

This textfile has been re-formatted to be 70 characters wide. This makes printing easier for you. However, if you don't have a printer and you're not into reading all the text on screen, you can buy a printed manual for your Buddha controller. The contents are the same!

## CONTENTS

### BUDDHA INSTALLATION MANUAL

#### SOFTWARE MANUAL

- Introduction
- Backing-Up the CacheCDFS Master Disk
- Installation
- Using CacheCDFS
- Theory of Cache Operation
- Setting CacheCDFS Preferences
- Playing Audio CDs
- Introduction to the CD32-Emulator
- Installing the CD32-Emulator
- Using the CD32-Emulator
- Setting the CD32-Emulator preferences
- Questions & Answers - Troubleshooting

### BUDDHA INSTALLATION MANUAL

#### License conditions

No part of the hardware, the software or the manual may be multiplied, disseminated or processed in any way without the written consent of Elaborate Bytes, Oliver Kastl and individual Computers, Jens Schönfeld. Violations of these conditions will be prosecuted in every case.

The use of hardware or software is done at your own risk. The manufacturer and developer accepts no liability for any damages, either as direct or indirect consequence of the use of this product or software. We do guarantee that these products were subjected to thorough tests and that no deficiencies could be detected.

Only observance of these conditions allows you to use the hardware and software in your computer system.

All rights reserved.

Software Copyright 1993, 1994, 1995, 1996, 1997 Elaborate Bytes, Oliver Kastl (okastl@msn.com).  
Hardware Copyright 1996, 1997 individual Computers, Jens Schönfeld (sysop@nostlgic.tng.oche.de).

Any trademarks used in this documentation may be protected without special indication. Amiga is a registered trademark of Escom AG. The Buddha logo may be multiplied for advertising purposes for this hard/softwarepackage.

## Preface

Buddha is a combined program/hardware package which lets you use IDE devices such as harddisks and Atapi CD-Rom drives in any Amiga Zorro-II system.

The package consists of the following parts:

1. The Buddha controller and one IDE-cable which lets you use IDE harddisks without additional software except the commodore install disks.
2. ATAPI allows the usage of any ATAPI devices (CD-Roms, Streamer) with the IDE port. For the use of ATAPI streamers, a backup program is required. All CD-Roms conforming to ATAPI 1.2 or better are supported. It is possible to operate one IDE harddrive together with one IDE-ATAPI CD-ROM on the same connector.

These drives have been tested. We can only guarantee correct function with these drives:

Acer 6825-P  
Chinon CDS-525-I Chinon CDS-545  
Creative Labs CD220-E  
Mitsumi FX-001DE Mitsumi FX-x00 series  
Panasonic CR-574B  
Sony CDU-55E  
Toshiba XM-5203B  
Wearnes CDA-120 Wearnes CDA-220

3. CacheCDFS is a CD-Rom filing system for use with ATAPI CD-Roms on the Buddha controller.
4. PlayCD is a CD Audio player for ATAPI CD-Roms
5. The CD32-Emulator emulates a CD32 games console with ATAPI CD-Roms

All programs require Kickstart 2.04 or better to operate.

## Contents

The package contains the following items:

- \* Buddha IDE controller
- \* IDE cable
- \* Buddha install disk

The following accessories are separately available or may be bundled within the package:

- \* Amiga 500 adaptor
- \* printed manual
- \* additional IDE ribbon cable

If anything from this list is missing please immediately complain at your dealer.

### Installing the Hardware

ATAPI units have to be connected with one of the Buddha IDE ports. Two units can be operated on one IDE port.

If you connect IDE devices: Pay attention to the orientation of the ribbon cable. Make sure that Pin 1 of the CD-ROM is connected with Pin 1 of the IDE connector. One edge of the ribbon cable is marked with a color strip which identifies Pin 1. The CD-ROM also needs to be connected to the power supply of your Amiga. To do so, connect one free plug from the power supply to the appropriate connector on the ATAPI drive. This connector must have four contacts and from all of them a wire must run to the power supply. Sometimes these plugs only have three wires attached which will not work!

Connect one or two IDE drives to one IDE cable. When connecting two drives, one of them must be configured as the Master drive, the other must be configured as the Slave drive. If you wish to connect an IDE Harddisk and an ATAPI CD-Rom together to this connector, the harddrive must be configured as MASTER and the CD-Rom as SLAVE. Refer to the manual or data sheet of the hard drive and/or the ATAPI CD-Rom.

Example:

Buddha IDE -----Master-----Slave  
                                   (Harddisk)                                  (CD-Rom)

You may also use 4-drive adaptors on each of the Buddha ports. We strongly recommend that all of the cables are not longer than 1,80m if you add them all together, because the bus drivers on the Buddha are not designed to drive longer cables. If you need more IDE ports in your Amiga, we recommend to install another Buddha controller instead.

### Installing the Software

Before you can use a CD-ROM or a connected IDE drive which is not mounted automatically after bootup, you have to install the required driver software on your system. Very likely your Amiga is already equipped with a harddrive from which the Workbench automatically starts after power on. This is exactly where the appropriate files and programs need to be copied to. If you need instructions on how to install a workbench on a harddisk, please refer to the manuals that were shipped with your Amiga. The Buddha controller is compatible with the commodore "Hdtoolbox", just boot from the "Install Disk" of your workbench distribution and proceed as described in your manuals.

