

Q-emuLator for OS X

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Users' Manual

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1. Getting Started

1.1 Introduction

Q-emuLator is a software emulator of the Sinclair QL home computer. The QL was first released in Europe by Sinclair in 1984.

Originally written in 1994/95 for the Mac OS, Q-emuLator was ported to Windows three years later and to OS X in 2010.

Q-emuLator emulates the QL processor (the Motorola MC68008) and redirects the QL I/O (video, keyboard, mouse, mass storage, sound) to the Mac hardware. Putting a QL ROM in this virtual environment makes it possible to run QDOS without its noticing that it's not running in a QL black case.

Q-emuLator runs like any other applications in the OS X environment, without taking over all the machine. You can switch to other active applications, and Q-emuLator can also run in the background.

Q-emuLator includes a RAM disk and can access a variety of file formats, including QL software packaged in ZIP files. Partial Gold Card emulation allows running the SMSQ/E operating system (not included).

1.2 Requirements

Q-emuLator runs on Intel Macs with OS X version 10.5 or later. (You can find the type of processor and OS X version you have by clicking on 'About this Mac' in the Apple menu).

1.3 Installation and registration

To install Q-emuLator, download the `qemulator.dmg` file from the Q-emuLator web site. If you use Safari, the file should automatically expand to a folder; If it doesn't, double click on `qemulator.dmg` to expand it. Move the Q-emuLator folder to your Applications folder. Installation requires about 3.5 MB of free disk space.

To purchase a registration code, follow the link from the Q-emuLator's web site.

You can also request by email a temporary code to evaluate the program for about two weeks.



Figure 1 - Registration window

1.4 Running the emulator

Start Q-emuLator by double-clicking on the program's icon.

Before starting the emulated QL, you may want to click on one of the microdrive slots (the gray rectangles in the 'Microdrives' window) to attach it to a location containing some QL software, like a QDOS floppy disk, a Mac folder or a ZIP file. For example, attach it to the 'QL Software/QL demo' sub-folder found in the Q-emuLator installation folder.

Start emulation by selecting 'Start' from the 'QL' menu (Command-R), or simply by clicking on the picture of the QL keyboard in the main window.

If the first microdrive slot is attached to a mass storage location containing a SuperBASIC program named 'boot', that program will automatically start after you press F1 or F2 at the initial QL prompt.

1.5 Overview

There are two windows: The QL display and the virtual microdrives (Figure 2) .

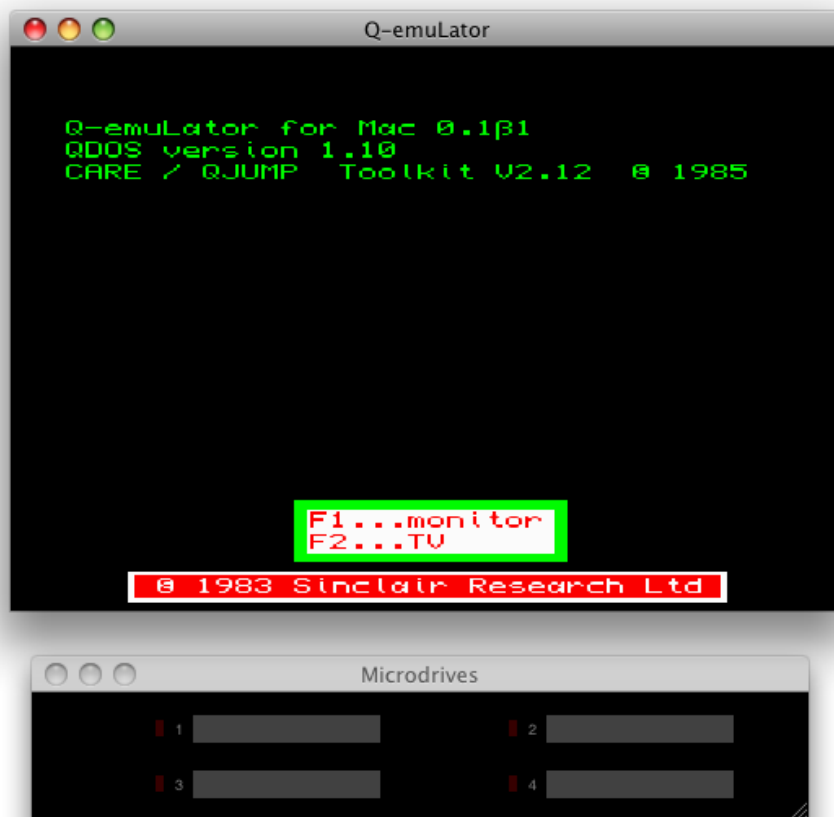


Figure 2 - Main (QL display) window and microdrives window

You can attach a Mac folder, a floppy disk drive or a QXL.WIN file to a microdrive slot by clicking on it (in the microdrive slot gray rectangle) and selecting a command from a pop-up menu (Figure 3). You can also attach ZIP files, enabling you to read their contents as if they were read-only disks. Finally, you can access microdrive and floppy disk physical images.

