ShapeShifter

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COLLABORATORS			
	TITLE : ShapeShifter		
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REVISION HISTORY			
NUMBER	DATE	DESCRIPTION	NAME

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ShapeShifter

1.1   ShapeShifter Manual

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                    The ShapeShifter
                      Version 3.4
                       What's new?

                  A Macintosh II emulator
                 for Amiga/DraCo computers

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Overview                What is ShapeShifter?
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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
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1.2   What's new?

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The most important changes to version 3.3:

 · The Ethernet driver has been improved and now also allows the use
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    of MacIPX
· Together with an Emplant card, using LocalTalk is possible
· Forced quitting of Mac programs with Command-Shift-Escape works
· Better co-operation with SCSI cards from phase 5
· ShapeShifter runs again on the DraCo
· My postal address has changed
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Details are given in the revision history.

1.3 Overview

ShapeShifter is a multitasking Macintosh II emulator for the Amiga
and DraCo. It allows programs written for Apple Macintosh computers to run
on the Amiga/DraCo without hardware modifications or expansions. The
emulation runs as a normal task under AmigaOS, 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 up to 16.7 million colors

· Support for one or two monitors

· 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 can be read and written with an original Macintosh drive
  if "CrossMAC" is installed.

· Simulation of up to two Macintosh volumes in AmigaDOS files

· Can use up to two hard drive partitions directly as Macintosh
  volumes

· CD-ROM drives are supported

· A SCSI interface in the Amiga can be accessed from the Macintosh
  and allows for using removable hard disks, scanners, streamers and
  other devices

· Access to Ethernet networks with AppleTalk/MacTCP/MacIPX

· 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:

- CD-ROMs and SCSI devices 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). The shipment on disk may take 3..4 weeks, please be patient!

1.5 Support

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

Port 1: +49-261-805012 (Zyx19.2/ISDN)
Port 2: +49-261-84280   (V.FC)

Board: ShapeShifter-SUPPORT

You can also leave your bug reports there. The author of ShapeShifter can be reached under the user name "Cebix".

Those with ftp access can also get ShapeShifter and some useful
accessories from the following server:

ftp://server.biologie.uni-erlangen.de/pub/shapeshifter/

The Frodo/ShapeShifter homepage in the WWW contains some links to the
latest versions and other information related to ShapeShifter:

http://www.uni-mainz.de/~bauec002/

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.
   ShapeShifter also runs on the "DraCo" by MacroSystem.
 · 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 unless you own "CrossMAC"
and an original Macintosh drive.
· 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:
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  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
  ReKick64s.lha         - Adapted softkicker for A2000s
  SaveROM.mbin          - Program for reading the ROM (MacBinary)
  SaveROM.hqx           - Program for reading the ROM (BinHex4)
  empcd14.lha           - Fast driver for CD-ROM drives
  Bestellformular       - Order form (german version)
  BonDeCommande         - Order form (french version)
  OrderForm             - Order form (english version)
  SSOktaPatch.lha       - For users of an Oktagon/AT-Bus 2008/AlfaPower/
                          TandemAT/ALF2/ALF3
  Catalogs/#?           - Language files
  MacHandler/Mac-Handler - Mac file handler
  MacHandler/MAC        - Mountlist for the Mac-Handler
  MacHandler/MacControl - Control program for the Mac-Handler
  Video Drivers/#?      - External video drivers
```

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.

Users of an Oktagon/AT-Bus 2008/AlfaPower/TandemAT/ALF2/ALF3 should
install the program "SSOktaPatch" (see the file "README" in the archive
"SSOktaPatch.lha") to avoid errors when using DeviceDisks and SCSI
devices.

1.9 Installing PrepareEmul

ShapeShifter poses two special requirements to the Amiga it is running on:

1. The (logical) start of the Chip RAM has to be at least at $2000,
   i.e. the lower 8K have to remain completely free as they are being
   used by the MacOS
2. The VBR (vector base register) must not be zero, it has to point to
   a vector table in regular memory

To achieve this, there are a couple of possibilities:

A) "PrepareEmul"

This program is included in the ShapeShifter archive and should do its
job well under most circumstances (for the exceptions, see the other
possibilities). Copy "PrepareEmul" into the C: directory of your hard disk
and insert the line "C:PrepareEmul" into the file "S:Startup-Sequence"
directly at the beginning. 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.

PrepareEmul installs a "KickTag" to remain in memory after a reset. This
is most likely to produce warning messages from virus scanners but you
can calmly ignore them.

B) "PrepareEmul A1200"

PrepareEmul does not work directly on expanded Amiga 1200s (esp. the
"Blizzard" cards are making problems). In this case you have to call
PrepareEmul in the Startup-Sequence with the line "C:PrepareEmul A1200".
But there are some things to consider:

 - The "A1200" switch works only with Kickstart V39 and V40
 - During the boot phase, you will see colors to indicate that PrepareEmul
   has been installed
 - Cold/CoolCapture vectors will be modified which might also cause
   warning messages from virus scanners
 - If you have other programs installed in your Startup-Sequence that
   use Cold/CoolCapture vectors you have to call them BEFORE PrepareEmul
 - You should call PrepareEmul only either with or without the "A1200"
   switch, never mixed
 - Users of Picasso graphics cards should, if they call PrepareEmul with
   the "A1200" switch, do this as early as possible in the Startup-Sequence
   and not bother about every second reset being done twice

C) "PrepareEmul" and "NoFastMem"

Some A1200 "Blizzard" cards require additionally to the information given
in B) the program "NoFastMem" called directly before and after "PrepareEmul"
in the Startup-Sequence.

D) Blizzard cards and "patch1230scsi"

Registered users of the "patch1230scsi" program can get a special
patch1230scsi-version, which replaces PrepareEmul. For registration-info
get the file 'hard/misc/patch1230.lha' v39.2 from aminet or contact the
author of 'patch1230scsi' (kessler@fim.uni-erlangen.de, Thomas Kessler,
Sonnenstrasse 95, D-91564 Neuendettelsau, Germany).

E) Softkickers and "KickShifter"

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.

F) A-Max IV/Emplant: "A-MaxInit"/"RsrvMem"

Owners of "Emplant" and "A-Max IV" can leave "RsrvMem" resp. "A-MaxInit"
installed as usual instead of "PrepareEmul".

G) Fusion Forty: "SetFF"

To be able to use all features of ShapeShifter, you have to install the
original (AmigaOS) "68040.library" in LIBS: and insert the following two
lines at the top of your Startup-Sequence:

  SetFF FASTKICK AMAXIV
  SetPatch NOAGA REVERSE QUIET

Or, if you are softkicking a different ROM image:

  SetFF FASTKICK devs:kickstart AMAXIV
  SetPatch NOAGA REVERSE QUIET

You don't need "PrepareEmul" then.

H) The most permanent solution: Burning a new Kickstart ROM

The best but also the most expensive solution for every PrepareEmul trouble
is to read out the Kickstart ROM from your computer, modify it with
KickShifter as described under C), burn the modified file into an EPROM
and plug them into your Amiga instead of the ROMs. Then you will not need
PrepareEmul any more (eventually only to set the VBR).

I) DraCo

PrepareEmul is not needed on the DraCo. You can start ShapeShifter directly.

However, the option "Enforcer from 0" must be turned off in the "DraCoSystem"
preferences editor.

Another notice: If you start the developer tool "Enforcer" in your Startup-
Sequence, you should remove it as it doesn't work with ShapeShifter (because
of the "MacOS uses the lower 8K" thing, not because ShapeShifter has
Enforcer hits :-).

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 68040/060 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/BinHex4 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 files
   "SaveROM.mbin" and "SaveROM.hqx" 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 "StuffIt Expander" or one of the numerous other Macintosh utilities
   to convert "SaveROM.mbin" from MacBinary format or "SaveROM.hqx" from
   BinHex4 format to an executable Macintosh program. Repeat: SaveROM must
   be converted, 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 ftp.support.apple.com (directory /pub/apple_sw_updates/US/
Macintosh/System Software/System 7.0.1/).

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 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" (you must install the
   Ethertalk software even if you are not going to use a network!) and
   "Software for ImageWriter" (you cannot use any of the Apple printer
   drivers but you should install a driver, so I recommend the smallest
   one, the ImageWriter driver. No, the "DeskWriter" driver doesn't work
   with the "DeskJet"!) and click on "Install". Now follow theinstructions
   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
  Arguments/Tool Types

  Selecting the graphics display
  Creating volumes for the Macintosh
  Using CD-ROM drives
  Using SCSI devices
  Using Amiga ports from the Macintosh
  Using printers
  Linking into Ethernet networks
  Linking into LocalTalk networks
  Allocating memory for the Macintosh
  Saving the settings

  Starting and quitting the emulation
  Switching between Amiga and Mac side

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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 or the icon of a preferences file after
rebooting your Amiga. Then the Main window for the emulation settings
will appear. A click on one of the eight 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 you 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.

In case of emergency, there is a way 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   Arguments/Tool Types

ShapeShifter understands the following arguments/tool types when being
called from the Shell resp. the Workbench:

FILE <filename> - Loads the settings from the specified file

QUICKSTART - Prevents the opening of the settings window and directly
  starts through to the emulation when starting ShapeShifter

ENFORCER - Allows using "Enforcer" and ShapeShifter at the same time on
  a 68040 machine

DEBUG - Hands off! I really mean it!

NOCOPYBACK - Disables the 68040/060's CopyBack cache while the emulation

is running (not possible on all 68040/060 machines)

720KKLUDGE – Allows formatting 720K Macintosh disks under System 7.5
  without the 720K Disk Formatter extension

REMAP8K – On the 68040/060, allows caching the lower 8K of RAM while the
  emulation is running

STARTUPSOUND – Enables the Macintosh startup "bing" on (re)starting
  ShapeShifter

1.15 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 CyberGraphX cards
  Display on Graffity cards
  Display on the Picasso graphics card
  Display on the Merlin graphics card
  Display on the Retina Z3 graphics card
  Display in a window on the Workbench

  Using video display modes

  Using two monitors