The included software falls in two parts: The programs required to operate the CD-ROM and those required to operate an IDE harddrive. You need only install those programs you actually need. You shouldn't install the IDE software without having an IDE drive attached. The same is true for the CD-ROM software.

Note: For IDE-ATAPI CD-Rom drives, only the CD-ROM software is required.

### Installing the CD-ROM Software (ATAPI and/or CacheCDFS, CD32-Emulator, PlayCD)

Important: To be able to install the CD-ROM software you must have set up your hardware appropriately first. It is not possible to install the software without having a CD-ROM drive connected.

The CD-ROM software is conveniently installed into your system with the supplied installation program. Start the Workbench of your Amiga as usual. Then start the program Install from the included disk. This program interactively installs your system appropriately.

### Installing the IDE tools

The installation of the IDE software must be accomplished manually. But, don't be afraid, this is easier than you probably think. The installation program mentioned above has already copied all necessary files to your Harddisk.

To utilize an already formatted IDE drive you just need to connect it to one of the Buddha IDE ports. After restarting your Amiga the harddrive should automatically show up. Use the Hdtoolbox from your "Install Disk" of your workbench distribution to change the bootpriority.

To use a new harddrive or removable media you need to format it first using the program HDToolBox. This program is located in the Tools directory of your Workbench partition. For instructions, consult your Amiga operation manual.

## Manuals

Detailed user manuals to all programs can be found as text files on the disk. Look into the Docs Drawer. For each program there is a file which can be read by simply double clicking on it.

In your Amiga user manual you find information on how to print a copy of these files using the program PrintFiles from the Workbench.

Further, you should refer to this Software manual.

## Software Manual

### Introduction

Welcome to CacheCDFS, a CD-ROM control solution for the Amiga family of computers. The CacheCDFS package consists of a high-performance FileSystem, a CD Audio player program, an emulation package that allows you to play most of the popular CD-ROM games designed for the AmigaCD32 game console and other support programs to further control your CD-ROM drive.

In this package you will find: this manual and a 3.5 inch master disk. You are strongly advised to fill in the registration card at the end of this manual and send it to us to achieve technical support and updates.

### What is a FileSystem?

Data is written to a storage media in a precise manner. With Amiga hard drives, this data layout is called FastFileSystem. Data on CD-Roms is stored differently. This is why you need a different filesystem. In simple terms, the FileSystem is a "translator" between the physical layout of a disc and AmigaDOS.

It must be noted, that a FileSystem only provides access to data. No processing or converting of the actual data takes place. This job is left to other applications. A good example for such an application would be a PhotoCD reader (like PhotoWorx from Corporate Media). The FileSystem gives AmigaDOS access to the physical disc layout, PhotoWorx uses AmigaDOS to read the images and shows them. There are different common ways the data on a CD-ROM may be organized:

#### 1. HighSierra

High Sierra was the first attempt to define a standard data layout for CD-Roms. It has been quickly replaced by its successor, the ISO9660 standard. Today this format can be considered obsolete. The CacheCDFS does NOT support the High Sierra protocol. High Sierra formatted disks can't be read by the CacheCDFS. However, if there is

enough public demand High Sierra might find its way into the FileSystem in a future release.

## 2. ISO9660, Level 1

This is the most popular data layout for CD-Roms and can be found mostly in the MS-DOS world. The CacheCDFS is able to read such discs.

## 3. ISO9660, Level 2

This is an extension to ISO9660, Level 1. It allows longer filenames. It is the most popular format for dedicated Amiga CD-Roms. The CacheCDFS is able to read such discs.

## 4. Rock Ridge

Rock Ridge is a further extension to ISO9660. The "trick" with Rock Ridge is, that an ISO9660, Level 1 formatted disc, readable with MS-DOS machines, "magically" gets extended file names on more "sophisticated" machines, like your Amiga. The CacheCDFS is able to process Rock Ridge extensions correctly.

## 5. Macintosh HFS

As the name implies, this format can only be found on Apple Macintosh machines. It is the same layout as used on Macintosh harddisks. The CacheCDFS will try its best to read such disks.

## System Requirements

This package requires the following to operate:

- an Amiga computer
- AmigaDOS 2.04 or greater
- a Buddha controller with CD-ROM drive
- at least 1 megabyte of memory
- any ISO9660, RockRidge or HFS formatted CD-ROM discs

The CD32 Emulator requires the following to operate:

- a Commodore Amiga computer with AA/AGA chipset and an MC68EC020 or better processor (A1200 with Z-II expansion board or A4000)
- AmigaDOS 3.0 or greater (for better compatibility with CD32 games, AmigaDOS 3.1 is recommended)
- A Buddha controller with a double speed ATAPI CD ROM drive (some games will also work with single speed drives)
- at least 2 megabyte of chip memory and 1 megabyte of 32-bit fast memory.
- an AmigaCD32 game on compact disc.

## Backing-Up the Buddha install Master Disk

It is always advisable to make a backup copy of your master disk. Since CacheCDFS is not copy-protected, the Commodore diskcopy utility will suffice for this purpose. If you are unfamiliar with this program, consult the AmigaDOS manual for further instructions.

## Installation

For a painless installation procedure, CacheCDFS utilizes the Commodore Installer utility. Important Note: Before starting to install CacheCDFS, your CD-ROM drive MUST be connected to your Amiga and must be operational (switched on), otherwise the installation will not work!

