

MagicQ Installation Instructions

REVISION HISTORY			
NUMBER	DATE	DESCRIPTION	NAME
Latest	31/01/2024		ChamSys

Contents

1	Installing MagicQ Software & Drivers	1
1.1	MagicQ software	1
1.2	MagicDMX	1
1.3	MagicQ Wings & Interfaces	1
1.3.1	GeNetix nodes	2
1.4	MagicQ on Windows	2
1.4.1	Drivers for older MagicQ products	2
1.4.2	User permissions on Windows	9
1.5	MagicQ on Mac	9
1.5.1	Turning off App Nap	9
1.5.2	Making the MagicQ folder writeable	10
1.6	MagicQ on Linux	11
1.6.1	Installing	11
1.6.2	High DPI screens	11
2	Using MagicQ on PCs and Macs	13
2.1	Simple Generic Console	13
2.2	Technician Test Head	14
2.3	Demo Shows	15
2.4	Touch View	16
2.5	Playback mode	16
2.6	Copy and paste to external applications via the clipboard	16
2.7	MagicQ PC / Mac Restrictions (Demo and Reduced Mode)	17
2.7.1	DEMO MODE	17
2.7.2	REDUCED MODE	17
2.7.3	UNLOCKED MODE	18
2.7.4	GeNetix / SnakeSys DMX Node Unlocking	18
2.7.5	MagicHD Stand Alone Restriction	19

3	MagicQ Concepts	20
3.1	Show Storage	20
3.2	Output channels	20
3.2.1	HTP / LTP channels	21
3.3	Cues	21
3.4	Cue Stacks	22
3.5	Playbacks	22
3.6	Pages	22
3.7	FX	22
3.8	Window Layouts	23
3.9	Shift Functions	23
3.10	The Programmer	23
3.11	Help	23
4	MagicQ Layout	24
4.1	Physical layout	24
4.1.1	Touch Screen, Encoders & Soft Buttons	24
4.1.2	Main Windows	25
4.1.3	Layouts	26
4.1.4	Active Window	26
4.1.5	Window Sizing	27
4.1.6	Support for Find in MagicQ windows	27
4.1.7	Support for Cut and Paste in MagicQ windows	27
4.1.8	Status and Display Windows	28
4.1.9	Head Control	28
4.1.10	Editor Buttons	29
4.1.11	Playback	29
4.2	Keyboard, Keypad, Select & Confirm Windows	30
4.3	Common Actions	30
4.3.1	Items	30
4.3.2	Setting the value of items	31
4.3.3	Naming items	31
4.3.4	Moving items	31
4.3.5	Copying items	32
4.3.6	Removing items	32
4.3.7	Recording items	32
4.4	Icons	32
4.4.1	Actions on Playbacks	33

5	Quick Start	34
5.1	Starting up MagicQ	34
5.2	Calibrating the Touch Screen	34
5.3	Starting a New Show	35
5.4	Enabling Outputs	36
5.4.1	Using Direct DMX Outputs	36
5.4.2	Using Outputs via network	36
5.5	Connecting a MagicQ Playback Wing	37
5.5.1	Setting Playback Wing IDs	37
5.6	Connecting External Monitors	37
5.7	Patching	38
5.7.1	Naming and Numbering Fixtures	39
5.8	Controlling Heads	40
5.8.1	Selecting Heads	40
5.8.2	Selecting heads from the Group/Heads Window	40
5.8.3	Recording a Group	41
5.9	Naming a Group	41
5.10	Recalling a Group	41
5.11	Setting Levels for Dimmers	41
5.12	Locating Heads	42
5.13	Modifying Attributes	42
5.14	Recording a Palette	44
5.15	Adding in FX	45
5.16	Recording a Cue	45
5.17	Recording a Cue Stack (Chase or Theatre Stack)	45
5.18	Selecting and recording complete window layouts	46
5.19	Saving the Show	46
5.20	Playback	47
6	Handy Hints	48
7	MagicQ Shortcuts	49
8	MagicQ Consoles	58
8.1	MagicQ MQ500 Stadium Console	58
8.2	MagicQ Compact Series	59
8.3	MagicQ Wings for use with PC/Mac	59
8.4	Plugging Up	59
8.5	DMX Connections	60
8.6	Powering Up	60

8.7	Powering Down	60
8.8	Resetting the Console	60
8.9	Hard Reset	60
8.10	Power Supply Protection	61
8.11	Care of your MagicQ console	61
8.12	Safety Information	61
8.13	Security Information	62
8.14	Disposal Information	62
9	Software & Firmware Upgrade	63
9.1	Changing MagicQ Console Software	63
9.2	Console Kernel Update	64
9.3	MQ80 Kernel v2 upgrade	64
9.4	Resetting a MagicQ console to factory defaults	64
9.5	Firmware	64
9.6	MQ50, MQ70 and MQ80 front panel firmware	65
9.6.1	Pre v1.9.5.3 software	65
9.7	MQ250M Stadium firmware	66
9.8	MQ500 Stadium firmware	66
9.9	MQ500M Stadium firmware	67
9.10	MQ500M Wing firmware	68
9.11	Compact & Mini Connect firmware	69
9.12	Firmware Change Log	69
9.12.1	CH346 Firmware (MQ50, MQ70, MQ80, MQ500(M) Midi Card, MQ500(M) V2 Display Controller and MQ250M Display controller)	69
9.12.2	CH310-021 Firmware (MQ250M & MQ500M Motor board)	70
9.12.3	CH310-022 Firmware (MQ250M & MQ500M Playback Panel)	70
9.12.4	CH310-023 Firmware (MQ500M Programmer Panel)	70
9.12.5	CH310-025 Firmware (MQ250M Programmer Panel)	70
9.12.6	CH310-028 Firmware (Compact Connect)	71
9.12.7	CH310-033 Firmware (Mini Connect)	71
9.13	Updating Firmware	71
9.13.1	Upgrading to latest firmware	71
9.13.2	Manual firmware update	71
9.14	Upgrading Legacy product firmware	72
9.14.1	Original Compact series MQ40/MQ40N/MQ60/MQ70 firmware	72

10 Troubleshooting	74
10.1 No outputs	74
10.2 MagicQ not responding	74
10.3 MagicQ responding slowly	75
10.4 Strange key presses, unexpected window changes	75
10.5 MagicQ console not booting	75
10.5.1 MQ100 series console not booting	75
10.5.2 MQ80 console blank screen and not booting	75
10.5.3 MQ80 console MagicQ not starting	76
10.5.4 MQ50 / MQ70 / MQ250M console MagicQ not starting	76
10.5.5 MQ40/60 console not starting	77
10.6 MagicQ console blank screen	77
10.7 MagicQ console white screen	77
10.8 MagicQ console distorted screen	78
10.9 MagicQ console internal touch screen not working	78
10.10 All 10 S buttons flashing blue	78
10.11 Fader, Encoder or Button not working correctly	78
10.12 Unable to save shows or patch heads after performing a *777 erase all on the console	79
10.13 "MagicQ needs to write to the install folder..." message on Mac	79
10.14 Linux: MagicQ fails to start / libGL error	79
11 Licensing	81
11.1 Qt	81
11.2 LibPNG	91
11.3 LibJPEG	93
11.4 LibJPEG-Turbo	94
11.5 LibICU	95
11.6 FFmpeg Binary	102
11.7 FFmpeg Library	108
11.8 LibArchive	117
11.9 Zlib	117
11.10 PortAudio	118

ChamSys Ltd



The features and functions of the MagicQ software and consoles and the ideas contained therein are the property of ChamSys Ltd. The console is intended for the control of lighting systems. No warranties are expressed or implied regarding the use of the MagicQ software of lighting consoles. No liabilities are accepted for the accuracy of the information contained within this manual.

MagicQ software and MagicQ and SnakeSys lighting console products are supplied, designed and manufactured by ChamSys Ltd.

Products containing ChamSys Ltd software and firmware embody proprietary information and are licensed not sold and may not be duplicated in any way.

ChamSys Ltd does not guarantee the accuracy, adequacy, suitability or completeness of any information or products and is not responsible for any errors or omissions or the results obtained from use of such information or products.

ChamSys Ltd does not accept responsibility for the consequences of misuse or abuse of its equipment. The equipment is designed to meet all current regulation requirements in the UK for electrical products.

None of the equipment or software supplied by ChamSys Ltd may be used in any life-critical or potentially life-endangering situations or in situations where personal injury may result.

ChamSys Ltd reserves the right to make any changes and/or improvements or to discontinue any and all of their product's or service's without prior notice, and advises customers to obtain the latest version of relevant information to verify, before placing orders, that information being relied on is current and complete. All products are sold subject to the terms and conditions of sale supplied at the time of order acknowledgement, including those pertaining to warranty, patent infringement, and limitation of liability. Some of the available functions of products may be altered over the life of the product.

The ChamSys Ltd range of products meet EU directives where applicable, for example the EMC and LVD directives, as laid down by the European Community and ChamSys Ltd has a policy of regularly testing samples to ensure that production units continue to meet these specifications.

ChamSys Ltd will not accept goods back for repair if the serial number sticker is removed or defaced so that it is illegible. This also applies to warranty repairs. See terms and conditions of sale for full details.

All other product names are trademarks or registered trademarks of their respective owners.

No part of this publication may be reproduced or distributed, transmitted, transcribed, stored in a retrieval system, or translated into any language in any form by any means without the prior written permission of ChamSys Ltd.

Copyright 2020 by ChamSys Ltd. All rights reserved.

www.chamsys.co.uk

Chapter 1

Installing MagicQ Software & Drivers

1.1 MagicQ software

MagicQ software runs on PCs and Macs and can be downloaded free from the ChamSys web site www.chamsys.co.uk/download.

1.2 MagicDMX

MagicDMX devices do NOT need any additional drivers – they use HID drivers within the operating system. Simply plug in the device and start MagicQ.

To confirm that the MagicDMX is operating correctly go to Setup, View System, View status, Interfaces. The MagicDMX Status should say "Connected" and "DMX out".

MagicDMX is enabled as DMX output by default. It can be disable/enabled from Setup, View Settings, Ports, MagicDMX.

When first plugged in the MagicDMX alternates green and orange LEDs every second. When MagicQ is started and connects to the device then the green LED is on permanently and the orange flashes faster as it receives data from MagicQ.

When using MagicDMX Basic and MagicDMX Full interfaces *demo mode* will continue to be shown at the top of the MagicQ window. This does not affect the programming of MagicQ or restrict the output if you have a MagicDMX Full interface. *Demo mode* does restrict some advanced MagicQ functions which are unlocked with MagicQ hardware (Not MagicDMX).

1.3 MagicQ Wings & Interfaces

Current MagicQ Wings & Interfaces including Stadium Connect, Compact Connect and Mini Connect and the older PC Wing Compact and Extra Wing Compact do not require special driver installation.

Ensure the setting "Setup, View Settings, Ports, MagicQ Wings & Interfaces" is set to "Yes (auto DMX)"

Older MagicQ Wings (Mini wing, PC Wing, Maxi Wing, Extra Wing, Playback Wing, Execute Wing) and MagicQ DMX interfaces (Dual DMX, Audio, MIDI/SMPTE) use a USB chipset made by FTDI. PC Wing Compact & Extra Wing Compact should not require any manual drive For other MagicQ Wings & Interfaces or if for any reason MagicQ does not detect Compact wings, drivers can be manually updated using the steps below.

Note that the drivers for MagicQ Wings and MagicQ DMX interfaces are not applicable to MagicDMX Basic or MagicDMX Full. Do not attempt to install drivers for MagicDMX.

1.3.1 GeNetix nodes

The GeNetix GN2, GN5 and GN10 have optional USB connection, enabling them either to be used in USB or Network mode.

When a GeNetix node is connected via USB to a PC (Windows, Mac or Linux) with MagicQ running then the GeNetix node runs in USB mode as a MagicQ interface connected directly to the MagicQ application.

In USB mode it is treated just like a MagicQ Wing or Interface with the configuration being controlled from within MagicQ rather than from within the GeNetix node. In this mode the node configuration is unused, although it is retained for when the node is used again in Network mode.

When in USB mode, the DMX outputs are configured in MagicQ from the Setup Window, VIEW DMX I/O. For GN5 and GN10 the MIDI, Timecode and 10Scene port are configured in MagicQ from the Setup Window, VIEW SETTINGS. The configuration is stored in the MagicQ show file as normal.

The node indicates USB mode on its front panel when in USB mode.

