

ShapeShifter

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COLLABORATORS

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Chapter 1

ShapeShifter

1.1 ShapeShifter Manual

The ShapeShifter
Version 2.0
What's new?

A Macintosh II emulator
for Commodore-Amiga computers

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Overview	What is ShapeShifter?
Registration	Limitations of the unregistered version
Support BBS	Call me!
Installation	How to install ShapeShifter
Using ShapeShifter	The main part
Notes on the emulation	Things to pay attention to
Questions and answers	Solutions to common problems
The Mac-Handler	Mac volumes on your Workbench
Reference	For consultation
Copyright	Legal mush
Bug reports	How to report bugs
Credits	The author wishes to thank...
The author	Programmer's address
History	Revision history of ShapeShifter

1.2 What's new?

The most important changes to version 1.14:

- ShapeShifter now pre-emptively multitasks. Everything said in the manual

about "real time behavior" is therefore obsolete. The system conforming mouse polling is now as smooth as the direct one and the keyboard polling is a lot more precise. Moreover, the emulator should no longer stop and wait for something.

- ShapeShifter now tries to get around with all ROM sub versions. It no longer depends upon special sub version.
- For softkicked Amigas, a new "KickShifter" utility is provided to make PrepareEmul work (see here)
- The "only gray pattern" problem with sub-version 34 ROMs and Amiga graphics/Zorro-II card is fixed
- A severe bug in the stack handling code is fixed that was responsible for most of the emulation's unreproducible crashes.
- CyBERgraphics 15 and 24 bit modes now work.
- SCSI IDs can be turned on and off individually.
- The US\$ registration has been increased from US\$ 35 to US\$ 40. That's due to the fact that US\$ 35 are only DM 47,- these days... Payment is now also possible with foreign checks when adding DM 10,- or US\$ 10 (as cashing such checks is expensive for me).

Details are given in the revision history.

1.3 Overview

ShapeShifter is a multitasking Macintosh II emulator for the Commodore Amiga. It allows programs written for Apple Macintosh computers to run on the Amiga without hardware modifications or expansions. The emulation runs as a normal task under the Amiga operating system, so that Amiga and Macintosh programs can be used concurrently. With ShapeShifter you can combine the flexibility of the Amiga with the power of Macintosh software!

(Note: Almost every mention of "Macintosh" in this manual refers to the Macintosh emulated by ShapeShifter)

Some of the emulation's features:

- Color display with up to 256 colors on AA Amigas (1200/4000), up to 16 colors on older models in all available resolutions
 - Support for Amiga graphics cards with EGS/CyBERgraphics or the Picasso-II up to 16,7 million colors
 - Needs no MMU
 - No support for other Macintosh operating systems apart from System 7.x, only 32 bit clean programs will run
 - Uses up to two Amiga disk drives. Macintosh HD disks can be used
-

directly with an HD drive as in the Amiga 4000, DD disks formatted with ShapeShifter can be read by any Macintosh. 800K Macintosh DD disks, however, cannot be used.

- Simulation of up to two Macintosh volumes in AmigaDOS files
- Can use up to two hard drive partitions directly as Macintosh volumes
- A SCSI interface in the Amiga can be accessed from the Macintosh and allows for using CD ROM drives, removable hard disks and other devices
- Multichannel sound output
- An Amiga sound digitizer at the parallel port is supported
- Amiga tablets can be used from the Macintosh side
- Redirection of the two Macintosh serial ports to the serial/parallel ports of the Amiga, even on I/O expansion cards
- Texts can be exchanged via the Macintosh and Amiga clipboard
- An AmigaDOS handler exists to access the files on Macintosh volumes from every Amiga program

1.4 Registration

ShapeShifter is shareware. To ease your decision whether to pay, the unregistered version has two limitations:

- SCSI cannot be used
- ShapeShifter cannot access hard disk partitions (DeviceDisks)

The shareware fee is US\$ 40,- or DM 50,-. Registered users will receive a personalized keyfile which enables the missing functions. This keyfile will work with all future versions of ShapeShifter, so as a registered user you can always download the most recent freely distributable version.

How do you become a registered user?

The simple way is to fill in the file "OrderForm", to print it out, sign it (in this order, if possible), put it in an envelope together with the registration fee and send it to me. I won't accept order forms which are not signed.

The keyfile will be sent to you either uuencoded via EMail or on floppy disk (as you like it).

1.5 Support BBS

The Next Generation BBS (Koblenz, Germany) will always have the latest version of ShapeShifter:

Port 1: +49-261-805012 (Zyx19.2)

Port 2: +49-261-84280 (V.FC)

Board: ShapeShifter-SUPPORT

You can also leave your bug reports there.

1.6 Installation

This section describes the requirements for running ShapeShifter on your Amiga and explains the installation of the program and the additional components required for operation.

You should, however, at first read the chapter Using ShapeShifter to become familiar with the usage and settings items of ShapeShifter.

System requirements

Installing the software

Installing PrepareEmul

Installing the Macintosh ROM

Installing the Mac operating system

1.7 System requirements

Requirements:

- The Amiga must have at least a 68020 processor. ShapeShifter will run on every Amiga 1200/3000/4000, but not on stock Amiga 500/2000.
- 4MB of memory are necessary.
- ShapeShifter runs under AmigaOS 2.1 and higher (CrossDOS must be installed).
- You need an original Macintosh ROM file or access to a real Macintosh.
- No Macintosh operating system is included with ShapeShifter. It can be purchased from every Apple dealer (best and most recent are System 7.1 or System 7.5).

Not required but recommended:

- A hard disk, as the Macintosh operating system can be used from disk, in principle, but it is very inconvenient. You don't have to reformat your hard drive to make the emulator use a part of it. But if you plan on working heavily with the emulation, you should consider buying a separate hard disk for the Macintosh.
- An HD disk drive as in the Amiga 4000 is necessary to read Macintosh HD disks (especially to install the Macintosh system software), in other respects only DD disks formatted with ShapeShifter can be

- used for data exchange with real Macintoshes.
- A graphics cards with chunky pixel modes (nearly all available models) will speed up color display extremely.
- Macintosh programs are very memory hungry. Your Amiga should have at least 8MB of RAM.

1.8 Installing the software

The archive contains the following files:

README	- Short description
ShapeShifter	- Main program
ShapeShifter PRAM	- Contents of the simulated Mac parameter RAM
ShapeShifter Prefs	- Settings of the emulator
ShapeShifter.guide	- This manual (german version)
ShapeShifter_E.guide	- This manual (english version)
PrepareEmul	- Small startup utility
KickShifter	- Utility for patching kickstart files
ReKick	- Adapted softkicker for A2000s
SaveROM	- Program for reading the ROM (MacBinary)
Bestellformular	- Order form (german version)
OrderForm	- Order form (english version)
Catalogs/#?	- Language files
MacHandler/Mac-Handler	- Mac file handler
MacHandler/MAC	- Mountlist for the Mac-Handler
MacHandler/MacControl	- Control program for the Mac-Handler

To install, simply create a new drawer for ShapeShifter on your hard disk and unpack the archive into it. The files in "Catalogs" don't have to be copied to LOCALE:, they can stay where they are. ShapeShifter needs no assigns.

For the file "ShapeShifter ROM", only the icon is present. This file must contain an original Macintosh 512K/1MB ROM which, for legal reasons, is not included in the archive. Please follow the instructions under Installing the Macintosh ROM to read the ROM from a real Macintosh and prepare it for ShapeShifter.

1.9 Installing PrepareEmul

The program "PrepareEmul" serves for reserving the lower 8K of Chip memory for ShapeShifter and must be installed in the Startup-Sequence. Copy "PrepareEmul" to the C: directory of your hard disk and insert the line "PrepareEmul" into the file "S:Startup-Sequence" directly after the invocation of "SetPatch". Now every Amiga cold reboot will be executed twice while PrepareEmul installs itself. In case of any problems: PrepareEmul disables itself when the Caps Lock key is pressed on startup (i.e. the red/green light is on). Then, however, you cannot start ShapeShifter.

Owners of "Emplant" can leave "RsrvMem" installed as usual instead of "PrepareEmul".

If you start the developer tool "Enforcer" in your Startup-Sequence, you should remove it as it doesn't work with ShapeShifter.

