



**CD-Recording Software
for Windows 95, Windows 98,
Windows NT 4.0**

nero
BURNING ROM

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1 Introduction

1.1 CD-Recording as a New Technology

— At the beginning of the 1980's, the CEO of a large electronics company which was intensively driving the development of the digital compact disc (CD) - used at that time primarily for music - was asked if there was truly a market for these little discs. Since then, the question has provided its own answer. Analog black records can now only be found at flea markets, and in most music stores the space for cassettes is less and less to make room for CDs.

Its memory capacity of 650 MB and the excellent price-performance relationship, combined with problem-free usage and data security, made the data processing world sit up and take notice of the new medium. At the same time, people were really only thinking of a read-only technology (ROM = Read Only Memory) in 1985.

In 1989 a process was developed with which a CD can be directly written by means of a laser beam. The way for the self-creation of CDs was thus opened. At the moment you can distinguish a CD recordable from the non-writable by their gold or green burning side. Massproduced CDs are silver, and they cannot be burned on a CD-recorder.

With the passage of time, the self-creation of CDs to meet individual needs has been made easy and economically feasible thanks to improved hardware and practical software. You have just such a product in your possession right now: Thanks to its user-friendly interface and optimized processes, **Nero - Burning Rom** makes it possible for you to easily and quickly create your own CDs.

1.2 Applications for CD-Recording

The CD is an ideal medium for the *distribution of information* of any kind (text, images, sound, data and programs). Along with relatively low production costs, it provides high memory capacity with direct access and a long life span, and is thus without competition at this time, even when you only have low production numbers. For this reason, a majority of all PCs today are already equipped with a CD-ROM drive.

The *self-created CD* opens a wide range of application possibilities:

Let's assume that you, as a program developer, have generated a test version of your *software* and copied it directly to a CD-R. You may immediately test it for functionality and performance and then pass it on to the pressing operation to have it copied. The same is true with *electronic books* and *CBT applications* (Computer Based Training), for example.

Until today, magnetic tapes and streamers were generally employed for *data security* and for *hard drive back-up*, while microfilm and microfiche were widely used for *archiving of data*. Access to data stored in this manner is complicated and relatively slow. Here the CD represents an attractive alternative because you can access your data with more convenience and speed.

If you want to archive your Photos in digital form, a CD is ideal for this, because it can handle the large file sizes. For example *Photo-CDs* have an application in the archiving of medical image data. Suitable data compression technologies make it possible to store entire films on Movie CDs.

For music lovers, the self-creation of personal *Audio-CDs* should be among the most fascinating possibilities offered by CD-Recording. With this technology, you could compile your own entirely personal "The Best on CD" list, for example.

Speaking of that: The protection of intellectual property is guaranteed by national and international laws and regulations. Before you write data which is not yours onto a CD, you must therefore check into the legality of making the copy. The creation of copies of outside-sourced data is usually allowed only under specific conditions, or not at all. The responsibility for this in any case is entirely yours.

1.3 Layout of the Manual

This manual consists of a total of seven chapters which are supplemented by an Appendix and an extensive glossary.

You have just finished reading **Chapter 1**.

Chapter 2 describes the installation of **Nero** with Windows.

Chapter 3 presents a simple example to show you how to create your first CD.

Chapter 4 covers the basics of CD-Recording.

Chapter 5 will familiarize you with **Nero** in detail. You will learn more about procedures, the individual windows and the actual writing or burn process there.

Chapter 6 is a step-by-step description of how you can create and write an ISO compilation, an Audio-CD or an image file.

Chapter 7 contains the **Nero** Reference. The individual menu items are systematically explained there.

In the **Appendices**, you will find tables with the allowed character sets and a summary of key shortcuts.

The **Glossary** is found at the end of the manual. Here, you will find brief explanations of all of the important terms used.

1.4 Conventions

We have added brief commentaries and icons in the margins throughout the manual. They are intended to help you find important information at a glance. When you see this icon, it means:



Caution! Pay special attention at this point.

2 Installing Nero

In this chapter, you will find out which components you need for *CD-Recording* and how you install and configure **Nero** with Windows 3.1x, Windows NT, Windows 95 and Windows 98.

2.1 System Requirements

2.1.1 Hardware Requirements

As the *minimal configuration* for all Windows operating systems, you must have: A PC with a 486 processor or higher and speed of at least 33 Mhz, a minimum of 8 MB RAM and an SCSI Host Adapter with WINASPI support (not required for IDE-Recorders).

The PC must have a CD-ROM drive in order to install **Nero**. If your CD-Recorder is recognized as a CD-ROM drive when running with Windows, you may also use the recorder. Up to now, Windows 95/98 has supported all of the drivers which are required for this. You may experience less success with Windows 3.1x.

Your hard drive should be as fast as possible. The *access time* should be under 19 milliseconds. The necessary *transfer rate* from the hard drive to the recorder depends on the speed with which your recorder can write. If you have a 1x recorder, we recommend a transfer speed of at least 1 MB/second, and correspondingly 4 MB/second with 4x. Otherwise the data are not continuously transferred to the recorder; the result can easily be a buffer underrun condition, the "worst possible scenario" in CD-Recording.

For **Nero**, you need approximately 4.8 MB of hard drive space.

2.1.2 Overview: Components for CD-Recording

You will require the following components for CD-Recording:

- an *SCSI-Host Adapter* with a power cable,
- a *CD-Recorder* (either an internal or external device) and a *terminator* as required (if not installed internally),
- you already have the *recording software* (**Nero - Burning Rom**),
- and, of course, you will need *CD-Recordables*.

You can find out which CD-recorders are currently supported by **Nero** in the Appendix covering *Supported CD-Recorders*, or you can get this information from your supplier.

2.2 The Installation

2.2.1 Installation of the SCSI Host Adapter

Install the SCSI Host Adapter according to the manufacturer's instructions. Don't forget to also install the software for the SCSI Adapter. If necessary, you must also install the ASPI Manager for Windows which is supplied with your SCSI Adapter. And finally, you must restart your PC.

Caution: Not all SCSI Host Adapters support WINASPI. You must therefore make absolutely sure when you buy your adapter that it supports WINASPI.

2.2.2 Installation of the CD-Recorder

Please refer to the installation instructions supplied with your recorder for detailed procedures.

Caution: If you only have one recorder connected to the SCSI Adapter or if your recorder is the last SCSI device connected, then you must generally provide a terminator for the open SCSI plug on the recorder. Some recorders have built-in termination. Again, you will find information on this subject in the recorder manual.

Don't forget to plug in the power cable.

If driver software is provided with the recorder that enables you to also use it as a CD-ROM, install the software.

Your recorder is now ready for operation. Restart your PC now.



Caution for an external recorder: Switch the recorder on first, and then the PC. If you do not follow this sequence, the recorder will not be recognized by the operating system; you will have to restart the PC at some time before you want to write to a CD.

2.2.3 Installation of Nero

You can configure **Nero** without any problems by using the installation program. For the setup, carry out the following steps, corresponding to the operating system you use.

2.2.3.1 Windows 95/98 and Windows NT 4.0

1. Insert the **Nero - Burning Rom** CD in the CD-ROM drive.
2. In the **Start Menu** under **Run**, select **setup.exe** on the **Nero** CD.
3. The **Installation Program** will guide you through the subsequent steps. Just follow the instructions as they appear on the screen. You will be asked to enter such information as your name, your company and the serial number of the CD. You will find the serial number on or

in the **Nero** package. You then have the option of choosing between different setup types. After completing the installation, you can start **Nero** immediately.

2.2.3.2 Windows 3.1x

1. Insert the **Nero - Burning Rom** CD in the CD-ROM drive.
2. Select the CD-ROM drive in **File Manager**.
3. Then select the **setup.exe** program on the Nero CD.
4. The **Installation Program** will guide you through the subsequent steps. Just follow the instructions as they appear on the screen. You will be asked to enter such information as your name, your company and the serial number of the CD. You will find the serial number on or in the **Nero** package. You then have the option of choosing between different setup types. Finally, you will need to enter the program group. After completing the installation, you can start **Nero** immediately. Note: IDE-Recorders are not supported under Windows 3.1x.

Congratulations! You have completed the installation of your **Nero**. Now go to the ***Quickstart*** in Chapter 3 in the manual to find out how to write your first CD.

When you start **Nero**, the system preferences will be checked to ensure that any preference settings which could initiate a message, thereby interrupting the burn process, are deactivated. This check is performed every time you start **Nero**, and the preference settings concerned are changed accordingly if you accept them and the PC is then restarted.

2.2.4 Uninstalling Nero

If you are using Windows 95/98, **Nero** can be uninstalled, if necessary. Select **Nero** from the Start Menu under Settings/Control Panel/Add-Rem ... Programs, and select *Remove*. This operation will delete all **Nero** program files and will remove **Nero** from the Start Menu.

With Windows 3.1x, simply delete the **Nero** programs and any **Nero** program groups which might exist in the File Manager.

3 Quickstart

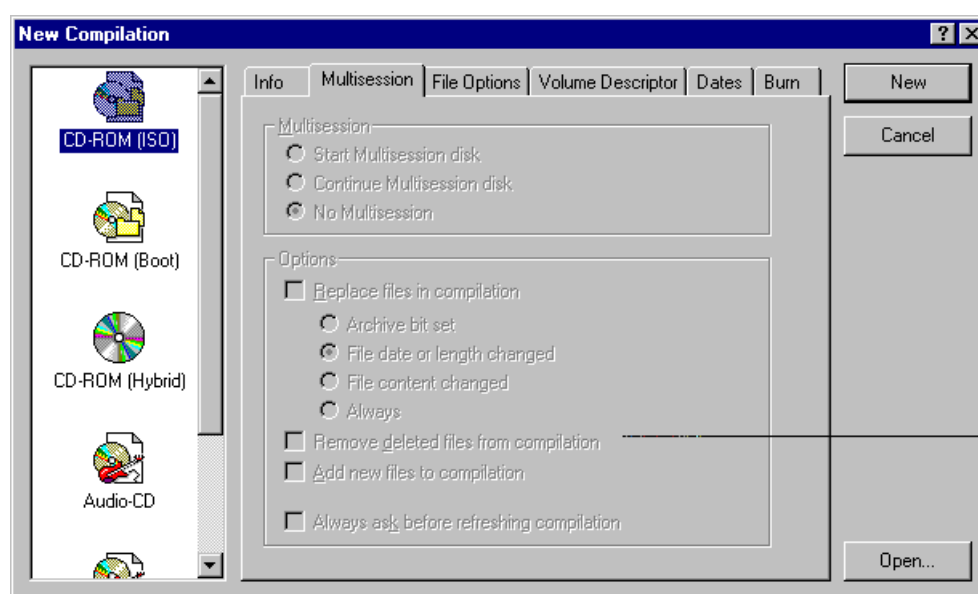
After you have successfully installed **Nero**, you can begin your first job with the recording software. In this chapter, we will use a simple example to show you how you can create a CD with **Nero**.

We will assume that you have installed **Nero** with Windows 95. You can now open **Nero** through the task bar and the Start Menu. You will find the default installation for the program under

START > Programs > **Nero - Burning Rom.**

Open **Nero** by clicking on it in the Start Menu.

The following illustration shows the options window for a *New Compilation*, which is the default window after **Nero** is started.



*The dialog box
New Compilation*

In a brief summary, the entire process for the creation of a CD may be described in the following steps:

1. **Creating a Compilation.** In the Compilation, you determine which files will be written on the CD.
The next two steps are for the only purpose of avoiding a possible buffer underrun.
2. **Determining Write Speed**, also called the Speed test. This test is where the maximum possible write speed is defined. If a slower speed is measured in the Speed test than provided by the current setting, the speed setting is correspondingly reduced. This test should be performed before every simulation - or before the burn process, when there is no simulation.

3. **Simulation** of the Write Procedure: Here, the data of the compilation are transferred to the CD-recorder, but the laser beam does **not** write the data onto the CD. In this way it is determined whether you can expect everything to run without problems during the burn process.
4. **Burn process (Write process)**. You simply make sure a recordable CD is correctly inserted and then press the Write button, provided of course the write speed test and simulation were successful.

3.1 Create a New Compilation

In the *New Compilation* dialog box, click on the **CD-ROM** compilation type (it doesn't matter which property sheet is currently activated). Leave all of the default options as they are. Then, in the upper right of the same window, click on the *New* button.

The Compilation window will open. This window consists of two panes. In the left window, replace the file name NEW (in the upper left next to the CD icon) with HELLO.

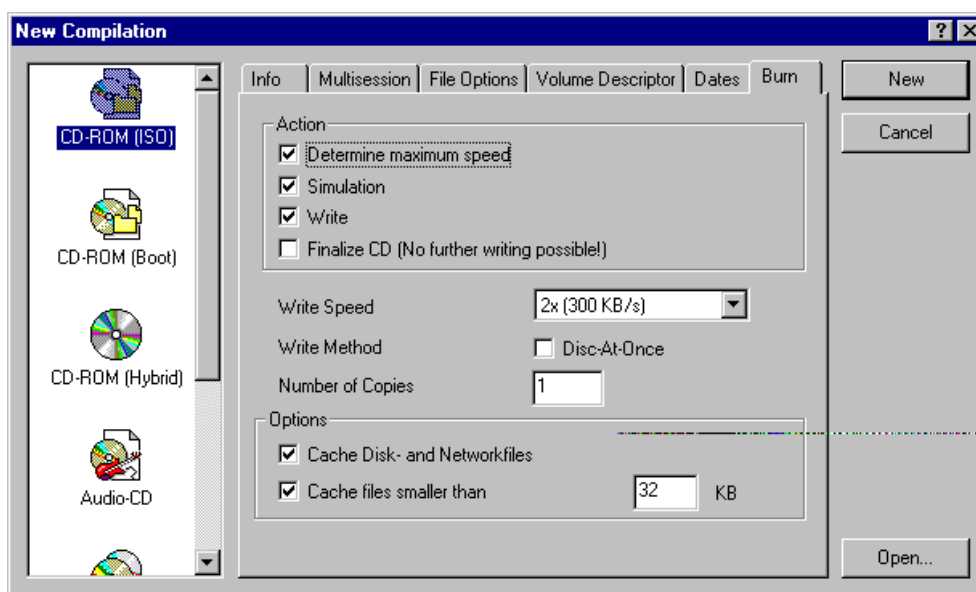
In the right window, you will see the **Nero** file browser. The selection of the data which you want to write onto the CD is very simple with the browser. For your first attempt to write a CD, select the file "Hello.txt" from the file browser in the directory [Drive name]:\Programs\ahead\Nero (if you have accepted the suggested target directory during installation) and drag it into the left compilation window. Then activate it by clicking on it somewhere.

Now save the compilation by clicking on the floppy disk icon in the toolbar. The *Save* window will open. Type in the file name HELLO and then activate the *Save* button. Your first compilation file is now complete.

3.2 Determining Maximum Write Speed

Click on the icon for Write CD in the toolbar. The *Write CD* window is displayed with the **Burn** property sheet. The boxes for **Determine Maximum Speed** and **Simulate** are already selected in this window. Click on the **Write** selection box at this time. You may leave all of the other options with their default settings. Confirm your selection by clicking on the *Write* button.

In the following illustration, you see the *Write CD* dialog box with the **Burn** property sheet and the selected options.



The dialog box **Write CD**

As the first step, **Nero** will now determine the maximum possible write speed and then transfer this value into the **Write Speed** field.

3.3 Simulation of the Write Procedure:

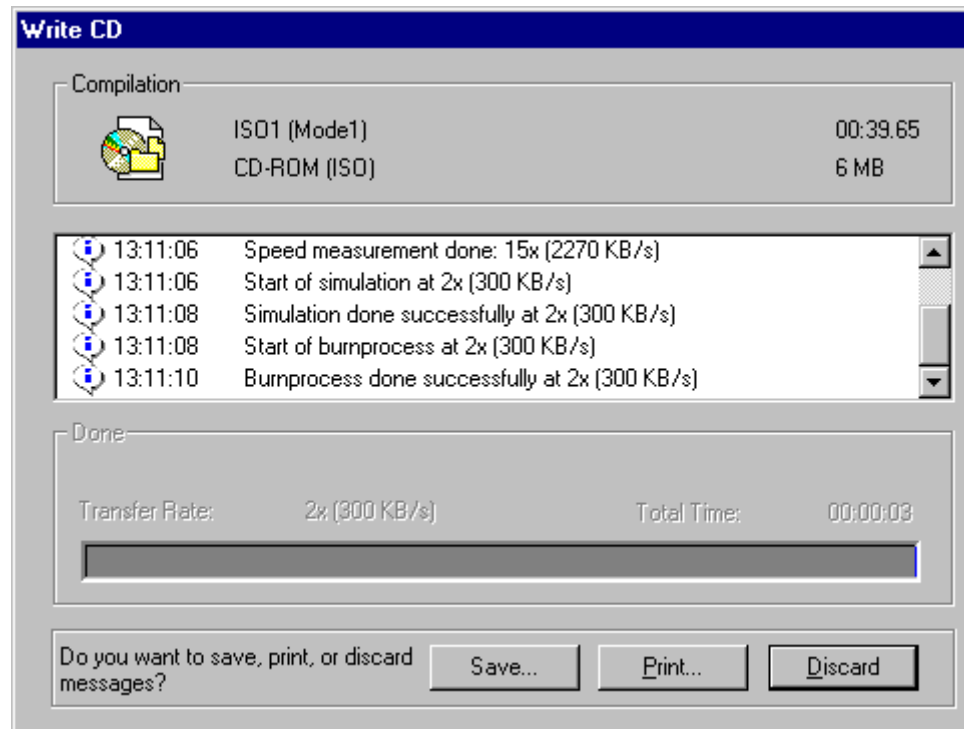
The execution of this step was already set by the previous selection of the **Simulate** box. **Nero** now simulates the burn process in order to test whether the actual burn process will also run without any problems. **Nero** will inform you when the simulation has ended. With many recorders, the CD will be ejected. This means that, depending on the recorder, it might be necessary to either re-insert the caddy or to close the CD drawer.

3.4 The Burn Process (Write Process)

You have already been prompted above to select the **Write** control box. By doing this, the burn process is performed immediately after the simulation. **Nero** will now begin the entire writing procedure with all of the preselected phases.

During this process, a status window is opened (refer to the following illustration) which provides you with different information during writing. The current compilation is displayed in the upper pane of the window. The phase which is running and its result is shown in the center pane. Below this, you will see a progress display for each process.

*The status
window
during the
burn process*



Good job!

The end of the writing process is indicated by an information box.

You have just created your first CD-ROM.

4 Fundamentals of CD-Recording

CD-Recording is a relatively new technology. An explanation of new terms is therefore just that much more important. In this chapter, along with the most important fundamentals of CD-Recording, we will introduce you to the important terms and their meaning.

4.1 The Rainbow Books

Knowledge of the most important standards is necessary for a basic understanding of CD-Recording. The first standard was defined in 1980 by Sony and Philips. It was published in a book with a red cover. Subsequent definitions followed this style, and each used a book cover with a different color. As a result, this series of standards has also become known as the Rainbow Books.

The family of Rainbow Books is being expanded constantly, including new versions of those already in existence which are published in order to keep up with new developments. For example, modifications were made in the Red Book in order to improve the play-back reliability of recordable CDs, which are actually described in the Orange Book.

4.1.1 Red Book

The first CD standard was known by the name "Compact Disc Digital Audio" (CD-DA). It describes the way music CDs, which may be played back by typical CD players, are produced.

However, even the name "Compact Disc Digital Audio" is not exactly correct. Among other things, the fundamental structural principles of all CDs and their corresponding play-back devices are described in this standard. This is because the structure and the essential elements of all CD formats are the same.

The Red Book defines the scan system at its lowest level, building from there to the EFM (Eight-to-Fourteen-Modulation) modulation process, a method for the synchronization and storing of control information (the length of the title, for example) and the CIRC (Cross Interleave Reed-Solomon Code) procedure for correcting errors. With the help of this process, the CD can even be played back when it is dirty or scratched.

It is only at the highest level - and only this level is truly specialized in music - that it is defined how music is encoded on a CD (CD quality): 44.1 kHz, 16 bit stereo.

4.1.2 Yellow Book

In 1984 - for years after the first standard - the Yellow Book followed. This standard also originated with Sony and Philips. At the same time, the computer began to win the field. The significance of the CD as a storage medium for program files or applications for PC use was recognized very quickly. Thus, the CD-ROM was born.

Two further track types are defined in the Yellow Book, which have been designated as Mode 1 and Mode 2 (originally only defined with CD-I). Mode 1 is used for pure CD-ROMs. It always employs an additional code for error recognition and correction in order to ensure that scratches or manufacturing defects do not have any influence on the accuracy of the computer data.

Mode 2 is used with CD-ROM/XA (CD-ROM eXtended Architecture) and CD-I (Compact Disc - Interactive, see below), for example, and can be used for compressed audio data, videos, images and also for other types of data, whereby the differing types of data may occur within a single track. In addition, there is a differentiation between Form 1 and Form 2 sectors. In Form 1 - as with Mode 1 - a supplemental error recognition and correction code is used. It is only the arrangement of the data that is somewhat different. Form 2 does not make use of this additional protection. It is therefore only suitable for data in which errors do not necessarily create an interference (for example, with audio data).

A process which describes the way *tables of contents* for computer data are filed on a CD is not defined in the Yellow Book. The most frequently used method is defined in **ISO 9660** and is supported by most operating systems (Macintosh OS, MS-DOS and Windows, and also UNIX, for example).

4.1.3 Green Book

After three more years had elapsed, the next standard was introduced - the Green Book. This standard describes the CD-I (Compact Disc - Interactive) and an operating system which is known as CD-RTOS. The specification for the CD-I Bridge was also published in the Green Book. Both standards represent an extension to the Red and Yellow Books, and they are based on ISO 9660.

While the Audio-CD is only suited for music and the CD-ROM was developed only for use with a computer, the CD-I is aimed at the consumer market, although it has not achieved any wide-spread use there, except in one specialized form: the Photo-CD.

4.1.4 Orange Book

Most CDs are of the **Read Only** type (*can only be read*, and not written to). The Orange Book Standard describes various processes for writing data onto a CD, which in the case of the CD-Recordable is also known as *burning*. The Orange Book also originated with Philips and Sony and was first published in 1991. The standard is divided into three main sections:

Part I describes the Compact Disc - Magneto Optical (CD-MO), also known as the Hybrid-CD. The CD-MO contains an internal recording area which is produced similar to the typical CD. Externally, there is an area which can be read magneto-optically, and which can be written to more than once. However, this area cannot be read by a normal CD scanner.

Part II describes the Compact Disc - Recordable or Compact Disc - Write Once (CD-R, CD-WO). This CD may also have an internal area which is produced in the typical manner. Contrary to the CD-MO, however, the external area is created in such a manner that it may be played back by any CD reading device. Generally, a CD-R possesses only this external area.

A CD-R may be written either as a whole or partially in several separate procedures which are known as sessions. One-time writing is described as a single session, while more than one writing is known as a multi-session. There are now also traditional CDs (silver) which are structured as multi-session CDs.

Part III is still in the standardization phase and describes the CD-ReWritable (CD-RW, formerly CD-Erasable). In contrast to the CD-R, this CD is not limited to just one writing, but may be erased and rewritten as often as desired. Nonetheless, the CD-RW cannot be read by every traditional CD reader, but rather only by those which are specially designed for CD-RW (known as CD-RW enabled CD players). It will be interesting to watch the future development of this technology.

4.1.5 White Book

The second-most recent standard is known as the White Book. It standardizes the video-CD. A video CD can store over 70 minutes of playing time through the compression of the video data (with MPEG 1). The quality is about the same as that of a VHS video recorder. It is not adequate for true movie quality with Dolby Surround. It will probably not be until the next generation - the DVD (Digital Versatile Disc, also frequently and incorrectly called Digital Video Disc) with its even greater memory capacity - that this type of quality will be achieved.

4.1.6 Blue Book

This is the most recent standard and was established in 1995. The Blue Book describes the Enhanced Music CD, often called merely CD-Enhanced, CD-Extra or simply by its logo, CD-Plus or CD +. The enhanced Music CD is always a multi-session CD, or - to be more precise - a two-session CD. The first session contains audio data as defined by CD-DA (Red Book), the second contains a CD-ROM (Yellow Book). This means that information other than audio data may also be stored on one medium.

4.2 Definition of Concepts

4.2.1 Tracks

Data items on a CD are not stored in concentric circles, as one might at first think. They are rather arranged in an extended spiral-shaped line whose origin is at the center of the CD. The line runs from the inside to the outside. Those sections on the spiral on which data items are located are called tracks. Up to 99 tracks may be stored on an Audio-CD. One track generally corresponds to one piece of music on the CD.

4.2.2 Sectors

The track itself is made up of units called sectors. A sector contains 2352 bytes, of which - depending on the type of CD used - a different number may be used for user data. The sector generally consists of a header, synchronization bits and user data. It may also have error recognition and correction data. To read a sector, a drive with single read speed requires 1/75th of a second.

4.2.3 Table of Contents

The initial area of the CD is physically located at the inside of the CD surface and is approximately 4 mm wide. It contains the Table of Contents of the CD (TOC) and other information about the CD, such as the name, the author or the date of the CD.

4.2.4 Single-Session, Multi-Session

The term multi-session practically speaks for itself. A multi-session CD was produced in several sessions, that is, recording procedures.

The individual sessions may have been written at random time intervals.

One session consists of at least one track.

A single-session CD is created in only one session, as the name implies. Audio-CDs are almost always single-session CDs, while CD-ROMs or Photo-CDs consist of one or more sessions.

4.2.5 Disc At Once, Track At Once

Today, we differentiate between two different recording technologies with CD-recorders: Disc At Once and Track At Once. Newer recorders generally support both technologies, while older devices frequently can only handle Track At Once.

For a recorder with Track At Once, every track is written separately. Therefore, pauses are unavoidably created between the tracks which cannot be influenced by the recording software. In contrast to this, with Disc At Once, the entire CD is written in one procedure, which allows more freedom for the recording software, but at the same time prevents subsequent modifications. For many formats (Audio-CD) Disc At Once is more logical, since unnecessary pauses can be avoided, while Track At Once is generally used for multi-session CDs.

4.3 Recording Formats

We will give you an overview of the most important recording formats in the following sections.

4.3.1 Audio-CD

In 1980, the Audio-CD was the first medium for storing information on a CD. The corresponding requirements are described in the Red Book. All CD-ROM drives typically available in the marketplace can also read Audio-CDs.

4.3.2 CD-ROM

It is impossible to imagine today's PC world without the CD-ROM. The technical foundations are exactly the same as with the Audio-CD, except that they have been extended by an error-correction process. Thus computer data may also be reliably processed on a CD-ROM drive.

4.3.3 ISO 9660

The logical structure of a CD-ROM is established by the ISO Standard 9660. Right after the publication of the Yellow Book Standard, the so-called High-Sierra format was developed which was the forerunner to ISO 9660 and provided its basis.