The node continues in USB mode even if the USB link is lost or MagicQ is stopped. To restart the node in Network mode, disconnect the USB or shut down the MagicQ and then power the GeNetix node on and off.

Note that the GN2 can run in network mode but still be powered from USB - provided that it is not connected to a PC running MagicQ – if MagicQ is detected it will be switched to USB mode.

1.4 MagicQ on Windows

MagicQ supports Windows 8, Windows 10 and Windows 11.

MagicQ Connect products do not need any drivers installed.

MagicDMX devices do not need any drivers - see Section [1.2](#).

MagicQ runs on all types of Windows PC including both Intel and ARM based Microsoft Surface.

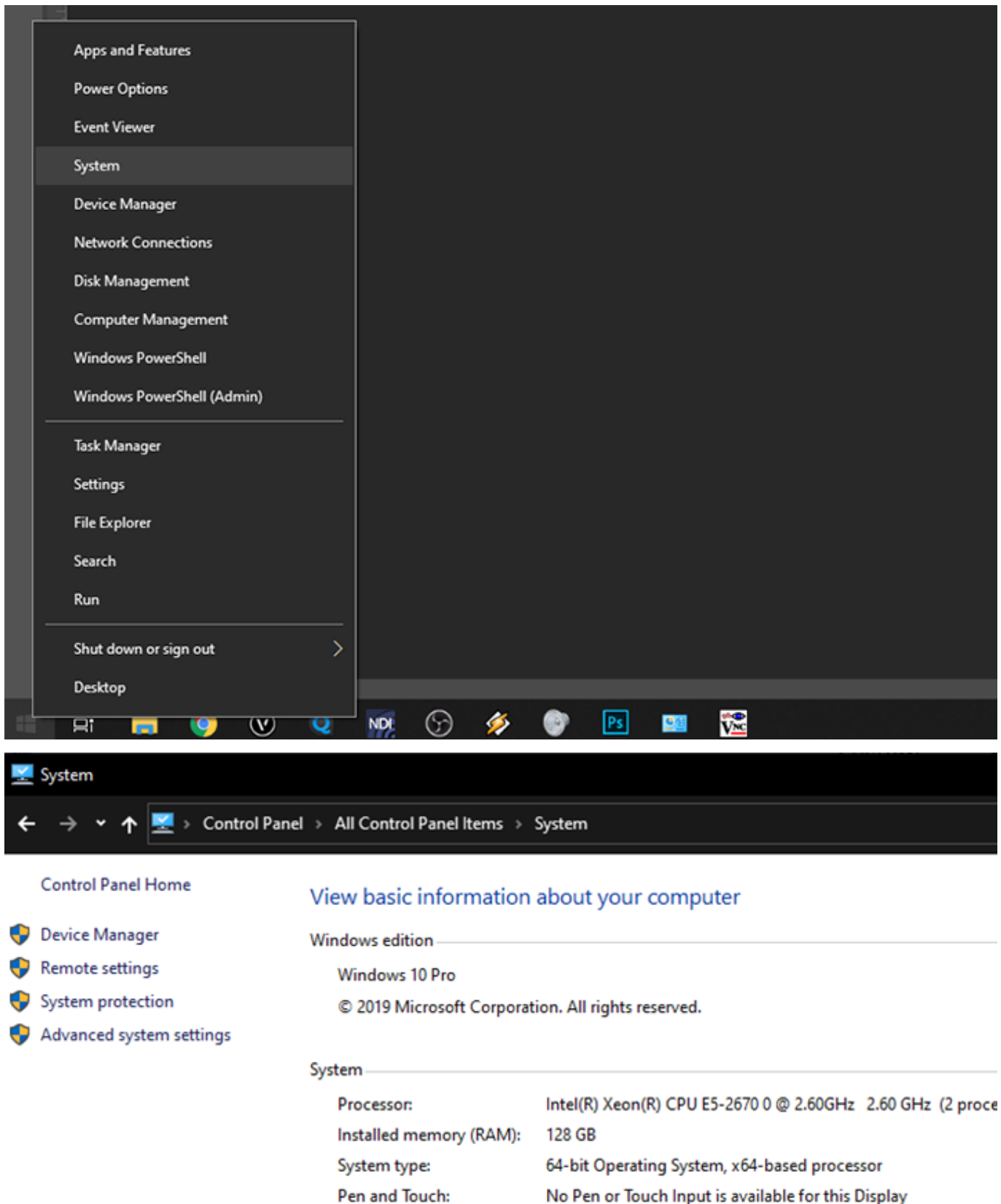
1.4.1 Drivers for older MagicQ products

The drivers for older MagicQ products are included in the MagicQ download.

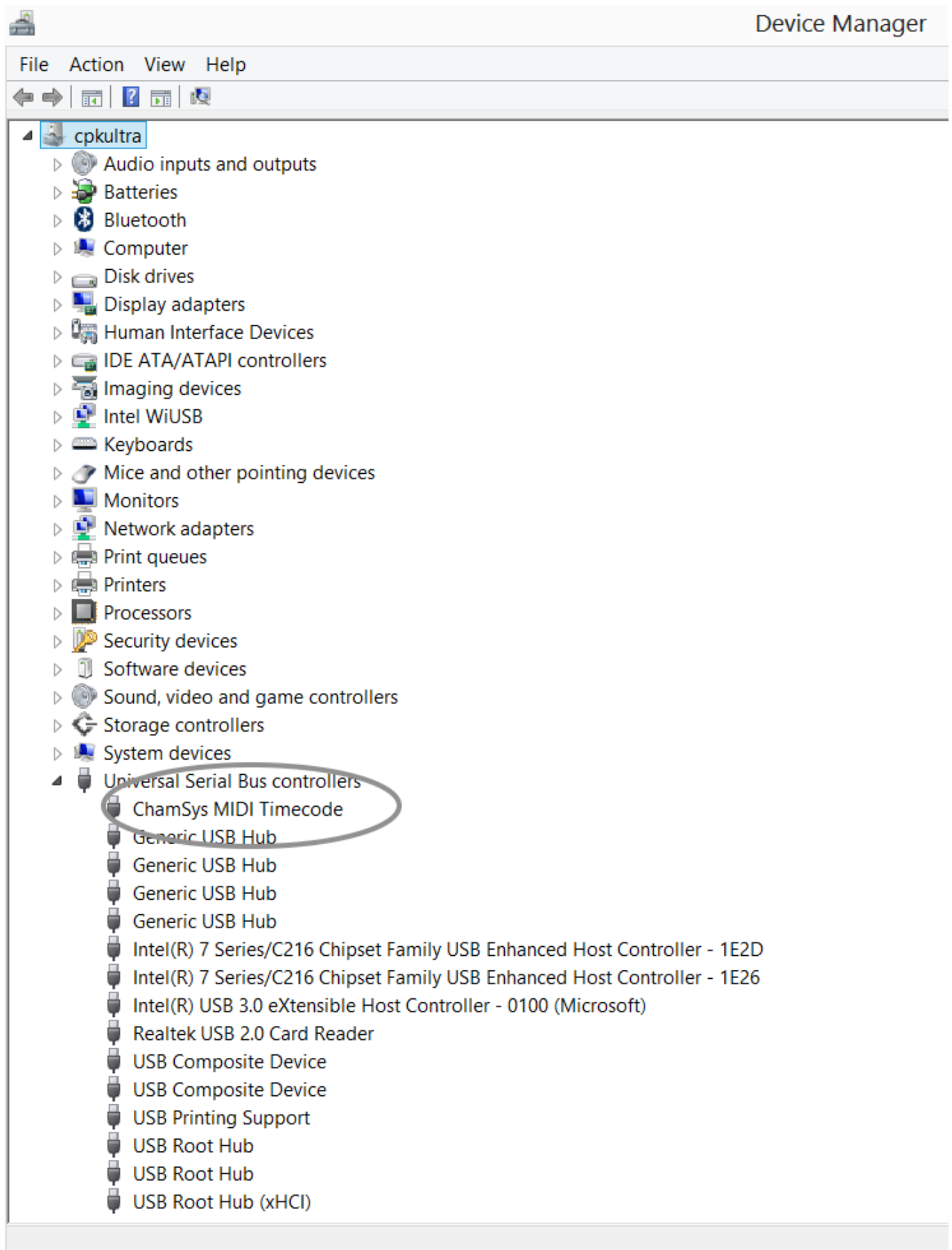
C:\Program Files (x86)\ChamSys Ltd\MagicQ\MagicQ Wing Drivers

Disconnect all MagicQ Wings and Interfaces except the one you are trying to install the driver for.

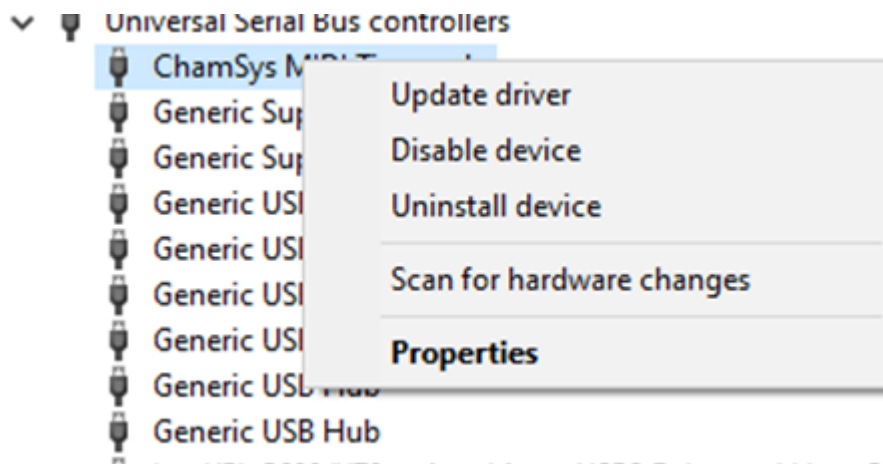
Open Device Manager. This is found in different places depending on the version of Windows, but it can normally be accessed by opening Control Panel and then selecting System, and then selecting Device Manager.



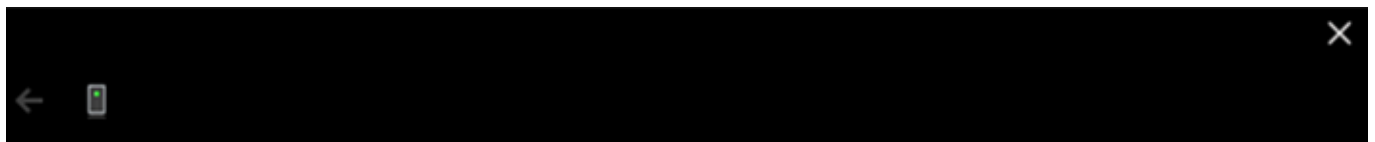
Device Manager lists all the devices on your system. The MagicQ device is normally listed at the bottom under Universal Serial Bus Controllers but it may be under any other section. It may be listed as a ChamSys or MagicQ device or just as a FTDI device. If you can not find it then try disconnecting and reconnecting the USB cable to the device - the listing should update and indicate to you which device is being plugged/unplugged.



When you have identified the device then right click and press Update Driver.



Select "Browse My Computer for Driver Software (Locate and Install Driver Software Manually)". Do not let Windows search for a driver.



How do you want to search for drivers?

