and Adobe Acrobat Reader. Note that this deinstall script removes all GEAR specific files. To remove programs selectively, please use the dinstall utility located on your GEAR installation CD.

NOTE: Only users logged in as root can see the administration folder.

Starting GEAR from the IRIX Desktop

Two new pages are added to the icon book: Gear and SysGear. The menu item GEAR is added to the Find menu of the Toolchest which opens the GEAR page when selected.

On the GEAR page, three icons can be found

gear
Double clicking this icon opens a dialog window prompting for the directory where the images must be created (defaults to the home directory).

gearhelp
Double clicking this icon starts the Adobe Acrobat Reader with the GEAR manual.

README Double clicking opens a window showing the release notes.

On the Sysgear page, there are also three icons:

gearkey   For obtaining and entering Tracer license info.

drivers   Script for switching between the Tracer driver and the standard SCSI driver and changing permissions on the device special files GEAR uses (to allow non root users access to use GEAR).

deinstall   A script which removes GEAR, the Tracer driver, license manager and Adobe Acrobat Reader. Please note that this deinstall script removes all GEAR specific program files. To remove programs selectively, use the dinstall from your installation CD.

Starting GEAR from Open Windows

Open Windows is available on Sun Solaris 2.x. Since it has no application manager, the file manager is used in instead. The file manager will show the gear directory with the following files/icons:

gear   Double clicking this icon will open a dialog window prompting for the directory where your CD images will be created (defaults to the home directory).

gearhelp   Double clicking this icon starts the Adobe Acrobat Reader which opens the GEAR manual.

README   Double clicking here will open the GEAR release notes.

sys   A directory which contains scripts to deinstall GEAR, enter the Tracer license key, and changing access permissions on the special device files to allow non root users to access GEAR.

On the Sys directory, there are three icons:

gearkey   For obtaining and entering Tracer license info.

gearusers   For changing the permissions of the special device files
                GEAR uses (to allow non root users to use GEAR).

deinstall   A script which removes GEAR, the Tracer driver and its
                license manager and the Adobe Acrobat Reader. Note
                that this deinstall script removes all GEAR specific files.
                To remove programs selectively, use the dinstall from your
                installation CD.

Running GEAR as a non-root User

To record a CD with GEAR as a non root user, one needs both read and write permissions on the special device files used to access the recorder. The owner, group and access permissions of the special device files can be changed with the Unix commands *chown*, *chgrp* and *chmod*. However, on some platforms these files are recreated anytime your computer is rebooted, so information regarding access permissions may be lost. To avoid this, the script /usr/gear/bin/gearuser has been provided. On CDE platforms this script can also be started by clicking on the gearuser icon in the GEAR administration folder (or the driver icon on HP-UX 10.x systems). This will allow changing the owner, group and access permissions. These settings are maintained across boots.

An example of how gearuser works is shown below where the group staff is granted read/write access to the special device files corresponding to the recorder:

        Current driver   Tracer driver
        Current owner   root   access: yes
        Current group   bin   access: no

        Do you want to change the owner, group and permissions of the Tracer device files?
        Type (y or n) [n] :y

        Give the new owner of the Tracer device files [root]:
        Give the new owner of the Tracer device files [bin]: staff
        Do you want to give staff access (y/n) [n]: y

        Changing owner, group and permissions was successful

        Press RETURN

NOTE: The set user id on execution bit (chmod u+s) solution might no longer work on GEAR 3.5.

Below is a list of the various platforms and the device special files used by GEAR to access a CD-R drive:

Sun	/dev/scsi/c<bus_id>t<target_id>
Sun Solaris	/dev/rgd/c<bus_id>t<target_id>l0s0 These files are created during boot.
IRIX 6.2 (Tracer)	/dev/rgd/c<bus_id>t<target_id>dOsO These files are created during boot.
IRIX 6.2 (Standard)	/dev/scsi/c<bus_id>t<target_id>lO These files are created by the /dev/MAKEDEV script and maintained across boots.

DEC Unix	/dev/rgd<no>a	
	These files are created during boot.	
AIX	/dev/rgd<no>a	
	These files are created during boot.	
HP 10.x	/dev/rgd/c<bus_id>t<target_id>dOsO	
(Tracer)	These files are created during boot.	
HP 10.x	/dev/scsi/c<bus_id>t<target_id>	
(Standard)	On HP 9000/700 and HP 9000/800 D series these files are created by the script /usr/gear/bin/mkscsi and maintained across boots.	
	On HP 9000/800 series these files are created during boot by the script /sbin/init.d/SCSIdd.	

On DEC and Sun Solaris the user can install GEAR in a directory different from /usr. For instance, if GEAR was installed in the directory /usr/local, the correct path of the gearuser would be /usr/local/gear/bin/gearuser.

Accessing SCSI devices on a HP 9000/800 series

When using GEAR on the HP 9000/800 series, kernel configuration is required to permit access to CD-Recorders and/or tape drives using the HP-UX 10.x pass through SCSI driver or the Tracer driver. This is performed as part of the installation of GEAR, but anytime there is a significant change in your hardware set up, this configuration process must be repeated (i.e. the SCSI id of the recorder has been changed, the recorder is connected to a different SCSI bus, or a tape device is added and must be used by GEAR).

To configure the kernel to allow access to CD-R drives and/or tape devices use the script /usr/gearbininstdd. It functions the same way as the driver selection command described earlier in the section *Installing GEAR on HP-UX 10.x.* This script can also be used to remove driver lines from the kernel. To do so it must be called with the option -r (i.e. /usr/gear/bin/instdd -r). See also the note below. Use the following steps to manually configure a new kernel:

1. Determine the hardware path of your CD-recorder/tape device with the command: **/usr/sbin/ioscan -f**. This will result in a listing like the one below. In this example the hardware path (H/W Path) of the CD-recorder PIONEER CD-WO DW-S114X is 56/52.5.0.

Class	H/W Path	Driver	S/W State	H/W Type	Description
bc	0	root	CLAIMED	BUS_NEXUS	
bc	1 56	bc	CLAIMED	BUS_NEXUS	Bus Converter
ext_bus	0 56/52	scsil	CLAIMED	INTERFACE	HP 28655A -SE SCSI ID
target	0 56/52.0	target	CLAIMED	DEVICE	
tape	0 56/52.0.0	tape2	CLAIMED	DEVICE	HP HP35470A
target	3 56/52.5	target	CLAIMED	DEVICE	
disc	256/52.5.0	disk3	CLAIMED	DEVICE	PIONEER CD-WO DW-S114X
target	2 56/52.6	target	CLAIMED	DEVICE	
disk	1 56/52.6.0	disc 3	CLAIMED	DEVICE	DEC VP3215S
tty	0 56/56	mux	CLAIMED	INTERFACE	MUX
ba	0 60	bus_adapter	CLAIMED	BUS_NEXUS	Core I/O Adapter
lan	0 60/6	lan2	CLAIMED	PROCESSOR	Processor
memory	0 63	memory	CLAIMED	MEMORY	Memory

2. Generate a kernel configuration file with: **/usr/lbin/sysadm/ system_prep -k /stand/vmunix -v -s /stand/system.** Your current configuration file will be backed up as /stand/system.prev

3. Add the following line to your system file: **driver <hardware path> spt**. For each device you want to use with GEAR a similar line must be added (recorders, tape devices, medium changers in juke boxes). In the example above the line 'driver 56/52.5.0 spt' must be added.

4. Build a new kernel: **/usr/sbin/mk_kernel -v -o /stand/vmunix -s / stand/system.** Your current kernel will be backed up as /stand/ vmunix.prev.

5. Reboot your system.

Once your computer is up again check to see if the devices you just configured were claimed by the driver spt by entering: **/usr/sbin/ioscan -f**

NOTE: If a device which had been configured to be used by GEAR, will be used with ordinary HP-UX utilities such as tar or swinstall, the corresponding driver line must be removed from /stand/system and a new kernel built in the way described above.

9

Getting Started With GEAR (CLI)

This chapter contains basic information on how to create CDs with GEAR UNIX professional pre-mastering software. It contains the following sections:

- Creating a new GEAR image
- Writing to CD-R
- Writing to Premaster Tape

Creating a new GEAR image

To create a new image, first start GEAR by entering the gear command from the Unix shell:

```
gear
```

The GEAR main screen will then appear. There are three sections of this screen:

- The version and module name located at the top of the screen.
- The work area located in the middle of the screen - where the GEAR prompt appears: CD>
- Status lines that appear at the bottom of the screen. These lines contain important information regarding the status of GEAR and your image.

NOTE: The message 'No Volumes Found' will appear if GEAR cannot find a GEAR image in the current directory.

Creating a new ISO 9660 CD-ROM or DVD-ROM volume

To create a new GEAR volume (image) for your CD you can use the NEWVOL command of GEAR:

```
newvol <volume_name> <disc_size>
```

Example:

```
newvol SAMPLE 74 ISO
```

In this example, GEAR would create a new CD-ROM volume called 'SAMPLE' and virtual image of an ISO 9660 track. The image would have a maximum capacity of 74 minutes, and would contain a single data track in ISO 9660 format. The new track image will be created and selected automatically. Possible disc sizes are 18 min, 63 min, 74 min and 80 min for

CD projects, and 428 min (3.9 GB), 509 min (4.7 GB), 922 min (8.5 GB) and 1844 min (17 GB) for DVD-ROM projects. WARNING: The sizes 922 min and 1844 min cannot be written to a DVD disc, so these may not be very useful. This would imply dual layer/dual side technology and this is not possible with DVD-R(W) media (only with mastered DVDs).

You can choose three track types in GEAR:

- ISO is the standard track type for CD-ROM and DVD-ROM discs, in the ISO 9660 format. It is also referred to as Mode 1 format. This format is appropriate for recording computer data.
- XA is a the track type for CD-ROM XA discs. This format is appropriate for recording computer data. This format was targeted in the past specifically for multi-media applications, that can be compared with CD-I. XA is also the appropriate track type for formats like Photo CD, Video CD, CD-I Bridge, CD Extra (= Enhanced Music CD) and Electronic Book .
- DA is the track type for CD digital audio. The audio format for CD digital audio is PCM, 44100 Hz with 16 bit stereo samples. Every piece is music is recorded in a separate track on the CD. The CD digital audio format allows up to 99 audio tracks. Additional audio tracks can be created by GEAR using the NEWTRK command. If audio tracks are combined on one disc with an ISO or XA track, up to 98 audio tracks can be used. This format is called Mixed Mode. The data track must always be the first track with Mixed mode.

NOTE: There disc size is measured in minutes: 18, 63, 74, and 80 minutes for CD media, and 428, 509, 944 and 1822 for DVD media. This size determines the amount of data GEAR will allow you to copy into the image. If you type NEWVOL with no parameters, GEAR will prompt you for the image name and disc size in minutes.

About Virtual Images

CD volumes created by GEAR are virtual images. A virtual image contains the minimum amount of information required to record a CD. Think of it as being a file with aliases pointing to the source files you want to record. Conversely, a physical image will contain a bit for bit representation of your entire image. Because of this, physical images consume much more hard

drive space than a virtual image does. Before creating new virtual image file, please review the following information regarding virtual images and their properties.

When you create a virtual image, you're really creating what's called a volume administration file. This file will carry the file extension .VOL and in order to create one, you must have more than 25 MB of free disk space available.

After creating a virtual image, you may add data to it by loading files and directories into the image. Whenever you add a track to your image, four administration files will be created in the current working directory for each one. These files contain the first eight characters of your image name, plus the following extensions (where xx represents the track number):

- .mxx
- .ixx
- .fxx
- .rxx

WARNING!: Never edit or delete these files manually; Doing so results in a corrupt image. Administration files are automatically deleted when the associated image is deleted.

Displaying GEAR Images

To display a list of your previously created and saved GEAR images, enter:

```
vdir
```

Any images in the current directory are then displayed.

To display a list of tracks in your currently selected GEAR image, enter

```
tdir
```

A list of tracks is then displayed

Copying Files Into Your CD Image

You can copy files from any directory into your new GEAR image using the cp [-r] command. To copy a complete directory tree into an image, type:

> **cp -r <os_dir_tree> <target_directory>**

All files and subdirectories in the specified tree are loaded automatically. Subdirectories are created in the GEAR image if they exist in the source tree. The image will contain an exact copy of the specified tree. To copy a specific file to the virtual image, enter:

> **cp <file_spec> <target_directory>**

To copy all files and subdirectories from the /data directory into your sample GEAR image, you may type:

> **cp -r /data/* .**

In the above example, all files in the '/data/*' directory are copied to the current directory in your GEAR image. The current directory is displayed on the status line at the bottom of your screen. You can change the current directory in the GEAR image with the cd command.
During the copy operation GEAR will report you which files are being loaded, by outputting lines of text in the log window.

To only copy files with a certain extension, type:

> **cp /data/*.abc .**

In the above example, all files with the extension .abc are copied from the DATA directory to the current directory in your image. The current directory is displayed on the status line at the bottom of the screen. You can change the current directory just as you would with other Unix programs.

ISO file names may only contain the characters A–Z, the numbers 0–9, and underscores. If any file names contain invalid characters, GEAR will warn you. ISO invalid filenames can be translated to an ISO-compliant file name or ignored altogether.

WARNING!: SUN systems cannot read ISO CDs that have file names containing lowercase

characters. Therefore, SUN users should use the Rock Ridge extensions or translate their filenames to uppercase.

Copying Files to a Specific Directory

To copy all files and subdirectories to a specific directory in your image, enter:

```
cp -r /data1 DATA1
```

In the example above, GEAR would create a directory called DATA1 in your image, then copy the contents of the directory /data1 to the DATA1 directory in your image.

Display Files in the Current Image Directory

To display a list of all files in the current image directory, type:

```
ls
```

The files will appear on your screen in standard Unix output format. The current directory is displayed on the status line at the bottom of your screen. You can change the current directory as you would with other Unix programs.

Change Subdirectories in Your Image

To change to a subdirectory in your GEAR image, enter:

```
cd <directory name>
```

You can use the ls command to list the contents of the subdirectory.
Type ls -r to display all directories and subdirectories. This allows you to verify the contents of your GEAR image. Once you have finished copying all

the files you want to record to your GEAR image, you'll be ready to write the image to CD-R.

Writing to the recorder

Images are written to the CD/DVD recorder with the Gear Recorder module. With this module you can create both multi-session and single-session CDs.

Writing a Single-Session Disc

Before an image is written to disc, you must check the CD-R settings are correct. Verifying and changing the CD-R Settings can be done with the **GETCDRPARMS** and **SETCDRPARMS** commands.
If you type

        getcdrparms

A list of CD recording parameters is displayed on your screen in the format <parameter>=<value>. If you do not want to accept the displayed values, you can change the value of a parameter with the **SETCDRPARMS** command:

        setcdrparms <parameter> <value>

Now you can verify with getcdrparms that the parameter now has the appropriate value.

IMPORTANT: If this is the first recording attempt with your current hardware configuration, we strongly recommend that you conduct a test run before attempting to write a CD. A test run can be forced by setting the WriteEnable parameter to FALSE. A test run allows a user to asses the quality of their current configuration to see if it supports the data transfer needs of CD recording without the risk of loosing a blank disc due to a buffer underrun error

---

You are now ready to write your disc. To start writing your image to CD-R, enter:

```
writecd <volume_name>
```

For example:

```
writecd SAMPLE
```

After entering this command your CD image titled 'sample' would be written. However, GEAR proceeds with a series of operations before the actual writing operation commences:

First, the image is verified, whereby the size and time stamp of every file is compared to it's size and time stamp from the time it was loaded. If there are any discrepancies, a warning will appear. Discrepancies typically occur when files are modified after being loaded in an image. Modified files may be updated and reloaded.

GEAR then checks the recorder to be sure a blank disc is loaded. If there is no disc loaded in the recorder, GEAR prompts you to load one. Once a disc is loaded, writing commences. As the disc is written, the percentage completed will be displayed on the status lines at the bottom of your screen.

Once writing is complete, the disc is automatically ejected.

Writing a Multi-Session Image

To create a multi-session image, follow the instructions as illustrated earlier in this chapter under the heading *Writing a Single-Session Disc*. However, before you write your image to disc, set the CD-R Multi-Session setting to true. Please see the chapter entitled "Working With Multi-Session Discs" in this manual for more information.

10

Working With Virtual Images (CLI)

This chapter contains information about working with Virtual Images that have already been created and contain data. It contains the following sections:

- Calculating Virtual Image Capacities
- Editing a Virtual Image
- Working with Tracks
- Editing Track Contents
- Editing Settings for the Generator Engine

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 virtual image data capacity for each disc size and track type:.

Table 8.4: Virtual Image Data Capacity

Disc Size	ISO (Mode 1)	XA (Mode 2 Form 1)	CD Audio
18 min.	158 MB	158 MB	181 MB
63 min.	553 MB	553 MB	635 MB
74 min.	650 MB	650 MB	746 MB
80 min.	703 MB	703 MB	807 MB

While copying tracks to your image, keep these points in mind:

- Track number is assigned automatically and relevant only for CD Audio discs. 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 1 if you create either an ISO or XA track on the virtual image. The ISO or XA rack must be the first track.
- When a new track is created, it is automatically assigned the maximum available space on the virtual image.

NOTE: A CD recorder will always verify if there is enough free space for the multi-session overhead - usually 15 MB.

Editing a Virtual GEAR Image

To edit a virtual image, you must have previously created it, and copied data to it as described in earlier chapters in this manual.

To display your available GEAR images in the current directory enter:

`vdir`

The following will be shown for your available images:

- Name and Size
- Image type
- Session number
- Number of tracks in the image
- Image Status
- Date and time the image was created

Images created with the NEWVOL command will always have a single session. Images generated using the SESSION command may have higher session numbers.

Opening (selecting) an existing GEAR Image

To open an existing GEAR image (GEAR Volume), enter:

`selvol <volume_name>`

To view the amount of available free space in your image, enter the **FREE** command. Please note that the FREE command can take some time to complete when dealing with large image sizes.

Selecting a Track Within the current GEAR Image

To select a track within an existing GEAR image, enter:

`seltrk <track_number>`

NOTE: Your track number may be as high as 99 for DA images only. Remember that ISO and
        XA images contain only one track.

Deleting a GEAR Image

To permanently delete a GEAR image you've created, enter:

`delvol <volume_name>`

When   images   are   deleted,   all   associated   physical   images   and
administration files are also removed from your system.

Working with Tracks

Tracks are files that contain data you want to record. Tracks can contain
multiple files and directories which you may edit over the course of
constructing your image.

Displaying Available Tracks

To display the available tracks in an image, enter:

`tdir`

This command will work with ISO, XA, or DA tracks. When executed, the **tdir**
command will display the track number, track size, track type and other
useful information for each track in the currently selected image.