ISO 9660 describes how data items are to be organized on a CD. Among these are the rules which limit the the number of levels in the directory structure or the length of the file names. ISO 9660 is supported by most of today's common operating systems (Macintosh OS, MS-DOS, Windows, Unix). Most CDs correspond to this standard. It is only in the Macintosh environment that HFS CDs have established themselves as alternatives to this standard.

In order for an operating system to read a CD which was created as defined by with this standard, software is required which can read ISO 9660 files. For a computer running MS-DOS or Windows 3.x, the corresponding application is called MSCDEX.EXE. This is a driver which will ensure that the CD and the CD-ROM drive can communicate with each other. The driver must be loaded in both the AUTOEXEC.BAT and CONFIG.SYS system files separately. Windows 95 and the Macintosh operating system can both work with a CD as a standard feature.

ISO 9660 defines a directory structure which is designed from the outset in such a way that it can be used on as many different systems as possible. Therefore there are also stringent rules as to what file and directory names are allowed:

In a file or directory name, only the capital letters A through Z, the numbers 0 through 9 and the underline character may be used. The file name must contain exactly one dot, which comes between the actual name and the file extension. The name and the extension may not be missing at the same time. The maximum length of a file or directory name may not exceed 31 characters.

Because many operating systems (MS-DOS, Windows 3.x) are not capable of handling 31 characters, ISO 9660 defines a total of three levels of compatibility: Levels 1, 2 und 3:

For a CD-ROM as defined by Level 1, the following limitations are observed:

- The file name may not be longer than 8 characters.
- The file extension may not have more than 3 characters.
- Directory names may consist of a maximum of 8 characters.

A CD-ROM as defined by Level 2 does not have any limitations for file or directory names, but a file may not be fragmented.

However, this limitation does not exist at Level 3. For example, Level 3 may be used for incremental backups when only parts of a large file have been changed. It is not necessary in this case to completely re-

write the entire file. Instead, you can continue to use the old parts of the file already on the CD which are still valid.

There are expansions for many operating systems which attempt to store additional information in an ISO directory while not interfering with other systems. Examples of these are the **Rock-Ridge**-Expansions for Unix-Systems and the **Apple-ISO** Expansions. **Joliet**, which is defined by Microsoft, has significance here. It provides a second, complete directory structure in Unicode and is currently being used by Windows NT and Windows 95.

4.3.4 Mixed-Mode CD

The Mixed-Mode CD contains a data track (CD-ROM as defined by the Yellow Book) and one or more audio tracks (CD-DA as defined by the Red Book). The Mixed-Mode CD has the advantage that the audio data can be made directly audible with the help of earphones or an amplifier (if they can be connected) without the requirement for a soundcard or a processor insert.

The synchronization of sound and other data do present a problem. This problem, however, is eliminated by the CD-ROM/ XA. Another problem is that old CD players occasionally attempt to play the data track back as audio information, which can cause unpleasant noises and - if the noise level is high enough - may lead to the destruction of the loudspeaker. This problem is eliminated by the Enhanced Music CD.

4.3.5 Enhanced Music CD

The Enhanced Music CD is a combination of an Audio-CD in the first session and a CD-ROM in the second session. The CD-ROM must contain a directory as defined by ISO 9660 and certain specified files. Beyond that, any other kind of data may be stored on it.

Much to the regret of the experts, the correct designation - Enhanced Music CD - has not managed to catch on for this format. Along with Enhanced Music CD, the terms Enhanced CD, CD-Extra or CD Plus are also in use.

4.3.6 Photo-CD

The CD-I (Compact Disc Interactive) is defined in the Green Book. Unfortunately, CD-I is not quite CD-I. There is a wide range of applications for CD-I. Although in theory every CD-I should contain a program for playing the respective CD-I, this is not supported very well by many players. The most important application of the CD-I is the Photo-CD, which is not only capable of reproduction by CD-I or

Photo-CD players, but can also be processed by many computers, such as the Macintosh.

5 Nero

In this chapter you'll get better acquainted with **Nero**. You will learn the basics about how **Nero** works in the compilation of files. The user interface with its different windows and the burn process are also described here.

5.1 Basic Process

With **Nero**, the creation of a CD-ROM or an Audio CD is relatively simple. First, you'll need to decide which files should be written onto the CD. Then you can give your undivided attention to the ***compilation***. A compilation is created with **Nero** by the drag & drop method. Here, you'll select the files which you want from the File Browser and then drag them with the mouse into the compilation window. There, you can arrange your files in any way you wish or even insert new folders. The advantage here is that this arrangement does not have any influence on the physical file structure on the hard drive.

After the compilation is arranged the way you want it to be, you should run the ***speed test***. This test checks the access speed to the hard drive, or to the partition where the files which you want to be written are located. Depending on the results of this test, a speed for the simulation will be recommended. The ***simulation*** which will now follow (and it should always follow!) assumes this test result. By doing this, errors which might otherwise occur during the burn process may be detected and corrected. After a successful simulation, you can be relatively confident that the compilation you have created can also be written. The ***burn process*** itself takes place as the last step.

5.2 Terms and Concepts

During the preparation of data for the burn process, **Nero** follows the principles of a ***Virtual Image File***, as it is known. This file is a reference to all of the files which are to be written onto the CD during the burn process. We call this the ***compilation***, and the writing process which comes next is performed in a process known as '***On-The-Fly***'. Every compilation is stored as a compilation file. The name of this file will appear in the bar above the compilation window. It doesn't have any influence on the name of the CD which is to be created. With a CD-ROM, we refer to this as a CD-ROM compilation, and an Audio-

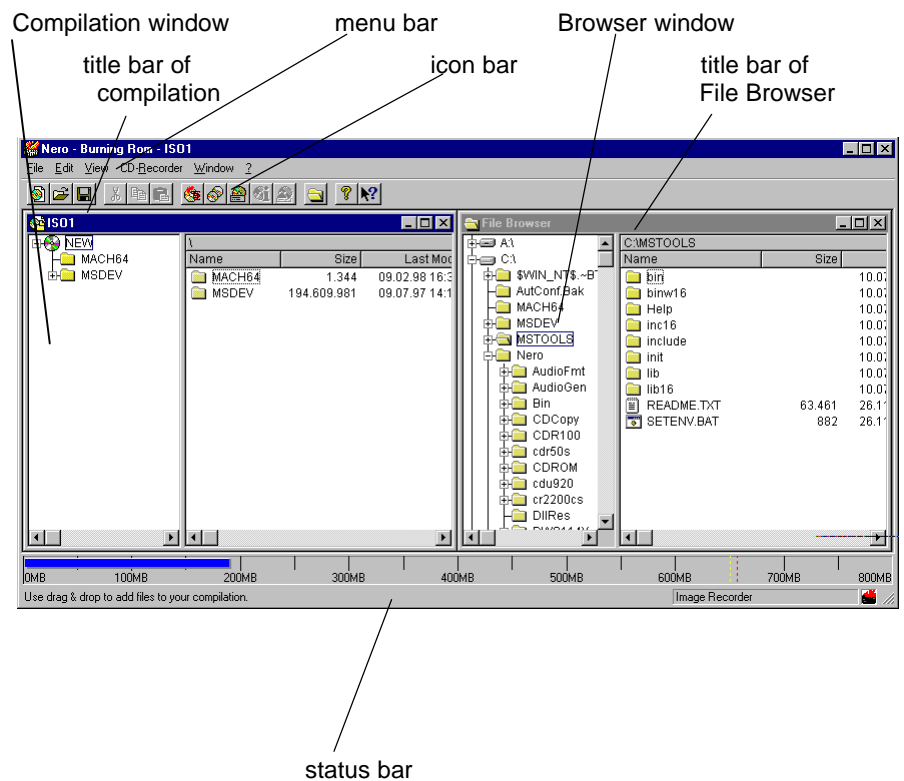
CD is called an Audio-CD compilation. Along with the file references which are to be written, a compilation contains additional necessary information which is written onto the CD.

The term *session* defines a connected or related writing process. We differentiate between *single-session* and *multi-session CDs*. Multi-session CDs are written in more than one burn process.

The *name of the data medium* (generally known as the *volume label*) relates to the entire CD. This is the name you will find when you look for the CD, when you display the CD through the Explorer, for instance.

5.3 User Interface

*The
Nero
interface*



This interface is a Multi-Document Interface, or MDI, for short. With MDI, there is a frame program which provides an outer window. This outer window continues as long as **Nero** is active. The menu bar, the toolbar and also the status bar are located here. Within this outer window, any number of "smaller" windows can be opened. By manipulation with the mouse, these windows can be changed in their size and location in any way you wish.

Title Bar

In the title bar, you will find the **Nero** system icon on the left, next to the product name. To the right of that you'll see the name of the current open file, and on the far right the three additional buttons which every Windows 95 application has.

If you click on the system icon in the upper left, the system menu field will open. You can perform different actions through this menu. On the other hand, if you double-click the symbol, the entire application is closed.



With the system menu, you can give commands to RESTORE, MOVE, change SIZE, MINIMIZE,

MAXIMIZE and CLOSE.

In the right-hand corner of the title bar, you will find the three buttons which provide for dimensioning of the main window. These buttons are typical of all Windows 95 applications. The left button is the symbol for the command to MINIMIZE. It is actuated by the mouse. A simple click is all it takes, and the window is then represented only as a small symbol in the task bar. In this way, you can easily put **Nero** aside and work with a different application. **Nero** continues to be active and the contents of the window aren't changed in any way. With the middle button, you can give the command for the FULL DISPLAY or maximize. This is represented symbolically by a single small window or two windows that are overlapping. When this button shows a single small window, a click on it will fill the entire screen with **Nero's** main window. When it is two overlapping windows, a click will reduce the main window so that it only fills part of the screen. On the far right is a button with an X. When you click this button **Nero** is closed. If changes have been made to a compilation, a message box will be displayed in which you can decide whether the changes should be saved or not. The functions just described are just the same for other windows within **Nero**.

You can also change the size of the window if you use the mouse to double click on the title bar. If the window was a full screen, it will be reduced after the double click. Just the reverse, if the window was reduced, a double click maximizes it.



Other options are available to you for individually changing the size of the window:

- Window borders can all be dragged to size the window in any direction (down/up or right/left).
- If you "grab" the window at a corner with the mouse, you can change its size by dragging it to the height or width you wish.

If the window is not a full screen on the desktop, it can be moved with the mouse. Just click on the title bar, hold the left mouse button down and you can drag the entire window into the position you want.

5.3.1 Menu Bar

As is typical with Windows programs, you will find the menu bar below the title bar. With **Nero**, there are a total of six menu items here. Each menu item represents a specific group of options, each of which carries out a specific function. In order to access the options within a menu item, you must first open the menu. This is done by clicking on the menu item in the bar with the mouse. The menu selections are displayed. In order to activate the function, place the mouse pointer on the desired menu option and click on it.

You may also use the ALT key to do this. When you do this, the FILE menu is highlighted as the default. Using the cursor, you can then select the desired menu item and then press the Enter key. The menu selections are displayed. You can move to the individual menu commands with the cursor. Press the Enter key again in order to open the corresponding function. You can also use the keyboard in order to invoke a menu item directly by holding down the ALT key and pressing the underlined letter of the menu item. For example, the keyboard combination ALT + R opens the CD-Recorder menu item directly.

The *menu bar* contains the following items:

File	In the FILE menu, you will find the typical commands such as OPEN, CLOSE, PRINT and EXIT. In addition, there is a command to WRITE CD and a command to retrieve detailed information about your compilation.
Edit	The EDIT menu provides familiar menu items such as Copy, Paste, and others.
View	With this menu, you may determine which toolbars will be displayed as defaults and how the contents of the Nero windows will be displayed. You may also activate an additional File Browser.
CD-	In this menu, you will find instructions which concern

Recorder	the CD-Recorder and the CD which is inserted into it.
Window	You will find commands here which are typical to Windows, such as the way the individual windows are arranged.
?	The ? Menu finally, (HELP) provides you with an On-line Help function and product information about Nero , its version number and the copyright.

5.3.2 Toolbar

You can conveniently access the most important functions and commands through **Nero's** toolbar. There is no need for you to memorize the individual functions which are represented by the icons. You will already know a few of them from other Windows applications. You'll get used to the others quickly.

With the help of the mouse, you can quickly get information about the function of a specific icon. Just move the mouse pointer onto the icon, and an information box will be displayed which provides you with the most important explanations about this function.

Below, you will find a quick review of all of the icons with their names and functions.

New	Creates a new compilation.
Open	Opens an existing compilation.
Save	Saves the active compilation.
Cut	Cuts the selection and puts it on the clipboard.
Copy	Copies the selection and puts it on the clipboard.
Paste	Inserts the contents of the clipboard.
Write CD	Opens the WRITE CD dialog box.
Recorder	Chooses a recorder driver.
CD-Info	Displays information about the CD.
Eject	Ejects the CD.
File Browser	Opens a new window for the File Browser.
Info	Displays program and copyright information, and the version number.
Help	Help (Direct help)

5.3.3 Status Bar

You will find the status bar on the lower border of **Nero's** user interface. This bar displays different messages. Since hiding the status bar does not provide a significant increase in desktop space, and since helpful information is displayed here during your work with **Nero**, you should always keep the status bar open.

The left field of the status bar displays context-dependent messages which relate to the selected commands in the pulldown menus of the menu bar. For example, when you open the CD-RECORDER menu item and select the command CHOOSE RECORDER, this command is displayed on the status bar. In the right-hand field of the status bar, you will see the name of the connected CD-recorder.

5.3.4 Right Mouse Button - Context-Related Menus

You can invoke context menus for **Nero** windows with the right mouse button. Context menus (object menus) are menus which are related to the individual windows. They contain the most frequently-used commands of the respective windows, of the view within the window or of the file(s) or folders which are currently selected.

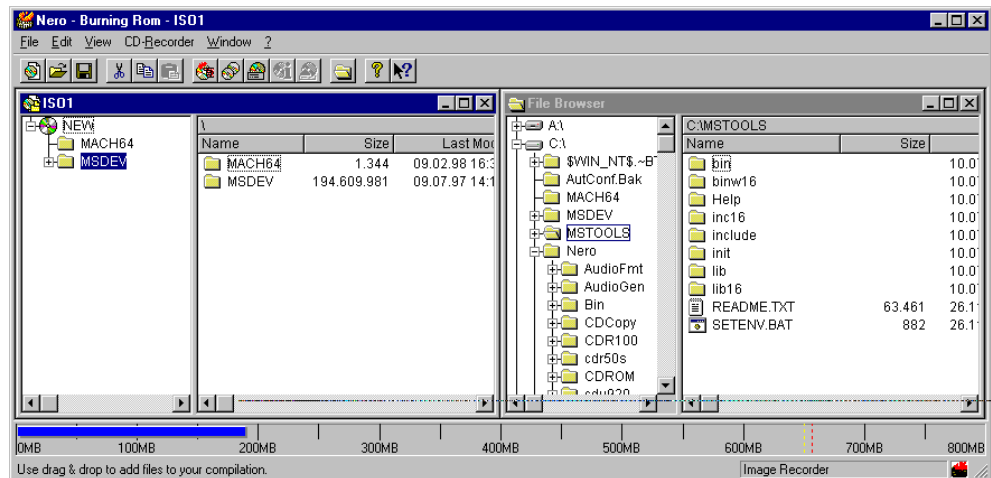
5.3.5 Nero Windows

Nero employs three different types of windows: the *File Browser*, the *Compilation Window* for **CD-ROM** and the *Audio-CD Compilation Window*.

5.3.5.1 The File Browser Window

The following illustration shows **Nero's** File Browser. Its window is divided into two panes: The directory structure of your computer is displayed in the left window pane: The corresponding folders and files are shown in the right pane. Here, you will find additional information concerning the size, the last modification date and the attributes of the files. The way the information is represented is very similar to the Explorer of Windows 95.

The Nero File Browser



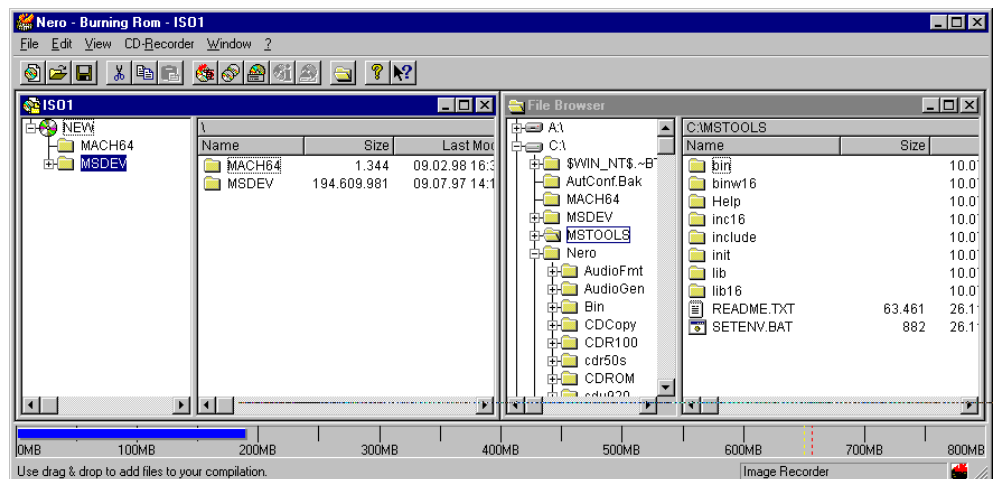
As an alternative to using **Nero's** own File Browser, you may also use the Explorer or File Manager. Just activate it outside of **Nero**, and the procedure from there is the same: Select the desired files and use the mouse to drag & drop them into the appropriate compilation window. When using the Explorer from Windows 95 or the File Manager from Windows 3.1, you must be careful that you do not move the files on the hard drive by mistake. With the **Nero** File Browser, that can't happen. It doesn't allow any physical change of the selected folders or files on the hard drive.

5.3.5.2 The CD-ROM Compilation Window

The structure of the CD-ROM compilation window corresponds essentially to that of the File Browser. In the left window pane, you will see the directory structure of the CD-ROM compilations. Their files and folders are displayed in the right pane.

You can use drag & drop to move folders and files within a compilation window and to rearrange them any way you wish. If you want to insert new folders or files, just select the target directory, and then give the ADD FILE command in the EDIT menu. In addition you can delete folders or change their name the same way you do that in Windows.

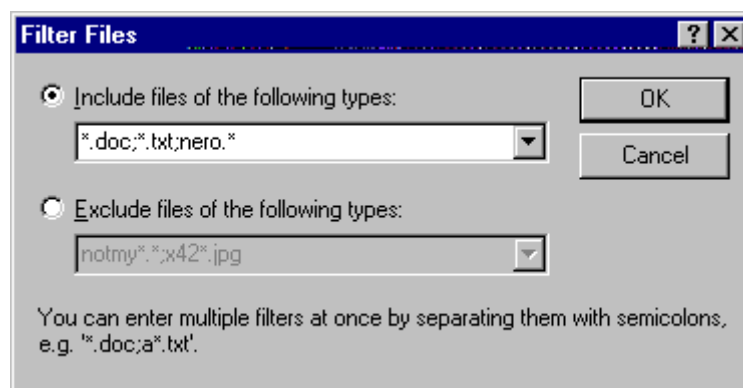
The *CD-ROM* Compilation window



If you drag the folders and files from **Nero's** own File Browser using the right mouse button, you can filter the files which will be added to the compilation. You can alternatively include or exclude files of different types:

- Include files: Input the type of files you want to allow in your compilation, e.g. **.txt* : all existing files of TXT type will appear in your compilation. You also have the possibility to enter multiple filters at once by separating them with semicolons, e.g. **.txt;*.xls;*.doc* : all files of TXT, XLS and DOC type will appear in your compilation.
- Exclude files: Input the type of files you don't want to allow in your compilation, e.g. **.txt* : all existing files of TXT type will not appear in your compilation. You also have the possibility to enter multiple filters at once by separating them with semicolons.

Filtering files

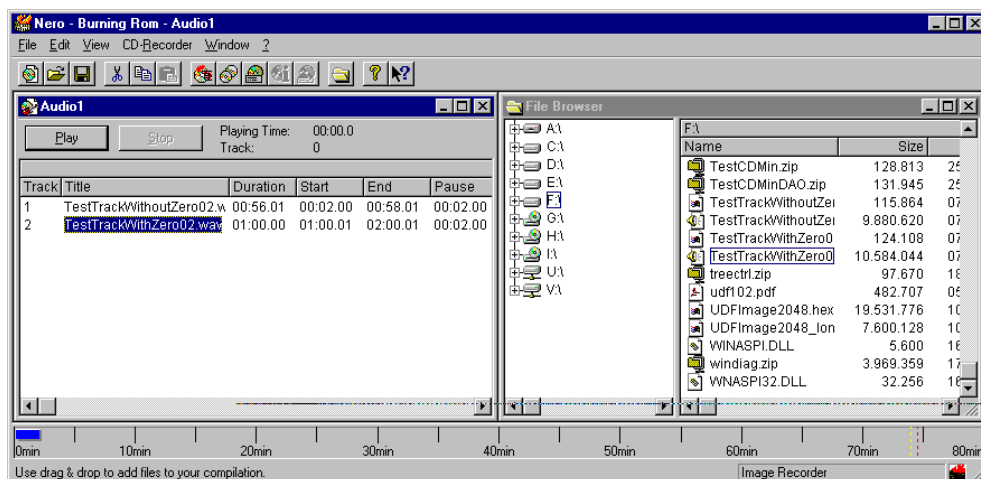


5.3.5.3 The Audio-CD Compilation Window

The Audio-CD compilation window corresponds in its functions to the CD-ROM window, but it has different parameters. An important prerequisite for creating Audio CDs with **Nero** is that the music files are available in WAV format with 44.1 kHz and 16-bit stereo. The audio files are also moved into the Audio-CD compilation window

using drag & drop. After you have moved a WAV file into the compilation window, related information such as track, title and length is displayed in the lower window pane. By clicking the PLAY button, you can play the contents of the file, assuming you have a sound card, have connected a loudspeaker and selected the track. You can also select all of the titles in the compilation window and play them back in sequence. You can use the STOP button to discontinue playing.

The *Audio-CD compilation* window



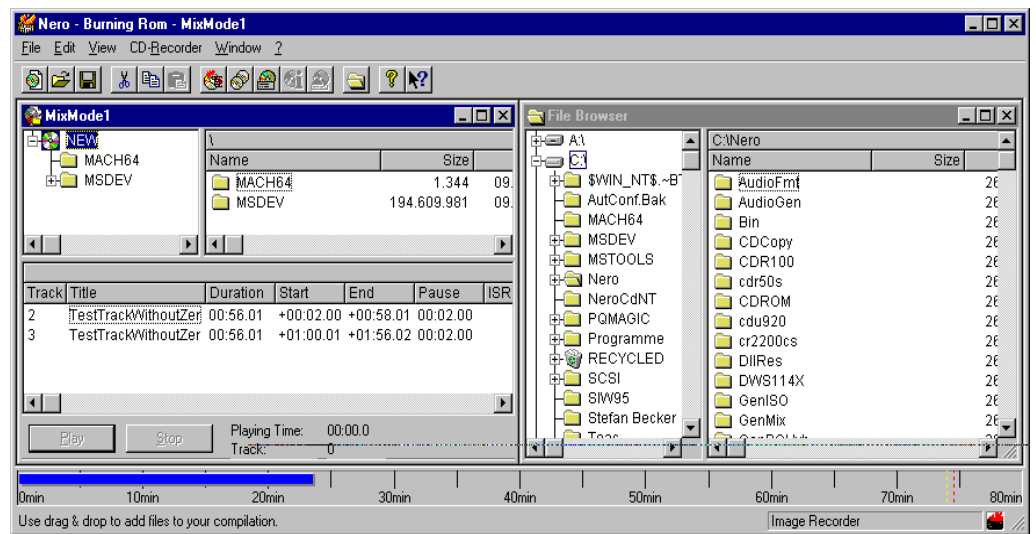
5.3.5.4 The Mixed-Mode-CD Compilation Window

The Mixed Mode CD compilation window combines the two windows, CD-ROM and Audio-CD, into one window with two separate sections. The data section is in the upper part of the window and the audio section is in the lower part of the window.

The standardized form of a Mixed-Mode CD consists of a single data track (the first track) and up to 98 audio tracks. Your mixed mode compilation must contain tracks of CD-ROM and audio tracks. The CD should be written in one session.

The functions and prerequisites described in the previous two sections “The CD-ROM Compilation Window” and “The Audio-CD Compilation Window” can be used in their corresponding sections in the Mixed Mode Compilation Window as well.

The *Mixed-Mode-CD* Compilation window



5.3.5.5 The Multisession-CD Compilation Window

The Multisession- CD Compilation Window corresponds to the CD-ROM Compilation Window.

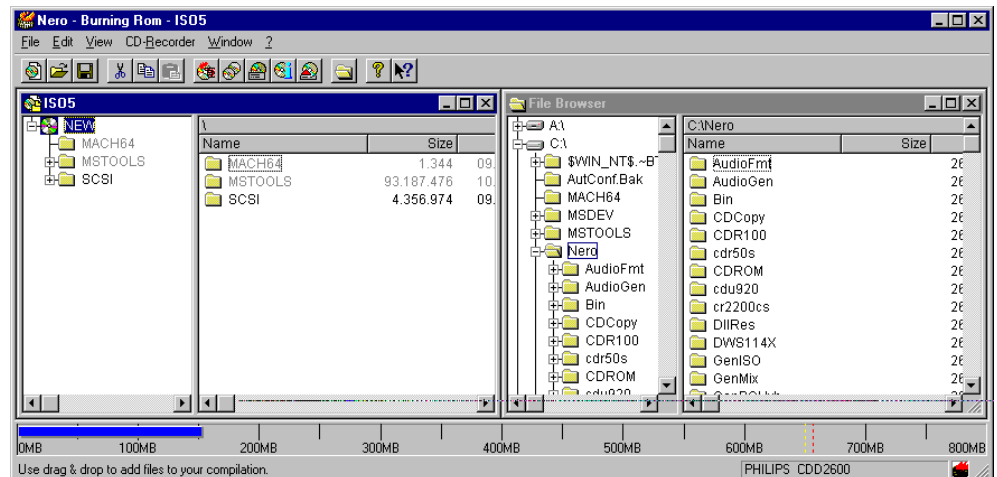
Information about files and folders such as origin, length, etc... are displayed.

Folders and files shown in black means: they have been changed or recorded on your hard disc since your last session. They will be recorded on your CD now. Folders and files shown in grey means that they are already on your CD. They have been recorded during your last session. They are not going to be physically rewritten.

Which files or folders will be written in black or grey depends on the options selected in the multisession property sheet.

Like in the audio compilation or CD ROM compilation, you can use drag & drop to move any kind of datafile within the multisession compilation window or to add some files from the explorer.