  Changing the screen size
  Setting the refresh

1.16 Macintosh graphics basics

ShapeShifter allows using the built-in Amiga graphics hardware as well
as stock graphics cards for displaying the Macintosh screen. You can
use one or two monitors at the same time.

The graphics settings window contains three main groups of gadgets:
The upper left group holds the settings for one monitor when the
topmost gadget is set to "1 monitor" or the settings for the first
monitor when it is set to "2 monitors". The upper right group contains
the settings for the second monitor when "2 monitors" is selected.
The lower group of gadgets contains settings that apply to both monitors.

Tthe organization of the display memory is very different from the
Amiga to the Macintosh. The Amiga uses the planar format, where the

single bits of a color information are arranged in multiple bit planes
one "behind" the other, the Macintosh uses 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>.

1.17   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 "Refresh rate" 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.

1.18   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".

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 "Refresh rate" the best way.

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

1.19   Display on CyberGraphX cards

If you have a graphics card with CyberGraphX 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 "CyberGraphX".

3. To select the screen mode, click on "Choose..." and choose a mode of your card that fits your needs. The color depth setting is automatically adapted 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, please see under refresh how to select the "Refresh rate" the best way. Depending on the graphics card, however, it may be that no conversion is needed at all. Especially the "CyberVision 64" can display 15 and 24 bit in full speed.

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

1.20   Display on Graffity graphics cards

If you have a graphics card that uses the "Graffity" system by Alexander
Kneer and Tobias Abt, 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 "External".

3. Click on the small gadget to the right of the "External driver" string
   gadget and choose the driver "Graffity" from the appearing file requester.

4. 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.

5. To select the screen mode, click on "Choose..." and choose a mode
   of your card that fits your needs.

6. The values in the "Size" gadgets are set automatically. You should not
   change them.

7. If you have selected a color depth other than 8 bit, please see under
   refresh how to select the "Refresh rate" the best way.

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

1.21   Display on the Picasso graphics card

If you use the "Picasso" graphics card by Village Tronic with the
CyberGraphX system, then please see here. Otherwise, please proceed as
follows to set up ShapeShifter in an optimal way for your card (the card
must not be in segmented mode):

1. Open the window "Graphics Settings" if you haven't done already.

2. Set the screen type to "External".

3. Click on the small gadget to the right of the "External driver" string
   gadget and choose the driver "Picasso" from the appearing file requester.

4. 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.

5. To select the screen mode, click on "Choose..." and choose a mode
   of your card that fits your needs.

6. The values in the "Size" gadgets are set automatically. You should not
   change them.

7. If you have selected a color depth other than 8 bit, please see under
   refresh how to select the "Refresh rate" the best way.

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

1.22   Display on the Merlin graphics card

If you use the "Merlin" graphics card by XPert/ProDev with the CyberGraphX
system, then please see here. Otherwise, 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 "External".

3. Click on the small gadget to the right of the "External driver" string
   gadget and choose the driver "Merlin" from the appearing file requester.

4. 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.

5. To select the screen mode, click on "Choose..." and choose a mode
   of your card that fits your needs.

6. The values in the "Size" gadgets are set automatically. You should not
   change them.

7. If you have selected a color depth other than 8 bit, please see under
   refresh how to select the "Refresh rate" the best way.

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

1.23   Display on the Retina Z3 graphics card

If you use the "Retina Z3" graphics card by MacroSystem with the CyberGraphX
system, then please see here. Otherwise, please proceed as follows to set up
ShapeShifter in an optimal way for your card:

1. The "RetinaEmu" must be activated to use the card with ShapeShifter.
   The older Retina Z2 cannot be used.

2. Open the window "Graphics Settings" if you haven't done already.

3. Set the screen type to "External".

4. Click on the small gadget to the right of the "External driver" string
   gadget and choose the driver "Retina Z3" from the appearing file requester.

5. 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.

6. To select the screen mode, click on "Choose..." and choose any

mode, it does not matter which one.

7. You have to enter the desired resolution of the screen in "Size" gadgets,
   e.g. "640" $\times$ "480".

8. If you have selected a color depth other than 8 bit, please see under
   refresh how to select the "Refresh rate" the best way.

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

1.24   Display in a window on the Workbench

You can make ShapeShifter display the Macintosh desktop in a window on
the Workbench. Then the Amiga mouse pointer will be used to control the
gagdets and menus of the Macintosh. Sadly, the display is only monochrome
at the moment. Please proceed as follows to set up ShapeShifter for this:

1. Open the window "Graphics Settings" if you haven't done already.

2. Set the screen type to "Amiga window".

3. Enter the desired window size in the "Size" gadgets. This will also
   be the size of the Macintosh desktop.

4. Select "1" or "2" as the "Refresh rate".

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

1.25   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.

1.26   Using two monitors

If you have connected two monitors to your Amiga (one monitor to the
built-in video hardware and another monitor to a graphics card) you can
use both monitors at the same time from the Macintosh and move windows
back and forth between them. So you can, for example, use a high-resolution
monitor on a graphics card for displaying and editing a 24 bit picture in
an image processing program and keep the tool palettes and Finder windows
on a second monitor to have more room for the 24 bit display.

To do this, set the topmost gadget in the window "Graphics settings" to
"2 monitors" and make the settings for the second monitor in the right
gadget group the same way as you did for the first monitor in the left
group. There are only few limitations:

· You cannot set both monitors to "Amiga bitplanes"
· You cannot use the screen type "Amiga window"
· Your graphics card must allow a two-monitor setup. On CyberGraphX cards,
  you have to set the environment variables "KEEPAMIGAVIDEO" and
  "NOPASSTHROUGH" to 1. For other cards, please consult the manual of
  your card.

After having made the settings for two monitors and having started the
Macintosh, you must first open the "Monitors" control panel and set the
arrangement and color display of both monitors. If you have used
ShapeShifter with only one monitor before, the display on the second
monitor is not activated until you close the control panel.

1.27 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.

1.28 Setting the refresh

With the field "Refresh rate", 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). The refresh rate is given in
1/50th of a second. For example, a setting of "5" will leave 1/10ths of
a second between two refreshes.

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 have a 68040/060 processor and enabled the option "MMU refresh",

ShapeShifter will try to use the MMU to only update the portions of the
screen that have actually changed. In this case, you can set the refresh
rate to "1".

If you don't own a graphics card, you should select "Amiga bitplanes" and
1 bit color depth, otherwise "CyberGraphX"/"EGS"/"External" 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,
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 - -
Amiga window    yes - - - - -
CyberGraphX  - - - no  (yes) (yes)
EGS     - - - no  yes yes
External        --- depends on the driver ---
```