→ Search automatically for updated driver software

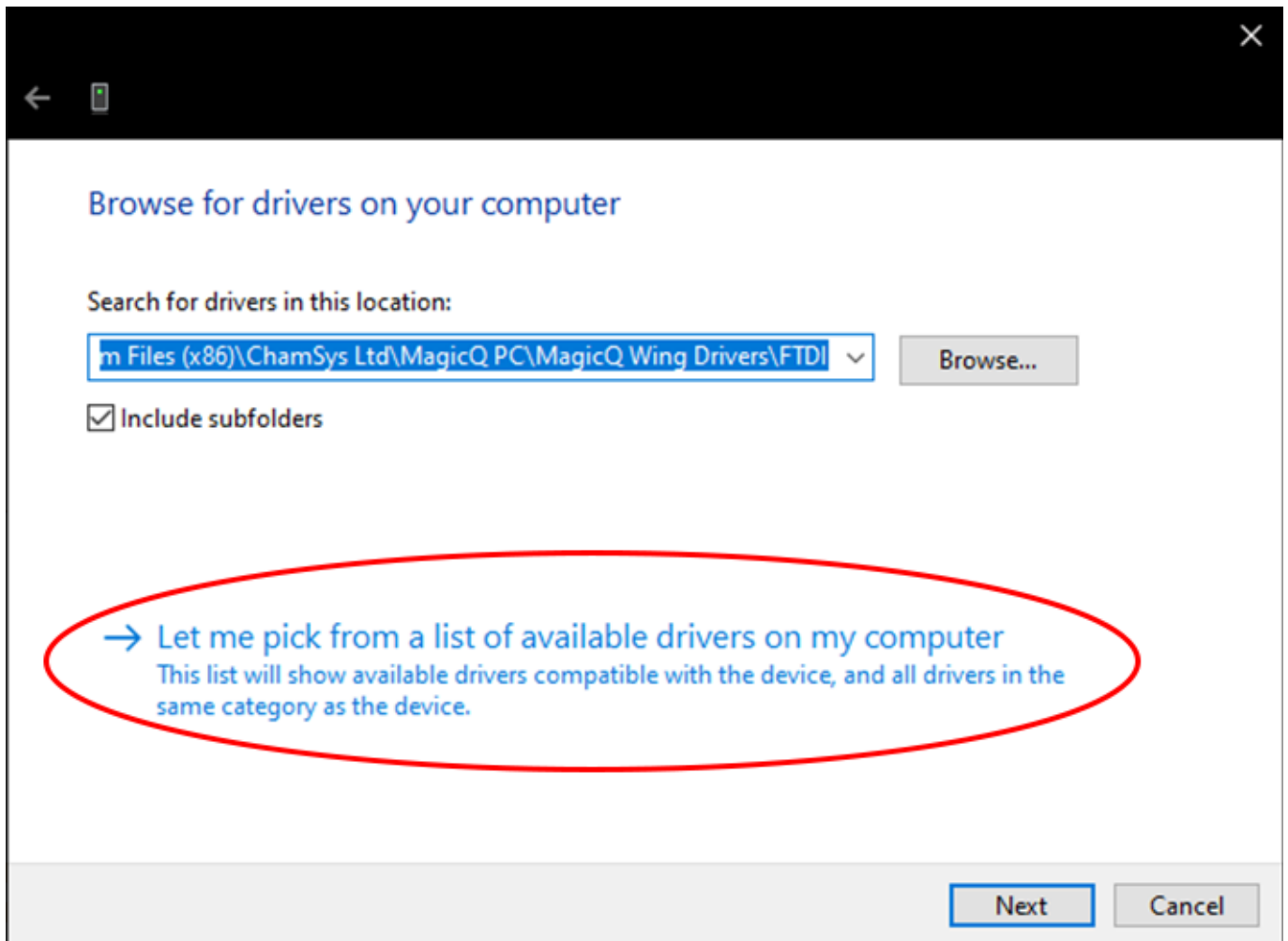
Windows will search your computer and the Internet for the latest driver software for your device, unless you've disabled this feature in your device installation settings.

→ Browse my computer for driver software

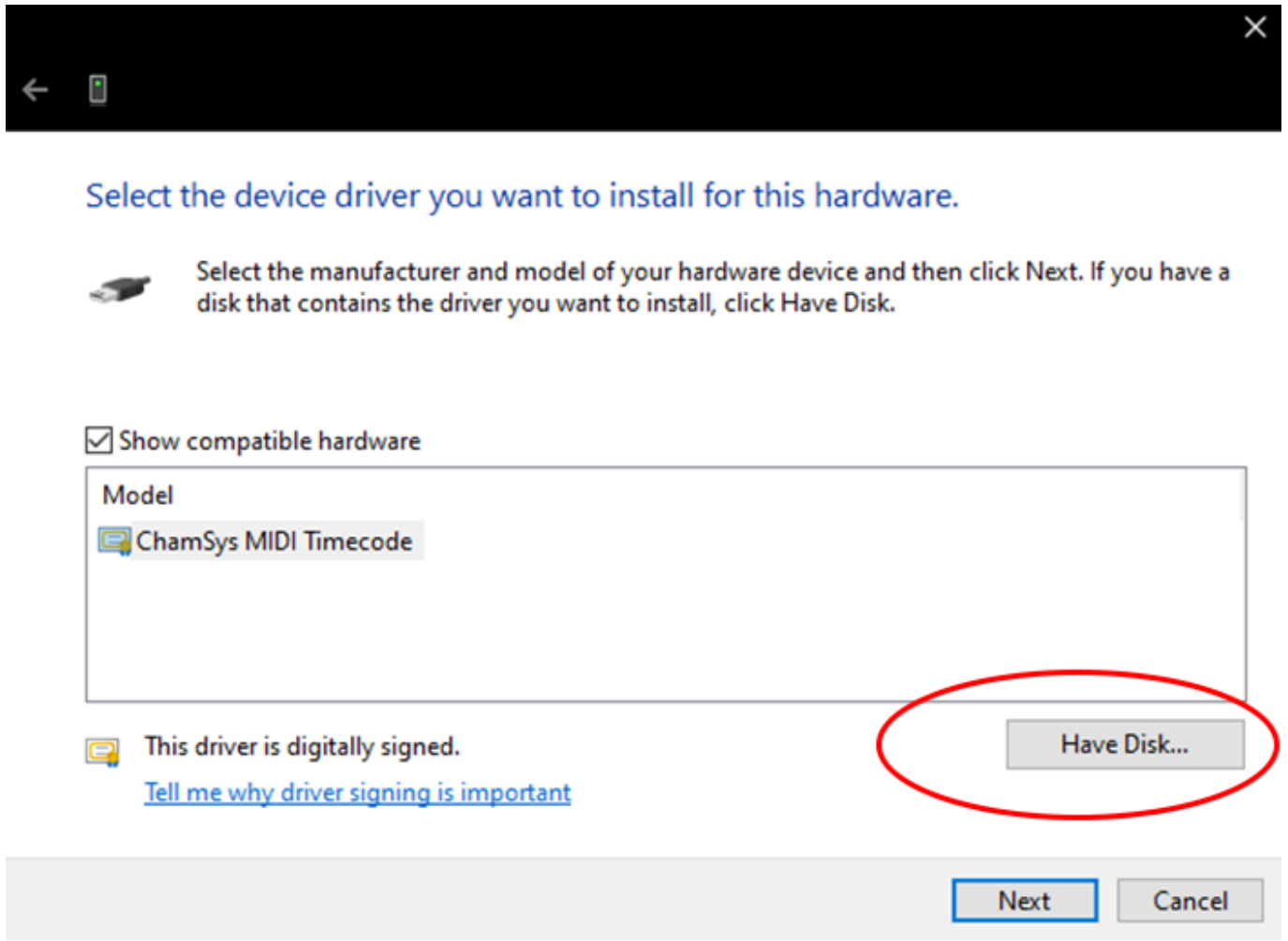
Locate and install driver software manually.

Cancel

Select the option "Let me pick from a list of device drivers on my computer".

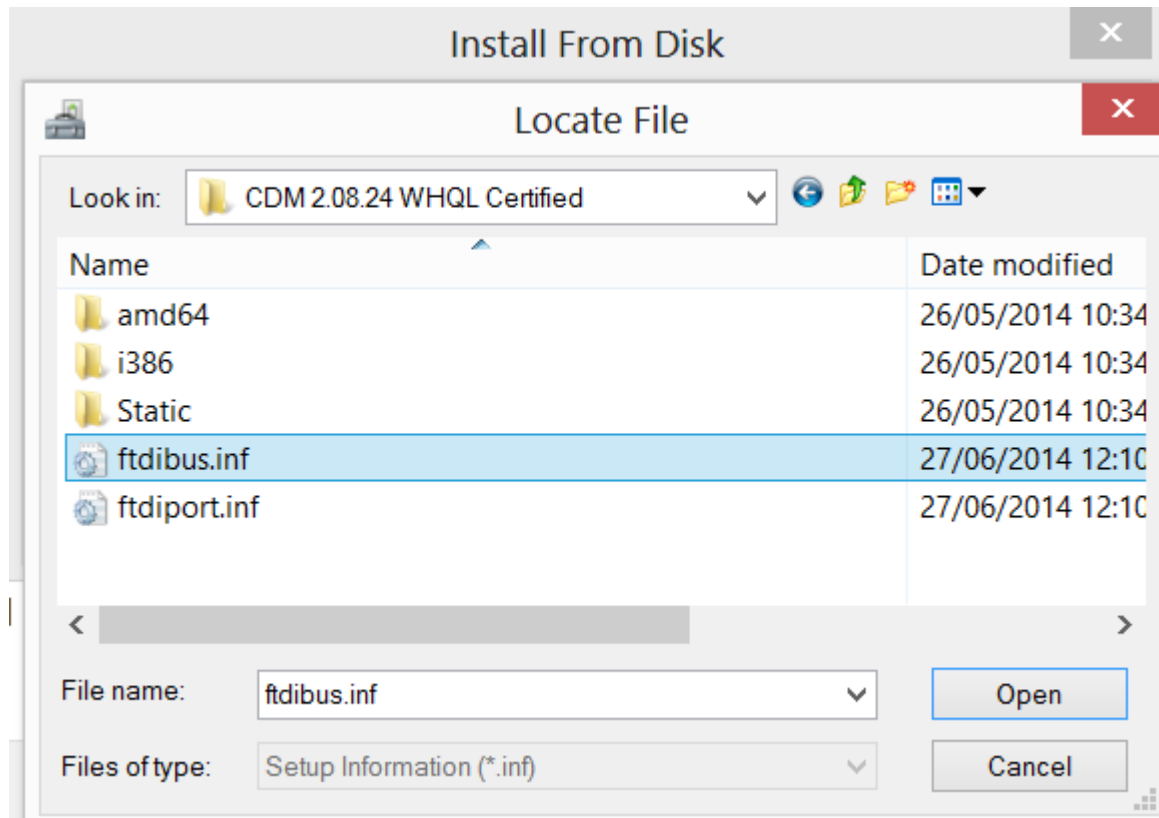


Select "Have Disk". If you cannot find "Have Disk" then click on items in the list until you get it.

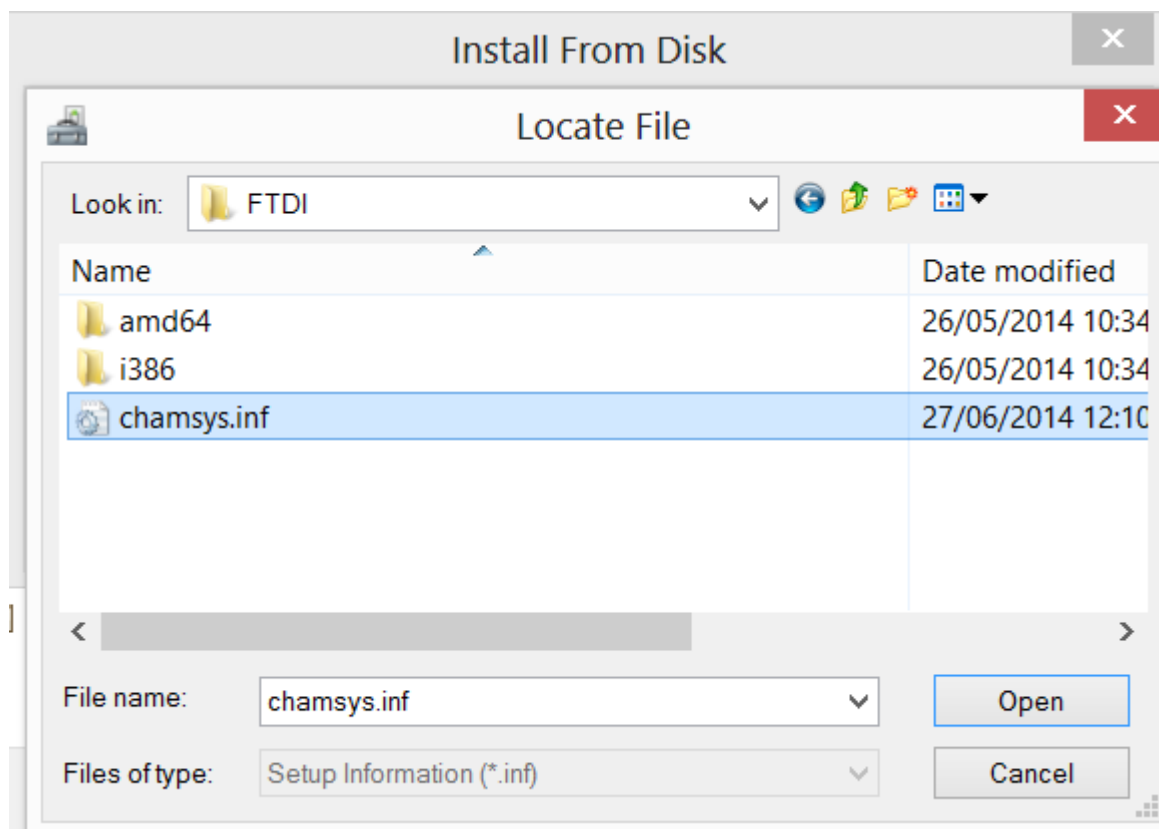


For PC Wing Compacts the drivers are in C:\Program Files (x86)\ChamSys Ltd\Magicq\MagicQ Wing Drivers\PC Wing Compact\CDM 2.08.24 WHQL Certified\ftdibus.inf

PC Wing Compacts require MagicQ software version 1.5.8.0 or above.



