

Contents

Chapter 1	Introduction
1.1	<u>What is GEAR?</u>
1.2	<u>What Do I Need to Know About CDs?</u>
Chapter 2	Getting Started
2.1	<u>Data Formatting (Generation)</u>
2.2	<u>CD-R Writing</u>
2.3	<u>Premaster Tape Writing</u>
Chapter 3	Installation
3.1	<u>Configuration Required to Run GEAR</u>
3.2	<u>Software Installation</u>
3.3	<u>Hardware Installation</u>
3.4	<u>CD-Recorders</u>
Chapter 4	Creating a Virtual Volume
4.1	<u>Creating a New Empty Virtual Volume</u>
4.2	<u>Creating Tracks on a New Virtual Volume</u>
4.3	<u>Selecting Track Contents</u>
Chapter 5	Use of Existing Volumes
5.1	<u>Locating and Opening an Existing Volume</u>
5.2	<u>Editing Tracks</u>
5.3	<u>Editing Track Contents</u>
5.4	<u>Editing a Volume Descriptor</u>
5.5	<u>External Volumes</u>
5.6	<u>Appending Volumes to a Multi Session Disc</u>
5.7	<u>Editing Volume Settings</u>
Chapter 6	Logs, Batch Files and Commands
6.1	<u>Creating and Editing a Log</u>
6.2	<u>Running a Batch File</u>
6.3	<u>Running a Command</u>
Chapter 7	Testing and Writing a Volume
7.1	<u>Verify</u>
7.2	<u>Physical Volumes</u>
7.3	<u>Estimate</u>
7.4	<u>Writing to CD-R</u>
7.5	<u>Writing to a Premaster Tape</u>
Chapter 8	GEAR Tools
8.1	<u>Disc Information</u>
8.2	<u>Read Track</u>
8.3	<u>Jukebox Control</u>
Chapter 9	GEAR Options
9.1	<u>GEAR On-Screen Windows</u>
9.2	<u>CD-ROM XA</u>
Chapter 10	GEAR Default Settings
10.1	<u>Generator Setup</u>
10.2	<u>CD-R Setup</u>

- 10.3 [Premaster Tape Setup \(DDP Format Optional\)](#)
- 10.4 [Customer Settings](#)
- 10.5 [Setting the Working Directory](#)

Chapter 11 Configuration/Initialization Files

- 11.1 [What is the GEAR.INI file?](#)
- 11.2 [Generic Information](#)
- 11.3 [Generation Information](#)
- 11.4 [CD-R Information](#)
- 11.5 [Premaster Tape Information](#)

Chapter 12 Appendices

- Appendix A [ISO-9660 File and Directory Naming](#)
- Appendix B [GEAR.INI](#)
- Appendix C [GEAR for CD-Bridge and Electronic Book](#)
- Appendix D [Sense Codes \(Hardware Troubleshooting when Writing to CD-R\)](#)
- Appendix E [Referenced Documents](#)
- Appendix F [GEAR Commands](#)

What is GEAR?



GEAR 3.2 for Windows

Elektroson's GEAR™ product family is a pre-mastering and CD-Recordable package that supports all aspects of Compact Disc indexing and production.

Formats supported include:

- CD-ROM
- CD-ROM XA
- CD Digital Audio
- CDTV
- MMCD
- Photo CD
- Video CD
- CD-ROM Mixed Mode
- Multi Session
- CD-i (Compact Disc Interactive)
- EB (XA) - Electronic Book
- HFS (Hierarchical File System)
- 3DO

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

With GEAR you can:

- Format your data files into a CD-ROM image that conforms to the ISO-9660 standard. Versions are also available for MS-DOS, Apple Macintosh, Sun, HP9000 and other platforms. Unix versions have support for the Rock Ridge standard as well.
- Write a CD-R disc on any of the available CD-R recorders, including Sony, Philips, Kodak, Pioneer, Ricoh, Plasmon, JVC and Yamaha. The CD-R discs produced with GEAR are fully compatible with normally mastered CDs.
- Create a pre-master tape on 8 mm Exabyte, 9 track tape or 4 mm DAT for CD reproduction; optionally in DDP-format.

For each step GEAR offers the right solution.

What Do I Need to Know About CDs?

Before you start production, it is important and helpful that you understand the following concepts of CD and CD-R.

Multi Session

According to the Orange Book, Multi Session is the possibility to record the information on the CD-R in several interrupted actions (sessions) i.e. at a different time on a different recorder. Each session can contain information according to one of the CD standards (ISO, XA, DA, etc.). The data in different sessions can be linked i.e. a newer session can refer to data in an older session.

This functionality offers enormous possibilities for:

- document archiving
- updating catalogs of information regularly

Each session will introduce a data overhead (lead in and lead out) of 15 megabytes. This limits the number of sessions on a disc to about 40 (for a 650 Mb disc).

A true Multi Session CD-ROM reader will automatically go to the last session and present all linked sessions as one. As a user you will never be aware of the number of sessions on the disc.

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

Multi Volume

Multi Volume discs use the same principle as a Multi Session disc. There is however an important difference; when writing Multi Volume discs, each 'session' or Volume on the disc has no reference to another volume on the disc. Each volume can be seen as a separate CD. In order to read a Multi Volume disc you need a specific device driver which allows you to select a volume on the CD-R. Currently there are several third party software packages with this functionality.

GEAR fully supports the creation of Multi Volume discs. If you want to add a volume to a disc, just create the volume as any other volume (with the New option in the Session menu). When the image is ready just put the CD-R disc you want to add the volume to in the recorder, and write the new volume.

Tracks

- A CD-R can contain up to 99 tracks, regardless of the number of sessions or the type of tracks on the disc. GEAR allows you to create up to 99 tracks (Multi Media version only).
- It is not possible to have both ISO and XA tracks on the same session or virtual volume.
- In most cases only a Multi Session player can play an audio track on a Multi Session disc. Not all audio CD players can handle Multi Session audio discs.
- Each session or virtual volume always contains at least one track; Refer to the table below for the possible track structures for a session or virtual volume:

Possible track structures

	<i>Number of tracks</i>		
	ISO	XA	DA
Structure 1	1	-	Up to 98
Structure 2	-	1	Up to 98
Structure 3	-	-	Between 1 and 99

Structures 1 and 2 can be used for each session of a Multi Volume or Multi Session disc. However, the

maximum number of tracks for the whole disc is still 99. Structure 3 should not be used for Multi Session discs. Structure 3 should not be used for Multi Session discs. There is, however, another structure enabling the use of audio tracks in combination with Multi Session called 'CD Extended' or 'CD Plus'. These CD-Rs have multiple audio tracks in the first session and use the subsequent sessions for data. This means that an audio player only 'sees' the first session (i.e. audio tracks), whereas a Multi Session CD-ROM player only presents the data sessions.

Incremental Write

Incremental Write is the possibility to divide a data track into small data packets and write each data packet separately to a CD-R disc. For Incremental Writing there are two requirements:

- The CD-Recorder and software must support Incremental Write (refer to your CD-Recorder manual). GEAR supports Incremental Write. Most CD-Recorders do NOT support Incremental Write
- The ISO 9660 file system standard has to be extended. The ISO 9660 standard does not support Incremental Write. There is however a new (European) standard, ECMA 168, which is an extension of the ISO 9660 standard and which describes the necessary enhancements required for the support of Incremental Write. Support for the new ECMA 168 standard will be available in future releases of GEAR.

The packet size determines the amount of overhead. For a 64 Kb packet size. the overhead is about 15%. A special driver is required to read incrementally written discs. Most CD-ROM readers currently on the market can not read an incrementally written disc!

CD-Recorders

CD-Recorders are computer peripherals with some very specific aspects. When a recorder is writing data to a disc, it cannot wait for the data (unlike for instance a tape unit). The data buffer of the recorder must always contain data.

Data transfer can only be stopped at very specific points. These points are determined by the way the disc is written (Disc at once, track at once or incremental). At these points (end of disc, end of track and end of packet) the recorder can finalize the writing of data and then the writing can be resumed at a later time. *If the recorder cannot finalize the disc because it runs out of data unexpectedly, the CD-R disc is wasted and can not be used.* Therefore, the data transfer rate to a CD-Recorder is very important! To minimize the chances of an unexpected data underrun, you could use Incremental Writing. However, Incremental Writing is not yet supported by CD-Recorders.

GEAR allows you to do a performance check on your system to check the transfer rate before data is written. We advise you to do this until you are very familiar with the possibilities of your system. GEAR also supports the so-called 'test mode' of CD-Recorders. In this mode all data is transferred, but the disc is not actually written. This allows you to check your system performance for writing discs. When you start with CD-Recording, we advise you to use this test option for the first few discs. This allows you to get to know the software and the hardware, and also prevents you from wasting CD-R discs.

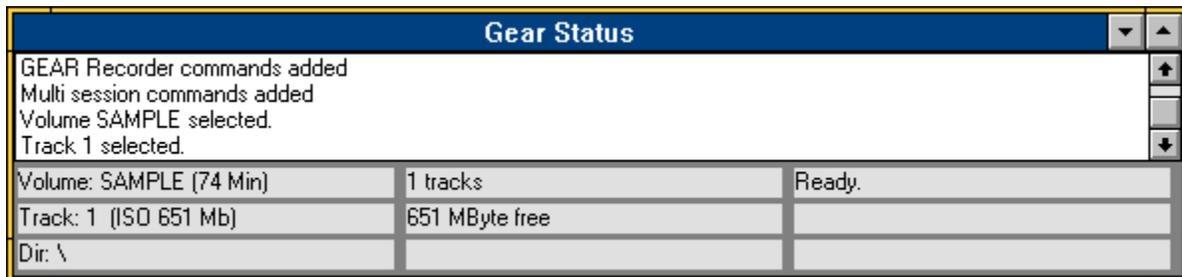
Single Session

Single Session discs usually contain one session. Once a volume is written as Single Session (by disabling the GEAR Multi Session option) no more data can be added to the disc. This can be used to 'finalize' a Multi Session disc so that nobody can ever add data to the disc, or to create a disc with only one session.

Data Formatting (Generation)

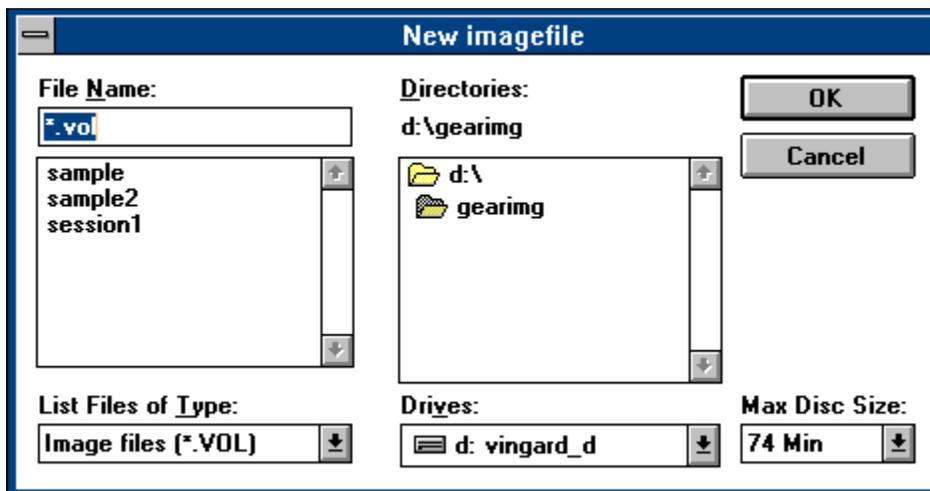
Three windows appear when you start the software; the GEAR Working Window , the GEAR Status Window, and the New imagefile Window.

The Status Window indicates what GEAR is currently doing. The nine status fields of the Status Window display useful information about the CD-image you are working on, such as selected volume, selected track within the volume or selected directory.



The New imagefile Window allows you to create a new virtual image file; just type in a name for your new virtual image file and click OK. The Create track window opens. Click on Create and select the ISO format. Click on Cancel to close the Create track window.

The virtual image file is created and the File Manager appears. You are now ready to start loading your data!

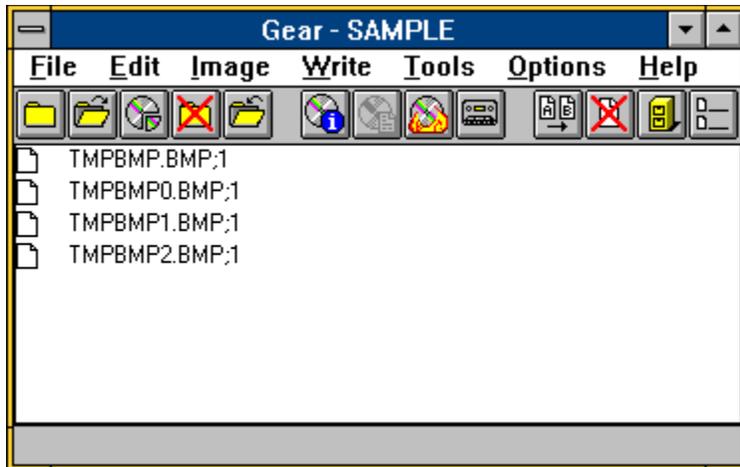


Files or directories are copied to the virtual image file simply by selecting them in the File Manager Window and dragging them to the GEAR Working Window.

Important

File Manager does not allow you to drag icons from its tree window (on the left); you can only use the directory window on the right. Just select a few files and/or directories and drag them to the GEAR Working Window.

Directly after you drop the selection, GEAR starts loading. The GEAR Status Window will show you which files are loaded under which name and at which location.



An ISO file or directory name is limited to 30 characters; valid characters are 0...9, A...Z and the underscore '_' ([refer to Appendix A for further information](#)). GEAR gives you a warning if there are any invalid characters in the file name. You can then choose to translate the file name to an ISO compliant name or you can leave the file name unchanged. GEAR has several options for handling non-ISO names. Chapter 4 explains all these options.

After every file and directory has been loaded, the structure of the image can be verified in the GEAR Working Window. This window shows all files and directories present in the root directory of virtual image file. You can browse through your virtual image file just like you would do with a directory tree in the File Manager.

At this stage your ISO formatting is completed! There are no additional formatting actions required. You are ready to write your image to CD-R disc and/or premaster tape!

Multi Session Formatting

If you want to append data to a Multi Session disc you must first use the GEAR software to read back the last session on the disc.

Important

The last session can only be read back if the disc was written with the Multi Session option enabled!

Put the disc in the recorder, start GEAR and choose Append from the Session menu. After selecting the Append option, select a session number (default is the last session on the disc). The selected session on the CD-R disc is read and a volume is created which contains the complete directory/file structure of the this session. This image will have the same name as the selected session on the disc. If the virtual image of this session is still present or another virtual volume with the same name is present, GEAR will give you a warning and will ask if it should overwrite the virtual volume. If you don't want to overwrite it you can use another working directory for creating the new session.

The data structure is displayed in the GEAR Working window. Files and directories can now be added in exactly the same way as for any other image. All files/directories belonging to the original session are colored differently than files added to the new session.

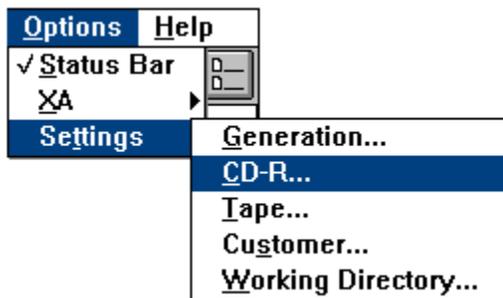
CD-R Writing

You can write the volume to disc by using the CD-R option of the Write menu or the disc icon of the toolbar.



Before writing to CD-R it is advisable to change the CD-R settings first

1. Select the Settings option from the Options menu.
2. Select the CD-R option; the CD-R settings dialog will appear. If you want to write a Multi Session disc, make sure that the Multi Session option is enabled.



3. Disable the writing of the CD-R disc by clearing the Recording enabled check box. This prevents you from wasting a disc due to data transfer problems. You can also check what other settings will be used by GEAR for writing your image. Click on OK.
4. Select the CD-R option of the Write menu or click on the disc icon in the toolbar

When CD-R writing has been initiated, GEAR optimizes your virtual image; the volume is resized to the minimum size that can contain all the information. Next, all files in the volume are verified; the actual size and time stamp of each file is compared to the size and time stamp at the time of loading. If there are any differences GEAR warns you, and you can update the changed files by reloading them. Differences occur if files are changed after being loaded into the virtual image.