A step by step guide through the installation

Important Note: Read this carefully while doing the first time installation! Double-click on the Install icon to invoke the installation progress. The Install window will appear. Here you should click Proceed with Install. Now you are asked for Installation Options. Simply click Proceed. Now the FindCD program is launched to help you selecting the correct device and unit for the CD-ROM drive you wish to install. You may manually select the device driver by clicking its name, or you may click the Scan gadget. If you click Scan, FindCD will search for any CD-ROM drive connected to your machine. If FindCD finds a CD-ROM drive, it will be displayed. Note for users with more than one CD-ROM drive: If more than one CD-ROM drive is found, you have to select the one you wish to install. To install multiple CD-ROM drives or CD-ROM changers, you simply have to start the Installation utility again and again, until all of your drives are installed. After you selected the drive to install, click Use. If everything went well, you are now presented with the Filesystem -> Controller Configuration window. If not, FindCD was not able to locate your CD-ROM drive. In this the case, you'll have to check your hardware installation.

Now the Installation utility asks you, if you would like the CD-ROM drive automatically mounted upon bootup. Usually you should select Yes.

Important Note: If you are not sure if your CD-ROM works with CacheCDFS and the Buddha controller, it was wise to select No. Otherwise you might not be able to boot your Amiga, as the machine might freeze or crash while trying to activate your CD-ROM! If you are in doubt, select No! After testing the proper operation of CacheCDFS with your CD-ROM, you can simply start the installation utility again and select Yes at this point of the installation procedure.

Now you are asked which AmigaDOS device name your CD-ROM should get.

The default is CD0. You may insert any valid AmigaDOS device name if you like. Be sure that you choose a unique name. Do not enter trailing colons, e.g. enter CD0 and NOT CD0:! Note for users with more than one CD-ROM drive: Your CD-Roms must be named differently, of course! After you chose the name, click Proceed. Now you should specify where the installation utility shall place the CacheCDFS support programs, like the JukeBox audio player or the CD32-Emulator. It is advised that you create a new drawer for the CacheCDFS stuff on your harddrive by clicking Make New Drawer. If you are not running the installation utility for the first time, you should simply select the drawer created from the last installation procedure. Then click Proceed.

Should the CDFSprefs utility be installed?

With CDFSprefs you can easily change the operational parameters of CacheCDFS "on the fly". You really should click Yes. The CDFSprefs utility is installed in your SYS:Prefs directory, as it is a classic "Preferences" program!

Should the KillDev utility be installed?

With KillDev you can completely "unmount" a CD-ROM drive after it has been mounted. This is very handy if you plan to use more than one CD-ROM filesystem (e.g. the Xetec CDx FileSystem for CDTV emulation).

Should the FindCD utility be installed?

You already used FindCD during the installation. It is of no real use for normal operation. However, it might be handy for diagnostic purposes.

Should the PlayCD utility be installed?

PlayCD is small but powerful Audio Player for SCSI-2, Mitsumi and ATAPI drives. The documentation is accompanied with the program and will be copied, too. Please refer to the documentation that comes with it.

Should the CD32-Emulator be installed?

This question will only appear, if you are running Kickstart / Workbench version 3.0 or better on your machine, as the CD32-Emulator will not work without it!

Should the Installer utility be installed?

This question will only appear, if you installed the CD32-Emulator. The CD32-Emulator needs the Installer utility. If you have the Installer utility already somewhere on your harddisk, you may select No, otherwise you should select Yes.

Now the installation of CacheCDFS (and the CD32-Emulator) has been completed.



## Using CacheCDFS

### Activation

CacheCDFS can be activated in a number of ways depending on your version of AmigaDOS and whether you specified that CacheCDFS be automounted in the Installation utility.

If you have AmigaDOS 2.04 installed on your Amiga, you will need to use the mount command as follows:

```
mount <DEVICE> from devs:MountList.<DEVICE>
```

where <DEVICE> represents the appropriate device name as specified in the install procedure, usually CD0.

For example, to manually activate CacheCDFS installed as CD0:, you would have to enter the following command:

```
mount CD0: from devs:MountList.CD0
```

If you chose AutoMount during installation, this command will be inserted into your s:user-startup file and automatically executed upon bootup.

With AmigaDOS 2.1 and above, Commodore has introduced the concept of Storage and DOSDrivers directories. In this case, a file needs to be created in either the SYS:Storage/DOSDrivers directory or the DEVS:DosDrivers directory. This file will contain a conventional mountlist, with the mounted device assuming the filename. All files in the DEVS:DosDrivers directory are automatically mounted upon startup, while files in the SYS:Storage/DOSDrivers directory are not. Both directories are searched when a mount command is issued. For example, if you want to mount CacheCDFS installed as CD0:, you would enter the following command: mount CD0:

Further you can activate CacheCDFS without entering the mount command from the shell by double clicking the device icon in either the DEVS:DosDrivers or SYS:Storage/DOSDrivers directory.

### Use of AmigaDOS Commands

The comfort of a FileSystem is that its operation is totally transparent to the user. All AmigaDOS commands, such as dir, copy, list work exactly as if they were executed on a floppy or hard drive. You may use your favorite directory utilities such as SID, DirWorks or Directory Opus with CacheCDFS. This can simplify the traversal of the disc, especially where Macintosh HFS discs are concerned, as many

non-standard characters are present in HFS filenames. Due to the read-only nature of CD-ROM discs, it is impossible to write on the disc. Therefore, AmigaDOS will regard the CD-ROM disc as a large, write-protected volume. All attempts to write to the disc will result in a standard "write-protected" requester, which has to be canceled.

