

**07bfe810-0**

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**COLLABORATORS**

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**REVISION HISTORY**

NUMBER	DATE	DESCRIPTION	NAME

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# Chapter 1

## 07bfe810-0

### 1.1 Main

MagiC64 Commodore 64 Emulator

=====  
What's new in this version

New features  
    Introduction

What's~MagiC64?

A~C64~Emulator~in~1995?

...what is a C64?

System~Requirements

Quick~Start  
    The Emulator

Copyright~and~Registration

Save

Graphics

CPU~&~ROM

Video

Sprites

Sound

Joysticks

Keyboard

Floppy

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D64-Disks  
T64-Tapes  
P00-Files  
Disk~State  
C64-Files  
Start  
Quit  
    Floppy Emulation  
Introduction  
Supported~Functions  
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    Hilfsprogramme  
Monitor  
    Frequently Asked Questions  
Why some games don't work properly with 1.5 ?  
How to transfer software from C64 to Amiga ?  
How~to~speed~up~the emulator ?  
How to slow down the emulator ?  
Which Programs~don't~work ?  
No~feedback~from~the~emulator ?  
What are these warnings?  
History  
To~Do  
Where to find C64 software  
Greetings/Thanks~and~Acknowledgements

## 1.2 New features

### New features

MagiC64 V1.5 includes a powerful monitor with very advanced breakpoint possibilities. All illegal opcodes are supported now,

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(optionally) the flags are set correctly within BCD commands. A new smart refresh mode speeds up screen refresh up to 20%. CyberGfx support was added, additionally it's possible to display the border in C64 mode. On very fast Amigas you can reduce the speed of the emulation to the speed of a real C64. Random access files can be read now, the P command is supported, too. You can now use all options in the unregistered version, but time in C64 mode is restricted to ten minutes. Registration fee was lowered to 20\$, register till 31.9.1996 and pay only 15\$. There is a MagiC64 homepage now:

<http://www.ac-copy.com/~magic64>

MagiC64 V1.3 now supports playsid library. New hotkeys for autofire, sound and the Fast Mode were introduced with this release. Disk accesses will be indicated in C64 mode with a red label. Many games not working with MagiC64 V1.21 should run now (Armalyte, Nemesis, Rainbow Islands, Loco, Thrust, Park Patrol, Bangkok Knights, Traz, Rolands Rat Race and some others). If you find programs without fastloaders which don't work with this release, please let me know.

MagiC64 V1.21 fixed an enforcer hit bug from V1.2. No other changes were made.

MagiC64 V1.2 especially has improved on the emulation side. Many programs not working under V1.1 should run with no hassle now. Bugs in the graphics display were removed, scrolling is much smoother now. The CPU and CIA emulation were improved, too. Floppy emulation was rewritten and now supports SEQ files.

The emulator remembers the last position of a window, allowing you to configure your preferred window positions. These positions are saved in a file, too.

There are now some hotkeys in the C64 mode for changing the frame rate and joystick ports.

Some other bugs were fixed, for further information please see

History

## 1.3 What's MagiC64?

What's MagiC64 ?

MagiC64 is a C64 emulator for the Amiga, which tries to emulate a real C64 in an exact manner. The emulator has the following properties:

- Complete emulation of the 6510-CPU (including illegal opcodes)
- Line-by-line VIC emulation
  - All graphics modes
  - Horizontal and vertical scrolling

- Complete sprite emulation
  - Sprite-sprite collisions
  - Sprite-background collisions
- Sound emulation with 6581sid.library or playsid.library
- ROM emulation; you can also use the original ROMs
- Keyboard and joystick input
- Floppy 1541 emulation
  - Fastload and fastsave for all programs
  - Nearly all 1541 commands are supported
- Support for the following formats: D64, T64, P00 and C64
- Conversion between all formats possible
- Bitplane optimized graphics functions, on fast Amigas original C64 speed is possible. Graphics cards are supported, too.
- The emulator is programmed OS-friendly, it runs in a fully multitasking environment.

## 1.4 A C64-Emulator in 1995?

A C64-Emulator in 1995?

This emulator was written in a time, when -in my opinion- there were no reasonable C64-Emulators for the Amiga. Prototype for MagiC64 basically were the C64-Emulators for the PC, which have reached an impressive quality today. As a consequence, MagiC64 supports the most common PC formats, because nearly all C64 programs are available in one of those formats. Another goal during the development of MagiC64 was a good speed of the emulation. That is why MagiC64 has very fast bitplane optimized graphic functions. There is no conversion from chunky to planar, which results in a dramatically improved graphics performance.

Now Amiga owners have the ability to use (almost) all the games and programs of a C64. Although these games and programs do not convince anymore with today's sound and graphic standards, they often possess an amazing level of fun and excitement as they are what we call "original ideas".

Furthermore MagiC64 has the common features only emulators can offer e.g. fastload, fastsave and the possibility of freezing and continuing programs at any time.

## 1.5 System Requirements

System Requirements

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Any C64 emulation is, if it works line-orientated like MagiC64, quite CPU intensive. MagiC64 needs at least a 68020 CPU, while a fast 68030 or 68040 is recommended. Using an A4000 or an Amiga with a fast 68030 CPU board should guarantee full pleasure during the use of MagiC64.

Add to this, that the graphic functions need some memory for look-up tables, and there must be a minimum of 1.7Mb of free memory available, which if it is high-speed fast RAM the emulator works in more comfortable manner.