If verification is successful and the Estimate before write setting is enabled, GEAR checks the performance of your system. If the system performance is sufficient, GEAR continues with writing the disc, otherwise writing is aborted.

To improve the system performance you can either minimize the fragmentation on your hard disk with a disk optimization program, or you can use the physical image file of the volume (*refer to section 7.2*).

GEAR then checks the recorder. If there is no disc in the tray, you will be asked to load one: writing of your CD-R disc starts. During writing, the software reports the percentage of each track of the volume written in the GEAR Status Window.

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

Premaster Tape Writing

You can write the volume to disc by using the Premaster tape option of the Write menu or the tape icon of the toolbar.



When premaster tape writing has been initiated, GEAR optimizes your virtual image; the volume is resized to the minimum size that can contain all the information. Next, all files in the volume are verified; the actual size and time stamp of each file is compared to the size and time stamp at the time of loading. If there are any differences GEAR warns you, and you can update the changed files by reloading them. Differences occur if files are changed after being loaded into the virtual image.

If verification is successful GEAR continues with writing the tape. GEAR checks the tape unit. If there is no tape loaded you will be asked to put a tape in the unit and writing of your tape starts. During writing, the software reports the percentage of each track of the volume written in the GEAR Status Window.

If the Verify before write setting is enabled, GEAR compares the contents of the tape with the actual volume. This means that the complete tape is read back and the data is checked against the contents of your virtual image. If there are any differences GEAR warns you. After verifying the tape, or directly after the writing if you decided to skip the verify operation, the tape is ejected automatically. You can now send the tape to a CD-ROM mastering plant!

Configuration Required to Run GEAR

The Multi Media version of GEAR for Windows requires the following configuration (versions for DOS, Sun, HP9000 and MAC are also available. Contact your distributor for more information).

Computer: IBM AT or compatible; 386DX or 486 (486 advised).

Hard disk: 25 Mb free disk space.

Important

A fast hard disk with a fast controller (12 msec average access time or less) is recommended. Use only hard disks that do not require thermal recalibration. If thermal recalibration occurs during CD-R writing, the data stream stops and the disc is wasted!

Operating system: PC or MS-DOS 5.0 or higher.
Microsoft Windows 3.1 or higher.
Aspi4dos.sys driver, Aspi7dos.sys driver or CAM driver.

Memory: 4 Mb (8 Mb advised) RAM.
500 kb conventional memory.

Adapter cards: Adaptec SCSI card or any other interface card which is supported by the ASPI or ASPI compatible driver.

Future domain card with CAM driver.

The hard disk and CD-Recorder unit should be connected to separate SCSI controllers.

Recorders: JVC XR-W1001, XR-W2001
Kodak PCD200, PCD225, PCD600
Philips CDD521, CDD522
Plasmon RF4100
RICOH RS-9200CD
Sony CDW-E1/W1, CDW900E
Yamaha CDR100, PDS301
Pioneer DR-R504X
Pinnacle RCD-1000

"Config.sys" file: Files=20
Buffers=40
Device=aspi4dos.sys /d
(refer to the card installation manual)

Refer to your MS-DOS manual for help when editing the "config.sys" file.

Hardware Installation

This section indicates important considerations when installing hardware so that you can connect a premaster tape and/or CD-R unit.

Important

Always consult the manufacturer's instructions before installing hardware. Problems encountered during installation are usually due to hardware installation and not due to GEAR.

Use the software supplied with the Adaptec 1540/1542 SCSI host adapter or any adapter supported by the Adaptec ASPI manager driver or compatible. GEAR has been successfully tested with the Buslogic, Future Domain and Bustek adapters. In all cases the adapter was tested with the ASPI software delivered with the adapter.

Important

We strongly advise NOT to use the same Adaptec board to control your hard disk and the CD-Recorder.

If you install a separate adapter for the CD-R unit, make sure the BIOS of this adapter is disabled, and check the address settings to prevent an address conflict with the hard disk adapter. The INT Request and DMA channel selection of the two adapters must be different to prevent conflicts.

If an adapter is already present in your computer, you may have to change the interrupt channel, IO address and DMA channel select to prevent conflicts between the adapters.

Important

We strongly advise not to use different types of adapters in the same computer.

Adaptec 1540 and 1542 Adapters

If you use the Elektroson driver for the Adaptec 1540/1542 adapter and you have changed the settings on the Adaptec adapter, check the settings in the GEAR.INI file.

The following settings for the Adaptec board controlling the CD-R unit, usually results in a working configuration:

- IO Address 230
- IRQ channel 15
- DMA channel 7

A conflicting hardware configuration might result in the following messages being displayed:

- Cannot write channel 2 buffer
- DMA test of AHA-154X board failed

Other error messages can result from an ASPI manager. If you are using an ASPI manager and errors occur, use another DMA channel and/or IRQ channel.

ASPI Managers

If you are using an ASPI manager as the device interface for multiple controllers and your CD-R unit is recognized by ASPI but not by GEAR, you will probably have to change the AspiHostAdapterNumber in the GEAR.INI file. If ASPI is installed for more than one adapter, the ASPI manager numbers each adapter, starting from 0. The GEAR.INI entry defines which adapter GEAR should use for searching for

the CD-R unit.

SCSI Adapters

The CD-Recorder can not always handle the high SCSI bus transfer rates that some of the new SCSI2 controllers are using. This problem could cause 'miscompares' on CD-R discs.

Previous controllers had a DMA transfer rate of 5.0 Mb/sec. SCSI2 controllers have a default transfer rate of 10 Mb/sec. Besides that, the new controllers use a type of 'sync negotiation' which is used to negotiate the synchronous data transfer rate. This 'sync negotiation' should be disabled for CD-Recorders because most of them cannot handle it adequately.

If 'miscompares' occur on a CD-R disc, you should check the following:

- type of controller used by the CD-Recorder
- DMA transfer rate used
- termination
- 'sync negotiation' enabled
- parity checking enabled

With Adaptec controllers you can check these settings by pressing <CTRL> A at boot time.

Medium Changers

Currently, GEAR supports 2 medium changers, the ASM Jukebox and the Kodak Disc Transporter. If a medium changer is being used, it must be connected to the same SCSI bus as the CD-Recorder. GEAR will use the medium changer only for automatic loading and unloading of the CD-R discs. The GEAR.INI entry UseMediumChanger must be set to TRUE if a medium changer is being used.

Software Installation

This section guides you through the installation of GEAR. We advise you to read chapter 2 after installation.

Warning

GEAR is delivered on one 3.5" diskette (includes the default GEAR.INI file). Unauthorized copying of the diskette is prohibited except for backup purposes.

Additional copies of GEAR can be ordered. The diskette always contains the following files:

WINGEAR.EXE	The GEAR main program
GEAR.IN_	The GEAR initialization file
WINGEAR.HL_	The GEAR help file
SETUP.EXE	The setup program

Additional files may be supplied with GEAR; these files are dependent upon the version of GEAR you have.

You need approximately 10 Mb of free space on the hard disk for installation of GEAR. GEAR takes up about 2 Mb of hard disk space after installation.

Important

Before installation:

- Make a backup copy of your GEAR software.
 - If you want to use an ASPI or CAM driver install it.
1. Insert the GEAR diskette into your floppy disk drive. Windows must be running before you can run the GEAR SETUP program. Click the File option of the Windows Program Manager and select the Run command.
 2. Type 'a:setup' in the Command line box (assuming your floppy disk drive is drive A) and click on OK to confirm; the install program will begin.

A new directory for your GEAR software is created (default 'C:\GEARWIN'). The GEAR system files are copied to this new directory. You will also be asked to specify the GEAR working directory (default 'C:\GEARIMG'). All files generated by GEAR are saved in this directory.

During installation the following files are modified.

WIN.INI file

The following lines are added the WIN.INI file:

```
[Gear for Windows]
GEARDIR=C:\GEAR
```

If you selected a directory name other than the default for the GEAR system files, the 'GEARDIR=' line is changed accordingly.

SYSTEM.INI file

If you selected Elektroson's Adaptec device driver, the following lines are added to the SYSTEM.INI file.

```
[386Enh]
```

DEVICE=GEARHDR.386
GEARHDR_IOADDRESS=330

If you selected the ASPI or CAM driver, the SYSTEM.INI file is not modified. If you want to change from Elektrosen's Adaptec driver to the ASPI driver or vice versa the software has to be installed again!

GEARHDR.386 file

The GEARHDR.386 file is copied to the system directory of Microsoft Windows.

Important

If GEAR has to be installed again, remove the GEAR specific lines in the SYSTEM.INI and WIN.INI files.

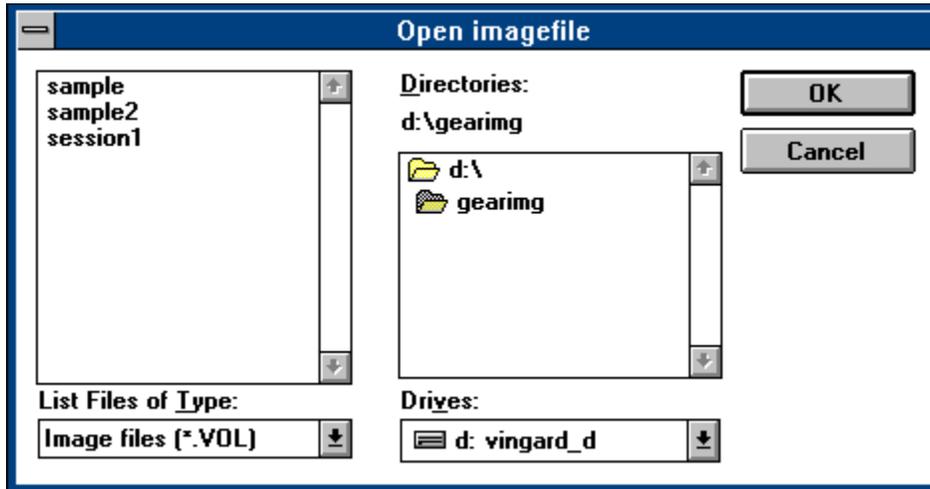
The WIN.INI variable GEARDIR should be set correctly. If not, the software cannot locate the GEAR.INI file and initialization will fail. If you don't want to use the WIN.INI variable you can copy the GEAR.INI file to the GEAR working directory. GEAR notifies you if it cannot find the GEAR.INI file (*for more information about the GEAR.INI file refer to Chapter 10*).

The CONFIG.SYS and AUTOEXEC.BAT files are not affected by the installation of GEAR.

Locating and Opening an Existing Volume

An existing volume can either be a GEAR volume or an external volume. An external volume can not be edited but just written to CD-R disc and/or tape.

1. Click on Open CD-Image... in the File menu. The Open imagefile window displays a list of available volumes in the current working directory.



2. To change the current directory select the relevant directory string from the Directories tree.
3. When the existing volume has been located double click on the volume name; a GEAR volume is indicated by the ".vol" file extension.

Warning

Volumes of version 3.01 and earlier (with the .vfl extension) cannot be edited using version 3.2 and higher!

The previously selected volume (if any) is minimized and closed, and the selected volume is opened. The first track of the volume opens automatically and its size is expanded to the maximum free space available within the volume. The maximum free space is dependent upon the maximum disc size specified when creating the volume and the memory required by the other tracks within the same volume. The volume information is indicated in the GEAR Status window.

Closing the Current Volume

1. Click on Close CD-Image... in the File menu OR click on the relevant icon.

GEAR optimizes the Volume during closure; the current track is resized to the minimum size that can contain all the information. The information in the GEAR Status window is reset.

Deleting a Volume

Warning

Deleted volumes can not be restored. Use this command with care.

1. Click on Delete CD-Image... in the File menu. The Delete imagefile window displays the volumes available in the currently selected directory.

2. To change the current directory select the relevant directory string from the Directories tree.
3. When the volume has been located double click on the volume name; a GEAR volume is indicated by the ".vol" file extension.
4. Confirm deletion of the volume by clicking on OK and then on Yes.

The related administration files and physical volume files are also deleted.

Creating a New Empty Virtual Volume

This will allow you to create and name a new empty virtual volume.

1. Click on New CD-Image... in the File menu.



2. Type in a name for your new virtual volume. The name is limited to 8 characters; valid characters are 0...9, A...Z and the underscore '_' (*refer to Appendix B for further information*).

Note

If you want to give your virtual volume a longer name you can use the Volume Descriptor option in the in the Edit menu (*refer to Edditing a Volume Descriptor*).

3. GEAR creates a file by adding a suffix '.vol' to the virtual volume name. This file is called the virtual volume administration file and is stored in the currently selected working directory. You can change the working directory by using the Options menu.

Warning

Volumes of version 3.01 and earlier (with the .vtl extension) cannot be edited using version 3.2 and higher!

4. Click on the Max. Disc Size menu and select the length of the virtual volume. The values 80, 74, 63 and 18 denote the virtual volume length in minutes and therefore determine the data capacity of the virtual volume. When adding data, the GEAR status window allows you to check the remaining space on the virtual volume.

5. Click on OK to confirm creation of the new virtual volume.

Warning

GEAR cannot create a volume administration file if there is less than 25 Mb of free disk space. If the message 'Volume administration files could not be created' is displayed you will have to create this free disk space.

Calculating virtual volume capacities

Data capacity = sector capacity (bytes) x length (mins) x 60 (secs) x 75 (no. of sectors)

Sector capacities

ISO 2048 bytes
XA and CD-i 2336 bytes
CD audio 2352 bytes

Virtual volume capacities

	ISO	XA and CD-i	CD audio
18 min	158 Mb	180 Mb	181 Mb
63 min	553 Mb	631 Mb	653 Mb
74 min	650 Mb	741 Mb	746 Mb
80 min	703 Mb	802 Mb	807 Mb

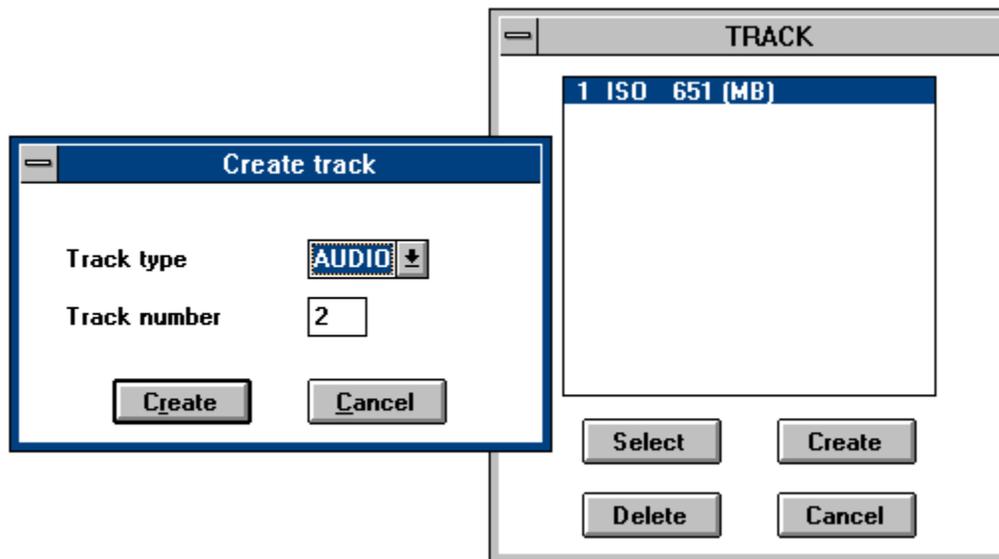
Note

A CD-Recorder always checks if there is enough space left for the Multi Session overhead. Depending on the CD-Recorder this overhead is somewhere between 15 and 25 Mb. Therefore if you want to use all of the remaining memory for data, disable Multi Session.

Creating Tracks on a New Virtual Volume

When you have created a new virtual volume the Create track window menu appears. This menu allows you to add tracks to, and delete tracks from the virtual volume.

1. Select the required track type. The available track types are ISO, XA and CD audio. Click on Create to confirm. To add another track select Create and repeat this procedure. The Track window displays the created tracks.