### Using PhotoCDs/Multisession CDs

PhotoCDs are recorded in a special format (CDXA) which differs from standard data CDs. To read PhotoCDs, your CD-ROM must be capable to read CDXA (CD extended Architecture) discs. All modern CD-ROM drives should be able to do so.

Further, some CD-ROM drives (e.g. the drives made by Toshiba) must be "switched" in a special CDXA- Mode manually before PhotoCDs can be read.

The CacheCDFS will do so automatically, if it detects a Toshiba CD-ROM drive. Do NOT use any external program for this purpose as this may cause some confusion.

Multisession PhotoCDs are "write-once" CDs, where you can add additional files on additional "sessions" later. To access the added sessions, your CD-ROM must be capable to do so. Further, the FileSystem must be aware of these extended sessions and look for the directory of the CD on the last session, otherwise you would only see the files present on the first session.

CacheCDFS will do so automatically, if your CD-ROM drive is a SCSI-II or IDE-ATAPI drive. Multisession will NOT work with SCSI-I drives.

As CacheCDFS handles all this automatically, you must not use any additional tools which enable PhotoCD or multisession capabilities (e.g. MSpatch). Using CacheCDFS with Macintosh HFS

The Macintosh HFS file system is a bit tricky to use. Any HFS file consists of two "forks" - a data and a resource fork. Unlike other filesystems CacheCDFS will always show you the data and resource fork as two different files. To distinguish these two files you may add an extension to either the resource filename, the data filename or both with the CDFSprefs program.

Some HFS filenames contain a lot of spaces. This makes typing their names from the shell a tedious task. The "convert spaces" option of CDFSprefs will convert spaces in HFS filenames to underscores. (See also the chapter "Setting CacheCDFS Preferences")

### Theory of Cache Operation

Before continuing, there are a few things about cache organization that you must know. In order to make cache access as fast and efficient as possible, the main cache "buffer" must be organized in a special way. We talk about "lines", "prefetch", "data buffer" and "minimal direct read".

These values all relate very closely to sector numbers. All devices that are used to store files on have sectors. One sector is a tiny bit of information - in case of a CDROM - 2048 bytes in size.

All devices have a controlling task (a running program) called a device driver, whose primary task it is to read and write these sectors.

If a file system (like CacheCDFS) wishes to read sectors off a drive, it must ask the device driver to fetch those sectors. This device driver is sometimes called an "Exec" device driver.

The file system is a kind of protocol that describes how data is organized on the physical device. The CacheCDFS can read ISO9660, RockRidge and MAC HFS formatted disks.

As the filesystem is a kind of interface between the exec device driver controlling the hardware and AmigaDOS, it is sometimes called a "DOS" device driver.

The term "prefetch" is an indication of how many sectors the cache will read or write for each physical device access. If prefetch is set to 4, then this means, that even if the DOS only asks for two sectors, four will be read. Since each drive access is a lengthy and time consuming procedure, much time can be saved by "guessing" what sectors will be needed next. Since the best guess is often that "the next sector will be needed next", prefetching sectors in clusters is indeed a good thing. Keep in mind that it only takes a bit longer to read four sectors than to read one. It would take much longer to read four sectors individually than to read them all in one go.

Furthermore, as the FileSystem really knows how large a file actually is and how the disc is organized, those guesses have a very good chance to be correct.

Prefetch, or "read-ahead" if you want, can boost performance a great deal, providing you set the prefetch value not too big. If you use too much prefetch, it will not help you one bit. In fact, it will probably work against you, slowing everything down. This is because the next sector in sequence probably is NOT the next sector that will be needed, and so the cache will be reading much more than it should, on each access.

The morale is to use prefetch with reason. Generally a prefetch of 2 or 4 gave very good results with ISO9660 formatted disks.

Moving on to the term "lines". Lines is a means of grouping together

sectors in "blocks" of a certain length. If a cache buffer uses 32 sets of lines, this means that the cache can remember up to 32 different entries, with each entry consisting of 'prefetch' number of sectors. To illustrate this, consider the following sketch of a 32 line cache, with a prefetch of 4:

Set number	Line contents
0	[sector][sector][sector][sector] (4*2048=8k)
1	[sector][sector][sector][sector] (4*2048=8k)
2	[sector][sector][sector][sector] (4*2048=8k)
3	[sector][sector][sector][sector] (4*2048=8k)
4	[sector][sector][sector][sector] (4*2048=8k)
etc....	
31	[sector][sector][sector][sector] (4*2048=8k)
	32*8k=256k

Each line can hold any four consecutive disk sectors with this prefetch configuration. If the file system asks for sector number 8, the cache will read sectors 8, 9, 10 and 11 into one of the lines. By now it must be obvious that more lines also mean more space available for sector data, and therefore a higher chance that a read operation will be able to complete with no or only little physical disk access. Unfortunately, it also means you have to set aside more memory for the buffers. A compromise you often encounter with computers.

A typical cache configuration is a 50-set, cache, with a prefetch (line size) of 4. The memory required by such a cache buffer will be:

$$50 \text{ sets} \times (4 \times 2048 \text{ bytes}) = 400\text{k bytes}$$

The CacheCDFS has also a special buffer, called "data buffer". This buffer has always the multiple size of one line.