1.29   Creating volumes for the Macintosh

Here, you'll learn how to use your floppy disk drives 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 necessery settings are done in the
windows "Volumes", "Floppys" and "SCSI Settings" which can be opened by
selecting the gadgets "Volumes/Disks...", "Floppys..." or "SCSI..." in
the main window.

  Using floppy disks

  Creating a simulated hard disk
  Creating a dedicated Macintosh partition
  Accessing SCSI disks directly
  Using CD-ROM drives

  Formatting the volumes on the Mac side

  Choosing the boot volume

1.30   Using floppy disks

ShapeShifter can use up to two floppy disk driver 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:

```
 Size Format         Hardware/Software required
 ----------------------------------------------------------------------
 720K Mac/PC DD    Any Amiga floppy drive, mfm.device V38/V40/V41
 800K Mac DD       Original Macintosh drive and a CrossMAC supported
                   adapter to connect the drive or any Amiga floppy drive
                   with the A-Max II+/IV cards, mfm.device V41
 800K A-Max/       Any Amiga floppy drive, mfm.device V41
      Emplant DD
1440K Mac/PC HD   Amiga HD drive (drives requiring special drivers won't
                  work), mfm.device V38/V40/V41
```

mfm.device V38/V40 is part of the CrossDOS version that comes with AmigaOS
2.1 and later releases. mfm.device V41 is included in the commercial
versions of CrossDOS and CrossMAC by Consultron.

The 720K and 1440K formats can be read, written and formatted. The 800K
formats can only be read and written but not formatted with ShapeShifter.
To use the PC (MS-DOS) formats, a suitable Macintosh System Extension
such as "PC Exchange" or "Access PC" must be installed.

All of the above formats, except the "800K A-Max/Emplant DD" one can be
read, written and formatted on a real Macintosh where the PC formats also
require "PC Exchange"/"Access PC". To format the 720K Mac format, however,
you need the "720K Disk Formatter" System Extension.

The 800K Mac DD format requires an original Mac drive or the A-Max II+/IV
card because these disks are divided into different speed zones like on
C64 disks and this cannot be read with Amiga drives.

When inserting an Amiga formatted 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.

Which floppy drive ShapeShifter should use as the first and the second
Macintosh drive can be selected in the "Floppy Settings" window that will
open after a click on "Floppys..." in the main window with "Floppy 1"
and "Floppy 2". With a click on "Search", ShapeShifter will automatically
detect the first two drives connected to your Amiga.

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 the disk icon has been dragged onto the trashcan), 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
first floppy disk drive and a '2' for the second one.

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 appeat, but then the light is off,
   everything is OK)

3. Eject the disk.

If you are using a real Mac drive, this disk will of course be ejected
automatically.

When inserting a Macintosh disk, there is usually a delay until it is
recognized as the AmigaDOS first tries to access it. This can be
prevented by activating the gadget "Inhibit AmigaDOS" in the "Floppy
Settings" window. This will completely inhibit this drive for AmigaDOS
as long as ShapeShifter is running. If you want to read Amiga disks
with it, you first have to quit ShapeShifter.

1.31   Creating a simulated hard disk

ShapeShifter allows the simulation of up to two Macintosh hard disks in
Amiga fies 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.

1.32   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. You may also
enter the Amiga partition name (including the ":") into the DeviceDisk
string gadget. ShapeShifter will then analyze the partition on run-time.

If the partition is on a removable media (e.g. SyQuest or CD-ROM), you
also have to click on "Removable" to make ShapeShifter recognize media
changes.

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).

1.33   Accessing SCSI disks directly

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

SCSI hard disks and removable disks should be configured as DeviceDisks
if possible, as this will give you a higher performance.

But you may also partition and format a complete, dedicated hard disk with
direct SCSI access as you would do with the hard disk of a real Macintosh.
During this process, a Mac SCSI driver will also be copied onto the disk.
To do this, you need a Macintosh hard disk installation program such as
the program from Apple that comes on the "Disk Tools" disk or the better
"Apple HD SC Setup" or the "HDT Primer" from FWB.

The Apple program on the "Disk Tools" system disk 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.

1.34   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 immedately 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.

1.35   Choosing the boot volume

If you have installed multiple bootable volumes for the Macintosh, you
can select which one to boot from. To do this, you have two alternatives:
1. The "Startup volume" control panel on the Mac, 2. the "Boot from"
gadget in the volumes window.

The control panel only works with real SCSI devices, the "Boot from"
gadget only with File-/DeviceDisks. The setting in ShapeShifter has
priority over the control panel. Unless you set the gadget to "Last
selection", the control panel setting is ignored. If you set the gadget
to "Any", the Mac will start from the first bootable volume found (in the
order floppy -> SCSI device -> DeviceDisk -> FileDisk).

To put it in other words: The setting "Last selection" of the "Boot from"
gadget doesn't explicitly change the startup volume (this corresponds to
the old behaviour of ShapeShifter). If you, for example, select "FileDisk 1"
as the startup volume, it will boot from the first FileDisk. If you then
choose "Last selection", it will still boot from the first FileDisk.
Selecting "Any" then will make it boot again from the first bootable
volume found. If you then set it to "Last selection", it will continue
to start from the first volume found.

1.36   Using CD-ROM drives

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

For accessing CD-ROM drives under ShapeShifter, there are two possibilities:

1. As a "DeviceDisk" using the supplied "empcd.device" by Nicola Salmoria.
   This method is faster, doesn't require a special Macintosh driver and
   will also work with IDE drives, but you can only use data CDs.