Regardless of the type of mass storage attached to a particular slot, you can access it with any of the MDV, FLP or WIN devices names. In other words, all of MDV1_, FLP1_ and WIN1_ refer to slot

number 1. This way, you can for example copy your microdrive programs to a folder on your Mac's hard disk, and it will automatically work despite the program trying to access its files by using MDV1_ instead of WIN1_ (WIN is the device name traditionally used to access the hard disk in QDOS systems expanded with a hard disk interface).

To transfer files from your QL system to the Mac you can use QDOS formatted floppy disks and read them from Q-emuLator. If your Mac has problems reading your old QL floppy disks and you still have your QL, try using Q-emuLator to format an empty floppy disk and copy your old floppy disks to the new one on your QL.

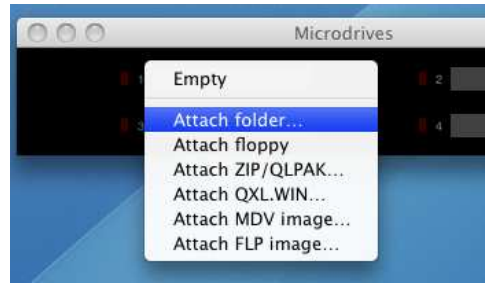


Figure 3 - Slot assignment pop-up menu

To switch from window mode to full screen and viceversa, press Command- F.

2. Emulator Features

2.1 Main Features

- QL expanded with up to 16 MB of RAM
- Supports all Sinclair and Minerva ROMs as well as many experimental ROM editions
- 16KB expansion ROM
- Up to 8 virtual microdrives, each mapped to a OS X directory, QDOS floppy disk, QXL.WIN file, ZIP or QLPAK package, microdrive or floppy disk image.
- Original QL screen (mode 4, mode 8 - including display hardware flashing emulation) and second screen (used by some games and by the Minerva ROM)
- Compatible with most Mac keyboard layouts
- Support for subdirectories ("Level 2" file system)
- Windowed or Full Screen modes of operation
- Acceleration of some QDOS graphics routines
- Sound (BEEP) emulation
- Ability to store QL and Q-emuLator settings for easy retrieval and fast changes of emulation mode
- Easily editable QL and Q-emuLator settings through a user-friendly interface
- Very fast processor emulation, with a special mode to slow it down to actual QL speed (for games and animations)
- Compatibility with recent versions of SMSQ/e for the Gold/Super Gold Cards¹
- Built-in ram disk
- Mouse support (when the Pointer Environment or SMSQ/E is installed)
- Ability to paste text from the OS X clipboard

¹ So far, SMSQ/e versions from 2.70 to 3.13 have been tested.

3. Configuring Q-emuLator

3.1 The QL Configuration window

The term *configuration* denotes a set of Q-emuLator's preferences and of emulated QL's settings. Only one configuration can be active at any time. You can change some configuration settings through menus. For example you can change the QL's memory amount through the 'QL → RAM' menu. All the other settings that can't be changed through menus are editable in the 'QL Configuration' window.

To open the QL Configuration window, choose the 'QL Configuration' command from the 'QL' menu (Fig. 4). The same menu also has commands to start, pause or stop emulation, reset the QL and disable sound emulation.



Figure 4 - QL menu

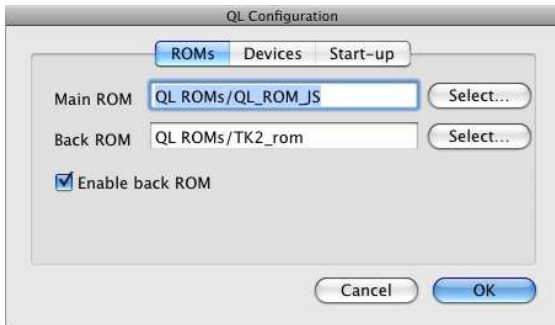


Figure 5 - ROMs

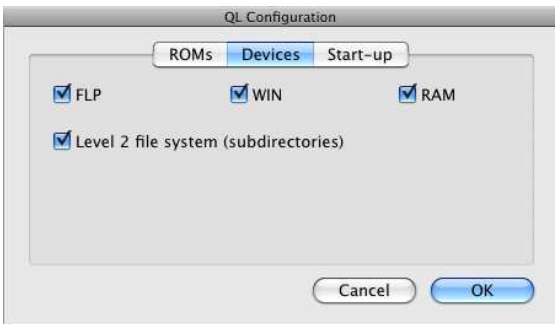


Figure 6 - Devices

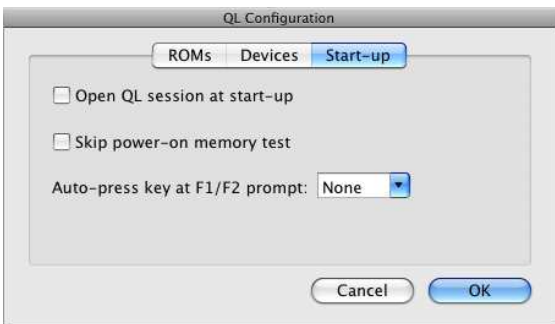


Figure 7 - Start-up

The QL Configuration window has three pages (tabs), named 'ROMs' (Fig. 5), 'Devices' (Fig. 6), and 'Start-up' (Fig. 7). You access each page by clicking on its label in the top part of the window.