On the software side one should have Kickstart 2.04 or higher, the special features of Kickstart 3.0 with regard to screen double-buffering are used, too. Summarized:

- MC68020 or higher
- 1.8 MB free memory (better 32bit Fast RAM)
- Kickstart V2.04 or higher

The emulator can be used on Amigas without AGA chipset, too.

## 1.6 Quick Start

### Quick-Start

The emulator can be started from CLI or Workbench. In the unregistered version a window will pop-up, showing the copyright and registration conditions. It can be closed by clicking the OK button. After that you will see a window with several selection buttons.

You can reach the C64 mode by clicking the "Start" button, and return to the emulator window by pressing the ESCape key. By doing this, the actual state of the emulation is frozen.

To load and start a program the right format must be chosen under the point "Disk & Tape". Both D64 files, which are images of a 1541 disk, and T64 files, which are tape images, are supported. Finally the P00 files, which represent a single C64 program, are supported, too. If T64 or P00 is chosen, all files in the corresponding directory are scanned and the C64 names of the programs appear in a requester. Double clicking on the name of a program loads and starts it, after returning you to the C64 mode. If you see an empty requester you can determine the directory in which the files reside by clicking on "T64-Path" or "P00-Path". If you want to use D64 files, then you should first click "Load D64".

Select a D64 file. The directory of the selected disk file will appear in the requester, again you can load and start a program by double clicking it. In C64 mode you can cause a reset by pressing F9, which is followed by a module check, so that module programs are started again. If you press F10 a hard reset is done, which always leads to the initial message of the emulator. At any time (even after a program is loaded), the joystick port can be changed by clicking "Joysticks". Changing the joystick port is also possible by pressing the '\*' key on the numeric keypad.

If in your opinion the emulator is too slow, you can type a value greater

than 1 in the Graphics window in the requester "Framerate". In C64 mode you can change the frame rate with the +/- keys on the numeric key pad. On an A4000 you should gain full speed for every program with a value of 3. Changing this value also helps when audio sounds strangely.

Another possibility of speeding up the emulation is the Fast Mode which is turned on/off with "." key on the numeric keypad. There is no screen refresh in the Fast Mode, very useful if a program is decrunched.

The most important keys in C64 mode:

- ESC           Return to emulator window
- F9            Reset with module check
- F10           Reset without module check
- \*            Change C64 joystick port
- /            Turn on/turn off sound
- +/-          Increase/Decrease frame rate
- [ / ]        Decrease/Increase autofire frequency
- .            Turn on/turn off fast mode

## 1.7 Copyright and Registration

### Copyright and Registration

There are two versions of MagiC64:

- The unregistered version, in which time in C64 mode is restricted to ten minutes. You can copy and distribute the unregistered version without any restrictions.
- The registered version without a time restriction. Copying or distributing this version is forbidden.

Snail mail:

Michael Kramer  
Im Hirschfeld 28  
52222 Stolberg  
Germany

EMail:

michael\_kramer@ac-copy.com

You can register at the above address or by EMail. The registration fee is \$20 US or 30 DM, payable cash or as Euro cheque. If you like you can send the same amount of money in your local currency. Registering until 31.9.1996 will save you another 5\$, registration fee is \$15 in this case. If you send the money or the Euro cheque, I'll send you the keyfile which enables all features. Online registration for credit card owners is possible via:

<http://www.ac-copy.com/~magic64>

Please note: When using cheques ONLY Euro cheques are accepted !

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If you like, email me for further information before registering.

Please note:

For sound you will need the 6581sid.library OR playsid.library, both are NOT part of MagiC64. The 6581sid.library is part of A64. A demo version of A64, which contains this library, is available on AMINET. The playsid library is included in Sidplay. Sidplay is available from Aminet, too.

Please accept the copyright conditions of theses programs.

DISCLAIMER: MagiC64 should be a bugfree product. The author takes no responsibility for any errors or damages occuring when MagiC64 is used.

## 1.8 Save

Save

Save all settings and paths in the MagiC64.prefs file.

## 1.9 Graphics

Graphics

- Display Video

If you turn off this option, only a window will pop up when clicking the "Start" button. The emulation is running in background mode now. Use this, if you run programs which have no or only some visual output. Emulation speed is very fast in this mode.

- Synchronize

Turning on this option means that non displayed frames are synchronized with the real display. This will result in better music and sound effects. You should TURN OFF this option if you have a very slow computer e.g. a plain A1200. This option has no effect if the value "Display every (n)th frame" in the "Video" menu is equal 1 because every frame is displayed in this case. You should TURN ON this option if you have a very fast CPU e.g. 68060 otherwise MagiC64 will probably run much faster than a real C64.

- Display Border

A border is displayed in C64 mode. Some games e.g. Delta or

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Wizball require a border for proper working. Please note: Side border sprites are NOT supported. Without border the emulator will run approximately 10% faster, so turn off if you like.

#### - Speed Limit

Emulation speed will be reduced to the speed of a real C64. Useful for very fast Amigas with 68060.

#### - Smart Refresh

When using Smart Refresh only the parts of the screen , which have changed, are updated. You can speed up the emulator up to 20%. Because of the working principle of a C64 which uses character codes instead of raw display data, display errors can occur. So turn off in doubt. Whenever big parts of the screen are updated constantly (e.g. vertical scrolling) Smart Refresh makes no sense, the emulator will run faster in this case without Smart Refresh. Pressing ENTER two times in C64 mode will always force a display update of the whole screen.