PrepareEmul doesn't work with programs that reload a Kickstart file from disk (softkick), except the A3000 with BootROMs. If you use such a program, you have to modify the Kickstart file. To do so, the program "KickShifter" is provided. KickShifter can only be started from the Shell and expects the name of a Kickstart file as argument. This file will be modified and written back under the same name. Therefore, you should make a backup copy of the Kickstart file in case anything goes wrong.

Moreover, A2000 users should use the included program "ReKick" to load the Kickstart file.

For the technically interested: "PrepareEmul" only performs two functions. First, it sets the first usable Chip RAM address to \$2000 (instead of \$0400/\$1000 as the Kickstart ROM does), second, it moves the VBR to Fast RAM. For reserving the Chip RAM, it uses a KickTag.

ShapeShifter only checks the position of the first Chip RAM MemChunk and the VBR to see if PrepareEmul is installed. All other methods giving the same results (Chip RAM at \$2000, VBR in Fast RAM) will also work with ShapeShifter.

1.10 Installing the Macintosh ROM

ShapeShifter requires the contents of an original Macintosh ROM as an Amiga file for operation. ShapeShifter can only use 512K or 1MB ROMs version 124. The version 124 ROMs are subdivided into different sub versions. ShapeShifter tries to work with all sub versions (tested with sub version 17, 19, 21, 34, and 39). If your ROM should not be suitable for some reason, ShapeShifter will display an appropriate message. If there is no message, but it nevertheless doesn't work, then try another ROM. The ROMs of PowerMacs cannot be used.

If your Amiga is fitted with a 68040 processor, you should use a 1MB ROM, as under the other sub versions, the performance of the system will drop notably. With a 68020/030 processor, a 1MB ROM is not necessary (and a pure waste of memory).

To get the ROM file you can use the program "SaveROM" from the archive which will read a Mac's ROM and save it to disk. In addition, you can check with this program whether the ROM version is suitable for ShapeShifter. "SaveROM" is a Macintosh program in MacBinary format. It has to be converted before it can be run on a Macintosh.

Note: Reading out and using a ROM is only legal if you have acquired the rights for using, either by owning a real Macintosh or a real ROM chip. In any other case, the use is illegal. Under no circumstance will I send away ROM files.

The following step-by-step instructions explain how to get the needed ROM file:

1. Format an MS-DOS disk on your Amiga (using CrossDOS) and copy the file
-

"SaveROM" on it.

2. Look for a real Macintosh with 512K or 1MB ROM (e.g. a Macintosh LC/LC II, Performa, Quadra or a PowerBook) on which "AccessPC" or "PC Exchange" for reading MS-DOS disks is installed.
3. Start the Macintosh and insert the MS-DOS disk.
4. Use "File Exchange" (with the MacBinary-to-Mac filter), "UnStuffIt" or one of the numerous other Macintosh utilities to convert "SaveROM" from MacBinary format to an executable Macintosh program. Repeat: SaveROM must be converted from MacBinary format, a simple copy won't do!
5. Start the program "Save ROM". You will see some data about the ROM and you are be told if this ROM is suitable for ShapeShifter (the message "Dieses ROM is für ShapeShifter geeignet" will appear). If the ROM is not suitable (message "Dieses ROM ist NICHT für ShapeShifter geeignet") click on "Abbrechen" and look for another Macintosh.
6. If the ROM is suitable, click on "Speichern" and save the ROM with the default name "ROM Image" to the MS-DOS disk.
7. Eject the ShapeShifter disk and insert it into the Amiga.
8. Copy the file "ROMIMAGE.BIN" (or whatever it is named now) to the ShapeShifter directory.
9. Rename the file to "ShapeShifter ROM".
10. Done. Please note that for legal reasons ShapeShifter and the Macintosh the ROM was read from may not be used at the same time from now on.

1.11 Installing the Mac operating system

If you start the emulator without making further settings, you'll be prompted with a flashing question mark to insert a Macintosh system disk. ShapeShifter needs System 7 (System 7.0.1 with System 7 Tuner, System 7.1 or System 7.5). If you own such a system disk, you may start the Macintosh directly with this disk. System 7.0.1 is freely available via www.apple.com.

However, it's better if you first create one or more (simulated) volumes for the Macintosh (as described here), format them from the Macintosh and then install System 7 from installation disks on the Mac volume. (Note: In the following description, "hard disk" always refers to a FileDisk or a dedicated Mac partition on a hard disk).

For this, two passes are necessary: The first one to format the hard disk, the second one to install the System. This is because the System 7 installation program expects the hard disk to be formatted already, which of course isn't the case on the first bootup of the emulation. If you have acquired System 7.1 or 7.5, proceed as follows:

1. Create a FileDisk or a Mac partition on you hard disk (see here)
-

and save the settings.

2. Start the emulation. After a short while you should see an empty Macintosh screen and a disk icon with a flashing question mark will prompt you to insert a system disk.
3. Insert the System-7-Disk "Disk Tools". The emulator should boot from it.
4. After a while, a dialog box should appear: "Not a Macintosh disk" with the icon of the FileDisk or DeviceDisk next to it. Now click on "Initialize", then on "Erase", enter a name for the hard disk and click on "OK". The Macintosh volume will now be formatted.
5. When the formatting is done, please wait until the startup process is complete, quit ShapeShifter with the menu item "Special/Shut down" and remove the "Disk Tools" disk.
6. The hard disk is now formatted and the proper installation can begin. Start ShapeShifter again and start the emulation. Then insert the Disk "Installation 1".
7. After a while, the window of the installation program appears. First click on "Volume" to select the volume you want the system to be installed onto, then click on "Custom". Here you can select which components you want to be installed. Please choose "System software for every Macintosh", "Ethertalk software" and "Software for ImageWriter" and click on "Install". Now follow the instructions of the installation program.
8. When the installation is done, click on "Quit", wait until the shut down screen appears, eject the installation disk and select "Restart". The Macintosh should now boot from the hard disk.
9. Now the installation is finished and you can use the control panels to set up your system, select the sound volume, or switch on the color display (if present).

If you own a CD-ROM drive, you may of course install System 7.5 from CD. Activate the gadget Apple CD300 emulation in the window SCSI for this and start from the disk that came with the CD. After the formatting, you may insert the CD and start the installation.

1.12 Using ShapeShifter

This section describes the usage of ShapeShifter and explains the many settings items that will have an effect on the emulation.

Starting and quitting ShapeShifter

Selecting the graphics display

Creating volumes for the Macintosh

Using SCSI devices

Using Amiga ports from the Macintosh

Linking into EtherTalk networks

Allocating memory for the Macintosh
Saving the settings

Starting and quitting the emulation
Switching between Amiga and Mac side

Using keyboard and mouse
Data exchange with the clipboard
Sound input and output

1.13 Starting and quitting ShapeShifter

If PrepareEmul was installed correctly, you can start ShapeShifter by double-clicking its icon after rebooting your Amiga. Then the Main window for the emulation settings will appear. A click on one of the seven big gadgets will open additional windows where you can adjust the settings. All windows can be used simultaneously and the settings are used immediately.

If you enter the tool type "QUICKSTART" in ShapeShifter's icon, or give "QUICKSTART" as an argument when starting it from the shell, the settings window doesn't appear and ShapeShifter will start through to the emulation directly. If you use ShapeShifter from the Workbench, you won't be able to access the settings window any more unless you remove the "QUICKSTART" tool type (e.g. by putting it in round brackets).

To quit ShapeShifter, click on the gadget "Quit" in the main window or select the menu item "Quit" (shortcut Amiga-Q). Please note that you'll lose your settings unless you saved them.

To quit the running emulation, select the menu item "Shut down" in the Macintosh Finder's "Special" menu. ShapeShifter will close the screen, save the Macintosh PRAM to the file "ShapeShifter PRAM" and quit.

For emergencies, there is a possibility to quit ShapeShifter "the hard way", e.g. if the Macintosh doesn't boot or a program has crashed and you cannot reach the "Shut down" menu item. In this case, press the key combination <Ctrl><Shift left><Alt left><Esc>. ShapeShifter should then quit itself. However, you shouldn't use this key command as a quick way to quit the emulation. Please always use the "Shut down" menu item if possible, as this will leave the Macintosh system in a secure state.

1.14 Selecting the graphics display

In this section, you'll learn how to use your Amiga's built-in graphics capabilities or a graphics card to display the Macintosh screen and how to set properties like color depth, resolution and graphics speed. These settings are done in the window "Graphics Settings" which can be opened by a click on the gadget "Grafik..." in the main window.