For all other products the drivers are in C:\Program Files (x86) \ChamSys Ltd\Magicq\MagicQ Wing Drivers\FTDI



If the MagicQ USB wing periodically disconnects and restarts then check the Windows settings for your USB ports - Windows may be shutting down the USB ports when it incorrectly thinks they are idle. Click on Control Panel, System, Device Manager

and scroll to the bottom to get a list of the USB devices. For each USB Root Hub click on Properties, Power Management and make sure that the option "Allow the computer to turn off this device to save power" is NOT selected.

On some Windows systems the Update Drivers dialog will not show the driver files even though they are correctly in the MagicQ Wing Drivers folder. In this case try copying the whole MagicQ Wing Drivers folder to the desktop (using Windows Explorer) and then try to update the drivers again.

1.4.2 User permissions on Windows

On new installs of MagicQ, show files are stored in **Documents/MagicQ/show/** in your home folder.

If you have upgraded MagicQ from an old version, then your show files may instead be stored in one of the following locations:

- C:\Users\username\AppData\Local\VirtualStore\Program Files\ChamSys Ltd\MagicQ PC\show
- C:\Program Files (x86)\ChamSys Ltd\MagicQ PC\show

If MagicQ does not store settings after a restart - it forgets the number of universes, IP address or DMX I/O settings - then this is likely caused by Windows restricting write access to the folders where MagicQ stores this data. Check permissions.

To check if permission settings are causing issues, try to run MagicQ as administrator. Right click on the MagicQ desktop icon and select *run as administrator* from the options menu.



Warning

MagicQ should not be run as an administrator in normal operation - this is only recommended as a troubleshooting step. Complete functionality is available as a normal user.

Windows controls the level of access to system folders through the User Account Control Settings. This can be found in Control Panel, User Accounts, Change User Account Control settings. Setting this to "Never Notify" will make Windows less restrictive. Note that for security reasons this is only recommended for stand alone systems dedicated to MagicQ which are not connected to the internet - please make sure you understand the implications for your computer, before changing this setting.

1.5 MagicQ on Mac

MagicQ Supports macOS 10.12 and 10.13, 10.14, 10.15, 11 and 12.

Note when using Apple M1 hardware ensure that MagicQ is installed via Rosetta.

No driver installation is required for MagicQ wings and interfaces.

On MagicQ v1.9.0.5 and older, wings and interfaces must be powered up and connected before MagicQ is started.

On MagicQ v1.9.0.5 and older (except for PC Wing Compact and Extra Wing Compact), wings and interfaces require going to *SETUP* → *VIEW SETTINGS* → *Ports* → *MagicQ Wings & Interfaces* and changing to **FTDI + VCP driver, auto DMX**.

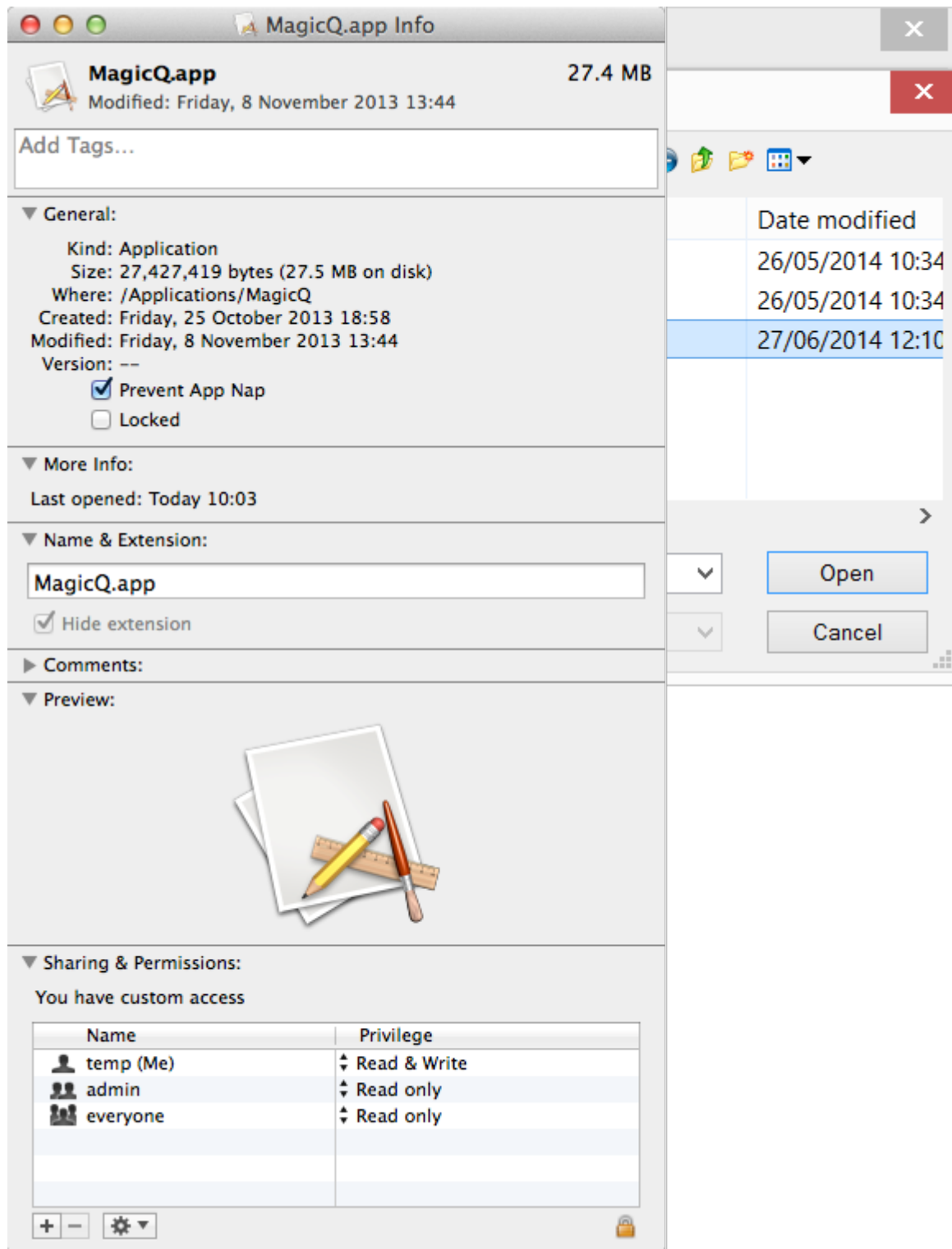
MagicQ downloads for unsupported versions of macOS are available from the [Legacy Downloads](#) page.

1.5.1 Turning off App Nap

On all versions we recommend you disable Computer sleep and turn off App Nap to avoid MagicQ being shut down inadvertently.

- Quit MagicQ
 - From the OSX Finder, navigate to the `/Applications/MagicQ/` folder
 - Select MagicQ.app, then go to the "File" menu and select "Get Info" (or select the app and hit Command+i)
-

- Check the box for "Prevent App Nap", found under the General section of Get Info



1.5.2 Making the MagicQ folder writeable

If you get the message "Cannot write file" when trying to save a show file, or your settings changes are not saved then check that the MagicQ folder and all its subfolders have both read and write permission.

If you get a message starting with "MagicQ needs to write to the install folder...", you will need to check the permissions of the "MagicQ" folder. There are [detailed steps](#) in the troubleshooting chapter.

1.6 MagicQ on Linux

MagicQ can be installed on current Ubuntu LTS releases (14.04, 16.04 18.04 and 20.04) 64 bit.

You can download MagicQ for Linux from the [bugtracker](#).

Using older MagicQ wings and interfaces requires the ftdi_sio kernel driver which is included as standard on most Linux distributions.

We cannot provide support for Linux specific issues; the best place to ask questions is on community forums and social media websites.



Important

MagicQ for Linux is only available for 64 bit AMD/Intel systems. We no longer provide downloads for 32 bit Linux from version 1.8.0.3. MagicQ will not run on other architectures (e.g. ARM).

1.6.1 Installing

To install the downloaded .deb file, run the following command in a terminal:

```
sudo dpkg -i magicq_ubuntu_vx_x_x_x.deb
```

Replacing the filename above the the name of the downloaded file.

1.6.2 High DPI screens

Automatic scaling for high resolution screens is disabled by default as with some screens it made the MagicQ user interface too big.

From version 1.8.0.4 you can create a file called `.magicq_init.sh` in your home directory (`/home/USERNAME/.magicq_init`) and make sure it has executable permissions.

```
# ~/.magicq_init.sh
```

```
# Uncomment the following line if you want MagicQ to try to scale automatically
#export QT_AUTO_SCREEN_SCALE_FACTOR=1
```

```
# Uncomment and adjust the following line if you want to manually decide how to ←
#   scale MagicQ
# You can specify a fractional number (e.g. specify 1.5 to make it 50% bigger)
#export QT_SCALE_FACTOR=1.0
```

```
# If you have multiple screens that need different scaling, uncomment and set the ↵  
    following  
# line to a semicolon-separated list of scale factors  
#export QT_SCREEN_SCALE_FACTORS=1.5;1.0
```

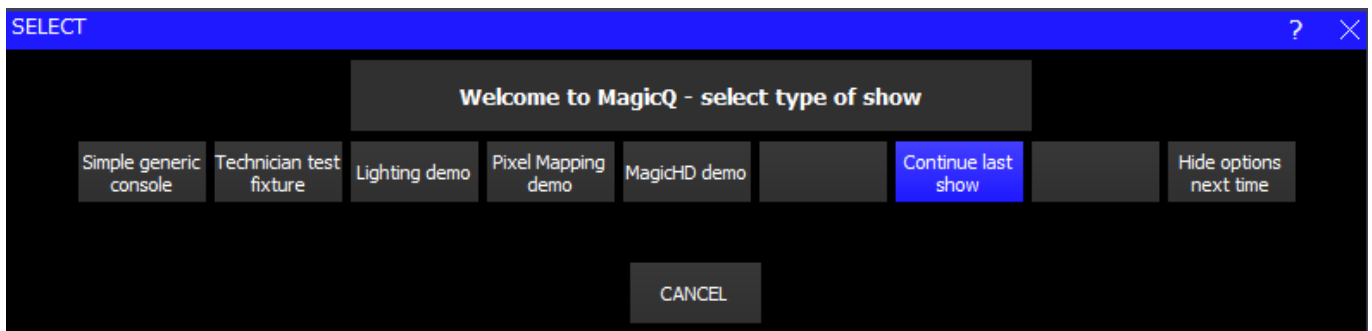
See <https://doc.qt.io/qt-5/highdpi.html#high-dpi-support-in-qt> for more information on the environment variables in this file.

Chapter 2

Using MagicQ on PCs and Macs

The MagicQ software for PCs and Macs has exactly the same features as the MagicQ console software with support for pre-visualisation of up to 256 universes, and full output of 64 Universes. Along with support for ChamSys low cost MagicDMX interface, for simple USB-DMX output.