#### - Frame Rate

With this value you determine which frames of the emulation are really calculated and displayed on screen. The higher this value is, the faster C64 programs will run, because fewer processing time for the graphics is required. On values greater than 1 it may happen that sprite collisions are later recognized. This is not a severe problem for most programs. Recommended values are in range 1 to 5. Also raise this value if music and sound effects are too slow. In this case the emulation can't deliver the sound data for the sound library fast enough. In C64 mode you can change the frame rate with +/- keys on the numeric keypad.

#### - Screen Mode

By clicking on "Select ..." a standard screenmode requester will appear where you can select the screen mode for the C64 mode. The emulation is running in 320x200, so you should select a mode like PAL or DBLPAL. In other modes e.g. EURO72 you have a higher frequency, but only part of the screen is used. You need Kickstart 2.1 for changing the screen mode, as standard mode you have PAL or DBLPAL.

#### - Screen Type

In this cycle gadget you can choose between "Amiga-View", "Amiga-Screen" and "8 Bit RTG". Because screen doublebuffering is supported first in Kickstart 3.0 with special operating system functions, you should use "Amiga-View" in lower Kickstart versions for optimum performance. Using Amiga-View you can't use Amiga M for screen flipping. The multitasking is not impaired in other terms. "Amiga Screen" does \*ONLY\* work correctly in Kickstart 3.0 if you have installed SetPatch 40.16 or higher. If you don't have, MagiC64 will crash when using "Amiga Screen".

As a rule of thumb:

- In OS 2.04 and OS 2.1 you should always use "Amiga View" for performance reasons.

- In OS 3.0 you have to install SetPatch 40.16 or higher, otherwise "Amiga Screen" won't work. If you haven't installed SetPatch 40.16 or higher, choose "Kick 2 Double-Buffering" when prompted at start or use "Amiga View" instead.
- In OS 3.1 "Amiga Screen" will correctly work.

You can determine the version of your SetPatch program by typing Version C:SetPatch in the CLI.

SetPatch 40.16 is available on Aminet in the util/boot directory.

Starting with MagiC64 1.5 graphics cards are supported with 8 Bit RTG. You will need CyberGfx in this case, with AGA-Amigas you can use a native 8 bitplane Amiga mode but it's very slow. Because MagiC64 works with bitplanes internally, a planar-chunky conversion must be done. So 8-Bit modes are always slower than native Amiga modes.

#### - DB Type

Select the double buffering mode which is used in Amiga Screen modes. This is possible starting with Kickstart 3.0. In earlier versions of MagiC64 you had to choose the DB type when starting MagiC64. Now it's possible to do this every time. For further information see Screen Type.

#### - Direct Access

You can speed up MagiC64 somewhat in 8 Bit RTG mode if direct access to the memory of the graphics card is enabled. Turn on this feature here.

## 1.10 CPU & ROM

### CPU & ROM

#### - Warning at crash opcode

When the emulation executes a crash opcode e.g. \$02, normally the C64 mode is left and a warning is given. A real C64 could only be restarted by reset. As a consequence the warning requester gives the possibility of a reset or continuation of the emulation. Pressing the F10 key is the only action making sense in this case, when back in C64 mode.

#### - Warning at break opcode

The execution of the opcode \$00 (BRK) is normally no action of a C64 program making any sense. You should switch off these warnings if you want to use monitor programs in the C64 mode.

#### - Fast BCD Mode

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Arithmetic commands of the 6510 can use a special decimal mode. With fast BCD mode only the carry flag will be set in a correct manner, the other flags are undefined. Turning off fast BCD mode means that all flags are set correctly but this surely won't make a difference for a real world program.

- Skip RAM Test

Normally the C64 RAM is checked during a reset. This test can be switched off by a ROM patch, which speeds up the reset remarkably.

- ROM Emulation / Original ROM

Because of copyright reasons the original ROMs are not included, instead ROM emulation is used. This emulation uses changed ROMs, if you read them out and put them into a real C64, it will not work. Whoever wants can also use the original ROMs. They must reside in the ROMs directory, named BASIC.ROM, CHAR.ROM and KERNAL.ROM.

## 1.11 Video

### Video

- Rasterline Cycles

This is a value for the VIC emulation determining how many cycles one rasterline will consume. You may change this value slightly (!) when raster interrupts cause flickering on screen. Recommendable values are in the range 60 to 66.

- Badline Cycles

This determines the number of cycles a badline is consuming. Badlines are rasterlines in which the CPU has fewer cycles available because these cycles are required by the VIC. Change only slightly. Recommendable values are in the range 20 to 24.

- Start Cycle

Determines the cycle in which the VIC will begin to fetch char data. For vertical scrolling it is important whether the scroll register is written before or after this cycle. Change this value when vertical scrolling doesn't work properly. Recommendable values are in the range 12 to 17.

- PAL / NTSC

Determines how many lines the emulation is internally using. Some games only work in one of the two modes. If you use NTSC the emulation will run somewhat faster because fewer lines have to be calculated. On the other side the C64 CPU has fewer cycles per frame available.

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## 1.12 Sprites

### Sprites

#### - Display Sprites

Turn on sprites. Turning off sprites speeds up the graphics, but makes no sense for most games.

#### - Sprite-Sprite Collisions

Turn on sprite-sprite collisions. If you turn off this option, graphics may speed up a little bit. Many games use their own collision detection instead of the hardware detection anyway, so turning off this collisions can make sense.