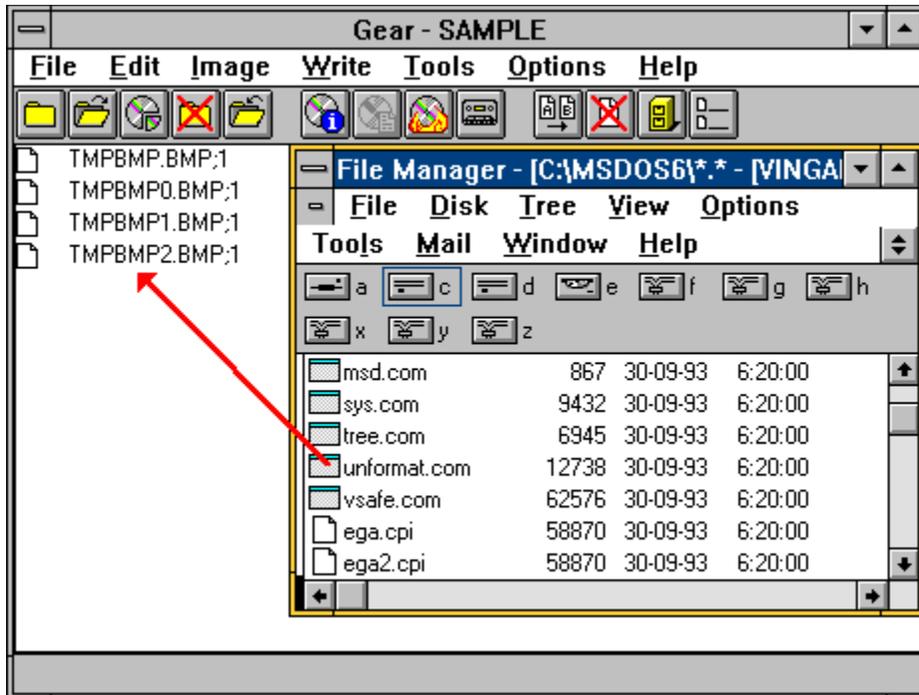
Notes

- The track number is automatically selected; this number is only relevant for CD audio, since ISO and XA tracks are always assigned track number 1.
- A virtual volume can contain up to 99 tracks.
- It is not possible to have both ISO and XA tracks on the same virtual volume.
- It is not possible to assign CD audio to track number 1 if either an ISO or an XA track is selected on the virtual volume.
- When a new track is created it is automatically assigned the maximum available space on the virtual volume.

Selecting Track Contents

The content of each track is built up by selecting files/directories in the File Manager window and dragging them to the GEAR working window shown under the main menu.

1. Click on the required track and then click on Select. This track is automatically assigned the maximum available space on the virtual volume. The track name is displayed in the GEAR status window.
2. Use File Manager to drag and drop files to the GEAR working window.



Notes

- It is not possible to drag directories to a CD Digital Audio track.
- Data tracks only: the NonISONameHandling option of the Generator Setup window determines how and when non ISO file and directory names are translated.

CD-Recorders

This section describes important installation and operational information that is specific to each of the CD-Recorders supported by GEAR.

If an error occurs, an error message is displayed. The error message consists of a description plus an additional sense code. Sense codes are described in Appendix E.

If a buffer underrun occurs, GEAR always tries to unload the disc. If GEAR does not succeed in unloading the disc we advise you to eject the disc manually.

JVC XR-W1001

This CD-Recorder can only write at single speed. It can perform a test run. Only the latest firmware (2.10) from JVC supports Multi Session. GEAR only supports this version of firmware. Usually, GEAR will give you the following error message if you have the unsupported firmware:

ERROR: Illegal request for SCSI CD-Recorder. Additional sense code 24 (Hex)

If this happens, contact your dealer to upgrade your CD-Recorder.

The XR-W1001 has a very small internal buffer (64 kb) so a sustained data rate is very important.

Philips CDD521, Kodak PCD200

Both CD-Recorders are terminated internally. Therefore make sure that when you connect your CD-Recorder it is at the end of the SCSI chain and without an external terminator. If you don't want the CD-Recorder at the end of the chain remove the internal terminators! CD-Recorders which are terminated twice can cause problems.

Both CD-Recorders have a comparatively small buffer. If you want to write CD-ROM XA or CD Digital Audio check your system performance carefully. CD-ROM XA and CD Digital Audio images require a data transfer rate which is about 15% faster than ISO!

Older firmware versions (below 2.x) cannot write at single speed or perform a test run; double speed writing is used regardless of the settings. Newer versions support single and double speed writing, and can perform a test run.

All versions support Multi Session.

Philips CDD522, Kodak PCD225

These CD-Recorders can write CD-R discs at single and double speed, support Multi Session and can perform a test run. The internal buffer size is 1 Mb, upgradable to 32 Mb. They are also capable of reading CD Digital Audio tracks via the SCSI bus, and are NOT terminated internally! These recorders allow you to write 'Disc at once' besides 'Track at once'.

Pioneer DR-R504X

This CD-Recorder can write CD-R discs at single, double and quadruple speed. It supports Multi Session and can perform a test run.

Plasmon RF4100

This CD-Recorder can write CD-R discs at single and double speed, supports Multi Session and can perform a test run. The internal buffersize is 1 Mb, upgradable to 32 Mb. It can NOT read CD Digital Audio tracks via the SCSI bus.

RICOH RS-9200CD

Despite having a large internal buffer (1Mb), this CD-Recorder can only write at single speed. It supports Multi Session and can perform a test run.

Check the DIP switch settings carefully before connecting the CD-Recorder to prevent incorrect termination of the SCSI bus. The RS-9200CD may occasionally have difficulties reading the disc or getting on line. If this happens, switch the it off, wait a while and then switch it back on again. This will usually solve the problem.

At the time of printing, this was the only CD-Recorder supporting Incremental Writing.

SONY CDW-E1/W1, CDW900E

These CD-Recorders do not support Multi Session. Both CD-Recorders have a very large buffer (1-3 Mb). Only the CDW900E can write at double speed. Neither CD-Recorder supports disc reading.

The CDW900E has both a hardware and a software switch for initialising a test run. We advise you to use the software switch. Initialization for writing can last for 1.5 minutes.

The SONY CDW900E is one of the few CD-Recorders which can write subcode information to a CD-R disc.

You can connect up to 16 CDW900E (or 32 CDWE1/W1) CD-Recorders to the same SCSI controller; this allows you link 16 CD-Recorders together and write 16 discs in parallel!

YAMAHA PDS301

The PDS301 does not support Multi session and can not be used for disc reading. It supports single and double speed writing, and can perform a test run.

The PDS301 must always be the last CD-Recorder in the SCSI chain. Connect it to the SCSI bus through SCSI port 2.

You can connect up to 14 PDS301 CD-Recorders to the same SCSI controller; this allows you to link 14 CD-Recorders together and write 14 discs in parallel!

Yamaha advises the use of special TDK discs with the PDS301.

YAMAHA CDR-100

The CDR-100 can write CD-R discs at single, double and quadruple speed. It supports Multi Session and can perform a test run. If you want to use the quadruple speed option make sure you use the special quadruple speed (4x) medium to prevent problems. This is the only medium certified for quadruple speed writing.

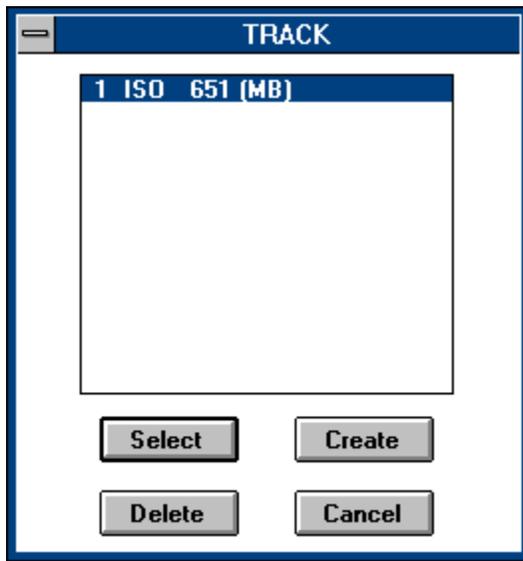
It can read CD Digital Audio Tracks via the SCSI bus.

Firmware revisions 1.04 and higher allow you to write 'Disc at once' besides 'Track at once'. Also 1.04 revisions allow you to write subcode information to your CD-R disc.

Editing Tracks

When you have selected new virtual volume the `Track` window appears. This window allows you to add tracks, delete tracks, and select tracks so that the content can be edited.

1. Select the volume ([refer to section 5.1](#)) and click on `Tracks...` in the `Edit` menu. The `Tracks` window presents a list of all existing tracks in the currently selected volume



2. Click on one of the following options:

Select

Selects an existing track for editing. When a track is selected, the previously selected track is optimized; resized to the minimum size that can contain all the information. The newly selected track is assigned the maximum available space on the volume.

1. Click on `Select` in the `Track` window. The `GEAR Working` window is displayed. The track information is displayed in the `GEAR Status` window. ([Refer to section 5.3 for editing the track contents.](#))

Create

Creates an empty track of a chosen type. The available track types are [ISO](#), [CD-ROM XA](#) and [CD Digital Audio](#).

1. Click on `Create` in the `Track` window.
2. Select the required track type. The available track types are [ISO](#), [CD-ROM XA](#) and [CD Digital Audio](#). Click on `Create` to confirm. To add another track select `Create` and repeat this procedure. The `Track` window displays the created tracks.

Notes

- The track number is automatically selected; this number is only relevant for [CD Digital Audio](#), since [ISO](#) and [CD-ROM XA](#) tracks are always assigned track number 1.
- A [virtual volume](#) can contain up to 99 tracks.
- It is not possible to have both [ISO](#) and [CD-ROM XA](#) tracks on the same virtual volume.

- It is not possible to assign CD Digital Audio to track number 1 if either an ISO or an CD-ROM XA track is selected on the virtual volume.
- When a new track is created it is automatically assigned the maximum available space on the virtual volume.

Important

Three administration files are created for each new track and located in the current working directory. The name of these files consists of the first 8 characters of the volume name plus the extensions '.Mxx' , '.lxx' and '.Fxx' ., where 'xx' stands for the track number.

Information

If you need files on your hard disk that represent audio. These files must always fulfil the following requirements (the so called Red Book format):

- Sample frequency must be 44.1 KHz.
- Audio must be stereo.
- Each sample must consist of 16 bits.
- The byte order must be the byte order used by the computer running the GEAR software. If this is not the case the generic option MSBAudio= can be used so that GEAR will swap the audio bytes for all tracks.

DOS/Windows: LSB audio default, with MSBAudio=true each track will be swapped by GEAR.

Depending on the audio package being used, the audio file may or may not contain a sound header. You can also use the readtrack option of GEAR to copy a digital audio track from CD to a file on hard disk. This option operates on the CDD522 and CDR100. The readtrack option creates no header so the resulting file can be used directly.

Warning

The CDD522 reads audio in MSB format while the CDR100 reads audio in LSB format. The current GEAR version supports Red Book audio files, WAV audio files and AIFF audio files. All files should fulfil the above requirements. For WAV and AIFF files the header is automatically removed.

AIFF files are usually in MSB format.

Warning

GEAR cannot create the Track administration files if there is less than 25 Mb of free disk space. If the message 'Track administration files could not be created' is displayed you will have to create this free disk space.

You should never edit or delete these files manually: this will result in a corrupt and thus useless volume. They will be deleted automatically when the associated volume is deleted!

Delete

Deletes the selected track. The related administration files and physical volume files are also deleted.

Warning

Deleted tracks can not be restored. Use this command with care.

Cancel

Closes the Tracks window.

Editing Track Contents

When a track has been selected ([refer to section 5.2](#)) you can edit it in the following ways:

- create a new directory on the track
- rename a file/directory on the track
- delete selected files/directories from the track
- select files/directories on the track
- de-select files/directories on the track

To Create a New Directory on the Track

First make sure you have selected the correct track.

1. Select the Files/Directories option from the Edit menu.
2. Select the `Create` option.
3. Type in the name of the new directory to be added to the track. The directory name is limited to 30 characters. Valid characters are 0..9, A..Z and the underscore '`_`' ([refer to Appendix A for further information](#)). GEAR gives you a warning if there are any invalid characters in the directory name. You can then choose to translate the directory name to an ISO compliant name or you can leave the file name unchanged. GEAR has several options for handling non-ISO names. Chapter 9 explains these options.

Note

- We advise you to limit the number of entries in a directory to 50.
- DOS can only handle names of up to 8 characters; files can have an extension of up to 3 characters.

Hiding the Directory

It is possible to create hidden directories by setting the `Hidden` option on before creating the new directory.

1. Select `Options` from the GEAR main menu.
2. Select the `Settings` option.
3. Select the `Generation...` option. The `Generator Setup` window appears.
4. To hide new directories, toggle the `Hidden` box so that a cross is displayed. Press OK to confirm.

To Rename a File/Directory on the Track

Renames the selected directory or file in the [virtual data track](#) to the new name. The name may not contain any other characters than uppercase A..Z, digits 0..9 and underscore '`_`' ([refer to Appendix A](#)).

1. Select the file(s) to be renamed. This can be done by:
EITHER
a. Clicking on the file with the mouse.
OR
b. Selecting the file(s) by using the `Select` option from the `Files/Directories` menu ([refer to section below - To Select Files/Directories on the track](#)).
2. Select the `Files/Directories` option from the Edit menu and then the `Rename` option.
3. Type in the new name for the file and click on OK to confirm.

To Delete Selected Files/Directories from the Track

Deletes selected files/directories from the current track. A complete directory tree can be deleted without having to delete the files first!

1. Select the files/directories to be deleted. This can be done by:
EITHER
 - a. Clicking on the file with the mouse.OR
 - b. Selecting the file(s) by using the `Select` option from the `Files/Directories` menu (*refer to section below - To Select Files/Directories on the track*).
2. Select the `Files/Directories` option from the Edit menu and then the `Delete` option.
3. Confirm by clicking on OK.

To Select Files/Directories on the Track

This option lets the user enter a specification for selecting files/directories on the currently selected track. DOS wild-cards are allowed. This option is used for selecting a specific set of files/directories for deletion or renaming. Alternatively, the standard Windows method of file selection with the mouse can also be used.

1. Select the `Files/Directories` option from the Edit menu and then the `Select` option.
2. Type in the DOS string criteria for file/directory selection i.e. '*.txt' for all files with the 'txt' extension. Confirm by clicking on OK.

To Deselect Files/Directories on the Track

This option lets the user enter a specification for deselecting files/directories on the currently selected track. DOS wild-cards are allowed. This option is used for selecting a specific set of files/directories previously selected for deletion or renaming. Alternatively, the standard Windows method of file selection with the mouse can also be used.

1. Select the `Files/Directories` option from the Edit menu and then the `Deselect` option.
2. Type in the DOS string criteria for file/directory deselection i.e. '*.txt' for all files with the 'txt' extension. Confirm by clicking on OK.

Creating and Editing a Log

Creating

The GEAR batch utility allows you to RUN multiple GEAR commands without user interaction. The easiest way to create a batch file is to use the logging option of GEAR and create the image one time interactively. This is particularly useful if the same image has to be created but with an updated set of files e.g. a CD which is published every quarter. All of the commands required for the creation of this image are saved in the log file. This log file can be used as a batch file without any editing.

You can also read the log file to check the image generation process.

1. Start logging of the session by selecting the `Generate Log...` option from the `Session` menu.
2. The `Name of imagefile` window opens. An existing log file or a new log file can be used. If logging is restarted during the same session with the same file name then the information will be appended to the file, otherwise the existing file will be renamed. To change the current directory select the relevant directory string from the `Directories` tree.
3. Click on OK to confirm the log file name; logging of the session starts
4. Stop logging of the session by selecting the `Generate Log...` option from the `Session` menu again.

From log to batch file (editing)

A log file can be edited with any text editor and then used as a batch file.

The contents of the log file could be as follows:

```
;New log file created at 1994 09 07 15:58
;Logging started.
;D:\GEARIMG
NEWVOL DEMO 74
;Volume DEMO created.
SELVOL DEMO 74
;Volume DEMO selected.
NEWTRK ISO 1
;Track 1 created.
COPYTREE D:\DATA DATA
;D:\DATA\FILE1.DAT
;Successfully loaded as: FILE1.DAT;1 at sector 169.
;Tree loaded.
COPYTREE D:\STARTUP STARTUP
;D:\STARTUP\INSTALL.EXE
;Successfully loaded as: INSTALL.EXE;1 at sector 200.
;Tree loaded.
;Log file closed at 1994 09 07 15:59
```

All lines preceded by a semicolon are ignored when running this log file as a batch file. You can add comments as long as they are preceded by a semi-colon. GEAR commands should start on a new line. Any of the commands as mentioned in Appendix G can be used.