2. With direct SCSI access. Though this method is slower, it is more
   compatible to Macintosh programs and you can also use audio and hybrid
   CDs and (with a suitable drive) programs to read CD-DA. However, the
   direct SCSI access requires a true SCSI drive (or an IDE drive with
   powerful SCSI emulation) and a CD-ROM driver on the Macintosh side.

For using the "empcd.device", please consult the documentation that comes
with that driver and is included in the archive "empcd14.lha".

For the direct SCSI access, please read here how to make the SCSI settings
in ShapeShifter. You will then also need a Macintosh driver suitable for
your CD-ROM drive, e.g. the freely available NEC driver (which also works
with drives from other manufacturers) or the extended "CD-ROM ToolKit"
by FWB.

If you have no suitable driver but 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" in the window
"SCSI-Settings". The drive will appear 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.

Some drives don't work correctly with the CD300 emulation. In this case,
you have to use a different driver of access the drive with the
"empcd.device".

1.37   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 CD-ROM drives, scanners and streamers 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.

  Configuring ShapeShifter for SCSI
  Disabling individual SCSI IDs

  Accessing SCSI hard drives
  Using CD-ROM drives

  Speed and memory requirement
  SCSI options and defective drivers

1.38   Configuring ShapeShifter for SCSI

The Macintosh has access to a single SCSI bus with up to seven connected
devices (referenced with IDs from 0 to 6) under ShapeShifter.

If you open the window "SCSI settings", you see in the upper part of the
window seven rows with gadgets, each belonging to one ID whose number
is printed at the very left of every row. Every single row contains three

gadgets, namely

- · A checkbox gadget which enables or disabled the access of the Macintosh
  to this ID. When the gadget is not checked, no device is connected
  for the Macintosh on this ID, even if the other gadgets specify a
  connected device.

- · A string gadget ("SCSI driver") in which you must enter the name of
  the Amiga SCSI driver to be used for this ID. On the Amiga 3000/4000T
  or when using the Commodore SCSI cards A2091 or A4091, this is
  "scsi.device". If you are using a third party product, please consult
  your SCSI adapter's manual about what the driver's name is.

- · A number gadget ("Unit") for entering the unit number that is to be
  accessed with this ID. The unit number normally corresponds to the
  real SCSI ID of the device. If you have multiple SCSI adapters of the
  same manufacturer built in, you can select which card to use with the
  hundred's digit of the unit number if both cards use the same driver.

The distinction between the real SCSI IDs resp. unit numbers of the
devices and the logical IDs under which they appear on the Macintosh
is important. Two examples to clarify this:

1. You have a CD-ROM drive (ID 2) and a scanner (ID 6) on the built-in
   SCSI connector of an Amiga 3000. To use both devices with the Macintosh
   you have to enter into the row of ID 2 as SCSI driver "scsi.device"
   and as unit "2" and into the row of ID 6 as driver also "scsi.device"
   and unit "6". Moreover, you have to put a checkmark into the checkbox
   gadgets of ID 2 and ID 6. With this, the CD-ROM would appear on ID 2
   and the scanner on ID 6 from the Macintosh, just as from the Amiga.

   You might have entered "scsi.device"/unit 6 into the row of ID 0 and
   "scsi.device"/unit 2 into the row of ID 1 as well and check the boxes
   for ID 0 and ID 1. Then, the CD-ROM would be connected to ID 1 and
   the scanner to ID 0 for the Macintosh.

2. You have an Amiga 4000 with a "GVP Series II" and a "Fastlane Z3" card.
   Several hard disks are connected to the Fastlane of which you want to
   use that with ID 3 for direct SCSI access under ShapeShifter. On the
   GVP card (with Guru ROM) there is a streamer, also with ID 3, which
   you want to use with the Macintosh, too. You can now, for example,
   enter into the row of ID 0 as SCSI driver "z3scsi.device"/unit 3 and
   into the row of ID 1 as driver "omniscsi.device"/unit 3 and check the
   boxes for both IDs. Then you can access the hard disk on ID 0 and the
   streamer on ID 1 from the Macintosh.

1.39   Disabling individual SCSI IDs

The checkboxes next to the numbers "0" to "6" at the left side of the
window "SCSI settings" 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.

1.40   Speed and memory requirement

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).

When the gadget "Direct transfers" is activated, ShapeShifter will bypass
its buffers if possible and transfer the data directly from the SCSI card
into the Macintosh memory (and the other way). This is less compatible
with some Macintosh programs but requires less memory and is faster on
SCSI adapters that can DMA into 32 bit memory. If you continuously get
messages like "Could not allocate buffer for reading" from ShapeShifter,
you should also activate this gadget. Some SCSI drivers with broken
HD_SCSICMD interface also require this setting.

1.41   SCSI options and defective drivers

The drivers of Amiga SCSI cards belong to one of two categories: Bug-free
drivers and buggy drivers. Unfortunately, many drivers are of the second
kind.

A bug-free driver (e.g. GVP cards with Guru-ROM, newer versions of Oktagon,
Masoboshi) can be recognized if it runs under ShapeShifter with the
following settings:

 · SCSI memory type: Any
 · Direct transfers: On
 · "Summer" mode: Off

If a driver doesn't work with these settings, it is defective. Period.
To convince even broken drivers to co-operate, ShapeShifter offers some
possibilities:

For old DMA SCSI cards that also don't work on the Amiga side without
a correct setting of the "Mask" value (e.g. GVP cards without Guru ROM),
the "Memory type" must be set to "Chip RAM" or "24 bit DMA" and the
"Direct transfers" must be turned off.

For older Oktagon/AT-Bus 2008/AlfaPower/TandemAT/ALF2/ALF3, the program
"SSOktaPatch" is supplied, that fixes the bugs in their drivers (see the
file "README" in the archive "SSOktaPatch.lha").

All SCSI product from phase 5 have a defective HD_SCSICMD interface that
constrains their use with ShapeShifter. There are two solutions:

 a) Switch the transfer mode for HD_SCSICMD commands to "polling" with
    the program "UnitControl" that comes with the SCSI card. This will
    slow down all SCSI operations, but it works.

 b) If you don't want to use polled I/O, the option "Direct transfers" must
    be turned on. For some Mac CD-ROM drivers, it is also necessary to use
    the "Summer" mode. The "Summer" mode only affects fixed and removable
    hard disks and CD-ROMs and significantly decreases general compatibility
    on the Mac side, so it should only be turned on if necessary.

Very old SCSI cards that have no HD_SCSICMD interface at all (e.g. "Next
Generation") cannot be used with ShapeShifter. This is not going to change.

1.42   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.

1.43   Using Amiga ports from the Macintosh

The modem and printer ports of the Maintosh 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"
of the AmigaOS, 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

If you have an A-Max II+/IV or Emplant card installed in your Amiga you
can make ShapeShifter use the modem and printer ports on the card by
activating the "A-Max/Emplant" gadget.

Macintosh computers are using round 8-pin connectors for the port, so
you cannot connect Macintosh devices to normal Amigas (the Commodore
serial card and the A-Max/Emplant boards, however, have 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.

Another word about parallel devices: As these appear to be serial to
the Macintosh, you can make all the settings typical for serial ports
there, e.g. baud rate, parity etc. For parallel devices, all these
settings are ignored, except for "hardware (CTS) handshake" which is
mapped to the parallel "ACK handshake". With this, you can avoid data
losses when transferring data to parallel printers.