If the line size is 4, and the data buffer has a size of 4, it is organized like this:

$$[\text{line}][\text{line}][\text{line}][\text{line}] (4*4*2048=32\text{k})$$

If the FileSystem does caching (it does not always, see the term "direct read" later), it checks the actual file length. In case the file is longer as the amount actually requested, the rest is read immediately into the data buffer, and then copied to the appropriate cache line. The main difference between the Data Buffer "read ahead" and the normal "read ahead" is as follows:

The cache lines are always filled (a "classic" read ahead cache), so even different directory sectors or sectors from different files are cached. The data buffer is a more "intelligent" special read-ahead cache line, existing only once and caching only files, if the filesystem "believes" they are worth it.

So you can do nice caching even on machines with not much free memory.

Look at this (which is the default setting after first time installation):

50 sets with a line size of 1 (no "directory" prefetch!), but a data buffer of 8 (8 sectors "file" prefetch).

50 sets x (1 x 2048 bytes)  
= 100k bytes

+ 8 x (1 x 2048 bytes) (data cache)  
= 116k bytes

This gives pretty good results, even on a machine with not much memory available.

Now moving to the term "direct read". If you read large files (e.g. "off the disk animations") it is pretty useless to cache all these blocks. The file will purge all other sectors out of the cache, even such blocks like directory entries. To avoid this, you can specify a "minimum direct read" value. If DOS requests more sectors than specified here, the filesystem will bypass the cache and the device driver will copy its data directly into the callers buffer (if any of these sectors are already present in cache memory, these will be used). Specifying a value of zero (0) will give you a sophisticated default. A very high value (e.g. 2000) will only do requests greater than 4MB directly, what is very unlikely to happen and the cache will always be used. Specifying a value smaller or equal to the data buffer size is not very useful, as you would in fact waste memory.

For best performance, use the default (0).

Before doing direct read, the Memory Type and Memory Mask of the callers buffer will be checked, if it fits to the device requirements (specified in the mountlist as BufMemType and Mask). If it doesn't, the data buffer will be used as a cache.

It's simply not possible to give you a recipe on how to create a perfect cache. The range of possible combinations of all the above values and the memory you wish to spend for caching is simply too vast. You will have to experiment to find the combination that best suit your needs.

You can adjust all these values in the filesystem's mountlist entry using a text editor, but this method is strongly discouraged - using the CDFSprefs program for this purpose is much easier and secure.

### Setting CacheCDFS Preferences

All options for CacheCDFS can be set via an Intuition-based preferences editor. This will eliminate the need to change cryptic mountlist entries. The CDFSprefs program is located in your SYS:Prefs drawer and can be activated by double-clicking its icon.

Important Note: To edit the preferences for a particular CD-ROM drive, the drive must be activated (mounted)!

The window of the CDFSprefs program is splitted into 3 sections:

- The upper half of the window defines overall preferences
- The lower left part are ISO9660 preferences
- The lower right part are Macintosh HFS preferences

Simply adjust the values as you like, and click the SAVE gadget. The changes will be stored in your mountlist entry and the filesystem will be informed of these changes immediately. There is no need to reboot for making the changes active! The USE gadget will perform the changes, but will not store them in the mountlist entry. This is handy if you want to experiment with different cache settings.

## GADGETS

### DEVICE:

Select the CDROM you want to edit. If only one CDROM is mounted, it will be selected automatically.

### BUFFERS:

Same as "Buffers" entry in mountfile. Sets the number of cache lines. The default is 50.

### DATA CACHE:

Same as DC in control entry in mountfile. Sets the size of the Data Cache. The default is 8. Note that the size of the Data Cache is defined in "multiples of the Line Cache size".

### LINE CACHE:

Same as LC in control entry in mountfile. Sets the size of the Line Cache (prefetch). Default is 1 - this means that prefetch is off.

### MIN DIRECT:

Same as MD in control entry in mountfile. Specifies the amount of sectors a read request must have to bypass the caching system. Default is 0 (automatic).

### RAM (Read only gadget):

Shows you the total amount of RAM use of your buffer settings in Kbytes.

### PRO BITS:

This will specify the protection bits all files on a CD-ROM should have, as the SetProtection command of AmigaDOS will not work because of the read-only nature of CD-ROM media.

### SCAN FIRST FOR:

Select, if the FileSystem should look first for an ISO9660 or a MAC-HFS identification on a CD inserted. This is useful, if you have

"Dual-system" discs with both an ISO9660 and a Macintosh HFS "partition".

SCSI DIRECT:

Same as S in control entry in mountfile. Uses SCSI direct calls instead of trackdisk like commands. Default has been set by the Installation utility.

NO CHANGEINT:

Same as NC in control entry in mountfile. If set, CacheCDFS will not use TD\_ADDCHANGEINT and TD\_REMCHANGEINT. Default has been set by the Installation utility.

MOTOR OFF:

Same as M in control entry in mountfile. Will send a TD\_MOTOR off after CMD\_READ. Default has been set by the Installation utility.

FILES TO LOWERCASE:

Same as L in control entry in mountfile. All file names will be converted to lowercase. This option only applies to ISO9660 discs.

VOLUMES TO LOWERCASE:

Same as LV in control entry in mountfile. All Volume names will be converted to lowercase. This option only applies to ISO9660 discs.

CONVERT FIRST CHAR:

Same as LFC in control entry in mountfile. This option only applies to ISO9660 discs and specifies the behavior of FILES TO LOWERCASE and VOLUMES TO LOWERCASE. If selected, all characters in names will be converted to lowercase. If not, the first character will be untouched.