Editing a Volume Descriptor

This option allows you to edit the information in the Primary Volume Descriptor for the currently selected volume. The default values are specified in the GEAR.INI file and can be changed with the `Generator` option of the `Settings` menu. The content of the GEAR.INI file and the default values are explained in chapter 9.

1. Select the `Volume Descriptor...` option from the `Edit` menu. The Primary Volume Descriptor window is displayed.
2. Type in the Volume Descriptor information for the currently selected volume. Click on OK to confirm.

The following information can be edited:

- Volume Identifier
- System Identifier
- Publisher Identifier
- Data Preparer Identifier
- Application Identifier
- Application Use
- Copyright Identifier
- Abstract File Identifier
- Bibliographic File Identifier

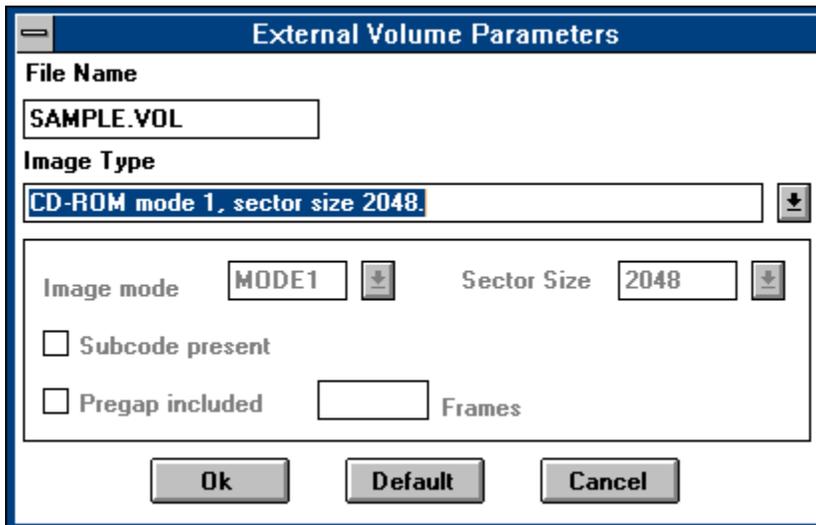
Note

- This only affects the currently selected volume.

External Volumes

An external volume is a volume that has been generated by another indexing package. An external volume can not be edited by GEAR. However, it can be written by GEAR to a CD-R disc or to a premaster tape. Before writing an external volume, it must be opened and the parameters defined.

1. Click on **Open...** in the **Session** menu. The **Open imagefile** window displays a list of available volumes in the current working directory.
2. Select the **External image file** option from the **Files of Type** list. All external volumes in the currently selected directory are shown. To change the current directory, select the relevant directory string from the **Directories** tree.
3. When the required external volume has been located double click on the name. The **External Volume Parameters** window is displayed. The previously selected volume (if any) is minimized and closed, and the selected external volume is opened. The external volume information is indicated in the **GEAR Status Window**.



4. Select the format by:
 - using the default format
 - selecting a pre-defined format
 - defining the format

Using the default format

Click on the **Default** button

Selecting a pre-defined format

From the **Image Type** list select one of the following pre-defined format:

Type	Format
1	CD-ROM mode 1 (ISO etc.) sector size 2048
2	CD-ROM mode 1 (ISO etc.) sector size 2352
3	CD-ROM mode 1 (ISO etc.) sector size 2352, scrambled sectors with 2 seconds pre-gap
4	CD-ROM XA mode 2 sector size 2336
5	CD-ROM XA mode 2 sector size 2352
6	CD-ROM XA mode 2 sector size 2352 scrambled sectors with 2 seconds pre-gap

- 7 CD-i mode 2 sector size 2336
- 8 CD-i mode 2 sector size 2352
- 9 CD-i mode 2 sector size 2352 with 2 seconds pre-gap
- 10 CD-i mode 2 sector size 2352 scrambled sectors with 2 seconds pre-gap
- 11 Standard CD Digital Audio

External volume type

- 1 Standard ISO, HFS or CDTV image
- 2 Standard ISO with EDC/ECC codes
- 3 ISO with EDC/ECC codes, pre-gap and scrambled
- 4 Standard XA or EB XA (e.g. images with Mammoth XA streams)
- 5 Standard XA with EDC/ECC codes
- 6 XA with EDC/ECC codes, pre-gap and scrambled
- 7 Standard CD-i without EDC/ECC codes
- 8 Standard CD-i with EDC/ECC codes
- 9 Standard CD-i with pre-gap
- 10 CD-i with EDC/ECC codes, pre-gap and scrambled. Uses the same output format as that of most CD-i authoring tools.
- 11 Standard Audio

Notes

- The size of the pre-gap should always be 2 seconds (150 sectors). Scrambled images must contain SYNC, HEADER and ECC/EDC code information. Unscrambled images can be accepted with a 2352 sector size without the SYNC, HEADER and ECC/EDC filled in.
- The byte order of audio files must be the byte order used by the computer running the GEAR software. If this is not the case the generic option MSBAudio= of the GEAR.INI file can be used so that GEAR will swap the audio bytes for all tracks. DOS/Windows: LSB audio default, with MSBAudio=TRUE each track will be swapped by GEAR. Audio files should NOT contain any sound header! If sound headers are not removed or cleared, they will cause a sharp click in the resulting audio track on the CD. Audio files should only contain 16 bit samples, stereo (one sample for the left channel and one for the right channel) sampled on 44.1 kHz.
- The External image files option allows you to select only one file. If the external volume consists of more than one file you can use the Track list files option to specify more than one external file.

The track list file (*.tlf) contains one or more lines where each line specifies a track of the CD-ROM (a full path can be used) e.g. to write a mixed mode image (contains one ISO track and a number of digital audio tracks) the following lines can be specified in a track list file:

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

Defining the format

From the Image Type list select User defined image type. Set the parameters for the format.

- 5. Click on OK to confirm the format.

Appending Volumes to a Multi Session Disc

Append

GEAR allows you to append a new session to any session already existing on a multi-session CD-R disc. This powerful feature of GEAR allows you to:

- recover data from older sessions
- skip the last session if there are read errors on this session
- create 'CD Extended' or 'CD Plus' discs.

One of the sessions on the CD-R disc, to which the session is to be appended, is used as the basis of a new virtual image. The content of the virtual image is edited. Finally, the virtual image is written to the multi-session CD-R disc.

1. Select the `Append` option from the `Session` menu.
2. Select a session/track number; this track will be used as the basis of the virtual image (the default number is that of the last session on the disc). If the selected session/track is an audio track select the data format of the next session (`ISO` or `XA`) and enter the name of the new session. If the selected session/track is a data track this information need not be entered, as it is derived from the session on the CD-R. The selected session/track on the CD-R disc is read and the virtual image created. The virtual image contains the same directory/file structure as that of the session. The data structure is displayed in the GEAR Status window.

Important

The virtual image is automatically assigned the same name as the selected session. If a virtual image with this name (i.e. the original virtual image) is present, GEAR warns you and asks if it should overwrite. If you don't want to overwrite the existing virtual image, use another directory for saving the new virtual image to.

Note

This procedure does not delete or corrupt data on your CD-R disc.

3. Add or remove files just like with any other virtual image; select and drag them from the File Manager window. Files belonging to the original session are colored differently to those added to the virtual image.

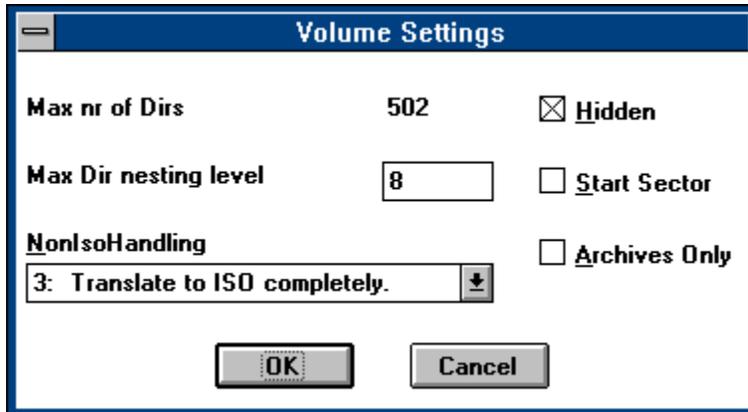
The directory tree is always recreated, allowing you to remove information from a session. Therefore, directory names are the same color as newly added files names.

The new session can be appended to the CD-R by using the `Write` menu. Only the changes will be written to the CD-R disc! Remember: every session on a CD-R disc contains approximately 15 Mb of overhead.

Editing Volume Settings

This option allows you to edit the volume settings for the currently selected volume. The default values are specified in the GEAR.INI file and can be changed with the Generator options of the Settings menu. The content of the GEAR.INI file and the default values are explained in chapter 11.

1. Select the Volume Settings... option from the Edit menu. The volume settings window is displayed.
2. Change the settings according to your needs.



Note

- The maximum number of directories cannot be changed for the currently selected volume.
- This only affects the currently selected volume.

Running a Batch File

Starts executing commands from the given batch file.

A batch file can either be a log file from a (previous) GEAR session or a manually created batch file. The commands in the batch file are read on a line by line basis. Any line that starts with a semi-colon will be treated as a remark and will be skipped when the batch is run. Lines starting with an unknown command will also be skipped. If parameters are missing or invalid, the software will ask you to insert them again.

1. Selecting the Run Batch... option from the Session menu.
2. The Name of batchfile window opens. Select a batch file to be run. To change the current directory select the relevant directory string from the Directories tree.
3. Click on OK to confirm the batch file name; the batch file starts to run. Lines starting with an unknown command will also be skipped. If parameters are missing or invalid, the software will ask you to insert them again.

A batch file can be created/edited with any text editor. Refer to your text editor manual for further information. Any GEAR for DOS command can be used in the batch file. *Refer to Appendix F for a complete list and description of these commands.*

Running a Command

This option can be used to execute a single batch command.

1. Selecting the Run Command... option from the Session menu. The window allows you to enter one command with its parameters.
2. Click on OK to confirm the command line.

Any GEAR for DOS command can be used. *Refer to Appendix F for a complete list and description of these commands.*

Verify

During verification the time, date and size of each file in the track/volume (at the time of loading) is compared with the current time, date and size. If a file is not up to date, GEAR displays a message. The track/volume can be updated by reloading the reported files.

1. Open the volume you want to verify (*refer to Section 5.1*)
2. Click on `Verify` in the `Image` menu.
3. The next window asks if you want to verify the currently selected track or volume. Click on `Track` or `Volume` . Verification starts. A status report is displayed in the GEAR Status window.

Physical Volumes

A physical volume is a byte for byte copy of the future CD-ROM. It is not strictly necessary to write a physical volume, a virtual volume can always be used. But, if the data transfer rate for CD-Recording needs to be increased a physical volume should be used.

Before writing the physical volume, GEAR verifies the virtual volume. If any file is not up to date the physical volume will not be written. The virtual volume can be updated by reloading the reported files.

For each track in the virtual volume a physical volume file is created. The sector size for the ISO track (if present) will be 2048 bytes. The sector size for the CD-ROM XA track (if present) will be 2336 bytes while the sector size for the DA track (if present) will be 2352 bytes.

The physical volume contains the contents of the virtual volume at the time of creation. Any subsequent changes to the virtual volume do not affect the current physical volume!

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

1. Open the virtual volume you want to create a physical volume for (*refer to Section 5.1*)
2. Click on `Convert to Physical` in the `Image` menu.
3. The next window asks if you want to create physical image files for the currently selected track or volume. Click on `Track` or `Volume`. Verification starts. A status report is displayed in the GEAR Status window.
4. If verification is successful creation of the physical volume/track will start. If physical files already exist for the volume/track you will be asked if you want to overwrite them.

Estimate

This option checks the performance of your system for writing the selected volume to CD-R disc. The software measures the time it needs to read all the information from the selected volume and transfer it to the CD-Recorder with the current speed settings. No data is transferred to the recorder. During the estimate the software displays which parts of the image cannot be read fast enough (if any).

Please read the next section for ways to improve the system performance in case this happens.

Note: An estimate only measures the time it needs to read all the information from the selected volume. The SCSI controller used for the CD-Recorder and the internal buffer of the CD-Recorder is not taken into account. You can use Writing to CD-R with the Write Enable option off to do a complete performance test of your system.

Note

Due to the nature of an estimate, the Estimate command cannot guarantee that the disc will be successfully written!

1. Open the virtual volume you want to do an estimate for (*refer to section 5.1*)
2. Click on Estimate in the Write menu. If the physical volume is not available you will be asked if the virtual volume should be used. During estimate a status report is displayed in the GEAR Status window.

Writing to CD-R

When writing a CD Image (volume) to a CD-R disc, GEAR can use either the virtual volume or the physical volume file(s). When the virtual volume is used, the physical volume is constructed and immediately written to disc. Writing from a physical volume is, in principle, faster than writing from a virtual volume.

If the `EstimateBeforeWrite` option is enabled GEAR will check the performance of your system first before writing the selected volume to CD-R disc. If the performance is sufficient, the software will continue with writing the disc, otherwise the writing will be aborted.

Important

The system has to maintain a high data transfer rate to the CD-Recorder. If this transfer rate can not be maintained, the writing of the CD-R disc will fail. CD-R discs can be written at single speed, double speed or quadruple speed. The data transfer rate is dependent on the speed of recording and the type of track (ISO, CD-ROM XA, CD Digital Audio) written (see table).

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

For external volumes the required transfer rate depends on the selected sector size. 2048 bytes per sector is comparable to ISO, 2336 bytes per sector CD-ROM XA and 2352 bytes per sector CD Digital Audio.

If the CD-Recorder supports a test mode or write disable mode (like most CD-Recorders do), the `WriteEnable` option of the CD-R Settings window (refer to the `Options` menu) can be used to check if the image can be written to CD-R disc. If the `WriteEnable` option is disabled, all information is transferred to the CD-Recorder but the disc is not actually written. Therefore, the performance can be checked without wasting a disc. In case the performance of your system is not sufficient you can try the following:

- Use a lower recording speed if possible.
- Use a physical volume instead of a virtual image.
- Minimize disk fragmentation.
- Check if you are running applications in the background and if so disable them during writing of the CD- R disc.
- Check if your hard disk does recalibration.
- Check if Windows has enough free memory; if Windows has not enough memory it will use hard disk space as memory. This will slow down the performance considerably.
- Check your smartdrive configuration. If you are using a physical volume disable smartdrive for the drive on which the volume files are located. If you are using a virtual volume enable smartdrive for the drive where the volume files are located.
- Check if the SCSI termination is correct. Wrong SCSI termination could cause delays on the SCSI bus.

Important

The performance of the system for writing a CD-R disc is better if the access time of your hard disk is lower. This is more important than a faster processor. A lot of hard disks currently on the market regularly perform what is called 'recalibration'. Recalibration means that the hard disk verifies its read/write operation to prevent problems. If this happens during the writing of a CD-R disc, this might result in a data transfer problem. Refer to your hard disk documentation or speak with your supplier to check whether or not your hard disk performs recalibration.

Information

The best hard disks for writing CD-R discs are the so called 'multi media' or 'AV' hard disks. This type of hard disk minimizes the recalibration time and guarantees a high sustained data rate.

The CD-R option always creates the following files after an image has been written: WO_IDENT.TXT and WORESLT.TXT. The WO_IDENT.TXT file contains the TOC (Table of Contents) plus some customer information of the image written to CD-Recorder. The customer information is read from the GEAR.INI file. The WORESLT.TXT file contains status information.

1. Open the virtual volume you want to write to CD-R (refer to section 5.1)
2. Click on CD-R in the Write menu. If the physical volume does not exist, you are then asked if the virtual volume should be used for writing to CD-R; if you select No, writing is aborted. During CD-R writing a status report is displayed in the GEAR Status window.

Writing to a Premaster Tape

Use this option to write a volume to (premaster) tape. The tape is written in ANSI (X3.27-1987) format. GEAR can use either the virtual volume or the physical volume file(s). When the virtual volume is selected, the physical volume is constructed and immediately written to tape.

The premaster tape can be sent to a replication company for mastering and replication. If `VerifyAfterWrite` is enabled GEAR verifies the contents of the tape with the volume after writing to premaster tape.

The software supports most tape units providing that they use a SCSI interface (e.g. EXABYTE, DAT, M4 9track). The preferred configuration is the Adaptec 1540 or 1542 interface card with an EXABYTE tape unit, a Hewlett Packard DAT unit (HP35470A) or an M4 9track unit.