The 'ROMs' page allows setting the names and locations of the QL ROM images to be used by the emulator. File paths can be absolute or relative. In the latter case they are relative to the directory containing the Q-emuLator application.

The 'Devices' page allows to enable or disable the FLP and WIN device names (in addition to MDV) to refer to the virtual microdrive slots. You can also enable or disable file system support for QL subdirectories and enable the built-in RAM disk.

The 'Start-up' page allows to specify an optional key to be automatically pressed at the initial QL F1/F2 prompt and to enable or disable two more settings:

- If the 'Skip QL power-on memory test' option is checked, the QL will not execute the memory test at start-up. The memory test is the first thing that you see when you power on or reset a real QL and is responsible for the coloured dots that fill the screen before the F1/F2 prompt. Checking this option skips this test, so the QL directly goes to the F1/F2 prompt. As a result, the QL's start-up is quite faster, especially with large amounts of QL memory.
- The 'Open QL session at start-up' option instructs Q-emuLator to immediately start a QL emulation session when starting or when loading the configuration from file.

3.2 Speed menu

Q-emuLator's emulation speed is determined by the 'Speed' menu (Fig. 8). You can choose between "Full Speed", "Original QL" and "Gold Card".



Figure 8 - Speed Menu

When running at "Original QL" speed, the emulator simulates the precise timing of each instruction to allow games and animations to run at the same speed as on a QL. The main exceptions are that file operations and reading SuperBASIC programs are much faster. This avoids having to wait minutes to load complex SuperBASIC programs like on a real QL, but a side effect is that sometimes you may not see programs' splash screens for long (QL software would often show splash screens only for the duration of loading the main program from microdrive).

3.3 RAM menu

The 'RAM' menu (a sub-menu of the 'QL' menu) allows setting the emulated QL's RAM amount and to enable or disable the add-on ROM.

Note that some QL software may only work with specific amounts of RAM. Early software often only works if the RAM is set to 128 KB and fails otherwise as it expects data and programs to be at fixed locations in memory.

3.4 Configuration files

Configuration files store the emulated QL's configuration and some other Q-emuLator settings.

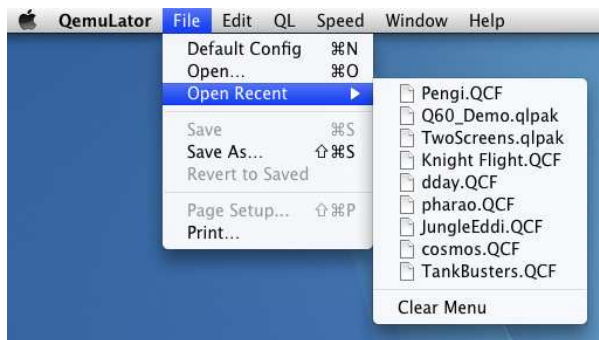


Figure 9 - File Menu

Configuration files have a ".QCF" suffix (file extension).

To start Q-emuLator with the settings specified in a particular configuration file, double-click the icon of the .QCF file, or drag it onto the Q-emuLator.exe icon. If you start Q-emuLator without opening any configuration file, the program uses a default configuration. If you want to change the default configuration, you can do this by saving the desired settings into a configuration file named "default.qcf" and placing it in Q-emuLator's installation folder.

You load and save configuration files through commands in the Q-emuLator's 'File' menu (Fig. 9). The 'Default Config' command reloads the default configuration.

The 'File' menu also allows printing a screenshot of the active window.

3.5 Q-emuLator preferences

Two emulator preferences are global to all emulation sessions. They are automatically saved as program preferences rather than stored in ".QCF" files. They are the windows location and the magnification filter on/off preference (can be changed through the 'Window' menu).

4. File Handling

4.1 QDOS files

QL executable files (as well as some other kinds of files) are stored on the Mac filesystem in a special format containing QDOS-specific information.

Most non-executable files do not need to store extra QDOS information; therefore they have the same format both in the QDOS and in the Mac environment.

Files are transparently converted between the different formats by the emulator. The user and QL software just use them like standard QL files.

The QL file system limits the maximum file name length to 36 characters.

4.2 Virtual microdrive slots and access to OS X files

When you click on a slot, you can choose to attach it to a Mac folder or to a floppy disk drive with a QDOS-formatted disk in it, or you can empty the slot if it was already filled.

You can also attach virtual microdrive slots to QXL.WIN files, ZIP files and microdrive or floppy disk images.

Note that you can access each of the eight virtual MDV slots with all of the MDV, FLP and WIN device names, regardless of what type of medium is attached to a slot.

4.3 QDOS formatted floppy disks

If you have a USB floppy disk drive connected to your Mac, Q-emuLator allows reading and writing to QDOS-formatted floppy disks.

Associate the floppy disk drive to the slot either before or after inserting the floppy disk (by clicking on the microdrive slot and choosing 'Attach floppy').

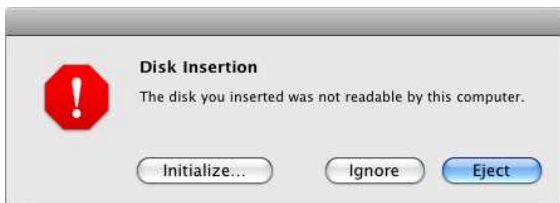


Figure 10 - Floppy disk insertion message

When OS X detects the floppy disk being inserted, if it is QDOS-formatted the OS will complain that it is not readable as it doesn't recognize the disk format (Fig. 10).