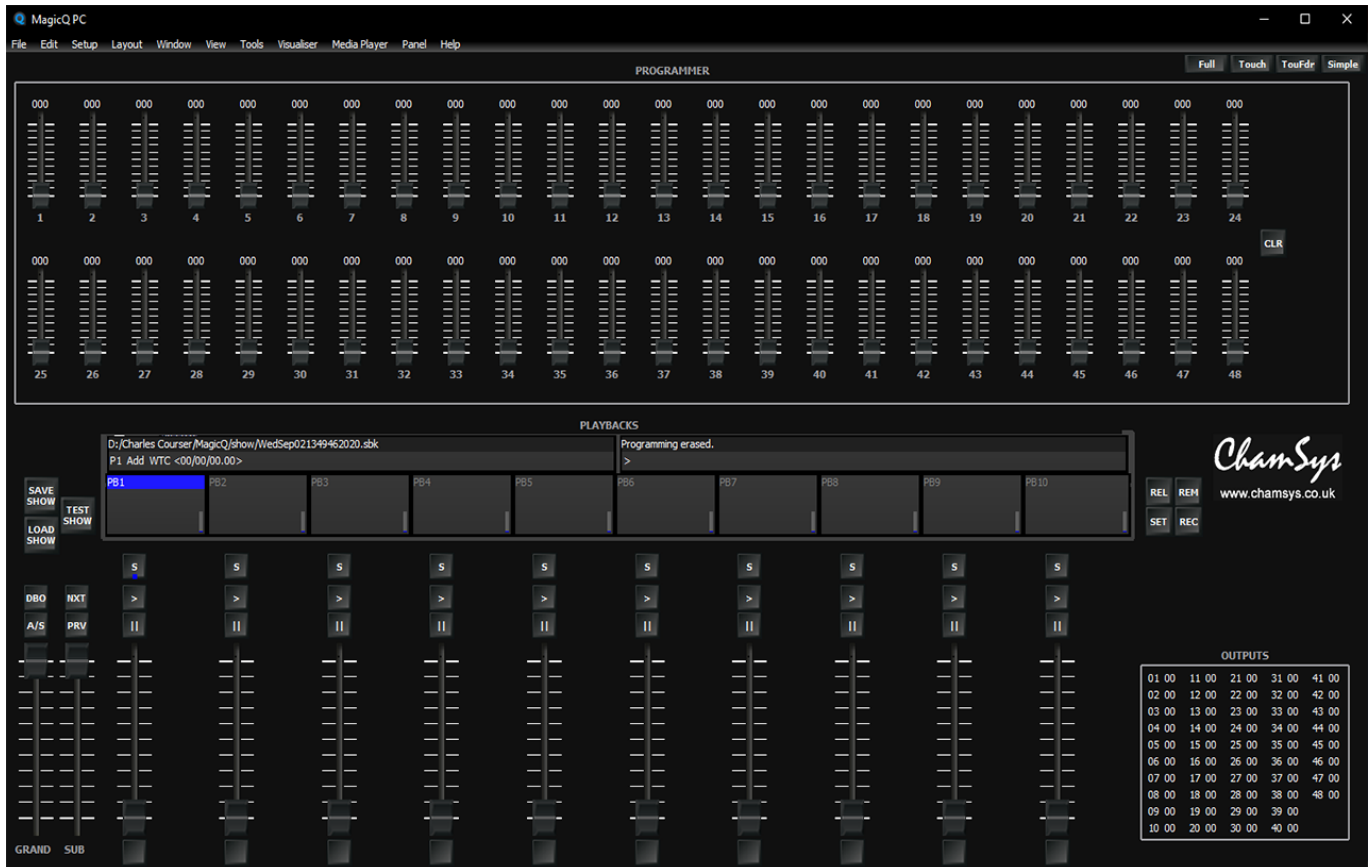
When MagicQ PC or Mac is installed for the first time, it will show a window with choices of demo shows.



This window can be hidden on subsequent starts by pressing the "Hide Options Next Time" button. It can be reactivated by setting the Setup, View Settings, Windows, Start Mode option to "Choose Demo show".

2.1 Simple Generic Console

Choosing Simple Generic Console opens MagicQ in Simple View and loads a Simple 48 Channel Generic Console show file.



In this mode the console simply operates as a 48 channel traditional theatre console with 48 dimmers patched on Universe 1 at channels 1 through 48.

If a MagicQ Wing, MagicQ Dual DMX Interface or MagicDMX interface is connected to MagicQ then the 48 channels will be automatically output on the 1st output.

There are 10 Playback Faders labelled PB1 to PB10. Depending on your screen resolution you may have a S, > and II button for each fader. Pressing in the box labelled PB1 to PB10 is the same as pressing the appropriate S button.

To record a Cue set the faders as required. Then press REC and press the S button of the Playback fader you wish to record it to. Press CLEAR to clear the Programmer and return the faders to their defaults.

To record a chase, record multiple Cues to a Playback fader simply record more than one cue to a Playback fader.

To remove the Cues from a fader press REM and press the S button of the Playback fader you wish to remove Cues from.

To name a fader press SET and press the S button of the Playback fader you wish to name. You will be shown a text entry box. Type the name followed by RETURN.

Multiple pages of faders are supported through the Next Page / Previous Page buttons.

It is possible to interchange between the Normal and Simple views of the console by pressing the Norm and Simple buttons in the top right corner of the Application.

2.2 Technician Test Head

The Technician Test Head mode enables technicians to test a moving light or other head in a very simple way. Simply press the TEST SHOW soft button and select a head and a mode.

A new show will be created using that head patched at DMX address 1 on the first Universe. The 48 faders show up to 48 channels of the head. Each fader is named with the attribute name and the values are set to their default values.

The picture below shows a Clay Paky Alpha Spot HPE 1200 in Standard mode.



The Playback faders are automatically set up with some useful functions including Macros for Lamp On, Reset and Lamp Off, Locate and Movement, Colour, Gobo and Strobe tests.

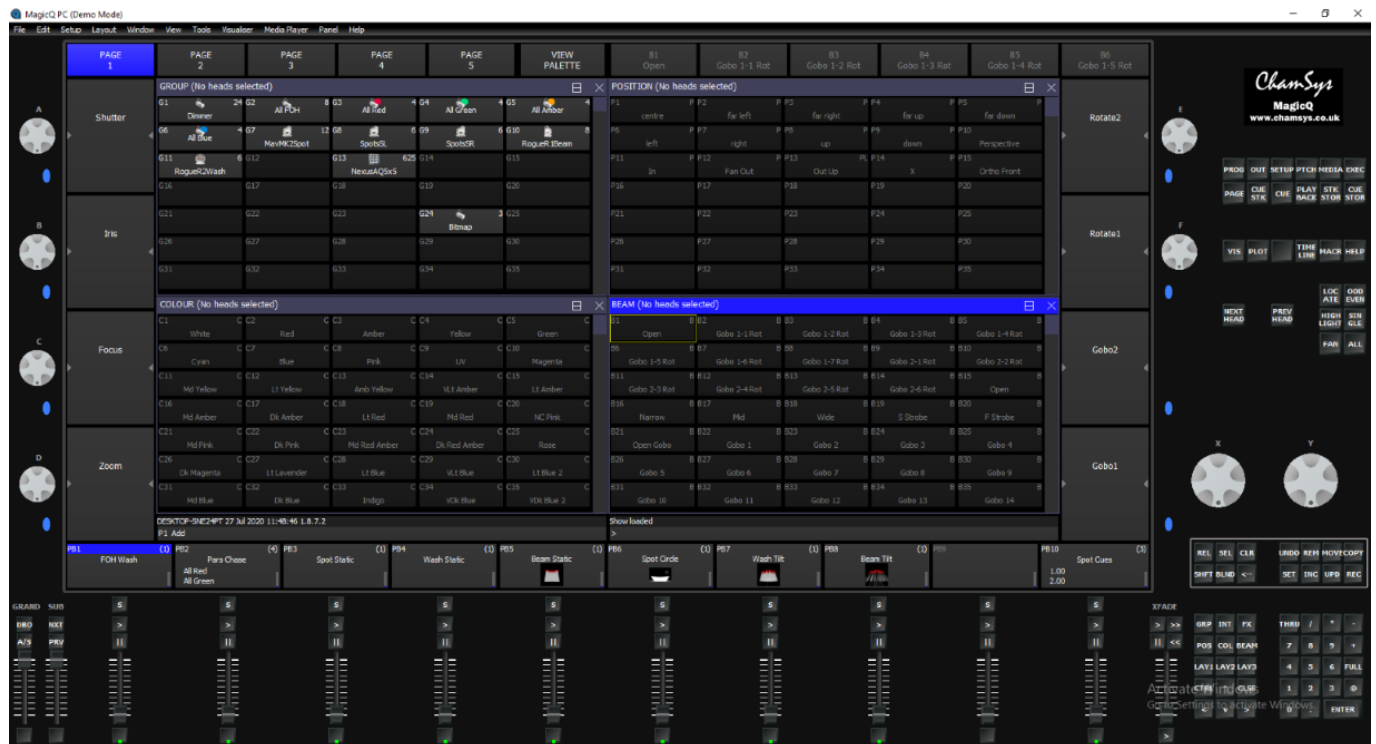
If a MagicQ Wing, MagicQ Twin DMX Interface or MagicDMX interface is connected to MagicQ then the head will be controlled on the 1st output.

The preset faders can be used to change the values of individual attributes. Use SHIFT and the faders to make a fine adjustment.

2.3 Demo Shows

The start up Window gives also gives a choice of a standard Lighting demo show or a PixelMapping demo show.

Additional demo shows for other head types, media servers and visualisers can be found by going to Setup, View Settings, Load Show and selecting the demo show folder.



2.4 Touch View

The Touch View is designed for use with touch screens with buttons that are sized bigger so that it is easier to select functions. Select Touch View by pressing Touch or Touch2 in the top right corner of the Application.

2.5 Playback mode

MagicQ PC supports a Playback Mode which enables MagicQ to be run in a pure "Playback" mode. This mode is selected by clicking on the new Playback mode Icon on the desktop or in the Programs, ChamSys MagicQ PC menu.

Playback mode is only supported when connected to a MagicQ Wing or MagicQ USB interface. The MagicQ interface must be connected and powered on before MagicQ is started in Playback mode. Note Playback mode is not supported with MagicDMX or 3rd Party interfaces.

In Playback mode MagicQ it is not possible to record or make changes to the show data. MagicQ will not save the show files / status files. Changes (e.g. change of chase speed) will be lost when the application is stopped and restarted.

Playback Mode shows a much reduced set of buttons on the screen – only buttons required for show playback are shown.

In Playback Mode only pages of playbacks that have been programmed are shown – pressing NEXT PAGE will automatically change to the next programmed page and will cycle around all programmed pages.

2.6 Copy and paste to external applications via the clipboard

MagicQ now supports copying and pasting to external applications such as Word, Excel and text editors.

On the toolbar select Edit, Copy or press the short cut key CTRL C. The item at the cursor position in the focused window, or multiple items if cursor selection is active, will be copied to the Clipboard. In the external application CTRL V (or Paste) can be used to paste the information.

It is possible to quickly select all items in a window by selecting Edit, Select All or using the short cut CTRL A.

It is also possible to copy and paste into MagicQ from external applications. In the external application use CTRL C or Copy to copy the required data to the Clipboard. In MagicQ change to the Window that you wish to paste to, cursor select the required cells and on the toolbar select Edit, Paste or press CTRL V. The data will be pasted into the MagicQ window. MagicQ only supports pasting of text data - typically names of items. When pasting to multiple selected cells MagicQ verifies that the quantity of data on the Clipboard matches the number of selected cells.

Extreme care should be used when pasting into MagicQ.

2.7 MagicQ PC / Mac Restrictions (Demo and Reduced Mode)

When MagicQ PC (Windows, Linux or Mac) is not connected to a MagicQ USB interface, Connect, MagicQ USB Wing or SnakeSys network product, then a small number of remote and automation features are restricted and "Demo Mode" is shown in the title bar. This does not affect show programming or playback.

There are three categories of unlock, depending on which hardware is connected to the PC or Mac - DEMO MODE, REDUCED MODE and UNLOCKED MODE.

2.7.1 DEMO MODE

- DEMO MODE shown in title bar
- MagicQ programming and playback of shows
- 64 universes Art-Net/sACN in and out
- MagicDMX
- RDM

Demo mode is in operation when no ChamSys devices are connected to MagicQ, and when only MagicDMX (Basic & Full) or 10Scene Gateway are connected.

2.7.2 REDUCED MODE

- REDUCED MODE shown in title bar
- All demo mode features
- Startup in full screen / saved window positioning
- Auto starting Playbacks
- Execute Window full screen
- Scheduled Events and Automations
- iOS / Android Remote app
- Web Server editing
- 10Scene Gateway and 10Scene remote app

Reduced mode is in operation when Dual DMX, Audio Interface, SnakeSys B4, T2, R4, R8 and GeNetix GN2 are connected. GeNetix GN2 also unlocks into reduced mode when connected via network (subject to number of MagicQ restriction below).