#### - Sprite-Background Collisions

Turn on sprite-background collisions. Only few games use hardware sprite-background collision detection, so turning off these collisions may be helpful. Graphics performance is improved in this case.

The above options act for all sprites together. In the individual settings options you can do the above settings for single sprites. You can construct trainer versions of games by turning off the collisions for the sprite the player is driving. This only works if games use hardware collision detection.

## 1.13 Sound

### Sound

The 6581sid.library OR playsid.library is required. These libraries are NOT part of MagiC64. A demo version of A64, another C64 emulator for the Amiga (which became commercial from version 3), contains this library. A64 is available in AMINET. The playsid.library is included in Sidplay. You can get Sidplay from Aminet, too.

Please note: playsid.library will not work with 68060 and this library will not work with Executive, too.

#### - Emulation

Choose your preferred sound library. If the library is not installed you won't hear anything. It is possible to switch between the two libraries on the fly, but sometimes sound will be available again only after a reset in C64 mode (F10).

#### - Sound on

Turn on music and sound effects. Turning off maybe useful in games with bad music. In C64 mode you can turn on and turn off the sound with the '/' key on the numeric keypad.

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## - Channels

Turn on the three channels individually.

## - Volume

With this slider gadget you can regulate the maximum volume for all three channels.

## 1.14 Joysticks

### Joysticks

#### - Joystick settings

Amiga and C64 both have two digital joystick ports. Because the Amiga uses port 0 for the mouse, you can redirect the input of port 1 to the virtual ports 0 and 1 of the C64. It's possible to direct one Amiga port to two C64 ports at the same time. If you choose this setting every game should work, independent of which port is used. There can be some strange effects if a game uses the C64 port 0 and the keyboard at the same time because at the C64 port 1 is connected parallel to the keyboard. Of course for games with a two-player mode the Amiga port 2 can also be used, but then the mouse must be taken off. (you knew this, didn't you? ;) Changing the joystick port in C64 mode is possible if you press \* on the numeric keypad.

If you choose "No C64 port" you can simulate joystick input via the numeric block of the keyboard. See the following picture for the directions, the keys 0 and 5 correspond to Fire:

```

  7   8   9
    \ | /
  4 - 5 - 6
    / | \
  1   2   3

```

#### - Autofire settings

Set the autofire frequency for the Amiga port here. A frequency of 0 means no autofire for the port, a frequency of 1 is the same like pressing the fire button constantly. Some games can't be fooled in this way, so you have to choose a frequency of 2 or higher. The autofire is 'intelligent', pressing the fire button the first time will turn on autofire, pressing the fire button the second time will turn off autofire, so you can release the fire button in the mean time. You can decrease/increase the frequency in C64 mode with the '[' and ']' on the numeric keypad.



## 1.15 Keyboard

### Keyboard

#### - Original / National

When original mode is running, the emulator tries to copy a C64 keyboard physically in a nearly exact way. In this mode are e.g. in German Y and Z exchanged, the # key is covered with = etc. This mode makes sense for games, which depend upon a certain location of the keys on the keyboard. On the contrary, in the national mode every key is treated corresponding to the national location of the keys and the key is translated into the correct C64 key press.

In both modes some keys have a special meaning:

#### - ESC

The emulation is frozen and returns from C64 mode to the main window of the emulator. There you can change some settings, after that press "Start" to continue in C64 mode (no reset).

#### - F9

Reset of C64 emulation. A module check for a module at \$8000 is done. If there is a module, the module program will be started, otherwise the initial C64 message will appear on the screen.

#### - F10

Hard reset of the C64 emulation. There is no module check, the emulation always returns to power-up message.

#### - Enter (in arithmetic keypad)

Stops the emulation without leaving C64 mode. After pressing the enter key for a second time the emulation is continued. This key is useful if you want to look carefully at a situation during a game. It is also possible to save the the screen with a screengrabber program.

#### - Ctrl

Corresponds to the RUN/STOP key of the C64.

#### - Help

Corresponds to the RESTORE key of the C64.

#### - TAB

Corresponds to the Ctrl key of the C64.

#### - Del

Corresponds to the CLR/HOME key of the C64.

#### - left Alt

Corresponds to the Commodore key of the C64.

#### - right Alt

Corresponds to the @ of the C64.

#### - right Amiga

Corresponds to the ' of the C64.

- left Amiga

Does a keyboard reset in the national mode. Press this key when the keyboard is blocked.

- Cursor keys

Cause the equivalent C64 function.

## 1.16 Floppy

### Floppy

Under this label, adjustments concerning the emulation of a 1541 floppy, are put. The 1541 emulation works on D64 files. More about D64 files in the corresponding chapter.

- Floppy on

Here the 1541 emulation can be switched off; subsequently the C64 emulation assumes that there is no floppy. If you enter e.g. LOAD"\$",8 the computer will announce "DEVICE NOT PRESENT". Switching off the floppy can make sense when P00 or T64 files try to load some data again e.g. highscore lists.

- Disk Access Indicator

Everytime the floppy is accessed you will see a red label 'DISK' in the right bottom of the screen in C64 mode. You can turn off this indicator here. For technical reasons you won't see a logo in 8 Bit RTG mode.

- Write Protection

Effects the write protect status of the actual D64 file. When selected, this D64 file in memory, will not be changable by the user. This option is useful if you want to prevent files written or changed.