Macintosh graphics basics

- Display with built-in Amiga graphics
- Display on EGS graphics cards
- Display on CyBERgraphics cards
- Display on the Picasso graphics card

- Using video display modes

- Changing the screen size
- Setting the refresh

1.15 Macintosh graphics basics

ShapeShifter allows using the built-in Amiga graphics hardware as well as stock graphics cards for displaying the Macintosh screen.

But the organization of the display memory is very different from the Amiga to the Macintosh. The Amiga is using the planar format, where the single bits of a color information are arranged in multiple bit planes one "behind" the other, the Macintosh is using the so-called chunky pixel format, where the bits of a pixel are arranged next to each other in memory.

QuickDraw (the Macintosh graphics routines) expect the Mac's display memory to be organized in chunky pixel format. With the built-in Amiga graphics, this is only the case for a color depth of 1 bit (2 colors) and e.g. with a VGA based graphics cards only for 8 bit (256 colors).

Otherwise, the whole graphics memory must be periodically converted ("refreshed") from the Macintosh to the Amiga format, thereby slowing down the speed of the emulator significantly.

Under Setting the Refresh you'll learn how to adjust the refresh settings in an optimal way and what configuration to use to avoid the need for refreshing completely and achieving the maximum graphics speed.

Generally, it can be said that you should use a graphics card for color display.

In case you have misadjusted the graphics in a way that the display is completely corrupted, you should wait for the hard drive to stop and quit ShapeShifter with <Ctrl><Shift left><Alt left><Esc>.

1.16 Display with built-in Amiga graphics

If you don't own a graphics card or want to use the built-in graphics capabilities of your Amiga for other reasons for the ShapeShifter display, please proceed as follows:

1. Open the window "Graphics Settings" if you haven't done already.
 2. Set the screen type to "Amiga Bitplanes".
-

3. Set the color depth to "1 bit (2 colors)" if you want the highest possible speed, or to one of the other possibilities (the more colors, the slower). The depths "15 bit" and "24 bit" cannot be used, however.
4. To select the screen mode, click on "Choose..." and choose a mode that fits your needs. The best choice is a mode with an aspect ratio of 1:1, e.g. "PAL Hires Lace" (if you have a video monitor) or "MULTISCAN Productivity" (for a VGA monitor). If you have selected more than two colors, you should not use big screen sizes.
5. The values in the "Size" gadgets are set automatically. You may input smaller values if you want to speed up the graphics in higher color depths. See changing the screen size.
6. If you have selected a color depth of more than 1 bit, please see under refresh how to select the values in the "Refresh" gadgets the best way.
7. With the field "Black border" you can choose if the border around the Macintosh display should be black. This setting is a matter of personal taste.
8. In the main window, click on "Save" to make your settings permanent.

1.17 Display on EGS graphics cards

If you have a graphics card that uses the "Enhanced Graphics System" (EGS) by Viona Development, please proceed as follows to set up ShapeShifter in an optimal way for your card:

1. Open the window "Graphics Settings" if you haven't done already.
 2. Set the screen type to "EGS VGA" if your card has a VGA chipset (e.g. the Piccolo and Spectrum card have), or to "EGS Chunky". If you work with a color depth of 8 bit, the setting doesn't matter.
 3. Set the color depth to "8 bit (256 colors)" first, as this setting should work on all cards. If you use other color depths you should be aware that on VGA cards you can only use 8, 15 and 24 Bit and that the depths "15 bit" and "24 bit" require a conversion.
 4. To select the screen mode, click on "Choose..." and choose a mode of your card that fits your needs.
 5. The values in the "Size" gadgets are set automatically. You should not change them.
 6. If you have selected a color depth other than 8 bit on a VGA card, please see under refresh how to select the values in the "Refresh" gadgets the best way.
 7. The field "Black border" has no meaning for graphics cards.
-

8. In the main window, click on "Save" to make your settings permanent.

1.18 Display on CyBERgraphics cards

If you have a graphics card with CyBERgraphics driver, please proceed as follows to set up ShapeShifter in an optimal way for your card:

1. Open the window "Graphics Settings" if you haven't done already.
2. Set the screen type to "CyBERgraphics".
3. To select the screen mode, click on "Choose..." and choose a mode of your card that fits your needs. The color depth setting does not matter and is adapted automatically to the selected screen mode. For 15 and 24 bit modes, however, it may be that a refresh is necessary.
4. The values in the "Size" gadgets are set automatically. You should not change them.
5. If you have selected a color depth other than 8 bit on a VGA card, please see under refresh how to select the values in the "Refresh" gadgets the best way. Depending on the graphics card, however, it may be that no conversion is needed at all (try it out).
6. The field "Black border" has no meaning for graphics cards.
7. In the main window, click on "Save" to make your settings permanent.

1.19 Display on the Picasso graphics card

If you use the "Picasso" graphics card by Village Tronic without the CyBERgraphics driver, please proceed as follows to set up ShapeShifter in an optimal way for your card:

1. Open the window "Graphics Settings" if you haven't done already.
 2. Set the screen type to "Picasso".
 3. For the color depth, you may choose between 8, 15 and 24 bit. You should try "8 bit (256 colors)" at first, as the depths "15 bit" and "24 bit" require a conversion.
 4. To select the screen mode, click on "Choose..." and choose a mode of your card that fits your needs.
 5. The values in the "Size" gadgets are set automatically. You should not change them.
 6. If you have selected a color depth other than 8 bit, please see under refresh how to select the values in the "Refresh" gadgets the best way.
 7. The field "Black border" has no meaning for graphics cards.
-

8. In the main window, click on "Save" to make your settings permanent.

1.20 Using video display modes

In contrast to most Macintosh models, with ShapeShifter you can record Mac graphics to video tape or display it on a TV set without problems. Things to take care for are:

1. You must select a screen mode that is compatible to video, that is one that has a beam frequency of 15kHz horizontally and 50Hz (NTSC: 60Hz) vertically, e.g. one of the "PAL ..." modes.
2. If you want to use the complete screen without disturbing borders, you have to set the overscan in the display mode requester to "Graphics size", "Extreme size" or "Maximum size". You can use the Overscan preferences editor to see and change the sizes of these regions.
3. Many graphics are not video compatible. If your graphics cards cannot handle video resolutions (see the manual for details) you have to use the built-in Amiga graphics.

1.21 Changing the screen size

The values in the "Size" fields are set automatically when you select a screen mode.

You can change the size (in pixels) manually by entering other numbers there. By setting a smaller size you can, for instance, speed up the graphics refresh.

1.22 Setting the refresh

With the fields "Refresh (foreground)" and "Refresh (background)", you adjust how much processing time should be left free when the display mode you selected requires a periodical refresh (conversion of the screen memory).

Sensible Values for an Amiga 4000/030 are 5 (2 bit), 20 (4 bit) and 60 (8 bit), but the 8 bit resolution is far too slow for serious work. If you plan on using more than 2 colors most of the time, you should use a graphics card with "chunky" modes (that are, for instance, all graphics cards based on a VGA chipset in 256 colors). Then the conversion is not necessary and the speed will go up extremely.

If you don't own a graphics card, you should select "Amiga bitplanes" and 1 bit color depth, otherwise "CyBERgraphics"/"EGS Chunky"/"EGS VGA"/"Picasso" and 8 bit color depth. These settings give the best results in most cases.

By entering a smaller size in the "Size" fields (e.g. 512\$ \times \$384 instead of 640\$ \times \$480) the refresh speed will be raised a lot.

Another hint: If you use a graphics mode with refresh, you should switch of the "Largest free block" option in the Memory Settings window, and not set the amount of allocated Mac memory to the maximum possible with the slider gadget, as parts of the screen memory could end up in slow Chip or 16 bit memory, thereby slowing down the refresh speed.