The following files are created after an image has been written to tape: TP_IDENT.TXT, TPRESULT.TXT, DDPID, DDPMS and PQDESCR. The TP_IDENT.TXT file contains the TOC (Table of Contents) of the image written to tape plus some customer information. The DDPID, DDPMS and PQDESCR files together form the DDP information of the last image written to tape. These files can be written to tape:

Writing DDP Files to Premaster Tape.

1. Click on the `Settings` option in the `Options` menu.
2. Click on `Tape...`. The `Tape Setup` window opens.
3. To enable writing of the DDP information to the tape click on the `Write DDP files to tape` option.

The customer information is read from the GEAR.INI file (refer to Chapter 10). The TP_IDENT.TXT file contains status information. It can be sent along with the premaster tape to the mastering company or can be written to tape:

Writing the TP_IDENT.TXT File to Premaster Tape.

1. Click on the `Settings` option in the `Options` menu.
2. Click on `Tape...`. The `Tape Setup` window opens.
3. To enable writing of the TP_IDENT.TXT file to the tape click on the `Write TP_IDENT.TXT file to tape` option.

Writing to Premaster Tape

1. Open the virtual volume you want to write to premaster tape (refer to section 5.1)
2. Click on `Premaster Tape` in the `Write` menu. You are then instructed how to set up the tape unit for recording. When the unit is ready click on `OK` to confirm writing. During writing a status report is displayed in the GEAR Status window.

Disc Information

This option displays information about the CD-R disc in the CD-Recorder. The following information is available:

- Type of CD-R disc.
- Number of sessions on the CD-R disc.
- Number of tracks on the CD-R disc.
- Start time (ATIME) of each session and track.
- The type and size of each track.
- Start time of the 'lead out'.

Notes

- The information displayed depends on the type of CD-Recorder. Not all CD-Recorders can give all the information mentioned above.
 - An ATIME is specified as mm:ss:ff where mm specifies the number of minutes, ss the number of seconds and ff the number of sectors.
 - The lead out is specified as the latest possible start position for the lead out and thus also indicates the CD-R capacity. For mastered CDs the start of the lead out indicates the end of the data area on the disc. If multi session disc is loaded the CD-Recorder will report that the last session on the disc is unfinished. This is because a recorder will always create the beginning of a new session when closing the last session on the disc.
1. To display the disc information select the `DiscInfo` option from the `Options` menu.

Read Track

This option can be used to read back a complete track from a CD-R disc and create a byte for byte copy of an existing track on the CD-R.

Notes

- Not all recorders support the reading of audio tracks via the SCSI bus. At the time of going to print only the Yamaha CDR-100 and the Philips CDD522 support this.
 - When reading audio with the CDD522 make sure that your computer is fast enough to store the audio data. If this is not the case, the CDD522 will skip parts of the audio.
1. Select the Readtrack option from the Tools menu. The Readtrack window allows you to select a track from the CD-R and enter a file name.
 2. Click on OK to confirm. The reading starts. A status report is displayed in the GEAR Status window.

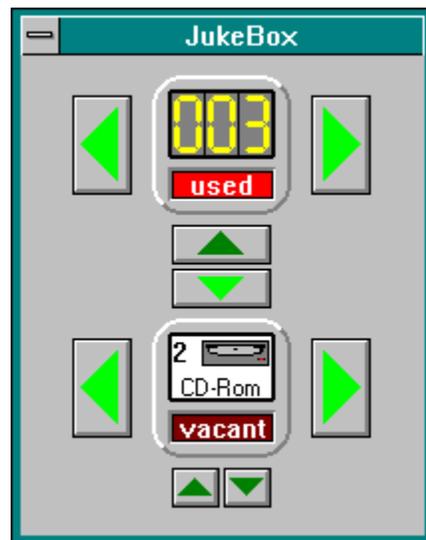
Jukebox Control

This option can be used to control a Jukebox supported by GEAR.

Notes

- Currently GEAR supports the ASM Jukebox, the Pioneer Jukebox and the Kodak Disc Transporter.
 - If you want to use a Jukebox to write several CD-Rs unattended, make sure that they are loaded consecutively from slot 1
 - You can also use the GEAR batch command 'MOVEMEDIUM' to control the place of CD-R media in the Jukebox.
1. Select the Jukebox control... option from the Tools menu. The Jukebox control window allows you to move CD-R media around in the Jukebox.

Click on the different controls to see their function...



GEAR On-Screen Windows

Status

This option determines if the GEAR Status window is opened or closed. The GEAR Status window displays information related to the virtual image:

- image size
 - number of tracks
 - remaining free space
 - the name of the file being loaded into the image.
 - log content
1. By default the GEAR Status is shown. To close select the `Status Bar` option from the `Options` menu. To open simply repeat this procedure.

CD-ROM XA

The option is used to specify Multi Media Files (MMF) on a CD-ROM XA track. A volume and CD-ROM XA track must first be selected.

Manual Interleave

When Manual Interleave is enabled the you must specify for each copying action the following information.

Data type

Specifies the type of each file that is loaded. Valid types are ADPCMBSN, ADPCMBSE, ADPCMBMN, ADPCMBME, ADPCMCSN, ADPCMCSN, ADPCMCMN, ADPCMCMN, ADPCMCMN, ADPCMCMN, ADPCMCMN, ADPCMCMN, VIDEO2048, VIDEO2324 and DATA2048.

ADPCMBSN is valid for ADPCM Audio, level B Stereo, No emphasis.

ADPCMCMN is valid for level C Mono with emphasis.

VIDEO2048 is used if each sector contains VIDEO data and ECC/EDC codes.

VIDEO2324 is used if each sector contains VIDEO data.

Channel number

Specifies the channel number for each file that is loaded. This number can range from 0 to 31.

Interleave data factor

Specifies the interleave factor for each file that is loaded. Refer to interleave total factor for an explanation. This number can range from 1 to 16.

Interleave total factor

Specifies the total interleave factor of each file that is loaded. This number, together with the interleave data factor determines the interleaving of each file. Valid combinations for interleave data factor and interleave total factor are: 1 - 4, 1 - 16, 1 - 8, 2 - 4 etc. The combination 2 - 4 means that for each set of 4 sectors the first 2 are occupied by the file. The interleave total factor can range from 1 to 16. ADPCM B Stereo files are interleaved 1 to 4 while ADPCM C Stereo files are interleaved 1 to 8.

Bit set

EOR specifies if the End Of Record (EOR) bit should be set in the sub-header of the last sector of each file that is loaded. This parameter can be specified together with the Trigger parameter.

Trigger specifies if the Trigger bit should be set in the sub-header of the last sector of each file that is loaded. This parameter can be specified together with the EOR parameter.

To enable Manual Interleave:

1. Select the XA option from the Options menu.
2. Select the Manual Interleave option.

This option allows you to specify all the options to create your own interleaved files. More information about the use of these parameters for CD-ROM XA applications can be obtained from the CD-ROM XA specification [4].

Note

In general it is easier to use the dedicated CD-ROM XA interleaving tools (like the Mammoth Tool Set) and the GEAR pre-interleaved option for creating these files .

Pre-interleaved

If the Pre-interleaved option is switched on, it is assumed that the specified files are pre-interleaved CD-ROM XA files (sometimes referred to as XA streams). GEAR can not check if a file is pre-interleaved

or not, and therefore you can load any file as a pre-interleaved file.

Important

Make sure that the files you are loading with this option are indeed pre-interleaved files. Non pre-interleaved files loaded with this option as pre-interleaved files are useless on the resulting CD-R disc! A pre-interleaved file must have a 2336 bytes sector size with the sub-header field filled in. This sub-header field is then copied together with the other information to the GEAR administration file. Normally the sub-header field is NOT included in a file and the sub-header information is generated by GEAR.

To enable Pre-interleave:

1. Select the XA option from the Options menu.
2. Select the Pre interleaved option.

Generator Setup

The following formatting settings are saved in the GEAR.INI file (*refer to section 11.2 for further explanation of these formatting settings*):

- System Identifier
 - Publisher Identifier
 - Data Preparer Identifier
 - Application Identifier
 - Application Use
 - Copyright File Identifier
 - Abstract File Identifier
 - Bibliographic File Identifier
 - Maximum Directories in Volume
 - Directory Nesting level
 - Archive Files only
 - Non ISO names handling
1. Select the Settings option from the Options menu.
 2. Select the Generation... option.

Some of these settings can also be set with the Volume Descriptor...or Volume Settings... option of the Edit menu. However, the difference is that the settings in the GEAR.INI file are used as the default for each new volume, while the items which are edited with the Volume Descriptor... option are only valid for the currently selected volume.

The following settings are not saved in the GEAR.INI file. Nonetheless, they do remain valid as long as the GEAR software is running.

Hidden

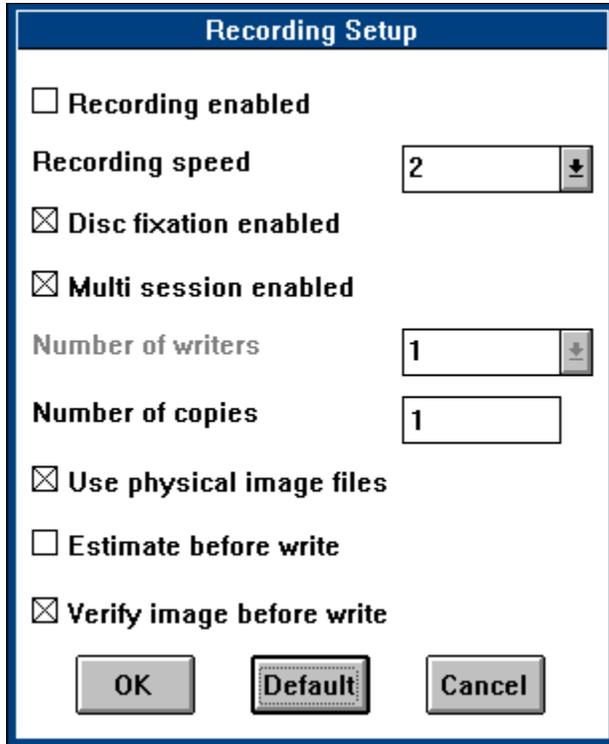
Changes the hidden mode. The hidden mode specifies if the files and directories, when loaded, are hidden or not. Files and directories are hidden if the hidden mode is on. Otherwise they will be loaded normally. Hidden files and directories, even during simulation, do not appear in the directory listing. Default value for this mode is off.

StartSector

Changes the sector mode. The sector mode specifies if the start sector of a file can be specified or not. The start sector of a file can be specified if the sector mode is on. Default value for this mode is off.

CD-R Setup

Defines the setup settings which are used when writing the CD-R disc and/or estimating the performance. The user can specify the following information:



The image shows a dialog box titled "Recording Setup" with a blue header. It contains several settings:

- Recording enabled
- Recording speed: 2 (with a dropdown arrow)
- Disc fixation enabled
- Multi session enabled
- Number of writers: 1 (with a dropdown arrow)
- Number of copies: 1
- Use physical image files
- Estimate before write
- Verify image before write

At the bottom, there are three buttons: "OK", "Default" (which is highlighted with a dotted border), and "Cancel".

1. Select the Settings option from the Options menu.
2. Select the CD-R... option.

These settings are saved in the GEAR.INI file and become the default settings.

Premaster Tape Setup

Defines the setup settings which are used while writing the premaster tape and/or while verifying the tape. The user can specify the following information:

	ISO tracks	XA tracks	DA tracks	Tape file strategy
Sector Size	<input checked="" type="radio"/> 2048 <input type="radio"/> 2352	<input checked="" type="radio"/> 2336 <input type="radio"/> 2352	2352	<input type="radio"/> Tracks on separate tapes <input checked="" type="radio"/> Tracks in separate files <input type="radio"/> Same type tracks in one file <input type="radio"/> One contiguous image file
Gaps + Pauses Included	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Tape Blocking Factor	<input checked="" type="radio"/> 4 <input type="radio"/> 6	<input checked="" type="radio"/> 4 <input type="radio"/> 6	6	<input type="checkbox"/> Write DDP files to tape <input type="checkbox"/> Write IDENT.TXT file to tape <input type="checkbox"/> Use physical image files <input type="checkbox"/> Verify after write
<input type="checkbox"/> Scramble ISO and XA sectors				

OK Default Cancel

1. Select the Settings option from the Options menu.
2. Select the Tape... option.

The user can also select which method will be used when writing to tape:

Tracks on separate tapes

Each track is written to a separate tape file on a separate tape. It is not possible to write DDP information to tape when using this method.

Tracks in separate files

Each track is written to a separate tape file. All files are then written to one tape. This method is the default.

Same type of tracks in one file

Tracks of the same type are combined into one tape file. The tape files are then written to the same tape. This option may be useful when there are many small audio tracks present in the volume. Using the previous methods would result in a large number of filemarks on the tape that could give problems while mastering. The use of the DDP option is advised when this method is used.

One contiguous image file

All tracks are written to one file (contiguous image). Sector size, scrambling, blocking factor and gap/pause inclusion are set to the following mandatory values:

```
Sectorsize=2352  
Scrambled=TRUE  
Blocking factor=6  
Gaps/pauses=Included
```

Important

The use of the DDP option is advised when using this method.

The GEAR software can generate tape images which include ECC and EDC codes. These correction and detection codes are only generated for data tracks if a sector size of 2336 or 2352 bytes has been selected.

Not all combinations of the above options are possible. The Tape command prevents the user from choosing combinations that are invalid. In general it is sufficient to use the default settings as specified in the supplied GEAR.INI file (*refer to Appendix B*). If you change the settings this information will be saved in the GEAR.INI file: these become the default settings.

Customer Settings

Shows the customer information that is used. This information is stored in the GEAR.INI file. The information can be changed in the Customer setup window or by editing the GEAR.INI file directly.

1. Select the Settings option from the Options menu.
2. Select the Customer... option.

These settings are saved in the GEAR.INI file and become the default settings.

Setting the Working Directory

Defines the GEAR working directory. This directory will be used as the default working directory when opening and creating a volume.

1. Select the `Settings` option from the `Options` menu.
2. Select the `Working Directory...` option.

What is the GEAR.INI file?

The GEAR.INI file contains configuration information and information messages used by GEAR. The GEAR.INI file can be edited with any text editor.

During startup GEAR tries to locate the GEAR.INI file in the current working directory. If this file is not present in the current working directory, the GEARDIR environment variable (*refer to section 3.2, software installation*) will be used to locate it. Be sure that the software can locate the GEAR.INI file since without the information in this file GEAR cannot run properly. GEAR will notify you if it cannot locate the GEAR.INI file.

The GEAR.INI file can be edited with a standard text editor to change the configuration information. However, it is preferable that this information is changed via the GEAR menus.

- Lines starting with a semi-colon are treated as comments.
- Parameters must be entered immediately after the '=' sign; the parameters are interpreted starting with the first character after the equal sign.
- All parameters are case sensitive.

The use of each entry in the GEAR.INI is as follows (*refer to Appendix B for the complete list of entries in the GEAR.INI file*).

Generic Information

Geometry Fields

These store the geometry information of the three main windows which are displayed while running GEAR. At startup GEAR uses this information to position and size these windows on the screen. Do not change these values yourself!

```
GearGeometry = 0,0,385,350
StatGeometry = 0,350,640,480
FileGeometry = 231,71,640,350
```

Identification fields

This information from the GEAR.INI file is written to the TP_IDENT.TXT and the WO_IDENT.TXT files when writing to a premaster tape or CD-R disc. Some premaster companies ask you to supply this information on premaster tape and/or on paper.

```
CustomerName=Your own Name
CustomerContact=Your contact person
CustomerPhone=Your telephone number
MasterIDCode=Your mastering code
ReferenceCode=Your reference code
DiscTitle=Your new CD title
```

The first three fields can be the same for all your CD-ROM titles. The last three fields are usually different for each CD-ROM title.

WorkingDirectory

This field specifies in which directory the GEAR software looks for the volume administration files during startup. If this field is not specified the software uses the directory specified as the working directory in the program properties window.

Generation Information

The following information is used during the creation of a volume. Afterwards this information can be changed for the selected volume using the Volume Descriptor... option of the Edit menu. All identifiers must conform to the ISO standard for interchange level 1 ([refer to Appendix A](#)). GEAR uses the default values if the fields are not specified.

SystemIdf

This field specifies the identification of the system.
Default value is the empty string.

PublisherIdf

This field specifies the identification of the person(s) who specified the content of the volume set of which this volume is a member. If the first character is a '_', the rest of the field will specify an identifier for a file containing the publisher identification. This file has to be loaded in the root directory.
Default value is the empty string.