- Warning at non-supported commands

A real 1541 is (well... was) an independent computer including a processor, RAM and an operating system. Nevertheless the 1541 emulation only emulates a 1541 on the commanding level. Therefore some commands, e.g. M-E (Memory-Execute), which execute some own programs in the Ram of a 1541, are not supported. Unfortunately because of that some programs, which use fastloader or execute other complex actions (copy protection) in the floppy, do not function. If you try to execute such commands, the C64 mode is left and a warning is given. With this switch you can turn off these warnings.

- Write on protected disk

A warning is given, if you try to write on a write-protected D64 disk. You can prevent these warnings with this switch.

---

## 1.17 D64-Disks

### D64 Disks

D64 files are files which represent one side of a 1541 disk. This format was introduced with C64S, a C64 emulator for the PC. With the time it developed to one of the standard formats for C64 emulators. You can find nearly all C64 programs as a D64 file. MagiC64 loads the whole D64 file into memory, the 1541 emulation is doing all commands in memory, too. If you want write operations to become permanent, you have to save the D64 file explicitly. This Save option is only available in the registered version of MagiC64.

#### - Selection Requester

Here you will see the directory of a D64 file which was loaded into memory with "Load D64". The first line in the requester shows the name of the disk, followed by its ID and format sign. Clicking the line makes no sense. The following lines show the single programs contained in the D64 file. The number on the left side of the name gives you the size of the program in blocks of 256 bytes (like a real C64 does). On the right side the type of the program is given. Doubleclicking one of these lines will lead to a reset in the background, next the C64 mode is entered and the program will be loaded and started. The last line of the listing gives information about the free blocks of the D64 file.

#### - Load

Loads a program from a D64 file into the memory. There is NO reset into the background and there is no automatic return to the C64 mode. Loading is very fast, even very big files (bigger than 200 blocks) will be loaded in few seconds. All data is loaded in the C64 memory, the I/O range is not touched during loading. Because of that it's possible to load programs bigger than 202 blocks, on a real C64 you can't do this without special loading functions.

#### - Load + Run

Same action like double-clicking a program name in the selection requester. Contrary to "LOAD" a reset in the background is forced and there is automatic return to the C64 mode.

#### - Load D64

After clicking this button you can select a D64 file in a standard requester. The directory of this D64 file will appear in the selection requester. This is the same action like inserting a disk in a 1541, so use this if a C64 program asks you to change the disk.

#### - Save D64

A D64 file is saved. Click this button if you wish to make changes to a D64 file, permanent, because the 1541 emulation will only work in memory.

#### - Save

A C64 program is written to the actual D64 file in memory. The file is only

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changed in memory. To make the changes permanently you have to click "Save D64", too. Saving has the same properties like loading: High speed and it's possible to save programs bigger than 202 blocks.

#### - Format

Formats a D64 file in memory. After clicking this button you have to enter the disk name and the disk ID. This is equivalent to the "NEW" command of the 1541. If you want to create an empty disk, load a D64 file with "Load D64", click "Format" and then save the file with "Save D64" under a DIFFERENT name.

#### - Delete

After queryback a program in a D64 file is deleted in memory. This is equivalent to the "SCRATCH" command of the 1541.

#### - Rename

After queryback a program in a D64 file is renamed in memory. This is equivalent to the "RENAME" command of the 1541.

#### - Initialize

After queryback a D64 file is initialized in memory. The BAM of the disk is read into memory, so it's possible to distinct disks with the same ID. This is equivalent to the "INITIALIZE" command of the 1541.

#### - Validate

After queryback a D64 file is validated in memory. All files still open are closed, the BAM is updated. This is equivalent to the "VALIDATE" command of the 1541.

## 1.18 T64-Tapes

### T64 Tapes

The T64 format was introduced with C64S, too. T64 tapes are C64 tape images. There can be more than one program in a T64 file.

#### - Selection Requester

The contents of ALL T64 files are displayed. Double-clicking selects the related T64 file, then the selected program is loaded in memory and started.

#### - Load

Loads the selected program from a T64 file into the C64 memory. NO reset in the background is done and there is no automatic return to C64 mode.

#### - Load + Run

Same as double-clicking a name in the selection requester: Reset in the background, return to C64 mode, loading and starting of the program.

---

#### - Save

After queryback a program is saved from C64 memory into a T64 file. The name you enter will appear in the selection requester. The range given in memory locations \$2B/\$2C and \$2D/\$2E is saved. It's possible to save programs with an end address bigger than \$CFFF. The T64 file written is new, existing files are overwritten.

#### - T64 Path

A standard requester will appear where you can select the new T64 directory. If you click "OK" all files in this directory are scanned. This can take a while when the directory contains many files. The contents of the T64 files will appear in the selection requester.

## 1.19 P00-Files

### P00 Files

The P00 format was introduced with the C64 emulator PC64. Every P00 file represents a single C64 program.

#### - Selection Requester

The contents of ALL P00 files are displayed. Double-clicking selects the related P00 file, then the selected program is loaded in memory and started.

#### - Load

Loads a selected program from a P00 file into the C64 memory. NO reset in the background is done and there is no automatic return to C64 mode.

#### - Load + Run

Same as double-clicking a name in the selection requester: Reset in the background, return to C64 mode, loading and starting of the program.

#### - Save

After queryback a program is saved from C64 memory into a P00 file. The name you enter will appear in the selection requester. The range given in memory locations \$2B/\$2C and \$2D/\$2E is saved. It's possible to save programs with an end address bigger than \$CFFF. The P00 file written is new, existing files are overwritten.