1.44   Using printers

To use a printer with Centronics interface you have to choose the device
belonging to the printer connection for the "printer port" in the
serial settings of ShapeShifter (in most cases, this will be
"parallel.device" for the built-in parallel port, but not "printer.device"!)
and activate the checkbox "Parallel device".

Then you have to install a suitable printer driver on the Mac side. You
cannot use any of the drivers supplied with System 7 with ShapeShifter (the
only exception is an Apple LaserWriter with EtherTalk connection). The
"DeskWriter" driver does not work with the "DeskJet". For Epson compatible
printers you can use "Chuck's Printer Driver" and for HP-PCL compatible
printers "HPDJ" (both are freely available via FTP and in many BBS's).
For some printers there are special Mac drivers that also work with
ShapeShifter (e.g. for the Epson Stylus). GDT Softworks offers a quite
universal driver package called "Power Print" (see here).

1.45   Linking into Ethernet networks

ShapeShifte supports Ethernet cards with SANA-II driver (e.g. A2065 or
Ariadne) for use with AppleTalk, MacTCP and MacIPX. Using different network
hardware (e.g. Arcnet) is not possible.

All necessary settings are done in the window "Network settings" that
will open after a click on the gadget "Network..." in the main window
of ShapeShifter.

In the gadget "Network driver", you specify the complete path to the
SANA-II driver to be used (e.g. "DEVS:Networks/a2065.device"). You may
also select the driver with a file requester by clicking on "Choose...".
The setting "Device unit" is used to select the network card if you have
several, all controlled by the same driver.

Important things to care for:
 - Using Ethernet requires a correct installation of the Macintosh System
   software (including the EtherTalk software!). Using System 7.0.1 is
   strongly discouraged.
 - When using MacTCP, neither AmiTCP nor Envoy may run concurrently on the
   Amiga side on the same Ethernet card.

1.46   Linking into LocalTalk networks

Using LocalTalk is only possible with an Emplant board with SCC. The board
is automatically detected and used by ShapeShifter. You only have to
switch to LocalTalk in the "Network" control panel as ShapeShifter defaults
to EtherTalk. The connection to the network is made on the "Printer" port
of the Emplant board.

Without an Emplant board, LocalTalk is not available and switching to
LocalTalk in the "Network" control panel will crash the system.

1.47   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 "Mac memory (KB)" gadget to type in 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. The maximum amount of memory
available for ShapeShifter is displayed under "Maximum (KB)".

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 "Allocate Mac ROM memory first" is checked, ShapeShifter
will allocate the memory for the Macintosh ROM before the Macintosh RAM, so
it is less likely that the ROM will end up in slow memory areas. This will
speed up the Macintosh operating system, but usually at the cost of less
free Macintosh memory.

The cycle gadget "ROM memory type" sets the preferred memory type the
Macintosh ROM should go into ("24-bit DMA" means 16-Bit FastRAM). Unless
you want to have more memory free for the Macintosh, you can leave it at
"Any".

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 and problems starting ShapeShifter you can try if switching off the
write protection helps. On the 68060, the write protection cannot be turned
on.

To get the maximum amount of memory for the Macintosh, you should activate
the options "Largest free block", disable "Allocate Mac ROM memory first"
and set the ROM memory type to "24-bit DMA". If you want the highest speed,
then turn on "Allocate Mac ROM memory first" and set the ROM memory type to
"Any". The setting with the highest compatibility is achieved by turning
off both options, setting the memory type to "Any" and entering in "Mac
memory" the value of "Maximum" minus the size of the ROM (e.g. maximum
amount displayed: 3120KB, Macintosh ROM size: 512KB -> enter "2608" in
"Mac memory (KB)").

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 selected (or the size of the "largest block") will be
displayed. 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.

1.48   Saving the settings

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

With the menu item "Save As..." you can save the settings under a different
name and with "Open..." you can load a different settings file. If you start

ShapeShifter by double-clicking on a settings file icon or from the Shell
with the name of the file as argument, these settings are loaded in
automatically. You can have multiple settings in different files on your
hard disk.

1.49   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.

1.50   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.

1.51   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      -> <Del>
```

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> severs 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 "MacsBug" 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.

1.52   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.

1.53   Sound input and output

ShapeShifter will use the built-in audio functions of your Amiga for
sound output. You can disable all Macintosh sound output by deactivating
the gadget "Audio output enabled" in the "Miscellaneous" settings window.

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.

1.54   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!
```

1.55   Restart, shut down etc.

After selecting the Finder menut 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.

1.56   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
(MicroBug) will appear. Both can be quit by entering "G".

MacsBug doesn't run on a 68060 without modifications. To use it, you have
to make some changes to the data fork with a file editor (MacsBug 6.5.2):

```
  Search for       Replace by
   4e7a 9803  ->  224f 4e71
   4e7a 9804  ->  224f 4e71
   4e7b 9803  ->  4e71 4e71
   4e7b 9804  ->  4e71 4e71
   4e7a 0805  ->  7000 4e71
   4e7b 0805  ->  4e71 4e71
```

After these modifications, most functions should work. MacsBug doesn't run
on a DraCo.

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

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

"xxxxxxxx" 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
@xxxxxxxx : The contents of address xxxxxxxx
```

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

1.57 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.

· 24 bit addressing. You can only use 32 bit clean programs.

- Programs accessing the Macintosh hardware direcly 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 serial drivers don't support hardware hangup with DTR.

- The Ethernet driver has no ERead call

- The SCSI routines support neither the scComp command nor SCSI messaging

- The sound input driver can only record mono and has no VOX recording

- Using MIDI is not possible

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

- Peace of Mind, a hardware diagnostic program

- Snooper, another diagnostic program

- SoundEdit 16

- System 7.0.1 Sound Control Panel

1.58   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 "Allocate Mac ROM memory first" on.

- Turn the option "Write-protect ROM" off.

- Switch off the CPU cache (command "CPU NODATACACHE" from the Shell).

- Start ShapeShifter with the tool type "NOCOPYBACK".

- Disable the tool type "STARTUPSOUND".

- Delete the file "ShapeShifter PRAM" and start ShapeShifter again.

- Change the graphics settings to "Amiga Bitplanes", "1 Bit" or try the
  "Amiga window" mode.

- Hold down the left shift key on startup (first wait for the dithered
  Mac background pattern to apprear). This will disable all system
  extensions.

- When you have problems with File-/DeviceDisks/SCSI then make sure that
  the maximum transfer sizes (MaxTransfer) are set correctly on the
  Amiga side as well as in the ShapeShifter settings. SCSI devices must
  be correctly terminated.

· 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", including the
  EtherTalk software.

· Try a different Macintosh ROM

1.59 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.

· 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.

1.60 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:
  How do I prevent volumes being ejected on restarting the Macintosh?

Answer:
  Hold down the Alt key (or the right mouse button), choose the "Restart"
  menu item and keep holding the Alt key until the Macintosh screen is
  cleared.

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:
  When I switch from the running emulation to my workbench screen,
  parts of the screen get overwritten with Macintosh graphics.

Answer:
  Sadly, there is no solution for this. Press <Ctrl><Tab> before switching
  screens and take care that no Macintosh program is drawing on the screen
  as long as the Workbench screen is in the front to minimize the effect.
  If you can live with a graphics slowdown, you may also activate the
  gadget "Refresh always" in the graphics settings.

Question:
  The screen refresh is as slow as ever. I thought that ShapeShifter
  will now use the MMU to speed things up?

Answer:
  The MMU is used for the refresh only when
  · A 68040/060 processor is present
  · The MMU is turned on
  · The option "MMU refresh" is enabled

Question:
  Will there be video drivers for the OpalVision/IV24 cards?

Answer:
  Not from me.

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. 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:
  PrepareEmul fails to work on my expanded A1200.

Answer:
  Start PrepareEmul with the "A1200" switch.

Question:
  PrepareEmul still doesn't work.

Answer:
  See here for alternatives.

Question:
  I have problems on my A2000 with G-Force040 accelerator and a 1MB ROM.

Answer:
  (According to Oliver Stein <SYLVESTER@dreamlnd.ruhr.de>):
  Find the program "Set040" by Nic Wilson and insert the following line in
  your "Startup-Sequence" right after PrepareEmul:

    Set040 >NIL: FASTROM NOLOCAL NOZCACHE

  If you remove all 16 bit Fast RAM from your system, you are able to
  use the original (AmigaOS) "68040.library", but then you have to use
  the "A1200" option of PrepareEmul.

  (According to Stefan Raudonis <SRaudonis@cosmos-l.gun.de>):
  The program "GVPCPUCtrl" must not be started in the Startup-Sequence.
  The command alone, without parameters will cause programs to crash
  under ShapeShifter.

Question:
  I have problems on my A2000 with a Fusion-Forty accelerator.

Answer:
  To get rid of ALL problems regarding the Fusion-Forty and ShapeShifter

and to be able to use ShapeShifter's MMU features, install the original
(AmigaOS) "68040.library" in LIBS: and insert the following two lines at
the top of your Startup-Sequence:

```
SetFF FASTKICK AMAXIV
SetPatch NOAGA REVERSE QUIET
```

Or, if you are softkicking a different ROM image:

```
SetFF FASTKICK devs:kickstart AMAXIV
SetPatch NOAGA REVERSE QUIET
```

You don't need "PrepareEmul" then.

Question:
  My SCSI devices are not being recognized.

Answer:
  1. The name of the SCSI driver must be spelt correctly. E.g. on the
     A3000 this is "scsi.device" in lowercase letters, without quotes,
     and without "DEVS:" in front.
  2. The IDs of the devices you intend to use must have a checkmark
     in the SCSI settings (the gadgets directly near the digits 0..6).
  3. The SCSI bus must be correctly terminated.

Question:
  I cannot use DeviceDisks and/or SCSI devices with my Oktagon/AT-Bus 2008/
  AlfaPower/TandemAT/ALF-2/ALF-3 controller.

Answer:
  You have to use "SSIOktaPatch". Please read the file "ReadMe" in the
  archive "SSOktaPatch.lha".

Question:
  I have problems with SCSI devices on a Fastlane/CyberSCSI/Blizzard SCSI
  card.

Answer:
  See here.

Question:
  How can I install the Macintosh System without HD floppy drives?

Answer:
  (According to Mike Carlson <carlson@kaiwan.com>):
  · Use a program called DiskDup+ on a real Mac to read in a Mac System
    disk. I used the Disk Tools (or whatever it's called) disk from
    System 7.5 as a test. It doesn't matter that the disk is 1.44 Mb.
  · After DiskDup+ reads the disk, have it save the image to a file.
  · Get it to your Amiga. I used a null-modem. But you can also use
    "Splitz" and "Jointz" to split the file into smaller parts that can
    be transferred with DD disks.
  · Tell ShapeShifter that this image is a FileDisk.

· Start ShapeShifter.

Question:
  How do I print under ShapeShifter?

Answer:
  You need a suitable Mac printer driver. For Epson-compatible parallel
  printers you can use "Chuck's Printer Driver", for HP DeskJets/LaserJets
  you need "HPDJ 3.0" (both are on the FTP site). Simply configure the
  Mac printer port for the parallel port and choose it from the Mac printer
  driver. The serial settings don't matter but you should turn on "Hardware
  Handshake".

  You may also use the commercial package "Power Print" that includes
  drivers for the most popular printers. For more info, contact:

    GTD Softworks INC.
    4664 Lougheed Highway
    Suite #188
    Burnaby,BC
    Canada V5C6B7

    Telephone: ++1-604-291-9121
    Fax: ++1-604-291-9689
    EMail: GDT.MKT@applelink.apple.com

Question:
  I can no longer format 720K disks under System 7.5. With 7.1 it worked.

Answer:
  Due to a brain-damaged modification to the Disk Initialization Package,
  System 7.5 refuses to format 720K disks unless the "720K Disk Formatter"
  extension is present. If you give ShapeShifter the tool type "720KKLUDGE",
  it will format these disks with 719.5K. Apart from losing 512 bytes
  disk space, it doesn't make any difference. 719.5K disks can be read
  on a real Mac as can 720K disks under ShapeShifter with System 7.5.

Question:
  I can't use my sound sampler. The Amiga hangs as soon as I click on the
  "Record" button.

Answer:
  Your CPU is probably not fast enough to do the sampling. The CPU load
  of sampling at 22kHz equals that of a serial transmission at a sustained
  data rate of approx. 250000bps. As you need a fast CPU to do this with
  the "serial.device", you need a fast CPU to do sound sampling under
  ShapeShifter. "But my A500 can sample at 48kHz!" you may answer. Then
  name any Amiga sound sampling program that multitasks while sampling.

Question:
  Nothing works! After starting ShapeShifter, I only get a white/gray/
  dithered gray screen with/without startup sound (which sounds distorted/
  is continuously repeated).

Answer:
  Try everything listed here. If that doesn't help, then I don't know
  (i.e. bug reports are useless).

1.61   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

1.62   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
    Floppys
    SCSI
    Memory
    Serial
    Network
    Miscellaneous

1.63   Main window reference

The main window appears directly after starting ShapeShifter.

By selecting one of the eight big gadgets Graphics..., Volumes/Disks...,
Floppys..., 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.

1.64   Graphics settings reference

1 monitor/2 monitors: This setting specifies if ShapeShifter is being
used with one or two monitors. For one monitor, the left gadget group is
used, for two monitors the left group is used for the first monitor and
the right group for the second one.

Color depth: Here you set the number of colors to be used by the
Macintosh for this monitor. 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. This type can only used
with one monitor at a time.

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

"EGS": If your graphics card works with the "EGS" (Enhanced Graphics
System) by Viona Development, you must use this setting. Only color depths
of 8, 15 and 24 bit are possible, while 15 and 24 bit require a refresh.

"Amiga window" displays the Macintosh desktop in 2 colors in a window
on the Workbench. The Amiga mouse pointer will be used to control symbols
and menus of the Macintosh. This type cannot be used with two monitors.

"External" uses the external video driver specified under "External driver".

External driver: This gadget specifies the path name of the
external video driver if the screen type is set to "External".

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. For the screen mode "Amiga window", the
size of the window is specified here.

Refresh rate: Here you can specify how many 1/50ths of a second should
pass between the refreshes. A value of 5 will, for instance, leave a tenth
of a second of computing time for the emulator between the refreshes. For
the optimal choice of this value, 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.

Always refresh: In the 8 bit graphics card modes, the Macintosh

graphics will always go to the front screen of the graphics card, even if
it is the Workbench screen, for example. By activating this gadget, a
refresh is done also in 8 bit, thereby preventing this annoying effect,
but slowing down the graphics speed.

MMU refresh: When this option is enabled, ShapeShifter will try to use
to MMU to only refresh the parts of the screen that have changed. This will
only work on 68040/060s with default MMU setup and has no effect on other
processors.

Amiga mouse pointer: If this box is checked, the Amiga mouse
pointer will be used for selecting things on the Macintosh side, too.
This is always the case in Amiga Window mode.

1.65   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. In the string gadget, you may also
directly enter the device name of a Macintosh partition (including ":").
The data will then be inquired at run-time.

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 drivers don't like it
when the amount of data transfered 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".

Removable: If this box is checked ShapeShifter will recognize
media changes on this DeviceDisk (e.g. for SyQuests or CD-ROMs).

Boot from: is used to select the startup volume. "Last selection"
leaves the setting as it is (or as it has been set in the "Startup volume"
control panel from the Mac), "Any" will make ShapeShifter boot from the
first found bootable volume and "FileDisk 1" resp. "DeviceDisk 1" force
it to boot from the first File-/DeviceDisk.

1.66   Floppy settings reference

Floppy 1/2: Here you select which Amiga floppy drives are to be used
as the first and second Macintosh drives. With a click on "Search",
ShapeShifter will automatically detect the first two connected drives.

Inhibit AmigaDOS: If this option is selected, AmigaDOS is inhibited
from accessing the corresponding drive as long as the emulation runs.
This will speed up the recognition of inserted Macintosh disks.

1.67   SCSI settings reference

0..6: With these checkboxes, individual SCSI IDs can be turned on and off
for the Mac. The gadgets in each row belong to these IDs.

SCSI driver: Here your give the name of the Amiga SCSI driver that
ShapeShifter will use to access this ID. 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.

Unit number: These gadgets contain the unit numbers ShapeShifter will use
to access the respective ID. The unit number normally corresponds to the
SCSI ID of the device. Most SCSI drivers use the hundred's digit of this
number to select the card if multiple cards are installed.

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 Speed and memory requirement.

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.

Direct transfers: If this field is checked, ShapeShifter tries to make SCSI
transfers without using a buffer. For more information, look here.

"Summer" mode: This option activates a workaround for a bug in SCSI drivers
from phase 5.

1.68   Memory settings reference

Mac memory: Here you enter the amount of memory to be reserved for
the Macintosh (in KB, 1MB=1024KB). For System 7, this must be at last
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.

Maximum (KB): The maximum amount of memory available for ShapeShifter
is displayed here.

Largest free block: With this setting, ShapeShifter will use the largest
available memory block as Macintosh memory. The value entered in
"Mac memory", the emulator gets all the memory it can.

Allocate Mac ROM memory first: When this gadget is checked, ShapeShifter will
allocate the memory for the Macintosh ROM before the other Macintosh memory.
This increases the chance of the ROM to end up 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.

ROM memory type: Here you set the type of memory to be used for the ROM.
"24 bit DMA" normally refers to 16 bit FastRAM.

1.69   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.

A-Max/Emplant: This gadget is only available if an A-Max II+/IV or
Emplant card is installed. When the box is checked, the modem and printer
ports on the card will be used instead of those specified with the other
gadgets.

1.70   Network settings reference

Network driver: Here you give the complete path of the SANA-II
ethernet driver to be used (e.g. "DEVS:Networks/a2065.device"). Other
network hardware like Arcnet is not supported (however, you can run
AppleTalk Remote Access or MacTCP with InterSLIP or MacPPP over a serial
connection).

Device unit: For drivers supporting multiple cards of one type,
you select the card with this setting. Please consult the manual of your
Ethernet card about this. Normally, the setting "0" refers to the first/
only card.

1.71   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.

Audio enabled: When this box is checked, the audio output of the Mac is
enabled, otherwise it's turned off completely.

1.72   Copyright

The programs "ShapeShifter", "PrepareEmul", "Mac-Handler", "MacControl",
"Save ROM" and this manual are © Copyright 1993-1996 Christian Bauer. They
may be freely distributed as long as they remain unchanged (archiving and
packing are allowed).

Chris J. Schnurr <cjs@icbl.heriott-watt.ac.uk> is hereby granted to place
this manual on his WWW page http://www.icbl.hw.ac.uk/~cjs/shape/.

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
one 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.

The user interface of the program was designed with GadToolsBox