Click 'Ignore' in this window!

Before changing a QDOS floppy disk in the drive, or removing it from the drive, it is recommended that the corresponding virtual

slot is emptied. This ensures consistency of the data written to the disk. It's not necessary to empty the floppy disk slots before closing the emulator.

4.4 Format QL floppy disks

Already-formatted floppy disks can be converted to QL format by using the **FORMAT** command from SuperBASIC.

When you FORMAT a disk, Q-emuLator automatically detects the disk density and re-formats the disk with the appropriate number of sectors, resulting in 720 KBytes (1440 sectors) of free space for a DD (double density) disk and 1.44 MBytes (2880 sectors) of free space for a HD (high density) disk.

IMPORTANT: Use the FORMAT command only to quickly erase all the files from an already formatted disk (either in Mac, PC or QL format). If the disk is unformatted or damaged and you format it from SuperBASIC, you may lose all the data that you subsequently store on the disk.

4.5 Access to QXL.WIN files

In this manual the term 'QXL.WIN file' refers to the files used by the QXL² (a hardware QL emulator for DOS) to store the emulated QL filesystem. These files are similar to images of SMSQ/e hard disks stored in a single file.

Q-emuLator allows you to attach QXL.WIN files to microdrive slots to access their content: click on a microdrive slot and select 'QXL Hard Disk File...' from the menu, then choose a QXL.WIN file to open.

You can read and modify existing QXL.WIN files, but creating new ones is not supported, yet. However, some free tools (wxqt2 and qxltools) are available on the Internet (<http://www.daria.co.uk/>) that will provide you with that capability.

Creating new directories in QXL.WIN files is not currently supported.

4.6 Microdrive images

Microdrive images contain a dump of some or all sectors of a microdrive cartridge. They can also contain other optional information to emulate bad sectors and special microdrive copy-protection information.

You can mount two types of microdrive images:

- Images obtained from a real microdrive by running the mdump_exe utility on a QL.
- Virtual microdrives used by the QLayer emulator.

To create microdrive images from real microdrives, you need to be able to transfer files between the QL and the Mac, usually through floppy disks or a serial link. Copy the mdump_exe utility (found on the 'Software' page of the Q-emuLator web site) to your QL and use it to create a microdrive image from the microdrive. Transfer it to the Mac and attach it to a Q-emuLator virtual microdrive slot.

Note: mdump_exe doesn't currently work on QLs expanded with a Gold Card or Super Gold Card due to the different CPU speed.

² Also used by uQLx - the "sister" emulator of Q-emuLator for UN*X systems-, its derivatives and the QPC II SMSQ/e emulator.

4.7 Floppy disk images

Floppy disk images contain all the raw sectors from a floppy disk. Third party utilities exist to copy images from/to floppy disks. Supported sizes are 360 KB, 720 KB and 1.4 MB.

4.8 Mounting ZIP files as drives

ZIP files can be mounted in the virtual microdrive slots to allow accessing their content as if they were a read-only drive.

This is especially useful because QDOS ZIP files often contain special QDOS file information that would be lost if you unzipped the file with the OS X version of ZIP/UNZIP, but that are preserved by Q-emuLator. (When the special information is lost, the most common symptom is receiving a 'bad parameter' error when trying to EXEC or EXEC_W a program.)

Mounting a ZIP file often allows executing the contained QL software directly from it without having to expand the archive first.

To expand a ZIP archive, rather than using the QDOS version of the UNZIP program, you can simply mount the ZIP file and copy its contents from there to a different microdrive slot associated with a Mac folder (for example by using the WCOPY command).

4.9 QLPAK archives

Files with extension QLPAK contain a piece of QL software together with the optimal emulation settings to run it.

You can start a QLPAK by double clicking on it or by attaching it to a QL slot. If a web site links to a QLPAK, just clicking on the link should download it and start Q-emuLator automatically.

Once loaded, the QLPAK can override some or all of the current QL configuration settings and it usually makes its contents available as a read-only drive attached to one or more microdrive slots.

5. Supported Devices

5.1 Keyboard

Q-emuLator is compatible with with most Mac keyboard layouts.

The keyboard type-ahead buffer has been expanded from the QL's 7 characters to over 1000 characters.

Some Mac keys not available originally on the QL are used as a shortcut for common combinations of QL keys (Table 1):

Mac (Q-emuLator) Key	QL Key combination
	
	
	
	
	
	
	

Table 1 - Q-emuLator - QL Key equivalents

5.2 Video and full screen modes

The main window can be resized by clicking on its bottom-right corner and dragging it to the desired size. When emulation is running, the grip bar in the corner is not visible, but it is still possible to click there to resize the window.

The Microdrive window can be resized to show more or less of the 8 available microdrive slots.

When the emulation is running, you can enter Q-emuLator's full screen mode by pressing the Command-F key. To return to window mode, press Command-F again.

In full screen mode, menus and microdrive slots are not visible. To access them, return to window mode first by pressing Command-F.

