

Ca3D-Engine

User Manual

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1 Introduction

Welcome to the user manual of the latest public-test release of *Carsten's 3D-Engine*. The Ca3D-Engine is a modern 3D graphics engine. It is a hobby project which I have developed over a number of years. Its most essential features include

- high-quality, real-time 3D graphics,
- cross-platform and cross-compiler portability,
- multi-player network support,
- physically correct lighting (radiosity based),
- dynamic per-pixel lighting and shadows,
- 3D sound effects,
- skeleton based model rendering, and
- great flexibility and easy extensibility by MODs.

A more extensive feature list is available on the website at <http://www.Ca3D-Engine.de>.

The website is the main source of general information for the Ca3D-Engine project: it has the latest news, the latest demo version, screen-shots and additional information about the project itself. This document is the main information source for the specific public-test release (a.k.a. *demo version*) of the Ca3D-Engine from May 2005.

I recommend that you read the entire manual, as some of the information in it is not mentioned either on the website or anywhere else. Nonetheless, I specifically created a section *Quick Start* (on page 5) for those who are in a hurry and are experienced with software downloaded from the Internet.

I hope you'll be happy with the Ca3D-Engine. I have done my best to create a good product which I will refine on an ongoing basis. The only catch is – if for any reason you're unhappy with the program, you must tell me why you don't like it. Otherwise, I'll never get it any better.

1.1 About this manual

This document is a replacement for the old `Readme.txt` and `Changes.txt` files. It is written using the L^AT_EX typesetting system and is published in PDF format. This way the documentation is easier for me to maintain and more readable and useful to you.

Throughout the entire document, the following conventions will be used:

- Technical terms that typically appear on your computer screen are written in `type-writer font`.
- Sometimes I use synonyms for certain terms. For example, “Ca3DE” is simply an abbreviation for “Ca3D-Engine”. Please refer to the Glossary on page 14 for a clarification of what is what!

1.2 Windows and Linux specifics

The instructions and examples in this manual were written with reference to the *Microsoft Windows* operating system. Now, with Ca3DE being also available on *Linux*, I rely on the Linux users skills and experience to transfer the provided information to their favourite OS. The transfer is almost always very easy to achieve: Examples include that Linux has `tar.gz` file archives versus `zip` file archives on Windows, and that the Linux executables are suffixed with `linux` versus `exe` on Windows.

I hope that this helps to keep this manual easy and intuitive to understand for everyone. The alternative would had been to mention all specifics for each OS in each text fragment and each example.

2 Quick Start

This section is intended for advanced users who are experienced with downloading and installing software. If you are in a hurry and don't want to study the entire document, but still want to make sure that you don't miss any of the important Ca3DE features, you will find everything here to get you started:

- Please pay attention to the *Legal* section before you begin, no matter what kind of hurry you are in.
- Installation is reduced to unzipping the packed file.
- Double-clicking on `Ca3DE.exe` starts the program.
- Optional: In the options dialog, choose another world from the list.
- The OK-button starts the engine.
- The ESC-key brings you back to the options dialog, where you can either quit the program or choose another world from the list (I recommend trying them all).
- For problem-solving, please consult the rest of this manual first. If you can't find your answer here, please write me an email.

3 Installation

3.1 Minimum System Requirements

Your computer system should meet the following minimum requirements for Ca3DE to run:

- Intel i386 compatible CPU with 1.0 GHz
- 256 MB RAM
- 3D graphics board with OpenGL support and programmable GPU (like NVidia GeForce3, ATI Radeon 8500, ...)
- Windows (9x, ME, 2000, or XP) or Linux operating system
- TCP/IP
- On Windows: DirectX 7.0 or higher

In order to use the advanced networking features of Ca3DE, the network environment of your system must be appropriately configured.

In other words, if some of the modern commercial 3D computer games run on your system, then this is a good indication that the Ca3D-Engine will work too.

I am developing Ca3DE in the Windows 2000 and Debian Linux environment, and I test it on as many platforms as I can get access to. I have only very little experience with other varieties of Linux, but have received only positive reports up to now, regarding compatibility with all supported operating systems.