2.7.3 UNLOCKED MODE

- All demo and reduced mode features
- Multi Programming including Net Sessions
- Playback Synchronisation
- Remote Control from other MagicQ systems
- Audio control and playback synchronisation with Winamp *
- Audio input from PC/Mac sound card
- Timecode send and receive from Art-Net
- Timecode (MIDI/LTC) from 3rd Party USB/Virtual interfaces.
- Triggering events / Cues / Timecode from DJ systems
- MIDI notes, CC, Show control from 3rd Party USB/Virtual interfaces
- ChamSys Remote Control Protocol (serial, or network)
- Open Sound Control (OSC)
- External Tracker send/receive (PSN, OTP, MQ Track)
- Mouse control of pan/tilt
- Encoder control from MIDI CC / OSC

Unlocked mode is in operation when Mini Connect, Compact Connect, Stadium Connect and Rack Mount Dongle are connected. GeNetix GN5 and GN10 also fully unlock when connected via network (subject to number of MagicQ restriction below).

Unlocked mode is also in operation with the following legacy products - PC Wing, PC Wing Compact, Extra Wing, Extra Wing Compact, Playback Wing, Execute Wing, Stadium Wing, MIDI/SMPTE.

*Note that the MagicDMX interface (Basic or Full) do not lift these restrictions, as these are low cost interfaces intended for learning how to program the system.

MagicQ PC/Mac running with the restricted features unlocked, supports control of the first 10 playbacks (PB1 to PB10) via ChamSys remote control protocol, MIDI and automations. This enables synchronisation with show control systems. Playbacks 11 to 202 can only be controlled by MagicQ Playback/Execute/Extra Wings. On MagicQ consoles all 202 playbacks can be controlled by these protocols.

MagicQ PC/Mac supports 256 universes for Previsualisation and 64 universes for full output.

In the MQ250M, MQ500 and MQ500M Previs panel modes in order to protect our customers investment in full MQ500 and MQ500M consoles, the normal outputs are disabled and only visualisation is supported. Visualisation can be internal MagicVis or direct network links to external 3rd part visualisers. When universes 65 to 256 are used with external visualisers there will be occasional breaks in the DMX to prevent usage to control real lighting rigs. MagicQ warns if universes are enabled when entering the MQ500 and MQ500M Previs panels.

2.7.4 GeNetix / SnakeSys DMX Node Unlocking

GeNetix GN2 unlocks into reduced mode, whilst GeNetix GN5 and GN10 unlock fully.

From v1.9.5.0 onwards GeNetix and SnakeSys nodes connected to MagicQ PC Systems over the network will only unlock MagicQ systems if there are no more than two MagicQ systems on the network (PC/Mac or console).

This enables a user to have a master and slave PC for their show unlocked, but prevents installations where a single GeNetix or SnakeSys device unlocks many MagicQ PC systems.

In previous versions SnakeSys devices would unlock all MagicQ PC Systems connected to the network.

Product	Via USB	Via Network
MagicDMX	None	
10Scene Gateway, GW2O, GW2I		None
GN2	Reduced	Reduced
GN5, GN10	Unlocked	Reduced
Mini Connect, Compact Connect, Stadium Connect	Unlocked	

Legacy products

Product	Via USB	Via Network
Audio i/f	Reduced	
B4,T2,R4,R8		Reduced
Mini Wing, PC Wing, Extra Wing, Stadium Wing, Playback Wing, Execute Wing, MIDI/SMPTE	Unlocked	

2.7.5 MagicHD Stand Alone Restriction

MagicHD when run as part of MagicQ supports 8 layers.

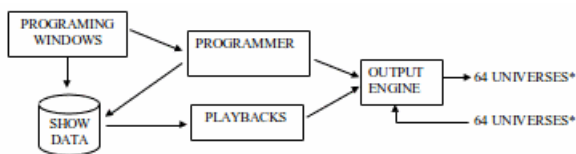
MagicHD when run as a stand alone program (not as part of MagicQ) only supports 1 layer unless a MagicQ / MagicHD USB Dongle is fitted to the system, or is connected via network to a MagicQ console with encoders, or connected via network to a MagicQ PC/MAC system with a connected MagicQ USB Wing with encoders.

SnakeSys and GeNetix products do not unlock stand alone MagicHD.

Chapter 3

MagicQ Concepts

A system diagram of the console is shown in the diagram below



- Universe count ranges from 4 to 256 depending on console.

3.1 Show Storage

MagicQ stores show data in a single show file stored on the hard drive of the MagicQ console, PC or Mac. The show file contains all the show settings, patch, palettes, cues and cue stack data. It also stores copies of all the personalities that are used within the show.

A MagicQ show can be transferred between MagicQ consoles and MagicQ PC or Mac systems simply by copying the show file. MagicQ show files are compatible across all MagicQ products. MagicQ maintains forward and backward compatibility for show files - enabling users to load shows created on any version of MagicQ software into any other version of MagicQ software.

Favourite shows, personalities, palettes and FX patterns can be imported into new shows to simplify and speed up show programming.

Show files can be copied using USB memory sticks or the network can be used to access the file system of MagicQ consoles.

When the user saves the show using the SAVE SHOW menu item or soft button MagicQ stores the show file with a .shw file extension. At all other times MagicQ automatically backs up the show data whenever changes are made to a (.sbk) file.

3.2 Output channels

Depending on the console, MagicQ software supports up to 256 universes output over Ethernet.

This allows up to 131,072 channels of lighting to be controlled. Ethernet to DMX Interfaces are used to convert from Ethernet to DMX512 as required.

Lighting consoles are often limited in the number of DMX channels or the number of intelligent heads they can control independently. MagicQ allows control of all DMX channels individually, whilst utilising grouping and programming functions to enable control of multiple heads or dimmers together.

MagicQ provides a library of over 35,000 personalities – data for each of the different types of intelligent head available. This data determines how the different attributes of an intelligent head are controlled by the console.

ChamSys adds new personalities for heads as the information becomes available. If a personality is not available then it can be requested from ChamSys. Users also have the ability to create the personality themselves in the inbuilt Head Editor.

3.2.1 HTP / LTP channels

The console supports two types of channels, highest takes precedence (HTP) and latest takes precedence (LTP). Generally HTP channels are used for channels controlling dimmers and for the dimmer channel of intelligent heads. LTP channels are used for the attributes of intelligent heads such as pan, tilt, colour, gobo etc. . .

For HTP channels the value that is output is the highest value of that channel on all of the active playbacks and the programmer. The console can be configured so that if a HTP channel is in the programmer it always overrides any active playbacks.

For LTP channels the value output is the value from the last active playback unless that channel is active in the programmer in which case the value output is the value stored in the programmer.

The last active playback is the last playback to be raised above zero, which is still above zero. Playbacks that are bumped in using ADD or SWAP buttons automatically become the last active playback until the button is released.

The type of channel used by the console is determined by the personality used to patch the dimmer or intelligent head.

Intensity channels should always be patched as HTP. In addition Red, Green, Blue channels in fixtures that do not have an Intensity channel are patched as HTP. All other channels are patched as LTP.

Playbacks can be set so that all channels controlled by the Playback act in a LTP way, thus allowing Intensity channels to be overridden by a single Playback.

The Patch HTP also affects the operation of channel releasing, Grand Master and DBO as in the table below:

Feature	Patch HTP	Patch HTP (Cue Stack All Chans Controlled LTP)	Patch LTP
Channel mixing	HTP	LTP	LTP
Channels release to 0	Yes	Yes	No
Fader controls level	Yes	Yes	No
GM/DBO controls level	Yes	Yes	No

3.3 Cues

The console stores lighting states as Cues – each Cue stores

- Level information
- Timing information
- FX information

The Cue stores level information for each of the channels recorded into it. If the channel level was set using a Palette, then a reference to the Palette is also stored so that the Cue can keep track of changes to the Palette.

CUE (Q55: used in CS30 Cue id 1.00)																			
Head name	Head type	No	Dimmer	Pan	Tilt	P/T Spec	Colour	Cyan	Magenta	Yellow	CTO	CMY Macro	CMY Macro	Strobe	Iris	Rot Gobo 1	Rot Gobo 2	Gobo 1 R	Gobo 2 Rot
MavMK3Spot	MavMK3Spot	11	100%	128	128	000	Open	000	000	000	000	No Function	Fast > Slow	Open	Big To Small	Open Gobo	Open Gobo	Index	Gobo Rot Index
MavMK3Spot	MavMK3Spot	12	100%	128	128	000	Open	000	000	000	000	No Function	Fast > Slow	Open	Big To Small	Open Gobo	Open Gobo	Index	Gobo Rot Index
MavMK3Spot	MavMK3Spot	13	100%	128	128	000	Open	000	000	000	000	No Function	Fast > Slow	Open	Big To Small	Open Gobo	Open Gobo	Index	Gobo Rot Index
MavMK3Spot	MavMK3Spot	14	100%	128	128	000	Open	000	000	000	000	No Function	Fast > Slow	Open	Big To Small	Open Gobo	Open Gobo	Index	Gobo Rot Index
MavMK3Spot	MavMK3Spot	15	100%	128	128	000	Open	000	000	000	000	No Function	Fast > Slow	Open	Big To Small	Open Gobo	Open Gobo	Index	Gobo Rot Index

The Cue stores timing information for the channels that have been recorded into it. Two types of timing information are stored:

General Times: Stored for each type of attribute (Int In, Int Out, Position, Colour, Beam)

Individual Times: Stored on an individual channel basis

The Cue stores FX information for each of the FX that has been recorded into the Cue. The FX information includes the type of FX, the heads that the FX is applied to, and the FX parameters for each head.

Each Cue has a number (e.g. Q1) and an optional name.

3.4 Cue Stacks

Cue Stacks are used to manage sequences of Cues. Cue Stacks keep track of the order of the Cues and the options for how they are played back. A Cue Stack can have a single Cue associated with it or may have a whole list of Cues.

The Cue Stack stores a Cue Id and a text field for each Cue so that the different steps in the stack can be labelled. The Cue Id and text field are shown on the playback display when the Cue Stack is played back which enables operators to keep track of the current position in the show.

Cue Stacks can be configured to run as a chase rather than as a simple list of Cues. The difference is that as a chase the timing of all Cues is determined by the chase speed and chase contrast rather than by the individual delay and fade times for each Cue.

Each Cue Stack has a number (e.g. CS1) and an optional name.

3.5 Playbacks

The console enables playing of recorded show data through Playbacks. Playbacks are associated with physical faders and buttons – each Playback can have one Cue Stack assigned to it.

The console supports 202 Playbacks; 10 main Playbacks situated below the touch screen and up to 8 extension wings each with 24 Playbacks.

On models where less than 8 wings are fitted, the not fitted playbacks can be utilised through the touch screen and associated buttons.

3.6 Pages

The console supports multiple pages of Playbacks enabling Playback faders to have different functions depending on the current page. Typically one page is used for each song in a show.

The current page is selected through the NEXT PAGE and PREV PAGE buttons on the main playback section or by selecting a page in the Page Window.

The 24 Playbacks on each wing are divided up into two rows of 12 Playbacks. Each of the rows has separate NEXT PAGE and PREV PAGE buttons. This enables the Page used by these Playbacks to be set differently to the main Playbacks.

This provides significant flexibility to how shows are played back – for example one section of a wing can be used to control front lighting whilst another could be used to control the main show FX lighting. Changing the Page of the front lighting would not change the Page of the FX lighting.

3.7 FX

The console contains a powerful engine for creating special effects (FX). FX can be applied to a group of heads at the touch of a button; there is no need to program lots of different Cues to create the effect. Special effects can be easily modified live, enabling, for example, the speed and size of the FX to be modified to match the mood of the show.

The console supports an extensive library of standard Position FX such as circles, squares, pan and tilt saws, lifts, zig zags, etc. In addition the console supports FX on Colour, Beam and Intensity attributes. The console supports programming and storing of new custom FX, which can then be re-used in shows as required. The FX engine enables complete shows to be programmed within a matter of minutes.

3.8 Window Layouts

The console provides a means of storing the positions and sizes of Windows as a Window layout to enable easy recall of useful Windows. This enables, for example, a Window configuration consisting of the Group, Position, Colour and Beam Windows to be stored and recalled at a button press.

The system supports several standard Layouts, including a standard Group, Position, Colour, Beam programming layout.



On Stadium consoles there are 12 Layouts on the left side of the right hand display. Further layouts can be accessed by pressing CTRL.

On Compact consoles Window layouts are recalled by pressing CTRL and selecting one of the top soft buttons. There are also three physical Layout buttons, which together with SHIFT can select Layouts 1 to Layout 6.

3.9 Shift Functions

The MagicQ lighting console uses SHIFT and CTRL buttons to enable access to advanced features. There is a SHIFT button and a CTRL button adjacent to the top corners of the touch screen in addition to the keys on the keyboard.