5.3 Screen magnification filter

When the QL screen is enlarged, a special filter adds extra pixels to the image. The goal is to smooth lines and text while keeping the image sharp, and to avoid the jagged look you would get by just duplicating the original pixels. (Fig. 11)

The filter can be turned on and off from the 'Window' menu.

5.4 Screen hardware flashing

When running in 8 colours mode, it is possible on a QL to mark pixels so that they appear to flash on and off. The flashing is accomplished by the display hardware, and is emulated by Q-emuLator. The FLASH command allows to print flashing text from SuperBASIC.

5.5 Ram disk

Q-emuLator provides a built-in ram disk device driver. If you use it instead of loading a QL software ram disk driver (like 'ramprt') you will gain in speed.

The device has eight drives, 'ram1_' through 'ram8_'.

You can use the ram disk either in dynamic or static mode. In dynamic mode you can freely copy files to the ram disk and more memory will be allocated for it every time it is needed, up to filling the whole QL's memory. In static mode you assign a fixed amount of memory to each drive, by formatting the drive and specifying the requested number of blocks as the medium name: For example, the command '**FORMAT ram1_400**' assigns a fixed amount of 200KB (as each block is 512 bytes long) to the first ram drive.

To erase a whole ram disk drive at once use the '**FORMAT**' command without specifying a file name: For example '**FORMAT ram4_**'.

In static mode all the memory needed by the driver is allocated when you format the drive. This means that you are sure that no other job can take away that memory before the ram driver needs it, but also that the ram driver is not allowed to use more memory than the amount specified.

Dynamic mode is easier to use, while static mode is faster: in dynamic mode the driver has to call QDOS routines every time that it needs to allocate or release a block of memory, whereas in static mode all the memory is allocated at the beginning and QDOS is no longer called when accessing the drive.

The ram disk device driver is not 'level 2' (ie. it doesn't support subdirectories), and there are no SuperBASIC extensions to modify its behaviour (for example there is no **RAM_USE** keyword).

If you prefer to use a different ram disk driver, just disable the built-in device driver in the 'QL Configuration' window, and install your third party driver by installing an add-on rom containing it or by loading it as an extension from your boot file.

Note: For a ram disk drive used in dynamic mode, the DIR command always reports a full drive, but you can still add more files to it as long you have enough free QL memory.

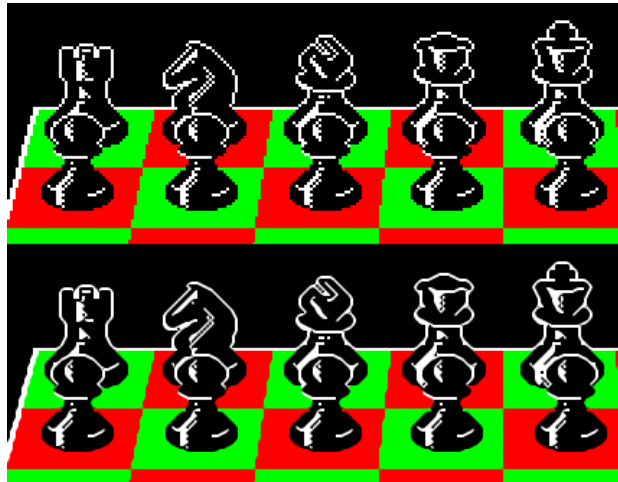


Figure 11 - Part of a QL screenshot enlarged by duplicating pixels (top) and by the Q-emuLator magnification filter (bottom)

5.6 Sound

QL 'BEEP' emulation is enabled by default. You can turn sound off through a switch in the 'QL' menu.

5.7 Mouse support

Mouse emulation is provided under the Pointer Environment through a special mouse driver.

To take advantage of it, install the 'MacMouse' mouse driver (included in the Q-emuLator package) JUST AFTER having installed the Pointer Environment (that is, the 'PTR_GEN' extension, not included in the Q-emuLator package).

To install the mouse driver use the following SuperBASIC command:

```
a=RESPR(1024):LBYTES mdv1_MacMouse11,a:CALL a
```

or, if Toolkit II is installed:

```
LRESPR mdv1_MacMouse11
```

The command assumes that the 'MacMouse11' file (the 11 at the end stands for "version 1.1") is in the first Microdrive slot.

Exception: You don't need to follow these steps to install the mouse driver when running SMSQ/e for the Gold Card. SMSQ/e includes the Pointer Environment in it, and Q-emuLator automatically installs a mouse driver when SMSQ/e is loaded.

Once the mouse driver is installed, any active QL mouse cursor will be moved instead of the OS X mouse pointer when it is over the QL display window (provided that the QL display window is the frontmost window).

Note that as the QL cursor follows the OS X one, its speed is independent from any settings in the QL environment. On the Mac, the mouse speed can be adjusted in the Mouse System Preference.

Unlike the left and right mouse buttons, the central QL mouse button is not emulated.

5.8 Real time clock

The QL had a real time clock, but you had to set it every time you started the computer because there was no battery to keep it working while the computer was powered off. On Q-emuLator there's no need to set the QL real time clock, as the current date and time is read from the Mac clock every time the program starts.

Note: Adjusting the QL clock doesn't affect the Mac clock, and the change is limited to the duration of the current emulation session.