#### - P00 Path

A standard requester will appear where you can select the new P00 directory. If you click "OK" all files in this directory are scanned. This can take a while when the directory contains many files. The contents of the P00 files will appear in the selection requester.

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## 1.20 C64-Files

C64 Files

C64 Files are files in the original C64 format. The first two bytes contain the start adress followed by program data.

## 1.21 Disk State

Disk State

The current state of the 1541 emulation is displayed. The message contains number, text, track and sector.

- Read State

Read the state and reset back to OK state.

## 1.22 Start

Start

Guess what? The emulation is started or continued at the point it was frozen.

## 1.23 Quit

Quit

This button does a very complicated function, but I can't tell you what, as it is a secret. Try to find out yourself.

; -)

## 1.24 Introduction

Introduction

The 1541 floppy is emulated on file and buffer level. The 6502 CPU and the special hardware are NOT emulated. Random access files are only readable.

---

## 1.25 Supported Functions

### Supported Functions

- LOAD and SAVE of programs. The wildcards \* and ? are possible.

Saving to a D64 file is also possible in the unregistered version of MagiC64, but you can't save the D64 file itself. Overwriting a file with a @ at the beginning of the name works always correct unlike to a real 1541. Random access files are readable only.

- Directory

All file types, protected (<) and not closed (\*) files are displayed. Wildcard and filetype selection while loading a directory is possible.

- Direct Access

It's possible to reserve buffers in the floppy with #, some floppy commands will utilize these buffers.

- Error Channel

All error and state messages are supported.

- Floppy Commands

Scratch, Rename, Initialize, New and Validate are supported. The Copy command can't append data to existing files, it's only possible to duplicate files with this command. Block-Read, Block-Write, Block-Allocate and Block-Free are possible, the equivalent User commands are supported, too. The buffer pointer can be set with the Buffer-Pointer command. Memory commands will work in the buffer range. The P command for random access files is supported, too.

## 1.26 Non supported Functions

### Not Supported Functions

All commands which execute their own code in the 1541 wont work, e.g. Block-Execute, Memory-Execute, the User commands 3 to 8, and the & command. So programs using their own fast loaders will not run. It's not possible to write random access files.

## 1.27 Monitor

The monitor MagicMon

MagicMon is a very powerful 6510 monitor which offers extended breakpoint possibilities and assembling with labels.

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The monitor is activated by clicking the monitor button. After this the monitor always will be activated when pressing ESC in C64 mode or when a breakpoint is executed.

Using the 'x' command you can quit the monitor, the monitor window will be closed and all breakpoints are cleared. If you use the 'q' command instead the window will stay open, the breakpoints are not deleted. The 'g' command will return to C64 mode, the program will run as long as no breakpoint is detected or ESC is pressed.

The online help of MagicMon is revealed if you use 'h'. Additional information for commands is available with h "command".

Most commands are self explanatory, so only MagicMon's special possibilities are introduced in detail.

The assemble command 'a startadr' will output the starting address staradr, you can now enter any 6510 command. All command including illegal opcodes are supported. You can quit assembly mode by pressing RETURN without entering any command or by entering 'f' followed by RETURN. In the later case the program will be listed again, all labels are resolved. Labels in th form of Mxx preceed the commands where xx is a hexadecimal number between 00 and 3F. Labels can be used with branch commands or with any load/store command. You could enter the following program starting at address 4096 (\$1000) with 'a 1000':

```
1000     ldx #00
1002 m02 lda m00,x
1005     beq m01
1007     jsr ffd2
100A     inx
100B     jmp m02
100E m01 rts
100F m00 .0d
1010     "HELLO"
1015     .00
```

The program will output 'HELLO' to the screen if called by entering SYS 4096 from C64 mode. Please note that you can enter single bytes to the program with .xx, complete strings are enclosed by ".

Breakpoints can be set with 'b breakpointadr', whenever this address is reached, program execution is stopped and MagicMon is called. In addition an address mask can be specified with &. This mask will be ANDed with the address and thus only address ranges can be defined. It's also possible to define a breakpoint counter, in this case the breakpoint will be activated when the program has reached the breakpoint address counter times. Last parameter could be a memory configuration between 0 and 7. This number corresponds to the lower three bits of CPU port 1. In this way you could define



breakpoints that become active when a programs run in the ROM area.

A special feature of MagicMon are memory breakpoints, that become active if a memory place or memory range is accessed. You can divide these breakpoints in read and write breakpoints, in addition you can specify a value. When reading or writing this value the breakpoint becomes active. Again it's possible to add a value mask and thus to break on the setting or clearing of individual bits in memory places. You will find examples in the online help. If a breakpoint occurs the command responsible for the break and the following command will be listed.

Breakpoints can be listed with 'bl', deleting them requires the 'bk' command. When defining breakpoints the emulation will run slower, that's especially true for memory breakpoints.

You can single step programs with 't', 'ts' will step through a complete subroutine. Because C64 mode will be entered for a short time with every trace, you can turn on the video display with 'v'.

Information about hardware is given with the info commands ci,si,vi,mi and ii, which will print display detailed information about the current state CIA's, the SID, the VIC, the current memory configuration and interrupt vectors.

With 'f' and 'fa' there are two comfortable search commands.

You can load and save C64 programs (lc,sc) and raw data (l,s). It's possible to load from or to save to D64 disks with the 'ld' and 'sd' commands.

You can access D64 blocks with the 'rb','sb' and 'wb'.