AUTO LOWER

Same as AL in control entry in mountfile. This flag will advise the FileSystem, that only file and volume names of non-Amiga CDs should be converted. CacheCDFS will try its best to determine, if mixed case file names exist on a CD. However, this may not always work.

NO ROCKRIDGE NAMES

Same as NRR in control entry in mountfile. This flag will disable RockRidge filenames. If it is selected, only ISO file names will be shown.

ROCK RIDGE CASE SENSITIVE

Same as RRCASE in control entry in mountfile. RockRidge file names are defined to be case sensitive, e.g. the file "Olli" is different from the file "oLLI". With Amiga DOS these two filenames describe the same file. If this flag is set, the CacheCDFS will handle RockRidge file names case sensitive. This may be useful, if you want to read a RockRidge CD where different files can only be distinguished by the case of their file names. Weird.

CONVERT SPACES:

Same as HCS in control entry in mountfile. This option only applies to MAC-HFS discs. Will convert spaces in MAC-HFS filenames to underscores, if selected.

**RESOURCE:**

Same as HR in control entry in mountfile. This option only applies to MAC-HFS discs. Defines the name extension of the resource fork of MAC-HFS files.

**DATA:**

Same as HD in control entry in mountfile. This option only applies to MAC-HFS discs. Defines the name extension of the data fork of MAC-HFS files.

**SAVE:**

Make changes active and save them to mountfile.

**USE:**

Make changes active.

**CANCEL:**

Exit without making changes.

**MENUS**

-----

**PROJECT - ABOUT:**

Gives you information about the CDFSprefs program and the CacheCDFS in use.

**PROJECT - QUIT:**

Leaves the program.

**EDIT - RESET TO DEFAULTS:**

Get the default presets.

**EDIT - LAST SAVED:**

Get the values saved in the mountfile.

**EDIT - RESTORE:**

Get the current active values.

**AUDIO - ON**

Check this Menu Item, if you want the CacheCDFS to display an Icon for Audio CDs on the Workbench screen.

**AUDIO - EXTERNAL AUDIO PLAYER**

Check this Menu Item, if you want the CacheCDFS to start an external audio play program, if you double click the Audio Icon.



## AUDIO - PATH

Here you can choose the external Audio player to be started by CacheCDFS. We recommend to use the PlayCD program (included in this package) for this purpose.

### Playing Audio CDs

To play audio tracks on a CD you can either use the capabilities embedded in the CacheCDFS filesystem, or you may use an external audio player program. Usually CD-ROM Audio play will only work with SCSI-II or IDE-ATAPI CD-ROM drives.

### Embedded Audio Capabilities

If you have enabled Audio support for the CacheCDFS file system with the CDFSprefs program and if you have a SCSI-2 compatible CD-ROM drive the filesystem will show an audio icon on your Workbench, if a CD with audio tracks is inserted.

The first track will be played, if you double click this icon.  
If you double click again, audio play will pause.  
If you double click again, audio play will resume.  
If you double - double click the icon (yes, this is four times!) the next track will be played.

If you have defined the use of an external audio player program with CDFSprefs, double clicking the audio icon will start this external player.

With this package three different CD audio player programs are included; for use with this feature we recommend Elaborate Bytes' "PlayCD".

### Defining a custom Audio Player Icon

You may use an own icon that will be displayed if a CD containing audio tracks is inserted. CacheCDFS will look for the file ENV:CDDA.info if it is started. If this file exists, it will be used instead of the built in design. Let us try this: Copy the file Trashcan.info to ENVARC:CDDA.info and reboot your machine. If you insert an Audio CD, the Trashcan icon will show up.

### Introduction to the CD32-Emulator

The CD32-Emulator is a separate part of the CacheCDFS package. If you have at least Kickstart 3.0 and if you have installed the CD32-Emulator with the Installation utility, you will find a drawer

named "CD32" on your harddrive.

The CD32-Emulator tries to emulate all of the special system resources that can be found in an Amiga-CD32 game console. This includes the emulation of the battery backed up RAM for storing Highscores and the setting of the preferred user language.

Embedded in the CD32-Emulator is a system degrader which will disable features of your Amiga - like processor caches or fast memory - to make your machine more "CD32" like, as some badly programmed games need this. You can control this "degration" easily from the CD32-Emulator's preference window and save your preferred settings.

Great effort has been taken to make the CD32-Emulator as compatible as possible, but the usual restrictions that can be found with any kind of emulation apply:

We cannot guarantee that all games that work on an Amiga CD32 game console will work with the CD32-Emulator!

The Amiga CD32 has an in-built CDTV emulation. The CD32-Emulator has NOT!

CDTV titles WILL NOT WORK with the CD32-Emulator, even if they work with the Amiga CD32 console!

### Emulating a PAL/NTSC console

On a PAL Amiga, the CD32-Emulator will emulate a PAL CD32, on an NTSC Amiga the CD32-Emulator will emulate an NTSC CD32. You may change the PAL/NTSC state of your Amiga from the Kickstart Boot Menu. This will change the type of the CD32 emulated (PAL/NTSC), too.

### Installing the CD32-Emulator

The CD32-Emulator may be used immediately from your harddrive. But it is very unlikely that many games will run correctly if you try this.