The SHIFT button is used with the cursor keys to enable selection of multiple items in Windows.

The ALT button is used to access functions which are supported by physical buttons on some consoles but not on others. For example, ALT is used to access PAGE UP and PAGE DOWN on Compact and Stadium consoles.

3.10 The Programmer

All recording of show data is carried out using the Programmer. The Programmer takes priority over all playbacks, and channels. It can also be used during live running to override the outputs – for example, for changing the colour or gobo of intelligent heads.

The Programmer can be considered to be a table of channel level and active flags for each of the channels patched onto the console. Initially all channels are set to their default values. When a channel is changed, the channel level for that entry in the table is set to the new level and the channel is flagged as active.

The console outputs any channels that are marked as active in the Programmer at highest priority – i.e. they over-ride all other playbacks.

To clear the Programmer press CLEAR. All channels will be deactivated and all HTP channels will be set to zero. Depending on the "unused Channels return to defaults" setting, LTP channels will either stay at their current values or return to their defaults. It is possible to force all LTP channels to zero by using CTRL CLEAR.

The programmer can be set into a Blind mode using the BLIND button so that the contents of the programmer do not affect the output of the console. This allows programming adjustments to be made during a live show and special effects to be "busked" in.

3.11 Help

The Help Window enables the operating manual to be viewed on-line. Press the HELP button at any time to open the Help Window. To close the window, press the CLOSE button.

Use the scroll encoder, the cursor keys, and the hyperlinks to navigate through the manual. You can go directly to a particular section using the top soft buttons, e.g. CONTENTS, QUICK START or SHORT CUTS.

You can search through the manual by typing some text and pressing SEARCH. To search for the same words again, press SEARCH AGAIN.

The Help window also contains a VIEW COMMANDS view which logs all of the commands and console responses. It also has a VIEW LOGS which logs all the buttons, fader moves and events including MIDI, LTC and network events.

Chapter 4

MagicQ Layout

4.1 Physical layout

All MagicQ consoles are very similar - they differ mainly in the number of playback faders. The programming interface is consistent across the entire range of consoles. MagicQ software on PC and Mac mimics the layout of the physical buttons on the MagicQ Consoles - a choice of different Panels is available from the Panel Menu. The Full Panel mode mimics Compact consoles whilst the Stadium Panel modes mimic the Stadium consoles. It is possible to change between different panel views at any time - it does not affect the programmed show - it just determines what buttons, faders and encoders are available for programming and playback.



4.1.1 Touch Screen, Encoders & Soft Buttons

There are 8 rotary encoders placed around the main touch screen.

The buttons around the top and sides of the display referred to as soft buttons since their function changes according to the active window on the touch screen. The current function of a soft button is displayed on the touch screen. To select the function you can either press the screen or the soft button itself next to the screen, depending on the console model



The function of the rotary encoders changes according to the active window with the current function being displayed adjacent to the encoder.

There are ALT, SHIFT and CTRL buttons.

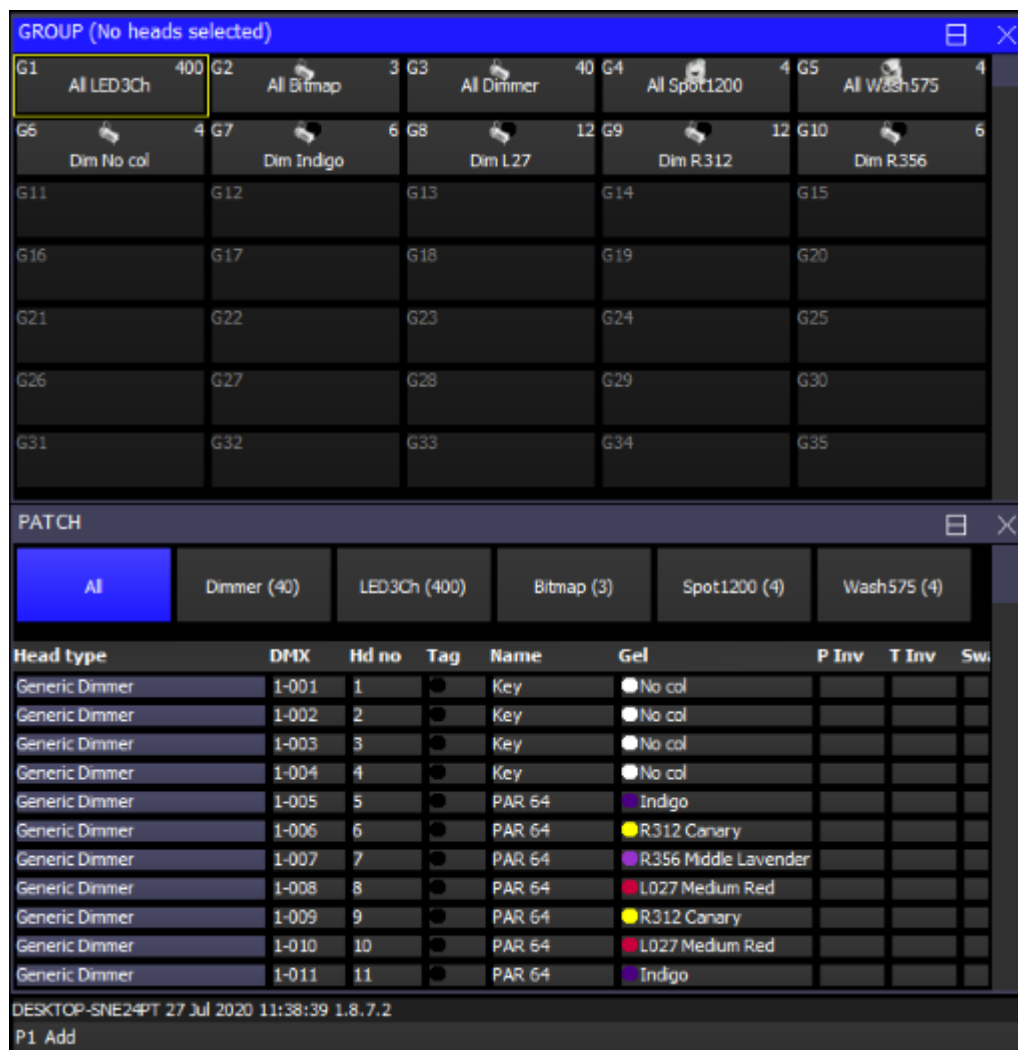
SHIFT is used for extra MagicQ programming functions.

CTRL is used for console settings such as setting screen brightness, console lamp brightness.

ALT is used to select alternative functions on MagicQ consoles that do not have a physical button for the particular function - the ALT function of a button is normally labelled on the panel.

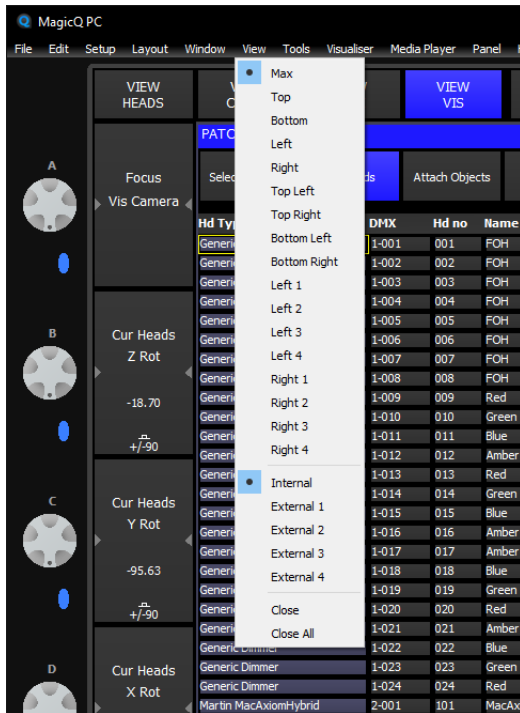
4.1.2 Main Windows

The area in the centre of the screen is the windows section in which the various control windows are displayed. There are three main types of windows – boxes style windows which have large boxes such as the Group Window, spreadsheet style editing windows such as the Patch Window, and free form windows such as the Plot, Colour Picker, and Timeline windows.



A window is displayed by pressing the appropriate window button. On MagicQ PC/Mac the window can be selected from the Window Menu from the toolbar. Changing window does not affect programming or playback.

Multiple windows can be displayed at one time by sizing and positioning the windows appropriately by clicking on the window title bar or using the SIZE button. On MagicQ PC/Mac the size and position can also be selected from the View Menu from the toolbar.



4.1.3 Layouts

Layouts specify a complete configuration of windows across one or more monitors.

Layouts can be selected using the Layout buttons - to select the Palettes layout (Groups, Positions, Colours and Beams) press the Layout 1 button.

On Stadium consoles the layout buttons are on the left side of the main touch screen. Use CTRL + the layout buttons to access more pages of Layouts.

On Compact consoles there are physical Layout 1, Layout 2 and Layout 3 buttons by the keypad. On these consoles SHIFT + Layout 1 gets Layout 4, SHIFT + Layout 2 gets Layout 5 and SHIFT + Layout 3 gets Layout 6. Press CTRL to access more layout buttons on the top soft buttons.



For more Layouts press ALT + CUE STACK to open the Layout Window. Layouts can be recorded to the Layout Window, named, moved and removed. When recording, the monitor mask can be chosen.

If the Layout Window is open full size on the first monitor then the Layout Window is not included in the Layout. In all other cases the Layout Window is included in the Layout.

4.1.4 Active Window

When a window button is pressed, that window becomes the active window. The active window is on the top of the screen and is easily identified as the window with the highlighted title bar at the top. It is also the window with the cursor in it.

An item in a window can be selected either

1. By pressing the touch screen over the appropriate part of the window
2. By moving the cursor to the appropriate position and pressing the ENTER button.
3. By moving the mouse to the position and pressing the left mouse button.

The cursor can be moved around the active window using the cursor keys in the Editor area of the console or via the cursor keys on the keyboard.

PG UP, PG DN, PG LEFT and PG RIGHT can be used to scroll the window in the appropriate direction. HOME and END can be used to get to the start and end of the window respectively.

On Stadium and Compact consoles the PG UP, PG DN, PG LEFT and PG RIGHT use ALT and the cursor keys.

On Stadium consoles HOME and END use ALT and HEAD and TIME respectively. On Compact consoles user ALT and LAYOUT 1 and LAYOUT 3.

On PC/Mac the contents of a Window can be printed to a printer or pdf file by selecting File, Print Window from the toolbar.

4.1.5 Window Sizing

MagicQ supports a Window Size dialogue box to enable the window position and window size to be selected directly with one press directly rather than stepping through all the possible window sizes and positions.

The window size dialog box can also be opened by double clicking on the title bar of the window that you wish to size. On MagicQ consoles the window size button SIZE opens the Window Size dialog box (ALT EXEC on Compact consoles, and ALT PATCH on Stadium consoles).

MagicQ allows sizing of windows to 1,2 or 3 rows when using the LEFT (1..4) and RIGHT (1..4) window sizes. By default they fill the left or right side automatically, but you can specify for each window whether they should be restricted to 1,2 or 3 rows.

If you only have LEFT (1..4) windows opened then they will automatically spread across the whole width - so you can choose the left column, right column or whole width.

The windows sizes and positions are stored/recalled in Layouts and also in the show file.

4.1.6 Support for Find in MagicQ windows

MagicQ supports a Find function which searches the text fields in the current focused Window.

On the toolbar select Edit, Find or press the short cut key CTRL F. Alternatively on consoles press CTRL and CURSOR RIGHT. Then enter the text to search for. The find can also be invoked by entering text on the command line and then using any of the previous methods to start the Find operation.

To search again forwards press CTRL and CURSOR RIGHT. To search again backwards press CTRL and CURSOR LEFT.

The CTRL F shortcut only works on PC/Macs when MagicQ Keyboard Mode is set to Normal. In all other MagicQ Keyboard Modes the CTRL and keyboard keys open MagicQ windows.

4.1.7 Support for Cut and Paste in MagicQ windows

Cut and paste is supported within MagicQ windows and between different MagicQ windows. It can also be used on PC and Macs to copy between MagicQ and other applications, making an easy way to transfer data in and out of MagicQ.

The keyboard shortcuts CTRL C and CTRL V can be used to cut and paste within MagicQ PC.

On consoles hold CTRL and press COPY for copy. Hold CTRL and press UPDATE to paste.

Multiple cells can be cut and pasted at a time.