3.2 Installing the Ca3D-Engine

In order to install the engine, simply unzip the packed file that you downloaded from the website. Please make sure that the directory structure is preserved. This is the common extraction process for nearly all contemporary decompression software. However, for some older programs you need to explicitly specify a command line option or check a checkbox. A new directory `Ca3D-Engine` will be created and all files will be extracted into this directory.

3.3 Upgrading

In order to upgrade the engine from an older, existing installation, please delete all the old files and directories and then re-install the new version as stated above. I am sorry for any inconvenience caused by this, but this is the best way to avoid many possible upgrade and version conflict problems.

3.4 De-Installation

Because the installation makes no changes to your system, it is sufficient to delete the `Ca3D-Engine` folder for a completely clean de-installation.

4 Running Ca3DE

In order to start Ca3DE, simply double-click on the `Ca3DE.exe` executable file. This file is in the `Ca3D-Engine` folder that was created during installation.

4.1 The Options Dialog

(The Options Dialog is not yet implemented on Linux. Ca3DE will skip it and apply the default options. You can select other worlds either from the command line, or via the in-game console (see section 4.3).)

After starting, the *Options Dialog* appears as shown in figure 1. This dialog allows you to set up Ca3DE in various ways (detailed below). *For your convenience, I preconfigured the dialog settings so that you can, almost always, leave them as they are and simply press the OK button.* For a more sophisticated setup, please read the rest of this section. It explains the dialog details in greater depth.

Run-Mode The upper part of the dialog asks you to choose which role Ca3DE should play in the network (i.e. your LAN or the Internet). I am calling this role the *Ca3DE run-mode*. There are three choices:

Client only Ca3DE acts as a Ca3DE-client only. This means that it will connect to a Ca3DE-server, reachable from within the accessible network: usually a LAN or the Internet.

Server only Ca3DE acts as a dedicated server only. Other players can run Ca3DE on their computers in “Client only” run-mode and connect to this server. This is the preferred method of setting up an Internet server for Ca3DE. However, before doing so, you should note that Ca3DE has not yet been extensively tested under real Internet conditions (see section 5).

Both Client and Server This is the dialog’s default choice, where Ca3DE starts up both a server and a client which communicate via your systems *localhost*. This run-mode is used both for single-player games and for typical multi-player LAN games, where one doesn’t want to operate an extra computer as the dedicated server. The current release of Ca3DE actually doesn’t differentiate between these two cases. Consequently, when you start a single-player game, you are actually starting a multi-player game with only one participating person. That game is hosted on your machine, and if your network is configured properly, other players can join you in the game. In this mode, some of the other dialog fields are overridden and therefore grayed-out.

Client Options This part lets you configure Ca3DE in its role as a Ca3DE-client. Depending on your choice of run-mode, not all fields will be available here.

Player name Your player name. Other players see this name when you talk to them.