Creating an New Track

To create a new track, enter:

`newtrk <ISO|DA|XA> [<track_number>]`

For discs that contain a data track in addition to audio tracks, you can add

your tracks in any order you choose, but GEAR will always place your data track as the first track to be recorded.

NOTE: You should not attempt to create ISO and XA tracks in the same image. If you are creating a CD with an ISO (or XA) track and DA tracks, your audio tracks must be added after the ISO or XA track.

Selecting Tracks

To edit a track, you must first select it using the following command:

seltrk <track_number>

After executing this command any other currently selected track will be closed, and the track specified in the command will be selected. The name of the newly selected track will appear on the status line at the bottom of your screen.

Deleting a Track

To delete a track, enter:

deltrk <track_number>

WARNING!: When a track is deleted, all administration and physical image files associated with it are also deleted.

Editing Track Contents

After loading data into your tracks, you may still edit the content of the track itself. Following is a summary of the basic track viewing and editing commands GEAR places at your disposal.

Displaying All Files and Directories in a Track

The following command will show your complete image recursively, which

encompasses all subdirectories and displays every file and directory contained therein:

```
ls [-r] [-iso] [<directory name>]
```

NOTE: With the **LS** command, if you do not specify a directory name, GEAR will default to your current directory.

For every file and sub-directory, the following will be shown:

- Name
- If the name represents a directory or file
- If the file (or directory) is hidden
- Start sector
- Date and time of entry
- Size (in bytes)

Changing Directories

To change to a different directory, enter:

```
cd <directory name>
```

NOTE: The CD command will supports Rock Ridge names if RockRidge Support is enabled. Otherwise ISO names will be used.

Creating a New Directory

To create a new directory in an existing track, enter:

```
mkdir <directory name
```

Copying Files and Directories to a Track

To copy an entire directory tree to a track, enter:

```
cp -r <directory_tree> <target_directory>
```

With this command, all files *and* subdirectories of the specified directory tree are copied to the specified directory in your selected track.

WARNING!: Never copy administration files into your image or it's tracks. Adding these files manually will destroy your image.

Copying a Single File to a Track

To copy a single file into a track, enter:

```
cp <file_name> <destination_track>
```

NOTE: SUN systems cannot read ISO CDs that have file names containing lowercase characters. All file names must be translated to uppercase or you must use the Rock Ridge extensions.

Renaming Directories and Files

Files and directories may be renamed using the MV command illustrated below:

```
mv <old_name> <new_name>
```

Deleting Files from your Image

You can delete individual files from a track in a virtual image by using the RM command as shown below:

```
rm <file_name>
```

NOTE: Adding (*.*) to your command will delete all files in the current directory

Deleting an entire Directory from your Image

To delete an entire directory from a virtual image, enter:

```
rmdir <directory_name>
```

Deleting an Entire Directory Tree

To delete a directory tree in a virtual image, enter:

```
rm -r <directory_tree>
```

Following this command, the specified directory and all its subdirectories will be deleted.

NOTE: The RM, RMDIR, and RM -r commands may be used for Rock Ridge type names ONLY if RockRidge Support is enabled. Otherwise, GEAR will default to using ISO names.

Editing Settings for the Generator Engine

GEAR allows you to edit a variety of generator (formatting) settings for your volumes. To change the initial values used for creating new volumes, use the **SETGENPARMS** command, or the **SETGENDEFAULTS** command if you want to save you new settings in the .gearrc file. The changes you make in this schedule will be reflected in all subsequent volumes you create, but will not affect volumes that are already created.

Editing Settings for Existing Volumes

To change the settings for a volume that is already created, you can use the **SETVOLPARMS** and **SETTRACKPARMS** commands, after you have selected the volume and the track.

To change the settings for the currently selected track, enter:

```
settrackparms <parameter> <value>
```

You will then be able to edit the following track parameters for ISO or XA tracks, as they pertain to the currently selected track:

- ISO 9660 Primary Volume Descriptor
- Non ISO name handling level
- Default File and Directory mode

- Maximum directory nesting level
- Follow Symbolic links on/off

Editing the ISO Primary Volume Descriptor

To edit the ISO 9660 Primary Volume Descriptor for the selected track, GEAR supports a set of parameters with the **SETTRACKPARMS** command:

SETTRACKPARMS <parameter> value>

You will then be allowed to edit the following parameters:
- Volume Identifier
- System Identifier
- Publisher Identifier
- Data Preparer Identifier
- Application Identifier
- Application Use
- Copy Right Identifier
- Abstract File Identifier
- Bibliographic Identifier

11

Writing Your Image to CD/DVD (CLI)

This chapter contains information regarding the testing, recording and verification of process involved in writing your GEAR generated images to the CD/DVD recorder. It contains the following sections:

- Verifying a Virtual Image
- Physical Images
- Creating a Physical Image from a Virtual Image
- Estimating System Performance
- Writing your image to the recorder
- Copying a disc

Verifying a Virtual Image

When you verify a virtual image, GEAR checks the size, date, and time stamp for each file in a given track or image. If any discrepancies are detected, a message will appear indicating that a file has been modified or updated since being added to the image. At this point, GEAR will prompt you to update the image. To update a track or image, simply reload the reported files and directories to your selected image.

Physical Images

A physical image is a bit by bit representation of the tracks you plan to write to CD. GEAR is able to create a physical image file of any track in your GEAR volume with the phystrk command. Depending on the performance of the computer system and the hard drive(s), a physical image may be appropriate to use when writing to CD, especially at higher recording speeds. Otherwise, a virtual image may provide sufficient performance for writing the disc. A virtual image also has the advantage of consuming much less storage space on your hard drive. Before creating a physical image, GEAR will verify the virtual image as needed. If any files in the virtual image are not up to date, the physical image will not be created. Again, virtual images may be updated by reloading the modified files. Depending on your needs, you can make one individual track or an entire GEAR Volume physical. Creating a physical image however is usually only relevant for data tracks. In most cases it will not be necessary to create physical images for audio tracks, because these usually contain only one (big) audio file.
The number of bytes per sector stored in the physical image file depends on the type of track. These are:

- **ISO: 2048 bytes per sector**
- **CD-ROM XA: 2336 bytes per sector**
- **CD audio (DA): 2352 bytes fer sector (frame)**

Any physical image you create will contain the contents of the virtual image

as it exists at that time, while any subsequent changes to the virtual image will not be reflected in the current physical image.

Creating a Physical Image from a Virtual Image

To create a physical image of all tracks in your selected GEAR volume, type:

physvol

A physical image will be created for each track in the virtual image. The physical image file names are <volume name>.pxx where xx represents track number. These files are always written to the current directory.

Creating a Physical Image of a Track

When you create a physical image of a track, you can choose to write to a physical track image file, or you can select a SCSI hard drive to store the physical image directly on the SCSI disk on a sector by sector basis, bypassing the file system. Transferring data on a sector by sector basis directly from a SCSI hard drive is usually faster than transferring it from a physical image file. This option is particularly useful when your system has difficulty maintaining its minimum required data transfer rate.
To create the physical image file with the default name <volumename.pxx>, where xx is the track number, type:

phystrk

To create the physical image file with a user defined (path) name, type:

phystrk <file_name>

To create the physical image file with a user defined (path) name, type:

phystrk -d <target_id>

<target_id> is the ID of the hard disk that can be used exclusively for storing the image, any other information at that location will be overwritten

WARNING!: Creating a physical image on a SCSI hard disk on a sector by sector basis will overwrite any information on that hard disk! Take care the SCSI hard disk is free for this use and is not used by the operating system as a mounted disk, and/or contains any data or partitions that should not be overwritten.

Verifying a Track

To verify the files and directories in the virtual image of the currently selected track, type:

vertrk

Executing this command will verify the time, date, and size of each file in the selected track against the current time, date, and size of the file. If a file has changed, GEAR will prompt you to update it. To do so, you will need to delete the file from the image then reload it.

Verifying an Image

To verify all tracks in a selected GEAR volume, type:

vervol

Executing this command will verify the time, date, and size of each track in the selected image against the current time, date, and size of the files. If a file has changed, GEAR will prompt you to update it. To do so, you will need to delete the file from the image then reload it.

Estimating System Performance

We recommend that you check the quality of your system performance before attempting to create a CD. In estimating performance, GEAR measures the transfer rate for each track in your image and compares this to the required data transfer rate needed to be able to sustain the selected write speed. If any problems are encountered during the system estimation process, GEAR will indicate with which file the problem occurred.

To ascertain if an image can be successfully written, enter:

```
estimate <volume_name>
```

Following the above command, GEAR will measure the performance of your system to determine if the data transfer rate from your hard drive to the CD recorder is capable of writing the image to CD-R. The speed settings as specified in the .gearrc file will be used. Please keep in mind that no data is actually transferred to the recorder
during this process, this is only a simulation. If parts of an image cannot be read fast enough GEAR will post a warning notification. In the event that you do receive a warning notification, try the following tips to optimize your system performance.

Optimizing Your System Performance

- Check to see if your SCSI termination is correct. Incorrect 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.

Writing your image to the recorder

When you write an image to a CD/DVD disc, GEAR can use either a virtual or a physical image file. Use a physical image file if slow data transfer rates interfere with your system performance, otherwise we recommend the use of a virtual image to save space on your hard drive.

Data Transfer Rates

While your computer is creating a disc, it must maintain a high data transfer rate to the CD recorder. If for any reason the transfer rate cannot be maintained, the writing of the CD-R will fail. Keep in mind that CD-R discs can be written at varying speeds and your data transfer rate is dependent on this speed, and the type of track being written (e.g.: ISO, CD-ROM XA, or CD digital audio). The following table illustrates the minimum required data transfer rates by disc type and speed.

Table 15.5: Data Transfer Rates

Track/Speed	1x	2x	4x	6x
ISO	153 KB/s	307 KB/s	614 KB/s	922 KB/s
CD-ROM XA	175 KB/s	350 KB/s	700 Kb/s	1051KB/s
CD Digital Audio	176 KB/s	352 KB/s	705 KB/s	1058 KB/s

For external (foreign) images, the required transfer rate will depend on the selected sector size, as a measure of comparison consider the following:
- 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.

Writing your GEAR image to CD/DVD

To write an image to a CD/DVD disc, type:

```
writecd [-t] <volume_name>
```

NOTE: GEAR will utilize a medium changer to change discs if it is connected to the same SCSI bus as your CD-R unit. However, if you are using a jukebox, your CDs must be loaded first.

Depending on the setup values, either a virtual or physical image file will be used for writing. When the physical image is used, the image is written directly to disc. Writing from a physical image will generally be faster than writing from a virtual image.

Files Created After Writing

The writecd command will always create a file called wo_ident after successfully writing an image. This file contains the table of contents (TOC) and additional information that is written to the CD recorder.

Fixating a Disc After Writing

Normally, GEAR fixates a disc automatically after writing. If a fixation failure occurs or if the Fixation option in the .gearrc file is set to false, you must fixate the disc manually. The default fixation value in GEAR has the fixation option in the .gearrc file set to true so that your disc will be automatically fixated after writing is complete.

IMPORTANT: A disc can only be read on a CD-ROM player after it is been fixated.

If you are writing audiotracks seperately, all tracks must be written to the disc with the Fixation option set to false. Before writing the final track to your disc,

if you wish your disc to be fixated, the last track must be written with Fixation set to true.

To just fixate a CD-R disc that has not been fixated, you can enter the following GEAR command:

```
fixation
```

Copying a CD

For easy copying of a CD, GEAR supports the COPYCD command:

```
copycd [-t] [<output_dir_spec>]
```

The copy CD procedure works as follows:

1. Make sure you have sufficient disk space for the temporary storage. A full Audio CD image might require up to 800 MB storage space, and a full data CD up to 700 MB. You can specify the output directory to use as argument with COPYCD.
2. Put the source disc into the recorder.
3. Make sure writing is enabled in the recorder setttings (WriteEnable=TRUE).
4. Execute the COPYCD command.
5. Wait until the whole CD is read and the temp image is stored. You will be prompted to insert a blank disc for the copy.
6. Insert a blank disc and continue with the copy procedure.
7. Wait until the copy is written and (optionally) verified.

You can force a test run before the real writing by using the -t option. A buffer underrun error during the test run will stop the copy procedure.

To write multiple copies you can change the parameter NrOfCopiesToWrite in the recorder settings to a value greater than 1.

It is posible to copy a CD-RW disc to a CD-R and vice versa.

12

Creating an Audio CD (CLI)

This chapter contains information about creating and editing audio CD images. It contains the following sections:
- About Digital Audio (DA)
- Creating an Audio Image
- Audio tracks in sessions > 1?
- Changing Recorder Settings for Disc-At-Once

About Digital Audio (DA)

Digital Audio (DA) is the standard track type for audio CDs. This robust format permits the creation of as many as 99 Red book compliant tracks within the same disc image. If you choose to create a hybrid disc, an ISO or XA track may be added. However, you will then be allowed to create only 98 DA tracks because of the non-audio track

When DA tracks are created, they must always conform to the following Red book specifications:

- The sample frequency must be 44.1 kHz.
- Audio must be stereo.
- Each sample must contain 16 bits.
- The byte order must be the identical to the byte order used by your computer, unless you are using a WAVE file. Wave files are always LSB. If you load a WAVE file into a virtual audio track, GEAR will automatically compensate for the MSB/LSB difference.

Depending on the audio editing package they came from, some audio files may contain a sound header. Audio files/tracks should not contain sound headers. If sound headers are not removed before recording, they will cause a sharp click during playback from the CD.

Use the readtrack command to copy digital audio tracks from a CD to your hard drive. By default the readtrack command will not create a header and produce a Redbook audio file in the byte order of your system (MSB or LSB), unless you specify the '-wave' option. So files copied in this manner may be recorded without any further editing on your behalf.

GEAR UNIX supports the following formats:
- Digital Audio/Red Book
- WAVE
- .IFF
- Sound Designer II

NOTE: WAVE files are typically in LSB format, AIFF files are typically in MSB format.

Creating an Audio Image

To create a new audio image with GEAR, enter:

`newvol <volume name> <80|74|63|18> DA`

Following this command, a new GEAR Volume is created, containing one empty digital audio (DA) track. The administration file for the GEAR image is located in your working directory, it's name will consists of the eight character image name you chose with the addition of the extension .vol, for example: MY_MUSIC.vol.

Adding audio tracks and loading audio files

Additional audio tracks in the GEAR Volume can be created with the newtrk command (up to 99).

`newtrk DA [<track number>]`

A track will be created and selected automatically. Audio files can be added (copied) directly from your hard drive to your Audio CD image. To copy audio files into the current track image you can use the cp command:

`cp /usr/me/myaudio/myredbookaudiofile.rdb .`

NOTE: Remember, only Red book, .WAV, and .AIFF files are supported by GEAR.

Using the readtrack command discussed earlier, you can also create an audio file first directly from an existing audio track on a music CD. The readtrack command will save audio files with the appropriate byte order for recording with GEAR. Simply follow these steps:

- Place the music CD you want to read from in your CD-R drive.
- Type readtrack
- Select the track you want to read from the dialog that appears.
- Enter a file name for the song.
- Press Enter to copy the selected track.

- Continue to repeat steps 1–5 to add more music to your image.

If you already know the number of the track you want to copy you can save time by using the following command:

```
readtrack <track number> <file name>
```

Any audio file you wish to record to a Digital Audio CD must comply with the Red Book standard. Your file must conform to the following criteria:

- The sampling frequency must be 44.1 KHz.
- Audio must be stereo.
- Each sample must consist of 16 bits.

Audio tracks in Sessions > 1?

Any time you record an audio CD, you should make an effort to conduct your recording in a single-session of a blank CD-R disc. This is because conventional CD audio players (Like your home and car stereo) are single-session readers. Consequently, you'll be unable to enjoy your music on these devices if you record your audio tracks in sessions > 1. Only the first session will be recognized by the CD audio players.

Changing Recorder Settings for Disc-At-Once

For writing your audio CD you can use either the track-at-once or the disc-at-once recording method. The recording method (and other recording parameters) can be changed with the **setcdrparms** command of the recorder module. To view the current recording parameters use the **getcdrparms** command. To edit one of the parameters, type the following command:

      `setcdrparms <parameter> <value>`

Writing in disc-at-once mode has the advantage that you can manipulate the pauses (= index 0) between the audio tracks. With track-at-once, the pauses will be fixed to two seconds (= 150 sectors). With disc-at-once you can set the pauses of audio tracks > 1 to any value, including zero. A pause of zero may be appropriate for CD's containing live music recordings. Fore the first audio track however the pause must be between 2 and 3 seconds, according to the CD audio standard. To change the pause (= index 0) of an audio track you can use the **settrackparms** command of the Generator module:
First select the audio track number in your GEAR volume of which you want to change the pause:
seltrack <track_nr>
Now change the pause length (= Index0Frames) of the audio track:

      `settrackparms Index0Frames 0`

NOTE: The pause length is specified in sectors/frames. Please note that one sector/frame is 1/75 second. So one second of audio cointains 75 sectors/frames.

13

Creating Multi-Session Discs (CLI)

With GEAR you can append additional data in the form of a new session to an existing disc, so long as that disc was previously recorded in a multi-session mode. This chapter contains information on creating and appending to multi-session discs, it contains the following sections:

- Creating a Multi-Session Disc
- Appending to a Multi-Session Disc

Creating a Multi-Session Disc

To create a multi-session disc for the first session, simply create your disc image as normal. Then before recording to CD-R check your settings with the **getcdrparms** command and make sure that the following settings are activated:

- Track-at-once: on
- Fixation: on
- Multisession: on

After verifying these settings, record your image as normal with the **writecd** command.

Appending to a Multi-Session Disc

When appending to multi-session discs, it is necessary to allocate approximately 15 MB of additional disc space for each append session you conduct to account for generating a new TOC and other administrative files. Keep this fact in mind if you are planning to conduct multiple append sessions to the same disc. Appending to multi-session discs allows you to add data to existing discs or create CD Plus and CD Enhanced formatted discs. When appending to a multi-session disc, GEAR will create a new virtual image which encompasses the existing data on the disc, and the data you are adding with the present recording session. This new image will have the same name as the session it is based upon. To create a new GEAR volume for appending to an existing multi-session disc, enter:

```
session <session_number>
```

<session_number> indicates an existing session on the multi-session disc that you want to append to.

NOTE: Unless a specific session is specified above, GEAR will default to the last session on

the disc as the session to append to. Please refer to the description of the SESSION command in the GEAR command reference chapter, for more information on the options that can be used with the SESSION command.

After entering the above command, GEAR will read the selected session on your disc and creates an image that integrates it's structure with the contents of the new session you are appending. Once this new virtual image has been created, it may be edited like any other image.

NOTE: GEAR lets you append data to a disc beginning with any session you select. This lets you restore data from older sessions that are not in the newer sessions and lets you skip the last session when there are data faults.