Redirect the output with the 'o' command, put byte sequences to memory with the ':' command. List or change register contents with the 'r' command. With a preceded '.' you can run any Amiga DOS command from within MagicMon. Disassemble programs with 'd', memory dumps are possible with 'm'. You can set the number of output lines for both commands with the 'ln' command.

## 1.28 Why some games don't work properly with 1.5 ?

With the Smart Refresh mode of MagiC64 1.5 some programs have problems with screen update. Turn off Smart Refresh in the graphics window in this case.

---

## 1.29 How to transfer software from C64 to Amiga ?

How to transfer software from C64 to Amiga ?

It's not possible yet with MagiC64 to connect a 1541 to the Amiga. However, there are a lot of freeware programs for this purpose. Here's a little list including the aminet directories where you can find these programs:

- 1541 Disk Reader by Dan Babcock

Read C64 disks with an Amiga 5.25 inch drive. You can create D64 files or read single files from the disks.

/misc/emu/1541.lha

- Datasette 64 by Holger Schemel

Convert digitized turbo tape files to a MagiC64 readable format with this program.

/misc/emu/d64.lha

- Frodo C64-Emulator by Christian Bauer

Connect a 1541 to the Amiga via special cabling and transfer programs to the Amiga. Schematics included in the guide.

/misc/emu/Frodo.lha

- Trans64 and StarCommander for PC's

Both programs allow connecting a 1541 to the PC via special cabling.

You can find these programs on emulation related archives e.g.

frodo.hiof.no

## 1.30 How to speed up the emulator ?

How to speed up the emulator ?

Do the following things in the Graphics window:

- Increase Frame Rate
-

- Turn off Synchronize
- Turn off Border
- Turn off Speed Limit
- Turn on Smart Refresh
- Use native Amiga modes
- Use Amiga Screen instead of 8 Bit RTG
- Turn on Direct Access when using a graphics card

In the Sprites window:

- Turn off Sprite-Background collisions
- Turn off Sprite-Sprite collisions

In the Sound window:

- Choose No Emulation (means no sound)

Please note: You should have a fast 68030 (40 Mhz) or a 68040 for decent speed.

### **1.31 How to slow down emulator ?**

How to slow down the emulator ?

In the Graphics window:

- Turn on Speed Limit. This will reduce the emulation speed to original C64 speed on very fast Amigas.

### **1.32 Which Programs don't work ?**

Which programs don't run with MagiC64 ?

All programs using their own fast loaders won't run with MagiC64. Side border sprites will not be displayed, the sound emulation has problems with complex sound effects. In-line graphics effects aren't displayed correctly.

### **1.33 No feedback from the emulator?**

---

No feedback from the emulator?

Maybe you have pressed ENTER (in numeric keypad). Just press ENTER again and there you go. In national keyboard mode the keyboard sometimes is blocked, in this case press the left Amiga key. Some games require the joystick in the other port, you can change the joystick port in the "Joystick" menu. In any case it should be possible to leave the C64 mode by pressing ESC, if not... this could be an error in the emulator.

## 1.34 What are these warnings?

What are these warnings?

Sometimes the emulator switches from C64 mode to Amiga mode and displays a warning. There are three types of warnings possible:

1. Crash Opcode executed. In this case the C64 program mostly is defect. Try the program on any different emulator, if it runs please contact the author because this is a bug in the emulation in this case.
2. Break Opcode executed. In most cases the program is defect. Some programs e.g. machine language monitors use this opcode. Turn off the warnings in the CPU-ROM window in this case.
3. Not supported floppy command (B-E,M-E). The C64 program tries to run a program in the floppy 1541. This is not supported by the emulator, so programs with fastloaders will fail.

## 1.35 History

History

\* = bug fix            N = addition

1.0

- First Aminet release.

1.01

\* - Wrong 68020 detection fixed

- Amiga View is now default

1.1

\* - The emulator did not run under OS 2.04 or 2.1. Fixed.

\* - Due to a bug in OS 3.0 "Amiga Screen" didn't work. Install SetPatch 40.14 or higher to fix this. If you use OS 3.0 a selection requester will appear at start.

---

- \* - When Double-Klicking a program to load and start it, sometimes only a reset was performed. In worst case the C64 screen stayed open, when leaving C64 mode. This should be fixed now.
- \* - In national mode the keyboard often was blocked. Fixed.
- \* - Some colors in the color palette simply were wrong. Fixed.
- \* - The 6510 commands PHP and BRK did not work correctly. The DDR 0 was not used, too. All three bugs fixed.
- \* - It's now possible to create an empty D64 disk by clicking "Format" when no D64 file was loaded previously.
- N - You can now explicitly synchronize not-displayed frames. Turning off (default) this option in the graphics menu will speed up the emulator, especially on slower Amigas.
- N - Many people asked for a plain C64 format. Here it is.
- N - Registering with keyfile is now possible. The keyfile is valid for all updates.
- N - ftp.ac-copy.com is now the official MagiC64 support suite. In the directory /pub/amiga you will find new versions of MagiC64 and a file c64progs.lha which contains about 100 games in P00 format.