© Copyright 1991–1993 Jaba Development.

Parts of the program are © Copyright 1992–1993 Jaba Development.

"Amiga" and "Commodore" are registered trademarks of Escom AG, Bochum.

"Apple", "Macintosh", "AppleTalk" and "EtherTalk" are registered trademarks
of Apple Computer, Inc.

Names of other hardware and software items mentioned in this manual and
in program texts are in most cases 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.

1.73   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 by doing "version ShapeShifter"
   from the Shell)
 · 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

But first please look here if there's a solution to your problem.

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

1.74   Credits

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

· Daniel Bobbert <dabo@coli.uni-sb.de>, my first beta tester, who
  printed dozens of pages from the "THINK Reference" for me
· Markus Winklbauer <sysop@ng-box.wwbnet.de>, my second beta tester,
  and the first who managed to make ShapeShifter run apart from me
· Bernd Limbach <beli@darkness.gun.de> for the "NetBSD" session,
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· All other beta testers for constructive criticism
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· Martin Berndt <m_berndt@wanderer.gun.de> for "KickShifter"
· Thomas Kessler <kessler@fim.uni-erlangen.de> for "ReKick"
· Dirk-Michael Brosig <Dirk-Michael_Brosig@maushro.baltic.de> for
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· Tobias Abt <zcjc1121@rpool1.rus.uni-stuttgart.de> for the "Graffity"
  video driver
· Nicola Salmoria <MC6489@mclink.it> for adapting "empcd.device"
· Lord Prayer for the Merlin docs
· Gary Goldberg <gg0012@epfl2.epflbalto.org> for proof-reading the
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  including your translated .guide, but ShapeShifter keeps on changing...)
· Pawel Hernik <spi-ph@srv1.tu.kielce.pl> for improving the chunky->
  planar conversion routines
· The following people for the catalog files:
      Italian : Giovanni Gentile <gentile@dsi.unimi.it> and
                 Bruno Vella (Vobarno (BS) Italia)
      French   : Tattoo Mabonzo <tattoo.mabonzo@ping.be> and
                 Thierry Cuvelier <Thierry.Cuvelier@ping.be>
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      Greek   : Minas N. Miliaras <mmiliaras@prometheus.hol.gr>
      Norwegian: Jan-Tore Eliassen
      Hungarian: László Török <phoenix@master.fok.hu>
      Finnish : Jari Mikkila <jmikkila@paju.oulu.fi>
· Apple Computer Inc. who made writing a Macintosh emulator a child's
  play
· Ace of Base, whose music kept me up during hardcore debugging
  sessions when "nothing" was working

1.75 The author

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

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WWW:
  http://www.uni-mainz.de/~bauec002/

Questions, criticism, suggestions and bug reports are always welcome.
EMail is preferred. But first look here if there's a solution to
your problem and please understand that I can't answer every letter/mail
personally.

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

1.76 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

V3.0 11.Jun.95
  - Multitasking behavior improved, no more deadlocks when waiting for
    I/O operations

- Ethernet support for MacTCP
- Serial driver now capable of asynchronous full-duplex operation
- Using serial.device while ShapeShifter is running is now safe
- Removed a bug when opening parallel devices in the serial driver
- The serial hardware handshake flag is now mapped to ACK handshake
  on parallel devices
- Serial devices are now always closed on shutdown

- More compatible SCSI routines
- Added a boot drive selector in the volumes window
- Separate window for floppy disk settings
- Macintosh-to-Amiga floppy drive assignment selectable
- Option to inhibit AmigaDOS from accessing floppy drives while the
  Mac is running
- Under "DeviceDisk 1/2" you may directly enter the name of a partition
- DeviceDisks are now always fixed disks
- Improved disk change detection
- More compatible to mfm.device V41
- Tooltype "720KKLUDGE" to allow 720K disks to be formatted
  under System 7.5 without the 720K Disk Formatter extension
- Booting from the System 7.0.1 Disk Tools disk is now possible
  (LocalTalk will no longer crash)

- On the 68040, the MMU is now used to only refresh the parts of the
  screen that have changed (as long as the ROM write-protection is
  switched on) except the 8 bit Amiga mode
- Support for Merlin graphics card
- Distinction between EGS Chunky and EGS VGA removed
- New screen type "Amiga window" that will display the Macintosh
  desktop in a window on the Amiga workbench using the Amiga
  mouse pointer. The size gadgets specifiy the window dimensions.
- The screen width is rounded to a multiple of 16
- Refreshed modes read the screen base at every refresh, no more
  screen trashing
- Option "Refresh always" to force a refresh even in 8 bit chunky
  modes to prevent screen trashing
- The BytesPerRow of the "Amiga bitplane" mode are read from the BitMap
- Selecting a CyBERgraphics mode will set the "Color depth" gadget
  automatically
- The CyBERgraphics mode will respect the screen size settings
- The CyberGfx code loops ScreenToFront until ib_FirstScreen is
  ShapeShifter's screen before calling GetCyberMapAttr/DISPADR
- Now complains when there's not enough free memory for a CyBERgraphics
  screen instead of crashing
- Background refresh rate removed, a refresh rate of 0 is intercepted
  and changed to 1
- Removed a screen closing bug

- New option to prevent the Macintosh from accessing the FPU (for 68060)
- 68060 compatible when FPU and ROM write-protection are disabled
- Control of 68040 copyback cache improved
- When quitting ShapeShifter, the original state of the cache is restored
- Option NOCOPYBACK to switch off the copyback cache
- Bus error handling revamped, VMM now runs if the ROM write-protection
  is switched off

- Dynamic memory handling removed
- Memory setting now with an integer gadget
- ROM checksum is tested

- Danish, french, swedish, dutch, and polish catalog files
- PrepareEmul can now use Olaf Barthel's "shutdown.library"

V3.1 12.Aug.95
- ROM sub-version 17 runs again (but in general, this version is not
  recommended for ShapeShifter)
- More detailed error messages concerning the Mac ROM

- FPU exceptions intercepted on the Mac side
- State of copyback cache is restored on exit
- Separated settings for MMU refresh and ROM write-protection
- The MMU code now also works with 8K pages
- The caching of the lower 8K RAM is now switchable with a ToolType
- 68060 FPU problems fixed
- Minor fixes to the FPU and MMU routines

- EtherTalk runs

- SCSI routines completely rewritten
- Maximum transfer sizes are rounded down to an even multiple of 512
- DeviceDisks do CMD_UPDATE on shutdown
- DeviceDisk write-protection detection more compatible with certain
  SCSI drivers

- Interface for external video drivers
- Faster graphics refresh in 2, 4 and 8 bit in Amiga bitplanes mode,
  8 bit mode can now also use the MMU
- Implemented BGRA32 and RGBA32 refresh modes

- When audio.device cannot be opened or channels 0 and 1 are already
  allocated, ShapeShifter will now simply set the volume to 0 and
  skip the startup sound instead of quitting with an error message

- The '\|' key on american keyboards is now mapped correctly
- ShapeShifter is now AppleScript bug-proof
- PRAM handling rewritten, the PRAM file is now only 256 bytes long;
  the old (longer) files are converted on loading
- Safer keyfile loading
- Minor fixes for future Draco compatibility

- MacMem integrated into PrepareEmul by means of an "A1200" switch

V3.2 17.Sep.95
- ROM write-protection disabled on 68060
- Removed "Do not use FPU" setting
- Early startup errors (e.g. PrepareEmul not installed) no longer affect
  the cache
- Full Thread Manager support, including the 68060 and pre-emptive
  threads

- Ethernet driver rewritten, now uses a subtask and eats 130k less
  memory (Honey, I shrank the .ENET driver!)
- Added error requesters for unsupported Ethernet packet types, Ethernet

cards that don't support multicast, and for ERead calls
  – Some Mac ROMs absorbed the Ethernet driver

  – A-Max II+/IV board serial ports supported
  – Support for 230kbps serial transmission

  – Workaround for mfm.device V38/V40 bug
  – Fixed bug in DeviceDisk 2 cleanup
  – Corrected MaxTransfer calculation
  – Device and unit for each SCSI ID can now be set individually
  – Implemented direct SCSI transfers
  – Small fixes in SCSI read, autosense and command completion

  – 2 Monitor support added, video driver code cleaned up
  – Merlin and Picasso support moved into external drivers
  – RTYPE_CUSTOM corrected
  – RGBA32 refresh mode available under CyberGfx
  – Better Mac mouse blanking in Amiga mouse pointer mode

  – More reliable audio channel allocation/deallocation
  – Audio output can be disabled completely
  – Sound input driver works asynchonously again
  – Audio interrupt handling improved
  – Mac startup sound is controlled by a tool type

  – Settings item for Mac ROM memory type
  – Task name is now always "ShapeShifter"
  – Handling of level 2 interrupts more OS compliant
  – Fixed problem with Mac mouse pointer settings
  – Fixed bug in restart code (called Enable() without preceding Disable())

  – Fixed bug in Mac-Handler ("Destination file removed" when copying
    files from Shell)

  – Greek, spanish and norwegian catalog files

V3.2a 21.Sep.95
  – Pre-emptive threads fixed for external FPUs

V3.3 20.Nov.95
  – Completely new Time Manager

  – Disabled phase errors on SCSI autosense
  – Support for SCSI LUNs

  – Level 2 of the external video driver interface: Added a flags tag
    for SHEV_OpenScreen
  – Better bitmap modulo calculation

  – Reimplemented old audio interrupt handling

  – Fixed bug in serial configuration

  – Loadable/saveable preferences, prefs files are ShapeShifter's
    "projects"

  – Finnish and hungarian catalog files

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V3.4  04.Mar.96
   – Added 68040 CPU sResource
   – Disabled multitasking in Mac interrupts
   – Forced quit (Command Option Esc) works

   – Removed various bugs in the Ethernet routines (mostly EWrite)
   – Ethernet driver now handles all packet types, DetachPH implemented
   – Better LocalTalk disabling
   – Network devices that are not Ethernet are rejected

   – Emplant board is automatically detected and used if present (serial
     ports/LocalTalk)

   – Apple CD300 emulation with AppleCD driver 5.1.1 didn’t work on
     some drives
   – "Summer" mode to avoid bugs in SCSI device drivers from phase 5
   – ShapeShifter won’t try to boot from SCSI devices other than direct
     access devices

   – Mac programs calling DebugStr() with no debugger installed will
     make ShapeShifter display the string in a requester
   – The AppleScript bug (workaround introduced in V3.0c) is now fixed by
     ShapeShifter
   – Fixed a bug in the mouse routines (Apeiron)
   – Included some firewall code in the Time Manager (File Sharing
     Extension bug)

   – No more CIA accesses on the DraCo
   – DraCo disk drives supported (HD only)
   – Audio disabled on DraCo
```