When you are ready to record (append) your GEAR Volume for the new session to the disc, just enter the **writecd** command.

14

Working With Foreign Image Files (CLI)

This chapter contains information about working with physical images that were created using foreign or external authoring packages - programs other than GEAR. This chapter this chapter contains the following sections:

- About External Images
- Writing an External Image to CD
- Additional External Image Information

About External Images

An external image refers to a physical image file you have created using GEAR or another authoring or formatting package, such as CD-I, 3DO, or Video CD. Usually there is a separate physical image file for every track. You cannot edit the contents of an external image in GEAR, however, you can take it 'as is' and use GEAR to write it to a CD-R disc or a pre-master tape.

Writing an External Image to CD

To write a foreign physical track image to a CD-R disc, type:

```
writecd -ext <type> <image_file | tlf_file>
```

You can specify the type and the name of an external physical track image file or a so-called 'track list file', which is a text file containing a list of track image files. <type> is a numerical value indicating the type of image file. Possible values for <type> are listed below. For track list files type should always be '12'.

1. CD-ROM mode 1 (ISO etc.), sector size 2048. Standard ISO.
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
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 most CD-I authoring tools

11. Standard CD digital audio Red Book audio (44.1kHz, 16 bit, stereo).
12. Use file name as a track list file (<track_list_file_name>). You can specify more than one track in a track list file.

IMPORTANT: Please view the description of the WRITECD command in the GEAR command reference chapter, for more information on foreign images and track list files.

You can specify the number of copies of the image you want create with the NrOfCopiesToWrite parameter, that can be set with the setcdrparms command. If a GEAR-supported medium changer is connected to the same SCSI bus as the CD recorder, GEAR uses the medium changer to change discs and automatically write multiple copies. Otherwise, GEAR prompts you to insert another blank disc as needed to write another copy.

Using a Track List File

You can use Type 12 to specify more than one track in a track list file. A track list file is a plain text file that contains one or more lines, where each line represents a track on your CD to write.
For example, to write a mixed mode image with one ISO and three audio tracks, you might enter the following 4 lines in a track list file:

> **image.dat ISO**
> **audio.2 DA +P:150** (This means there is already 2 second gap in the file)
> **audio.3 DA -P:225** (This will add 3 seconds gap before the file begins)
> **audio.4 DA -P:0**   (This will record no gap between tracks)

Support for Audio Files

Apart from loading audio files into a virtual audio track with GEAR, you can also use audio files directly as a physical track image. GEAR supports Red

book and WAV audio files as physical track images. You can use Type 11 for a standard Redbook audio file that does not have headers. You can create such a file with the readtrack command of GEAR from an audio track on an existing audio CD. If the audio file has headers (like WAV files), you have to create a track list file and use the option OB:44 to skip the header (assuming it is at the beginning of the audio file):

audio.wav DA OB:44 (This will skip the wave header of 44 bytes)

NOTE: WAVE files are usually in LSB format, but most Unix systems use the MSB format. If you are using a wave file as an external audio track image your system must be LSB. However, if you load a WAVE file into a virtual audio track created with the NEWTK command, GEAR will correct automatically for the MSB/LSB difference.

Any audio file must comply with the CD Audio (Redbook) standard. Keep in mind the following points:

- The samples must be PCM audio.
- The sampling frequency must be 44.1 kHz.
- Audio must be stereo.
- Each sample must consist of 16 bits.
- The byte order must match byte order of the computer you are using to run GEAR, unless you are loading a WAVE file into a vitual audio track..

Additional External Image Information

Please keep in mind the following points about physical track images:

- The size of the pre-gap of the first track should always be two seconds (150 sectors). Normally this pre-gap is not part of the image file. Changing the size of the pause between audio tracks to another value than 150 sectors will only have effect when using Disc-At-Once recording. GEAR supports Disc-At-Once. However, for this function to be enabled, the Disc-At-Once write method must be set with the SETCDRPARMS command.

- 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=True in the .gearrc 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 headers. 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 44.1 kHz
- The external image files option lets you select one physical track file only. If the external volume consists of more than one track, you have to write the image as a track list file.
- Unscrambled images can be accepted with a 2352 sector size without SYNC, HEADER, and EDC/ECC filled in.
- Scrambled images must contain SYNC, HEADER, and EDC/ECC code information.

15

Log and Batch Files (CLI)

This chapter contains information about creating and using batch files. It contains the following sections:

- Creating and Editing a Log File
- Running a Batch File

Creating and Editing a Log File

GEAR allows you to record all commands you type and all their feedback into a log file. The log file is a plain text file you can edit afterwards with a text editor. You can reuse the log file as a batch file with or without any editing. You can also read the log file to check for any errors in the image generation process, like when copying a large directory tree with the **cp -r** command.

Generating a Log File

To start generating a log file, enter:

```
log [<log_file_name>]
```

GEAR then will begin to record each action you perform into the log file. Logged will be the GEAR commands you enter, and all the feedback GEAR produces during the execution of a command. All the feedback in the log file is preceded by a semi-colon (;), except for the GEAR commands itself. In this way you can reuse the log file as a batch file. Lines preceded by a semi-colon in a batch file are treated as comment al will not be executed.
To stop recording to the log file, just type again:

```
log
```

GEAR will then stop recording to the log file. The LOG command acts as a 'toggle' command.

If logging is stopped and later on restarted again with the same log file name (without restarting GEAR) then the log information will be appended to that same file. Otherwise, the existing file will be renamed. It is not possible to start the logging of commands twice without stopping the logging in between. file again.

Editing a Log File

You can use a text editor to look at the log 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. For a detailed list of available commands, see the Command Reference chapter.

Running a Batch File

The GEAR batch file utility lets you run multiple GEAR commands automatically without ongoing interaction from you. You can start GEAR in batch mode by specifying a batch file name as an argument when starting gear from the Unix shell.

```
gear [<batchfile name>] [-a] [-x]
```

You can also execute batch files from within GEAR using the BATCH command directly from the command line.

The easiest way to create a batch file might be to use the LOG command to record a sequence if GEAR commands you use frequently into a log file, and use the log file as batch file. This is particularly useful for incremental backups or if you have to create the same image periodically with updated files, a CD that is updated quarterly, for example.

To run a batch file, enter the following GEAR command:

```
batch [-a] <file_name>.
```

The commands in the batch file are executed automatically. Each line that begins with a semi-colon or lines that contain unknown commands will be ignored. If any lines have invalid or missing parameters, GEAR will prompt you to provide the parameter.

16

Writing Your GEAR Image to a Pre-master Tape (CLI)

This chapter contains information regarding the testing, recording and verification of process involved in writing your GEAR generated images to CD-R or premaster tape. It contains the following sections:

- Verifying a Virtual Image
- Creating a Physical Volume
- Estimating System Performance
- Writing to CD-R
- Writing to Disc Description Protocol (DDP) Premaster Tape

Verifying a Virtual Image

When you verify a virtual image, GEAR checks the size, date, and time stamp for each file in a given track or image. If any discrepancies are detected, a message will appear indicating that a file has been modified or updated since being added to the image. At this point, GEAR will prompt you to update the image. To update a track or image, simply reload the reported files and directories to your selected image.

Verifying a Track

To verify the virtual image of a selected track, type:

VERTRK

Executing this command will verify the time, date, and size of each file in the selected track against the current time, date, and size of the file. If a file has changed, GEAR will prompt you to update it. To do so, you will need to delete the file from the image then reload it.

Verifying an Image

To verify a selected virtual image, type:

VERVOL

Executing this command will verify the time, date, and size of each track in the selected image against the current time, date, and size of the files. If a file has changed, GEAR will prompt you to update it. To do so, you will need to delete the file from the image then reload it.

Verifying an Image on Tape

1. To verify a selected virtual image, enter:

VERIFY TP <volume_name>

Table 15.6: Verifying an Image on Tape

Parameter	Definition	Example
<volume_name>	The name of the image	MY_DATA

2. GEAR then prompts you to use or change the current setup values in the .gearrcfile.

Depending on your setup values, either the virtual or physical image file can be used for verification. However, these setup values must match the setup values for writing to tape, since the contents of the tape will be verified against the source image.

Files Created After Writing to Tape

The write CD-R command will always create the following files after successfully writing an image:

- wo_ident
- woresult

The wo_ident file contains the table of contents (TOC) and additional information that is written to the CD recorder. The customer information is read from the .gearrc file. The woresult file contains general status information. These files are stored in the gear directory on the hard drive GEAR was started from.

Writing to Disc Description Protocol (DDP) Premaster Tape

If you are plan to mass-duplicate your CD-R, you may want to write your image to premaster tape. You can send the premaster tape to a replication company for mastering and duplication. GEAR can use either a virtual image or a physical image. Writing from a physical image is faster than writing from a virtual image.

You use the Tape module to write an image created with the GEAR. The tape is written in ANSI (X3.27-1987) format. The Tape module supports tape units that use a SCSI interface.

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
- tpresult
- DDPID (for DDP tapes only)
- DDPMS (for DDP tapes only)
- PQ_DESCR (for DDP tapes only)

The tp_ident 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. These files are written to your tape.

Customer information is also read from the .gearrc file and written to tape.

Writing GEAR Generated Images to Premaster Tape

To write an image to premaster tape, type:

WRITETP <volume_name>.

Table 15.7: Writing to Premaster Tape

Parameter	Definition	Example
<volume_name>	The name of the image	data.doc

Depending on the setup values, the virtual image or the physical image file is used for writing. When the physical image is used, the image is written directly to disc. Writing from a physical image is generally faster than writing from a virtual image.

Files Created After Writing to Tape

The write CD-R command will always create the following files after successfully writing an image:

- wo_ident
- woresult

The wo_ident file contains the table of contents (TOC) and additional information that is written to the CD recorder. The customer information is read from the .gearrc file. The woresult file contains general status information. These files are stored in the gear directory on the hard drive GEAR was started from.

17

GEAR Command Reference

This chapter contains the command reference of GEAR Pro for Unix. It contains the following sections:

- Basic commands
- Generator commands
- Recorder commands
- Jukebox commands
- Tape commands

The commands are listed in alphabetic order within each section.

Basic Commands

These commands do not rely on the generator or recorder engine being initialized

BATCH

BATCH [-a] <file_name>

  -a

  Execute the batch file in unattended mode. This means that no questions will be asked during the execution (dafault answers will be used automatically). Errors messages however will be reported,   because these may give vital information in case the execution of a command fails.

  file_name

  The name of a batch file, a full path is allowed.

Starts executing a batch file (text file) with GEAR commands or a previously created log file (see LOG command). The -a option can be used for unattended operation. In that case no user input is required. Otherwise, if there are commands in the batch file that have invalid or missing parameters, you will be prompted provide the parameter(s). Lines in the batch file that begin with a semicolon and empty lines will be ignored.

GETCDRDEFAULTS

GETCDRDEFAULTS

Lists the default parameters of the GEAR CD-R module, which will be used for initializing the GEAR CD-R module during next INITCDR command. GETCDRDEFAULTS can be used to inspect these defaults values. Subsequently they can be changed with a call to SETCDRDEFAULTS, if

necessary. Every parameter is listed in the form: <parameter>=<value>. Below the available parameters are listed with their default value.

```
Parameter name          default value
CDRInterface            2
SCSIBusID               0
TargetID                2
SCSIPath                <platform dependant>
SCSIBufferSize          64000
ImageReadBufferSize     262144
ImageWriteBufferSize    262144
WriteMethodCD           2
WriteMethodDVD          1
WriteEnable             TRUE
VerifyAfterWrite        TRUE
EjectAfterWrite         TRUE
AllowDiscOverflow       FALSE
NrOfWriters             1
WriteCDRSpeed           4
WriteCDRWSpeed          4
WriteDVDRSpeed          1
WriteDVDRWSpeed         2
ReadCDSpeedData         20
ReadCDRWSpeedData       20
ReadCDSpeedAudio        20
ReadCDRWSpeedAudio      20
ReadDVDSpeed            1
ReadDVDRWSpeed          2
Fixation                TRUE
MultiSession            TRUE
WriteBurnProof          TRUE
UsePhysicalImageFiles   FALSE
NrOfCopiesToWrite       1
UseMediumChanger        TRUE
InitializeMediumChanger FALSE
DriveNrInMediumChanger  3
FirstSlotNumber         1
NrOfSlotsInitialized    500
```

GETDISKDEFAULTS

GETDISKDEFAULTS

Lists the default parameters of the SCSI hard disk module. GETDISKDEFAULTS can be used to inspect these defaults values. Subsequently they can be changed with a call to SETDISKDEFAULTS, if necessary. Every parameter is listed in the form: <parameter>=<value>. Below the available parameters are listed with their default value.

```
Parameter name          default value
DiskInterface           2
SCSIBusID               0
TargetID                6
SCSIPath                <platform dependant>
SCSIBufferSize          65280
```

GETGENDEFAULTS

GETGENDEFAULTS

Lists the default parameters of the generator module, which will be used for initializing the generator module during next INITGEN command. GETGENDEFAULTS can be used to inspect these defaults values. Subsequently they can be changed with a call to SETGENDEFAULTS, if necessary. Every parameter is listed in the form: <parameter>=<value>. Below the available parameters are listed with their default value.

```
Parameter name          default value
SystemIdf               "GEAR CD-R PREMASTERING"
PublisherIdf            ""
DataPreparerIdf         "GEAR SOFTWARE"
ApplicationIdf          ""
CopyRightFileIdf        ""
AbstractFileIdf         ""
BibliographicFileIdf    ""
MaxNrDirsInVolume       2048
```

```
MaxDirNestingLevel          24
NonIsoNameHandling          1
AddRockRidgeInfo            TRUE
SpecifyStartSector          FALSE
FollowSymLinks              FALSE
UseLocalTime                FALSE
AddGMTOffset                FALSE
DefaultDirMode              rwxr-xr-x
DefaultFileMode             rwxr--r--
DefaultUID                  0
DefaultGID                  0
```

GETTAPEDEFAULTS

GETTAPEDEFAULTS
Lists the default parameters of the premaster tape module, which will be used for initializing the tape module during next INITTAPE command. GETTAPEDEFAULTS can be used to inspect these defaults values. Subsequently they can be changed with a call to SETTAPEDEFAULTS, if necessary. Every parameter is listed in the form: <parameter>=<value>. Below the available parameters are listed with their default value.

```
Parameter name                 default value
TapeInterface                  2
SCSIBusID                      0
TargetID                       5
SCSIPath                       <platform dependant>
DDP1FormatTapeForCD            TRUE
DDP2FormatTapeForDVD           TRUE
FileOptionForCD                2
FileOptionForDVD               2
DVDMode1TrackSectorSize        2048
DVDMode1BlockingFactor         16
CDMode1TrackSectorSize         2048
CDMode1TrackBlockingFactor     4
CDMode1TrackWithPregapPostgap  FALSE
CDDATrackWithPause             FALSE
CDMode2TrackSectorSize         2336
```

```
CDMode2TrackBlockingFactor    4
CDMode2TrackWithPregapPostgap FALSE
ScramblingFor2352Sectors      FALSE
UsePhysicalImageFiles         FALSE
VerifyAfterWrite              TRUE
UnloadAfterWrite              TRUE
WriteIdentTxtOnTape           FALSE
CustomerName                  " "
CustomerContact               " "
CustomerPhone                 " "
MasterIDCode                  " "
ReferenceCode                 " "
DiscTitle                     " "
```

GETWORKINGDIR

GETWORKINGDIR

GETWORKINGDIR list the current working directory that GEAR is using for
GEAR volumes (images). If necessary, the working directory can be changed
with a call to SETWORKINGDIR. A list of the GEAR volumes in the current
working directory can be obtained with the VDIR command.

HELP

HELP [<command>]

command

 Name of the command you are seeking help for.

If no arguments are specified on the command line, HELP displays a list of
GEAR commands that are available for user level access. If a valid
command name is specified on the command line as argument, HELP
displays a short help text associated with the command.

INITCDR

`INITCDR`

Initializes the GEAR CD-R module and the selected SCSI driver interface, scans for CD/DVD recorders on all SCSI busses driven by the SCSI driver, and initializes a CD/DVD recorder for usage (if any is found). If the selected BusID and TargetID in the recorder parameters do not match, the recorder with the highest target ID on the highest bus ID is used. If the bus ID matches (any recorder found on that bus), but the target ID does not match, the recorder with the highest target ID is used. If only one recorder is connected anywhere, the software will be able to find it. If the INITCDR command is successful, the other commands of the GEAR CD-R module are added (enabled) for usage. The default recorder parameters are used for the initialization, which are the last defaults set with the SETCDRDEFAULTS command. Once INITCDR has been executed successfully, changing the SCSI parameters with SETCDRDEFAULTS will not have effect until a reinitialization (EXITCDR-INITCDR). Changing the SCSI parameters can only be done with the SETCDRDEFAULTS command. Run time operating parameters like most CD recorder settings however can be obtained and changed after initialization with the GETCDRPARMS/SETCDRPARMS commands.

NOTE: INITCDR uses the SCSI IO driver of the GEAR CD-R module to find and initialize the recorder. If, for some reason, the SCSI IO driver in the system is unable to recognize a certain recorder, this will usually also prevent GEAR from finding your device, and INITCDR will not detect it! GEAR will only recognize the recorder devices of which the names are included in the recorder configuration files supplied with GEAR (Name = SCSI Inquiry Vendor ID + Product ID). A list of supported recorders can be found in the readme file suplied with GEAR. To support new models that appear on the market, GEAR Software will make updates available of these recorder configuration files regularly. Contact GEAR technical support for information on the possibilities to support a particular new drive model with your GEAR version.

INITGEN

`INITGEN`

Initializes the generator (formatting) engine and adds all generator commands as available GEAR commands. The default generator parameters will be used for initialization, which are the last defaults set with the SETGENDEFAULTS command. Changing the generator parameters after INITGEN can be accomplished with the GETGENPARMS/SETGENPARMS commands.
The generator always places its output like GEAR volume administration files, physical image files, etc. in the working directory last set by the SETWORKINGDIR command.

INITTAPE

`INITTAPE`

Initializes the tape module and the selected SCSI driver interface, scans for tape drives on all SCSI busses driven by the SCSI driver, and initializes a tape drive for usage (if any is found). If the selected BusID and TargetID in the tape parameters do not match, the tape driver with the highest target ID on the highest bus ID is used. If the bus ID matches (any drive found on that bus), but the target ID does not match, the driver with the highest target ID is used. If only one tape drive is connected anywhere, the software will be able to find it. If the INITTAPE command is successful, the other commands of the tape module are added (enabled) for usage. The default tape parameters are used for the initialization, which are the last defaults set with the SETTAPEDEFAULTS command. Once INITTAPE has been executed successfully, changing the SCSI parameters with SETTAPEDEFAULTS will not have effect until a reinitialization (EXITTAPE-INITTAPE). Changing the SCSI parameters can only be done with the SETTAPEDEFAULTS command. Run time operating parameters like most tape output format settings however can be obtained and changed after initialization with the GETTAPEPARMS/SETTAPEPARMS commands.