## 1.2 (22.12.1995)

- \* - Double-Klick reset problem finally fixed.
  - \* - VIC 6569 emulation
    - MagiC64 produced trash on screen when 38 char mode was on and the horizontal scrolling register contained a value not 0. This bug affected MANY games and crashed the whole emulator in worst case. Fixed.
    - In vertical scrolling games top and bottom of the scrolling area often were trashed. Fixed in nearly all cases but sometimes you can't avoid minor display bugs.
    - Better sprite timing. (International Karate)
  - CPU 6510 emulation
    - The upper three bits of 0 and 1 were always cleared. Fixed. (Bruce Lee, Zorro)
  - CIA 6526 emulation
    - 'Reversed' keyboard input is now possible.
-

(Pitfall II, Johnny Rebb II and many others)

- IRQ's and NMI's sometimes were not acknowledged.  
(Ghosts and Goblins)

- Timers run more accurate now.

- Floppy 1541 emulation

- Many little errors fixed.

\* - Pressing ESC when the emulator was halted with ENTER  
crashed MagiC64. Fixed.

\* - The listview gadgets sometimes were not refreshed  
properly. Fixed.

N - New features in floppy 1541 emulation:

- Read, write and append SEQ files.

- Load ISEPIC programs.

- Using wildcards when loading the directory  
is now possible.

- You can now use drivenumbers in filenames.

N - Window positions are saved in a file.

N - When clicking the P00-Path or T64-Path gadget you  
select a path and not a file. As a consequence  
path requesters will appear now.

N - T64 files with no name are displayed with <filename.t64>  
in the listview gadget.

N - Hotkeys for changing the frame rate (+/-) and the  
joyport (\*) in C64 mode.

N - In the registered version a warning is given when you  
want to change the D64 file and the previous D64 file  
was written. Your Double-Buffering selection at the  
start of MagiC64 is saved, too.

N - Some new catalogs, a german guide and a swedish guide  
were added.

1.21 (25.12.1995)

\* - Bug when calling LayoutMenus (Enforcer-Hit) removed.

N - MagicWB Icons added.

1.3 (14.1.1996)

\* - VIC emulation

- In PAL mode 313 instead of 312 lines were computed.

---

This bug affected games like Nemesis and Rainbow Islands.

- In multicolor graphics mode sprite background collisions sometimes were not detected (Thrust)
  - CIA emulation
    - Completely rewritten. Is shorter and more reliable now.
    - The wrong bit for coupled timer mode was used. (Ballblazer)
  - CPU 6510 emulation
    - PLP always set the B flag. Fixed.
    - In memory mode \$01=01 ROM instead of RAM was read. (Park Patrol)
  - Floppy 1541 emulation
    - It was not possible to read files or the directory from disks with the first two BAM bytes pointing NOT to the first directory block. Fixed.
    - The wildcard \* sometimes was not properly handled. (Bangkok Knights)
  - \* - Two enforcer hits removed (read access to 0), which occurred in rare cases.
  - N - playsid.library is now supported.
  - N - 'Intelligent' autofire option added.
  - N - Disk access indicator.
  - N - New hotkeys for sound, autofire and the Fast Mode.
- 1.5 (3.7.1996)
- \* - CPU 6510 emulation
    - all flags in BCD mode are set in correct way
    - all illegal opcodes are supported
    - Bugs with some illegal opcodes removed (On Court Tennis)
  - \* - VIC emulation
    - Sprite-Sprite and Sprite-Background interrupts are stopped as long as the corresponding registers are not read. (Potty Pigeon)
  - \* - Floppy 1541 emulation
-

- Random access files can be read now, the P command is supported, too. (Castle Wolfenstein)
- Loading directory with wildcards AND drive number specified works fine now. (Dr. Creep)
- When a file is opened, a former file on the same channel is closed first. (Creatures)
- \* - SID emulation
- Writing to the volume register corrupted the status register of the 6510 CPU. Fixed.
- \* - The screen is positioned correctly in all modes when using Amiga View.
- \* - MagiC64 should work fine with the task scheduler Executive now.
- \* - Green flickering when running Jumpman removed.
- N - MagicMon 6510 monitor
- N - Smart Refresh mode
- N - Slowdown for very fast Amigas.
- N - Support for graphics cards (CyberGfx).
- N - Joystick input via numeric keypad.
- N - All features available in the unregistered version. There is a time limit of 10 minutes in C64 mode now.

## 1.36 To Do

"To Do" list

- Fix bugs
- A freezer is planned.
- The possibility to connect a real 1541.
- Full 1541 emulation for very fast Amigas (68060)
- We'll see. :-)

## 1.37 Greetings/Thanks and Acknowledgements

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Greetings and Thanks

Thanks to:

Jochen Wiedmann for Flexcat.  
Helmut Neumann for Beta-Testing.  
My sister Katja for help with the translation of the docs.  
(although NLS touched them a bit ;)  
My brother Markus who supported this product at all times. :-)  
NLS for many useful hints and bug reports  
Leon Woestenberg for the dutch catalog translation  
Christer Bjarnemo for the swedish catalog translation and guide  
Peter Sandén for the MagicWB Icons

Nick "NLS" Sardelianos maintains the AmigaGuide documentation.

## 1.38 ...what is a C64?

What is a C64?

This page is under construction. Meanwhile let me tell you that Commodore 64 is the best 8 bit computer ever. :)

## 1.39 Where to find C64 software

Ftp to ftp.ac-copy.com. In the directory pub/amiga you will find a file c64progs.lha which contains about 100 games in P00 format. All games were tested on MagiC64 and should run without any problems. You can try these other ftp sites, too:

arnold.hiof.no  
128.195.201.233 (Childhoods End) cdrom directory  
frodo.hiof.no

You should read the newsgroup comp.emulations.cbm for further sources of C64 programs and games.

This page is under construction. It will include FTP and WWW addresses.

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