The *Multisession-CD* Compilation window



5.4 Finally: Nero burns...

After you have completed your compilation (CD-ROM or Audio-CD), it can be written or burned onto a CD. You should always perform the simulation before the actual burn process, because this significantly increases the probability that errors will not occur during the burn process - errors which generally mean that the CD will no longer be usable.

Beyond this, you should make every effort to ensure that ***no*** - and truly



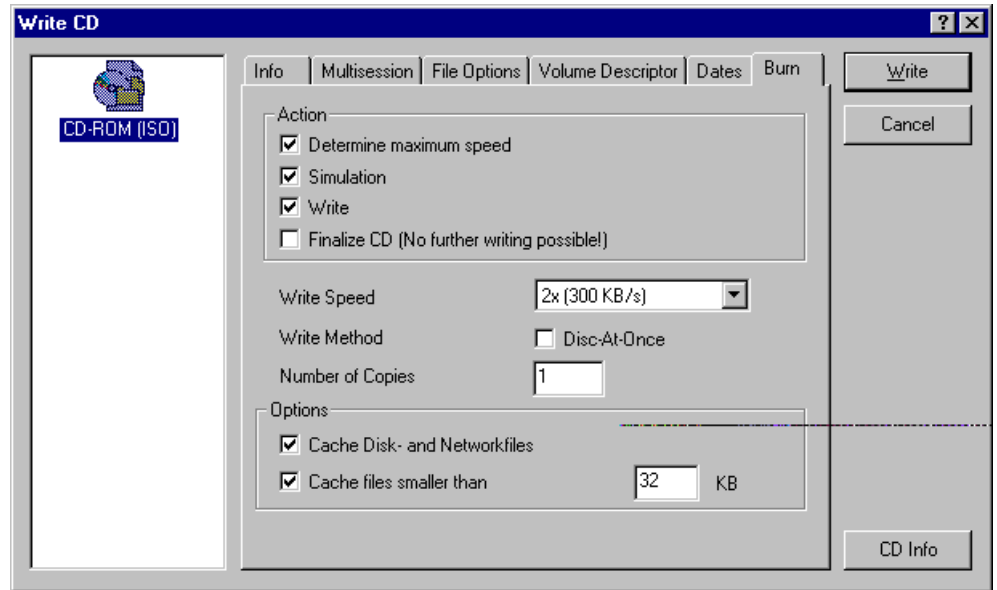
no - ***additional applications*** are active during the simulation and burn processes. Even "simple" applications can lead to problems during the burn process with PCs that have less than 16 MB of RAM. Therefore, always be sure that all other applications are closed before you begin to burn the CD.

5.4.1 Burn Dialog

In the **Write CD** dialog box, you will find five property sheets: GENERAL, INFO, VOLUME DESCRIPTION, FILE OPTIONS and BURN. The first four property sheets are described in more detail in the Reference chapter. They contain additional information and data which you may write onto the CD together with the selected files, if you wish. In the following section only the BURN property sheet, which contains all of the steps for the burn process with preferences, will be discussed in detail.

We will give you a survey of one complete burn process using the example of a CD-ROM compilation.

The dialog box
Write CD



You may select all of the steps concurrently in this dialog. The actual phases are then carried out in a logical sequence. If one of the tests should uncover errors, you'll find them in the Error Log, and a warning is displayed on the screen.

You can confirm that you are ready with the **WRITE** button in the upper right corner. A window will open following at this time which we will explain in detail during the burn process. Information concerning the different processes while they run is displayed in the status window which is subsequently opened.

5.4.2 Write Speed Test

The Write Speed test function is already selected as a default. This step tests the transfer speed of the data which you have selected in your window for the compilation. The result of the Write Speed test is an indication of the lowest-detected transfer speed which gives the setting for the following simulation run, or - if you choose - for the burn process to follow.

5.4.3 Simulation

In order to start the simulation of the burn process, click on the **SIMULATE** button in the right window pane. **Nero** now simulates the actual burn process. If you elected to forego the Write Speed test, the write speed which is set as a default will be used during the simulation. You will find additional details concerning the simulation in the description of the burn process.

5.4.4 Writing methods

There are two writing methods: track-at-once and disc-at-once. If the option "disc-at-once" is not checked, your CD will be written in track-at-once.

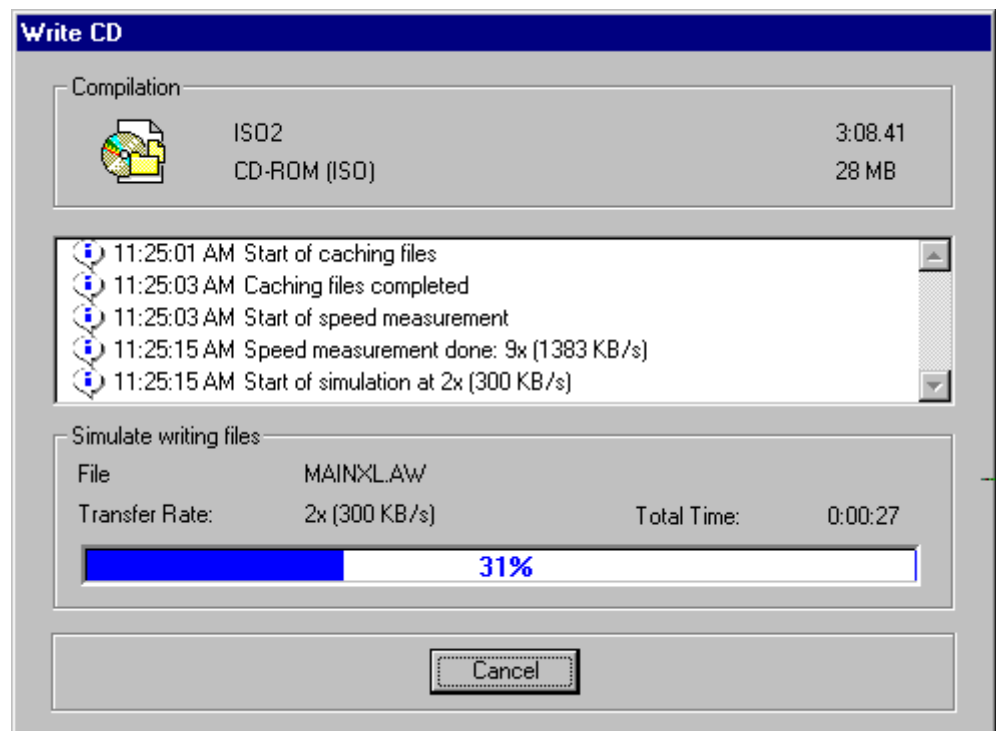
The disc-at-once option will be always selected as default, if your recorder supports this feature and if the format of the CD, you want to record, is Audio. The reason disc-at-once is automatically selected is that this is the best writing method for audio CD because unnecessary pauses can be avoided. Since the CD will be finalized with the disc-at-once, we recommend to deactivate this option, for example, if you just want to write a few tracks to the CD.

Note: when deactivating the disc-at-once option, be careful: the "Finalize CD" button will be automatically enabled and checked. So deactivate this option if you want to continue writing your CD at a later time!

5.4.5 Burn Process (Write process)

The burn process differs from the simulation in only one way: the CD is actually written now, that is, the laser is switched on. During processing, you will receive the same information as during the simulation, with the only exception that the burn process is finalized by the phase which writes the table of contents (TOC).

The status window of the burn process - here during simulation



The status window of the burn process (or of the preliminary test) provides you with the following information:

- In the upper window pane, you will find a field with information concerning your *compilation* such as the name of the compilation, actual file size, etc.
- The next block of information shows you a listing of the process phases and their results. These steps depend upon your selections in the previous dialogs.
- In the next pane you will find the field which indicates the current phase. Here, you will learn more about the process running at the time, such as how far the simulation process has proceeded at the moment, which file is currently being tested, etc. Here, **Nero** also shows you the progress of the current sub-process in a bar graph. You can cancel the simulation at any time using the CANCEL button.



Remember this: In contrast to the simulation, you cannot interrupt the burn process at any time. **Nero** does not allow you to CANCEL here, either. Any interruption would have as a consequence that the CD could no longer be read, nor could it be written to. The reason for this lies in the table of contents (TOC) which would be missing, and which is always burned as the last step of the burn process. If the table of contents is missing, then the data already burned can no longer be accessed and a subsequent session could not be added.

After this step (burning) has been successfully run, you have created a CD or a session of the CD. After each burn process, the CD is automatically ejected.

6 Step by Step

In this chapter, we will show you step by step how you use **Nero** to create and write a CD-ROM, an Audio-CD, an image file, a Mixed Mode CD, a Multisession CD and how to make CD Copy. For detailed information, please refer to the *Reference* chapter.

6.1 CD-ROM

1. Click on the CD-ROM (ISO) icon in the *New Compilation* dialog window which opens after you start **Nero**.

If you have already opened **Nero**, you can also reach this dialog window through the icon for "New Compilation."

On the property sheets - *File Options* is on the top - you can establish properties of the compilation such as the name of the CD and other characteristics and limitations.

2. Now click on the *New* button at the right.

The corresponding blank compilation window for CD-ROM opens.

3. Using *Drag & Drop*, compile the files for the CD by clicking on the desired files in the File Browser with the mouse and then dragging them into the compilation window.

If the File Browser has not yet been opened, you can do that now by entering the **VIEW> New File Browser** command or by clicking on the File Browser icon.

Within the compilation, you can insert any additional folders which you want (*EDIT> Create Folder*) or move files as desired (click and drag).

4. Save the compilation now so that you can use it again at a later time. To save, click on the *FILE> Save* menu option or click the corresponding icon.

The compilation name is prompted as the file name in the *File Name* field of the window which is opened now. You may replace this prompted name by simply writing over it. Click on the *Save* button.

5. Now open the *Write* dialog. The easiest way to do this is to click on the Write CD icon in the toolbar. You will then go to the *Write CD* dialog box, which will undoubtedly look familiar to you: it is the same box which you saw for the creation of a new compilation, only now the *Burn* property sheet is shown on the top. You will see several boxes, some of which are already selected. *Determine maximum speed* and *Simulate* are already selected, and you may now also select *Write*.
6. If you wish to create a CD-ROM as a single session, you must click on the *Finalize CD* box. Do not click this box for a session of a multi-



session CD, unless it is the last session. The CD is write-protected after this.

You may now check over all of the settings on this and the other property sheets and make any necessary changes.

7. Now you may confirm your selections by clicking on the **Write** button. All of the selected steps will now be carried out in sequence up to the write process. So that you can follow exactly what is happening, a status window is displayed in which the individual steps are listed. As a last step, you will see a message like "Burn process was successful with 2x (300 KB/s)." Finally, the CD will be ejected.
8. You may now check to see for yourself what was written onto your new CD by re-inserting the CD and clicking on the **CD-Info** icon.

6.2 Audio-CD

To write your own Audio CD, you can choose between two methods:

- The first one "Fehler! Verweisquelle konnte nicht gefunden werden." allows you to extract audio files from several CDs but you will have first to save them as .wav files on your hard disc. This method requires to have enough space on your hard disc since about 10 MB are needed to save one minute of music! Once the files have been saved on your hard disc, you will be able to write your audio compilation in **Disc-at-Once mode**. Using the Disc-at-Once recording mode, you will be able to make use of features such as variable pause length settings, index setting....
- The second one "Fehler! Verweisquelle konnte nicht gefunden werden." allows you to extract audio files (.cda) on-the-fly from several CDs, without having to save them first on your hard disc. This method requires **Track-at-Once recording mode**. This means that you will not be able to make use of some features of your CD recorder (e.g: variable pause length, CD Text or index setting) since such features are only available in disc-at-once mode. The reason why you are able to burn such a compilation only in track-at-once mode, is that during the writing process, you may have e.g. to insert several source CDs in your CD recorder if the selected audio tracks come from different CDs. This means that the CD recorder would have "to wait" before writing the next track: you would get then a buffer underrun and the CD wouldn't be readable.

6.2.1 Saving an audio track as a Wav.file

1. Insert an Audio CD in your recorder
2. Now select the *CD recorder>Save track menu*
3. All the information concerning your CD will be displayed in the Save track window: tracks, length,...
4. Select the tracks you which to save as a Wav-file and press the Save as a wavfile button. The Save as window opens.
5. Input now the name under which these sound files should be stored. Default is **track + chosen track number** (from window) and „**WAV**“. You can choose another name. :WAV will be added by **NERO**

6. After pressing the *Save* button, the Writing Wav file window opens. This window shows you the remaining time, % completed and the succesful copy - or not.

Now you can create and burn your own CD:



1. Click on the Audio-CD icon in the *New Compilation* dialog window which opens after you start **Nero**.

If you have already opened **Nero**, you can also reach this dialog window through the icon for "New Compilation."

On the property sheets - the *Audio-CD* card is on the top - you can establish properties of the compilation such as the name of the CD and other characteristics and limitations.

2. Now click on the *New* button at the right.

The corresponding blank compilation window for Audio-CD opens.

3. Using *Drag & Drop*, compile the WAV files for the Audio-CD by clicking on the desired files in the File Browser with the mouse and then dragging them into the compilation window.

If the file browser has not yet been opened, you can do that now by entering the **VIEW> New File Browser** command or by clicking on the File Browser icon.

4. Save the compilation now so that you can use it at a later time. To do this, click on the **FILE> Save** command or the corresponding icon.

The compilation name is prompted as the file name in the *File Name* field of the window which is opened now. You may replace this prompted name by simply writing over it. Then click on the *Save* button.

5. Now open the *Write* dialog. The easiest way to do this is to click on the Write CD icon in the tool-



bar. You will then go to the *Write CD* dialog box, which will undoubtedly look familiar to you: it is the same box which you saw for the creation of a new compilation, only now the *Burn* property sheet is shown on the top. You will see several boxes, some of which are already selected. *Determine maximum speed* and *Simulate* are already selected, and you may now also select *Write*. Since an Audio-CD as defined by the Red Book Standard is always a single-session CD, the *Finalize CD* box is selected.

You may now check over all of the settings on this and the other property sheets and make any necessary changes.

6. Now you may confirm your selections by clicking on the *Write* button. All of the selected steps will now be carried out in sequence up to the burn process. So that you can follow exactly what is happening, a status window is displayed in which the individual steps are listed. As a last step, you will see a message like "Burn process was successful with 4x (300 KB/s)." Finally, the CD will be ejected.

7. You may now check to see for yourself what was written onto your new CD by re-inserting the CD and clicking on the **CD-Info** icon.

6.2.2 Compiling audio tracks using drag & drop

1. Click on the *Audio-CD* icon in the *New Compilation* dialog window which opens after you start Nero. If you have already opened Nero, you can reach this dialog window through the icon for *New Compilation*.
2. On the property sheets, the *Audio-CD* card is on the top.
3. Now click on the *New* button at the right.
The corresponding blank compilation window for Audio CD opens.
4. If the File Browser has not yet been opened, you can do that now by entering the *VIEW>New File Browser* command or by clicking on the File Browser icon.
5. Insert in your CD ROM drive the first CD you want to extract audio tracks from.
6. In the Nero file browser or in the Explorer click on the drive letter corresponding to the drive you insert the original CD in. The contents of your CD will be displayed.
7. Using drag&drop, compile the files by clicking on the desired files with the mouse and then dragging them into the audio compilation window.
Note: By compiling the selected audio tracks, Nero will analyse the tracks information. You will be asked to give a name to each CD you want to extract audio tracks from.
8. If you want to extract audio files from a second CD, just insert now the second CD and compile the files in the same way you did it in step 6. If the first CD you have inserted was the only CD you wanted to extract files from, just continue with step 9.
9. Once you have compiled all audio data, open the *Write CD* dialog. The easiest way to do this is to click on the Write CD icon in the toolbar. You will then go to the Write CD dialog box, which will undoubtedly look familiar to you: it is the same box which you saw for the creation of a new compilation, only now the *Burn* property sheet is shown on the top.
10. You will see several boxes, of which some have already been selected. All of the preferences may now be examined and changed if necessary.
Important: Audio data that have been compiled on-the-fly without being first saved as wave files, can only be written in track-at-once mode. This means that you will not be able to make use of some features of your CD recorder (e.g: CD Text, variable pause length, or index setting) since such features are only available in disc-at-once mode.
11. Confirm by clicking on *Write*.



12. If the compiled audio tracks have been extracted from several CDs, a message will be displayed during the burn process asking you to insert the CD corresponding to the track Nero is ready to write.
13. Finally, the CD will be ejected.
14. You may now check to see for yourself what was written onto your new CD by re-inserting the CD and clicking on the **CD info** icon.

6.3 Image File

Processing of an image file consists of two independent steps. In the first step, the image file is created and saved as a file instead of being written immediately onto a CD. In the second step, this image file is written onto a CD.

6.3.1 Creating the Image File

1. Select Image Recorder from the **CD-RECORDER> Choose Recorder** menu and confirm your selection by clicking on **OK**.
2. Create a CD-ROM or an audio compilation as described above in Points 1 through 4.



3. Open the **Write dialog**. The easiest way to do this is to click on the Write CD icon in the toolbar. You will then go to the **Write CD** dialog box, which will undoubtedly look familiar to you: it is the same box which you saw for the creation of a new compilation, only now the **Burn** property sheet is shown on the top. You will see several boxes, some of which are already selected. **Determine maximum speed** and **Simulate** are already selected. In the case of an image file, however, it is enough to only select the **Write** box. You can deactivate the other steps by clicking on them. You may now check over all of the settings on this and the other property sheets and make any necessary changes.
4. You may now confirm your selections by clicking on the **Write** button. The **Save Image File** dialog box opens. Here, you can enter a file name for the image file. The files of your compilation will be written into this file. In other words, you need as much space for the image file as the total size of the files of the compilation.

6.3.2 Writing the Image File

1. If you wish to write a previously-created Image File (refer to 6.3.1) select **File> Write CD-Image** from the menu. The **Open** list box will open and display the existing NRG files (image files) for you. Select the file you wish from the list and confirm your selection with the **Open** command. You will then go to the **Write CD** dialog box, and the **Burn**

property sheet will be shown on top. From here, the procedure is the same as for writing a CD-ROM or an Audio-CD compilation. You will see several boxes, of which some have already been selected. **Determine maximum speed** and **Simulate** are already selected, and you may now also select **Write**.

All of the preferences may now be examined and changed if necessary.

2. You may now confirm your selections by clicking on the **Write** button. All of the selected steps will now be carried out in sequence up to the burn process. So that you can follow exactly what is happening, a status window is displayed in which the individual steps are listed. As a last step, you will see a message like "Burn process was successful with 2x (300 KB/s)." Finally, the CD will be ejected.
3. You may now check to see for yourself what was written onto your CD by re-inserting the CD and clicking on the **CD-Info** icon.

6.3.3 Saving data tracks using an image file

The purpose of saving audio tracks into wave file is obvious. They can be used to create personal „best of“ Audio CDs. But Nero can store mode 1 data tracks too. The result will be a **Nero** CD image file which can be burned afterwards. But what the heck is this good for if the same effect can be achieved by copying files onto the harddisk and burning them later as an ISO compilation? Well, storing data tracks into an image file surely makes sense because it has some advantages compared with the more „traditional“ method of copying files and burning them as an ISO compilation:

- 1) You can store data tracks containing another file system than PC's standard ISO! For example they could be Apple Macintosh HFS tracks or the so called „Hybrid CDs“ containing HFS and ISO data in a single track! The Macintosh information would be lost forever if files were burned as an ISO compilation. Saving the track and burning the resulting image file preserves all this additional data! The same argument is true for the „Apple ISO Extensions“ or the „Rockridge ISO Extensions“!
- 2) The **Nero** image files created by the command *Save track can be burned on non-empty CDs*. Furthermore the CDs don't have to be fixated after burning! Both mentioned advantages together make it possible to create CDs containing all the information of several „small“ (containing only some megabytes of data) CDs. Taking a look at some „silver CDs“ containing PC or Apple Macintosh software will show you, that most „silver“ CD ROMs are more or less „empty“ taking account of the fact that up to 640MB can be stored on a standard CD ROM. So why not combining several CDs on one writeable „golden CD“? Each „Sub-CD“ (or track) can be accessed easily from Windows through **Nero's Multi Mounter**. Enough theory. If you want to create such a „multivolume CD“ save all

desired CDs as a **Nero** CD image file using the menu command *Save track*. Then burn them one by one onto a writeable CD. Those multivolume CDs also have further important advantages compared with the CDs created by the „traditional“ method of copying CDs into folders and burning them all together as a single ISO compilation: There won't be any file name collisions concerning the famous „Autorun.Inf“ and „Setup.exe“ files and even those installers relying on a special volume name will do their job perfectly!

- 3) You possibly can copy multisession CDs which **Nero** normally can't copy! The procedure is straightforward: copy all tracks into **Nero** image files using the method mentioned in point 2) of this text. Then burn them on an empty CD. Unfortunately there is an important restriction for this method of copying multisession CDs: Those tracks containing links to other tracks may not be stored into a **Nero** CD image! The reason for this important restriction is the fact, that images created from linked multisession tracks would not contain all referenced files and folders! So if you tried to burn such a track onto a different CD everything would appear to be in perfect order until the very moment when you tried to read one of those files not contained in the original CD track. The result would be just read errors or junk data because the track link now would refer to some „nirvana“ (Hi Kurt, what's it like to play guitar on cloud nine?) CD sector. To avoid these rather disastrous consequences storing of linked multisession tracks is generally prohibited in **Nero**.

Some information concerning the implementation of the *Save track* command in **Nero**: As first step **Nero** tries to analyze the data track to gather information about the file system stored in the selected data track. Then all CD sectors from this track are written into the **Nero** CD image file. Finally the image file is processed to allow this image to be written onto a non-empty CD. For the experts among the **Nero** users: An ISO filesystem must be relocated if it is to be burned onto a different (non-zero) start sector of a CD. But don't be afraid. **Nero** will do all this „dirty work“ for you.

Important Note: **Nero** can store ISO, Joliet, Macintosh HFS- and Hybrid (which is ISO and HFS) CD tracks into an image file. But if the image file (resp. the original CD track) contains a different file system unknown to **Nero** (like native Unix filesystems or others) the result of burning this image onto a non-empty CD may be corrupted data. If it works or not depends on the kind of file system stored in the data track. For some file systems this might work and for others the result will just be corrupted data. But you can be sure to get correct results if the track contains one of the mentioned file systems: ISO, Joliet, HFS or Hybrid. Almost every available CD for PC or Apple Macin-

tosh is created using these file systems. By the way: the kind of track is displayed in the track list dialog appearing after selecting the menu command *Save track*. If the track is shown as „Data mode 1“ without any further information, then **Nero** won't be able to give any guarantees about the resulting CD. But **Nero** leaves you the freedom to decide whether you want to store those unknown tracks into a **Nero** image or not. Only an alert box is displayed to remind you of the risk.

6.4 CD-Copy

6.4.1 CD Copy - methods

It's hard to give general advice on when to use „on the fly“ and when to use „image copy“. The following list can give you some hints:

You may choose the „image copy“ if you:

- want the best possible reproduction (especially concerning audio tracks)
- have enough time for an image copy which takes somewhat longer than an „on the fly“ copy
- have enough free space on a harddisk to store the CD image (you will possibly need several hundred megabytes!)
- want to write multiple copies of a CD
- expect read errors on the source CD (for example if you can see scratches or dust on the disc)
- want to copy mixed mode (a data track and one or more audio tracks) CDs. This is because some CD-ROM drives have a unholy tendency to „hang up“ (that means they don't respond any longer to SCSI/DIE commands most likely crashing your computer) while reading blocks between the data and the audio track of a mixed mode CD. If this happens while an „on the fly“ copy takes place your destination CD will be crushed by a buffer underrun.

You may choose the „on the fly“ copy if you:

- don't have much time
- don't have enough free space on your harddisk (hint: 1 minute of audio takes about 10 MB and a CD image file may be several hundred MB long!)
- want to copy a CD-ROM (no audio tracks) and trust the error correction capabilities of your CD-ROM drive
- want to copy mixed mode (a data track and one or more audio tracks) CDs and are pretty sure (by experience?) that your CD-ROM drive will read audio tracks perfectly and won't „hang up“ (see above) between the data and audio track of a mixed mode CD
- don't care if audio index positions get lost
- have lots of empty CD recordables ☺
- **Nero** versions 3.0 or higher are capable of burning „on the fly“ copies using a CD-ROM drive as input device. You don't need several hundred

megabytes of free volume space on your harddisk any longer and will be able to copy CDs much faster. That's the good news.

6.4.2 The image copy

Nero reads the original CD from the recorder and then creates and saves an image file, with the contents of your CD, to e.g. your hard disk. In a third step, **Nero** writes the image file onto a blank CD.

This gives you a very high reliability for copies, because you will be able to select options such as *jitter correction* (if a read error has been detected, **Nero** will automatically slow down the read process, and read again the audio track). These options could not be used, if you copy a CD on-the-fly from a CD-ROM drive!

This method of CD Copy has shown the highest reliability of all different copy-methods: your CD will perform as expected!

1. Insert the original CD in your recorder (the source drive has to be your recorder). **Nero** allows you to backup CDs such as: Audio CDs, CD-ROM, Games CDs, Video CDs, and Mixed-Mode CDs. If your original CD is a Multisession CD or a blank disc, a message will be displayed and you will have to insert again a CD allowed by **Nero**.
2. Click on the CD-Copy icon in the *New Compilation* dialog window which opens after you start **Nero**. If you have already opened **Nero**, you can reach this dialog window through the icon for "New Compilation".

On the property sheets, the *Burn* card is on the top.

Important: if you are missing the CD Copy icon, please make sure that you have not chosen the image recorder and that the recorder has not been started after the operating system. Please start always your recorder before.

3. By clicking on the *CD Copy* button, the *Write CD* dialog box will open..
4. Now you may confirm by clicking on the *Copy CD* button. All of the selected steps will now be carried out in sequence including the burn process. So that you can follow exactly what is happening, a status window is displayed in which the individual steps are listed.
5. When the read process of the original CD is finished, a message will be displayed: you have to insert now a blank CD in your recorder.
6. As a last step, you will see a message like "burn process was successful with 2x(300 KB/s)".
7. Finally, the CD will be ejected.
8. You may now check to see for yourself what was written onto your new CD by re-inserting the CD and clicking on the *CD info* icon.

6.4.3 Copy from CD to CD (on-the-fly)

1. Insert the original CD in your CD ROM drive and a blank CD in your recorder. **Nero** allows you to copy CDs such as: Audio CDs, CD-ROM, Games CDs, Video CDs, and Mixed-Mode CDs. If your original CD is a Multisession CD or a blank disc, a message will be displayed and you will have to insert again a CD allowed by **Nero**.
2. Click on the CD-Copy icon in the **New Compilation** dialog window which opens after you start **Nero**. If you have already opened **Nero**, you can reach this dialog window through the icon for "New Compilation".
Important: if you are missing the CD Copy icon, please make sure that you have not chosen the image recorder and that the recorder has not been started after the operating system. Please start always your recorder before.
3. On the property sheets, the **Burn** card is on the top.
4. Select the *Copy Options* card to make sure that the "on-the-fly" method has been selected as well as your CD ROM drive as input device.
5. Now you can click on the **CopyCD** button, the **Write CD** dialog box will open.. All of the selected steps will now be carried out in sequence including the burn process. So that you can follow exactly what is happening, a status window is displayed in which the individual steps are listed.
6. As a last step, you will see a message like "burn process was successful with 2x(300 KB/s)".
7. Finally, the CD will be ejected.