LOG

```
LOG [<file_name>]
  file_name
```
   The name of the log file. A full path is allowed.

The LOG command acts as a 'toggle' command. In combination with a filename this command starts the logging of information into a log file. Logged will be the commands that are executed and other relevant log output normally logged to the screen. If logging has already been started, the LOG command will stop the logging. If logging is stopped and later on restarted again with the same file name (without restarting GEAR) then the log information will be appended to that same file. Otherwise, the existing file will be renamed. It is not possible to start the logging of commands twice without stopping the logging in between. All log output except for the GEAR commands itself will be preceded by a semi-colon in the log file, so it is possible to run the log file as a GEAR batch file again.

SCANCDR

```
SCANCDR
```

Scans for CD-Recorder devices on all target/SCSI ID's on all SCSI busses/ adapters, using the currently selected SCSI driver interface. SCANCDR produces a list of the CD recorder devices that have been found by the selected SCSI driver.
If, for some reason, the SCSI IO driver in the system is unable to recognize a certain device, this will usually also prevent GEAR from finding your device, and SCANCDR will not report it! GEAR will only recognize the recorder devices of which the names are included in the recorder configuration files supplied with GEAR (Name = SCSI Inquiry Vendor ID + Product ID). To support new models that appear on the market, GEAR Software will make updates available of these recorder configuration files regularly. Contact GEAR technical support for information on the possibilities to support a particular new drive model with your GEAR version.

SCANDISK

SCANDISK

Scans for hard drives on all target/SCSI ID's on all SCSI busses/adapters, using the currently selected SCSI driver interface. SCANDISK produces a list of the hard disk devices that have been found by the selected SCSI driver.

SCANJUKE

SCANJUKE

Scans for medium changer (Jukebox) devices on all target/SCSI ID's on all SCSI busses/adapters, using the currently selected driver interface. SCANJUKE produces a list of the medium changer (jukebox) devices that have been found by the selected SCSI driver.

NOTE: If you're going to mass-duplicate your CD-R you can, as an alternative to writing to a CD, you can write an image to a premaster tape. The tape, optionally written in DDP format, is accepted as a standard at mastering plants. You can send the premaster tape to such a replication company for mastering and duplication.

SCANSCSI

SCANSCSI

Scans for any SCSI devices on all target/SCSI ID's on all SCSI busses/adapters, using the currently selected driver interface of the DISK module. SCANSCSI produces a list of the SCSI devices that have been found by the selected SCSI driver.

NOTE: Because SCANSCSI uses the SCSI IO driver of the disk interface, it cannot be guaranteed that SCANSCSI will find all the SCSI (and IDE) devices in the system.

Different categories of devices may have different SCSI IO drivers! Instead of SCANSCSI, we therefore recommend to use a combination of SCANCDR, SCANJUKE, SCANTAPE and SCANDISK to determine all the SCSI (and IDE) devices in the system, using the appropriate SCSI IO driver for each type of device. If, for some reason, the SCSI (IDE) IO driver in the system is unable to recognize a certain device, this will usually also prevent GEAR from finding your device, and SCANSCSI will not report it!

SCANTAPE

SCANTAPE

Scans for tape devices on all target/SCSI ID's on all SCSI busses/adapters, using the currently selected driver interface. SCANTAPE produces a list of the tape devices that have been found by the selected SCSI driver.

SETCDRDEFAULTS

SETCDRDEFAULTS [<parameter>] [<value>]

parameter

Name of the parameter to set. Please refer to the description of the GETCDRDEFAULTS command for a list of supported parameters.

value

New value to assign to the parameter. If the value of the parameter refers to a boolean type in stead of a text string or a number, either "TRUE", "T" or "Y" may be entered for TRUE and either "FALSE", "F" or "N" may be entered for FALSE. Otherwise, the textual or numerical string can just be entered.

Sets the default parameters of the GEAR CD-R module, which will be used for initializing the GEAR CD-R module with the next INITCDR command. GETCDRDEFAULTS can be used to inspect these defaults values. Subsequently they can be changed with a call to SETCDRDEFAULTS, if necessary. Two arguments need to be specified on the command line. GEAR assumes the first argument indicates the textual name of the parameter to

change, and the second argument its new value. If the value of the parameter refers to a boolean type (TRUE or FALSE) in stead of a text string or a number, 'y' ot 't' should be entered for TRUE, and 'n' or 'f' for FALSE, as the second argument. Otherwise, the textual or numerical string can be entered for the second argument.

SETDISKDEFAULTS

SETDISKDEFAULTS [<parameter>] [<value>]

parameter

Name of the parameter to set. Please refer to the description of the GETDISKDEFAULTS command for a list of supported parameters.

value

New value to assign to the parameter. If the value of the parameter refers to a boolean type in stead of a text string or a number, either "TRUE", "T" or "Y" may be entered for TRUE and either "FALSE", "F" or "N" may be entered for FALSE. Otherwise, the textual or numerical string can just be entered.

Sets the default (SCSI) parameters of the GEAR Disk module. GETDISKDEFAULTS can be used to inspect these defaults values. Subsequently they can be changed with a call to SETDISKDEFAULTS, if necessary. Two arguments need to be specified on the command line. GEAR assumes the first argument indicates the textual name of the parameter to change, and the second argument its new value. If the value of the parameter refers to a boolean type (TRUE or FALSE) in stead of a text string or a number, 'y' ot 't' should be entered for TRUE, and 'n' or 'f' for FALSE, as the second argument. Otherwise, the textual or numerical string can be entered for the second argument.

SETGENDEFAULTS

SETGENDEFAULTS [<parameter>] [<value>]

parameter

Name of the parameter to set. Please refer to the description of the GETGENDEFAULTS command for a list of supported parameters.

value

New value to assign to the parameter. If the value of the parameter refers to a boolean type in stead of a text string or a number, either "TRUE", "T" or "Y" may be entered for TRUE and either "FALSE", "F" or "N" may be entered for FALSE. Otherwise, the textual or numerical string can just be entered.

Sets the default parameters of the GEAR Generator module, which will be used for initializing the GEAR Generator module with the next INITGEN command.. GETGENDEFAULTS can be used to inspect these defaults values. Subsequently they can be changed with a call to SETGENDEFAULTS, if necessary. Two arguments need to be specified on the command line. GEAR assumes the first argument indicates the textual name of the parameter to change, and the second argument its new value. If the value of the parameter refers to a boolean type (TRUE or FALSE) in stead of a text string or a number, 'y' ot 't' should be entered for TRUE, and 'n' or 'f' for FALSE, as the second argument. Otherwise, the textual or numerical string can be entered for the second argument.

SETTAPEDEFAULTS

SETTAPEDEFAULTS [<parameter>] [<value>]

parameter

Name of the parameter to set. Please refer to the description of the GETTAPEDEFAULTS command for a list of supported parameters.

value

New value to assign to the parameter. If the value of the parameter refers to a boolean type in stead of a text string or a number, either "TRUE", "T" or "Y" may be entered for TRUE and either "FALSE", "F" or "N" may be entered for FALSE. Otherwise, the

textual or numerical string can just be entered.

Sets the default parameters of the GEAR Tape module, which will be used for initializing the GEAR Tape module with the next INITTAPE command. GETTAPEDEFAULTS can be used to inspect these defaults values. Subsequently they can be changed with a call to SETTAPEDEFAULTS, if necessary. Two arguments need to be specified on the command line. GEAR assumes the first argument indicates the textual name of the parameter to change, and the second argument its new value. If the value of the parameter refers to a boolean type (TRUE or FALSE) in stead of a text string or a number, 'y' ot 't' should be entered for TRUE, and 'n' or 'f' for FALSE, as the second argument. Otherwise, the textual or numerical string can be entered for the second argument.

SETWORKINGDIR

`SETWORKINGDIR <work_dir>`

  `work_dir`

   New name of the working directory.

SETWORKINGDIR changes the current working directory of the GEAR. An opened volume is automatically closed when you issue this command. After having changed to a new directory through this command, new volumes will be stored in this directory. The work_dir parameter may be a relative path or a fully qualified path. In either case, the fully qualified path of the specified directory is calculated and stored as the working directory. For backwards compatbility, SETWORKINGDIRECTORY is an alias for SETWORKINGDIR.

VDIR

`VDIR`

VDIR produces a list of the GEAR volumes present in the current working directory, containing the following information:

- 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

The status of a volume can be either Selected or Closed. A volume is selected if it's currently selected by a OPENVOL (SELVOL) or SESSION command. 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 date and time is shown for the Pacific time zone. This information is sent to the WriteLine function, so don't use the PS_NO_LOGGING option. In a later Toolkit version this information will be stored in a separate structure.

Generator commands

CD

```
CD <dir_name>
```
dir_name

Directory name in the virtual image.

Changes to the specified directory in the virtual image. The command recognizes commands like CD.., CD /, CD SUB1, and CD /SUB1. It is possible to specify a path name as the directory name.

CHGRP

`CHGRP [-r] <GID> <file_dir_spec>`

`-r`

If the -r options is present sub directories are listed as well.

`GID`

Is a numerical value between 0 and some system specific limit (see man limits) indicating the new group id.

`file_dir_spec`

refers to directories or files in the current directory of the image. It may not contain directory separators, but wildcards are allowed.

Changes the group id for all files in the current directory that match file_dir_spec. The -r option also includes the files in the sub-directories. UID must be a number.

CHMOD

`CHMOD [-r] <mode> <file_dir_spec>`

`-r`

If the -r option is specified sub directories are traversed as well.

`mode`

mode is symbolic: <sym_change> { , <sym_change>}
where <sym_change> is the form:[<who>] <operator> [<permissions>]
or octal: [[[<n>] <n>] <n>] <n>
 <who>:u, g, o, a
 <operator>:+, -, =
 <permissions>:r, w, x, u, g, o, l, s, t
 <n>:0-7

`file_dir_spec`

Refers to files/directories in the current directory of the image. It may not contain a directory separator, but wildcards are allowed.

The components of <who> have the following meaning:

u: user
g: group
o: other
a: equivalent to ugo (user + group + other).

When <who> is absent a is assumed. Note that a (<who>) is equivalent to ugo.

The components of <operator> have the following meaning:

+: Add permissions.
-: Remove permissions
=: Add indicated permissions, remove others.

The components of <permissions> have the following meaning:

r: Read permission.
w: Write permission.
x: Execute permission.
s: Set UID/GID on execution.
t: Sticky bit.
l: Lockable file (i.e. SGID bit set, group execute permission bit reset). Gear uses this flag on all   Unix platforms, but not all Unix platforms support it, i.e. the l flag can be specified on DEC (using DEC's chmod, but it is shown as S by DEC's ls).
u: Copy permissions of user. If for example the command chmod o+u <file> is issued and user has permissions -wx while other has permissions r-- then the effect of the above command is to assign rwx to other.
g: Copy permissions of group.
o: Copy permissions of other.
If octal format is used and the number of octal digits is less then 4 the mode is left padded with zeroes (so 6 is equivalent to 0006, allowing read/write access to other, denying all access to user and group).

CHOWN

CHOWN [-r] <UID> <file_dir_spec>

-r

If the -r option has been specified sub-directories are traversed as well.

UID

Is a numerical value, indicating the new owner id, between 0 and some system specific limit (see man limits).

file_dir_spec

Refers to directories or files in the current directory of the image. It may not contain directory seperators, but wildcards are allowed.

Changes the user id for all files in the current directory that match fil_dir_spec. The -r option also includes the files in the sub-directories. UID must be a number.

CLOSEVOL

CLOSEVOL
CLOSEVOL closes the currently selected volume.

CP

CP [-r] <source_spec> <dest_spec>

-r

Indicates that all sub directories must be copied as well (equivelent to copytree).

source_spec

Files(s) which match the specified source_spec.

dest_spec

If a directory in the image, files are placed in it otherwise the files are copied into the

image under the named <dest_spec>.

Copies the files which match the specified <source_spec> in the image.
If <dest_spec> is a directory that already exists in the image, the files are placed in that directory. If not, the files are copied into the image under the named <dest_spec> (in that case <source_spec> may not contain wild cards). <dest_spec> may also be "." (the image's current directory).
Note that in order to achieve the same effect as the old GEAR command CP -r dir you must now type 'CP -r dir/* .' ("." indicates the current directory).
For example: Your disk contains the following files in the directory /usr/bin: file_1,file_2 and file_3.
The command 'CP -r /usr/bin bin' causes the directory bin with the files file_1, fil_2 and file_3 to be created in the image.
If you enter the command again, a sub directory will be created within the directory bin which will again contain the sub directory bin with the files file_1, fil_2 and file_3. This results in the following situation in the image:

```
/bin
/bin/file_1
/bin/file_2
/bin/file_3
/bin/bin
/bin/bin/file_1
/bin/bin/file_2
/bin/bin/file_3
```

DELTRK

DELTRK <track_nr>

  track_nr

  Track number of the track to delete.

Deletes the specified track in the selected GEAR volume. All administration files and the physical image file, if present, are deleted as well. Note that deleted tracks cannot be restored.

NOTE: External physical image files that have been added to a track with the NEWTRKEXT
        command, will not be deleted with the DELTRK command.

DELVOL

DELVOL <volume_name>

  volume_name

   The name of the volume that will be deleted.

Deletes the specified volume and all tracks in it. In addition, all
administration files of the volume and its tracks are deleted and the physical
image file if present. Be sure you want to do this because inadvertently
deleted volumes cannot be restored.

EXITGEN

EXITGEN

Closes the GEAR generator module and removes all generator commands
as available Toolkit commands. All currently opened volumes are optimized
and stored automatically.

GETGENPARMS

GETGENPARMS

DescriptionLists the current parameters of the generator module.
GETGENPARMS can be used to inspect these defaults values.
Subsequently they can be changed with a call to SETGENPARMS, if
necessary. Every parameter is listed in the form: <parameter>=<value>.
Below the available parameters are listed with their default value.
Parameter name   default value

```
SystemIdf                "GEAR CD-R PREMASTERING"
PublisherIdf             ""
DataPreparerIdf          "GEAR SOFTWARE"
ApplicationIdf           ""
CopyRightFileIdf         ""
AbstractFileIdf          ""
BibliographicFileIdf     ""
MaxNrDirsInVolume        2048
MaxDirNestingLevel       24
NonIsoNameHandling       1
AddRockRidgeInfo         TRUE
SpecifyStartSector       FALSE
FollowSymLinks           FALSE
UseLocalTime             FALSE
AddGMTOffset             FALSE
DefaultDirMode           rwxr-xr-x
DefaultFileMode          rwxr--r--
DefaultUID               0
DefaultGID               0
```

GETTRACKINFO

GETTRACKINFO

Lists information about the currently selected track in a GEAR volume. The information listed with GETTRACKINFO is not changable (read only). Changable track parameters are listed by the GETTRACKPARMS command, and can be set to different values with the SETRACKPARMS command.

GETTRACKPARMS

GETTRACKPARMS

Lists the changable parameters of the currently selected track in the currently selected GEAR volume. GETTRACKPARMS can be used to inspect

these values. Subsequently they can be changed with a call to SETTRACKPARMS, if necessary. Every parameter is listed in the form: <parameter>=<value>.

Below the available parameters are listed with their default value.

```
Parameter name          default value
Volume                  <volume_name>
SystemIdf               "GEAR CD-R PREMASTERING"
PublisherIdf            ""
DataPreparerIdf         "GEAR SOFTWARE"
ApplicationIdf          ""
CopyRightFileIdf        ""
AbstractFileIdf         ""
BibliographicFileIdf    ""
MaxDirNestingLevel      24
NonIsoNameHandling      1
SpecifyStartSector      FALSE
FollowSymLinks          FALSE
DefaultDirMode          rwxr-xr-x
DefaultFileMode         rwxr--r--
DefaultUID              0
DefaultGID              0
```

GETVOLINFO

GETVOLINFO

Lists global information about the currently selected GEAR volume. The information listed with GETVOLINFO is not changable (read only). Changable volume parameters are listed by the GETVOLPARMS command, and can be set to different values with the SETVOLPARMS command.

GETVOLPARMS

GETVOLPARMS

Lists the changable parameters, global for the currently selected GEAR volume. GETVOLPARMS can be used to inspect these values. Subsequently they can be changed with a call to SETVOLPARMS, if necessary. Every parameter is listed in the form: <parameter>=<value>.
Below the available parameters are listed with their default value.

```
Parameter name          default value
UPCEANCode                  " "
```

LN

```
LN [-u <uid>] [-g <gid>] <target> <file_name>
```

  -u uid

   The user id of the new link.

  -g gid

   The group id of the new link.

  target

   Target where the link points to. May be a path containing directory seperators.

  file_name

   Name of the new link. May not contain directory seperators.

Creates a new symbolic link referring from <file_name> to <target>. The options -u and -g set the corresponding values in <target>. Rockridge information is required for the track (AddRockridgeInfo set to TRUE when the track was created).

LS

```
LS  [-r] [-iso] [<file_spec>]
```

  -r

   If the -r options is present sub directories are listed as well.

  -iso

If the -iso options is present listing is done in ISO format.

file_spec

is the name of the file or directory to be listed. It may contain wildcards.

Produces a list of the file/directory entries present in the current directory of the current GEAR track image. If file_specis entered then only matching files/directories are displayed. Otherwise all file/directory entries in the current directory are displayed. The output is common to the output of the 'ls -l' command on Unix systems. If Rockridge information is present (AddRockridgeInfo wat set to TRUE when the track was created), LS will display the Rockridge names for all files and directories. Otherwise the ISO names will be displayed. The -r option can be used for recursive listing of all the subdirectories. The -iso option causes display of both Rockridge names and ISO names, in an output format common to the DOS 'DIR' command.

MKNOD

```
MKNOD [-m <mode>] [-u <uid>] [-g <gid>] <file_name> p
MKNOD [-m <mode>] [-u <uid>] [-g <gid>] <file_name>
      (b / c) <major> <minor>
```

-m mode

The access mode, specified in octal format like "mknod -m 0666 ...".

u uid

The user id.

-g gid

The group id.

file_name

The file to which a pipe is attached or the special block

p

Creates a named pipe(also known is FIFO).

b / c

Creates a character(c) or block(b) special file.

major / minor

Creates a character(c) or block(b) special file with major and minor number set to <major> <minor>

Creates a new named pipe, or a character(c) or block(b) device special file in the currently selected GEAR track image. The device special files are created using the specified major and minor numbers. Rockridge information is required for the track (AddRockridgeInfo set to TRUE when the track was created).

MKDIR

MKDIR <dir_name>

dir_name

Name of a new directory to create.