Note

When a filename is specified (by means of '_' as first character) an extension and/or version number may be omitted.

DataPreparerIdf

This field specifies the identification of the person or other entity which controls the preparation of the data to be recorded on the volume. If the first character is a '_' the rest of the field shall specify an identifier for a file containing the data preparer identification. This file has to be loaded in the root directory.
Default value is the empty string.

ApplicationIdf

This field specifies the identification of the specification of how the data is recorded on the volume set of which this volume is a member. If the first character is a '_', the rest of the field shall specify an identifier for a file containing the application identification. This file has to be loaded in the root directory.
Default value is the empty string.

ApplicationUse

This field specifies the language identification for an EB (XA) disc ([for further information refer to document \[6\]](#)).
Default value is the empty string.

CopyRightFileIdf

This field specifies the identification for a file loaded in the root directory and containing a copyright statement for the volume set.
Default value is the empty string.

AbstractFileIdf

This field specifies the identification for a file loaded in the root directory and containing an abstract statement for the volume set.
Default value is the empty string.

BibliographicFileldf

This field specifies the identification for a file loaded in the root directory and containing bibliographic records interpreted according to standards that are the subject of an agreement between the originator and the recipient of the volume.

Default value is the empty string.

MaxDirNestingLevel

This field specifies the maximum directory nesting level for the CD (the root is level 1). ISO allows a directory nesting level upto 8 while GEAR allows a directory nesting level upto 12.

Default value is 8.

MaxNrDirsInVolume

This field specifies the maximum number of directories in the volume in order to calculate the number of blocks needed for the path tables. This maximum number may not be larger than 65535.

Default value is 500.

ArchivesOnly

DOS uses the Archive information to determine if a file has to be 'backed up' or not. Tape archiving software usually only archives files which have the archive bit set. This information is reset when the file is written to tape. GEAR offers you the same functionality for CD-R writing. When the ArchivesOnly option is set GEAR only loads files with the Archive bit set into the image. The archive bit will be reset when the file is successfully loaded into the GEAR image. Valid values are TRUE and FALSE.

Default value is FALSE.

NonIsoNameHandling

This field specifies how non ISO names for files and directories are handled. Valid values are:

- 0 A dialog box appears for each non ISO name encountered. This dialog box will give you the possibilities to skip the file or translate the file name to an ISO compliant name.
- 1 All non ISO names will be ignored and each file will be loaded with it's original name.
- 2 All lower case characters will be translated to upper case characters. If the name still contains non ISO characters after that, the same dialog box as for option 0 will appear. This option is especially useful in the UNIX environment.
- 3 All non ISO names will be translated to ISO compliant names. Non ISO characters will be replaced by an underscore. If duplicate file names are generated a warning will appear.
- 4 All names will be translated so that they comply to ISO level 1.
- 5 All names will be translated to ISO level 1 AND the Rock Ridge specific information is added to the 'system use' field of each file and directory. The Rock Ridge information is specified in the (proposed) IEEE standards P1281 and P1282; it is specifically meant for UNIX systems and therefore option 5 should only be used on UNIX systems.

Default value is 0.

CD-R Information

The following fields can also be changed using the `CD-R...` option from the `Settings` submenu of the `Options` menu (*refer also to section 10.2, CD-R Setup*). All fields must be specified! The values as specified in the supplied `GEAR.INI` file are usually used.

UsePhysicalImageFiles

This field specifies if the physical image is used for writing to the CD-Recordable. Sometimes it might be necessary to use a physical image file to meet the data transfer rate requirements; in general writing using the physical image is faster. Valid values are `TRUE` and `FALSE`.

Default value is `FALSE`.

MultiSession

This field specifies if the CD-R disc is recorded in such a way that new sessions (data) can be appended to the disc in future. If a CD-R disc is written with this field set to `FALSE` the disc can never be used for recording new sessions. If the CD-Recorder does not support this mode the field will be ignored. Valid values are `TRUE` and `FALSE`.

Default value is `TRUE`.

WriteEnable

This field specifies if the CD-Recorder actually writes the image file to the CD-Recordable. Some CD-Recorders can be set to a so called test mode in which case the data is not actually written to CD-R disc. This mode can be used to test if the computer system can meet the data transfer requirements of the CD-Recorder for a specific CD-ROM image file. If the CD-Recorder does not support this mode the field will be ignored. Valid values are `TRUE` and `FALSE`.

Default value is `TRUE`.

Note

Some recorders do not have the possibility to set this mode using the software but instead use a switch on the unit (SONY).

Speed

This field specifies the recording speed of the CD-Recorder. A value of 1 means real-time recording (150 Kb/s). If the recorder does not support this option this field is ignored. Valid values are 1, 2, 4 and 6.

Default value is 2.

Fixation

This field specifies if the CD-Recorder will fixate the CD-ROM after the image file has been written to the CD-Recordable. If the CD-Recorder does not support this mode the field will be ignored. This option can be used to write 'track at once'; the last track must be written with fixation set to `TRUE` and all the previous tracks must be written with fixation set to `FALSE`. Valid values are `TRUE` and `FALSE`.

Default value is `TRUE`.

Warning

If an image is not fixated it cannot be read on a CD-ROM player!

LinearVelocityLevel

This field specifies the linear velocity level used by the CD-Recorder for writing the image file to the CD-Recordable. This field is only valid for the Yamaha PDS 301. The lower the linear velocity level the more data can be written to the CD-Recordable (refer also to the Yamaha PDS 301 documentation). Valid values are 1, 2 or 3.

Default value is 2.

NrOfWriters

This field specifies the number of writers used by the CD-Recorder while writing the image file to the CD-Recordable. This field is only valid for the Yamaha PDS 301 and the Sony CDW900E. Valid values are 1 to 14 for the Yamaha and 1 to 32 for the Sony.

Default value is 1.

Note

If multiple writers are used for the Yamaha the writers must have successive numbers (*refer also to the Yamaha documentation*)!

EstimateBeforeWrite

This field specifies if GEAR does a performance check before it writes the data to CD-Recordable. Valid values are TRUE and FALSE.

Default value is FALSE.

IncrementalWrite

This field specifies whether GEAR uses incremental write while writing the data source to CD-Recordable. Not all CD-Recorders support incremental write, in that case this field will be ignored. Currently only the RICOH RS 9200 supports incremental write. Valid values are TRUE and FALSE.

Default value is FALSE.

CDRInterface

This field specifies the CD-R interface to be used. Supported are:

- 0) Null device
- 1) Adaptec AHA-1540/AHA-1542 board driver (SCSI)
- 2) ASPI for DOS driver (e.g. ASPI4DOS.SYS)
- 3) ASPI for Windows driven (WINASPI.DLL)
- 4) Future Domain CAM driver

Default value is 2.

AdaptecIOAddress

This field specifies the IO address at which GEAR searches for the Adaptec card. If you change this address don't forget to change the settings on the card accordingly! Refer to the Adaptec installation guide for valid addresses and how to change the address on the card. This field must be specified if you have chosen the Elektroson driver (CDRInterface type 1)! If you are using the ASPI interface or CAM (CDRInterface type 2,3 and 4) this field is ignored. Refer to section 3.3 for the other settings on the Adaptec board.

Default value is 230h.

AspiHostAdapterNumber

Selection of the ASPI host adapter number which is used. This field is only used when CDRInterface 2 is selected. Valid values are 0, 1 and 2. If you are using the ASPI manager as the device interface for

multiple controllers and your CD-Recorder is recognized by ASPI but not by the GEAR software, you probably have to change the AspiHostAdapterNumber.
Default value is 0.

CDRTargetID

This ID can range from 0 to 6; ID 7 is normally used by the Adaptec controller. If only one CD-R unit is connected the software will automatically find the unit regardless of its ID. If multiple units are used, the unit with the specified CDRTargetID is used. If no unit is found at CDRTargetID the unit with the highest ID is used.

Default value is 4.

UseMediumChanger

This field specifies whether the GEAR software will look for a medium changer for loading and unloading CD-R discs. Currently the GEAR software supports the ASM Jukebox, the Pioneer Jukebox and the Kodak Disc Transporter. Valid values are TRUE and FALSE.

Default value is TRUE.

BufferSize

This field specifies the BufferSize in bytes allocated by GEAR for writing the CD-R disc. The number of bytes must be between 1 and 65000. A larger buffersize might be useful when the data transfer rate has some unexpected 'dips'. If the average transfer rate is too low a large buffersize does not always help.

Default value is 64000.

NrOfBuffers

This field specifies whether or not GEAR should use two buffers concurrently for writing the CD-R disc (sometimes referred to as QuickDMA). When using one controller for both CD-Recorder and hard disk drive, it might be necessary to set NrOfBuffers to 0. Valid values are 0 for 1 buffer and 1 for 2 buffers in parallel.

Default value is 1.

DriveNrInMediumChanger

This field specifies which drive in the Jukebox is the CD-Recorder. Currently there is no other way for GEAR to get this information. Valid values depend on the number of the driver in the Jukebox.

Default value is 1 (first drive in the Jukebox).

VerifyImage

This field specifies if the GEAR image should be verified before it is converted to a physical image, written to CD-R or written to premaster tape. A verify will, for each file in each track in the virtual image, check the time, date and size at loading against the current time, date and size of the file. If any file is not up to date a message will be displayed.

Premaster Tape Information

The following fields can also be changed using the `Tape...` option from the `Settings` submenu of the `Options` menu (*refer also to section 10.3, Premaster Tape Setup*). The fields which specify CD-ROM XA related information are ignored in the ISO only version. All fields must be specified! The values as specified in the supplied `GEAR.INI` file are usually used.

DDPFormatTape

This field specifies if the DDP files (`DDPID`, `DDPMS` and `PQDESCR`) are written to the premaster tape. The DDP files are also written to hard disk. Valid values are `TRUE` and `FALSE`. Default value is `FALSE`.

FileOption

- 1) Tracks on separate tapes: each track is written to a separate tape file on a separate tape. It is not possible to write DDP information to tape when using this method.
- 2) Tracks in separate files: each track is written to a separate tape file. All files are then written to one tape. This method is the default.
- 3) Same type tracks in one file: tracks of the same type are combined into one tape file. The tape files are then written to the same tape. This option is useful when there are many small audio tracks present in the volume. Using the previous methods would result in a large number of filemarks on the tape that could give problems while mastering. The use of the DDP option is advised when this method is used.
- 4) One contiguous image file: all tracks are written to one file (contiguous image). Sector size, scrambling, blocking factor and gap/pause inclusion are set to mandatory values.

Default value is 2.

ISOTrackBlockingFactor

This field specifies the tape blocking factor for an ISO track. Valid values are 4 and 6. Default value is 4.

ISOTrackSectorSize

This field specifies the sector size to be used on tape for an ISO track. Valid values are 2048 and 2352 (ECC/EDC will be added for sector size 2352). Default value is 2048.

ISOTrackWithPregapPostgap

This field specifies if the pregap and postgap are written to tape for an ISO track. Valid values are `TRUE` and `FALSE`. Default value is `FALSE`.

XATrackBlockingFactor

This field specifies the tape blocking factor for a CD-ROM XA track. Valid values are 4 and 6. Default value is 6.

XATrackSectorSize

This field specifies the sector size to be used on premaster tape for a CD-ROM XA track. Valid values are

2336 and 2352 (ECC/EDC will be added for sector size 2352).
Default value is 2336.

XATrackWithPregapPostgap

This field specifies if the pregap and postgap are written to premaster tape for a CD-ROM XA track. Valid values are TRUE and FALSE.
Default value is FALSE.

DATrackWithPause

This field specifies if the pause of CD Digital Audio tracks is written to premaster tape. Valid values are TRUE and FALSE.
Default value is FALSE.

ScramblingFor2352Sectors

This field specifies if the 2352 sectors must be scrambled before they are written to premaster tape. This field is only used if the sector size of the track written to tape is 2352. Valid values are TRUE and FALSE.
Default value is FALSE.

WriteIdentTxtOnTape

This field specifies if the TP_IDENT.TXT file is written to tape. Valid values are TRUE and FALSE.
Default value is FALSE.

UsePhysicalImageFiles

This field specifies if a physical image file is used for writing to the premaster tape unit. In general writing using the physical image is faster. Valid values are TRUE and FALSE.
Default value is FALSE.

VerifyAfterWrite

This field specifies whether GEAR does verification after it has written the data source to premaster tape. Valid values are TRUE and FALSE.
Default value is FALSE.

TapelInterface

This field specifies the tape interface to be used. Supported are:

- 0) Null device
- 1) Adaptec AHA-1540/AHA-1542 board driver (SCSI)
- 2) ASPI for DOS driver (ASPI4DOS.SYS)
- 3) ASPI for Windows (WINASPI.DLL)
- 4) Future Domain CAM driver

Default value is 2.

AdaptecIOAddress

This field specifies the IO address at which GEAR searches for the Adaptec card. If you change this address don't forget to change the settings on the card accordingly! Refer to the Adaptec installation guide for valid addresses and how to change the address on the card. This field must be specified if you have chosen the Elektroson driver (TapelInterface type 1)! If you are using the ASPI interface

(TapeInterface type 2) this field is ignored. Refer to section 3.3 for the other settings on the Adaptec board.
Default value is 230h.

AspiHostAdapterNumber

Selection of the ASPI host adapter number which is used. This field is only used when TapeInterface 2 is selected. Valid values are 0, 1 and 2. If you are using the ASPI manager as the device interface for multiple controllers and your Tape unit is recognized by ASPI but not by the GEAR software, you probably have to change the AspiHostAdapterNumber.
Default value is 0.

TapeTargetID

This ID can range from 0 to 6; ID 7 is normally used by the Adaptec controller. If only one tape unit is connected the software will automatically find the unit regardless of its ID. If multiple units are used, the unit with the specified TapeTargetID is used. If no unit is found at TapeTargetID the unit with the highest ID is used.
Default value is 4.

ISO-9660 File and Directory Naming

File name

Each file name consists of three components: name, extension and version number as follows:
<name>.<extension>;<version>

A name or extension consists of zero or more characters of the set [A..Z], [0..9] and _ (underscore). The version number ranges from 1 to 32767. The name and extension together must consist of at least one character e.g. .000;1 is a valid ISO-9660 file name

There are three levels of interchange defined by ISO-9660:

-Level 1

The number of characters of the name is restricted to 8 and the number of characters of the extension is restricted to 3.

-Levels 2 and 3

The total length of the name and extension is restricted to 30 characters (excluding the point and semi-colon). Within GEAR the file name length is restricted to 30.

Order of files in a directory

Files are listed in alphabetical order. If two file names do not have the same number of characters the shorter name is treated as if extended with spaces. This rule applies for both the name and the extension. If two files have equal names the file with the highest version numbers comes first e.g. AA.;2 before AA.;1.

Directory names

A directory name consists of one or more characters of the set [A..Z], [0..9] and _ (underscore) with a maximum of 31 characters. The maximum nesting level of directories is 8 (the root is level 1!). The total number of characters specifying a file within a directory (path) must be smaller than 256. Directories are sorted alphabetically.

Sorting order

The order of characters is according to ISO 646, i.e. [0..9] comes before [A..Z] and [A..Z] comes before _ (underscore).