6 Advanced topics

6.1 Copy-protected microdrives

The best way to continue to use your copy-protected QL software is to create an image file from the original microdrive (with the "mdump_exe" utility - see paragraph 4.6). The image preserves more information than just copying the files, including most low level details of the microdrive structure that are sometimes used by copy-protection schemes.

If you'd prefer to copy the individual files rather than creating a microdrive image, there is another utility that may work to preserve the copy protection in many cases: The "QL Software\FileUtil" folder contains the "MdvToWin_exe" program that can be used on a QL to copy a file from a copy-protected microdrive to floppy disk and attach to it special microdrive information used by some QL programs to verify the authenticity of the microdrive.

The resulting file should then be copied through the emulator from the floppy disk to a folder in the OS X file system, together with the other files included in the QL software (the other files can just be copied with the COPY command).

After these steps, Q-emuLator will emulate the original copy-protected microdrive when running this QL program.

6.2 Using Q-emuLator files on the QL

Q-emuLator automatically translates files between QDOS and Q-emuLator for OS X formats when copying files between a Mac folder and QDOS floppy disks or other containers, so the easiest way to move QL software from the Mac to the QL is simply to use Q-emuLator to copy it to a QDOS floppy disk.

Should you ever need to translate files on a real QL between QDOS and Q-emuLator for OS X formats, you can use the "QLToWin_exe" and "WinToQL_exe" utilities, found in the "Software\FileUtil" folder.

6.3 Using different QL ROMs

The emulator needs a file with a supported QL ROM image to work. Two ROM images are supplied with Q-emuLator, one is a Sinclair version "JS" ROM, the other is a Minerva 1.97 ROM.

Minerva is compatible with the original Sinclair ROMs, but faster and with more features.

You can use other ROM images with Q-emuLator, you can find them on the Internet (follow the link from the Q-emuLator web pages), or you can transfer your QL's ROM.

To install a new ROM image that is already on your Mac (for example a ROM that you downloaded from Internet), you need to point Q-emuLator to the ROM image: go to the '*QL Configuration*' window (Choose '*QL Configuration...*' from the 'QL' menu), click the uppermost '*Select...*' button and find the ROM image file in the file selection window that appears. Click 'OK' to close the window. Done!

6.4 Creating a ROM image on a QL

To create a ROM image on your QL, use the "SBYTES FLP1_QL_ROM,0,49152" command.

Note: This command doesn't work on Gold Card and Super Gold Card systems, as you get a modified ROM image instead of the original one. If you have a (Super) Gold Card, you must disconnect it before using the SBYTES SuperBASIC command and copy the ROM to a microdrive, then from there to a floppy after reconnecting the card.

On a Super Gold Card system (but not on a Gold Card), you may also be able to get the unmodified ROM image with the command `"SBYTES FLP1_QL_ROM,hex('400000'),49152"`, without having to disconnect the card.

Once you have the ROM file on a QDOS floppy disk you can use Q-emuLator to move it to your Mac. The recommended location where to place it is in the 'QL ROMs' folder inside the Q-emuLator installation folder. You can use the QL Configuration window to change the ROM used by the emulator.

6.5 Using the Toolkit II ROM

Q-emuLator includes a Toolkit II ROM containing many SuperBASIC extensions that are commonly used by QL software.

To use the Toolkit II ROM, make sure that '*Back ROM*' is 'Active' in the '*QL Configuration dialog*', and that the name of the '*Back ROM*' is '*TK2_ROM*'.

6.6 Using other 16KB QL expansion ROMs

Other 16KB expansion ROMs can also be optionally used by the emulator instead of Toolkit II. If a 16KB expansion ROM is installed on your QL, you can get an image of it with the `"SBYTES FLP1_MY_ROM,49152,16384"` command. To tell Q-emuLator to use the ROM image, copy it to your hard disk, go to the '*QL Configuration*' window (Fig. 5), press the second '*Select...*' button (the one on the '*Back ROM*' line) and select the ROM image on your hard disk.

6.7 Running SMSQ/e for the Gold Card

If you have a Gold Card or Super Gold Card QL expansion and you are running a recent copy of the SMSQ/e operating system on it, you can use your copy of SMSQ/e with Q-emuLator, too. Just configure the emulated QL to start with any Sinclair or Minerva ROM and plenty of RAM, and load and execute the SMSQ_GOLD or GoldCard_bin file as you usually do on your (Super) Gold Card system. (E.g. `LRESPR win1_SMSQ_GOLD`, assuming you have the Toolkit II installed in the emulator and the SMSQ_GOLD file is in a OS X directory associated with win1_).

Q-emuLator now emulates some of the Gold Card's hardware. Not all of it, but just enough to support SMSQ/e. The emulator also detects SMSQ/e being loaded and automatically adds its own device drivers to SMSQ/e, allowing for example access to the OS X file system. A mouse driver is also installed when you load SMSQ/e, enabling you to use the Mac mouse right away.

Note: Compatibility with SMSQ/e for the Gold Card is a new and still experimental feature. In particular, some problems may be expected with the file system and I/O in general, as the Q-emuLator's device drivers are not 100% compatible with the ones in SMSQ/e. Some preliminary testing has been done using SMSQ/e for the Gold Card versions from 2.97 to 3.13, and Q-emuLator is not expected to run with older versions of SMSQ/e. Please report any problems you find running SMSQ/E on Q-emuLator.