The preferred method is to create a dedicated "CD32-Emulator Boot Disk" and start the emulation from this disk. The "Make CD32 Floppy" utility will create such a disk for you. Another utility is the "Make HD Startup" utility. It will create a new Startup-Sequence on your harddisk, that allows you to boot directly into CD32-Emulation, if you press a function key during startup. Your original startup-sequence will be renamed to "Startup-Sequence.std" and will be executed if you boot without pressing the dedicated function key. This method is faster than booting from floppy, but it is advised that only experienced users try this option. Your original startup-sequence will be changed and there is a slight possibility that this may cause problems!

Important Note: The CacheCDFS must already be installed and the CD-ROM drive you wish to use MUST be mounted! The cache settings should be set to its default values and SAVED before starting the "Make CD32 Floppy" utility!

Double-click the "Make CD32 Floppy" icon and insert an empty disk into your internal drive (DF0:). The disk doesn't need to be already formatted as the program allows you to format the disk if you wish. All data on this disk will be erased!

After the installation is completed you should wait a few seconds for all disk activity to finish. Now you may reboot your Amiga and your machine will boot from the created CD32-Emulation disk and the CD32-Emulator preferences window will appear.

### Using the CD32-Emulator

The CD32-Emulator window offers you some detailed control possibilities of the emulation's behavior. Two gadgets exist to activate CD32 emulation: Boot and Initialize. Boot will set up the emulation and will immediately start any Games CD that is inserted in your CD-ROM drive CD0:

Important Note: Clicking Boot is a one-way-ticket! Once the boot process from a Games CD has been started, there is no way to resume normal Amiga operations. The only way to back out is to reset your machine! This is important to know if you have started the CD32-Emulator from your harddrive! Initialize will NOT start the Games CD, but will initialize all of the emulation modules embedded in the CD32-Emulator. Its purpose is for games that can be started from Workbench.

#### Important Note:

To get the most fun out of CD32 games, a CD32 game controller is recommended. Please note that the original Commodore controller may not work correctly with an A1200! The Competition PRO SuperCD32 controller works with the A1200. Both controllers work with the A4000.

### Setting the CD32-Emulator preferences

#### Gadgets

##### NoFastmem

Enabling NoFastmem will disable all Fast Memory in your Amiga. You should only enable this switch, if the game you want to play requires this. If the graphic and/or sound of a game is corrupted, try this option.

##### NoInstCache

This will disable the instruction cache of the processor. This option should rarely be necessary. If you encounter that a game is running too fast, you should try this option.

#### NoDataCache

This will disable the data cache of the processor. If you encounter that a game is running too fast, you should try this option.

#### VectorBase0

This option is only necessary if you started the game from Workbench. Some games don't work at all if this option isn't enabled.

#### NoVolumeControl

This will disable the attenuation control of the CD32-Emulator. If the digital audio produced by a game CD cannot be heard or the game "hangs", try enabling this flag.

#### Emulate Controller

If this is enabled, the CD32 Game Controller will be emulated with the keyboard. You shouldn't select this, if you have a CD32 Game Controller connected to your Amiga. You may connect a one or two button joystick and use the keyboard to access the additional keys. Emulation keys are: Numbers 1, 2, 3, 4, 6, 7, 8, 9 on numeric Keypad and cursor keys: Joypad direction.

[ and / on numeric keypad: Reverse.

] and \* on numeric keypad: Forward.

F1 and F6: Green button.

F2 and F7: Yellow button.

F3, F8 ,SPACE , ENTER and 0 on numeric keypad: Red button.

F4, F9 and DEL on numeric keypad: Blue button.

F5 and F10: Play/Pause button.

Note: It is possible that some games do not work if controller emulation is enabled!

#### Use 68040.library

Most games will not work if Commodores 68040.library is used. But if it is possible to use this library, system performance will be greatly increased. This only applies to machines with 68040 processors, of course.

#### Load Workbench

Some games will probably not run correctly if there is no Workbench process running. We know only of the game "Morph" which requires this flag to be selected. Usually you should leave this off.

#### DOS Device

Here you define the CD-ROM drive, where the CD32 emulation should happen.

#### Blocks Buffer

The CD32-Emulator has a built in prefetch cache. Here you can set the

size of this cache (1 Block equals 2048 Bytes). The optimum value differs depending on your configuration (Amiga model, host adapter, CD-ROM drive). You have to experiment to find a good value. The rule is: Keep the value as small as possible, but big enough, that off-the-disk-animations run smoothly. For the Buddha controller the optimum value is 4, most SCSI drives work best with a value of 2.

#### Delay p. Block

If you specify a value other than zero, a delay will be added between reading different sectors. This is important, if you have a CD-ROM drive, which is faster than the original CD32. If you have a single or double speed drive, leave this value to zero. If you have a faster (triple, - quad speed) drive, you should enter a value between 50 and 100 here. You must experiment for best results, as the correct timing will be affected by your system performance.

#### Max Volume

Here you can specify the maximum level the CD sound should have during gameplay.

#### Language

Here you can select your preferred language for multi-language games.

#### Menus

-----

#### Project - Save Settings

This allows you to save your CD32-Emulator preferences. The settings are stored as ToolTypes in the program's icon file.

#### Project - About

Tells you about the version and copyright of the CD32-Emulator.

#### Project - Quit

Will leave the program.