Here is a list that shows you for which color depth/screen type combinations a refresh is necessary:

	Color depth					
Screen type	1 bit	2 bit	4 bit	8 bit	15 bit	24 bit
Amiga Bitplanes	no	yes	yes	yes	-	-
CyBERgraphics	-	-	no	(yes)	(yes)	
EGS Chunky	no	no	no	no	no	no
EGS VGA	-	-	no	yes	yes	
Picasso	-	-	no	yes	yes	

1.23 Creating volumes for the Macintosh

Here, you'll learn how to use your floppy disk driver with the Macintosh, how to create simulated Macintosh hard disks (so-called FileDisks) without having to repartition your hard disk, how to place a real hard disk partition or a whole hard disk at the Mac's disposal (so-called DeviceDisks) and how to use SCSI devices like removable hard disks and CD-ROM drives with ShapeShifter. The necessary settings are done in the windows "Volumes" and "SCSI Settings" which can be opened by selecting the gadgets "Volumes..." or "SCSI..." in the main window.

Using floppy disks

Creating a simulated hard disk

Creating a dedicated Macintosh partition

Using SCSI devices

Formatting the volumes on the Mac side

1.24 Using floppy disks

ShapeShifter will recognize up to two floppy disk drives automatically and use them from the Macintosh side. With the emulation running, you can work with Macintosh as well as with Amiga disks as usual. The only difference between ShapeShifter and a real Macintosh concerning disk handling is when ejecting disks. What disk formats ShapeShifter will understand depends on the type of drive installed in your Amiga.

With a simple DD disk drive you can use two formats with ShapeShifter:

720K MS-DOS disks (with "PC Exchange", "Access PC" or "Exchange Files") and 720K Macintosh disks formatted with ShapeShifter. Normal Macintosh DD disks are recorded in a different format that is not directly readable on Amiga drives. So you cannot read 800K DD disks formatted on a real Macintosh. The DD disks formatted with ShapeShifter, however, can be used with any Macintosh (these conform to the "720K Exchange Format" that can even be formatted on some Macintoshes).

But with an HD drive as in the Amiga 4000 you may read normal Macintosh HD disks as Apple uses the MFM format on HD disks (like the Amiga and the PC do) and not the old GCR format. Moreover, 1.44MB PC disks are recognized by "PC Exchange" or "Access PC".

When inserting an Amiga disk while the emulation is running, the Macintosh will show a dialog box with the message "Unreadable disk". But you may read from and write to the disk as usual from the Amiga side.

A real Macintosh ejects disks electrically when picking the corresponding menu item or a disk icon is being dragged onto the trash can. This will prevent the user from ejecting a disk too early as the Macintosh caches some important data in RAM which is written back to disk only just before the disk is ejected.

As the Amiga has only drives with manual ejection, ShapeShifter uses a different method: The drive light will be constantly on while a Macintosh disk is inserted, to remind you that you may not yet eject the disk. Only if all data has been written and the disk is ready for ejection (after you selected the Eject Disk menu item), the light will go off and a flashing digit in the top right corner of the screen will indicate that the corresponding disk may be ejected. A '1' stands for the built-in disk drive, a '2' for the external, a '3' for the first DeviceDisk and a '4' for the second DeviceDisk.

So the normal procedure to eject a Macintosh disk will be as follows:

1. Drag the disk icon onto the trash can.
2. Wait for the flashing digit to appear and the drive light goes off (sometimes, the digit will not appear, but then the light is off, everything is OK)
3. Eject the disk.

1.25 Creating a simulated hard disk

ShapeShifter allows the simulation of up to two Macintosh hard disks in Amiga files on your hard disk. These simulated hard disks are called FileDisks. You may use FileDisks if you don't want to repartition your hard disk or buy a dedicated Macintosh hard disk. However, the speed of a FileDisk is far below that of a real hard disk, especially with higher capacities (10MB+).

For creating a FileDisk, click on the "Create..." gadget of the corresponding FileDisk in the "Volumes" window. ShapeShifter will ask you how large the FileDisk should be (in KB). Enter a size that fits your

needs and that fits on your hard disk and click on "Choose file...". A file requester will appear in which you must enter the name of the FileDisk file to be created. If you select an existing file, it will be overwritten. After a click on "OK" the file is created and the name is entered into the text gadget in the settings window. If you already have created one or more FileDisks, you can enter the name into the text gadget directly or select an existing file with the symbol to the right of the text gadget.

1.26 Creating a dedicated Macintosh partition

[Note: This function is not available in the unregistered version]

If you want to do serious work with ShapeShifter you should place an own hard disk partition or even a whole hard disk at the Mac's disposal. ShapeShifter allows using up to two such partitions, called DeviceDisks.

First, use "HDToolbox" or a similar hard disk installation program to create an Amiga partition on your Amiga hard disk or on a new hard disk you acquired for the Macintosh, with a size of your choice (if you are using a proper hard disk, you should create one partition that covers the whole disk). Please note that you will lose all saved data if you repartition a hard disk. So you should first backup your hard disk, then repartition it and finally restore the backup.

If the Partition is recognized by the Amiga, you may click on "Choose..." near the corresponding DeviceDisk in the window "Volumes" and choose the partition by its name. When clicking "OK", ShapeShifter will analyze the partition and enter the data required for the emulation in the text gadgets. Expert users may change the values manually, but doing so may cause severe data losses on Amiga and Macintosh partitions.

Now you should click on Save to make your settings permanent. When you have formatted the DeviceDisk from the Macintosh side, you may set the partition to "NoMount" with "HDToolbox", so the Amiga operating system will no longer worry about this partition (as it is only used by the Macintosh from now on).

1.27 Formatting the volumes on the Mac side

After the successful creation of a FileDisk or DeviceDisk, these have to be formatted by the Mac after starting the emulator. If the volume is recognized, a dialog box with the message "Damaged volume" or "Volume unreadable" and the icon of the volume will appear immediately after the Finder has started. The icon of the FileDisk is a sheet of paper with an Amiga checkmark and the number 1 or 2, the DeviceDisks use the icon of a disk, also with an Amiga checkmark and the number 1 or 2. After clicking on "Initialize" and entering a name for the volume, the volume gets formatted. Then the FileDisk or DeviceDisk is available to be used as a Macintosh volume.

1.28 Using SCSI devices

[Note: This function is not available in the unregistered version]

If your Amiga is fitted with a SCSI port (built-in into the Amiga 3000/4000T, otherwise you may use a stock SCSI adapter), ShapeShifter will allow using SCSI devices like removable hard disks and CD-ROM drives from the Macintosh. The necessary settings are done in the Window "SCSI Settings" which can be opened by a click on the gadget "SCSI..." in the main window.

- Selecting the SCSI driver
- Using multiple SCSI ports
- Disabling individual SCSI IDs

- Emulating an Apple CD300 drive
- Using SCSI hard drives

- Optimizing the speed

1.29 Selecting the SCSI driver

You have to inform ShapeShifter, what driver to use for accessing the SCSI port.

To do this, enter the name of the Amiga SCSI driver into the text gadget "SCSI Device" in the SCSI window. On the Amiga 3000/4000T or when using the Commodore SCSI cards A2091 or A4091, this is "scsi.device", and for a GVP SCSI adapter, for instance, this would be "gvpscsi.device". Consult your SCSI adapter's manual about what the driver's name is. If the driver is on disk (very rare), it can be selected by a click on "Choose...".

If you use an Amiga 1200/4000, you should not enter "scsi.device" in "SCSI Device", as this will access the IDE interface that won't work properly with ShapeShifter. If you want to use an IDE hard disk with ShapeShifter, you should configure it as a DeviceDisk.

1.30 Using multiple SCSI ports

ShapeShifter can only use one SCSI port at a time. If you have installed multiple SCSI adapters in your computer, it depends on the adapter how to choose the one that should be used by ShapeShifter.

Some SCSI adapters are accessing the different cards by multiple, separate drivers, e.g. "scsi.device" for the first card, "2nd.scsi.device" for the second one, etc. In this case, please enter the name of the driver that belongs to your preferred port in the text gadget "SCSI Device".

Other SCSI adapters are using the same driver for all cards of the same type, but assign different driver units for the different ports, e.g. unit 0..7 for the first card, unit 100..107 for the second one, etc. In this case, you must enter in the gadget "Unit number of first SCSI

device" the unit number, the units connected to the preferred port start from, i.e. "0" for the first port, "100" for the second one, etc.

1.31 Disabling individual SCSI IDs

The checkboxes with the numbers "0" to "6" at the bottom of the window may be used to turn on and off individual SCSI IDs. So you can, for example, prevent long waits for devices you don't want to use but that have a long initialization phase, or you can switch off devices that don't work with certain programs.