Creates a new directory in the selected track of the current GEAR volume. The directory name should be different from the existing directories in the selected track. If possible the number of files and directories in a directory should be restricted to about 50, which will improve the performance of the future CD-ROM.

MV

MV <old_name> <new_name>

old_name

File or directory name in the virtual volume.

new_name

New file or directory name. Path specification is not supported.

Moves (renames) a directory or file in the virtual image to the desired name, relative to the current directory. E.g. to rename a nested directory X/Y in your image to, e.g. S, you should first change to directory Y and then rename this

to S (MV Y S).

NEWTRK

NEWTRK <track_type> [<track_nr>]

track_type

Type of the virtual track to create, which can be ISO, XA or DA
ISO is referred to as track type based on the CD-ROM mode 1 format, for the storage of computer data according to the ISO 9660 standard.
XA (eXtended Architecture) is referred to as a track type based on the CD-ROM XA mode 2 format, for the storage computer data extended with extra multi-media possibilities. DA is a track type for digital audio (Redbook).
In the future the following track types will also be supported: ISOUDF102, ISOUDF150, ISOUDF200, UDF102, UDF150 and UDF200. These options will require Toolkit ISOUDF support and UDF support respectively.

track_nr

Track number for the new track to create in the volume. If not specified, a track number will be assigned that is one higher than the last track number in the volume. According to the CD standards, the highest track number must be less than or equal to 99.

Creates a new empty virtual track of the specified type in the selected GEAR volume. The track is automatically selected and its size will be expanded to take the remaining space within the volume. Optionally a track number can be specified, which is only relevant to virtual DA tracks since virtual ISO and XA tracks must have track number 1. Tracks with a number greater than or equal to the inserted track number are moved up. There are certain restrictions to the type of tracks that can be combined in one disc volume or disc session. ISO and XA tracks mutually exclude each other and therefore cannot be combined. In most cases, a data CD will be created with only one data track as the first track, or an audio disc with multiple audio tracks will be created. If audio tracks are added to the data track, a 'mixed mode' disc is created. In any case, it is not allowed that data tracks follow audio tracks. These data tracks will never be recognized by CD-ROM players, etc. The administration files of the virtual track are created in the current directory. The names of all the administration files consist of the volume name followed

by the extensions .mxx, .ixx, .fxx and .vxx, where xx stands for the track number.

NOTE: You should never edit, delete or otherwise modify the administration files manually. This will result in a corrupted and thus useless image.

NEWTRKEXT

```
NEWTRKEXT <file_name> <track_type> [N:<track_nr>]
          [S:<sector_size>] [+P:<pause>] [O:<offset>]
          [L:<length>]
```

file_name

A full path specification of an existing physical track image file on your computer.

track_type

A type string identifying the type of track. Possible options are: 'MODE1', 'XA', 'CDI', 'DA'.

track_nr

Track number for the new track to create in the volume. If not specified, a track number will be assigned that is one higher than the last track number in the volume. According to the CD standards, the highest track number must be less than or equal to 99.

sector size

The sector size (bytes per CD sector) of the track image file. Possible values are: '2048', '2336', '2340', '2352', '2352S' '2352S' means the data in the track image are 'scrambled'. Default values are 2048 for MODE1 tracks, 2336 for XA/CDI tracks and 2352 for DA tracks.

pause

The size of the pause/pregap (index 0) of the track in sectors/frames.
0 (zero) is an allowed value for the pause, if the track number is greater than 1. The default value is 150 frames not included (-P:150). The first track can only have the default value of 150. Non-default pause sizes are only supported with disc-at-once recording. A - sign before P means that the pause is not included in the image file, and that the pause is added as silence by the software to the (beginning of) a track. A + sign before P means that the pause is included in the image file, and that data from the

beginning of the image file are used for the pause.

offset

The offset in frames where the track should start within an image file. The default value is 0.

length

The length in frames of the track (within an image file). The default value is the complete file length.

NOTE: The offset and length can be used if the start and the end of a track do not match with the start and the end of a file.

Creates a new track with the given external track image file as 'physical track image' in the selected volume. No virtial track administration is created in this case for the track, hence no editing of the file and directory contents of the track is possible. However, it is possibly to use the GETTRACKPARMS and SETTRACKPARMS commands to edit options like the pause and the ISRC code of the track. Optionally a track number can be specified. Tracks with a number greater than or equal to the inserted track number are moved up. There are certain restrictions to the type of tracks that can be combined in one disc volume or disc session. ISO, XA and CD-I tracks mutually exclude each other and therefore cannot be combined. In most cases, a data CD will be created with only one data track as the first track, or an audio disc with multiple audio tracks will be created. If audio tracks are added to the data track, a 'mixed mode' disc is created. For Photo CD and Video CD, which contain tracks of the XA type, it is allowed to combine multiple (XA) data tracks in one volume. In any case, it is not allowed that data tracks follow audio tracks. These data tracks will never be recognized by CD-ROM players, etc.

NEWVOL

NEWVOL <volume_name> <capacity> [CD/DVD]

volume_name

The name of the volume to be created. The following restrictions can be applied to the volume name: ISONameHandling, ISO 9660 PVD and OS file-naming restrictions.

`capacity`

Indicates the length in minutes of the CD image. Not all sizes are applicable to all media, see the following table for an overview of formats:

Image	size	CD-R	DVD-R	DVD-T
18 min.	158 MB	+	–	–
63 min.	553 MB	+	–	–
74 min.	650 MB	+	–	–
80 min.	703 MB	+	–	–
428 min.	3.95 GB	–	+	+
509 min.	4.7 GB	–	+	+
922 min.	8.5 GB	–	–	+
1844 min.	17 GB	–	–	+

The DVD capacity 8.5 GB implies a single side dual layer or dual side single layer disc format. The DVD capacity 17 GB implies a dual side + dual layer disc format. For DVD-R recording and premaster tape output for DVD, the maximum capacity may is currently restricted to 3.95 GB or 4.7 GB format by GEAR (single side, single layer). GEAR allows to create 8.5 and 17 GB only for physical image file creation.

`[CD/DVD]`

Indicates the volume type: CD or DVD. If the CD/DVD option is not used, normal CD volumes will be created for volume capacities 18, 63, 74 and 80 minutes, and DVD volumes will be created for volume capacities 428, 509, 922 and 1844. It is not possible to create CD images for capacities larger than 80 minutes.

Creates a new empty virtual GEAR volume with the name and capacity in minutes you specify. The new volume is selected automatically. The volume administration file will be placed in the current working directory and its name is the volume name followed by the .vol extension.
NoteYou should never edit, delete or otherwise change the administration files by yourself. This will result in a corrupted and thus useless image.

OPENVOL

`OPENVOL <volume_name>`

`volume_name`

The name of an existing GEAR volume to be opened (selected).

Opens (selects) an existing GEAR volume. Only one GEAR volume and track can be opened simultaneously. Any prevously selected volume and track are automatically closed by OPENVOL. The VDIR command can be used to get an overview of all GEAR volumes present in the current working directory (which can be set by the SETWORKINGDIR command).

NOTE: SELVOL can be used as an alias for OPENVOL (for backwards compatibility with the command set of old GEAR software products).

PHYSTRK

```
PHYSTRK [<file_name>]
PHYSTRK #<scsi_id>
```

file_name

  Name of the physical image file to create. A full path is allowed.

scsi_id

  Target ID of of a raw (SCSI) hard disk, on which to create the physical image.

NOTE: GEAR interfaces with raw hard disk devices using a separate SCSI driver interface, which parameters can be with manipulated by the GETDISKDEFAULTS and SETDISKDEFAULTS commands. Use the SCANDISK command to obtain a list of disk drives that have been found by GEAR in the system.

WARNING!: Using this option will completely overwrite the hard disk with a byte to byte copy of the physical image. Take care not to overwrite disks that contain vital information for your computer system!

Assuming you have selected a volume and a track, PHYSTRK creates a physical image file of this track. The physical image file is a byte for byte copy of the future CD/DVD track. The sector sizes for the tracks are based on their type as follows:

```
Track type       Sector size
 ISO              2048 bytes
 ISO/UDF102       2048 bytes
```

```
ISO/UDF150      2048 bytes
ISO/UDF200      2048 bytes
UDF102          2048 bytes
UDF150          2048 bytes
UDF200          2048 bytes
XA              2336 bytes
DA              2352 bytes
```

Before writing the image file the software will verify the files loaded in the virtual track. For each file in the track the time, date and size of loading is checked against the current time, date and size of the file. If any file is not up to date, i.e. the check fails, the physical image is not written. The image can be updated by deleting the reported files from the virtual image. It is not strictly necessary to write a physical image file, all modules can handle virtual images as well as physical image files. The physical image contains the contents of the virtual image at that point in time. Any subsequent changes in the volume will only affect the virtual image. However, the physical image will be marked out of date, see GETTRACKINFO. The default physical image file name is the name of the volume with a .Pxx extension where, xx stands for the track number. This default physical image file is normally written in the current directory. However, if the optional parameter file_name is specified the image will not be written as the default name in the current directory but as file_name on the specified location. A full path for file_name is allowed, like D:\MyImages\MyTrack1Image.dat. This option may be useful if there is not enough hard disk space on the current drive/ directory, but if there is on another drive (letter).

PHYSVOL

PHYSVOL [<file_name>]

  file_name

   Optional physical file name that may include a full path.

Creates the physical image files of the selected volume. For each track in the image a physical image file is created. Each physical image file is a byte for byte copy of the future CD-ROM track. Before writing the image files the

software will verify the volume. That is for each file in each track in the virtual image the time, date and size at loading is checked against the current time, date and size of the file. If any file is not up to date (i.e. the check fails) the physical image file is not written. The image can be updated by deleting the reported files from the virtual image. It is not strictly necessary to write a physical image file, all modules can handle a virtual image as well as a physical image file. If, however the transfer rate for recording has to be increased you should use a physical image for writing to CD-R. Otherwise, you can usually write with a virtual image. The physical image contains the contents of the virtual image at that point in time. Any subsequent changes in the volume will only affect the virtual image. The default physical image file names are .Pxx where xx stands for the track number. These default physical image file are normally written in the current directory. However, if the optional parameter file_name is specified the images will not be written as the default names in the current directory but as file_name on the specified location. The file_name argument should therefore be specified preferably without an extension as volumes having more tracks will overwrite the previous ones.

RM

RM [-r] <file_spec>

  file_spec

   Name of the file to delete in the currently selected volume and track. Wildcards (* and ?) are allowed.

Deletes the specified file(s) from the virtual track image. For example, 'RM *' will delete all files in the current directory of the virtual image. The [-r] option is used to recursively delete directories.

RMDIR

RMDIR <dir_name>

  dir_name

Existing directory name in a virtual image, wildcards are not allowed.

Deletes the specified directory from the selected (data) track in the current volume. The directory must be empty, otherwise it cannot be deleted. Use the RM -R command to remove complete directory trees from the virtual image.

SELTRK

SELTRK <track_nr>

  track_nr

   Track number between 1 and the number of tracks in the volume.

Selects an existing track in a selected GEAR volume. The previously selected track (if any) is minimized and closed. A volume and track must be selected before you can edit the contents of a track.

SETGENPARMS

SETGENPARMS [<parameter>] [<value>]

  parameter

   Name of the parameter to set. Please refer to the description of the GETGENPARMS command for a list of supported parameters.

  value

   New value to assign to the parameter. If the value of the parameter refers to a boolean type in stead of a text string or a number, either "TRUE", "T" or "Y" may be entered for TRUE and either "FALSE", "F" or "N" may be entered for FALSE. Otherwise, the textual or numerical string can just be entered.

Sets the current parameters of the GEAR Generator module. These parameters affect the options with which new GEAR volumes and tracks will be created with the NEWVOL and NEWTRK commands. GETGENPARMS can be used to inspect the current values. Subsequently they can be

changed with by call to SETGENPARMS, if necessary. Two arguments need to be specified on the command line. GEAR assumes the first argument indicates the textual name of the parameter to change, and the second argument its new value. If the value of the parameter refers to a boolean type (TRUE or FALSE) in stead of a text string or a number, 'y' ot 't' should be entered for TRUE, and 'n' or 'f' for FALSE, as the second argument. Otherwise, the textual or numerical string can be entered for the second argument.

SETTRACKPARMS

SETTRACKPARMS [<parameter>] [<value>]

parameter

Name of the parameter to set. Please refer to the description of the GETTRACKPARMS command for a list of supported parameters.

value

New value to assign to the parameter. If the value of the parameter refers to a boolean type in stead of a text string or a number, either "TRUE", "T" or "Y" may be entered for TRUE and either "FALSE", "F" or "N" may be entered for FALSE. Otherwise, the textual or numerical string can just be entered.

Sets the parameters for the currently selected track, that has already been created with the NEWTRK command. GETTRACKPARMS can be used to inspect the current track parameters. Subsequently they can be changed with by call to SETTRACKPARMS, if necessary. Two arguments need to be specified on the command line. GEAR assumes the first argument indicates the textual name of the parameter to change, and the second argument its new value. If the value of the parameter refers to a boolean type (TRUE or FALSE) in stead of a text string or a number, 'y' ot 't' should be entered for TRUE, and 'n' or 'f' for FALSE, as the second argument. Otherwise, the textual or numerical string can be entered for the second argument.

SETVOLPARMS

SETVOLPARMS [<parameter>] [<value>]

parameter

Name of the parameter to set. Please refer to the description of the GETVOLPARMS command for a list of supported parameters.

value

New value to assign to the parameter. If the value of the parameter refers to a boolean type in stead of a text string or a number, either "TRUE", "T" or "Y" may be entered for TRUE and either "FALSE", "F" or "N" may be entered for FALSE. Otherwise, the textual or numerical string can just be entered.

Sets the global parameters for the currently selected GEAR volume, that has already been created with the NEWVOL command. GETVOLPARMS can be used to inspect the current parameters. Subsequently they can be changed with by call to SETVOLPARMS, if necessary. Two arguments need to be specified on the command line. GEAR assumes the first argument indicates the textual name of the parameter to change, and the second argument its new value. If the value of the parameter refers to a boolean type (TRUE or FALSE) in stead of a text string or a number, 'y' ot 't' should be entered for TRUE, and 'n' or 'f' for FALSE, as the second argument. Otherwise, the textual or numerical string can be entered for the second argument.

TDIR

TDIR

Displays a list of all tracks in the currently selected GEAR volume, containing the following information for each track:
- Track number
- Type of track
- Status of track
- Date and time stamp

The status of a track can be either Selected or Closed. A track is selected if it's currently selected by a NEWTRK orf SELTRK command. Otherwise, the

status of a track 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.

VERTRK

VERTRK

Verifies the contents of the virtual image of the currently selected track and checks if a physical track image can be created. For each file in the virtual image the time and date of loading is checked against the current time and date of the file. GEAR will report the files that are not up to date (have been changed or deleted after they were copied into the image). The image can be updated by deleting and/or reloading the reported files into the virtual image.

VERVOL

VERVOL

Verifies the contents of all virtual tracks in the selected volume and checks if physical (track or volume) images can be created. To this end, for each file in each track in the virtual image, the size, date and time stamp at loading is checked against the current size, date and time of the file. The files that are not up to date are reported by the MessageDialog and WriteLine functions. If there are discrepancies, it usually means a file has been modified since it was loaded into the volume. The image can be updated by deleting the reported files from the virtual image.

Recorder commands

CHECKDRIVE

CHECKDRIVE

Reports the status of the CD recorder drive (tray and disc status), without performing any eject or retract operations.

COPYCD

COPYCD [-t] [<output_dir_spec>]

-t

If this option is specified, a test run will be performed before a real write, if writing was enabled initially. If writing was not enabled initially, only a single test run will be performed for the writing, regardless of the '-t' option.

output_dir_spec

Optional name of an existing output directory where the track images will be stored. If this option is not specified, the software will attempt to create the image files in the current working directory.

This command performs a CD copy operation by reading all tracks of a single session CD into one or more image files on the hard drive, and writing the image back to a blank CD-R disc. The images are stored in the directory 'output_dir_spec' or, if not specified, in the current working directory of GEAR. All data tracks will be read into separate image files, whereas sequential audio tracks will be gathered into one image file. Between the reading and the writing, you will be prompted that the reading part has finished and a blank disc has to be inserted in the drive to continue with the writing part.

DISCINFO

DISCINFO [-isrc]

  -isrc

If this option is specified, GEAR will also try to read the UPCEAN code of the disc and the ISRC codes of audio tracks. If this option is not specified, UPCEAN and ISRC codes will not be read and an empty string will be returned for these fields. Reading ISRC may take more time for the DISCINFO to complete.

Obtains information on the disc currently loaded in the CD or DVD recorder in use. The information contains disc type information, session and track information (track type and start address). The following information will be displayed.

- Type of disc
- Number of sessions on the disc
- Number of tracks on the disc
- Start time (ATIME) of each session and track
- The type and size of each track
- Start time of the lead out

Please note the following about discinfo:

- TIME is presented in the following format: **mm:ss:ff**; Where mm represents minutes, ss = seconds, and ff = the number of frames.

- A lead out is the last possible start position for a new session and indicates the remaining capacity of your recordable disc. For mastered CDs, the beginning of the lead out indicates the end of the data area on the disc.

NOTE: Each track is constructed in sectors with a standard size of 2352 bytes. Each sector contains 98 frames. For your reference, one second of time on disc is equal to 75 sectors.

If a multi-session disc is loaded, the CD recorder reports that the last session on the disc is unfinished. This is normal for multi-session discs because a

recorder always creates the beginning of a new session while closing the previous session on a disc.

EJECT

EJECT

Ejects the caddy/tray from the currently selected recorder.

NOTE: Issuing the EJECT command when the caddy/tray is already ejected, is not treated as an error.

ERASECD

ERASECD [-quick]

  -quick

  If this option is specified a quick (minimal) erase is performed, and the recorder will only erase the PMA, first TOC and the first track pregap..

This command erases the entire CD-RW disc. If the -quick option is specified a minimal erase is performed: only the PMA, first TOC and the first track pregap are erased. If not specified, the entire disc is erased completely.

ERASESESSION

ERASESESSION [-uncloseonly]

  -uncloseonly

  If this option is specified the last session is unclosed only.

This command erases an entire session or uncloses a session, i.e., erases LEAD IN and LEAD OUT only. The session to erase should be the last session on the disc, either closed (fixated) or unclosed (not-yet-fixated). If

the -uncloseonly option is specified, the last session is unclosed. An error will be returned if the last session wasn't closed. If not specified, the entire session including all tracks will be erased. In this case the session may either be closed or unclosed. Detailed track and session information can be retrieved via the DISCINFO command.