#### Game Store - Select Path

Some CD32 games allow you to save highscores or other data in the battery backed up RAM of the Amiga CD32 game console for later retrieval. The CD32-Emulator allows you to save this data to a dedicated place either on floppy disk or your harddisk. If you select this menu item, a standard ASL requester will appear. Choose the directory where you want the CD32-Emulator to save the data. Every Game saving data will get its own drawer. You may easily manipulate (copy, delete, etc.) files in these drawers from the Workbench.

Remember: After adjusting your preferred settings, you should select Save Settings. You should ONLY degrade your system, if the game you want to play refuses to run otherwise. Most of the games run fine without degradation.

Some Example settings:

The best method to find the correct settings for a game is to start with "conservative" settings. These would be "NoFastMem=ON", "Vector Base 0=ON", "Use 68040.library=OFF", "No InstrCache=ON", "NoDataCache=ON", "Emulate Controller=OFF", "No Volume Control=ON", "Load Workbench=OFF". If you like the game you should first try to enable the Instruction Cache. If this works, try to enable Fast RAM and the 68040.library.

If you are using an IDE-ATAPI SONY CDU-55E CD-ROM drive (e.g. with the a4000\_atapi.device by Elaborate Bytes) you MUST leave "No Volume Control=ON".

Microcosm, Pirates Gold, D-Generation, Sleepwalker, Clou and Frontier - Elite II:  
All off.

Pinball Fantasies, James Pond II - Robocod:  
All off, but NoVolumeControl might be required on some host adapters or CD-ROM drives.

Diggers:  
All off, but the intro sequence will probably run too fast. For the correct speed of the intro sequence you should select NoFastmem.

Oscar, Dangerous Streets:  
NoFastMem  
NoDataCache  
VBR0 (only if started from Workbench on 68040 machines)

Morph  
NoFastMem  
Load Workbench

### Running the CD32-Emulator in the Background

You may specify the ToolTypes NoWinInst or NoWinBoot in the CD32-Emulator's icon file. NoWinInst will immediately install the CD32-Emulator's modules without opening its preferences window. If you wish to have the CD32 Emulation present all the time, you may specify NoWinInst and place the CD32-Emulator in your SYS:WBStartUp drawer.

NoWinBoot is very similar, but it will immediately try to boot from any disc present in CD0:.

### Questions & Answers - Troubleshooting

Q: The AmigaCD32 only has 2 megabyte chip memory. Why do some games only work on my Amiga 1200 if I add 32-bit-wide fast memory?

A: CacheCDFS and the CD32-Emulator are loaded from disk.. This will use the memory a game probably needs. If an Amiga1200 doesn't have fast memory, the CD32-Emulator will be loaded in chip memory. As chip memory is slower than fast memory the speed of the emulation will probably be too slow for some games.

Q: A game doesn't run on a plain A1200, but it works if I add fast memory. But I have to select NoFastMem in the emulator's preference window! Isn't that weird?

A: No, it isn't. The trick behind NoFastMem of the CD32-Emulator is, that CacheCDFS and the CD32-Emulator are loaded and initialized BEFORE the fast memory will be disabled. This leaves all the chip memory for the game to run.

Q: I have a NEC-SCSI-CD-ROM drive. It works fine with CacheCDFS. But the CD32-Emulator doesn't work correctly. Why?

A.: CacheCDFS works with any kind of CD-ROM drive, because it only needs to access plain data. The CD32-Emulator needs to access Audio playback functions and other more sophisticated stuff. The SCSI-2 standard defines the methods how this should be done and the CD32-Emulator uses SCSI-2 commands to talk to the drive. Only drives conforming to SCSI-2 will work correctly with the CD32-Emulator. Unfortunately most of the NEC drives do not comply to SCSI-2 and therefore won't work, sorry.

Q: What drives do work with the CD32-Emulator?

A: All SCSI-2 drives will work, e.g. Toshiba, Sony and Apple drives. To get full functionality, they should be "Double Speed".

Further, the IDE-ATAPI drives (Mitsumi FX001-DE, FX300, FX400, Sony CDU-55E, Wearnes CDA-120, Acer-Sertek 6825P, Chinon CDS-555I, etc.) work if you use a well programmed device driver (e.g. the a4000\_atapi.device from Elaborate Bytes or the AB-Union/ALFADATA CD1200plus). For the Sony CDU-55E to work correctly "No Volume Control" must be on! There is only one IDE-ATAPI drive known, that does not follow this rule: The Elitegroup Vertos 300 does NOT work correctly, sorry.

Q: I have one of the drives listed above, but it does not work at all. What's wrong?

A: Ask the manufacturer of your host adapter for assistance. Usually you have a hardware problem, or you need an update of the controller firmware.

Q: Microcosm shows "Internal hardware error".

A: Contact the manufacturer of your host adapter and ask for a firmware update.

Q: Microcosm runs very slow.

A: Your host adapter uses too much CPU time for CD-ROM access! If you have an Oktagon controller, you need at least ROM version 6.5. Ask the manufacturer for an update.

Q: May I use another filesystem with the CD32-Emulator?

A: Please don't. The results are unpredictable.

Q: Why didn't you add CDTV Emulation?

A: Some CDTV Titles don't run with other processors than the 68000. Most CDTV Titles don't work with Kickstart 2.0 or better. A lot of CDTV titles don't work properly if the AA/AGA chipset is enabled. The Amiga CD32 has built-in "compatibility hacks", that make even those titles run on the console. Without these hacks only a few titles would work, and this is simply not worth the effort