Appendix I

Format of .QCF files

A configuration file is a text file used to store the emulated QL's configuration and some other Q-emuLator's settings.

Configuration files have a simple format: each line of text describes a different preference or setting, identified by a keyword. The format of each line is:

Keyword = Value

You can, for instance, set the QL's memory amount to 640K with the following line in a configuration file:

Ram = 640K

Configuration files have the ".QCF" suffix and can be stored anywhere in the file system.

The following table (Table 4) describes the keywords you can find and use in configuration files. For each keyword, the table shows the possible values, their meaning, and the default value. The last column shows how you can alter the setting from Q-emuLator's user interface.

Note: Some of these keywords may be ignored by unregistered copies of Q-emuLator.

Keyword	Value	Meaning	Default	Q-emuLator
RAM	<i>N</i> <i>N K</i> <i>N M</i>	QL ram amount: <i>N</i> bytes <i>N</i> Kilobytes <i>N</i> Megabytes	128K	RAM menu
MainRom	<i>name/path</i>	Name/Path of main (48KB or greater, at address \$0) ROM Image	QL_ROM_JS	QL Config. Window
BackRom	<i>name/path</i>	Name/Path of back (16KB or greater at address \$C000) ROM Image	TK2_ROM	QL Config. Window
BackRomActive	Yes/No or On/Off	Enable back 16KB ROM?	Yes	QL Config. Window
UseFloppyName	Yes/No or On/Off	Access MDV slots via floppy disk alias?	Yes	QL Config. Window
FloppyName	<i>name</i>	Floppy disk alias/device name	FLP	QL Config. Window
UseHardDiskName	Yes/No or On/Off	Access MDV slots via hard disk alias?	Yes	QL Config. Window
HardDiskName	<i>name</i>	Hard Disk alias/device name	WIN	QL Config. Window
HasRamDisk	Yes/No or On/Off	Enable built-in Ram Disk?	Yes	QL Config. Window
RamDiskName	<i>name</i>	Name of Ram Disk Device	RAM	QL Config. Window
Subdirs	Yes/No or On/Off	Enable Level2 file drivers?	On	QL Config. Window
FastStartup	Yes/No or On/Off	Skip initial QL memory test?	No	QL Config. Window
AutoStartSession	Yes/No or On/Off	Launch emulation session when Q-emuLator starts?	No	QL Config. Window
FirstKey	None F1 F2 F3 F4	No special action on F1/F2 prompt Simulate a F1 keypress at startup Simulate a F2 keypress at startup Simulate a F3 keypress at startup Simulate a F4 keypress at startup	None	QL Config. Window

Keyword	Value	Meaning	Default	Q-emuLator
Sound	Yes/No or On/Off	Sound Emulation State	On	<i>Sound</i> command in the QL menu
SLOT1	Empty DISK_A QXL:full_path MDV:full_path FLP:full_path ZIP:full_path PAK:full_path path	The slot (device) is empty QDOS Floppy Disk QXL.WIN file at full_path Microdrive image Floppy disk image ZIP archive QLPAK package Mac Filesystem folder identified by path. Path should be an absolute path (i.e. /ql/)	Empty	Popup menu accessible by clicking on each microdrive slot
SLOT2	as above	As above	Empty	As above
SLOT3	as above	As above	Empty	As above
SLOT4	as above	As above	Empty	As above
SLOT5	as above	As above	Empty	As above
SLOT6	as above	As above	Empty	As above
SLOT7	as above	As above	Empty	As above
SLOT8	as above	As above	Empty	As above
Speed	QL GoldCard Full	Original QL Speed QL with Gold Card Speed Full Emulation Speed	Full	<i>Speed</i> Menu

Table 4 - .QCF file options

- Notes:
1. Keywords are not case sensitive and can contain spaces. For example, you can write 'FloppyName', but also 'FLOPPYNAME' or 'floppy name'.
 2. Paths can be absolute or relative. In the latter case the path is relative to the working directory or to Q-emuLator's directory.

As an example, the following is the content of a configuration file that specifies the default values:

```
Ram=640K
MainRom=QL_ROMs\QL_ROM_JS
BackRom=QL_ROMs\TK2_rom
BackRomActive=Yes
UseFloppyName=Yes
UseHardDiskName=Yes
HasRamDisk=Yes
Subdirs=On
Speed=Full
FastStartup=Yes
AutoStartSession=No
FirstKey=None
AcceleratedGraphics=Yes
Sound=On
Slot1=Empty
Slot2=Empty
Slot3=Empty
Slot4=Empty
Slot5=Empty
Slot6=Empty
Slot7=Empty
Slot8=Empty
```

Appendix II

Format of QL files stored in the Mac file system

QL files have a special piece of information associated with them, called the 'QDOS file header'. The header stores such information as the file name and whether the file is an executable program.

Q-emuLator for OS X stores part of the header at the beginning of files. The header is present only when it is useful, ie. only if it contains non-default information.