You may now check to see for yourself what was written onto your new CD by re-inserting the CD and clicking on the **CD info** icon.

6.5 Mixed-Mode CD



1. Click on the Mixed-Mode icon in the New Compilation dialog window which opens after you start Nero. If you have already opened Nero, you can also reach this dialog window

through the icon for "New Compilation".

On the property sheets- the File Options card is on the top- you can establish properties of the compilation such as the name of the CD and other characteristics and limitations.

2. Now click on the *New* button at the right. The corresponding blank compilation window for Mixed-Mode CD opens. This window combines the two windows, CD-ROM and Audio-CD, into one window with two separate sections.
 3. If the file browser has not yet been opened, you can do that now by entering the **VIEW>New File Browser** command or by clicking on the File Browser icon.
 4. Click on the desired data files in the File Browser with the mouse and then drag them into the data section, in the upper part of the window. Do the same with the desired audio tracks but drag them into the audio section, in the lower part of the window. To compile audio files, please refer to 6.2
 5. Save the compilation now so that you can use it at a later time. To do this, click on the **FILE>Save** command or the corresponding icon. The compilation name is prompted as the file name in the File Name field of the window which is opened now. You may replace this prompted name by simply writing over it. Then click on the *Save* button.
 6. Now open the *Write-CD* dialog. The easiest way to do this is to click on the *Write CD* icon in the toolbar. You will then go to the *Write CD* dialog box, which will undoubtedly look familiar to you: it is the same box which you saw for the creation of a new compilation, only now the *Burn* property sheet is shown on the top. You will see several boxes, some of which are already selected. Determine maximum speed, simulate, and write are already selected. Since an audio CD as defined by the Red Book Standard is always a single-session CD, the finalize CD box is selected.
- You may now check over all of the settings on this and the other property sheets and make any necessary changes.
7. Now you may confirm your selections by clicking on the *Write* button. All of the selected steps will now be carried out in sequence up to the burn process. So that you can follow exactly what is happening, a status window is displayed in which the individual steps are listed. As a



last step, you will see a message like "burn process was successful with 4x(300 KB/s)". Finally, the CD will be ejected.

8. You may now check to see for yourself what was written onto your new CD by re-inserting the CD and clicking on the CD info icon.

6.6 Multisession CD



1. Click on the CD-ROM icon in the New Compilation dialog window which opens after you start Nero. If you have already opened Nero, you can also reach this dialog window through the icon for "New Compilation"
2. The Multisession card is on the top. You will see several boxes, some of which are already activated. Make sure that the No Multisession box is not activated, otherwise you are not going to write a multisession CD but an ISO CD!
 If you just start to record a multisession CD, please select the appropriate option. If not, activate the Continue Multisession disk. Only by clicking on the Continue Multisession disk box, the options in the lower part of this property sheet will be enabled. You will see several boxes, some of which are already selected.
 You may now check over all of the settings on this property sheet and make any necessary changes. Then click on the New button at the right. The Select track dialog box opens.
3. Click on the track that should be backed up. It will be generally the last ISO track, that is why Nero selects it by default.
4. Now click on OK. The corresponding blank compilation window for Multisession CD opens. This window displays all information concerning the track you have selected. Depending on the refresh options selected in the multisession property sheet, you will see some Folders and files shown in black or in grey.
 Folders and files shown in black means: they have been changed or recorded on your hard disc since your last session. They will be recorded on your CD now.
 Folders and files shown in grey means that they are already on your CD. They have been recorded during your last session. They are not going to be physically rewritten.
5. Save the compilation now so that you can use it at a later time. To do this, click on the FILE>Save command or the corresponding icon. The compilation name is prompted as the file name in the File Name field of the window which is opened now. You may replace this prompted name by simply writing over it. Then click on the Save button.
6. Now open the Write-CD dialog. The easiest way to do this is to click on the Write CD icon in the toolbar. You will then go to the Write CD dialog box, which will undoubtedly look familiar to you: it is the same box which you saw for the creation of a new compilation, only now the Burn property sheet is shown on the top. You will see several boxes,

some of which are already selected. Determine maximum speed, simulate, and write are already selected. The finalize CD box is not selected by default. Don't activate it, unless you don't want to write you CD, after this session!

You may now check over all of the settings on this and the other property sheets and make any necessary changes.

7. Now you may confirm your selections by clicking on the Write button. All of the selected steps will now be carried out in sequence up to the burn process. So that you can follow exactly what is happening, a status window is displayed in which the individual steps are listed. As a last step, you will see a message like "burn process was successful with 2x(300 KB/s)". Finally, the CD will be ejected.
8. You may now check to see for yourself what was written onto your new CD by re-inserting the CD and clicking on the CD info icon. All sessions you recorded will be displayed.

Important: If you insert a multisession CD in a CD ROM drive or a recorder, only the last session will be displayed and for this reason can be accessed. To view all the sessions and to access all the files recorded on your Multisession CD, you have only one possibility: the Nero Multi-Mounter. *Please refer to 8 The Nero Multi Mounter.*

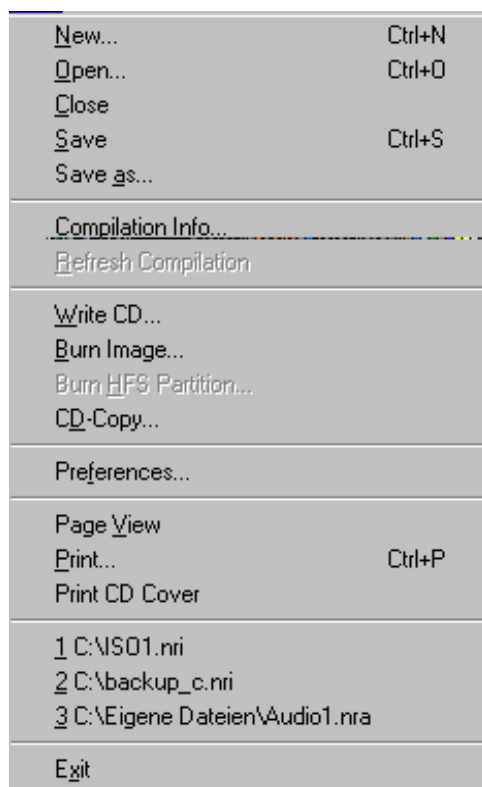
7 Reference

In this chapter, we will introduce you to all of the menus and their commands, including all of the available options.

7.1 The FILE Menu

In the **FILE** menu, you will find the various menu options which are typical to Windows applications, **Open** a file, **Save**, and others. Below the **Print** command, there is a list of the most recently opened compilations. You can use this to easily access them again.

For the creation of a CD, the menu options **Compilation Info**, **Write CD**, **Burn Image** and **Preferences** are especially important.



The menu
FILE

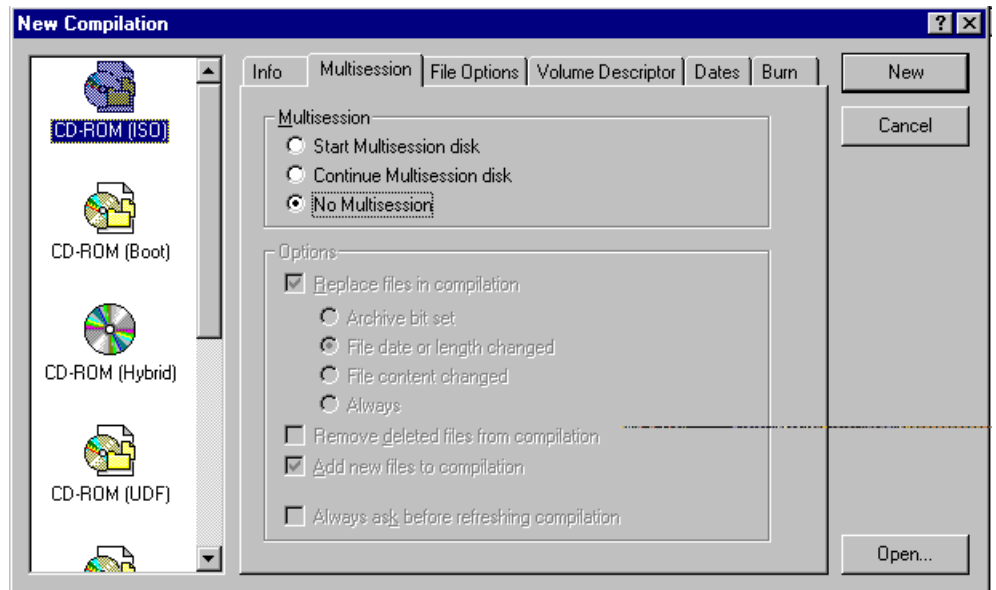
7.1.1 FILE> New

The menu option **FILE> New** opens a window which gives you the choice in the left pane of whether you want to write



- a CD-ROM or
- an Audio-CD.

The dialog
New Compilation



As an alternative to using the **FILE> New** menu option, you may also use the icon for New Compilation in the toolbar.

Click on your selection. Depending on the selection you have made, you will now see several property sheets. You may set the options for the compilation and the burn process here. These property sheets will be explained in more detail in the menu option **FILE> Compilation Info**. Each of the options on the property sheets can be changed at a later time, and may be seen now as merely a suggestion.

Confirm your selection by clicking on the **New** button. **Nero's** main window and a *File Browser* will open. You may now begin to fill your compilation with files.

However, if you want to re-access a compilation which already exists, click on the **Open** button at the right bottom. You will go straight to the **Open** list box.

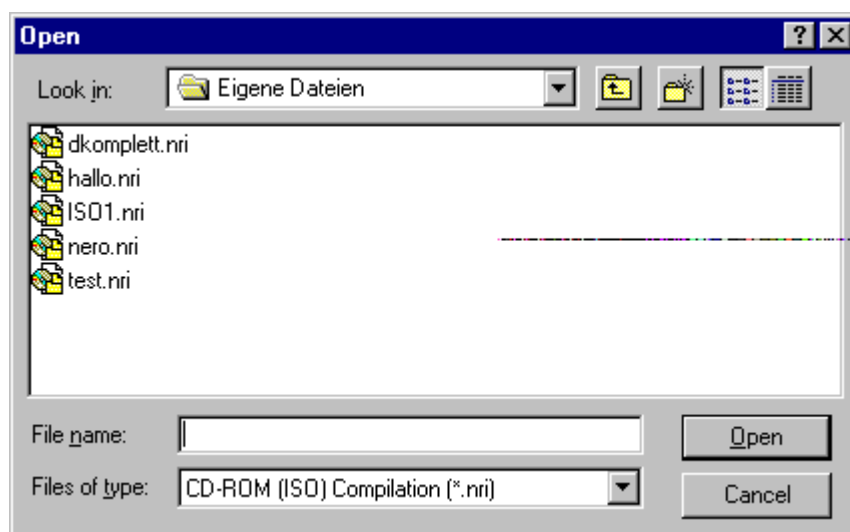
7.1.2 FILE> Open



If you have already saved compilations from previous sessions with **Nero**, you may re-access these compilation files through the

FILE > **Open** menu option. As an alternative to this, you may also use the corresponding **Open** icon from the toolbar.

The **Open** list box is displayed. The first time it is opened, the list of file names displayed in the \My Documents directory will always be files of the NRI type (CD-ROM). If you have previously created a CD-ROM compilation file, **Nero** opens the directory in which you have stored this file. The desired file can now be opened by selecting the file from the list and then giving the **Open** command.



The list box **Open** in Windows 95

The NRI file type describes **CD-ROM files**. Instead of the NRI file type, you may also open **Audio-CD files** (file suffix NRA) or **Image Files** (NRG file type) through the File Type menu. You may also call up and display any other files in the list of file names found in this directory. However, **Nero** can only open **Nero-specific** data formats as valid compilations.

Using **Look in** in the upper window pane, you may access a different directory, a different hard drive or, if your computer is connected to a network, you may access compilation files from a location within the network.

At the right, next to the **Look in** dialog box, there are other buttons available which will allow you to

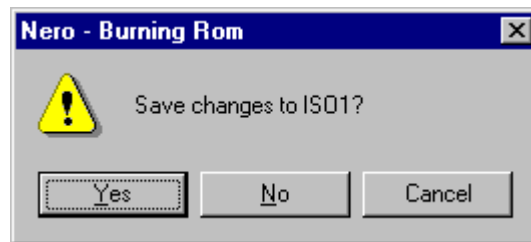
- change to a higher-level folder
- insert new folders
- display the files in the form of a list and
- receive a listing of the files with details on file specifications.

You can confirm the selection of the desired file by clicking the Open button. The opened file will then be displayed in a new compilation window.

7.1.3 FILE> Close

If you have opened and worked on a CD-ROM or Audio-CD compilation file, you can close the compilation file by using the **FILE>Close**. If you have made changes to the file, a dialog box is displayed in which you can decide whether you want to keep the changes or not. If you confirm by clicking **Yes**, the changes will be saved. Otherwise you may click on **No**.

Dialog box
*Should the
changes be saved
or not?*



If you had just activated the **Nero** File Browser, it will be closed with this menu item.

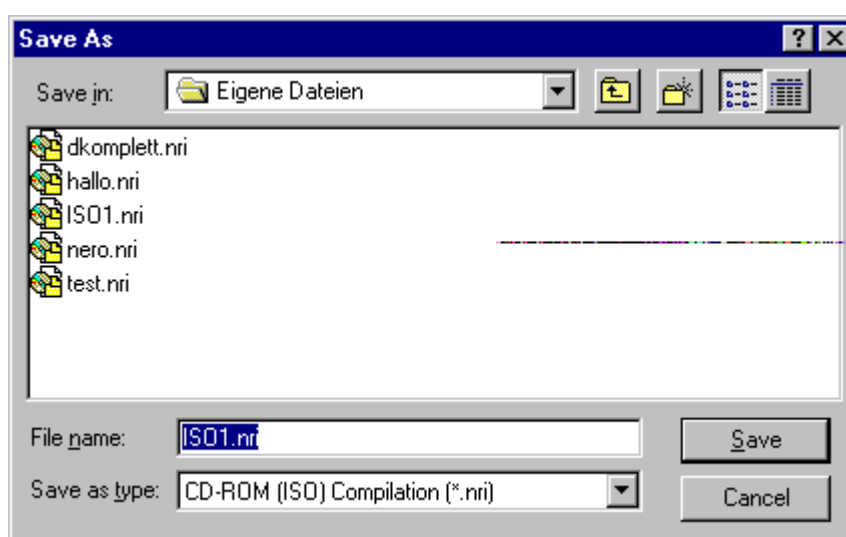
7.1.4 FILE> Save



You can save the current CD-ROM or Audio-CD compilation under the current file name with this menu option. You could also use the corresponding **Save** icon in the toolbar.

7.1.5 FILE> Save as...

If you wish to save the current CD-ROM or Audio-CD compilation under a different or a new file name, click on the **FILE> Save as.... command in the menu**. A list box will now open in which you can establish the file name, its type and the directory. The name of the compilation is always prompted as the new file name. You may also change the file name at this time.



List box
Save as

If you frequently create CDs, you should define different sub-directories for your compilations. Thematic subdivisions have proven themselves especially useful. You might therefore create a *Backup* directory and a *Music* directory.

7.1.6 FILE> Compilation Info (CD-ROM)

The **FILE> Compilation Info** menu option opens the associated dialog window in which you will find information concerning the compiled CD-ROM file. Here, you will receive not only information about your CD-ROM compilation, but you can also make changes or adjustments for almost every item.

You have already seen these property sheets in the **New Compilation** dialog. At that time, you had the option of entering special preferences for your compilation.

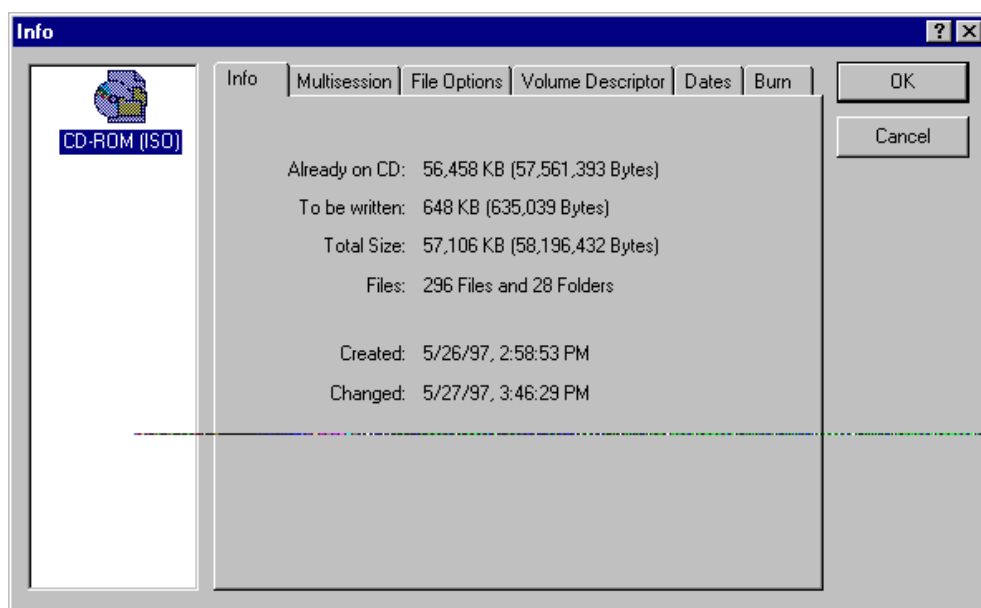
The dialog box is displayed with five property sheets. The preferences and additional information on these property sheets will be taken into the selected compilation and, after the burn process, they may be found in part in the Lead-In area of the CD and read with special programs.

We will look more closely at the individual property sheets and their functions in the following sections.

All information which is displayed in the **Compilation Info** dialog window pertains to the entire compilation. However, you can only access this information when the CD window is active.

7.1.6.1 The INFO Property Sheet

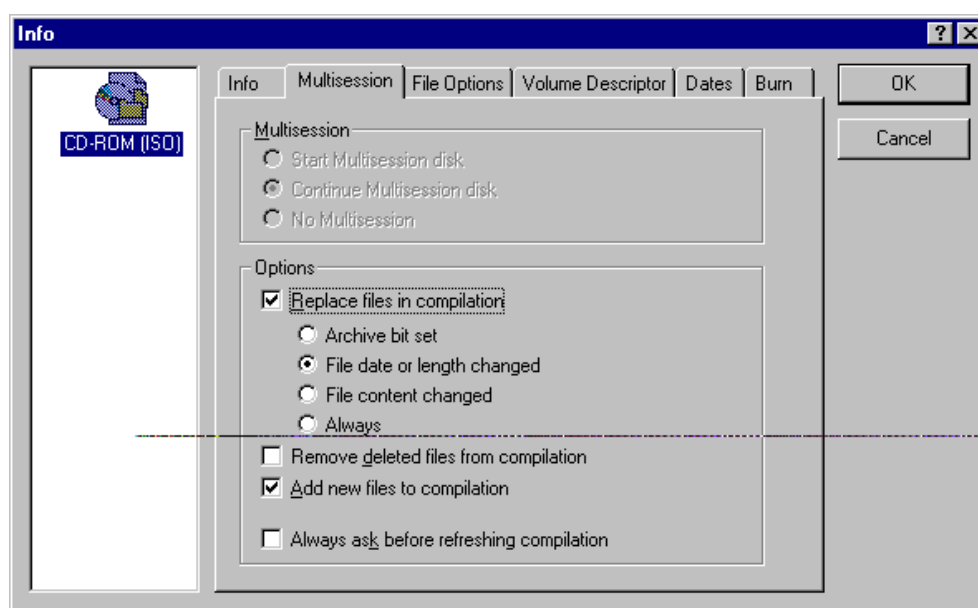
The
property
sheet *Info*



You will find general information concerning all of the files in your compilation on the property sheet labeled *Info*. The following survey will explain the individual points.

Size	Under "Size," you will find the total size of all of the data which are written by the CD-ROM compilation; this is given in KB or bytes (1 KB = 1024 bytes).
Files	This lists the number of files and folders which will later be located on the CD.
Created	Here you will find the date on which you worked with this compilation the first time.
Changed	The date of the last modification is displayed in this line.

7.1.6.2 The MULTISESSION Property Sheet



The property sheet
Multisession

You may use the writing mode "multisession", for example for incremental backups. A multisession CD allows files and folders not only to be recorded in different sessions at different times, until the CD is full, but also to be appended, deleted, and rewritten only if they have been changed.

If all the options in this property sheet are disabled, please make sure that you have not chosen the image recorder or that your recorder has been turned on before starting the operating system.

This property sheet contains two main parts:

- in the first part you define if you want to create a new multisession CD, to add new sessions to your CD or simply write a CD-ROM (ISO).

Start Multisession disk	Please select this option, if you want to create a multisession CD from a blank disc or from a CD you have already started to record. In this case, the resulting CD will be a ISO CD with additional multisession information.
Continue Multisession disk	If you have already started recording a multisession CD and just want to continue the disc, please select this option. You may now activate the options of the second part of this property sheet to define whether files and folders should be added, deleted or replaced during the automatic refresh.

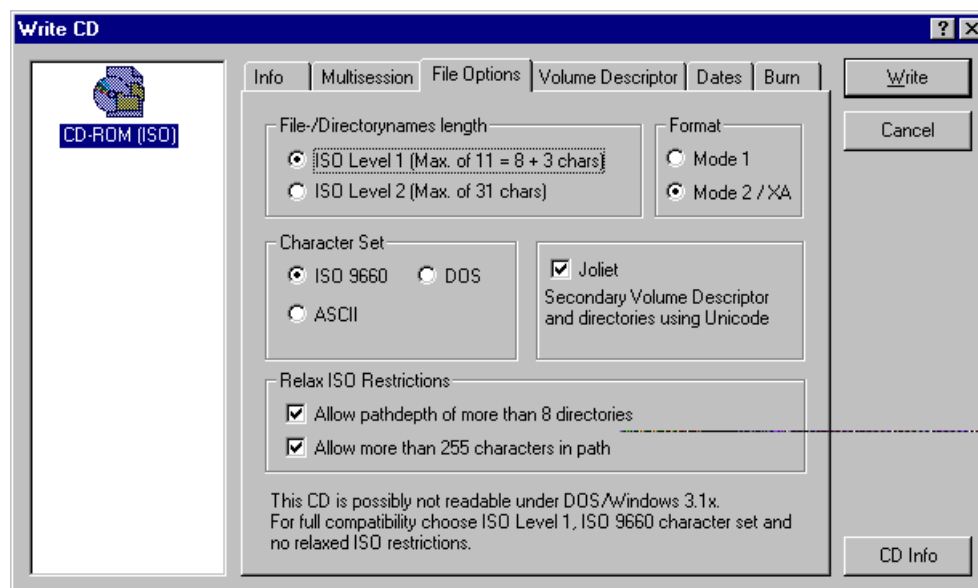
No Mul- tisession	If you just want to record a ISO CD-ROM, please select this option.
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- in the second part you can activate options for your compilation:

Replace files in com- pilation	Nero will replace the files existing on your CD, depending on which options you have activated: archive bit set, file date or length, or file content.
Archive bit set	Each file has, under Windows, an archive bit, which is set by the operating system, if a file has been changed or modified. This bit is used by backup programmes, which set the archive bit of a file to zero (0) each time it has been saved. If you activate the "archive bit" option, Nero will do the same. Therefore, this option is meaningful if you also use a backup programme.
File date or length changed	Nero will only replace the files of which date or length have been modified.
File con- tent changed	This option is designed to compare, byte for byte, all the files recorded on your CD with the files in your operating system. Nero will automatically replace files if some differences have been detected. You may use this option if, for example, your computer displays an incorrect time. Since every file will be read byte for byte, corrupted files on your CD will be also detected by Nero and replaced.
Always	All the files and folders will be replaced, no matter if they have been changed or not. Since all files and folders will be physically rewritten, you may improve the reliability of your backup. Disadvantage: you will lose space on your disc. However, from time to time, it might be useful to replace all files and folders.
Remove deleted files from compi- lation	If you activate the option, Nero will "delete" on your CD, files that don't exist anymore on your hard disc. They have been probably deleted since your last session. The pointer to these files's address will simply not be included in the directory of your new session: they seem to be erased. Only by using the Nero Multi

	Mounter you will be able to access them again, if you ever need them.
Add new files to compilation	This option allows you to add, in your new session, files that have been recorded to your hard disc since your last session.
Always ask before refreshing compilation	When activating this option, Nero will automatically display a dialog box with the refresh options before refreshing the compilation.

7.1.6.3 The FILE OPTIONS Property Sheet



The property sheet *File options*

The *File Options* property sheet is divided into three areas

7.1.6.3.1 Length of the file and folder names

Here, you establish which ISO level as defined by *ISO Standard 9660* will be used for the files of the compilation. **Level 1** allows the familiar maximum of 11 characters for the file designation (eight characters for the file name and three for the file extension).. **Level 2** allows a maximum of 31 characters.

7.1.6.3.2 Character Set

Three character sets are allowed which are processed for the files and in the Volume Descriptor based on this parameter. The character sets are ISO, ASCII and DOS.

Each of these three options defines which characters are allowed in a file or directory name (in ISO Standard the so-called *D-Characters*).

In addition, this also determines which characters may be used in specific fields of the Volume Descriptor (in ISO Standard the so-called **A-Characters**); refer to the Volume Descriptor property sheet. Each option thus always defines two character sets, which may always be used together. You will find more precise information concerning which characters are contained in which character set in the Appendix. Only the most important properties are described in the following section:

The **ISO 9660** option is very restrictive. Only capital letters, numbers and the underline character are allowed in file and directory names. In the Volume Descriptor, empty spaces and a few special characters are allowed beyond this, but no lower case letters. If you create a CD with the ISO character set, you may be certain that a different system will also be able to display these characters.

In file and directory names, the **ASCII** option allows all characters available in the ASCII character set, except control characters, empty spaces or some other characters which are not allowed under DOS or Windows in file names. Only the control characters are prohibited in the Volume Descriptor, while all other characters of the ASCII character set are allowed. Most of the typical operating systems use an internal character set which is based on or contains ASCII. If you create a CD using the ASCII character set, most of today's operating systems, including Windows 95 and the Macintosh OS, can read your CD.