1.32 Optimizing the speed

ShapeShifter is using buffers allocated in memory for transferring SCSI data. The speed of the transfer may vary heavily, depending of the memory area used for the buffers.

With the gadget "Memory Type", you can select the memory area to be used for the SCSI buffers. For a properly designed and configured SCSI adapter, this setting will only affect the speed and not the reliability of the transfer. If you use a PIO adapter, you may select "any", for a Zorro-II adapter capable of DMA (e.g. GVP Series II) you should select "24 bit DMA" on an Amiga 2000/3000 and "Chip RAM" on the Amiga 4000, for a Zorro-III adapter (e.g. A4091 or Fastlane Z3), "Any" is the best setting. If you only understood half of the last sentence, don't bother. Simply set it to "Any" or experiment a bit (you may use a Macintosh SCSI benchmark program to find the best setting).

1.33 Emulating an Apple CD300 drive

If you own a CD-ROM drive that conforms to the SCSI-2 standard, you may use it under ShapeShifter with the AppleCD driver that comes for instance, with System 7.5 and is originally intended for Apple CD-ROM drives only.

To do this, activate the gadget "Apple CD300 emulation". The drive will then behave like an Apple CD300 drive from the Macintosh side and you won't need special driver software. If you have connected a real Apple CD300 or have a special Macintosh driver for your drive, you should not select this option.

1.34 Using SCSI hard drives

SCSI hard disks should be configured as DeviceDisks if possible, as this will give you a higher performance. If you nevertheless want to configure a hard disk as a real Mac SCSI hard disk (with Mac partitions, SCSI driver and all), you can do this as usual with a suitable installation program. Please note, however, that the Apple installation program on the "Disk

Tools" disk that comes with the System, will only work with Apple OEM drives. But this can be bypassed by selecting the gadget "Apple hard disk emulation" in the "SCSI Settings" window. After formatting and partitioning the drive, you can and should turn this option off again.

1.35 Using Amiga ports from the Macintosh

The modem and printer ports of the Macintosh are redirected to Amiga ports by ShapeShifter. In the serial settings of ShapeShifter, you specify which port should be mapped to which driver. ShapeShifter supports all drivers that are compatible to the "serial.device" or the "parallel.device" by Commodore, i.e. even most I/O expansion card drivers.

All necessary settings are done in the window "Serial Settings" that will open after a click on the gadget "Serial..." in the main window. There are two sets of gadgets, one for the modem port and one for the printer port.

In the big text gadget, you enter the name of the driver (e.g. "serial.device"). When the driver is on disk, it may be selected with the gadget "Choose...".

If you are using an I/O expansion card with multiple ports, you can enter the unit number of the desired port into the gadget "Device unit". Please consult your card's manual about which number belongs to which port. For standard Amigas with only one serial and one parallel port, please enter "0" here.

Now, you have to tell ShapeShifter whether the selected port is a serial or a parallel one, as these have different properties (e.g. a parallel port doesn't have a baud rate setting). Activate or deactivate the gadget "Parallel device" for this.

E.g. if you want to redirect the modem port to the built-in serial port of the Amiga and the printer port to the parallel port, please enter the following:

- For the modem port: "serial.device", Unit 0, not a parallel device
- For the printer port: "parallel.device", Unit 0, parallel device

Macintosh computers are using round 8-pin connectors for the port, so you cannot connect Macintosh devices to normal Amigas (the Commodore serial card, however, has these connectors). There is the following solution: The very first Macintoshes didn't have these 8-pin connectors, but 9-pin DSUB connectors, as PCs use today. By using an adapter from a 25-pin DSUB female to a 9-pin male connector (available in every PC store) and an adapter from a 9-pin female to the round 8-pin connector (available from Apple and some third-party suppliers) the Amiga can be fitted with a Macintosh-conforming port.

1.36 Linking into EtherTalk networks

ShapeShifter doesn't support networks in the current version.
Or does it? :-)

1.37 Allocating memory for the Macintosh

ShapeShifter needs for the emulation a memory area with selectable size that is used as the main memory by the Macintosh. If you, e.g., select 4MB of memory, the emulator will allocate 4MB of the Amiga's memory on startup. The Macintosh operating system will then believe that it ran on a Macintosh with 4MB installed main memory. All Macintosh programs will only use these 4MB of memory for their data and when you start a Mac program, it will be assigned a part of these 4MB, no matter how many free memory is available in your Amiga beyond that. As a result of a lack of flexibility of the Macintosh operating system, the emulator is only able to use one contiguous block of memory.

All settings concerning memory are done in the window "Memory Settings" that will open after a click on the gadget "Memory..." in the main window.

You can either use the slider gadget "Mac memory" to set the size of the memory block to be used for the Macintosh or activate "Largest free block" so ShapeShifter will use the largest available block. Please note that the absolute minimum for System 7 is 1.5 MB.

Please do not wonder why the memory display in the Workbench screen title is displaying a far greater amount of free memory than you can set in ShapeShifter. As I said before, the memory for the Macintosh must be available in one block, which is not the case if your memory is fragmented. Restarting your Amiga or entering the command "avail flush" may help.

When the gadget "Mac ROM in fast memory" is checked, ShapeShifter will try to place the Macintosh ROM in the fastest memory installed in your Amiga, thus speeding up the Macintosh operating system, but at the cost of less free Macintosh memory.

With the setting "Write-protect ROM" in the "Misc" window, ShapeShifter tries to prevent write accesses to the Macintosh ROM. This will make the emulation more stable and better protected against buggy programs. However, the write protection only works with a 68040 processor. If you have a 68040 or 68060 and problems starting ShapeShifter you can try if switching the write protection off helps.

By selecting "Dynamic memory handling", you allow ShapeShifter to use additional Amiga memory apart from the block selected as Mac memory for temporary purposes (e.g. displaying menus). But for starting Macintosh programs, only the fixed block is used, as before. Some programs will not run with the dynamic memory handling, in which case you should turn it off.

To get the maximum amount of memory for the Macintosh, you should activate the options "Largest free block" and "Dynamic memory handling" and disable "Mac ROM in fast memory". If you want the highest speed, then turn on "Mac ROM in fast memory" and disable the dynamic memory handling. The setting with the highest compatibility is achieved by turning off all three options and setting the slider to the maximum value minus the size of the

ROM (e.g. maximum selectable size for the slider: 3120KB, Macintosh ROM size: 512KB -> set the slider to 2608KB).

Another word about the memory reports of some Macintosh programs. The window that will open after selecting "About this Macintosh" in the Finder, the amount of memory set with the slider gadget (or the size of the "largest block") will be displayed. If the dynamic memory handling is on, it will show the total amount of memory installed in your Amiga, where the memory allocated by Amiga programs is added to the "System software" reading. If a macintosh utility wanted you to believe that you have 127MB and more memory installed in your Amiga, this is because these utilities depend on the Macintosh memory beginning at the address zero, which is not the case on the Amiga.

1.38 Saving the settings

By clicking on "Save" in the main window of ShapeShifter or by selecting the menu item "Save settings" (shortcut Amiga-S), your settings will be saved to the file "ShapeShifter Prefs" and will be available on the next start of ShapeShifter.

1.39 Starting and quitting the emulation

To start the Macintosh emulation, click on the gadget "Start" in the main window of ShapeShifter or select the menu item of the same name (shortcut Amiga-R). ShapeShifter will then close all its windows and open a screen for the Macintosh system. Mouse and keyboard inputs will now go to the Macintosh.

If you specify the tool type "QUICKSTART" in the icon of ShapeShifter or give "QUICKSTART" as an argument when starting from the shell, ShapeShifter will immediately start through to the emulation without displaying the settings window. This can be used if you only occasionally change the emulation settings.

If you want to quit the emulation, select the menu item "Shut down" in the Macintosh Finder from the menu "Special". ShapeShifter will close the screen, save the Macintosh PRAM into the file "ShapeShifter PRAM" and quit itself.

Please note that you will lose all your settings for the next time when starting the emulation unless they have been saved.

1.40 Switching between Amiga and Mac side

By pressing <Ctrl><Tab>, you can turn off and on the Macintosh mouse and keyboard query. As long as the Macintosh query is turned off, the Amiga mouse pointer will be invisible until you select a window on another screen or press <Ctrl><Tab>. Moreover, no graphics refreshes will take place when the Amiga mouse pointer is visible.