4 Running Ca3DE

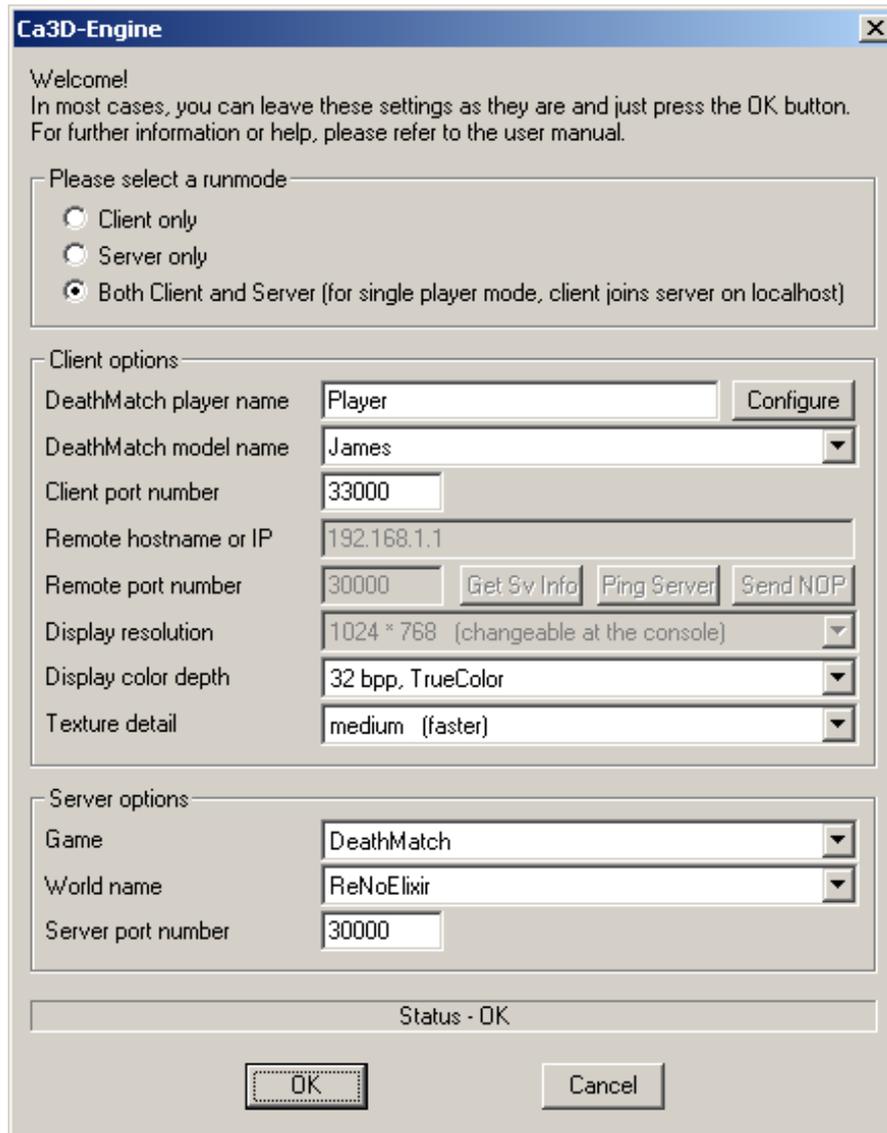


Figure 1: The Ca3D-Engine Options Dialog

Configure This button does not work yet. Later, one will be able to configure, load and save player profiles here.

Model name The name of your model. This defines what you look like for others in multi-player games.

Client port number The local network port number that this client will use for network communication.

Remote hostname or IP The name or the IP of the server that you wish to connect to.

Remote port number The port number at which the server is listening on the remote host.

Get Server Info Retrieves information from the server: such as current world, number of connected players and so on. Not yet implemented.

Ping Server Pings the server. Mostly for development purposes, but also interesting as long as there are no other (or automatic) ping indicators.

Send NOP Sends a “NOP” packet to the server (essentially instructing it to do nothing). For development purposes.

Other options Currently unused.

Server Options This part lets you configure Ca3DE in its role as a Ca3DE-server. Depending on your choice of run-mode, not all fields will be available here.

Server port number The local network port number at which the server is reachable when it is running.

World name As several interesting worlds are included with each demo release, this is usually the most important field when trying out Ca3DE: The combo-box lists all included worlds and lets you easily choose which one you wish to enter.

Other options Currently unused.

4.2 Keyboard Layout

In order to control the player and operate the game, you can use the keys as shown in table 1. The demonstrated layout reflects both *keyboard-only* player control layout and the popular *mouse+keyboard* player control layout. The keyboard layout will be made user configurable in future releases.

4.3 The Command Console

In order to activate or deactivate the console, press the accent grave key. This key is labeled `^` on German keyboard layouts.

When the console is active, all keyboard input goes to the console command line and the mouse input is ignored. That means that you cannot control the player while the console is active. The US keyboard layout applies independently from other settings in the operating system.

There are several defined console commands and variables, but I will only give two examples here:

```
help or h
```

prints out a short console help text, which should be sufficient if you really want to try out the other commands (such as changing the video mode or render style).

4 Running Ca3DE

Action	Key	Alternative
Move forward	↑ (Arrow up)	W
Move back	↓ (Arrow down)	S
Turn left	← (Arrow left)	(Mouse left)
Turn right	→ (Arrow right)	(Mouse right)
Strafe left	A	,
Strafe right	D	.
Jump	SPACE	
Walk	R.SHIFT	L.SHIFT
Run (even faster)	R.CTRL	
Look up	PAGE UP	(Mouse up)
Look down	PAGE DOWN	(Mouse down)
Look banked CW	HOME	
Look banked CCW	INSERT	
Look straight ahead	END	
Talk / Chat	T	
Toggle Console	~	
Screen-shot	F5	
Quit program	ESC	

Table 1: Keyboard layout for player control and game operations.

```
rc passwd ca3d
rc cl <filename>
```

`rc` is the short form for “remote console”. It means that the rest of the line is not processed by the local client, but rather sent to the remote server console. `cl` is the short form for “change level”. Therefore, the first line introduces you as the super-user at the server. The second line instructs it to initiate a level (world) change. For quick tests, however, it is much easier to leave the game with the `ESC` key and then to choose a new world from the world list in the options dialog.