GEAR.INI

The default contents of the GEAR.INI file are as follows.

```
; GEAR specific INI file
;
;
[generic]
;
; Customer information
;
CustomerName=
CustomerContact=
CustomerPhone=
MasterIDCode=
ReferenceCode=
DiscTitle=
;
WorkingDirectory=
;
[generator]
;
SystemIdf=GEAR FOR WINDOWS VERSION 3.2 JANUARY 1995
PublisherIdf=
DataPreparerIdf=ELEKTROSON BV 1995
ApplicationIdf=
ApplicationUse=
CopyRightFileIdf=
AbstractFileIdf=
BibliographicFileIdf=
ArchivesOnly=FALSE
MaxDirNestingLevel=8
MaxNrDirsInVolume=500
; Selection of ISO names handling
; 0. A dialog appears for each non ISO name
; 1. Ignore all non ISO names
; 2. Translate to Upper case only
; 3. Translate to ISO complete
NonIsoNameHandling=0
;
;
;
[tape]
;
UsePhysicalImageFiles=FALSE
DDPFormatTape=FALSE
; Selection of tape writing method
; 1. Tracks on separate tapes:
; 2. Tracks in separate files
; 3. Same type tracks in one file
; 4. One contiguous image file
FileOption=2
ISOTrackSectorSize=2048
```

```
ISOTrackBlockingFactor=4
ISOTrackWithPregapPostgap=FALSE
XATrackSectorSize=2336
XATrackBlockingFactor=6
XATrackWithPregapPostgap=FALSE
DATrackWithPause=FALSE
ScramblingFor2352Sectors=FALSE
WriteIdentTxtOnTape=FALSE
VerifyAfterWrite=FALSE
;
; Selection of tape interface used. Supported are:
;   0) Null device
;   1) Adaptec AHA-1540/AHA-1542 board (SCSI)
;   2) ASPI for DOS drive
;   3) ASPI for Windows drive
;   4) CD CAM driver
TapeInterface=2
; IO address of Adaptec AHA-154XX board (for TapeInterface 1):
AdaptecIOAddress=230h
BufferSize=
NrOfBuffers=
; ASPI host adapter number (0-2) to use (for TapeInterface 2):
AspiHostAdapterNumber=0
; SCSI ID of tape unit (only necessary if multiple units):
TapeTargetID=4
;
;
[cdrecording]
;
UsePhysicalImageFiles=FALSE
WriteEnable=TRUE
MultiSession=TRUE
Speed=2
Fixation=TRUE
LinearVelocityLevel=2
NrOfWriters=1
EstimateBeforeWrite=TRUE
IncrementalWrite=FALSE
DiscAtOnce=FALSE
UseMediumChanger=TRUE
;
; Selection of CD-R interface used. Supported are:
;   0) Null device
;   1) Adaptec AHA-1540/AHA-1542 board (SCSI)
;   2) ASPI for DOS drive
;   3) ASPI for Windows drive
;   4) CD CAM driver
CDRInterface=2
; IO address of Adaptec AHA-154XX board (for CDRInterface 1):
AdaptecIOAddress=230h
BufferSize=
NrOfBuffers=
; ASPI host adapter number (0-2) to use (for CDRInterface 2):
AspiHostAdapterNumber=0
; SCSI ID of CD-R unit (only necessary if multiple units):
```

```
CDRTargetID=4  
;  
;end of GEAR.INI
```

GEAR for CD-Bridge and Electronic Book

Elektroson's GEAR offers you the possibility to develop your CD-BRIDGE or Electronic Book application in house. All Multi Media versions of GEAR allow you to generate a CD-BRIDGE or Electronic Book (EB) image and write it to CD-Recordable and/or premaster tape.

CD-Bridge

The following steps describe how to generate a CD-BRIDGE image with GEAR.

1. Determine the name of your CD-i application e.g. CDI_APPL
2. Determine the name of the subdirectory to contain your CD-i application. e.g. CDI
3. Edit the following entries of your GEAR.INI file so that they contain the following:
SystemIdentifier=CD-RTOS CD-BRIDGE
ApplicationIdentifier=CDI/CDI_APPL.

NOTE

The ApplicationIdentifier must not start with a slash (/) and must end with a dot (.).

4. Use the GEAR software and create a volume with a CD-ROM XA track.
5. Create the subdirectory for your CD-i application and load your CD-i application file in this directory. Make sure that the names of your directory and CD-i application match those specified in the GEAR.INI file.

The CD-BRIDGE specific part of the image generation process is now complete. You can now continue the image generation process as for any other application (do not use the CD-i directory anymore!).

The resulting image can be processed with GEAR as any other CD-ROM XA image.

Electronic book

The following steps describe how to generate an Electronic Book image with GEAR.

1. Edit the following entry of your GEAR.INI file so that it contains 'ApplicationUse=EBxxx', where xxx stands for the language which will be used when the EB application starts. EB111 (for english) is most commonly used.
2. Use the GEAR software and create a volume with a CD-ROM XA track.
3. Load all of the files and directories associated with your EB application.

The resulting image can now be processed with GEAR as any other CD-ROM XA image.

NOTE

Elektroson can also do the Electronic Book specific indexing for you. Contact us for more information about our EB services.

Sense Codes (Hardware Troubleshooting when Writing to CD-R)

Additional sense codes provide a precise indication of the errors encountered while writing a CD-R disc.

02H NO SEEK COMPLETE

03H CADDY OUT

Indicates that the drive's caddy is out.

04H DRIVE NOT READY

Indicates that the drive is temporarily unable to perform the desired operation.

06H NO INITIAL POSITION

08H COMMUNICATION FAILURE

Indicates that a communication error between the SCSI controller and the servo controller prevented the command from being performed (Hardware error).

09H TRACK FOLLOWING ERROR

Indicates that focusing or radial tracking did not succeed (Hardware error).

11H UNRECOVERED READ ERROR

Indicates that the previous read command failed, probably due to a flaw in the disc (Medium error).

12H MODE 0 ERROR

Medium error.

14H BLOCK NOT FOUND

Medium error.

15H POSITIONING ERROR

Indicates that a seek to a requested location on disc failed (Hardware error).

17H RECOVERED READ DATA WITH RETRIES

Indicates that the previous read command required data recovery which was accomplished by additional read operations (Recovered error).

18H RECOVERED READ DATA WITH ECC CORRECTION

Indicates that the previous read command required data recovery which was accomplished using Error Correction Code (ECC) correction (Recovered error).

1AH PARAMETER LIST LENGTH ERROR

20H INVALID COMMAND

The previous SCSI command is not supported by the device.

21H INVALID BLOCK ADDRESS

Indicates that one or more of the block addresses requested by the last read, write, seek or verify command extends beyond the end of the disc.

22H ILLEGAL FUNCTION

24H ILLEGAL FIELD IN COMMAND DESCRIPTOR

Indicates that one or more of the reserved bits in the command descriptor was set, or an option was selected that is not supported by the unit.

25H INVALID LUN

Indicates that the logical unit field of the command descriptor was not zero.

26H INVALID FIELD PARAMETER LIST

Indicates that the parameter list contained one or more of the reserved bits set to 1, or an option was selected that is not supported by the unit.

28H MEDIUM CHANGED

Indicates that the disc may have been changed since the last command issued by this initiator.

29H POWER-ON RESET OR BUS-RESET OCCURRED

Indicates that a power on reset or a bus reset has occurred since the last command issued by this initiator.

2AH MODE SELECT PARAMETER CHANGED**2CH COMMAND SEQUENCE ERROR**

Indicates that the previous command is not allowed in the sequence.

31H MEDIUM FORMAT CORRUPTED

Indicates that the drive could not read (write) the requested information from (to) disc due to a corrupted or unknown format (Medium error).

32H WRITE DATA ERROR WITH CU

Indicates that a CU (uncorrectable) error occurred in the recorded data and was detected by monitoring the data writing operation through the RED level decoder (Hardware error).

33H MONITOR ATIP ERROR

Indicates that the drive could not read the ATIP code from the disc probably because of dust or shock (Medium error).

34H ABSORPTION CONTROL ERROR

Indicates that an error might have occurred while recording the data due to laser power clipping (Medium error).

3AH MEDIUM NOT PRESENT

Indicates that there is no disc mounted in the drive.

3DH INVALID BITS IN IDENTIFY MESSAGE

Indicates that the identify message is corrupted.

40H DIAGNOSTIC FAILURE

Indicates that a device self-test failed (Hardware error).

42H POWER-ON OR SELF TEST FAILURE

Indicates that a power on or self test sequence failed (Hardware error).

44H INTERNAL CONTROLLER ERROR

Indicates that the controller detected an error which could not be otherwise explained (Hardware error).

47H SCSI PARITY ERROR

Indicates that the controller detected a parity error.

48H INITIATOR DETECT ERROR

Indicates that the initiator detected an error.

50H WRITE APPEND ERROR

Indicates that an append by a write command during writing failed.

53H MEDIUM LOAD OR EJECT FAILED

Indicates that loading or unloading of the disc failed (Hardware error).

57H UNABLE TO READ TOC, PMA OR SUBCODE

Indicates that the drive was unable to read the TOC, PMA or subcode of the current disc (Medium error).

5AH OPERATOR MEDIUM REMOVAL REQUEST

Indicates that the operator requested to unload the disc.

63H END OF USER AREA ENCOUNTERED ON THIS TRACK

Indicates that the requested block exceeds the current track.

64H ILLEGAL MODE FOR THIS TRACK

Indicates that the data on the track is not according to the mode which is requested by the command.

65H VERIFY FAILED

Indicates that verification was not successful.

80H PROM ERROR

Indicates that the controller detected a PROM error.

81H ILLEGAL TRACK

Indicates that the track being accessed does not exist.

82H COMMAND NOT VALID NOW

Indicates that the command is not valid for the current host.

83H MEDIUM REMOVAL IS PREVENTED

A0H STOPPED ON NON DATA BLOCK

During reading data transfer stopped because you are attempting to read a block that is not a data block.

A1H INVALID START ADDRESS

A2H ATTEMPT TO CROSS TRACK BOUNDARY

A transfer length created by a write track command does not match the free space length in the track.

A3H ILLEGAL MEDIUM

The medium is not a Write Once disc.

A4H DISC WRITE PROTECTED

A5H APPLICATION CODE CONFLICT

The disc application code does not match the host application code.

A6H ILLEGAL BLOCK SIZE FOR COMMAND

Selected block size is not allowed for this command.

A7H BLOCK SIZE CONFLICT

Selected block size caused a mode conflict.

A8H ILLEGAL TRANSFER LENGTH

Indicates that the transfer length in the command descriptor block would cause an overflow of the write buffer.

A9H REQUEST FOR FIXATION FAILED

Fixation failed due to existing blank areas on disc.

AAH END OF MEDIUM REACHED

Indicates that during writing the end of the medium is detected, or the number of tracks reached the limit of 99, or the OPC area is full, or the PMA is full.

ABH ILLEGAL TRACK NUMBER

Indicates an invalid track number in the command descriptor block.

ACH DATA TRACK LENGTH ERROR

Indicates that the track length is invalid because not enough blocks were sent to the unit to meet the minimum track length of 300 blocks.

ADH BUFFER UNDER RUN

Indicates that the write action stopped because the cache buffer emptied.

AEH ILLEGAL TRACK MODE

Indicates that the selected track mode is not valid.

AFH OPTIMUM POWER CALIBRATION OPC ERROR

Indicates that power calibration failed. This could indicate a bad medium, laser failure or drive failure.

B0H CALIBRATION AREA ALMOST FULL

Indicates that only a few optimum power calibration areas are left.

B1H CURRENT PROGRAM AREA EMPTY

Indicates that the command could not be executed due to an empty program area.

B2H NO EFM AT SEARCH ADDRESS

Indicates that during reading or play back request no EFM was present.

B3H LINK AREA ENCOUNTERED

Indicates that during reading the link area was encountered.

B4H CALIBRATION AREA FULL

Indicates that the calibration area is full. This means that no more information can be written to the disc.

B5H DUMMY BLOCKS ADDED

Indicates that during writing, dummy blocks were added to meet the disc specification.

B6H BLOCK SIZE FORMAT CONFLICT

Indicates that during writing a block (with subheader) was received and a conflict was detected between the form bit of the header and the block size.

B7H CURRENT COMMAND ABORTED

Indicates that the current command has been aborted due to an abort command received.

C1H BARCODE READING ERROR

Indicates that an error occurred during barcode reading (Medium error).

D0H RECOVERY NEEDED

During power up the unit has detected that the device was writing during the last power down. The medium format can be corrupted.

D1H CAN'T RECOVER FROM TRACK

Indicates that the recovery of a corrupted track failed (Medium error).

D2H CAN'T RECOVER FROM PROGRAM MEMORY AREA

Indicates that the recovery of a corrupted program memory area failed (Medium error).

D3H CAN'T RECOVER FROM LEADIN AREA

Indicates that the recovery of a corrupted leadin area failed (Medium error).

D4H CAN'T RECOVER FROM LEADOUT AREA

Indicates that the recovery of a corrupted leadout area failed (Medium error).

D5H CAN'T RECOVER FROM OPTICAL POWER CALIBRATION AREA

Indicates that the recovery of a corrupted optical power calibration area failed (Medium error).

D6H EEPROM FAILURE

Indicates that the non volatile memory failed (Hardware error).

Referenced Documents

- [1] AHA-1540/1542 Installation Guide, Adaptec
- [2] ANSI X3.27-1987, File Structure and Labeling of Magnetic Tapes
- [3] International Standard ISO-9660, First Edition 1988-04-15, Information Processing, Volume and File Structure of CD-ROM for Information Interchange.
- [4] System Description on CD-ROM XA, May 1991, Philips / Sony.
- [5] Compact Disc Interactive, Full Functional Specification (Green Book), September 1990, Philips / Sony.
- [6] Sony Electronic Book System, Data Format Technical Specification, version 2.1 june 93, Sony.
- [7] Studio XA 2.0 Manual, Mammoth Micro Tools, 1993.

GEAR Commands

GEAR commands can be inserted in a batch file or as a single command line. GEAR can be controlled by these commands. The following sections describe all valid commands. The syntax of the commands is:

COMMAND_NAME <Y|N> <parameter> [optional]

A parameter enclosed in angular brackets must be specified. A parameter enclosed in square brackets is optional. The character '|' between parameters indicates that a selection between two or more parameters has to be made.

- Special keys such as 'ESCAPE' or 'CARRIAGE RETURN' are abbreviated and enclosed in angular brackets; for example: <ESC>, <RETURN>.

When the a parameter isn't specified GEAR will ask for the missing parameter. The default value (if any) is shown between brackets and is selected by pressing <ENTER>. This is also the case when extra information is required. A command can be interrupted by pressing <ESC>. Sometimes it will take time before GEAR stops executing the command. This is because commands require 'cleaning up' time.

Any of the following commands can be used.

1.General Commands

BATCH <file_name>

Starts executing commands from the given batch file. *Refer to section 6.2 for more information.*

EXIT

Ends the current session of the GEAR module.

HELP [<cmd>]

Provides information about the command. Entering an invalid command name or no command name results in a list of all available commands.

LOG <file_name>

Starts or stops the logging of session information in a given file. When logging is started for the first time the user has to specify the name of a file in which the information has to be stored. *Refer to section 6.1 for more information.*

VDIR

An overview of all volumes present is given. The overview consists of:

- The volume name
- The volume size
- The session number
- The number of tracks within the volume
- The type of the volume
- The status of the volume
- The date and time of creation

For a plain ISO-9660 volume the number of tracks is always 1 and the type is always 'ISO'. Multi Media

(MM) volumes allow you to create additional tracks and different types of volumes. The session number is always 1 for volumes created with the NEWVOL command. Only volumes which are created with the SESSION command can have a session number greater than 1. The status of a volume can be either 'Selected' or 'Closed'. A volume is 'Selected' if it is currently used otherwise the status of a volume is 'Closed'. The date and time of creation of a volume is determined by using the time zone (TZ) environment variable. If you do not specify this variable the date and time is shown for the Pacific time zone (PDT).

TDIR

An overview of all tracks present in the current selected volume is given. The overview consists of:

- The track number
- The track size
- The type of the track
- The status of the track
- The date and time of creation

The type of a track can be XA, DA or ISO. The status of a track can be either 'Selected' or 'Closed'. A track is 'Selected' if it is open for copying data to it, otherwise the status of a track is 'Closed'. The date and time of creation of a track is determined by using the time zone (TZ) environment variable. If you do not specify this variable the date and time is shown for the Pacific time zone (PDT).

2.Formatting Commands

The formatting commands are used to do CD-ROM file formatting. A variety of commands is available to generate an empty image and to add, delete or change files and directories in it.

All general commands, as specified above, plus the following are valid:

- volume related commands are valid
- track related commands
- directory and file related commands
- Multi Media related commands
- miscellaneous commands

Volume Related Commands

NEWVOL <vol_name> <80|74|63|18>

Creates a new empty virtual volume with the given name. The new volume is automatically selected. The name may not contain other characters than uppercase A..Z, digits 0..9 and underscore '_' (refer to Appendix A). The name can be 8 characters long. If you want to give your volume a longer name, you can use the PRIMVD command to rename the Volume Identifier. Refer to section 5.4 for more information.

SELVOL <vol_name>

Selects an existing volume for use. The previously selected volume (if any) is closed and the given volume is selected. A volume must be selected before you can edit the contents of a volume. Refer to section 5.1 for more information.

SESSION <session_nr>

The SESSION command is used to append data to a multi-session disc. Refer to section 5.6 for more

information.

PRIMVD

This command allows editing of settings in the Volume Descriptor.
The following settings can be changed:

- VolumeIdentifier
- SystemIdentifier
- PublisherIdentifier
- DataPreparerIdentifier
- ApplicationIdentifier
- ApplicationUse
- CopyRightIdentifier
- AbstractFileIdentifier
- BibliographicIdentifier

The default values specified in the GEAR.INI file can be changed using the EDITPREFS command. Refer to section 5.4 for more information.