For instance, if you want to switch to another Amiga program while the emulator is running, you should first press <Ctrl><Tab> which will bring up the Amiga mouse pointer and then press Amiga-M to bring the screen of the Amiga program to the front. If you want to continue working on the Macintosh side, get the ShapeShifter screen to the front, click into it and press <Ctrl><Tab> again. The Amiga mouse pointer will disappear and the Macintosh will accept input again.

The Macintosh screen can be used as any other Amiga screen. You may send it to the back with Amiga-M and move it by holding an <Amiga> key and dragging it with the mouse.

1.41 Using keyboard and mouse

The mapping of the Macintosh special keys to the Amiga keyboard is as follows:

Option	-> <Alt>
Command	-> <Amiga>
Shift	-> <Shift>
Ctrl	-> <Ctrl>
Caps Lock	-> <Caps Lock>
F1-F10	-> <F1>-<F10>
Help	-> <Help>
Backspace	-> <Backspace> (<-)
Delete	->

By pressing <Ctrl><Tab> you can turn off and on the Macintosh mouse and keyboard query and the graphics refresh.

The right mouse button has the same function as the <Alt> (option) key, if you are using a three-button mouse, the middle button will act like the <Shift> key.

Please note that all Amiga system key combinations will remain active. E.g. if you want to hold down the option and command keys to rebuild the desktop file of a volume, you have to press an <Amiga> key and the right mouse button, as the Amiga will interpret the combination <Alt><Amiga> as a replacement for the left mouse button. Likewise, the combination <Amiga left>-N will not create a new folder, but bring the Workbench screen to the front. To create a new folder, you have to press <Amiga right>-N.

The key combination <Ctrl><Shift left><Alt left><Esc> serves as a kind of emergency shut down option to quit ShapeShifter when the Finder menu item "Shut down" is not available (e.g. the Mac is not booting, garbage on the screen etc.). But this key command is only intended for emergencies.

With the key combination <Ctrl><Shift left><Alt left><Help>, you can activate Macintosh debuggers. If you don't have "MacBug" installed, the ROM debugger will come up. If you happen to press these keys by mistake, you can quit the debugger by entering "G".

You may use graphics tablets or touchscreens instead of the mouse, if

these appear like a mouse to the Amiga and are usable with all programs.

With the gadget "Direct mouse polling" in the "ShapeShifter Misc" window, you specify whether ShapeShifter should poll the mouse directly by itself or use the Amiga operating system to do so. The direct polling is more compatible with some Macintosh programs, but you cannot use graphics tablets or touchscreens with it.

1.42 Data exchange with the clipboard

Using the clipboard, you can exchange texts between the Amiga and the Macintosh side, i.e. if you select and cut text in a Macintosh program you can paste this text into an Amiga program and vice versa. An automatic conversion between the Mac and Amiga character sets will take place.

1.43 Sound input and output

ShapeShifter will use the built-in audio functions of your Amiga for sound output. If your speaker stays dead, please check if the sound volume is set to "0" in the Sound control panel.

And please note that some Macintosh programs, especially games, are accessing the Macintosh sound chips directly. This will not result in a crash under ShapeShifter, but there will be no sound.

If you own a sound digitizer that is connected to the Amiga parallel port, you may also use it from the Macintosh side and, e.g. record your own alert sound with the Sound control panel. Please note that ShapeShifter will only record in mono at the moment.

1.44 Notes on the emulation

Here, you will learn what to observe when using ShapeShifter and what problems you may encounter with the Macintosh emulation.

Restart, shut down etc.	Control over the emulator
Macintosh debuggers	The catcher comes
What ShapeShifter cannot do	Not yet! :-)
When nothing is working	The Mac won't boot. What now?
Possible problems on the Amiga side	Important! Read this!

1.45 Restart, shut down etc.

After selecting the Finder menu item "Restart", only the Macintosh side will be restarted, all Amiga programs and data will remain in memory.

The menu item Shut down will quit ShapeShifter and close the Macintosh emulation.

The "Restart"/"Shut down" buttons in some system error dialog boxes are not always working in the desired manner, however.

The "forced" quitting of a program with Command-Shift-Escape is not supported by ShapeShifter.

If you want to quit ShapeShifter, but the Finder menu item "Shut down" is not accesible (e.g. because of a crash/problems on startup), you may leave ShapeShifter with the key combination <Ctrl><Shift left><Alt left><Esc>. This command should only be used in case of emergency, however.

1.46 Macintosh debuggers

The key combination <Ctrl><Shift left><Alt left><Help> will simulate an NMI on the Macintosh side and can be used to activate debuggers. Unless you have installed "MacsBug", the debugger built into the Macintosh ROM will appear. Both can be quit by entering "G".

The ROM debugger (recognizable by the ">" prompt) understands the folowing commands ([] marks an optional argument):

```
G [xxxxxxx]           : Start program at given address,
                        "G" without argument will quit the debugger
DM [xxxxxxx]          : Display memory
SM [xxxxxxx] [yy yy...] : Change memory
TD                    : Display memory at $0C30 (this is where the
                        processor registers are stored)
D0..D7 [xxxxxxx]      : Show/set data register
A0..A7 [xxxxxxx]      : Show/set address register
PC [xxxxxxx]          : Show/set program counter
SR [xxxx]             : Show/set status register
```

"xxxxxxx" stands for a hexadecimal expression which may contain the following special symbols, that can be linked with '+' and '-' as well:

```
RD0..RD7 : Contents of a data register
RA0..RA7 : Contents of an address register
.         : The "current" address from which memory is being displayed
@xxxxxxx : The contents of address xxxxxxxx
```

Pressing the return key only will repeat the last command and display the next memory area for "DM".

1.47 What ShapeShifter cannot do

The following Macintosh properties are not (yet) emulated by ShapeShifter:

- Virtual memory. Even on Amigas with MMU, you should not switch on the virtual memory.
- AppleTalk. Though the emulator contains an ethernet driver, it's only there to prevent problems with accessing LocalTalk and is without function at the moment. You can activate AppleTalk, but not use it. Moreover, you should never select LocalTalk in the Network control panel as this will result in a crash.
- Multiple monitors. You can only use one monitor at a time with ShapeShifter.
- 24 bit addressing. You can only use 32 bit clean programs.
- Programs accessing the Macintosh hardware directly won't necessarily crash under ShapeShifter, but are limited in their usability. E.g. the game "Lemmings" is missing the sound (the Amiga version is nicer, anyway).
- The sound input of the emulator doesn't yet have all the features of the Apple sound input driver. Some programs may have problems when recording.
- Quitting a program with Command-Shift-Escape doesn't work.
- The serial drivers don't support hardware hangup with DTR.

The following Macintosh programs/utilities don't work with ShapeShifter or behave erratically:

- HDT CD-ROM Toolkit, use the AppleCD driver instead
- HDT harddisk drivers
- SCSIProbe, which probably isn't 32-bit clean
- Peace of Mind, a hardware diagnostic program
- Snooper, another diagnostic program
- SoundEdit 16

1.48 When nothing is working

In rare cases, it may happen that the Macintosh won't boot or might crash on startup. Then you should try the following:

- Turn the option "Mac ROM in fast memory" on.
 - Turn the option "Write-protect ROM" off.
 - Switch off the CPU cache (command "CPU NODATACACHE" from the Shell).
-

- Change the graphics settings to "Amiga Bitplanes", "1 Bit".
- Hold down the left shift key on startup (first wait for the dithered Mac background pattern to appear). This will disable all system extensions.
- Delete the file "ShapeShifter PRAM" and start ShapeShifter again.
- Boot the Macintosh from disk and use "First Aid" or the Norton Disk Doctor to check the integrity of the start volume and the system file.
- Re-install the Macintosh System, "for every Macintosh".

1.49 Possible problems on the Amiga side

Some properties of ShapeShifter may lead to problems on the Amiga side or may disturb concurrently running Amiga programs:

- PrepareEmul will move the processor's vector base register (VBR). This may break some, very very few Amiga programs. Those of you who have already installed a tool for moving the VBR in the Startup-Sequence, should not use it together with PrepareEmul as this will usually reset the VBR to address zero and ShapeShifter won't work.
- The FileDisks won't work with automatically (de)compressing file systems like XFH. If you use such a file system, you must create the FileDisk files using the name of the original (uncompressed) volume (e.g. "DH1:MacFileDisk" and not "XH1:MacFileDisk" if "XH1:" is an XFH mirror of "DH1:").
- The debugging tool "Enforcer" is not compatible with ShapeShifter on principle. You have to turn it off.