The header has the following format:

OFFSET	LENGTH(bytes)	CONTENT
0	18	"!QDOS File Header"
18	1	0 (reserved)
19	1	total length_of_header, in 16 bit words
20	length_of_header*2-20	QDOS INFO

The first 18 bytes are there to detect whether the header is present (ID string).

The headers Q-emuLator supports can be 30 bytes or 44 bytes long (the value of the corresponding byte at offset 19 is either 15 or 22). In the first case, there are 10 bytes with the values present in bytes 4 to 13 of the 64-byte QDOS header. In the second case the same piece of information is followed by 14 bytes containing a microdrive sector header, useful for emulating microdrive protection schemes. Additional header information (file length, name, dates) is obtained directly from the file through the host file system.

Some QL programs to translate between QDOS and Q-emuLator for OS X file formats are included in the Q-emuLator package.

The translation is transparently performed when you move files between QDOS floppy disks and OS X folders through Q-emuLator.

There is no need for you to use the provided conversion utilities, except when you want to copy files from a copy-protected microdrive to a floppy disk.

Q-emuLator for Windows uses the same file format.

Note: The old version of Q-emuLator for Mac OS uses a different scheme: the QDOS information is stored in the file's resource fork. (On Mac OS all files have both a data fork - corresponding to a OS X sequential file - and a resource fork, containing structured information called 'resources'). The latest version of Q-emuLator for Mac OS can read files created by Q-emuLator for OS X, but not vice versa.

Appendix III

Included ROMs and copyrights

Please note that although copyright holders allow usage of the included ROMs, they retain the copyright: These ROMs are not in the public domain! (With the possible exception of Minerva versions 1.89 and earlier.)

QL_ROM_JS is a Sinclair ROM version "JS". It's used by default unless a different ROM is installed in the '*QL Configuration*' window. The "JS" was the last version of QDOS released by Sinclair for the UK market.

Outside of North America, Sinclair ROMs are © 1983-1986 Amstrad Plc. Amstrad has kindly given permission to redistribute Sinclair ROMs (free of charge) and to include them with emulators, provided that the ROM's copyright notice is not altered.

In North America, Sinclair QL ROMs are © 1983-1986 Frank Davis and Paul Holmgren. Frank and Paul have kindly given permission to include Sinclair QL ROMs with Q-emuLator, on condition that users may not distribute these ROMs without first asking and obtaining explicit permission from them.

If you reside in North America, you are NOT allowed to distribute the Sinclair ROMs included in the Q-emuLator package without explicit permission from Frank Davis and Paul Holmgren.

MINERVA_197 is a Minerva ROM version 1.97.

Minerva ROMs are public domain. Tony Firshman kindly made version 1.89 and earlier public domain in 1998, and in 2003 Laurence Reeves (who wrote Minerva) made all versions public and released the latest sources under the GNU license. (Download Minerva sources from <http://bergbland.info>).

TK2_ROM is a Toolkit II ROM version 2.10.

Toolkit II is © 1985 by Tony Tebby. Tony Tebby generously changed its distribution from commercial to freeware in January 2005 (when he also changed to freeware the HOT_REXT, PTR_GEN and WMAN Pointer Environment extensions).

Appendix IV

QL ROMs supported by Q-emuLator

The following table (Table 5) shows the current compatibility status of Q-emuLator with available QL-compatible ROM images.

ROM Name	QDOS Version	SuperBasic Version	Author	Compatible	Size	Notes
AH	1.02	AH	Sinclair	●	48KB	
TB	1.03	TB	Sinclair	●	48KB	Reduced keyboard functionality
JM	1.03	JM	Sinclair	●	48KB	
JS	1.10	JS	Sinclair	●	48KB	
JS-4M	1.10	JS	?	●	48KB	Better to use the regular JS instead
JSU	1U10	JSU	Sinclair	●	48KB	
MG	1.13	MG	Sinclair	●	64KB	
MGUK	1Σ13	MGUK	John Alexander	●	48KB	
ULTRAMG	?	?	Ultrasoft	○	48KB	Crashes
MF	1.14	MF	?	●	48KB	RAM must be set to 1920KB or less
MGx	1x14	MGx	Sinclair	●	48KB	MGE, MGG, MGR, MGI, etc.
Minerva	1.6x to 1.98	JSL1	Q-View	●	48KB	
M89-T6	1.89	JSL1	H.P. Reckenwalt	●	80KB	
Tyche	2.05	TY05	?	●	64KB	RAM must be set to 1920KB or less
68K /OS	2.x	n/a	GST	●	32KB	File system not emulated

Table 5 - QL ROMS supported

Appendix V

Unzip code license

Q-emuLator contains altered parts of the Info-ZIP code. Those parts of the code have the following copyright and license:

*"This is version 2005-Feb-10 of the Info-ZIP copyright and license.
The definitive version of this document should be available at
<ftp://ftp.info-zip.org/pub/infozip/license.html> indefinitely.*

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Appendix VI

Contact information

Q-emuLator support site

You can find news and information about Q-emuLator (both Mac and Windows versions) at the following World Wide Web address:

<http://www.terdina.net/ql/q-emulator.html>

E-mail address for feedback

Please send feedback about Q-emuLator (support requests, bug reports, questions, comments, suggestions, etc.) to the e-mail address present on the Q-emuLator web support site (it's at the bottom of most pages).