ESTIMATE

```
ESTIMATE [<volume_name>]
ESTIMATE -ext <type> <file_name>
```

volume_name

Name of a GEAR volume to estimate. If not specified, the currently selected volume will be used.

file_name

Name of an external physical track image file ('type' = 1-11), or a track list file ('type' = 12).

-ext

Indicates that the (file) name argument should be interpreted as an external image file or track list file. In that case 'name' can be a full path name.

type

External image type (see WRITECD command).

This command estimates if the system performance is sufficient to write the specified or currently selected volume to a CD-R disc. No data is transferred to the recorder during this process. If parts of the image cannot be read fast enough, the GEAR will report a warning. Depending on the current value of the UsePhys parameter in the RecParams_t structure, the virtual volume or the physical image file is used during this process. External physical images and track lists are also supported (refer to the WRITECD command for more explanation).

EXITCDR

EXITCDR

Closes the CD-Recorder module and removes the CD-R commands as available commands.

FIXATION

FIXATION

Writes the lead-in and lead-out to a CD-R disc that is not yet fixated (last session was not yet closed). This can be useful if the recording of a disc failed due to, for example, a buffer underrun. To overcome an erroneous situation, issuing the FIXATION command followed by SESSION 0 may result in a still usable disc, thought the previous information will be lost irreversibly. Normally, the WRITECD command writes the lead-in and lead-out automatically if the 'Fixation' parameter is set to TRUE. The 'Fixation' parameter is one of the CD-R parameters (see SETCDRPARMS).

GETCDRPARMS

GETCDRPARMS

Lists the current parameters of the GEAR CD-R module. GETCDRPARMS can be used to inspect these defaults values. Subsequently they can be changed with a call to SETCDRDEFAULTS, if necessary. Every parameter is listed in the form: <parameter>=<value>.
Below the available parameters are listed with their default value.

Parameter name	default value
ImageReadBufferSize	262144
ImageWriteBufferSize	262144
WriteMethodCD	2
WriteMethodDVD	1

```
WriteEnable              TRUE
VerifyAfterWrite         TRUE
EjectAfterWrite          TRUE
AllowDiscOverflow        FALSE
NrOfWriters              1
WriteCDRSpeed            4
WriteCDRWSpeed           4
WriteDVDRSpeed           1
WriteDVDRWSpeed          2
ReadCDSpeedData          20
ReadCDRWSpeedData        20
ReadCDSpeedAudio         20
ReadCDRWSpeedAudio       20
ReadDVDSpeed             1
ReadDVDRWSpeed           2
Fixation                 TRUE
MultiSession             TRUE
WriteBurnProof           TRUE
UsePhysicalImageFiles    FALSE
NrOfCopiesToWrite        1
UseMediumChanger         TRUE
InitializeMediumChanger  FALSE
DriveNrInMediumChanger   3
FirstSlotNumber          1
NrOfSlotsInitialized     500
```

LOCKDRIVE

LOCKDRIVE
Locks the CD recorder drive (prevents operation of the OPEN/CLOSE
(EJECT) button on the drive).

READCD

READCD [-tao | -dao] <track_list_file> [<output_dir>]

track_list_file

Track list (text) file that will be created containing all the entries for the track image files. The function expects an existing directory if the track list specification includes a full path.

output_dir

Name of an existing output directory where the track images will be stored (default is the Toolkit's working directory).

-tao | -dao

Track-at-once (TAO) or disc-at-once (DAO). Indicates whether the track list has to be accomodated for track at once (TAO) or disc at once (DAO) recording. In case of TAO, the pauses (indexes 0) between the tracks will be set to 2 seconds (150 frames/ sectors) in the track list. In case of DAO, the pauses (indexes 0) between the tracks may be zero in the track list. The default value is disc at once (DAO) for recorders that support it. If disc at once (DAO) is not supported by the recorder, track at once (TAO) is used instead.

READCD reads all tracks of a single session CD onto the hard drive. READCD will create a track list file (text file) containing the table of contents of the disc and the references to the track image files that were read.
NoteAll non-audio tracks will be read into separate image files, whereas sequential audio tracks will be gathered into one image file. The output files and the ensuing track list file will be placed in the current working directory or the directory location specified by their respective command arguments. The output files will be described by the word '_TRK__' concatenated with 'M1' for mode 1, 'DA' for digital audio, 'CDI' for CDI or 'XA' for XA tracks. The extension of these files will consist of two-digit number ranging from 01 to a maximum of 99 to indicate the track number on CD. For instance suppose that a disk contains one mode 1 track followed by three audio tracks. READCD will then produce a '_TRK__M1.01' and '_TRK__DA.02' file. Furthermore, the DAO or TAO option can be specified to accommodate the track list especially for DAO or TAO recording. The track list file can subsequently be used with the WRITECD command option to write track list files. For DAO recording, GEAR will allow zero pauses (index 0) in the track

list file. For TAO recording, GEAR will only use a fixed pause of 2 seconds (150 frames). If necessary, track sizes etc. will be adjusted to force a more perfect copy with DAO recording, so every track will start at the same position as on the original disc. By using READCD and WRITECD with a track list file, a copy CD function can be accomplished easily with GEAR, as alternative for the COPYCD command.

READFILE

`READFILE <source_file> [<dest_file>]`

  `source_file`

    The filename (without path) in the current directory of the volume created with the SESSION command.

  `dest_file`

    The destination file (including path name) on the hard disk.

Command READFILE is used to copy a file from the CD-R disc to the hard disk, without the need to mount the disc first on the computer system. GEAR will directy access the recorder at the SCSI level to read the required data blocks that correspond with the file contents.

NOTE: Prior to executing this command both the GEAR generator module and CDR module must be initialized, and the SESSION command has to be excuted to create a GEAR volume and track that reflects the contents of the SESSION from which the file is going to be read. In Furthermore, an error or invalid data may occur when the CD-R in the recorder is changed between a SESSION command and a call to READFILE.

READTRACK

`READTRACK [-msb | -lsb | -wave] <track_nr> <file_name>`

  `track_nr`

    Specifies the track number on the CD to read.

  `file_name`

The name of the physical track image file that will be created on the hard drive. The function expects an existing directory if the image name includes a full path.

-msb | -lsb | -wave

These options are only applicable when reading audio tracks. The MSB or LSB option indicate the byte order of the 16 bit (2 byte) audio samples to create in the the image file. Intel based PCs assume audio in LSB format, and Unix and Apple Mac systems assume MSB. The default value will be the byte order for the target system for which the Toolkit is compiled. If the WAVE option is used, the READTRACK command will produce a WAVE file directly instead of a Red Book file. That is, a 44.1 kHz 16 bit audio file with a wave header of 44 bytes at the beginning of the file, correctly filled in. The audio type in the WAVE file is always LSB.

The READTRACK command is used to read all sectors of specified track from the CD(-R) disc and store them in the specified file on the hard drive. READTRACK will automatically determine the track type, track size and start position before 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 and for CD digital audio tracks, 2352 bytes are read per sector. By default, READTRACK will read audio tracks as Redbook files, optionally in MSB or LSB format. In addition, there is the 'WAVE' option for audio tracks to augment the (Redbook) audio file with a wave header, so a wave file is produced, common on MS Windows systems.

RECORDERINFO

RECORDERINFO

Lists information about the name and capabilities of the currently selected CD/DVD recorder, like the Vendor ID, Product ID, Firmware revision information, and its supported features. The supported features include the supported write methods, other read and write capabilities, the supported read and write speeds for various types of media, and the supported erase modes.

RETRACT

RETRACT

Closes the tray of the CD recorder drive. If the CD recorder does not have a tray but a caddy loading mechanism, the RETRACT command will fail.

NOTE: Issuing the RETRACT command when tray is already retracted, is not treated as an error.

SESSION

SESSION [-d] [<session_nr>] [<track_nr>]
          [<ISO | XA | DA>] [<new_volume_name>]

-d

Forces automatic overwrite of an existing GEAR volume with the same name.

session_nr

Specifies the session number on the multi session disc to append to. If 0 (zero) is specified, this forces GEAR to create a new empty volume for the remaining space on the multi session disc, without linking to any previous data on the disc.

track_nr

Specifies the track number on the multi session disc to append to.

new_volume_name

Volume name of the new GEAR volume to create for the new session. If no volume name is specified, GEAR will automatically try to retrieve the volume name from the data track to which the new session is appended. A name is required however for 'SESSION 0' and when appending to an audio track, because in this case no volume name can be retieved.

The session command is used to append data to an existing multi session disc. Both the generator and the CDR engine must be initialized prior to executing this command. When you use the session command, a new GEAR volume will be created, based on the information of one of the previous

sessions on the disc. For appending to an existing multi session disc a session number and track number must be supplied (default is the first track in the last session on the disc). The selected session on the disc is read and a volume is created which contains the complete directory/file structure of this previous session/track. After the volume is created, you can add or remove data just like with any other volume. The new session can be appended (written) to the disc with the WRITECD command.

If you are appending to an audio track you are free to select ISO, XA or DA for the new track type, so it is possible to append data to audio, as is required for Enhanced Music CD (CD Extra). A volume name also has to be supplied because, audio tracks do not contain volume information.

A session command with a 0 as first argument (SESSION 0) forces to create a new empty volume and makes the data of the previous sessions inaccessible. In this case you must also supply a new track type and volume name.

SETCDRPARMS

SETCDRPARMS [<parameter>] [<value>]

parameter

Name of the parameter to set. Please refer to the description of the GETCDRPARMS command for a list of supported parameters.

value

New value to assign to the parameter. If the value of the parameter refers to a boolean type in stead of a text string or a number, either "TRUE", "T" or "Y" may be entered for TRUE and either "FALSE", "F" or "N" may be entered for FALSE. Otherwise, the textual or numerical string can just be entered.

Sets the current parameters of the GEAR CD-R module. GETCDRPARMS can be used to inspect these parameters. Subsequently they can be changed with a call to SETCDRPARMS, if necessary. Two arguments need to be specified on the command line. GEAR assumes the first argument indicates the textual name of the parameter to change, and the second argument its new value. If the value of the parameter refers to a boolean type (TRUE or FALSE) in stead of a text string or a number, 'y' ot 't' should be entered for TRUE, and 'n' or 'f' for FALSE, as the second argument.

Otherwise, the textual or numerical string can be entered for the second argument.

UNLOCKDRIVE

UNLOCKDRIVE

Unlocks the CD recorder drive (allows operation of the OPEN/CLOSE (EJECT) button on the drive).
NOTE: Issueing the EJECT command will also terminate the locking status of the drive.

WRITECD

```
WRITECD [-t] [<volume_name>]
WRITECD [-t] -ext <type> <file_name>
WRITECD [-t] -d <scsi_id> -size <sizeinblks>
        [-ofs <offsetinblks> [-file <pre_file>]]
```

  -t

   Perform only a test run, even if 'WriteEnable' has been set to TRUE with the SETCDRPARMS command. This option is only available in the Unix command set.

   volume_name

   Name of a GEAR volume to write. If not specified, the currently selected volume will be used.

   file_name

   Name of an external physical track image file ('type' = 1-11), or a track list file ('type' = 12).

   -ext

   Indicates that the (file) name argument should be interpreted as an external image file or track list file. In that case 'name' can be a full path name.

   type

   Type number indicating the type of the external image file. We distinguish the

following type numbers:

1. CD-ROM mode 1, sector size 2048 (default). Used for any CD-ROM mode 1 track image file. This may be any type of CD-ROM mode 1 image file: ISO 9660, UDF, Apple HFS or other (native) formats.
2. CD-ROM mode 1, sector size 2352. Used for any CD-ROM mode 1 track image file with 2352 bytes per sector.
3. CD-ROM mode 1, sector size 2352, with scrambled sectors and with 2 seconds pre-gap. Used for any CD-ROM mode 1 track image file which contains EDC/ECC, a pre-gap and scrambled sectors of 2352 bytes.
4. CD-ROM XA mode 2, sector size 2336. Used for a CD-ROM XA track image file with mode 2 form 1/form2 sectors of 2336 bytes.
5. CD-ROM XA mode 2, sector size 2352. Used for a CD-ROM XA track image file with mode 2 form 1/form2 sectors of size 2352.
6. CD-ROM XA mode 2, sector size 2352, with scrambled sectors and with 2 seconds pre-gap. Used for a CD-ROM XA track image file with mode 2 form 1/form2 sectors, which contain EDC/ECC, are scrambled have size 2352. The CD-ROM XA image file should also contain the data for the pre-gap (index 0).
7. CD-I mode 2, sector size 2336. Used for a CD-I track image file with mode 2 form 1/form2 sectors of 2336 bytes.
8. CD-I mode 2, sector size 2352. Used for a CD-I track image file with mode 2 form 1/form2 sectors of size 2352.
9. CD-I mode 2, sector size 2352, with 2 seconds pre-gap. Used for a CD-I track image file with mode 2 form 1/form2 sectors of size 2352. The CD-I image file should also contain the data for the pre-gap (index 0).
10. CD-I mode 2, sector size 2352, with scrambled sectors and with 2 seconds pre-gap. Used for a CD-I track image file with mode 2 form 1/form2 sectors, which contain EDC/ECC, and scrambled sectors of 2352 bytes. The CD-I image file should also contain the data for the pre-gap (index 0).
11. CD Digital Audio, frame size 2352. Used for a Redbook CD Digital Audio file: An audio file containing 16 bits stereo PCM audio samples of 44.1 kHz, not containing any sound headers (i.e. Wave headers).
12. Track list file (textual). In this case, 'name' is not interpreted as a track image file, but as a text file that contains a list of track image files to be written. This option is required if multiple tracks have to be written using multiple track image files. Refer to the section 'track list file layout' for the layout of a track list file.

The size of the pre-gap should always be 2 seconds (150 sectors). Scrambled images must also contain SYNC, HEADER and ECC/EDC information. Unscrambled images can be accepted with a 2352 sector size without the SYNC, HEADER and ECC/EDC filled in.

`scsi_id`

Target ID of of a raw (SCSI) hard disk, to be used used as a source image for writing.

NOTE: GEAR interfaces with raw hard disk devices using a separate SCSI driver interface, which parameters can be with manipulated by the GETDISKDEFAULTS and SETDISKDEFAULTS commands. Use the SCANDISK command to obtain a list of disk drives that have been found by GEAR in the system.

`sizeinblks`

Size in 512 byte blocks of the source disk image. This should be less than or equal to the capacity of the raw (SCSI) hard disk.

`offsetinblks`

Optional offset in 512 byte blocks where the start of the source disk image is located. The default is 0.

`pre_file`

Optional file that will be put in front of the raw hard disk image to write. Such a file would typically contain boot/partition information to be written to the first sectors, when writing a CD containing a native file system. It is the responsibility of the user to create this file.

Writes the GEAR volume specified by 'name' to the CD (or DVD) recorder for creating a CD-R(W) (or DVD-R) disc. In case no arguments are supplied, the volume currently selected by the Generator module is being written. If the UsePhysicalImageFiles parameter is set to TRUE, the software will look for physical track image files for all the tracks in the GEAR Volume. If the 'X' or '-ext' option is used, 'name' will be interpreted as an external physical image file or track list file, instead of a GEAR volume name.

The WRITECD command always creates a wo_ident.txt file containing a table of contents of the tracks and some customer information. You can use

the number of copies parameter to write multiple discs of the same GEAR volume. If a medium changer is connected to the same SCSI bus as the recorder, the medium changer is used to change the discs. otherwise, the user is prompted to perform the medium change manually.

The WriteEnable parameter (see SETCDRPARMS) can be set to FALSE, to perform a dummy write operation (test write). In that case, all data is transferred to the recorder's buffer but the disc isn't actually written. Therefore, you can check system performance without recording a disc. Test-mode recording takes the actual time that recording takes even though you're not actually recording a disc.

Track list file layout:

A track list file is a plain text file representing a collection of physical track image files to write to the CD-R. Each line in the file represents a track for the CD to write. The syntax of a line in the track list file is described below. There are two possible options for specifying such al line:

1. Specifying a track image using a predefined external image type number.
2. Specifying a track image using a set of 'user defined' options. This method offers more flexibility, and also supports some additional features like:
   - Support for the setting of the pregap/pause length, and specify wether the pregap/pause is already included in the track image file, or not
   - Support the specification of an additional offset and a length, if the track image does not start at the beginning of the file and/or not ends at the end of the file.
   - Allow the specification of one UPCEAN code for the entire disc and/or ISRC codes for every track.

For 'pre-defined' track image types, the following syntax is used on a line in the track list file:

`<track_image_file_name> <predefined_image_type_number>`

`track_image_file_name:`

A full path specification of an existing track image file on your computer. This may be something like /MYIMAGES/MYAUDIO.TR1.

predefined_image_type_number:

A type number defining a certain pre-defined track image type, similar to the type parameter of the WRITECD command. The number should be preceded by a - sign.

For 'User-defined' track image types, the following syntax is used on a line in the track list file:

<track_image_file_name> <track_type> [<sector_size>]
    [+P:<pause>] [O:<offset>] [L:<length>]
    [UPCEAN:<UPCEANCode>] [ISRC:<ISRCCode>]

track_image_file_name:

A full path specification of an existing track image file on your computer.

track_type:

A type string identifying the type of track. Possible options are: 'MODE1', 'XA', 'CDI', 'DA'.

sector size:

The sector size (bytes per CD sector) of the track image file. Possible values are: '2048', '2336', '2340', '2352', '2352S' '2352S' means the data in the track image are 'scrambled'. Default values are 2048 for MODE1 tracks, 2336 for XA/CDI tracks and 2352 for DA tracks.

pause:

The size of the pause/pregap (index 0) of a track in sectors/frames. 0 (zero) is an allowed value for the pause. The default value is 150 frames not included (-P:150). The first track can only have the default value of 150. Non-default pause sizes are only supported with disc-at-once recording. A - sign before P means that the pause is not included in the image file, and that the pause is added as silence by the software to the (beginning of) a track. A + sign before P means that the pause is included in the image file, and that data from the beginning of the image file are used for the pause.

offset:

Offset in in frames in the file where the track image starts. If the offset is specified in bytes OB:<offset> has to be used.

length:

The length in frames of the track (within an image file). The default value is the complete file length. Offset and length can be used if the start and the end of a track do not match with the start and the end of a file. An image file containing multiple tracks

can be used by specifying the same file name on every line in the track list file, and using appropriate values for offset and length on evey line.

UPCEANCode:

The UPCEAN code (media catalog code) of the disc. This code contains a unique number of 13 digits (0-9 only) For the track list, this code has to be specified with the first track.

ISRCCode:

The ISRC code (International Standard Recording Code) of an aufio track This code contains 12 digits, and consists of a:

- Country code: 2 digits (A-Z)
- Owner code: 3 digits (A-Z or 0-9)
- Year: 2 digits (0-9)
- Serial number: 5 digits (0-9)

NOTE: If a track list file is automatically created using the READCD command of GEAR, the offset and length are used, because there will be only one big image file created for all tracks, if the tracks are of the same type. If the original disc contains UPCEAN codes and/or ISRC codes, these fields will also be filled in in the track list file by the READCD command.