1.50 Questions and answers

Question:

How do I rebuild the desktop file when starting the Macintosh?

Answer:

You have to hold down the left Amiga key and the right mouse button on startup. The key combination <Alt left><Amiga left> doesn't work because this combination is intercepted by the Amiga operating system as a replacement for the left mouse button.

Question:

I have xx MB of memory in my Amiga, but ShapeShifter is using only a small part of it.

Answer:

ShapeShifter can only use a contiguous memory block. E.g. if you have

2MB of Chip RAM, 8MB of 32 bit Fast RAM and 4MB of 16 bit Fast RAM, the theoretically available amount of memory for ShapeShifter is 8MB (and not 14MB). The Amiga operating system will, of course, use some of these 8MB for itself.

Question:

The Macintosh doesn't boot. How can I now quit ShapeShifter? The Finder is not loaded.

Answer:

Press <Ctrl><Shift left><Alt left><Esc>. ShapeShifter should then quit itself.

Question:

I have changed the graphics settings and now there is only garbage on the screen. How can I now quit ShapeShifter?

Answer:

Press <Ctrl><Shift left><Alt left><Esc> (eventually hold it down). ShapeShifter should then quit itself.

Question:

In spite of my 68040, the Macintosh emulation is slower than on an Amiga 3000. How can that be?

Answer:

You are probably using a 512K ROM, sub version 17 or 19. This ROM is not completely 68040 compatible and ShapeShifter has to turn off the data cache to make it run. If you use a 1MB ROM (e.g. from a Quadra) the speed should increase notably.

Question:

PrepareEmul fails to work, it just reboots and reboots. My Amiga is softkicked.

Answer:

PrepareEmul doesn't work with softkickers. The only solution is to patch the Kickstart file as shown here.

Question:

When I switch from the running emulation to my workbench screen, I get garbage all over the screen.

Answer:

Press <Ctrl><Tab> before switching screens and wait for the Amiga mouse pointer to appear.

1.51 The Mac-Handler

The Mac-Handler allows you to exchange files between the Amiga and the Mac side: With it, you can access Macintosh volumes like Amiga volumes while the emulation is running, and e.g. copy files from the Workbench.

To install, please copy the file "Mac-Handler" into the "L:" directory. The file "MAC" should not be copied to DEVS:DOSDrivers, as you might expect. This would mount the Mac-Handler at every restart automatically. But as it depends on ShapeShifter running, it doesn't work this way. You should copy "MAC" to SYS:Storage or wherever, instead.

To use it, first start ShapeShifter, wait until the Macintosh has finished the startup process and then double-click the "MAC" icon. Now, an icon for the Mac start volume should appear on the Workbench. You may access it from any Amiga program as if it was an Amiga volume.

To access other volumes than the start volume, you have to change the tool type "STARTUP" in the "MAC" icon. There, you give the number of the Macintosh volume to be used. 1 is always the start volume, the other volumes are counted up from 2.

All files on the Mac volume have a comment like "xxxx/yyyy". "xxxx" is the Macintosh file type and "yyyy" the signature of the creating program, e.g. "TEXT/ttxt" for a TeachText text file. Changing the comment will change type and creator of the corresponding Mac file. All folders have the number of contained objects (files or additional folders) as a comment.

The Mac-Handler can access only either the data or the resource fork of the Mac volume at a time, the file lengths are displayed accordingly. By default, it will use the data fork. The small program "MacControl" serves as a switch. It can only be used from the Shell and expects the device name of the Mac-Handler (e.g. "MAC") and one of the keywords "DATA" or "RESOURCE" as arguments. If you have, for instance, mounted a Mac volume as "MAC:", the command to switch to the resource forks is:

```
MacControl MAC: RESOURCE
```

And to switch back to the data forks, you use:

```
MacControl MAC: DATA
```

1.52 Reference

This section describes ShapeShifters window gadgets one by one in their function. You should use this reference for consultation if you want to learn more about the function of a single setting. How the settings interact and how to configure ShapeShifter for certain things is covered here.

Main window

Graphics

Volumes

Memory

SCSI

Serial
Network
Miscellaneous

1.53 Main window reference

The main window appears directly after starting ShapeShifter.

By selecting one of the seven big gadgets Graphics..., Volumes/Disks..., Memory..., SCSI..., Serial..., Network... and Miscellaneous... you can open the windows in which you do the settings.

A click on "Start" closes the settings windows of ShapeShifter and starts the Macintosh emulation.

With "Save", your settings are saved in the file "ShapeShifter Prefs", so they are available at the next start of ShapeShifter.

By selecting "Exit" you can quit ShapeShifter while discarding any unsaved settings.

ShapeShifter has only one menu, "Project", that offers three items:

"About ShapeShifter..." displays some information about the version of ShapeShifter used and the author of the program.

"Save settings" (shortcut Amiga-S) does the same as the gadget "Save". The settings are saved in the file "ShapeShifter Prefs".

With "Quit" (shortcut Amiga-Q), you quit ShapeShifter without saving the settings.

1.54 Graphics settings reference

Color depth: Here you set the number of colors to be used by the Macintosh. This setting is done here and not in the Monitors control panel, as it gives you the chance to switch to a lower color depth without problems when the speed in higher depth becomes too slow.

Screen type: Here you choose how the screen memory should be handled by ShapeShifter. This setting is closely connected to the selected screen mode. The options are now discussed in detail:

"Amiga bitplanes" is the setting for the normal Amiga graphics modes. You can use 2 to 256 colors. When using more than 2 colors, the graphics have to be refreshed periodically, which has an impact on the speed. Only at 2 colors the graphics is running at full speed.

"CyBERgraphics" is for graphics cards with a CyBERgraphics driver. Only color depths of 8, 15 and 24 bit are selectable, while most graphics cards require a refresh at 15 and 24 bit.

"EGS chunky": If your graphics card works with the "EGS" (Enhanced Graphics System) by Viona Development, you should use this setting (or "EGS VGA").

"EGS VGA" must be used if your graphics card works with EGS, but displays false colors at 15 and 24 bit with the "EGS chunky" setting. In this case, it is likely that your card works with a VGA graphics chipset that needs a refresh at 15 and 24 bit.

"Picasso" is intended for the Picasso graphics card by Village Tronic. Like "EGS VGA", only color depths of 8, 15 and 24 bit are possible, while 15 and 24 bit require a refresh.

Screen mode: After a click on "Choose...", the screen mode requester will open and allow the selection of any Amiga graphics mode to display the Macintosh screen, and the selection of the overscan region to be used. A high resolution, flicker-free mode like "Productivity" or a mode of a graphics card is recommended. For video applications, you can use the whole available screen for the display. When you have chosen a screen mode, the "Size" gadgets are set automatically to the normal values for this mode.

Size: Here you can manually set the size of the screen in pixels. By entering a smaller size (e.g. 512 \times 384), you can, for instance, increase the speed in higher color depths.

Refresh (foreground/background): Here you can specify how many 1/60ths of a second should pass between the refreshes. A value of 6 will, for instance, leave a tenth of a second of computing time for the emulator between the refreshes. The value "foreground" is used when the emulator screen is the active one, the value "background" is valid when another window is activated. So you can increase the speed when you work on the Amiga side. For the optimal choice of these values, please read the chapter Setting the refresh.

Black border: When this gadget is selected, the border around the Macintosh screen is displayed in black (requires ECS/AA), as on the real Macintosh. For graphics cards, this is mostly without effect, they always display a black border.

1.55 Volumes reference

FileDisk 1/2: In these two gadgets, you give the name of the files that ShapeShifter should use for the first resp. the second FileDisk. Instead of entering the name by hand, you may as well click on the symbol to the right of the text gadgets that will open a file requester. The gadget "Create..." is used to create a new FileDisk file. First, you have to enter the size in KB and, after a click on "Choose file...", set the name of the file in the file requester (you can also select an existing file, it will then be overwritten).

DeviceDisk 1/2: Here you enter the name of the Amiga driver to be used for the first resp. the second DeviceDisk. For SCSI devices, this is usually the name of the SCSI driver, but you may use any other "trackdisk" compatible driver. With a click on "Choose...", a file requester will appear that allows the selection of an existing volume (e.g. a hard drive

partition). ShapeShifter will then check if this volume is suitable as a DeviceDisk and will then enter the name of the driver and all the other data into the gadgets automatically.