Pressing the `~` key deactivates the console and brings you back to the game.

5 Known Issues

- The Linux port is still incomplete: The Options dialog is missing.
- Sound drivers frequently cause problems under Linux. Therefore, Ca3DE ignores sound initialization failures on Linux, preferring no or broken sound output over no functionality at all.
- So far, Ca3DE works well on all the machines that I have seen. However, before now, I had never seriously tested the network code under real Internet conditions.
- The dynamic shadows are not always correct. The world is sometimes lit where no light should be, and some problematic models cause ugly artefacts too.
- There are a few minor map-specific problems: *AEonsCanyonTower* shows false polygons where no polygons should be, when you look out of the windows in some places. Other maps show depth buffering artifacts.
- Use the latest drivers for your video card.
- Do not run Ca3DE from a full-screen DOS-Box. It will report an error.
- I cannot guarantee that the engine will run properly (or at all) on your system. In the eventuality that you can't make it run or you experience problems, please don't hesitate to contact me by email. I'll do my best to help you fix the problem.

6 Contact Information

It would be great if you told me what you think of this demo version of Ca3DE. Any feedback is welcome and helps further improvement.

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A Legal

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Miscellaneous

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A.2 Notes

- This program is a *public test release* of the Ca3D-Engine, which is also commonly called a *demo version*. It is neither an *Alpha* nor a *Beta* release.
- The artists mentioned in the *Thanks* section of the Ca3DE website generously permitted me to include their work with Ca3DE. Foreign artwork that comes with Ca3DE is copyrighted by its respective authors.
- There is also artwork material in Ca3DE that is used *without* explicit permission. I have included such material only under one of the following circumstances:
 - I found the material on the Internet, and found no stated reference to its author or copyright.
 - I contacted the author but the email address was invalid.
 - I contacted the author but never received an answer.

I certainly do not want to infringe on anyone's copyright. If you feel that there are any problems with the material that is included with Ca3DE, please contact me so that we can get everything in order!

B Glossary

The Ca3D-Engine project consists of many executables, has undergone many revisions and is likely to develop further. Moreover, the project has several names which are abbreviations of each other and which are used interchangeably on the website and throughout this entire manual. Here is a description which should clarify “what is what” in a logical order:

Carsten This is my first name, hence the engine name *Carsten's 3D Engine*.

Carsten's 3D Engine The full name of the 3D engine project.

Ca3D-Engine An abbreviation of the project name which is commonly used.

Ca3DE Another frequently used abbreviation. This term is also used as the file name for the main engine's executable `Ca3DE.exe`.

CaBSP The name of the first compiling tool which is required in order to make worlds for Ca3DE. This program is discussed in detail in the documentation of the “Ca3DE New Materials Development Kit”. The corresponding executable file name is `CaBSP.exe`.

CaPVS Another compiling tool.

CaLight The third compiling tool that performs the radiosity calculations for the Ca3DE worlds.

Map Most people use the two terms *map* and \uparrow world synonymously. But for technical reasons, I refer to a *map* as the static part of a world, i.e. the walls, the floors and the ceilings. You will (almost) never see me use this word in texts that are not related to the internal workings of Ca3DE.

Map file In order to create a new \uparrow world for Ca3DE, you begin with a map editor. A map editor's output file is called a *map file*, even though that is not entirely consistent with the definition of a \uparrow map. *Map files* contain more information than merely a \uparrow map description, such as \uparrow world specific data. The \uparrow CaBSP compiler turns *map files* into world files.

World A *world* is the term for everything that contributes to a game at a given time. That is to say, a *world* consists of a \uparrow map, players, monsters, the sky and everything else.

Level This term is synonymous to the term \uparrow world and is frequently used in other products. It will almost never appear in Ca3DE, but if it does, it just means the same as \uparrow world.

B Glossary