Example of a track list file:

```
MYIMAGE/DISCTRAX.001 DA UPCEAN:3259180004422 ISRC:GBA108100010
MYIMAGE/DISCTRAX.002 DA -P:0 ISRC:GBA108100020
MYIMAGE/DISCTRAX.003 DA -P:300 ISRC:GBA108100030
MYIMAGE/DISCTRAX.004 DA +P:150 L:1000 ISRC:GBA108100040
MYIMAGE/DISCTRAX.004 DA -P:0 O:1000 ISRC:GBA108100050
```

Jukebox commands

JUKEINFO

`JUKEINFO`

JUKEINFO retrieves information about the connected jukebox. The status of the jukebox slots, CD-ROM drives, and CD-R(W) drives in the jukebox will be displayed. If a disc is mounted in a slot, it is also shown. Information regarding grippers and the mailbox are also displayed if the jukebox contains them.

Displayed are:
- The SCSI Vendor and Product ID of the jukebox device.
- The adresses and number of elements in the jukebox (slots, drives, mailbox and grippers).
    - Storage slots are numbered from 1 to 1000.
    - CD recorders and CD readers are numbered from location 1001 to 2000.
    - The jukebox mailbox (input/output element) has a location of 2001.
    - The device that moves the medium—the gripper—is numbered from 3001 to 3002.
- An indication in which elements a medium (disc) is present.

Please keep in mind the following:

- Currently, GEAR supports a variety of jukeboxes. For the most up to date listing, please consult our web site at www.gearsoftware.com.

- If you use a jukebox to write multiple CD-R discs unattended, make sure they are loaded consecutively.

MOVEMEDIUM

`MOVEMEDIUM <src_address> <dest_address>`

`src_address`

Original location of caddy/disc.

`dest_address`

New location of caddy/disc.

Moves a caddy/disc from one element (address) to another in the jukebox. Predefined address ranges are used by GEAR to be specified for storage slots, drives, mailbox, and gripper(s):

- Storage slots are numbered consecutively from address 1 to 1000.
- Drives (CD recorders and CD readers) are numbered from address 1001 to 2000.
- The mailbox of the jukebox has address number 2001.
- The gripper - the device that actually moves the medium - has address 3001.

Tape commands

EXITTAPE

`EXITTAPE`

EXITTAPE closes the tape module and removes all tape commands as available commands.

GETTAPEPARMS

`GETTAPEPARMS`

Lists the current parameters of the premaster tape module. GETTAPEPARMS can be used to inspect these defaults values.

Subsequently they can be changed with a call to SETTAPEPARMS, if necessary. Every parameter is listed in the form: <parameter>=<value>. Below the available parameters are listed with their default value.

```
Parameter name                    default value
DDP1FormatTapeForCD               TRUE
DDP2FormatTapeForDVD              TRUE
FileOptionForCD                   2
FileOptionForDVD                  2
DVDMode1TrackSectorSize           2048
DVDMode1BlockingFactor            16
CDMode1TrackSectorSize            2048
CDMode1TrackBlockingFactor        4
CDMode1TrackWithPregapPostgap     FALSE
CDDATrackWithPause                FALSE
CDMode2TrackSectorSize            2336
CDMode2TrackBlockingFactor        4
CDMode2TrackWithPregapPostgap     FALSE
ScramblingFor2352Sectors          FALSE
UsePhysicalImageFiles             FALSE
VerifyAfterWrite                  TRUE
UnloadAfterWrite                  TRUE
WriteIdentTxtOnTape               FALSE
CustomerName                      ""
CustomerContact                   ""
CustomerPhone                     ""
MasterIDCode                      ""
ReferenceCode                     ""
DiscTitle                         ""
```

SETTAPEPARMS

`SETTAPEPARMS [<parameter>] [<value>]`

parameter

Name of the parameter to set. Please refer to the description of the GETTAPEPARMS command for a list of supported parameters.

value

New value to assign to the parameter. If the value of the parameter refers to a boolean type in stead of a text string or a number, either "TRUE", "T" or "Y" may be entered for TRUE and either "FALSE", "F" or "N" may be entered for FALSE. Otherwise, the textual or numerical string can just be entered.

Sets the current parameters of the GEAR Tape module. GETTAPEPARMS can be used to inspect these defaults values. Subsequently they can be changed with a call to SETTAPEPARMS, if necessary. Two arguments need to be specified on the command line. GEAR assumes the first argument indicates the textual name of the parameter to change, and the second argument its new value. If the value of the parameter refers to a boolean type (TRUE or FALSE) in stead of a text string or a number, 'y' ot 't' should be entered for TRUE, and 'n' or 'f' for FALSE, as the second argument. Otherwise, the textual or numerical string can be entered for the second argument.

TAPEUNITINFO

```
TAPEUNITINFO
```

Retrieves the vendor, product and firmware revision information and information about the capabilities of the currently selected tape unit.

VERIFYTP

```
VERIFYTP [<volume_name>]
VERIFYTP -ext <type> <file_name>
```

volume_name

Name of a GEAR volume to verify. If not specified, the currently selected volume will be used.

file_name

Name of an external physical track image file ('type' = 1-11), or a track list file ('type' = 12).

```
-ext
```
Indicates that the (file) name argument should be interpreted as an external image file or track list file. In that case 'name' can be a full path name.

```
type
```
External image type (see WRITECD command).

Verifies a GEAR volume with a written premaster tape.

WRITETP

```
WRITETP [<volume_name>]
WRITETP -ext <type> <file_name>
```

```
volume_name
```
Name of a GEAR volume to write. If not specified, the currently selected volume will be used.

```
file_name
```
Name of an external physical track image file ('type' = 1-11), or a track list file ('type' = 12).

```
-ext
```
Indicates that the (file) name argument should be interpreted as an external image file or track list file. In that case 'name' can be a full path name.

```
type
```
External image type (see WRITECD command).

Writes a GEAR volume or external image to a premaster tape. For mastering CD volumes, an Exabyte 8500 tape is recommended (written in DDP format). For mastering DVD volumes, a DLT tape is recommended (written in DDP format).

A

GEAR Parameters

- User Parameters
- Image Formatting Parameters
- CD/DVD-Recorder Parameters
- Jukebox Parameters
- Premaster Tape Parameters
- Hard Drive Parameters
- The .gearrc File

User Parameters

User information is saved in the tp_ident and wo_ident files, as created by the tape and recorder modules. When you want to master and replicate you CD, some premaster companies may ask you to supply this information on a premaster tape or paper.

Customer information includes the following values:

CustomerName:	Your name
CustomerContact:	Your contact person
CustomerPhone:	Your phone number
MasterIDCode:	Your mastering code
ReferenceCode:	Reference code
DiscTitle:	New CD title

CustomerName, CustomerContact, and CustomerPhone can be the same for all your CD titles. In general, MasterIDCode, ReferenceCode, and DiscTitle will change for each CD-ROM title.

Parameters for the GUI layer

ProjectType   The default project type to create with the GEAR GUI Application.
0) Empty Volume (no tracks).
1) DVD-ROM UDF (reserved for future use).
2) DVD-ROM ISO/UDF hybrid (GEAR Pro DVD only).
3) DVD-ROM ISO (GEAR Pro DVD only).
5) DVD-VIDEO UDF (reserved for future use).
6) DVD-VIDEO ISO/UDF hybrid (GEAR Pro DVD only).
10) CD-ROM UDF (reserved for future use).
11) CD-ROM ISO/UDF hybrid (GEAR Pro DVD only).
12) CD-ROM ISO.
15) CD-ROM XA.
20) CD Audio.
50) CD Mixed Mode 1 (ISO + Audio).
60) CD Mixed Mode 2 (XA + Audio).

DefaultDiscSize   The default maximum capacity for each new GEAR image you create. Valid values are 18, 63, 74, and 80.

DefaultTrackType   The default track type—ISO, XA, or DA—to use when creating a new track using the NEWTRK command.

ShowProjectBar   If set to TRUE, the GEAR GUI Application will show an additional bar in the main window for the creation of GEAR projects.

ShowDeviceBar   If set to TRUE, the GEAR GUI Application will show an additional output device bar in the main window, containing large buttons for executing writing, test write and device settings.

ShowLogWindow   If set to TRUE, the GEAR GUI Application will show an additional log window as part of the main window, similar to that of the GEAR Command Line Application.

Image Formatting Parameters

Image parameters are generated when you create a new image. Once an image is created, these parameters can be edited via the **SETTRACKPARMS** command. All parameters must conform to ISO specifications as described in appendix E. If values are not specified, GEAR will employ its default values.

SystemIdf   Identifies the system. The default value is an empty string.

PublisherIdf   Identifies the individual who specified what to record in the image set this image is part of. If the first character is an underscore (_), the rest of the field specifies an identifier for a file containing the publisher identification. This file must be loaded in the root directory. The default value is an empty string.

   NOTE: When a file name that begins with an underscore (_) is specified, you can omit the extension and slash (/) or version number.

DataPreparerIdf   Identifies the individual or other entity who controls the preparation of the data to be recorded on the image. If the first character is an underscore (_), the rest of the field specifies an identifier for a file containing the publisher identification. This file must be loaded in the root directory. The default value is an empty string.

ApplicationIdf   Identifies how data is recorded in an image set of which the image is a member. If the first character is an underscore (_), the rest of the field specifies an identifier for a file containing the publisher identification. This file must be loaded in the root directory. The default value is an empty string.

ApplicationUse   Identifies the language for an EB (XA) disc. Refer to the Sony Electronic Book System, Data Format Technical Specification, version 2.1, June 1993, Sony. The default value is an empty string.

CopyRightFileIdf   Identifies the file loaded in the root directory and contains a copyright for the image set. The default value is an empty string.

AbstractFileIdf   Identifies the file loaded in the root directory and contains an abstract statement for the image set. The default value is an empty string.

BibliographicFileIdf   Identifies the file loaded in the root directory and contains bibliographic records interpreted according to standards that are subject of an agreement between the originator and the recipient of the image. The default value is an empty string.

MaxNrDirsInVolume   Identifies the maximum number of directories that can be created for the CD. This number is limited only by the available space on the CD. However to prevent unnecessary overhead it is advised to increase the default value only if necessary. The default value is 2048.

MaxDirNestingLevel   Identifies the maximum number of directories that can be nested for the CD. The root level is one. ISO allows a nesting level of up to eight. GEAR allows a nesting level of up to 24. The default value is 24.

NonIsoNameHandling   Specifies how non-ISO file and directory names are handled. The default value is 5.

Table C.8: Non ISO Name Handling Values

Value	Name Handling
0	GEAR prompts you to indicate how it should handle each non-ISO name it encounters.
1	GEAR ignores all non-ISO names; each file will be loaded with its original name
2	GEAR changes all lowercase characters to uppercase. If the name still contains non-ISO characters, GEAR prompts you to indicate how it should handle each non-ISO name.

Table C.8: Non ISO Name Handling Values

Value	Name Handling
3	GEAR translates all non-ISO names to valid ISO names. Non-ISO characters are replaced by an underscore (_). GEAR warns you if duplicate names occur.
4	GEAR translates all non-ISO names to ISO level 1 valid names.
5	GEAR translates all non-ISO names to ISO level 1 names. The difference with option 4 is that option 4 can possibly generate duplicate ISO level 1 names while option 5 is explicitly meant to prevent duplicate names.

When Unix names are translated to ISO level 1 names, some Unix names may result with the same ISO level 1 name. GEAR uses the following mapping scheme. to prevent duplicate names.

- Character case is reversed. If the name is ISO-compliant, no further translation is necessary
- Starting from the end of the name, the first period (.) is translated as an extension and the name is split into a file name and extension. If the period is the first character or no period is found, no extension is created.
- The entire name is translated to uppercase characters.
- If a non-ISO-compliant extension exists, the extension is deleted.
- If the file name is longer than five characters, it is truncated. If the file name is shorter than five characters, it is padded with underscores.
- Non-ISO characters are replaced with underscores.
- Three random characters are appended to the file name to create a unique file name.
- If an extension exists, it is appended to the file name.
- A version number (;1) is appended to the file name.

IMPORTANT: A Sun system cannot read file names with lowercase characters. All file

names are translated to uppercase or you must use the Rock Ridge extensions.

Table C.9: File Name Translations

Unix Name	ISO Name	Notes
abc123.def	ABC123.DEF;1	No mapping required
a	A.;1	No mapping required
A	A___XXX.;1	Uppercase mapping
a_long_name	A_LONXXX.;1	Mapping usable characters
AB.c	AB___XXX.C;1	Only two usable characters
Ab.c	AB___XXX.C;1	XXX different than with AB.c
a.b.c	A_B__XXX.C;1	
abcd.efgh	ABCD_XXX.;1	Extension is invalid
.login	_LOGINXXX.;1	

NOTE: XXX is a randomly generated set of characters.

AddRockRidgeInfo   Identifies if the Rock Ridge specific information is added to the system use field of each file and directory. The Rock Ridge Information is specified in IEEE P1281 and is specifically meant for Unix systems.

FollowSymLinks   If this option is set to TRUE the symbolic links are followed by cp, i.e. the file that the link refers to is copied into the image. If the option is set to FALSE the links are placed in the image instead (as in older versions of GEAR). The same is true for 'dangling links' (for which there is no longer a target file); these will be copied without prompting.

> NOTE: If AddRockRidgeInfo is set to FALSE and FollowSymLinks is set to FALSE, symbolic links (and any other UNIX specific file) will be stopped. However, if AddRockRidgeInfo is set FALSE but FollowSymLinks is set to TRUE, symbolic links will be followed. Dangling symbolic links will produce a warning.

DefaultUID   If the user id for a file created with the mkdir, mknod or ln command has not been specified, the default value for DefaultUID will be used. The default value entered here must be a numeric value.

DefaultGID   If the group id for a file created with the mkdir, mknod or ln command has not been specified, the default value for DefaultGID is used. The default value entered here must be a numeric value.

DefaultDirMode   If the mode for a file created with the mkdir command has not been specified, the default value for DefaultDirMode is used. The default value entered here must be either a four digit number or a symbolic value.

DefaultFileMode   If the mode for a FIFO/device special file created with the mknod command has not been specified, the default value for DefaultFileMode is used. The default value entered here must be either a four digit number or a symbolic value.

> NOTE: DefaultUID, DefaultGID, DefaultDirMode and DefaultFileMode only refer to the commands used to create new files or directories within in the image. When copying

files with cp the attributes of the original are also copied. The file mode for links
created with ln is always rwxrwxrwx regardless of the value for DefaultFileMode.

CD-Recorder Parameters

You can configure the CD/DVD recorder module of GEAR with several parameters. You can specify configuration options for the SCSI driver, and also options for the recording process itself. You can change these parameters manually in the .gearrc configuration file, or you can get and set these parameters with the commands GETCDRDEFAULTS, SETCDRDEFAULTS, GETCDRPARMS and SETCDRPARMS. Please refer to the Command Reference chapter for more information on these commands, and which parameters you can change. Below, an additional explanation is given about what these parameters actually mean and do:

CDRInterface   Identifies the SCSI driver to use for interfacing with CD/DVD recorder devices. The default value is 2 on most platforms. Valid values are:

1) Tracer Technologies SCSI device driver (special file at 'SCSIPath1').
2) GEAR/Standard SCSI device driver (special file at 'SCSIPath2').
3) Caldera SCSI device driver (special file at 'SCSIPath3').

SCSIPath1   Identifies a template for the device-special file used for accessing a CD/DVD recorder device, when the Tracer SCSI driver (gd driver) is used. This value must be correct, otherwise the software cannot locate the device. The default value depends on your Unix system.

SCSIPath2   Identifies a template for the device-special file used for accessing a CD/DVD recorder device, when the standard platform SCSI-driver is used. This value must be correct, otherwise the software cannot locate the device. The default value depends on your Unix system.

SCSIPath3 Identifies a template for the device-special file used for accessing a CD/DVD recorder device, when the Caldera SCSI-driver is used. This value must be correct, otherwise the software cannot locate the device. The default value depends on your Unix system.

TargetID Identifies the target ID of CD/DVD recorder device to use. If only one device is connected, GEAR finds the unit automatically, regardless of its ID. If more than device is connected, GEAR will look for the one that matches TargetID, otherwise the unit with the highest ID is used. Valid values are 0 to 15. On some Unix platforms the ID is equivalent to the SCSI ID of the device, but on some Unix platforms the ID might only be a logical number assigned by the kernel that has no relation with the actual SCSI ID. GEAR combines the TargetID with the SCSIPath template to construct the name of device special file to open for the device.

SCSIBusID Identifies the SCSI Bus ID of the CD/DVD recorder device to use. Valid values are 0 to 7. Not all Unix systems actually use the bus ID. On some Unix platforms GEAR combines both the SCSIBusID and the TargetID with the SCSIPath template to construct the name of device special file to open for the device.

SCSIBufferSize Identifies the SCSI buffer size in bytes allocated by GEAR for transfers to the SCSI Driver and the SCSI device. The minimum value is 32768 (32KB), and the maximum is 65280. The default value is 64000.

ImageReadBufferSize Identifies the buffer size in bytes allocated by GEAR for file IO transfers, when the Recorder module is reading data from a GEAR image and transfers data to the CD/DVD recorder device, This occurs during the writing of a disc (WRITECD command) . The default value is 262144, and the maximum value is 1048576 (1MB).

ImageWriteBufferSize Identifies the buffer size in bytes allocated by GEAR for file IO transfers, when the Recorder module is reading data from the CD/DVD recorder device and outputs to a file. This occurs during

the extraction of tracks from a disc with the READCD and READTRACK command. The default value is 262144, and the maximum value is 1048576 (1MB).

WriteMethodCD   Determines the write method to use when writing CD-R(W) discs. Possible values are:

   1.) Disc at once recording (write lead in->tracks->lead out: no link areas).
   2.) Track at once recording (first write tracks, then fixate).

WriteMethodDVD   Determines the write method to use when writing DVD-R(W) discs (GEAR PRO DVD only). Possible values are:

   1.) Disc at once recording (write lead in->tracks->lead out: no link areas).
   2.) Track at once recording (first write tracks, then fixate).

WriteEnable   Identifies whether the recorder actually writes the disc or only performs a 'test run' (dummy write). If you set WriteEnable to FALSE you can test if your system's performance is sufficient to actually write at the selected recording speed, without wasting any media.

WriteCDRSpeed   Identifies the recording speed of the recorder for CD-R media. A value of 1 means real time recording (150 Kb/s).

WriteCDRWSpeed   Identifies the recording speed of the recorder for CD-RW media. A value of 1 means real time recording (150 Kb/s).