The **DOS** option allows all characters allowed with ASCII. Beyond this, OEM-specific special characters which are available both with DOS and with Windows are allowed, including the German umlauts (ä, ö, ü). The limitation to characters which are available with DOS and with Windows is necessary, since **Nero** is a Windows application, while recording on the CD must be performed with the DOS character set. You should only use the DOS option when you are certain that the CD will be used on a Windows 95 system. The Macintosh OS can display this CD, but the characters which are not contained in the ASCII character set will not be displayed correctly.

7.1.6.3.3 Joliet

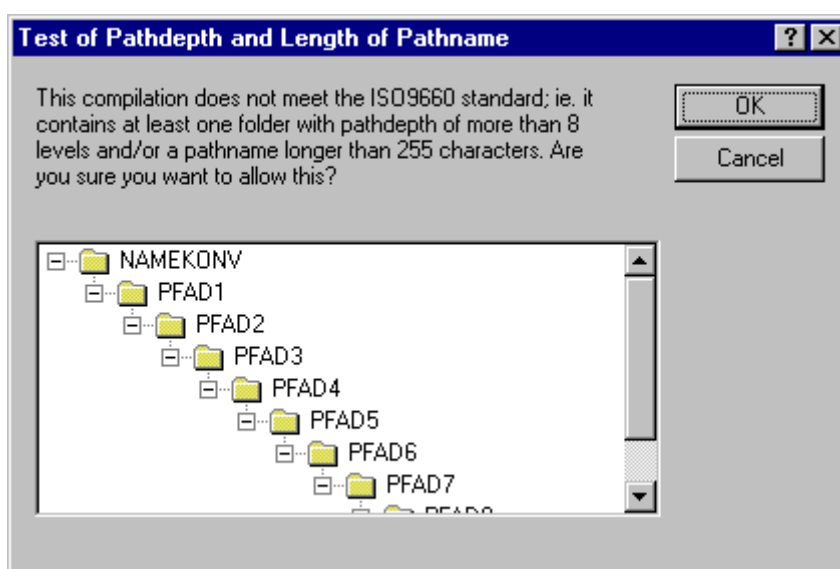
This supplement to the standards comes from Microsoft and is supported by Windows 95 and Windows NT. The CDs which are created under this standard are in conformity with ISO 9660, which allows long file names based on Unicode in additional directory structures.

7.1.6.3.4 Relax ISO Restrictions

Here, you can allow two options. However, this has as a consequence that the ISO standard is no longer exactly maintained. Most of today's systems can process CDs with which these restrictions have been lifted.

A **maximum path depth** of eight hierarchical steps is the ISO standard. If your path depth goes beyond this, and you want to maintain the hierarchical steps, select this option. If you did not know that you had more than eight steps and the option was not selected, you will be asked in a follow-up window whether you want to allow more than eight steps, and can make your decision at that time.

The same is true in principle for more than **255 characters in a path name**. The ISO standard establishes the total length at a maximum of 255 characters, including the file name. If you did not select this option and more than 255 characters are detected in the file name, you will be asked in a follow-up window if you want to allow more than 255 characters. At this point, you can consider whether you want to maintain the strict standard, or - in other words - whether you really need to restructure your file, or whether you will decide to choose to relax the standard.



*Test of
path depth*

Since this event will occur in only a few compilations, the test for path depth is **switched off as the default**.

7.1.6.4 The VOLUME DESCRIPTOR Property Sheet

In the **Volume Descriptor** property sheet, you can enter information concerning the CD you want to create. A total of nine fields are available to you.

Volume Label	The name of the CD or of the session with a multi-session CD. You may use up to a maximum of 32 characters of the D-Character Set.
--------------	--

The property
sheet *Volume
Descriptor*

All of the following entries are optional.

System Identifier	Enter the name of the operating system here with which the CD will be used. You may use a maximum of 32 characters of the A-Character Set.
Volume Set	If you have assembled several CDs as a set, you can enter a volume label for the set. You may use a maximum of 128 characters of the D-Character Set.

The following three entries may consist either of 128 characters of the A-Character Set, or of a file name which begins with the underline character and contains a maximum of 8+3 characters of the D-Character Set. The file must be located in the root directory of the CD.

Publisher	The publisher of the CD can be stored here.
Data Preparer	The person who has assembled the CD (in other words, usually yourself) can be entered here.
Application	If the CD contains an application, you can file its name here.

The following three entries contain a file name which consists of a maximum of 8+3 characters of the A-Character Set. The file must be located in the root directory of the CD.

Copyright File	You may add a copyright notice to your CD.
Abstract File	You can also store this brief summary of the contents of your CD in a special file.
Bibliographic File	You may store bibliographical information on the CD with this file. The same rules apply as for the Copyright file.

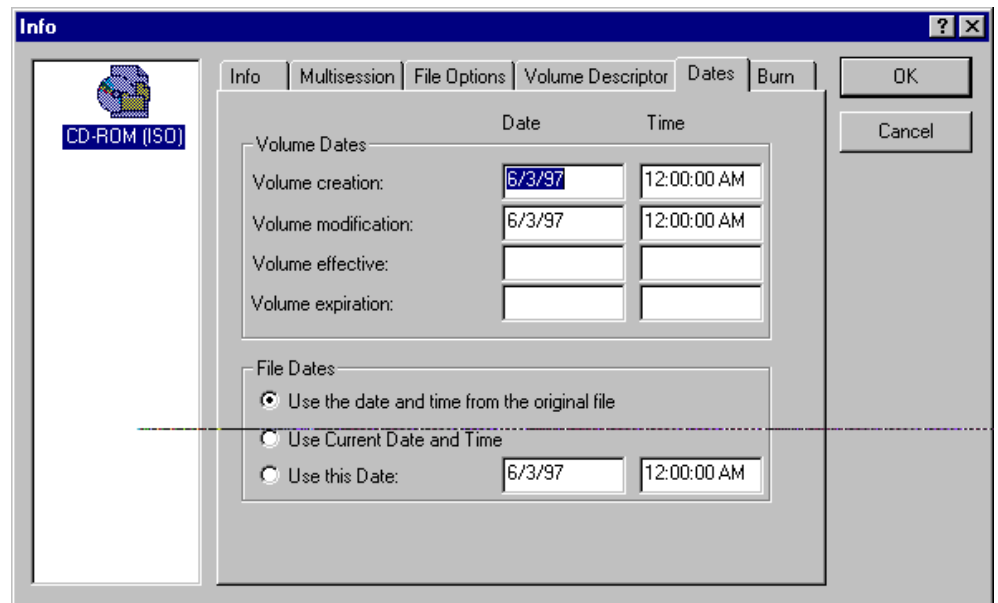
7.1.6.5 The DATES Property Sheet

On the registration card, you will find different date options for the data medium and the files. Here, you can establish the date and the time of the data on the data medium.

As a first option, you may enter the production date. As a default, **Nero** assumes the date on the computer's clock. You can then specify the date of the last modification.

A special characteristic of **Nero** is the possibility of limiting the functional capability of a data medium based on time. You can enter the date and the time in the third field beginning with which the data on the CD-R will be effective. As a final option, you have the possibility of preventing access to the data medium you have created after a specific date. However, not all operating systems can process this information.

The property sheet *Dates*



In the lower portion of the property sheet, you will find three options for the file date which will define the date on the CD.

With the option to *Use the date and time from the original file*, the information items from the original file will be maintained. In other words, the date will be imported in the same way as it is in the original file, and it will also be located that way later on the CD-ROM.

If, on the other hand, you want to use the current time and date on your computer, then you can activate the *Use Current Date and Time option*.

As a final option, you may also define a specific date on the *Dates* property sheet. To do this, select the option *Use this Date:* and then make the desired entries in the two fields for *date* and *time*.

The active option will always be indicated by a dot.

7.1.6.6 The BURN Property Sheet

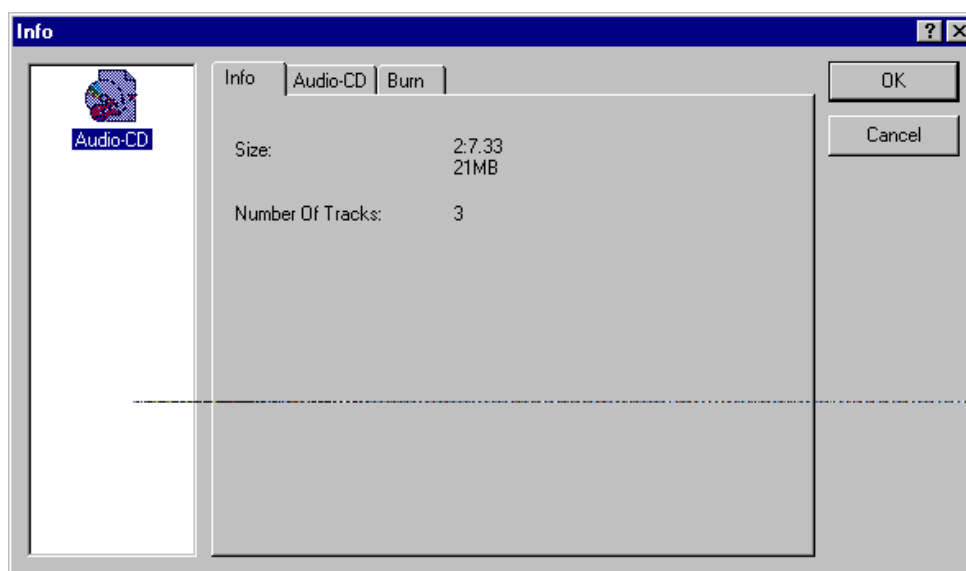
We will go into this property sheet in more detail under **FILE> Write CD**.

7.1.7 FILE> Compilation Info (Audio-CD)

When the Audio-CD Compilation window is active, a dialog box with three property sheets is opened after the **FILE> Compilation Info** command is given.

7.1.7.1 The INFO Property Sheet

The size and the number of tracks and their length are displayed on the **Info** property sheet. If the compilation was written onto a CD, the date is displayed.

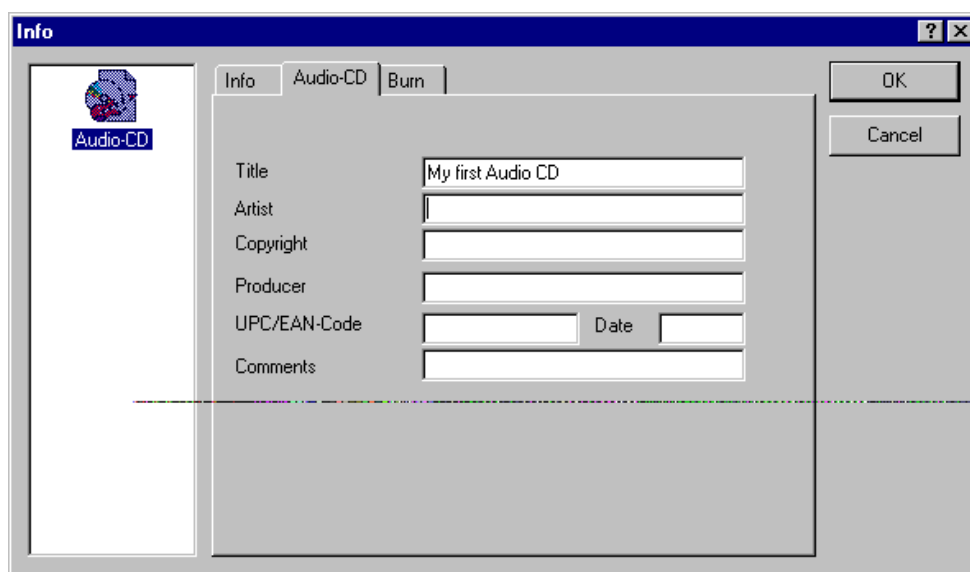


*The property sheet **Info***

7.1.7.2 The AUDIO-CD Property Sheet

You may enter the title of the CD, the artist, a copyright notice, the producer, the UPC/EAN-Code, the date and additional comments in the fields provided on this property sheet. This information will not be transferred to the CD, but will only be stored in the compilation file.

The property
sheet *Audio-CD*



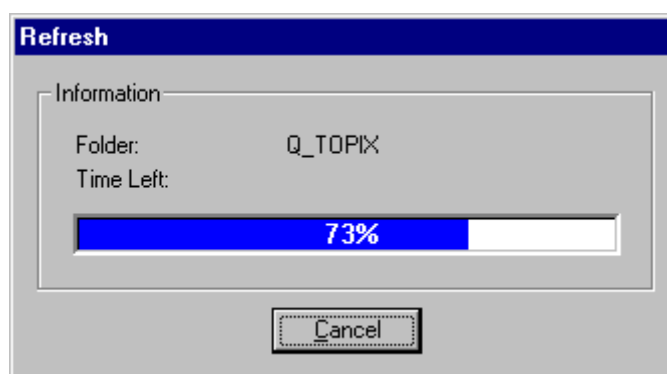
7.1.7.3 The BURN Property Sheet

We will explain the *Burn* property sheet in detail under the **FILE> Write CD**.

7.1.8 FILE> Refresh Compilation

With the *Refresh Compilation* menu option, **Nero** scans the entire contents of the CD compilation for changes. A small window is first opened, in which the procedure and its progress are displayed. Depending on computer performance and the size of the compilation, this procedure may last several seconds. With small amounts of data, you may hardly even see the window.

*The Refresh Compi-
lation procedure
while running*

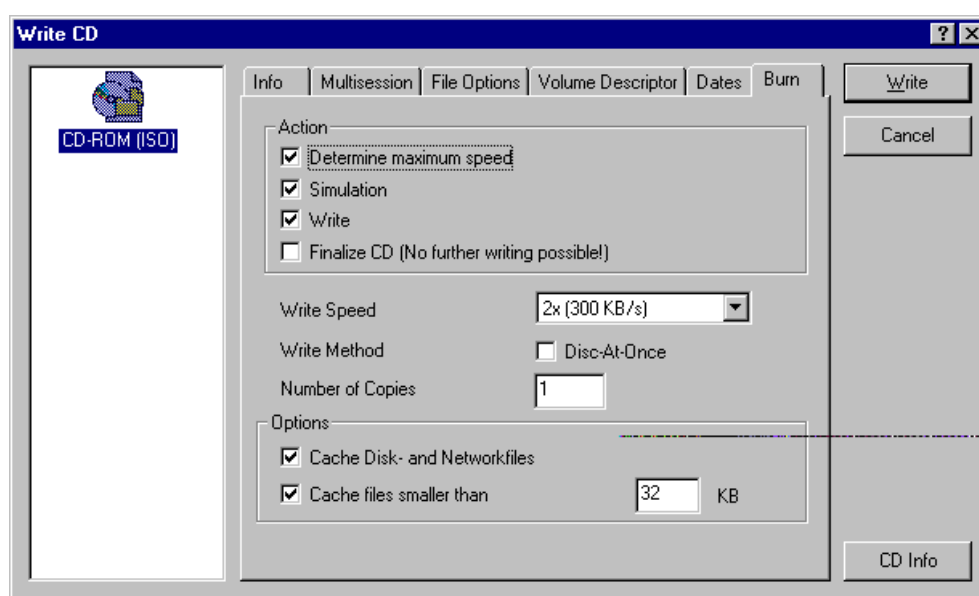


After **Nero** has completed the Refresh procedure, a small window will show you how many files were removed since the last processing of your compilation. You may now close with **OK**.

7.1.9 FILE> Write CD

Open the FILE> Write CD menu to begin the actual burn process. You may also select the corresponding icon from the toolbar. First, the Write CD dialog box opens. You will recognize this dialog box from the New Compilation and FILE> Compilation Info dialogs. The property sheet for Burn is now displayed as the top sheet (it is the same sheet for CD-ROM and Audio-CD compilations). All further property sheets depend on the selected format.

For a CD-ROM compilation, the Write CD dialog window looks like this:



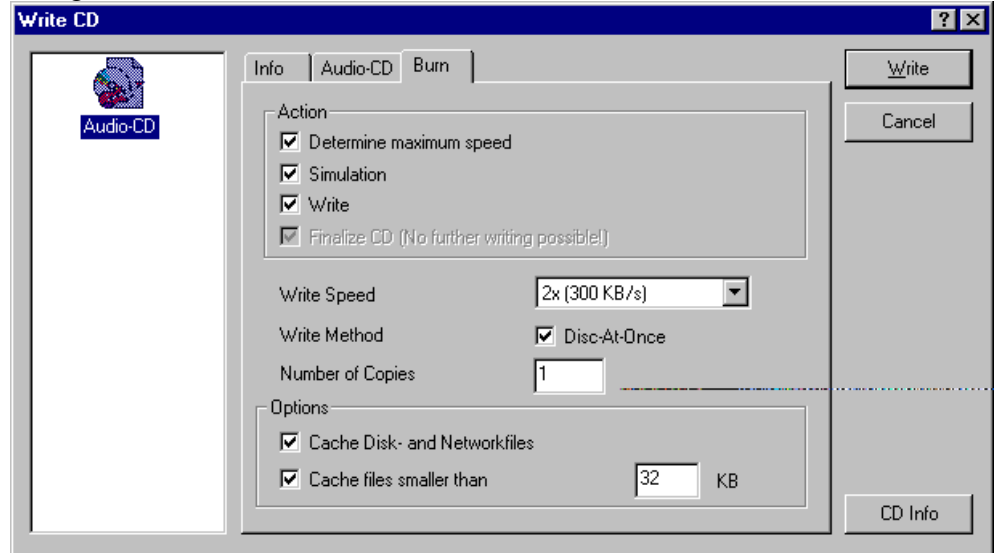
The Property Sheet ***Burn*** with a CD-ROM compilation

The ***Info***, ***Volume Descriptor***, ***Date*** and ***File Options*** property sheets are identical with the property sheets of the ***FILE> Compilation Info*** dialog window.

The Audio-CD dialog box contains three property sheets: The ***INFO*** and ***AUDIO-CD NAME*** registers are identical with the property sheets of the ***FILE> Compilation Info*** menu.

The Property
Sheet **Burn**
with an Audio-
CD compilation

You will see three different areas on the **BURN** property sheet. In the upper area, you will set the desired processing steps. The settings which are marked there indicate basic preferences which you may change.



The *Write phases* in detail:

Determine maximum speed:	This speed test accesses the files of the compilation in order to determine their transfer speed. If the speed which is set is greater than the speed determined by the test, it will be automatically reduced.
Simulation	The simulation test corresponds to the actual burn process. In other words, the files are transferred to the recorder, but the laser burn-head is switched off during the test. The actual write or burn process is thus simulated with great accuracy, and the transfer speed which was previously set or determined through the speed test is checked once again.
Write	The files are physically written onto the CD, and the session is ended after this.

Finalize CD (no further writing possible!)	<p>Since you probably want to write several sessions onto the CD (multi-session) with CD-ROM, you may decide for yourself when the CD is to be fixed, or finalized with no further writing possible.</p> <p>With an Audio-CD, there is usually only one session on a CD, so the finalization is set as a default.</p>
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You may change the burn speed in the middle window pane. Generally, however, you will have to run a speed test and a simulation of the burn process with the result that the optimal *write speed* is set here. If you forego the speed test and the simulation, the recorder's highest speed is always set here.

In the *Number of Copies* field, you have an additional selection with which you can determine how often you want to have the compilation written.

In the lower area, you will find different options which provide you with a *cache* where you can store files in a buffer which are "in danger" and thereby ensure a problem-free burn process. When you use a cache, the *Cache files* phase will be placed before the phases above.

Cache Disk and Network Files	If your compilation contains files which are located on a slow network or a floppy disk, it is advisable to use this option.
Cache files smaller than ... KB	This option is set actively as a default because the burn process is nearly always accelerated by it.

You will find three buttons in the right window pane. The upper button assumes a different status depending on the phase or phases you have selected. It begins the process regardless.

The function of the CD-INFO button corresponds to the menu option of the CD-Recorder menu. You may once again make sure that you have inserted the correct CD.

7.1.10 FILE> Burn Image

The *FILE> Burn Image* allows you to write previously-created image files.

The image file is produced by the selection of the Image Recorder in the *CD-Recorder> Recorder Selection* menu (refer there also) and the subsequent creation of a CD-ROM or Audio-CD compilation.



Caution: In contrast to the usual procedure, this contains a copy of all of the files of the compilation and thus requires as much memory space as the total size of the files of the compilation.

When you have selected this menu item, the **Open** list box is displayed. It lists the existing files of the NRG type (Image File). Select the file you wish from the list and confirm your selection with the **Open** command.

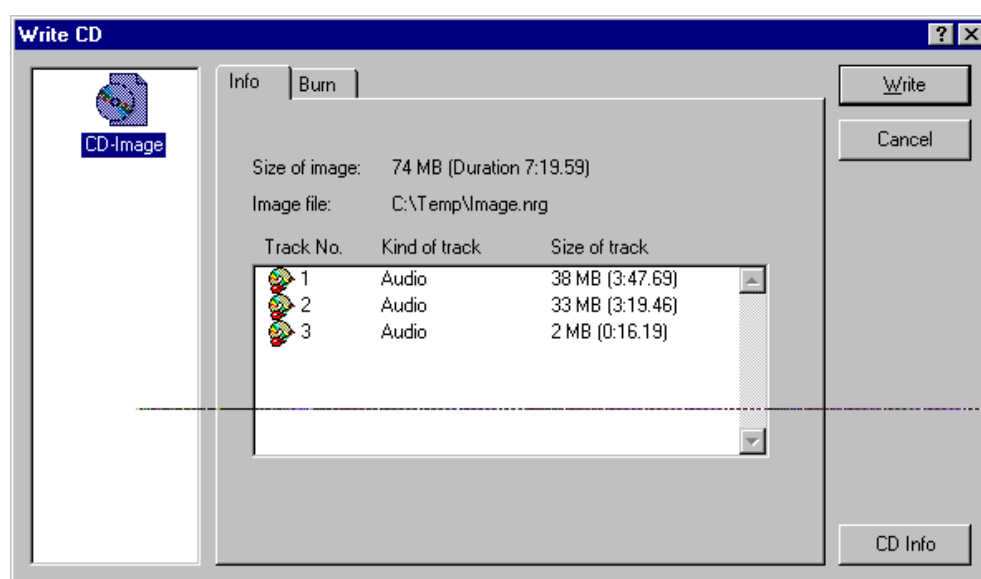
The property sheet **Open** to select the Image File



You will then go to the **Write CD** dialog box, and the "Burn" property sheet is displayed on top. For your information, you will also find

7.1.10.1 The INFO Property Sheet

On this property sheet, you can see the size, the source and the number of tracks of the Image File.

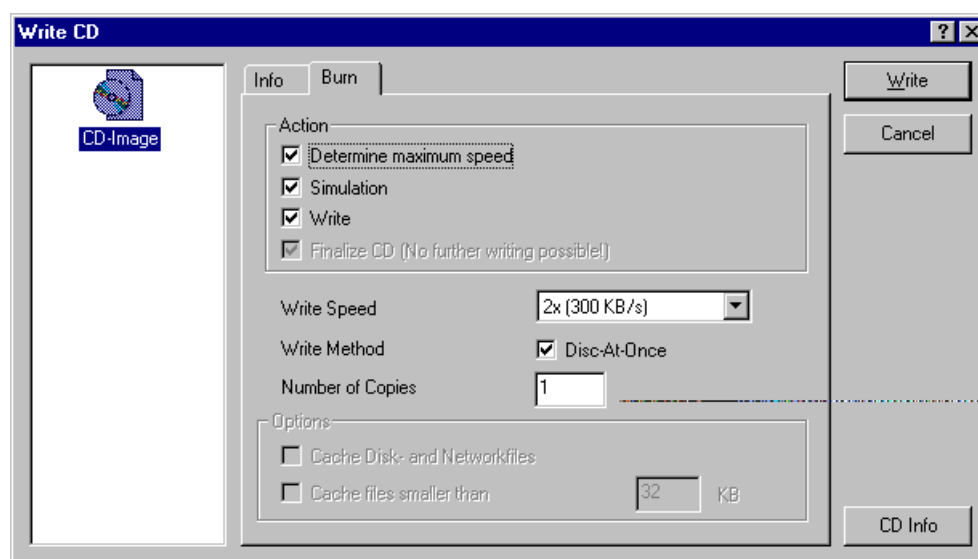


The property sheet *Info*

7.1.10.2 The BURN Property Sheet

The procedure here is the same as with writing a compilation: You will see several boxes, some of which have already been activated. *Determine maximum speed* and *Simulate* have been selected as defaults. For additional details concerning the individual phases, refer to the description under *FILE> Write CD*.

The property sheet *Burn*



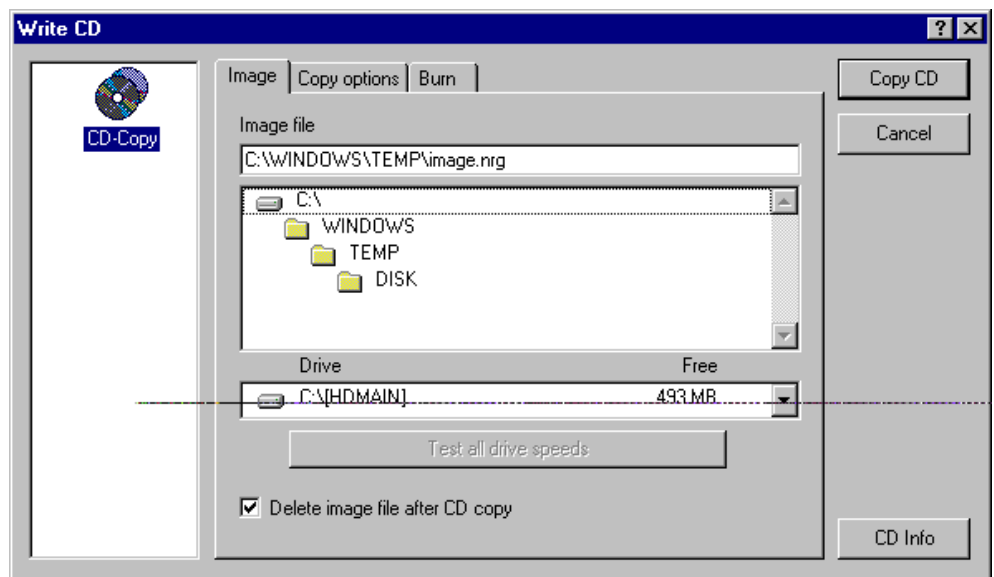
7.1.11 FILE> CD-Copy

7.1.11.1 The IMAGE Property Sheet

If you choose to make an **Image copy**, this property sheet is very useful. You can select where you wish the image file to be saved on, if you don't agree to the preselected suggestion. You need as much space for the image file as the total size of the files of the original CD. If your computer has more than one drive, you should test which is the fastest drive to record your image file onto it. Press this button to start the speed test.