EDITVOL

This command allows editing of the Generator Setup settings used during the creation of a volume. The following settings can be changed:

- NonIsoNameHandling
- Hidden option
- Startsector option
- Archive option
- Maximum directory nesting level

The default values specified in the GEAR.INI file can be changed using the EDITPREFS command. Refer to section 10.1 for more information.

PHYSVOL

Creates the physical image files for the selected volume. For each track in the image a physical image file is created. It is also possible to use the PHYSTRK command for creating physical image files. Refer to section 7.2 for more information.

VERVOL

Verifies the virtual image of the selected volume. Refer to section 7.1 for more information.

DELVOL <vol_name>

Deletes the specified virtual volume. Refer to section 5.1 for more information.

Track Related Commands

SELTRK <track_nr>

Selects an existing track for use. The previously selected track (if any) is minimized and closed, and the given track is selected. Refer to section 5.2 for more information.

NEWTRK <ISO|XA|DA> [<track_nr>]

Creates a new empty virtual track with of the chosen type. The new track is automatically selected. Refer

to section 5.2 for more information.

PHYSTRK [<file_name>]

Creates a physical image file of the selected track. If the optional parameter <file_name> is specified the image will be written to this directory and not the working directory (e.g. use PHYSTRK D:\IMAGES\IMAGE1). GEAR will automatically find the physical image when necessary (e.g. when using the physical image for the WRITE command). Refer to section 7.2 for more information.

VERTRK

Verifies the virtual image of the selected track. Refer to section 7.1 for more information.

DELTRK <track_nr>

Deletes the specified virtual track. Refer to section 5.2 for more information.

Directory and File Related Commands

CD <dir_name>

Changes to the specified directory of the virtual image. The command recognizes 'DOS' commands like 'CD ..', 'CD \' and 'CD \SUB1'. It is possible to specify a path name for the new directory. Refer to section 5.3 for more information.

NEWDIR <dir_name>

Creates a new directory on the virtual image. It is possible to create hidden directories by setting the HIDDEN option to TRUE before creating the new directory (refer to the EDITPREFS command). Refer to section 5.3 for more information.

DELDIR <dir_name>

Deletes the specified directory in the virtual image. Wildcards are not allowed. A directory must be empty before it can be deleted. Complete directories can be deleted by using the DELTREE command. Refer to section 5.3 for more information.

COPY <file_spec>

Copies the specified data file(s) to the virtual image. Wildcards are allowed. Refer to section 4.3 for more information.

It is possible to specify the exact location (sector number) for the file(s). This can be achieved by switching the SECTOR option on. GEAR will ask for the start location of each file to be loaded (see EDITPREFS command).

Files can also be hidden by setting the HIDDEN option to TRUE (see EDITPREFS command) before copying the files. The hidden setting cannot be changed afterwards; the only solution is to delete the file(s), reset the HIDDEN setting and reload the file(s).

COPYTREE <os_dir_tree> [<cd_dir>]

Copies a complete directory tree to the virtual image. All files and subdirectories of the specified tree are automatically loaded. Subdirectories are created in the image if necessary. After completion the virtual

image contains an exact copy of the tree specified. The target directory specifies where in the virtual image the OS directory will be loaded. The software will create as much space as necessary for each directory in the specified tree. The maximum number of nested directories under ISO is 8.

RENAME <old_name> <new_name>

Renames a directory or file in the virtual volume to the new name. Wildcards are not allowed. Refer to section 5.3 for more information.

DELETE <file_spec>

Deletes the specified file(s) from the virtual image. Files can be specified by their complete name i.e. including the version number. Wildcards are allowed e.g. *.* will delete all files in the current directory of the virtual image. If files with non ISO names have been loaded, the version number can be omitted. Refer to section 5.3 for more information.

DELTREE <dir_tree>

Deletes the specified ISO tree from the virtual image. The specified directory and all subdirectories are deleted. Wildcards are not allowed. Refer to section 5.3 for more information.

Multi Media Related Commands

These commands can only be used if an XA track is selected.

COPYMMF <file_spec><mmtype><chnr><int_fac><tot_fac>[<EOR|TRG>]

Copies the specified Multi Media file(s) to the virtual XA track. Refer to section 9.2 for more information. The following parameters must be specified:

mmtype Multi Media type; specifies the type of each file that is loaded.

chnr Channel number; specifies the channel number for each file that is loaded.

int_fac Interleave factor; specifies the interleave factor for each file that is loaded. Refer to tot_fac for an explanation.

tot_fac Total interleave factor; specifies the total interleave factor of each file that is loaded. This number together with the interleave data factor determines the interleaving of each file.

EOR End of record; specifies if the End Of Record bit should be set in the subheader of the last sector of each file that is loaded. This can be specified together with the TRG parameter.

TRG Trigger; specifies if the TRiGger bit should be set in the subheader of the last sector of each file that is loaded. This can be specified together with the EOR parameter.

More information about the use of these parameters for CD-ROM XA applications can be obtained from the CD-ROM XA specification [4].

Usually it is easier to use the dedicated CD-ROM XA interleaver tools (like the Mammoth Tool Set) for creating these files and use the GEAR COPYXA command to load pre-interleaved Multi Media files.

COPYXA <file_spec>

Copies the specified files as pre-interleaved files to the image. Refer to section 9.2 for more information.

Miscellaneous Commands

EDITPREFS

This command can be used to change the generator settings. Some of these settings can also be changed with the PRIMVD command. The difference is that the EDITPREFS command changes the contents of the GEAR.INI file, while the PRIMVD command changes the settings for the selected volume. Settings in the GEAR.INI file are used for each new volume. The PRIMVD settings are for the selected Volume only. Refer to section 9.1 for more information.

FREE

Shows the amount of free space (bytes) on the selected virtual volume. This command can take some time if you have a large volume with a lot of empty space.

DIR [<dir_name>] [/P] [/S]

Shows all the files and directories present in the current or specified directory of the selected track. If dir_name is not specified the current directory will be shown.

For each entry the following is shown:

- Name
- Directory (<DIR>) if it's a directory
- Hidden (H) or normal (n) entry
- Startsector of file
- Time and date of entry
- Size in bytes

The /S option can be used to display the contents of the subdirectories. The /P option can be used to generate a printout. The total number of files listed displayed at the end of the printout.

3.CD-R Commands

The CD-R commands are used when writing a volume to CD-R disc.

MOVEMEDIUM <src_address><dest_address>

Moves a caddy/disc from one location (address) to another location (address) in the Jukebox. Storage slots are numbered from location 1 to 1000. Drivers (CD-Recorders and CD-Readers) are numbered from location 1001 to 2000. The mailbox of the Jukebox has location number 2001. The gripper(s) (the device that actually moves the medium) is/are numbered 3001 and 3002.

WRITECD <volume_name> [<nrofcopies>]

Writes a GEAR volume to a CD-R disc. The number of copies parameter can be used to write multiple discs of the same volume. If a medium changer (supported by GEAR) is connected to the same SCSI bus as the CD-Recorder, GEAR will use the medium changer to change the discs. Otherwise, the user is asked to do the medium change. Refer to section 7.4 for more information.

WRITECD <foreign_image_name|track_list_file_name> [<nrofcopies>] [X] [<type>]

This command is used when working with external volumes. The optional character X indicates that the

specified name should be interpreted as a foreign image or track list file. [Refer to section 5.5 for more information.](#)

ESTIMATE <volume_name>

Checks the performance of your system for writing the selected GEAR volume to CD-R disc. [Refer to section 7.3 for more information.](#)

ESTIMATE <foreign_image_name|track_list_file_name> [X] [<type>]

Checks the performance of your system for writing the external volume to CD-R disc. The optional character X indicates that the specified name should be interpreted as a foreign image or track list file. [Refer to section 7.3 for more information.](#)

DISCINFO

Displays information about the CD-R disc in the CD-Recorder. [Refer to section 8.1 for more information.](#)

SETUPCD

Defines the settings used when writing the CD-R disc and/or while estimating the performance. The following information can be specified:

- Use the physical image file (Yes or No)
- Write a multi session CD-R (Yes or No)
- Use the test mode of the CD-Recorder (Yes or No)
- Write a CD-R disc with 1x, 2x or 4x speed (1, 2 or 4)
- Fixate the CD-R after writing (Yes or No)
- Linear velocity used for writing (1, 2 or 3)
- Number of CD-Recorders which should be addressed (1 up to 32).

The setup information is saved in the GEAR.INI file. You can either edit the GEAR.INI file directly or (preferably) use the SETUP command to change the settings. [Refer to section 10.2 for more information.](#)

FIXATION

Checks the disc currently loaded. If the disc is not already fixated it will fixate the disc. This command can be used in combination with 'track at once' CD-Rs. All tracks can be written separately to the CD-R with the 'Fixation' entry in the GEAR.INI file set to FALSE. The tracks can then be fixated using this command. [Refer to section 10.3 for more information.](#)

Warning

If an image is not fixated it cannot be read on a CD-ROM player!

READTRACK <nr> <file>

Reads all of the sectors of the specified track from the CD-R disc and saves them in the specified file. The amount of information read depends on the track type. This command will automatically determine the track type, the track size and the start position of the track and will then start copying. For ISO tracks (mode 1) 2048 bytes will be read per sector. For CD-ROM XA and CD-i (mode 2) 2336 bytes will be read per sector and for CD Digital Audio 2352 bytes will be read per sector. Not all CD-Recorders support the reading of CD Digital Audio tracks and/or CD-i tracks!

Files created with this command can be written to a CD-R disc again as external image files!

LISTCD

Shows the selected setup settings which are used for estimating and writing.

4.Premaster Tape

The premaster tape commands are used when writing a volume to premaster tape.

WRITETP <volume_name>

Writes the GEAR volume to premaster tape. *Refer to section 7.5 for more information.*

WRITETP <foreign_image_name|track_list_file_name> [X] [<type>]

This command is used when working with external volumes. The optional character X indicates that the specified name should be interpreted as a foreign image or track list file. *Refer to section 5.5 for more information.*

VERIFY <volume_name>

Verifies the volume by comparing it to the volume on tape. Before the verification GEAR asks if the current setup values should be used or if they should be changed. The setup values determine whether the virtual volume or the physical image file is used for verification. The setup values must be the same as those used for writing the tape.

VERIFY <foreign_image_name|track_list_file_name> [X] [<type>]

This command is used when working with external volumes. The optional character X indicates the specified name should be interpreted as a foreign image or track list file. All setup values are used except for the value that determines whether the virtual image or the physical image file is used. The file is interpreted as a physical CD-ROM image file or as a track list file which specifies multiple image files (see WRITE command).

SETUPTP

Defines the setup values which are used while writing the premaster tape and/or while verifying the tape.

In general it is sufficient to use the default values as specified in the supplied GEAR.INI file (*refer to Appendix C*). The setup information is saved in the GEAR.INI file. You can either edit the GEAR.INI file directly or use (preferably) the SETUP command to change these values. *Refer to section 10.3 for more information.*

LISTTP

Shows the selected setup values which are used for verification and writing.

A CD-ROM based system in the same market segment as CD-i. Based on a Risc processor for optimum graphical performance

The time a CD-ROM drive or harddisk needs to read and transfer the requested data from disc to the target computer

A method of compressed audio data storage; instead of storing the signal, the difference between signals is stored. This means that only 4 bits are needed per sample rather than the normal 16 bits.

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 signal are 37.8 kHz and 18.9 kHz for levels B and C respectively. This brings the band width (the maximum frequency to be produced) to 17 kHz and 8.5 kHz. For level A these figures are 44.1 kHz and 20 kHz. Using ADPCM, a 16-fold reduction in storage requirements can be achieved (Level C, mono)

Working method for modelling (new) information. Examples of authoring systems are word processors and spreadsheets on the PC, as well as Multi Media workstations for combining sound, video, images and text for real-time audiovisual presentations.

The smallest unit of information. Bit is a contraction of "binary" and "digit". A binary digit has the value of "0" or "1"

A symbol or character, consisting of 8 bits.

A system for presenting information (text, images and video) on a television screen. The standard is defined by Philips and Sony and is described in the Green Book.

Based on audio CD technology, CD-ROM is a storage medium which can only be read.

XA stands for Extended Architecture and is standard for CD-ROM in which a number of options from CD-i have been added. These include audio compression (ADPCM), multi-channel audio (max. 16), file interleaving, user data (2336 bytes/sector), image compression etc. A CD-ROM XA disc is a Mode 2 disc in which the data is located in Form 1 (2048 bytes/sector) or Form 2 (2336 bytes/sector) sectors.

A 4mm tape format also used for data storage.

DDP is a CD sector level protocol designed to adequately describe a compact disc. A compact disc described using DDP can be reliably mastered. Some mastering and replication companies prefer the premastering tape with DDP protocol

CD-ROM only uses 2048 bytes of a sector of 2352 bytes for data storage. Header and synchronization information uses 12 and 4 bytes respectively. The remaining 288 bytes are used for ECC (Error Correction Code) and EDC (Error Detection Code) information. This information is used by the drive hardware to detect and correct data errors caused by scratches or dirt on the disc and thereby optimizing data integrity.

Form 1 is a sub-format of Mode 2. It defines the structure of the CD-ROM sector as follows: sync (12 bytes), header (4 bytes), subheader (8 bytes), data (2048 byte), EDC (4 bytes), ECC (276 bytes), This layout is used for normal data files (incl. Photo CD and Electronic Book).

Form 2 is a sub format of Mode 2. It defines the structure of the CD-ROM sector as follows: sync (12 bytes), header (4 bytes), subheader (8 bytes), data (2324 bytes), and 4 bytes reserved or for EDC. This layout is used for files where error correction is pointless or impossible due to their real-time character i.e. compressed audio or moving images.

The Hierarchical File System is used by Apple floppy's, hard disks and for CD-ROM. Apple also supports the ISO-9660 standard.

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 that all CD-ROM applications should conform to. GEAR of course meets this standard!

The process in which the Glass Master is produced for production of the Stampers which in turn are used for replication of the CD's. The glass master contains photosensitive lacquer which is illuminated on a Laser Beam Recorder (LBR). The data for mastering comes from a premaster tape.

Defines the structure of the CD-ROM sector as follows: sync (12 bytes), header (4 bytes), data (2048 bytes), reserved (8 bytes), ECC (276 bytes), and EDC (4 bytes).

Defines the structure of the CD-ROM sector as follows: sync (12 bytes), header (4 bytes), subheader (8 bytes), remainder (2312 bytes) dependent on the chosen form (1 or 2)

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 660 Mb and thus demands 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 the user 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.

The Small Computer Standard Interface is an industry standard for the interface between computers and peripherals.

Making a CD-ROM image usually requires an exceptional amount of hard disk space as all data is present in the original files and duplicated in the CD-ROM image. GEAR allows the user to make an application without the need for so much hard disk space by producing a virtual image which is just an administration of the image structure. The software keeps record of the files to be present in the final application. Simulation and writing of the final premaster tape or CD-Recordable 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 which means that for every track of the CD-ROM an administration is kept.



ELEKTROSON

USA: Elektroson USA
10 Presidential Boulevard
Suite 125
Bala Cynwyd, PA 19004
USA
tel: 610 617 0850
fax: 610 617 0856
BBS: 610 617 0857
Compuserve: 74777,2140
Applelink: ELEKTRO.GEAR

World: Elektroson BV
PO Box 2436
5600 CK Eindhoven
The Netherlands
tel: +31 (0)40 515065
fax: +31 (0)40 514920
BBS: +31 (0)40 512644
Internet: elektro@sci.kun.nl
Compuserve: 100567,3221
Applelink: HOL0489

Pressing this button will select the previous slot.

Pressing this button will select the next slot.

This control shows which slot has been selected. The bar under the didgets shows whether the slot is occupied or not. Clicking on one of the didgets will increment the didget by one.

Pressing this button will move the disc loaded in the selected drive or gripper to the selected slot.

Pressing this button will move the disc loaded in the selected slot to the selected drive or gripper.

Pressing this button will select the previous drive or gripper (if any) in the list.

Pressing this button will select the next drive or gripper (if any) in the list.

This control shows which drive or gripper has been selected. The bar under the icon shows whether the drive is occupied or not.

Pressing this button will insert a disc into the system. This will only work when an unoccupied gripper is selected.

Pressing this button will eject a disc from the system. This will only work when an occupied gripper is selected.