WriteDVDRSpeed   Identifies the recording speed of the recorder for DVD-R media (GEAR Pro DVD only). Please not that 1x DVD speed is equal to about 9x CD speed.

WriteDVDRWspeed   Identifies the recording speed of the recorder for DVD-RW media (GEAR Pro DVD only).

ReadCDSpeedData   Identifies the read speed of the for reading data tracks on CD(-R) media.

ReadCDRWSpeedData Identifies the read speed of the for reading data tracks on CD-

RW media.

ReadCDSpeedAudio   Identifies the read speed of the for reading audio tracks on CD(-R) media.

ReadCDRWSpeedAudio Identifies the read speed of the for reading audio tracks on CD-RW media.

ReadDVDSpeed   Identifies the read speed of the for reading from DVD(-R) media (GEAR Pro DVD only).

ReadDVDRWSpeed   Identifies the read speed of the for reading from DVD-RW media (GEAR Pro DVD only).

VerifyAfterWrite   Identifies whether GEAR will verify the image after it has been written to the recorder. Only effective when WriteEnable is set to TRUE.

EjectAfterWrite   If set to TRUE, the disc will be unloaded after the write process (default). If set to FALSE the caddy will not be ejected (for caddy loaders) or the tray will be openend and closed again (for tray loaders).

UsePhysicalImage-Files Identifies whether a physical image is used for writing to CD-R. It may be necessary to use a physical image to meet the data transfer rate requirements. In general writing from a physical image is faster. Valid values are true and false. The default is false.

AllowDiscOverflow   If set to TRUE, it is allowed to write a little bit more data (max 2 min) than the official capacity of the disc. If set to FALSE, this overflow of the disc capacity is not allowed (only writing within specs is allowed).

WriteBurnProof   If set to TRUE, burnproof writing will be enabled, if the recorder supports this feature. Possible buffer underrun errors will be automatically corrected by the drive and will not be reported.

MultiSession   Identifies whether the CD-R(W) disc will be closed so that future

sessions can be appended to the disc. If a CD-R disc is written with this value set to FALSE, the disc can never be used for future recording sessions. The default value is TRUE.

Fixation   Identifies whether the recorder will fixate the disc (close the session and write the LEAD IN and LEAD OUT) after the image has been written to the CD-R. The default value is TRUE.

WARNING!:   Until a disc is fixated, you cannot read it on a CD-ROM player.

NrOfWriters   Identifies the number of additional writer units your CD recorder uses to write simultaneously. This setting is only valid for the Sony CDW900E, for which valid values are 1 to 32. The default value is 1.

NrfCopiesToWrite   Number of copies to write,when writing or copying a disc. This setting applies both to writing multiple copies manually, and to writing multiple copies with a medium changer. The default value is 1.

UseMediumChanger   Identifies whether GEAR will look for a medium changer device (Jukebox) for loading and unloading CD-R discs. The default value is FALSE.

Jukebox Parameters

InitializeMediumChanger Identifies whether GEAR will initialize a jukebox. If the value is TRUE, GEAR will use the entries FirstSlotNumber and NrOfSlotsInitialized to determine the range of slots to initialize. Valid values are true and false. The default value is FALSE.

DriveNrInMedium-Changer Identifies which jukebox drive is the CD recorder. Valid values depend on the number of drivers in the jukebox. The default value is 1.

FirstSlotNumber   Identifies the first jukebox slot GEAR uses to initialize and record.

If you record a disc using the WRITECD command, GEAR follows this procedure.

1. Checks the recorder for a disc
2. Loads the disc at FirstSlotNumber if there is no disc in the recorder
3. Writes the disc and moves it to the original location
4. Loads the disc from the next slot if number of copies is more than 1
The default value is 1.

NOTE: Make sure FirstSlotNumber plus NrOfCopies is less than the maximum number of slots you have.

NrOfSlotsInitialized   Identifies the number of slots GEAR should initialize. This value is used only when a jukebox is initialized.

Premaster Tape Parameters

You can configure the Premaster Tape module of GEAR with several parameters. You can specify configuration options for the SCSI driver, and also options for the tape writing process itself. You can change these parameters manually in the .gearrc configuration file, or you can get and set these parameters with the commands GETTAPEDEFAULTS, SETTAPEDEFAULTS, GETTAPEPARMS and SETTAPEPARMS. Please refer to the Command Reference chapter for more information on these commands, and which parameters you can change. Below, an additional explanation is given about what these parameters actually mean and do:

TapeInterface   Identifies the SCSI driver to use for interfacing with tape recorder devices. The default value is 2 (Stardard SCSI driver).

SCSIPath2   Identifies a template for the device-special file used for accessing a tape device, when the standard platform SCSI-driver is used. This value must be correct, otherwise the software cannot locate the device. The default value depends on your Unix system.

TargetID   Identifies the target ID of the tape device to use. If only one device is connected, GEAR finds the unit automatically, regardless of its ID. If more than device is connected, GEAR will look for the one that matches TargetID, otherwise the unit with the highest ID is used. Valid values are 0 to 15. On some Unix platforms the ID is equivalent to the SCSI ID of the device, but on some Unix platforms the ID might only be a logical number assigned by the kernel that has no relation with the actual SCSI ID. GEAR combines the TargetID with the SCSIPath template to construct the name of device special file to open for the device.

SCSIBusID   Identifies the SCSI Bus ID of the tape device to use. Valid values are 0 to 7. Not all Unix systems actually use the bus ID. On some Unix platforms GEAR combines both the SCSIBusID and the TargetID with the SCSIPath template to construct the name of device special file to open for the device.

DDPFormatTapeForCD Identifies whether the premaster tape for CD media is written in DDP format (DDP version 1.0) . This means that DDP files generated by GEAR (DDPID, DDPMS, and PQDESCR) are also written to the premaster tape. The default value is TRUE.

DDPFormatTapeForDVD Identifies whether the premaster tape for DVD media is written in DDP format (GEAR Pro DVD only). This means that DDP files generated by GEAR (DDPID and CONTROL.DAT) are also written to the premaster tape. For DVD-ROM mastering GEAR creates a tape according to the DDP 2.0 standard. For DVD-Video mastering GEAR uses the DDV_CMF 1.0 standard defined by the DVD Forum. The default value is TRUE.

FileOptionForCD   Identifies the method GEAR uses to write tracks into tape files for mastering CD media. Valid values are 1 to 4. The default is 2.

FileOptionForDVD   Identifies the method GEAR uses to write tracks into tape files for mastering DVD media. Valid values are 1 to 4. The default is 2.

Table C.10: File Writing Options

Method	How tracks are written
1	On separate tapes; DDP information cannot be written to tape
2	In separate files; all files are written to one tape
3	All tracks of the same type in one file; all tape files are written to the same tape; useful when image contains many small audio tracks; DDPFormatTape set to true is recommended
4	One contiguous image file using the following required values: sectorsize, 2352; scrambled, true; blocking factor, 6; gaps/pauses, included; DDPFormatTape set to true is recommended

DVDMode1TrackSectorSize Identifies the sector size to use on tape for a DVD-ROM mode 1 track (GEAR Pro DVD only). Currently only the value 2048 is valid.

DVDMode1BlockingFactor Identifies the tape blocking factor for an ISO track or any CD-ROM Mode 1 track. Currently only the value 16 is valid.

CDMode1TrackSectorSize Identifies the sector size to use on tape for an ISO track or any CD-ROM Mode 1 track. The default value is 2048.

CDMode1TrackBlockingFactor Identifies the tape blocking factor for an ISO track or any CD-ROM Mode 1 track. Valid values are 4 and 6. The default value is 4.

CDMode1TrackWithPregapPostgap Identifies whether the pregap and postgap are written to tape for an ISO track or any CD-ROM Mode 1 track. The default value is FALSE.

CDMode2TrackSectorSize Identifies the sector size to use on tape for an XA track or any

CD-ROM Mode 2 track. The default value is 2336.

CDMode2TrackBlockingFactor Identifies the tape blocking factor for an XA track or any CD-ROM Mode 2 track. Valid values are 4 and 6. The default value is 4.

CDMode2TrackWithPregapPostgap Identifies whether the pregap and postgap are written to tape for an XA track or any CD-ROM Mode 2 track. The default value is FALSE.

CDDATrackWithPause Identifies whether pauses on DA tracks are written to tape. Valid values are true and false. The default value is FALSE.

ScramblingFor2352Sectors Identifies whether the sectors must be scrambled before they are written to tape. This value is used only if the sector size of the track written to tape is 2352. The default value is FALSE.

WriteIdentTxtOnTape Identifies whether the tp_ident file is written to tape as IDENT.TXT file. The default value is FALSE.

UsePhysicalImageFiles Identifies whether a physical image file should be used for writing to tape. The default value is FALSE.

VerifyAfterWrite Identifies whether GEAR will verify the image after it has been written to tape.

UnloadAfterWrite Identifies whether GEAR will unload the tape automatically it has been written.

Hard Drive Parameters

GEAR uses the following values to raw read from or write to a hard disk using the **PHYSTRK** command. These values are required.

DiskInterface   Identifies the SCSI driver to use for interfacing with raw hard disk devices. The default value is 2 (Stardard SCSI driver).

SCSIPath2   Identifies a template for the device-special file used for accessing a hard disk device, when the standard platform SCSI-driver is used. This value must be correct, otherwise the software cannot locate the device. The default value depends on your Unix system.

TargetID   Identifies the target ID of the hard disk device to use. On some Unix platforms the ID is equivalent to the SCSI ID of the device, but on some Unix platforms the ID might only be a logical number assigned by the kernel that has no relation with the actual SCSI ID. GEAR combines the TargetID with the SCSIPath template to construct the name of device special file to open for the device.

SCSIBusID   Identifies the SCSI Bus ID of the hard disk device to use. Valid values are 0 to 7. Not all Unix systems actually use the bus ID. On some Unix platforms GEAR combines both the SCSIBusID and the TargetID with the SCSIPath template to construct the name of device special file to open for the device.

The .gearrc File

The .gearrc file contains configuration information used to run GEAR. When you start GEAR, it searches for the .gearrc file in the current directory. If the file is not there, GEAR searches in the users home directory.

NOTE: GEAR will not run properly without the .gearrc file and will notify you if it cannot

find the file.

WARNING!:   Do not use a .gearrc file from an earlier version of GEAR.

Editing the .gearrc File

You can edit the .gearrc file using any text editor, however, it is better to change the information through the GEAR software. Lines that begin with a semi-colon (;) are comments and are skipped when GEAR processes the file. Each parameter must be entered immediately following the equal (=) sign—parameters are interpreted starting with the first character after the equal sign.

B

ISO-9660 Naming Properties

This appendix contains information regarding the naming properties for ISO 9660 compliant files. It has the following sections:

- File Names
- Directory/Folder Names

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:

- 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.

Order of Files in a Directory/Folder

Files are sorted in alphabetical order. If two file names do not have the same number of characters, the shorter name is treated as if it is 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 can consist 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

C

Frequently Asked Questions (FAQ)

How can I get GEAR to recognize me as User rather than Root?

The system administrator must run the 'gearuser' script from /usr/gear/bin, then set the permissions for the user.

I successfully recorded a disc but when I attempt to read the disc my computer doesn't see any data on it. What happened ?

Filenames parameters are slightly different for the various Unix operating systems, if you have one of the following OS/filename combinations this may be the reason:

• Solaris can read 256 character filenames but they must all be uppercase letters when using ISO.

• SGI can read 256 character filenames and can read upper and lowercase letters

• HP UX 9.0x does not support the reading of Rock Ridge extensions

(Q) **I wrote multiple directories and sub-directories, but cannot see some of the sub-directories. Why ?**

(A) When writing sub-directories you must write them to be ISO Level 1 compliant. ISO Level 1 name handling includes 8 character file names with 3 character extensions using only: A-Z, 0-9 and _. Please note that these characters must be all uppercase.

(Q) **I can't rename files/directories?**

(A) You may be trying to rename a file/directory which is located in one or more directory level(s) deeper then your current directory.

(Q) **I can't move files/directories?**

(A) It is not possible to move a file/directory with the MV command in GEAR. The only way a file may be moved is to delete it from the image, then copy it again into the image at the desired location.

Q **I have entered the key code, but I still cannot see the CD-R. What is wrong ?**

A Your driver may have expired. If so, it is necessary that you reinstall GEAR.

Q **I cannot initialize my CD-R. What can I do?**

A If you are having problems initializing your CD-R drive try the following measures:

- Check your dmesg and verify that your system can identify the GD driver attached to the CD-R drive.
- Ensure you are the Root of the machine, not a user.
- Confirm that the following files were installed in the correct order: GEARLM, GEARGD, GEAR
- Check your GEAR RC file for the following:
   - The proper recorder type is checked.
   - The SCSI path is the same path as the CD driver.

Q **How do I create a disc that will be readable on? Mac & Win 95?, Win NT & Sun?, Win 3.1, Mac, and UNIX?**

A With GEAR for UNIX, you have several different options for filename handling. If you want a CD to be read on Mac and Windows 95, set 'NonIsoNameHandling' to 1 before creating your volume.

If you want it to be read on Win NT & Sun, set 'NonIsoName Handling' to 2 and 'AddRockridgeInfo' to TRUE.

To make a CD which will be readable on Win 3.1, Mac, and UNIX, all filenames on the disc must not be longer than 8 characters with a 3 character file extension. To accommodate these parameters, set 'NonIsoNameHandling' to 4, and to add readability on UNIX machines, set 'AddRockridgeInfo' to TRUE.

Q **Do I need to be root to run GEAR on my UNIX workstation?**

A No. With GEAR for UNIX v3.51, you can specify a group and/or a user which can access the recorder. This is done with the gearuser script (found in /usr/gear/bin, by default).

Q **I am using the CP command and GEAR tells me the directory is empty, but it is not. I am using Sun OS. What is wrong?**

A Type PRINTENV to check your environment setting. You may not have the path /usr/sbin/ in front of the path /usr/bin. GEAR uses these commands from the directory /usr/bin.

Q **I can write a CD-R, but after when checking the disc, I receive miscompares. What went wrong?**

A Certain CD recorders are unable to handle the high SCSI transfer rates some SCSI controllers use by default. If this happens, check the following:

- What type of controller does the CD recorder use?
- What is the DMA transfer rate?
- Is the termination done properly?
- Is sync negotiation disabled? Most recorders cannot handle sync negotiation properly.
- Is parity checking enabled?

Q **I have written a Rock Ridge CD on the HP and I am not able to see the Rock Ridge information on the HP.**

A That is normal. HP UX 9.0x does not support RRI.

Q **On Sun, I have created an ISO disc with all filenames in uppercase letters. However, I still have all the file names in lowercase. Why?**

A All names on an ISO disc appear to be in lowercase characters.

Q **After writing a multi-session CD with an HP drive, I am unable to mount the CD with the HP drive.**

A The current HP CD-ROM drivers are unable to mount multi-session CD-Rs. You can create multi-session CDs on the HP but cannot mount them on the HP. Try mounting your multi-session discs on another system that accepts multi-session CD-Rs.

Q **A SCSI Bus time out occurred. What happened?**

A A time out occurs when the signal sent from the host (SCSI controller) to your peripheral device is not received in time. This is usually caused by improper termination or the length and quality of the SCSI cable.

Please note that both ends of the SCSI chain must be terminated. SCSI cable length should not exceed 1 meter (three feet) between devices and 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 **GEAR reports the data buffer is empty. What should I do?**

A This means the recorder ran out of data while writing to CD-R. This is a serious error because you loose your disc when writing is aborted. To prevent this, try the following:

- Use a physical image; it takes less time to read than a virtual image.
- Use a lower writing speed, if possible.

Q **When I try to create a directory, GEAR says it cannot.**

A The default maximum number of directories you can create on a CD-R is 2048. This is set in the .gearrc file—MaxNrDirsInVolume. You can increase it to any value but remember that the higher the value, the longer it takes to generate an image. Another cause may be that your directory nesting levels exceeds the value in the .gearrc file— MaxDirNestingLevel. The default value is 8 but you can increase it to 24, however, remember to include the root if you change this value. In versions 3.5 and 3.51 the default is already set at 24.

Q **I can read the disc I created with GEAR on my CD recorder but I am unable to read this disc in my CD-ROM drive. Why?**

A Fixation may be set to false in the .gearrc file. If a disc is not fixated, it can be read on a recorder but not on a CD-ROM drive. If you are using a CD-ReWritable disc, your CD-ROM reader(s) may not support that type of media. Ensure that your CD-ROM reader(s) support 'MultiRead'.

Q **When I check the disc contents with the DISCINFO command, I see an unfinished session. What does this mean?**

A This means you have a multi-session disc and you are able to add another session. For example, if you wrote two sessions to a disc, GEAR would report: "2 sessions on the disc with x sectors and an unfinished session on the disc."

I created a multi-session disc but I can see only the first session.

There are two things you must have to read a multi-session disc. 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 and type DISCINFO. This 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 and CD-ROM drive are Orange Book Multi-Session compatible.

Some readers are Photo Multi-session instead of 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.)

When reading a CD-R disc in my CD-R drive, I receive no error messages, but when I try to read the disc in my CD-ROM drive, I can see the directories but there are no files in the directories, what is the cause of this?

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 is not multi-session compatible or you do not 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 al-lows 30 characters in the entire name which is too large for the DOS naming convention.

When using the READTRACK command 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?

This error occurs when you are trying to extract digital audio through the SCSI bus of a recorder that does not allow for this option. Check with GEAR technical support for an updated list of supported recorders.

When recording a CD, I receive the following error: 34H Absorption Control Error. What causes this?

The absorption control error is a media error caused by the laser in your CD-R drive not being able to etch the media properly. If this error occurs during the recording process but does not terminate the recording process, the disc should be readable. This error is caused by old firmware in the recorder.

If this occurs and recording halts, the problem may have been caused by the media. Try resetting your recorder then replace the media and attempt to record another CD. If the problem continues, contact either the media supplier, recorder manufacturer, or GEAR technical support.

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 cannot 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 does not 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 300 KB/sec for 2x, 600 KB for 4x, and 900 KB for 6x

Q **.I get the error, "cannot open (or write) 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
- You may not have permissions to read or write some of the file(s)
- There may not be any free disk space on the file system on which the volume is located

Q **Why can I not write at higher speeds?**

A If you are experiencing buffer underruns during writing it means that GEAR cannot retrieve the data of your image fast enough to maintain a steady flow of data to the CD-R drive. In most cases GEAR uses a virtual image which means that during writing, the virtual image is converted into a stream of data and then written to the recorder. Sometimes this process can take too long and creates a buffer underrun. The main reasons for the data transfer lag time are:

- Heavy network traffic
- A high number of small files and folders
- Hard disk thermal recalibration
- Slow access time on hard disk
- Other programs running in the background

D

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 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. Elektroson is an OSTA associate

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.

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