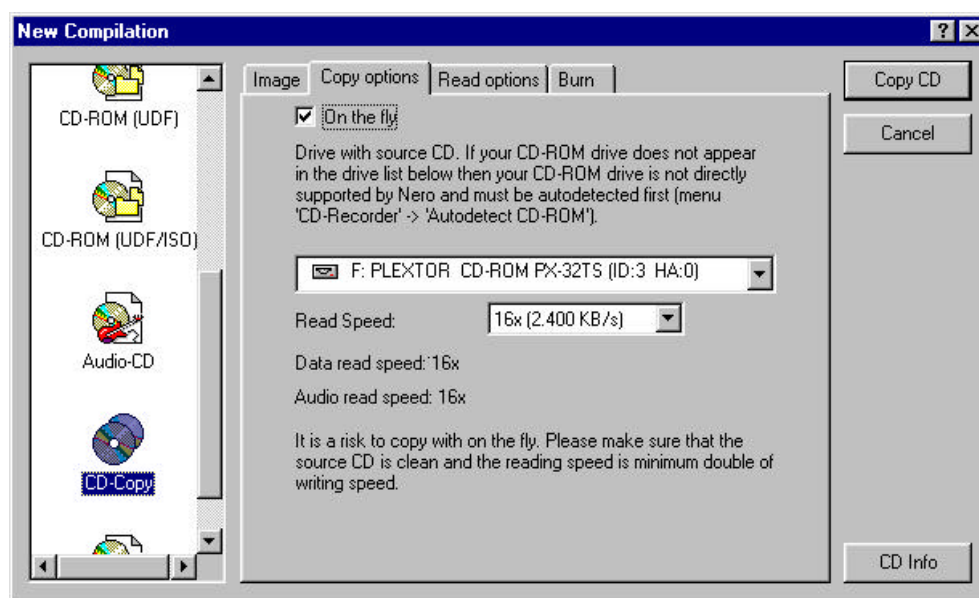
Click on the option „delete image file after CD copy“ to uncheck it, if you wish to create the same CD at a later time. The original CD will not be necessary anymore. You can use the same image file.

The property
sheet *Image*



7.1.11.2 The COPY OPTIONS Property Sheet

In this property sheet, you can choose the copy method you wish to use: image copy or copy on-the-fly (CD to CD).



The property sheet *Copy Options*

If you want to make a direct copy from CD-ROM drive to recorder, Select the option *On-the-fly* . If this option is not selected **Nero** will read the original CD from the recorder, create an image file on the hard disk and then in a third step write the image file onto a blank CD.

If you have chosen the "on-the-fly" copy method, make sure that the CD ROM drive from which the original CD should be read is selected. If you only have one CD ROM drive, make sure this drive is selected and not the recorder!

The option *Read speed* gives you the possibility to select a read speed for your CD ROM Drive. Depending on the CD, you would like to copy, it is sometimes better not to select the maximum read speed but a lower one to ensure the best quality possible.

7.1.11.3 The READ OPTIONS property sheet

Here you can set options to avoid errors that might occur during the read process.

Before confirming your selection by clicking on "Copy CD", make sure that all options needed in the property sheet "Burn" are also activated. If you click on "Copy CD", the dialog box "write CD" will open and the burn process will begin.

This property sheet contains three main parts:

- in the first part you will find options for both data and audio tracks.

Number of retries before read error	If Nero finds some read errors, how many times do you want Nero to read again the CD? Please
-------------------------------------	--

	enter a number between 1 and 10.
--	----------------------------------

- in second first part you will find options for data tracks.

Unreadable data	Abort copy	Here Nero will check for errors and notify you. The copy of the CD will be aborted as soon as unreadable data tracks have been found. Please check the contents of your CD and select again the appropriate option.
	Continue copying	Nero will ignore unreadable data, and continue the read process. All the tracks will then be faithfully reproduced.
Data mode 1	Force raw reading	All sectors including ECC and EDC information of your original CD will be read, allowing Nero to detect and correct corrupted data. The button can be disabled, disabled and checked, or enabled, depending on recorder capabilities.
	On errors...	When selecting "try to correct data" option, Nero will use the ECC and EDC information to correct sector errors. If your CD contains bad sectors and you are aware of that, do not choose this fonction: your CD may then be unreadable, because some bad sectors should not be corrected. When activating "write uncorrected" option, corrupted data will be read and faithfully reproduced with all errors and corruption. If you know that your CD contains probably bad sectors, because copyrighted, we suggest to select this option.
Data mode 2	Force raw reading	All sectors including ECC and EDC information of your original CD will be read, allowing Nero to detect and correct corrupted data. The button can be disabled, disabled and checked, or enabled, depending on recorder capabilities.
	On errors...	When selecting "try to correct data"

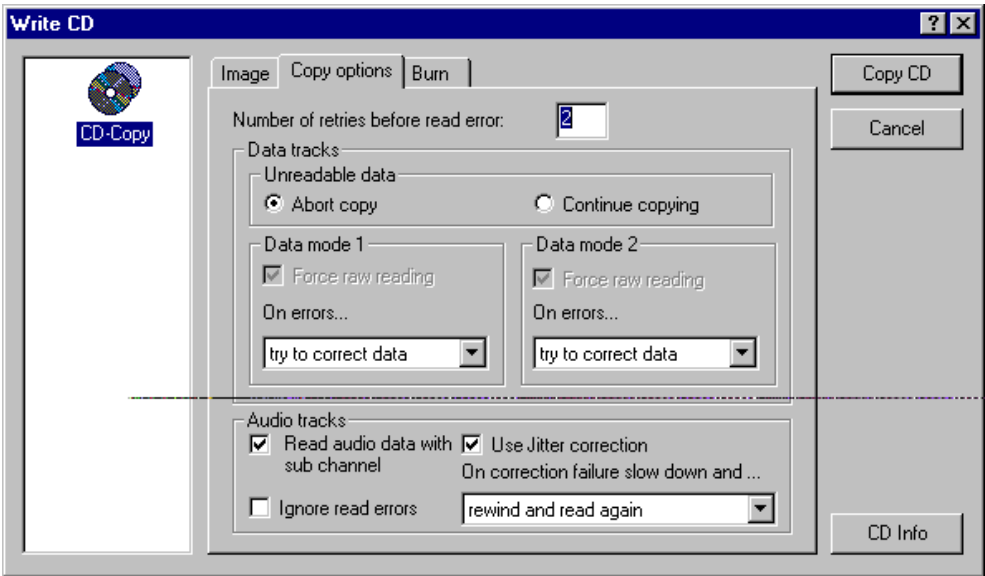
		<p>option, Nero will use the ECC and EDC information to correct sector errors. If your CD contains bad sectors and you are aware of that, do not choose this function: your CD may then be unreadable, because some bad sectors should not be corrected.</p> <p>When activating "write uncorrected" option, corrupted data will be read and faithfully reproduced with all errors and corruption.</p> <p>If you know that your CD contains probably bad sectors, because copyrighted, we suggest to select this option.</p>
--	--	---

- in the third part you will find options for audio tracks.

Read audio data with sub channel	<p>Additional information, such as audio index positions and the position of the end of an audio track, will be provided during the read process. These information are required to determine the exact end of an audio track.</p> <p>If this option is not checked, your Mixed-Mode or Audio CD will be copied without any audio index positions. The audio tracks might be then stored on the CD with pauses in between. Therefore, we recommend not to select this option, if you want to copy a continuous playing CD.</p> <p>If this option is checked, the index pauses will be also copied. The read process might be slower, depending on the recorder.</p>
Use Jitter correction	<p>To avoid that a disc does not perform as expected, please select the "jitter correction" option. When doing CD Copy, Nero will detect reading errors that might be caused by your recorder. Such errors might occur, for example, when audio data are not read by the recorder from the expected position. The cause of such errors is generally the read speed. For this reason, Nero will automatically slow down the read process, as soon as errors have been detected.</p>
On correction failure...	<p>When Nero detects an error, the audio track will be rewind and read again. The reading process will slow</p>

	down. This is the most reliable method to correct errors. If you select this option, Nero will slow down the reading process only from the error's position.
Ignore read errors	Nero will ignore unreadable audio tracks, and continue the read process. All the tracks will then be faithfully reproduced.

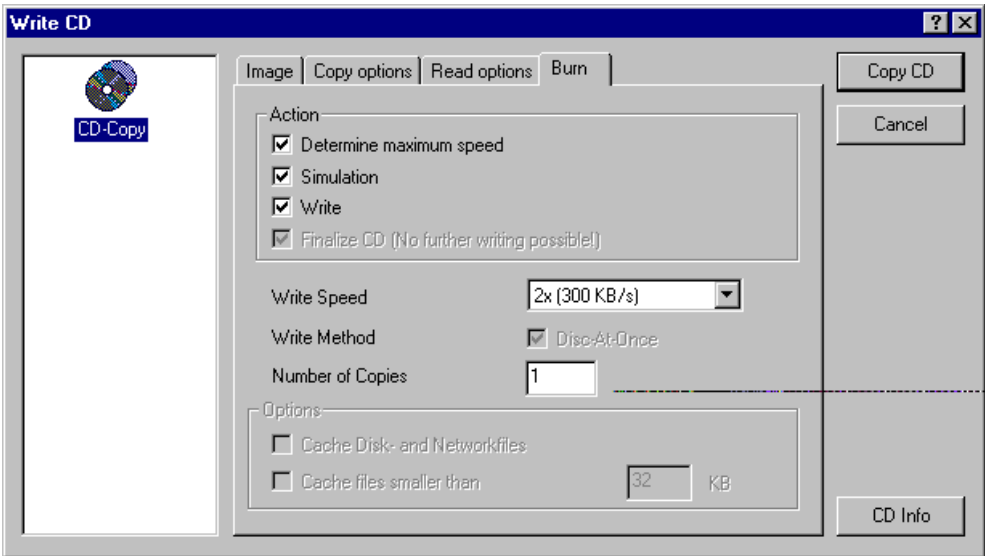
The property sheet
Read Options



7.1.11.4 The BURN Property Sheet

We explained the *Burn* property sheet in detail under the **FILE>Write CD**. Please refer to this chapter.

The property sheet
Burn



7.1.12 FILE> Preferences

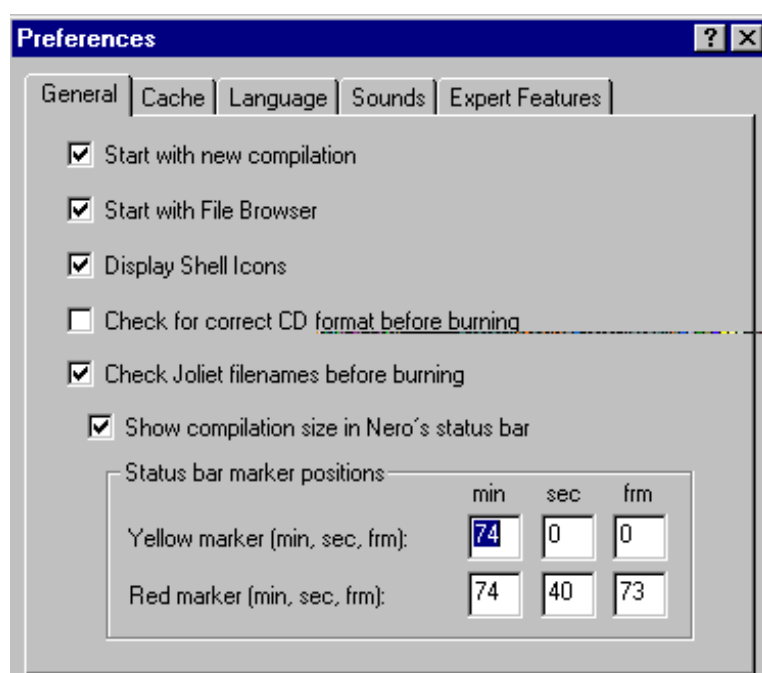
In the **FILE> Preferences** menu, you will find general preference settings for **Nero** which are valid for all windows.

7.1.12.1 The GENERAL Property Sheet

In the **General** property sheet, you have three options:

If the **Start with new compilation** option is activated, **Nero** will start with **FILE> New** with every program startup.

If the **Start with File Browser** option is activated, the File Browser is opened every time **Nero** is started.



The *Nero preferences* the **General** property sheet displayed here

If the **Display Shell Icons** option is activated, you will see the windows-specific shell icons for each file in all of the windows. If you deactivate this option, only simplified icons are displayed, and access to folders and files can be noticeably faster under certain circumstances. This option is not available with Windows 3.1x.

If the **Check for correct CD format** option is activated, **Nero** will then show you an alert box if you're about to create an unspecified CD format. You can either abort the burn process or ignore **Nero's** warning. There is no guarantee, that unspecified CD-ROM formats can be written on any CD-ROM drive.

Defined standard CD formats are: CD-ROM, Audio-CD, Mixed Mode, Multisession CDs, etc...

Unspecified CD formats: for example it's not a good idea to mix mode 1 and mode2/XA tracks on the same CD. Another illegal CD format may be created by writing some audio tracks followed by an ISO mode 1 track and then to write some other audio tracks behind the others. Such CDs can not or can only partially be read by most CD-ROM drives. Many CD recorders can't write additional tracks on such CDs. Mostly likely they panic and throw lots of SCSI/IDE errors instead (especially „illegal request“ errors).

If the *Show compilation size in Nero's status bar* option is activated the level display in Nero's status bar will be turned on. **The level indicator** is located at the bottom of Nero's gray main window. Its purpose is to show the **size of the current compilation** and to indicate, if the compilation data will fit onto a CD. Normally, digital data is measured in megabytes and audio data in minutes of playing time. Therefore, Nero will display the size of audio and mixed mode compilations in minutes and other compilation types in megabytes. The blue bar graph inside the level indicator shows the current compilation size.

Normal CDRs have a capacity of 650 MB (74 minutes). However, some manufacturers produce now CDRs with larger capacities. So all, that can be said without examining a given CDR is, that 74 minutes of data should always fit onto the CD. Between 74 and 75 minutes the data might or might not fit onto the CD. Data larger than 75 minutes will definitively not fit onto a CD recordable. These borders are shown in Nero's level indicator as a yellow and a red dotted line.

If some companies manufacture CDRs with a capacity of more than 75 minutes, there is still a way to make Nero display a correct level indicator. It's possible to adjust the positions of the **yellow and red line** in Nero's preferences. But these values influence only the look of the level indicator. It is definitively not possible to „fake“ some additional megabytes onto the CD-R by modifying these values. But it's possible to turn off Nero's level indicator completely in the preferences dialog. Some users might like that, because harddisks and computer displays have something in common: They are always too small; no matter how large they are...

A level indicator is a nice thing to have. Unfortunately the displayed compilation sizes are not absolutely exact. This is the case, because:

- In most cases (except a „continued“ Multisession CD) Nero doesn't know the size of the destination CD yet. Maybe the CD wasn't placed in the CD recorder yet. Nero's level indicator behaves in this case just as if the destination CD would be empty.

- To calculate the size of some kinds of compilations (like for example ISO compilations) can be very difficult. The data structures to be built are rather complex, their size depends upon many Nero settings and it might take quite some time to build an ISO file system (this task is definitively not a „real time“ process)! But unless the ISO structures are built completely, the exact size of an ISO compilation is not known. So all, that **Nero** can do is to show a „good“ approximate compilation size.

In the input fields you can determine:

- the position of the yellow marking line within **Nero**'s level indicator in the measurement unit MSF (minutes, seconds, frames). One second corresponds to 75 Frames and one minute contains naturally 60 seconds. The default amounts to 74:00.00, which is the "minimum" CDR size of nowadays.
- the position of the red marking line within **Nero**'s level indicator in the measurement unit MSF (minutes, seconds, frames). One second corresponds to 75 Frames and one minute contains naturally 60 seconds. The default amounts to 74:40.73, which is the "maximum" CDR size of nowadays.

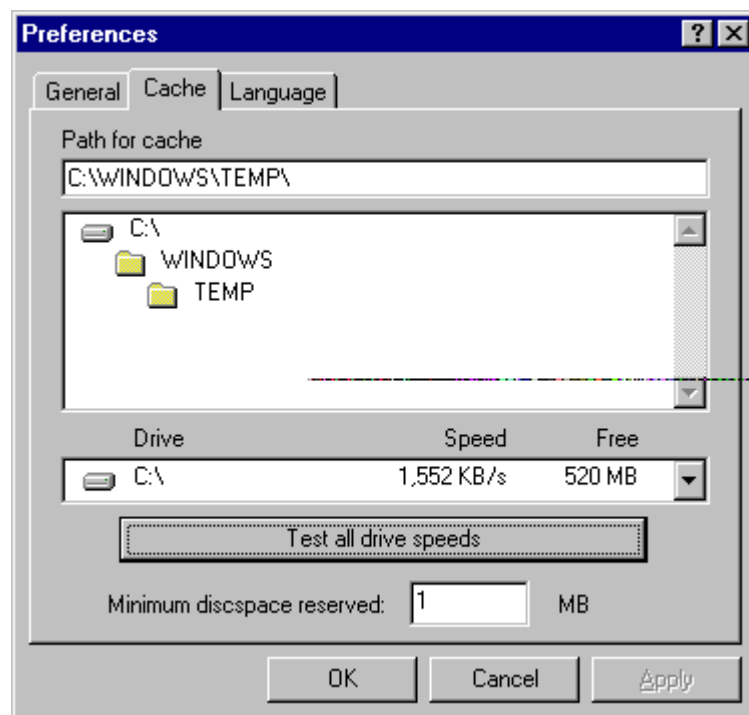
Note: The modification of this value influences only the optics of the level indicator.

7.1.12.2 The CACHE Property Sheet

You may establish preferences for a cache in this property sheet. A cache is a fast buffer memory in which data are stored during the burn process. The cache increases the assurance of a problem-free write or burn process. You can establish the path of the cache memory in the selection window. If more than one hard drive is installed in your computer, it is recommended that you test the speed of the hard drives and allocate the cache memory to the fastest drive.

The CACHE options are especially recommended for CD-ROM compilations. Cache memory cannot be used with Audio-CD compilations.

The property sheet *Cache*



7.1.12.3 The LANGUAGE property Sheet

You can select a language in the Language property sheet. **Nero** "likes best" to work together with the language of the operating system.

The property sheet *Language*

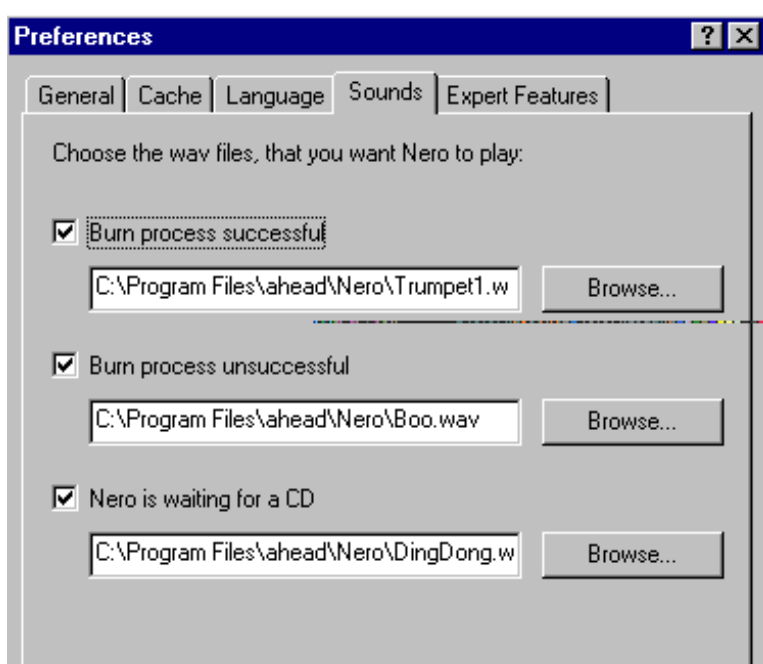


7.1.12.4 The SOUNDS property sheet

In this property sheet, you can choose some wave files that Nero can play when:

- the burn process has been successful
- the burn process has not been successful
- Nero is waiting for a CD

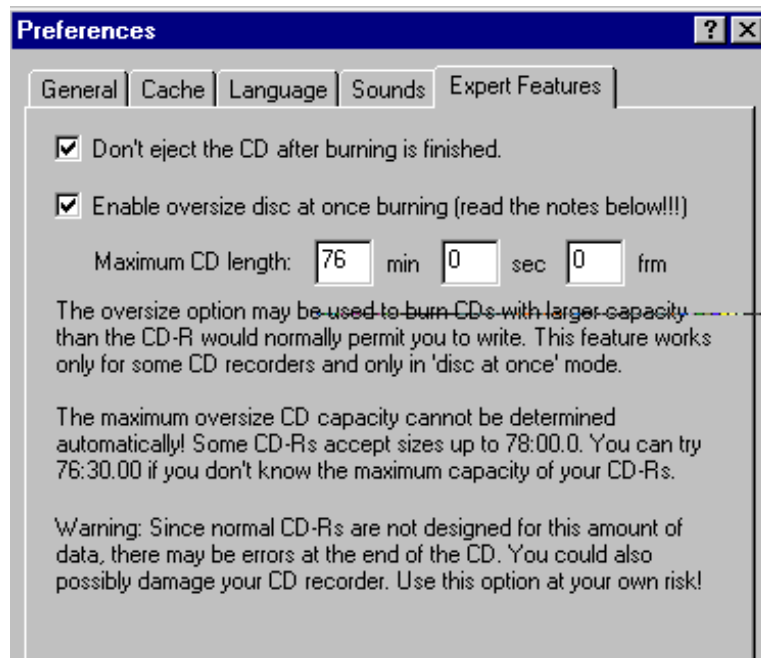
To be informed/alerted with the help of sounds can be useful to avoid a waste of time.



The property sheet *Sounds*

7.1.12.5 The EXPERT FEATURES property sheet

The property
sheet *Expert
Features*



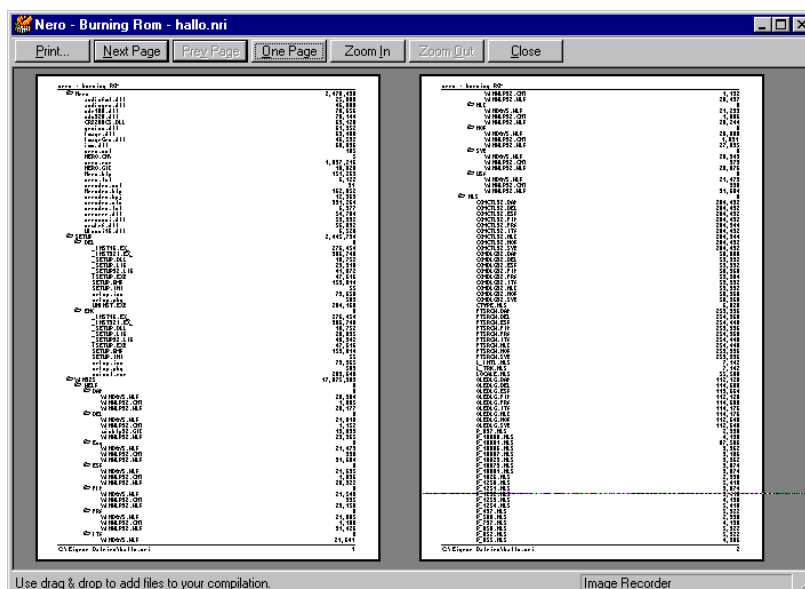
If the *Don't eject the CD after burning is finished* option is activated, the tray of your recorder will stay closed even if the burn process is done, which is not the case normally. This option is useful if you don't stay near your computer while your recorder is working. One of the Nero users wrote us, that he needed this option desperately, because his cat always used to jump onto the open tray of his CD recorder! We felt pity for him and implemented this feature.

If the *Oversize* option is activated, you will be able to write up to 76 minutes onto a 74 minutes CDR and up to 82 minutes onto a 80 minutes CDR. This option can only be used if your recorder supports the Oversize recording feature. Unfortunately, not all the recorders provide this feature.... To check if your recorder supports it, select the menu CD Recorder>Choose Recorder. If it does, you will see in front of "Oversize" the word "supported".

7.1.13 FILE> Page View

With the **FILE> Page View** menu option, you can take a more exact look at the directory structure of the active CD compilation before printing. The window shown in the illustration below is opened by this command. You can look closer at the individual pages here. Using the

appropriate buttons in the Page View window, you can print out the desired page (refer also to the **FILE> Print** menu). You can also zoom in or out, or show two pages side by side.



The *Page View* of the selected directory

7.1.14 FILE> Print

Nero allows you to print out the contents of a compilation. To do this, activate the compilation window and give the **FILE> Print** command. The printout will reflect the complete contents of the compilation. The size of each file is indicated. The number of pages and the source directory of the selected files are indicated on the lower edge of the printout. With this, you can locate the corresponding data at some later time.

After you have entered the **FILE> Print** command, the **Print** dialog box opens. You can select a specific printer here, if applicable. You can also select or change print properties, define the pages to be printed and the number of copies.

7.1.15 FILE> Print CD Cover

The *Print CD Cover* option allows you to print the booklet (or cover) and the inlaycard of the CD you have written. This option is part of the Cover Editor software.

Right now, the text that will appear in the Cover or Inlaycard has to be written in Nero. Soon, you will be able to edit the text also directly from the Cover Editor. We are working on it!

Audio CDs:

- To give a name of each audio tracks of your compilation, please double click on a track in your audio compilation. The Audio Track Info dialog box opens. In the *CD Text* fields (title/artist) write the name of the selected track. This name will then appear in your inlaycard.
- To give a name to the CD, please select *File>Compilation Info* and click on the *Audio CD* property sheet. You can enter then the title of the CD and the artist's name.

CD ROM:

- The Cover Editor will use the file names of your CD ROM compilation.
- To give a name to the CD, please select *File>Compilation Info* and
- click on the *Volume Descriptor* property sheet. In the *Volume Label* field, enter the name of the CD.

7.1.16 FILE> Exit

If you wish to quit working with **Nero**, select **FILE> Exit**. If you have made changes to an open compilation, you will be given a prompt asking if you want to save them.

7.2 The EDIT Menu

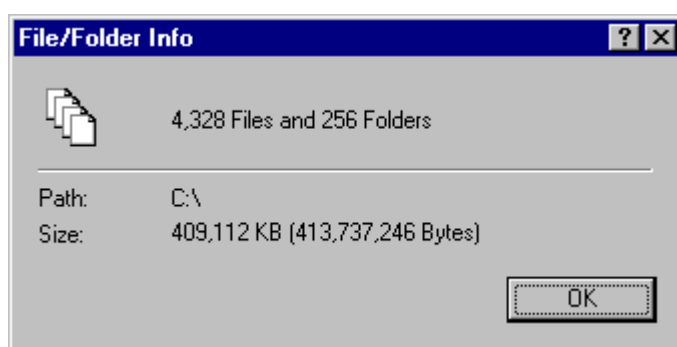
The **EDIT** menu serves primarily for exchanging data and for the organization of data in a compilation.