Device unit: Specifies the number of the driver's unit to be used. For SCSI devices, this is the ID of the SCSI device.

First sector/Number of sectors: These values define the section of the volume that is used by ShapeShifter. This is extremely important if you have created proper partitions for the Amiga operating system and ShapeShifter on a shared hard disk. Should the sector values be wrong, ShapeShifter might overwrite data on Amiga partitions. If you don't know about the logical structure of volumes, you should only create a DeviceDisk by using the "Choose..." symbol and not change the automatically entered sector values afterwards.

Maximum transfer size: Some IDE and older SCSI driver don't like it when the amount of data transferred in one block exceeds a certain size (e.g. 64KB). In this case, you can set the maximum block size with this setting. The setting corresponds directly to the value "MaxTransfer" in the MountList and the Rigid Disk Block and is set right automatically when using "Choose...". When the hard disk has no limitation for the transfer size, you can set this to "-1" or "0".

1.56 Memory settings reference

Mac memory: With this slider, you set the amount of memory to be reserved for the Macintosh. For System 7, this must be at least 1.5MB. ShapeShifter requires additional memory for the ROM and the graphics memory. When you receive the message "There is not enough memory available" on starting the emulation, then please lower the value.

Largest free block: With this setting, ShapeShifter will use the largest available memory block as Macintosh memory. The position of the slider doesn't matter, the emulator gets all the memory it can.

Mac ROM in fast memory: When this gadget is checked, ShapeShifter tries to place the Macintosh ROM in the fastest available memory, speeding up the emulation. Otherwise, it could happen that the ROM ends up in Chip RAM or slow 16 bit memory.

Dynamic memory handling: When the dynamic memory handling is turned off, the Macintosh will only use the assigned memory block. When you activate this setting, the whole remaining memory in your Amiga is available to the Macintosh for temporary purposes, e.g. for displaying menus or copying files in the Finder.

1.57 SCSI settings reference

SCSI driver: Here you give the name of the Amiga SCSI driver that ShapeShifter will use to access the SCSI port. For Amigas with built-in SCSI port or the Commodore SCSI cards, this is "scsi.device". If you use

a different SCSI adapter, please consult its documentation about the name of the driver. If the driver is in a file on disk or hard drive, you can select it by clicking on "Choose..." with a file requester.

Unit number of first SCSI device: This setting determines from what Amiga driver unit the ID numbers of the SCSI devices should start. Setting it to "100", for instance, will access the SCSI device with the ID 2 with the driver unit 102. You should only enter a value not equal to "0" if you have installed multiple SCSI adapters in you Amiga, as the hundreds digit of the driver unit is commonly used to select the adapter.

Memory type: Here you set the type of memory to be used for the SCSI transfer buffers. "Chip RAM" will use the Chip RAM, "24 bit DMA" allocates memory in the 24 bit address space (important for DMA Zorro-II cards) and "Any" will get any (but not always the fastest) free memory. Please also read the chapter Optimizing the speed.

Apple CD300 emulation: When this field is checked, you can use SCSI-2 conforming CD-ROM drives with the AppleCD driver. If you have connected a real Apple CD300 or are not using the AppleCD driver but a special one for your drive, you should disable this setting.

Apple hard disk emulation: This setting is only required to make Apple's hard disk installation program believe that an Apple hard drive is connected. Otherwise, it should be left switched off.

0..6: With these checkboxes, individual SCSI IDs can be turned on and off for the Mac.

1.58 Serial settings reference

Modem port/Printer port: Here you give the name of the Amiga driver (e.g. "serial.device") to be used for input and output over the Macintosh modem resp. printer ports. When the driver is on disk, it can be selected with a click on "Choose...".

Device unit: For drivers that support multiple ports of one type, this selects the port. Please consult your I/O cards manual about this. For standard Amigas with one serial and one parallel port, enter "0".

Parallel device: Here you have to specify whether the selected driver is compatible to the "serial.device" or the "parallel.device", i.e. if it drives a serial or a parallel port. A wrong setting may result in malfunctions or even in crashes when accessing the ports.

1.59 Network settings reference

The settings in the network window are intended for a future version of ShapeShifter and without function at this time.
(Or do they work???)

1.60 Miscellaneous settings reference

Direct mouse polling: With this, you specify whether ShapeShifter should poll the mouse directly by itself or use the Amiga operating system to do this. The direct polling is more compatible to some Macintosh programs. However, you cannot use graphics tablets or touchscreens with it.

Write-protect ROM: When this option is enabled, ShapeShifter will try to write-protect the Macintosh ROM. This will only work on 68040s with default MMU setup and has no effect on other processors.

1.61 Copyright

The programs "ShapeShifter", "PrepareEmul", "Mac-Handler", "MacControl", "Save ROM" and this manual are © Copyright 1993-1995 Christian Bauer. They may be freely distributed as long as they remain unchanged (archiving and packing are allowed).

No profit must be made by distributing ShapeShifter, especially the price of a disk containing ShapeShifter may not exceed US\$ 5,- (or equivalent amounts in other currencies). Please feel free to distribute ShapeShifter over bulletin board systems and networks and as part of shareware/freeware CD-ROMs. All rights for commercial use remain at the author.

The keyfile that registered users will receive, must only be installed on one computer and in no case passed on to others. Offences will result in penal prosecution by me. With your signature on the order form, you accept these conditions.

The program is presented to the users as it is, without any warranty of any kind, be it expressed or implicit. Anyone using this program agrees to incur the risk of using it for himself. In no way can the author be made responsible for any damage directly or indirectly caused by the use or misuse of the program.

The Macintosh ROM files necessary for using ShapeShifter are not part of ShapeShifter and copyrighted by Apple. The author will not take upon himself the responsibility for the legal consequences, an illegal use of such a ROM file can have.

Names of hardware and software items mentioned in this manual and in program texts are registered trade marks of the respective companies and not marked as such. So the lack of such a note may not be used as an indication that these names are free.

The user interface of the program was designed with GadToolsBox
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Parts of the program are © Copyright 1992-1993 Jaba Development.

1.62 Bug reports

If you find a bug or a misfeature in ShapeShifter, or have an idea how to make some things better, then please drop me a note so I'll be able to improve ShapeShifter in the future. My address can be found here.

Important for a bug report is the following information:

- Version of ShapeShifter (can be found in the 'About ShapeShifter...' requester)
- Used AmigaOS version (e.g. 2.1, 3.0 etc.)
- Used MacOS version (e.g. System 7.0.1, System 7.1 etc.)
- Installed hardware, if of interest for the problem
- Information about installed startup programs on the Amiga or INITs on the Macintosh
- ShapeShifter settings
- Detailed description what program produces the bug and how it can be reproduced

And please consider: Even Macintosh software has bugs! So it is not always the emulator's fault when something is not working.

1.63 Credits

The following persons/companies deserve special thanks from me as they made a significant contribution to the development of ShapeShifter:

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- Ace of Base, whose music kept me up during hardcore debugging sessions when "nothing" was working

1.64 The author

No one wanted to develop a software Macintosh emulator.
So I had to do it. :-)

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Questions, criticism, suggestions and bug reports are always
welcome. EMail is preferred.

Under no circumstance will I send you ROM files, not even "under
friends"! No chance!

1.65 History

V1.14 29.Mar.95

- First public release

V2.0 11.Apr.95

- Pre-emptive multitasking
 - Quickstart now works reliably
 - Bug in stack handling corrected
 - Graphics cards in 24 bit address space work with ROM 34
 - CyBERgraphics 15 and 24 bit modes now work, selecting a CyBERgraphics mode will automatically set the color depth
 - Needs no special ROM sub versions any more
 - Setting for task priority removed
 - Macintosh reset routine revamped
 - Italian catalog files
 - When the selected amount of Mac memory is not available, you can choose to use the largest free block
 - Numerous internal corrections and improvements
 - SCSI IDs individually switchable, an error when accessing ID 0 will no longer cause the other IDs to be skipped
 - The graphics refresh is now done by a subtask, enabling the Amiga mouse pointer will prevent any refreshes
 - ROM write-protection is now choosable
 - The FileDisk driver will no longer open files with empty names
-