The menu options in **EDIT** with active *File Browser window*

Undo	Ctrl+Z
Cut	Ctrl+X
Copy	Ctrl+C
Paste	Ctrl+V
Delete	Del
Select All	Ctrl+A
Invert Selection	
Properties...	
Add File...	
Create Folder	
Find...	Ctrl+F

7.2.1 Menu commands with an active File Browser window

With the **EDIT** menu, different menu options are available to you, depending on the active window. With an active Data Browser window, there are three available commands: **Select All**, **Invert Selection** and **Properties**. We will describe them first here.



The **Properties** of the **WINDOWS** Folder in the **File Browser**

7.2.1.1 EDIT> Select All

With this command, you select *all* of the files and folders which are located in an open directory.

7.2.1.2 EDIT> Invert Selection

Using this option, you remove the active selection and select those folders and files which were not selected before.

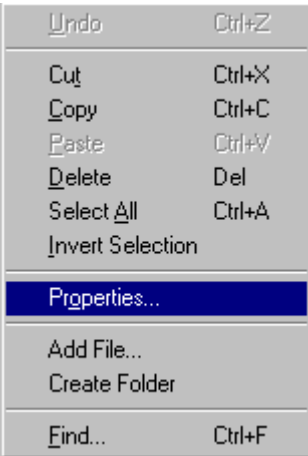
7.2.1.3 EDIT> Properties

This command provides you with information concerning selected folders or files. After you enter this command, the **File Info** window opens and **Nero** calculates the total size of the selected files. In the upper area of the window, you will find the name of the folder or file. In the middle of the window, the path, the size, the contents and the dates of production and the last modification are displayed. If you have selected a file, the corresponding attributes are displayed in the **File Attributes** field.

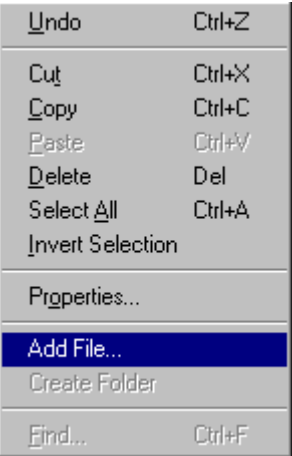
7.2.2 Menu options with an active CD-ROM or Audio-CD window

With the **Undo**, **Cut**, **Copy**, **Delete**, **Select All** and **Invert Selection** menu options, the same commands may be performed for a CD-ROM compilation as for an Audio-CD compilation. There are differences in the **Properties** and **Add File (Audio file)** and **Create Folder**. With CD-ROM compilations, there is the additional **Find** option.

The *EDIT Menu*
with active *Audio-CD*
compilation window



The *EDIT Menu*
with active CD-ROM compilation
window



7.2.2.1 EDIT> Undo

You can undo the last change to a compilation with this menu option. Of course, this command is only available when changes have actually been made.

7.2.2.2 EDIT> Cut

With the *EDIT> Cut* option, a selected portion of a compilation is removed and stored in the clipboard. The cut portion may then be pasted in at a different place. You may also use the icon from the toolbar as an alternate method.



7.2.2.3 EDIT> Copy

This command is used to copy a selected portion of a compilation into the clipboard. It can then be pasted in at a different place (duplicated). There is also an icon available here as an alternate method.



7.2.2.4 EDIT> Paste



With **EDIT> Paste**, a copied directory or files may be inserted at a desired location. There is an icon for you to use here also.

7.2.2.5 EDIT> Delete

This command deletes a selected directory or selected files. If you have carried out a deletion by mistake, you can restore the deleted data with the **EDIT> Undo** command. The deleted data do not actually land in the Windows Recycle Bin, since this is not really a deletion of files but rather an operation within the compilation, similar to deleting when editing text.

7.2.2.6 EDIT> Select All

If you wish to select the entire directory with all of its data, then you may use the **EDIT> Select All** menu option. This instruction is very useful when you want to import all of the data from an existing compilation into a new CD-ROM or Audio-CD compilation.

7.2.2.7 EDIT> Invert Selection

It is often desirable to copy only a certain portion of a directory. For example, if you want to copy the major portion of a directory but do not want a few files from it, select just the few, and then use **Invert Selection**. The selected areas can now be processed, for example by copying, cutting or deleting.

7.2.2.8 EDIT> Properties

7.2.2.8.1 CD-ROM compilation

The **EDIT> Properties** menu option may be applied in the following specific areas of a CD-ROM compilation:

- for the entire compilation
- for one or more folders
- for one or more files.

If you have activated the Volume Label of the compilation, this command will provide different information, including the total size and the number of the files and folders which are contained in the compilation. You already know this Information window from the **FILE> Compilation Info** menu.

On the other hand, if you are interested in information concerning a specific folder, click on the object you are interested in and then select the **EDIT> Properties** menu option. If you have selected a folder, the

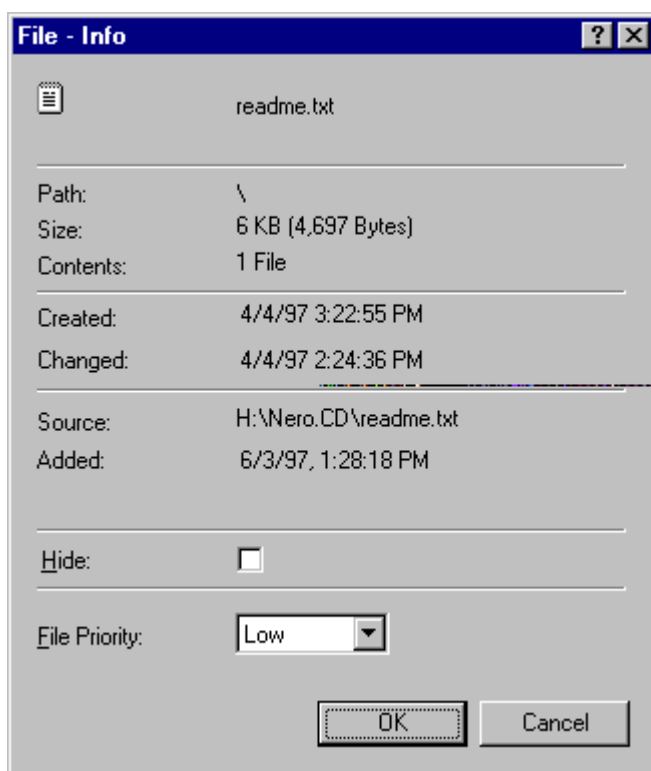
Information window will show you the name of the folder, its size, the contents and other information. You will see an example of the *Folder Info* window in the following illustration.

If you are interested in the properties of several folders, then you will receive essentially the same information. The one difference is that **Nero** does not display the names of the individual folders, but rather only the number of files which they contain.

The properties of a
CD-ROM compilation
folder



If you are looking for information on one or more specific files, select them in the compilation. The FILE INFO window is opened through the *EDIT> Properties* menu option. You will find detailed information on the size, location, date and source of the file here. In the lower window pane, you can define different attributes of the file. For instance you may chose to *Hide* the file or establish a priority for it. When the file is written, this *Priority* will be observed.



The properties of a file of the *CD-ROM compilation*

7.2.2.8.2 Audio compilation

The **EDIT> Properties** menu option may be applied for one single file of an Audio compilation. You will find information about the audio track you have selected.

7.2.2.8.2.1 TRACK PROPERTIES property sheet

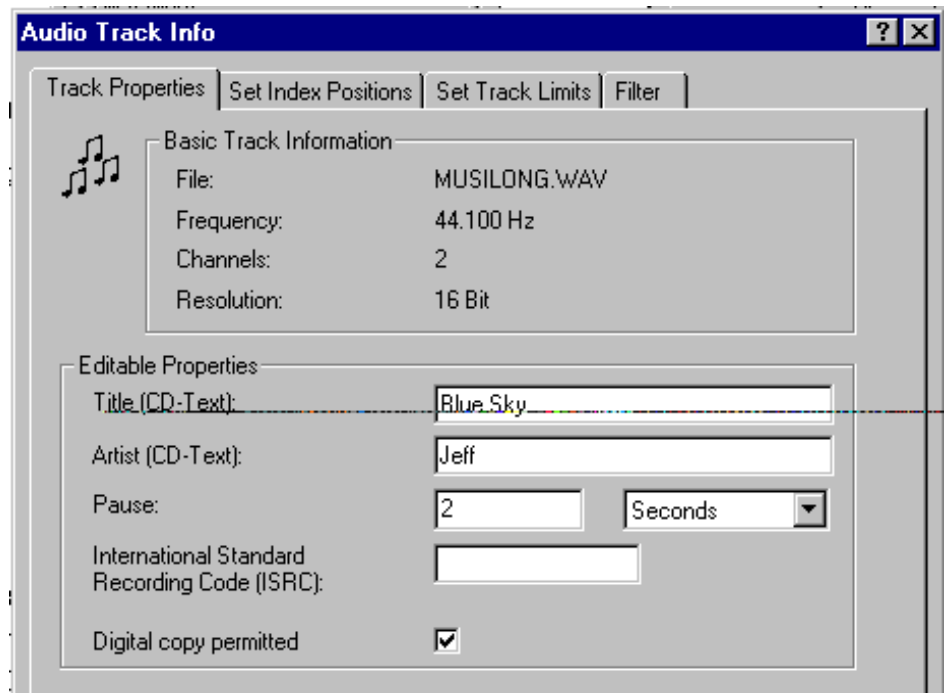
The **Track Properties** property sheet contains two main parts:

- in the first part, the name of the audio file you have selected will be displayed.
- in the second part you may change the track properties:

Title (CD Text)	Here you can give a rename to the audio track you have selected
Artist (CD Text)	Here you can enter the name of the artist
Pause	<p>Here you can set the pause length between two tracks in seconds or frames (75 frames=1 second). This option is very interesting, especially if your recorder doesn't support disc-at-once: unnecessary pauses can be avoided.</p> <p>If you don't change the pause length, the audio tracks will automatically be stored on the CD with two seconds in-between.</p>

ISRC	The ISRC (International Standard Recording Code) is a code to identify a CD track . ISRCs normally start with three characters followed by 9 digits. For example, „ABC123456789“ would be a legal ISRC. This information will be written to a CD if ISRC codes are supported by your recorder.
Digital Copy Permitted	Each audio track has a copy protection bit which is turned on by default. Nero will show a § character to remind you when you're copying an audio track with its protection copy bit turned on.

The property page
Track Properties



7.2.2.8.2.2 SET INDEX POSITIONS property sheet

This property page allows the definition of additional audio index positions. These audio index positions are recognized only by some (high quality) audio CD players and allow jumping to a defined position within an audio track.

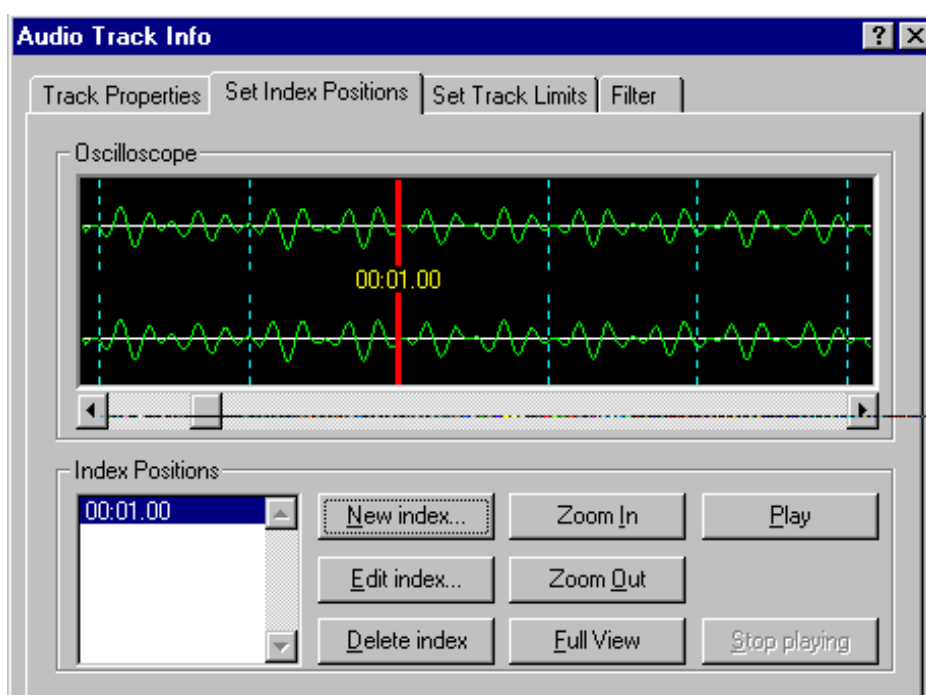
Note: The Windows 95 and NT Audio CD Player applications are unable to access audio index positions.

The oscilloscope style display can be used to watch audio data in a graphical style. Both stereo channels are shown as well as the current position within the audio track displayed as MSF (minutes, seconds and frames; one frame equals 1/75 of a second). Index positions are shown as red vertical bars. They can be created using the button *New*

index. The right mouse button can be used to switch horizontal zooming.

The **Index Positions** list shows the currently defined audio index positions. If you select an index position then the oscilloscope style display will show the corresponding audio samples. The selected audio index will be deleted if **Delete index** is clicked and it will be changed if **Edit index** is clicked.

If you choose the **Play** button, then playing will start at this position. **Stop playing** will stop any audio playback.

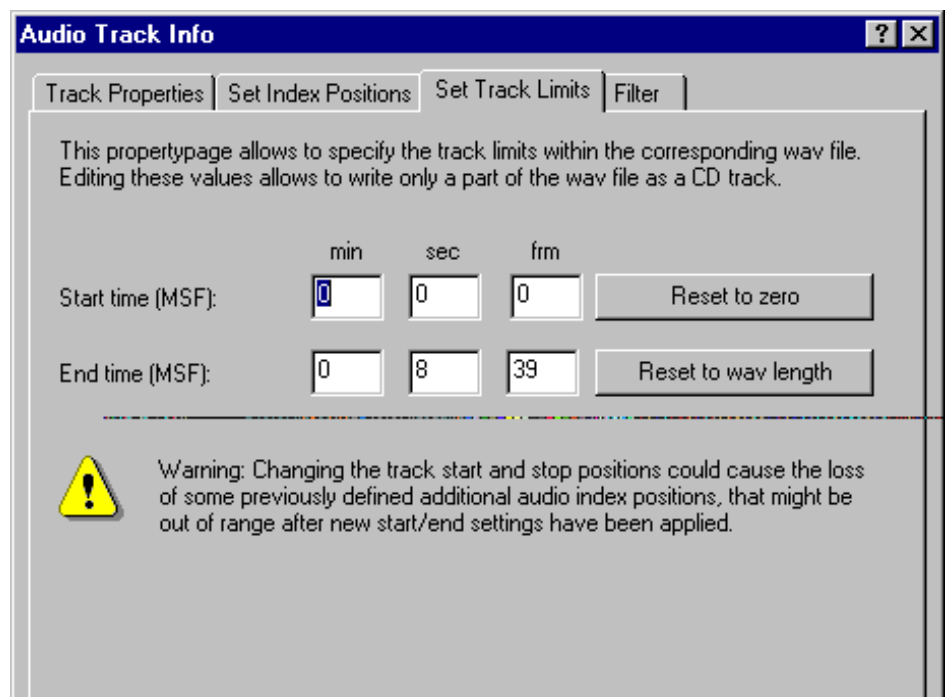


The **Set Index Positions** property page

7.2.2.8.2.3 SET TRACK LIMITS property sheet

This property sheet enables you to set limits within a Wav file. Editing these values allows to write only a part of the Wav. file as a CD track. This feature is intended to split large Wav files into several audio tracks.

The property sheet *Set track limits*

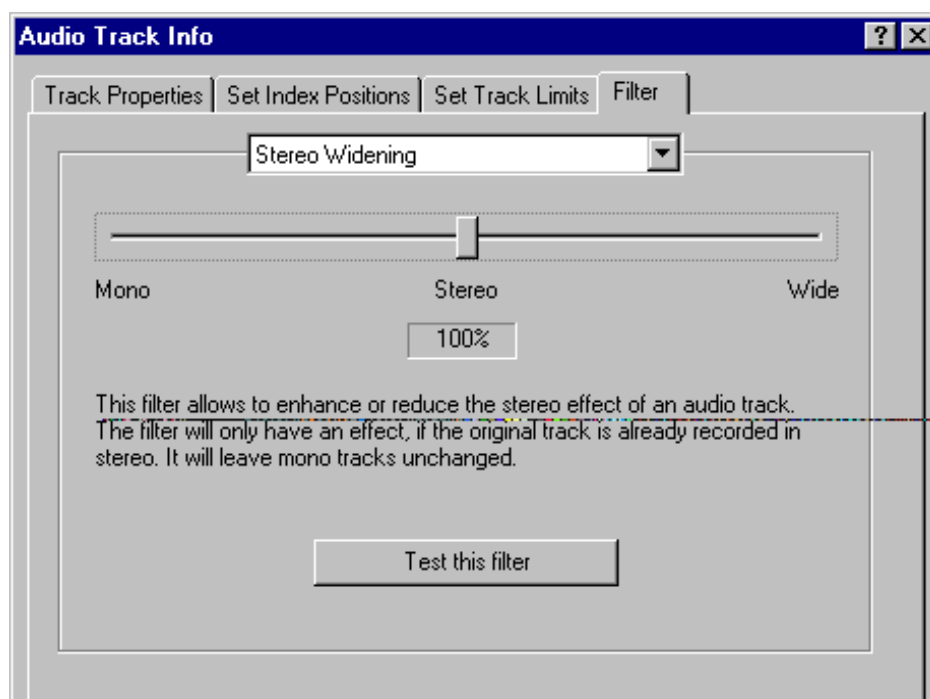


7.2.2.8.2.4 The FILTER property sheet

In this property sheet you will find several useful filters you may use for your audio CD:

- stereo widening
- fade in
- fade out
- normalize
- declick
- hiss reduction

Nero gives you the possibility to test all filters. Just click on the *Test this filter* button



The property sheet *Filter*

7.2.2.9 FILE> Add File

A list box is opened by the **EDIT> Add File** menu option. Here, you can specify the file you want to be added to the directory which you previously selected in the compilation. Through this list of menu items you can choose which files will be imported into the compilation. Select the files from the file name list here and confirm with **Open**. The desired file (or files) will be added.

The **Add File** command for more than one file



7.2.2.10 EDIT> Create Folder

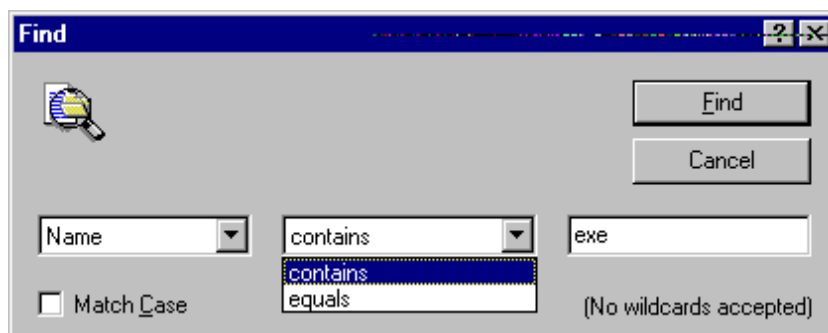
You can insert a new folder at any place in the compilation using the **EDIT> Create Folder** menu function. This command is especially useful for the regrouping of data.

7.2.2.11 EDIT> Find

Nero places a convenient search tool at your disposal. To search for an item, just use the **EDIT> Find** menu function. The **Find** dialog box opens. With the help of this dialog box, you can search through the data base of the CD-ROM compilation using different search criteria.

The illustration here shows a search for a file whose name contains the character sequence 'exe' as an example. Other search criteria which can be selected are: **Size is smaller than or equal to ... KB** and **File written/not written**.

Dialog box **Find** for files in the compilation



7.2.3 Shortcut keys for the EDIT menu

Many of the commands in the **EDIT** menu can be executed by corresponding key combinations (shortcuts) without opening the menu itself. These shortcuts are summarized below.

Undo	Ctrl+Z
Cut	Ctrl+X
Copy	Ctrl+C
Paste	Ctrl+V
Delete	Del
Select All	Ctrl+A
Find	Ctrl+F

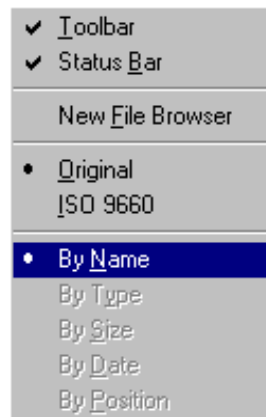
7.3 The VIEW Menu

The **VIEW** menu provides you with five preferences with which you can configure the working environment for **Nero**. This pull-down menu also relates to the CD-ROM window. If you have activated the File Browser window, only the three first options and instructions for the arrangement of the folders and files are available.

7.3.1 VIEW> Toolbar and VIEW> Status Bar

With the first two menu items, the toolbar and the status bar can be displayed or hidden. If either of the options has a check mark next to it, that bar will be displayed. Both bars are displayed as a default setting. In order to hide a bar, open the **VIEW** menu, select the corresponding item and click on it with the left mouse button. The check mark disappears, and the bar is immediately hidden.

The **VIEW** menu
with active
CD-ROM window



7.3.2 VIEW> New File Browser



With the **VIEW> New File Browser** menu option, an additional File Manager in the **Nero** work environment is opened. You may also use the icon in the toolbar for this function.

7.3.3 VIEW> Original or VIEW> ISO 9660

With the menu selection **VIEW> Original, ISO 9660** you establish whether the files of a CD-ROM compilation will be displayed with its original name or with the converted name corresponding to the selected ISO-Level. You will find additional information regarding ISO and the different ISO Levels under the **FILE> Compilation Info** (CD-ROM) menu item on the **File Options** properties sheet.

7.3.4 VIEW> By Name, By Type, By Size, By Date, By Position

You can establish the order of the files and folders in the window through the **EDIT> By Name, By Type** etc. menu items. There are no sorting criteria for Audio-CD compilations.

The files are displayed by name only in the CD-ROM compilation, while in the File Browser you have the choice of four further display criteria in addition to the alphabetical display. The current criterion is indicated by a dot at the left of the display selection.

By Name	This menu item displays the files sorted in alphabetical order.
By Type	With VIEW> By Type , the files are displayed by file type. They are displayed alphabetically within the same file type.
By Size	With this menu option, the files of the compilation are displayed based on their size. They are listed in descending order.
By Date	If you wish to display the files by the date of their last modification, choose this menu selection.
By CD-Position	This selection displays the files in their actual sequential position.

7.4 The CD-RECORDER Menu

There are five menu options available to you in the **CD-RECORDER** menu: **Choose Recorder**, **CD-Info**, **Save Track**, **Erase CD-ReWritable** and **Eject CD**.



The Menu
CD-RECORDER

7.4.1 CD-RECORDER> Choose Recorder

You can obtain information concerning the installed CD-recorder(s) through the **CD-RECORDER> Choose Recorder** menu. You may also use the icon from the toolbar for this function. **Nero** displays all of the CD-recorders in a list box.

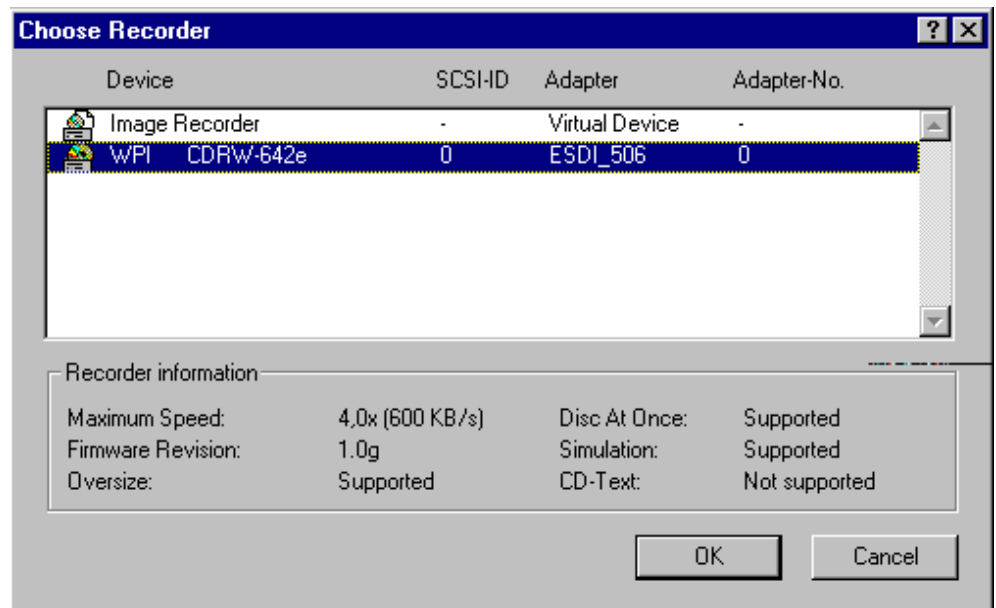
You will find the device designation for your recorder, the SCSI-ID, the host adapter and the adapter number in this list box.

You will also see the **Image Recorder** here. If you select this recorder, the files of the compilation will be written into an image file which you can use later (refer to **File> Burn Image**). You will be



prompted to enter a file name. Image files always have the suffix NRG.

The Dialog box
**Choose
Recorder**



Additional information on the selected CD-recorder is displayed in the lower area of the window. Here you can see

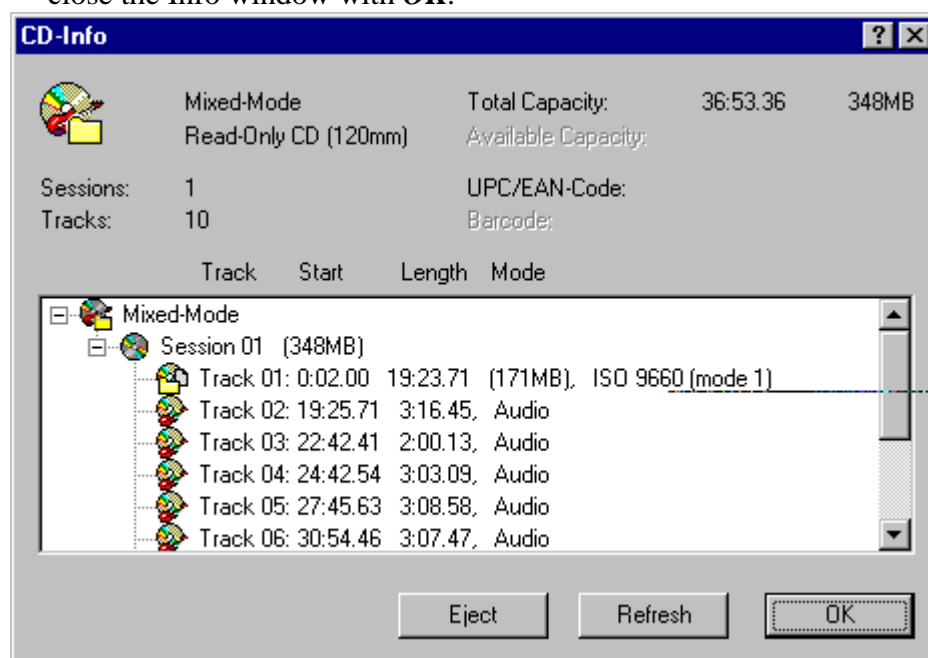
- what the maximum write or burn speed is with which your CD-recorder can work
- which firmware revision is involved
- whether the recorder enables Oversize CD recording
- whether the recorder supports Disc At Once
- whether the CD-recorder supports the simulation of the burn process, that is, whether it can run the actual write process, with the only difference being that the laser is not switched on for the simulation.
- and whether the recorder supports CD Text.

7.4.2 CD-RECORDER> CD-Info



You can obtain information concerning the CD-ROM or Audio-CD which is currently in the CD-recorder through the **CD-Info** menu option. You may also use the icon from the toolbar for this function. An information window will be opened. In the upper window pane you will find information about the type and the remaining available capacity. The lower window pane contains information on the session, the track, the mode and the length and size of the data base which is stored.

With the **Eject** button, you can instruct the recorder to open the CD drawer or to eject the caddy. You can remove the CD now. With the **Refresh** button, the current information is re-checked and displayed again if you have inserted a different CD since the last check. You can close the Info window with **OK**.



Information
about the CD in the
CD-RECORDER
menu

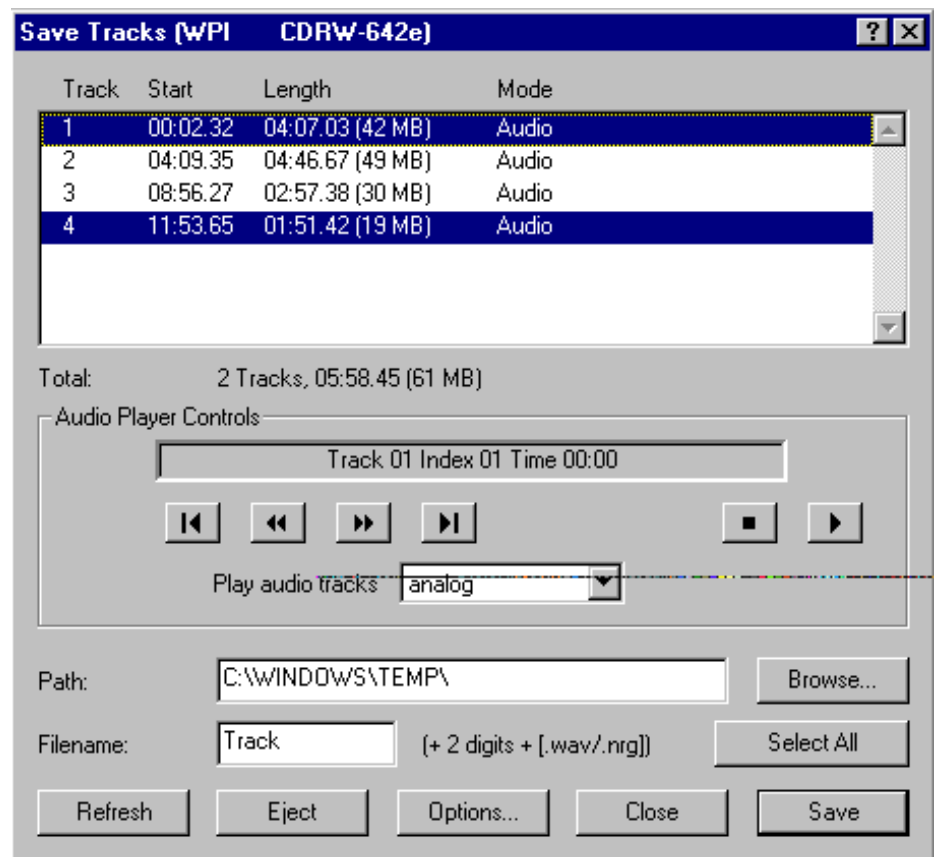
7.4.3 CD-RECORDER> Save track

Use this command to save audio tracks as Wav files or to save tracks temporarily. You will also find options to correct errors found during the burn process.

If you choose (by clicking) an Audio track in the window, you get the option to choose only **this** title, to save it temporary and to add further titles from other Audio's, too. So you can burn your *own* Audio. When an Audio-track in the above window is selected it will be saved as a WAV-file when button „Save as wavefile...“ is pressed. Here you input the name under which these sound files should be stored. Default is **track + chosen track number** (from window) and „**WAV**“. You can choose another name. .WAV will be added by NERO. If you save your Audio files the following windows will show you the remaining time, % completed and the succesful copy - or not.

You can also choose a data track, which will be saved as *Nero image file*. Later you will be able to burn this image file to a CD with **FILE> Burn Image**.

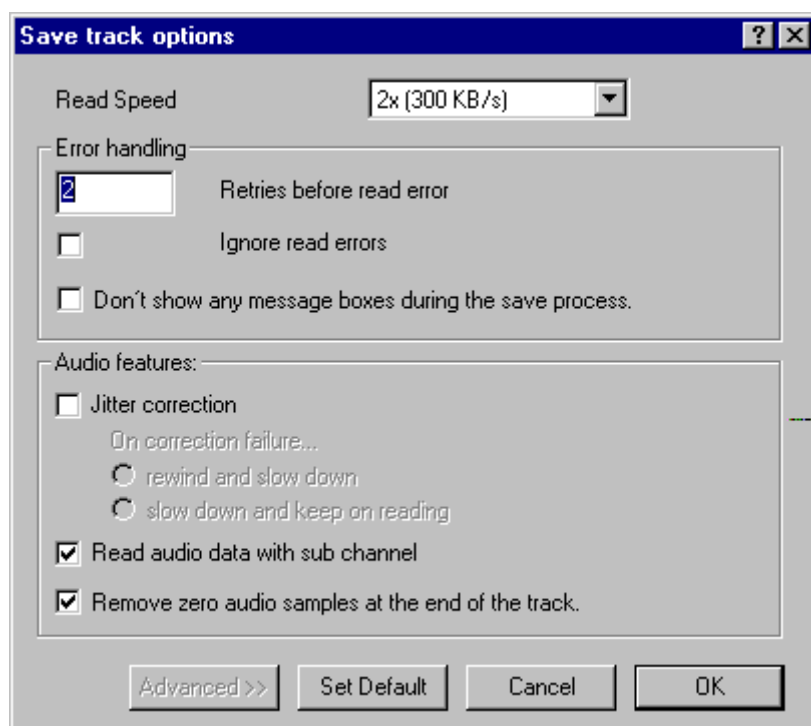
The Dialog
box *Save Track*



The *Audio player* can now be used before saving audio tracks as Wav. files. This audio player is also able to play audio digitally. That means, audio tracks can be played even from those devices, that are not connected to the sound card.

With *Options...* you can set options concerning the treatment of errors that might occur during the read process. The options you may set were explained in detail under 7.1.11.3 *The READ OPTIONS property sheet*.

If you have activated some options and are not sure you were right, please click on the *Set default* button. All the options will be displayed with their default settings.



The Dialog box
*Save Track
Options*

With **Advanced>>** you can set advanced options for the correction of errors that might occur during the read process of an Audio- CD or an Audio track.

To correct read errors Nero uses a two step method: While reading audio tracks Nero will check, if the audio data is continuous. If a discontinuity is detected, Nero will read the corresponding blocks again. Then Nero tries to find matching audio blocks from previous and current audio data. If matching audio blocks can be found, these blocks are written to the CD.

The details of the algorithm to detect discontinuities are as follows: Nero calculates a (linear) prediction for the audio data to come. Afterwards Nero compares the audio data with its previous prediction. The difference between expected and detected audio data is then compared with a threshold, which can be entered in the dialog field ***Tolerance for continuity***. Audio samples may have values from -32768 up to 32767 (for 16 bit samples). Therefore the maximum threshold is 65336. The precision of the linear prediction is determined by the number of input samples ***Number of samples*** and the number of prediction coefficients ***Number of coefficients***. The number of input samples must be greater than the number of coefficients.

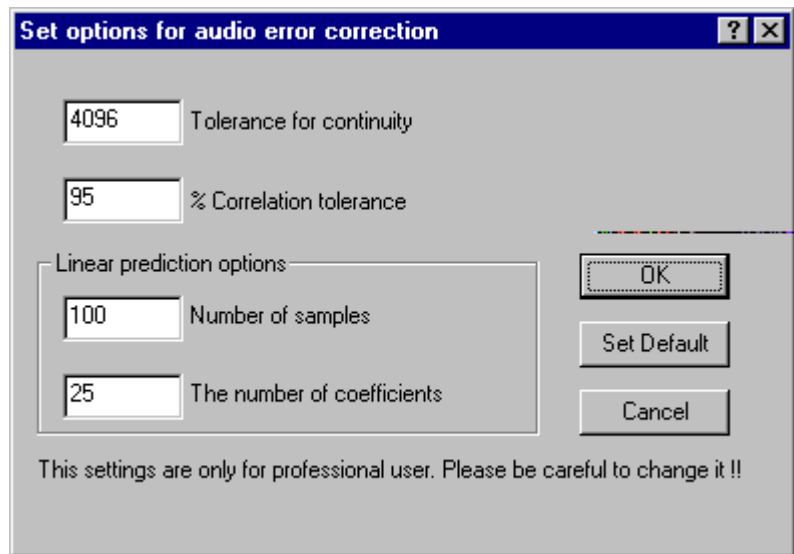
If the first step of the jitter correction detects a discontinuity, then the second step is to try to correct the error. Nero will reread audio data before trying to find matching sectors by calculating the correlation between the audio samples. A high correlation means, that both sectors have „something in common“. A correlation of 1.0 indicates a

perfect match. Nero again uses a threshold to determine if two sectors should be treated as identical. You can enter the threshold as percent in the dialog field **Correlation tolerance**. Again 100% indicates a perfect match.

Because these options can change the way Nero corrects audio data, modifications should only be done by an experienced user.

If you have made some changes and you are not sure, please press on the **Set default** button and you will get the default settings suggested by Nero.

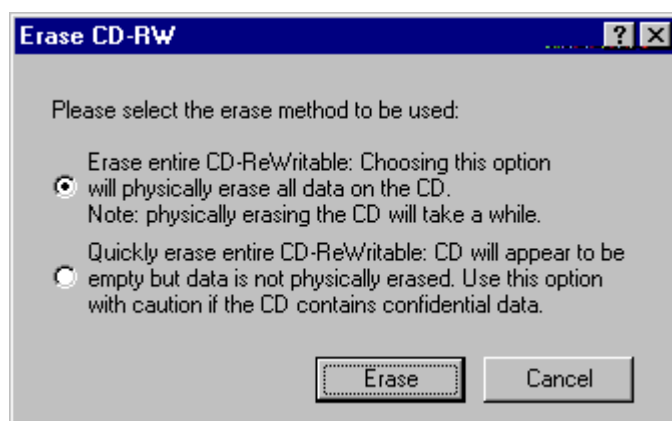
The Dialog
box *Options for
audio error cor-
rections*



7.4.4 CD-RECORDER> Erase CD-ReWritable

The menu option **Erase CD-ReWritable** is available only if you connected a CD recorder which is capable of writing ReWritable CDs. You may select between two erase methods to be used:

- Erase entire CD-ReWritable: Choosing this option will physically erase all data on the CD.
- Quickly erase entire CD-ReWritable: CD will appear to be empty but data is not physically erased. Use this option with caution if the CD contains confidential data.



The Dialog box
*Erase CD-
ReWritable*

7.4.5 CD-RECORDER> Eject CD

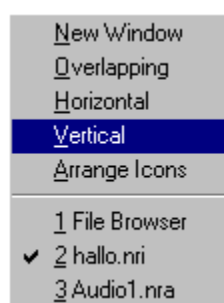
With the *Eject* menu option, you can instruct the recorder to open the CD drawer or to eject the caddy with the CD. There is also an icon available for this operation.



7.5 The WINDOW Menu

So that you will not lose your way in **Nero** while you are working with several open windows, the **WINDOW** menu provides you with different possibilities for arranging your work. The standard options which you already know from other Windows applications are available here.

In order to activate a window, all you need to do is to click on it. You should do that in an area of the window that doesn't have any special functions.



The **WINDOW**
Menu

In addition to the options for arranging things here, the windows which have been opened are listed in the lower area of the menu. The active window is checked.

7.5.1 WINDOW> New Window

You can open an additional window with the **WINDOW> New Window** menu option. Which one that is will depend on the active window. For example, if you have activated the File Browser, a new File Browser window is opened. The same is true for the compilation window.

7.5.2 WINDOW> Overlapping

The **WINDOW> Overlapping** menu option arranges the opened windows in a cascade in the **Nero** work area. This type of window arrangement is generally useful if you have a number of windows open at the same time - if you are working on several sessions at the same time, for instance. In order to bring a window to the top of the display, just click on its title bar.

7.5.3 WINDOW> Horizontal

This function arranges the open windows one on top of the other. Depending on screen size and resolution, this arrangement is useful up to a maximum of three windows. After that, Windows will look for a good arrangement for you.

7.5.4 WINDOW> Vertical

This function places the individual windows next to each other. This arrangement is also only useful with up to three windows. With more than that, Windows will look for a better arrangement.


7.5.5 WINDOW> Arrange Icons

The **Arrange Icons** function only comes into play when you have removed open windows from the desktop, or minimized their window size. The corresponding icons are then arranged in sequence in the lower working space of the window.

7.6 The ? Menu (Help)

7.6.1 HELP TOPICS

Nero is distinguished by user navigation which is intuitive in its operation. Nevertheless it may occur that you will need specific information during a work phase. Every good application has a Help function which will assist users in those places where they don't quite know what to do next. And so it is with **Nero**.

In the version of **Nero** which you have, we provide you with extensive **Direct Help** at the first level, also known as **context-sensitive Help**. If you wish additional information concerning an element on one of the Nero screens, just select the  symbol in the toolbar and then click on this element. An information window will open.

If you click on **F1**, you will also receive - unlike the Windows standard - the context-sensitive help for the field at which the cursor is pointing at the moment.

7.6.2 About Nero

When you open *About Nero*, you will see the **Nero** logo with information about your **version** of **Nero**, the copyright notice and the **serial number** of your copy which you entered at installation.

8 The Nero Multi Mounter

The **Nero Multi Mounter**, available for Win 95 und Win NT4.0, allows you to view ALL the sessions and to access ALL the files recorded on your Multisession CD!

The **Nero Multi Mounter** is automatically installed with the installation of **Nero**.

How to use the Nero Multi Mounter?

1. Insert your Multisession CD into your CD-ROM drive or your recorder.
2. Go to the Explorer and select the drive in which you put the CD.
3. Select *properties* either through the menu *File/properties* or by using the right mouse button. Then you will see two or more property sheets one of which is the *volumes* sheet.
4. Select the *volumes* property sheet. You can see now all the sessions listed that have been burned onto the CD.
5. Click on the session you want to be displayed, then return to the Explorer. You can see now the contents of the selected session and select a file.

9 Appendix A - ISO Character Set and Conversion Rules

9.1 Conversion Rules

Since different operating systems use different character sets, it is possible that a CD which is written or burned with one system cannot be read by a different system. Because of this, ISO 9660 has been accepted as the standard. The characters allowed in ISO 9660 are permitted in all of the common data structures of the most frequent operating systems. As a result, ISO 9660 imposes significant limitations on the letters and characters which are permitted for assigning names. **Nero** therefore makes provisions for the ISO 9660 character set as well as for the DOS and ASCII character sets.

For ISO, DOS and ASCII, there is the further division between the a-character set and the d-character set, which are listed below. For **ISO 9660**, there is yet another differentiation between two different levels:

- **Level 1** limits the length of a file name to a maximum of eight characters. When a file extension is to follow this, there is a '.' separation sign and a three-character file extension.
- The **folder name** may have a maximum length of eight characters in Level 1.
- At **Level 2**, the length for the file and folder names may total a maximum of 31 characters.

The following rules are generally observed:

- The d-character set is a sub-set of the a-character set.
- For file and folder names, the d-character set is always used.
- The following are valid for the fields of the volume descriptor:

Name	Character set	Length
Volume Descriptor	d-character	32 Bytes
System Identification	a-character	32 Bytes
Volume Set	d-character	128 Bytes

Publisher	a-character	128 Bytes
File Preparer	a-character	128 Bytes
Application	a-character	128 Bytes
Copyright File	d-character, '.', ';	37 Bytes
Abstract File	d-character, '.', ';	37 Bytes
Bibliographical File	d-character, '.', ';	37 Bytes

- The characters 'Ä', 'Ö', 'Ü', 'ä', 'ö', 'ü' and 'ß' are converted to 'AE', 'OE', 'UE', 'ae', 'oe', 'ue' and 'ss' in the ISO and ASCII character sets.
- The dot '.' is eliminated in the ISO character set if it was used in the folder name. With file names, only the last dot is maintained in the ISO character set as a separator between the file name and the file extension.
- Characters which are not allowed from the selected-character set are replaced by the '_' underline character.
- File and folder names are shortened if they are longer than the selected maximum length. Abbreviation procedure: the first four characters are maintained, the next character(s) is/are eliminated until the length is not more than the allowed maximum. For example: from the original file name **börning_rom.txt**, the file name after conversion to ISO Level 1 is **BOER_ROM.TXT**.

9.2 ISO 9660 charset

ISO 9660 a-character set

	0	1	2	3	4	5	6	7
0				0		P	`	p
1						Q	a	q
2						R	b	r
3						S	c	s
4						T	d	t
5						U	e	u
6						V	f	v
7						W	g	w
8						X	h	x
9						Y	i	y
A						Z	j	z
B					K	[k	{
C					L	\	l	
D					M]	m	}
E					N	^	n	~
F						-	o	D

ISO 9660 d-character set

	0	1	2	3	4	5	6	7
0				0		P	`	p
1						Q	a	q
2						R	b	r
3						S	c	s
4						T	d	t
5						U	e	u
6						V	f	v
7						W	g	w
8						X	h	x
9						Y	i	y
A			*			Z	j	z
B			+		K	[k	{
C			,		L	\	l	
D			-		M]	m	}
E			.		N	^	n	~
F			/			-	o	D

10 Appendix B - Shortcuts (Hotkeys)

It is frequently easier and quicker to perform certain functions in **Nero** with a specific key combination (hotkeys or shortcuts) without having to open the associated menu. These shortcuts are listed and explained below.

10.1 In the FILE Menu

New	Ctrl+N
Open	Ctrl+O
Save	Ctrl+S
Print	Ctrl+P

10.2 In the EDIT Menu

Undo	Ctrl+Z
Cut	Ctrl+X
Copy	Ctrl+C
Paste	Ctrl+V
Delete	Del
Select All	Ctrl+A
Find	Ctrl+F

10.3 In the CD-RECORDER Menu

Eject CD	Ctrl+E
----------	--------

11 Glossary

A/D

Analogue/Digital. The conversion of analogue signals to digital characters.

ADPCM

Adaptive Delta Puls Code Modulation. This is a compression procedure for audio data which is applied primarily for CD-I and CD-ROM/XA. With this procedure, up to 16 hours of music in normal radio quality can be stored on a CD.

ASPI

Advanced SCSI Programming Interface. An expanded Standard SCSI software interface which serves as a link between host adapters and SCSI programs.

Block

A block is the smallest addressable information unit on a CD-ROM. A block corresponds to a sector.

Bridge Disc

A CD-ROM which can be read by a normal CD drive as well as by CD-I devices. It is specified in the White Book. An example of a Bridge Disc is the Photo-CD.

Cache

A fast intermediate or buffer memory which is applied at many different areas in a computer system. With **Nero**, cache memory is used to store files in buffer from drives which cannot be accessed quickly enough in order to ensure that the writing process continues without interruption.

Caddy

A special plastic housing used to protect the CD. The CD is inserted into the drive in the caddy.

CD-DA

Compact Disc - Digital Audio. The typical music CD is written with this CD format. At this time, up to 74 minutes of music can be written on a CD. The corresponding standard is the Red Book.

CD-I

Compact Disc - Interactive. This format allows the storage of different types of data such as images, music or video on a CD. The process is defined in the Green Book.

CD-R

Compact Disc - Recordable. A technology for CD-R (recordable) media. You will find a description of this technology in the Orange Book.

CD-ROM

Compact Disc - Read Only Memory. This is described in the Yellow Book. Differing types of data which can be read by a computer such as programs, text, image data or sound may be stored with this CD format.

CD-ROM - Mode 1 and 2

A supplement to the CD-ROM format which provides an additional error recognition and correction function. Mode 1 is especially used for computer data and employs a code for error correction. Mode 2 is used with CD-ROM/ XA and CD-I with audio data and contains an error recognition code only.

CD-ROM/ XA

CD-ROM/ Extended Architecture. This CD format makes it possible to store computer data and audio or video data on one track. The different types of data are linked to each other (Interleaving) so that synchronization problems can be reduced.

CD-WO

CD - Write Once. A CD which, as the name implies, may only be written on one time. Refer also to CD-R.

CIRC

Cross-Interleaved Reed-Solomon Code. An error-recognition and correction process which is integrated permanently in the hardware of a CD player or the CD-recorder.

CLV

Constant Linear Velocity. CLV describes a method by which the data of a CD may be read with a constant scanning rate.

Digitalization

Conversion of analogue signals to digital signals.

Disc At Once

Disc At Once is a method for recording of data onto a CD. With this method, the entire CD is written in a single process. The CD-recorder first writes a Lead-In, then the data block, and finally a Lead-Out. In contrast to Track At Once, linking blocks are not used between the individual tracks with Disc At Once.

EDC/ ECC

Error Detection Code/ Error Correction Code. This process serves for the recognition and correction of scan errors which might be caused on the CD surface by scratches or dirt.

Enhanced Music CD, CD + and CD Extra

An expansion of the Audio or Mixed-Mode CD, consisting of two sessions. The first session corresponds to CD-DA, while the second session consists of computer data. The process is specified in the Blue Book.

Finalization

Finalization is the permanent closing of the writing procedure on a CD. After that, it cannot be written to, regardless of whether it was produced as a single-session or a multi-session CD.

Frame

A sector is made up of 98 frames. A frame contains 24 data bytes and 9 control bytes. With an Audio-CD, 75 sectors provide one second of played music.

Green Book

The standard in which the CD-I is defined.

High Sierra

The forerunner of today's ISO Standard 9660. It was published in 1986. With the passage of time it has lost its significance.

Host Adapter

An adapter which connects a CD-recorder with the SCSI bus of the computer.

Hybrid-CD

The term Hybrid-CD is used in connection with CD-recording with two different meanings.

- A Hybrid-CD is a multi-session CD on which the first session has been previously written and all subsequent sessions may be written at a later time. The CD-WO (Write Once) and the term multi-session are defined in the Orange Book, among other things.

- With the appropriate recording software, for example with **Nero**, you can create CDs on a Macintosh which contain an HFS (Macintosh) and an ISO 9660 data system, and may therefore be read by a PC. These are known as Hybrid or multi-platform CDs.

Image

The term "image" describes all edited data which will later be located on a CD. The creation of an image file is known as premastering.

Interleaving

This is the designation for the storage of computer data on the CD-ROM/ XA in linked form. Another term here is nesting. This makes possible the synchronization of audio and computer data during playback.

ISO 9660

ISO Standard 9660 describes the construction of a CD-ROM, so that it may be read and processed by different types of operating systems.

Joliet

This supplement to the standards comes from Microsoft and is supported by Windows 95 and Windows NT. The CDs which are created under this standard are in conformity with ISO 9660, which allows long file names based on Unicode in additional directory structures.

Label

Most CDs are provided with an imprint. This is known as the label. It is possible to place it on the CD with different technologies, for example, with screen printing.

Lead-In Area

The initial area of every session is known as the Lead-In Area. This is where the TOC and additional information concerning the CD is stored.

Lead-Out Area

This defines the end of a session. If the CD has not yet been finalized, the reference to the next session is stored here.

Master

After the creation of an image file, the actual process of CD production occurs. If the CD is to be used for reproduction purposes, it is known as a master.

Mixed Mode-CD

Music and computer data are stored on one CD with this type of CD. The computer data are generally located on track 1 and audio data are located in the ensuing tracks.

Multi-Session-CD

A CD which is written in several sequential sessions is known as a multi-session CD.

On-The-Fly

A process for burning data onto a CD-R. There are two different methods of doing this. With the classical and older method, all of the data which are to be recorded onto the CD are first stored in a buffer in a large file known as an image file. From there, they are copied or burned onto the CD-R. In contrast to this, the method known as On-The-Fly transfers the data directly from their original memory locations on a hard drive onto the CD-R. With **Nero**, a so-called compilation is used for this purpose. This is a small file which only cross-references the data to be transferred.

Orange Book

The standard in which the CD-MO (Magneto-Optical) and CD-WO (Write Once) technologies are defined. It provides the basis for CD-R.

Photo-CD

A CD which is used for storing images, photos, slides and other visual data. The Photo-CD is generally capable of multi-sessions. The standard comes from Kodak and Philips.

Premastering

The preparation of data which are to be written onto a CD at some later time. An image, which represents an exact replica of the data and the directory structure, is usually created first.

Rainbow Books

The collection of standards which define the different types of CDs. Through these standards, it has been achieved that CDs can be read and processed by as many devices and operating systems of the different manufacturers as possible.

Red Book

This standard describes the CD-DA.

Scan Rate

This is the indication of the frequency with which analogue signals are converted into digital characters.

SCSI

Small Computer System Interface. SCSI is a modern bus system to which different terminal devices such as an SCSI hard drive, streamers or a CD-recorder may be connected. At this time, SCSI is the only possibility of operating a CD-recorder on a typically-used computer system.

Sector

A sector is the smallest addressable information unit of a CD. It is composed of 2352 bytes of which - depending on the type of CD used - differing amounts are available as user data. A sector generally consists of a header, synchronization bits and user data. It may also have error recognition and correction data. To read a sector, a drive with simple reading speed requires 1/75th of a second.

Session

An inter-related writing procedure is defined as a session. A session consists of the Lead In area, the data area, and the Lead Out area. A

CD can be written with several sessions. This is then called a multi-session CD, in contrast to a single-session CD which only contains one session. A silver CD generally consists of one session.

Simulated Recording

Simulation of the burn process in order to test whether there is a constant writing flow. The procedure is the same as the writing of the CD, with the only difference being that the laser writer is switched off.

Toc

Table of Contents. This designates the contents of every session and is stored in the Lead In.

Track

In an Audio-CD, one track corresponds to one piece of music. With a CD-ROM, one track contains computer data and it may have any number of files and folders.

Volume Descriptor

The Volume Descriptor is the area at the beginning of a CD in which the structure of the file system is contained. It may also contain additional and optional information about the CD, such as the name of the CD, the publisher, a copyright notice, etc.

Wo

Write Once. A medium which may be written to once. This includes the CD-Recordable.

Yellow Book

This standard defines the CD-ROM.

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