4.1.8 Status and Display Windows



Towards the bottom of the touch screen are two small windows, the Status Display and the Input Display. The Status Display shows the current date and time, the ADD / SWAP status of the console and other relevant status information.

The status window also shows warnings - for example if *INVALID NET* is seen here this indicates MagicQ has been setup to output via Network e.g. Art-Net and that MagicQ's IP address has been set differently to the PC's network adapter.

```
DESKTOP-SNE24PT 27 Jul 2020 17:47:55 1.8.7.2
P1 Add Inv Net
```

The Input Display shows the data that has been currently entered through the keypad and the keyboard. Note that text is not entered into the main Windows until ENTER is pressed. This allows the user to choose whether the keyboard data is SET into fields in the windows or onto Playbacks.

```
Programmer cleared
>
```

After a command has been entered it also confirms that the command has been accepted and shows any error messages when a command is not possible.

4.1.9 Head Control

The area around the two large rotary encoders is referred to as the head control area. It is used to alter the parameters of individual heads and apply effects such as fans over groups of heads.



The NEXT HEAD and PREV HEAD buttons are used to select an individual head to modify.

The other buttons control the selection mode; LOCATE, HIGHLIGHT, FAN, SINGLE, ODD/EVEN, and ALL.

4.1.10 Editor Buttons



The Editor buttons are used to modify program data. The 8 buttons on the right hand side are the action buttons which are used to modify show data. The action buttons are UNDO, REMOVE, MOVE, COPY, SET, INCLUDE, UPDATE, and RECORD.

The buttons on the left:

BLIND and CLEAR affect the programmer

REL and SELECT affect playbacks

SHIFT selects alternate functions

←- undoes keyboard input and clears actions

4.1.11 Playback

The Playback area is situated directly below the touch screen and consists of 10 playbacks each with a fader and four buttons (FLASH, GO, STOP, SELECT). The area above each of the playbacks on the touch screen is used to provide information about the status of the playback.



The playback area also contains a Grand Master, a Sub Master, Page Select buttons and a Manual Playback for taking control of Cue Stacks.

The cross fade section contains a GO, STOP, FWD, BCK buttons, a cross fader and a master GO button. The cross fade section controls the current playback selected with the S button.

On the MQ500 there are 15 fader playbacks and 15 execute playbacks above them.

4.2 Keyboard, Keypad, Select & Confirm Windows

MagicQ has a set of additional on-screen Windows that can be used to enter text, select items and confirm actions. You can choose whether you use the physical keyboard/keypad to navigate around these items or whether you use the mouse/touch.

To open the Keyboard Window at any time press SET SET. To open the icon selector press SHIFT + SET.

Confirm Windows are shown when you carry out important actions that may overwrite or delete show data. You can confirm an action by pressing 1 on the keypad. To cancel the action press 0 on the keypad.

4.3 Common Actions

MagicQ utilises many common actions for carrying out programming functions. All the actions use similar button presses. Once you understand the action in one Window, you will understand how it is done in another Window.

We strongly recommend you make yourself familiar with these actions – they will save you valuable programming time.

4.3.1 Items

Actions in a Window can be carried out on individual items or on multiple items. For actions on a single item, use the cursor keys to move around the Window so that the cursor is over the required item.

For multiple items in a Window, move the cursor to the first item. Then press and hold the SHIFT button whilst moving the cursor to the last item. All the items will be highlighted.

Alternatively hold the CTRL button and select multiple individual items.

In spreadsheet style Windows (e.g. Patch) pressing the touch screen or left clicking on the item with the mouse moves the cursor to the item. You can highlight multiple Window items by pressing the touch screen and moving the touch across multiple items.

In boxes style Windows (e.g. Group), pressing the touch screen or left clicking performs the function associated with the item (e.g. recalls that Group). In these Windows use SHIFT or CTRL and the cursor keys to highlight multiple boxes.

4.3.2 Setting the value of items

To set the value of one or more items in a spreadsheet style window:

- Move the cursor over the item (s)
- Enter a value on the keypad and press ENTER.

OR

- Type in the value on the keypad
- Press the touch screen / click / ENTER over the item.

For items that have a simple value of yes or no if you do not enter a value on the keypad then the value will toggle. For items that have multiple values double click on the field for a list of values. On the touch screen select the field and then press anywhere in the Input Display (right side area underneath the main window) to bring up the list of values.

Items that are coloured darker are read only and therefore cannot be set.

4.3.3 Naming items

- Press the SET button
- Press the touch screen / click / ENTER over the item to name.
- Enter the name on the external or on screen keyboards

When working in spreadsheets style windows with an external keyboard it is not necessary to press the SET button in the above sequence - you can edit the spreadsheet like any other, just by moving to the appropriate box and entering text on the keyboard.

To name multiple items it is often easier to highlight the items before pressing SET. If you press SET immediately after highlighting multiple items then the console will assume that these are the items you wish to set.

You can also press SET instead of pressing ENTER in the above sequences.

4.3.4 Moving items

- Press the MOVE button.
- Press the touch screen / click / ENTER over the source item.
- Press the touch screen / click / ENTER over the destination item.

You can also press MOVE instead of pressing ENTER in the above sequences.

To move multiple items it is often easier to highlight the items before pressing MOVE. If you press MOVE immediately after highlighting multiple items then the console will assume that these are the source items and will only prompt for the destination. You can hold SHIFT or CTRL to highlight multiple items.

From 1.7.6.4 MagicQ supports dragging to move items within Windows. Press SHIFT + MOVE to enter Drag Move mode. Items can then be dragged and dropped within windows. Drag Move mode will continue until MOVE is pressed again, or BACKSPACE is pressed.

The MOVE button flashes when in Drag Move mode.

4.3.5 Copying items

- Press the COPY button.
- Press the touch screen / click / ENTER over the source item.
- Press the touch screen / click / ENTER over the destination item.

You can also press COPY instead of pressing ENTER in the above sequence.

To copy multiple items highlight it is often easier to highlight the items before pressing COPY. If you press COPY immediately after highlighting multiple items then the console will assume that these are the source items and will only prompt for the destination. You can hold SHIFT or CTRL to highlight multiple items.

When copying Cues, Cue Stacks or Pages the console by default does not make individual copies of the Cues - the Cue Stacks link to the same Cues. To copy unlinked (i.e. to create new Cues) then press SHIFT and COPY in the above sequence and select Unlinked.

4.3.6 Removing items

- Press the REMOVE button.
- Press the touch screen / click / ENTER over the item to remove.

To remove multiple items highlight it is often easier to highlight the items before pressing REMOVE. If you press REMOVE immediately after highlighting multiple items then the console will assume that you wish to remove the highlighted items.

You can also press REMOVE instead of pressing ENTER in the above sequence.

4.3.7 Recording items

In boxes style windows it is possible to record an item (e.g. in the Group Window, to record a group):

- Press the RECORD button.
- Press the touch screen / click / ENTER over the item to record.

You can also press RECORD instead of pressing ENTER in the above sequence.

4.4 Icons

MagicQ supports icons for all programmed items. The size of the icons can be set in the Window Settings in the Setup Window.

Icons can be used on Groups, Colours, Beams, Positions, Cues, Cue Stacks and in the Execute Window.

To set an icon for a Window item (e.g. a Palette Entry) press SHIFT SET. Press the touch screen / click / ENTER over the item to set an icon for. This will open the Icon library. The Icon library is split into different types of Icons for colours, positions and different types of gobos.

Select the icon from the icon library.

4.4.1 Actions on Playbacks

Actions on playbacks are similar to window items except that the S buttons are used instead of window items.

To select a Playback, press the S button for the appropriate Playback.

To record a Playback, press RECORD, then press the S button for the appropriate Playback.

To name a Playback press SET, then press the S button for the Playback. Enter the name using the on screen keyboard or the external keyboard.

To move a Playback, press MOVE, then press the S button for the source Playback and then press the S button for the destination Playback.

To copy a Playback, press COPY, then press the S button for the source Playback and then press the S button for the destination Playback.

To include the contents of a Playback into the Programmer, press INCLUDE, then press the S button for the destination Playback.

To remove a Playback, press REMOVE, then press the S button for the Playback. Press the S button again to confirm the remove.

Chapter 5

Quick Start

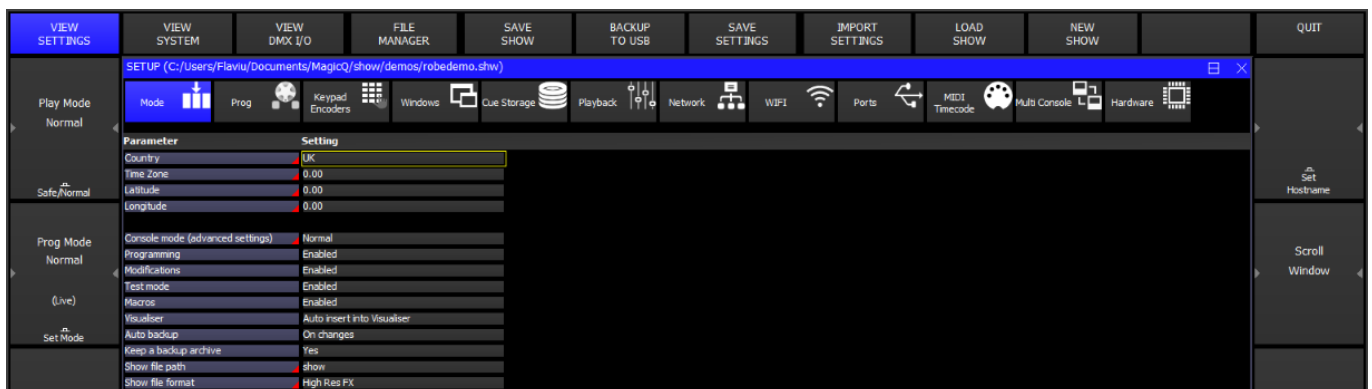
5.1 Starting up MagicQ

On MagicQ consoles hold the power button on the rear panel. On MagicQ PC and Mac click on the MagicQ application icon.

On start up you are presented with an option to load demo shows or to continue the last show. Selecting last show will load and run the last show used on the system. This option can be hidden for subsequent start ups.

The console remembers all windows that were open when the console was last used. To close all windows press SHIFT and CLOSE.

Press SETUP to open the Setup Window.



5.2 Calibrating the Touch Screen

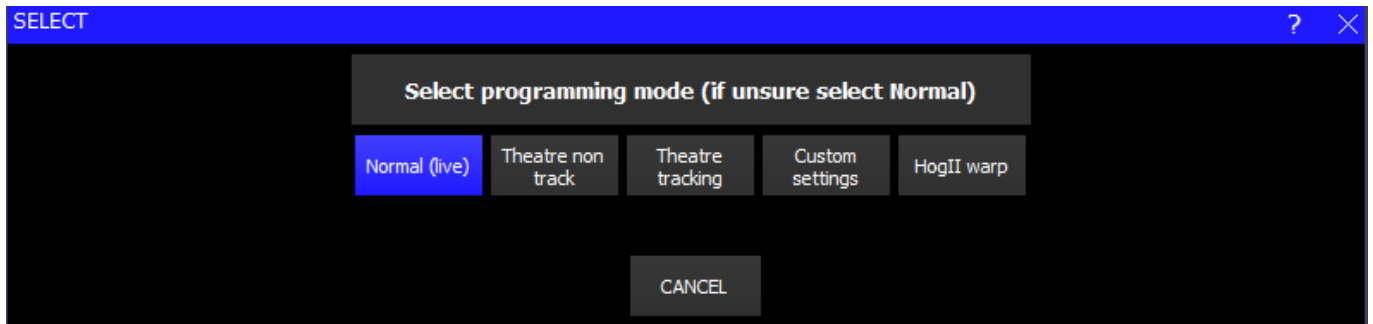
On MagicQ consoles if the touch screen does not seem to be responding to your touch correctly then you may need to calibrate the touch screen.

Press the SETUP button to open the Setup Window. Press the CAL TOUCH soft button. When asked for confirmation press 1 on the keypad or press the CAL TOUCH soft button again.

Calibration works by finding the bottom left and top right corners of the screen. First press the bottom left of the touch screen and then the top right. You may wish to use a fine but blunt object.

The shortcut CTRL + SET can be used to open the Calibrate window at any time.

5.3 Starting a New Show



To start a new show, go to the Setup Window and press the NEW SHOW soft button. This will clear the current show from memory – shows that have been previously saved to disc will not be affected. You will be asked to confirm by selecting YES.

There is a choice of six modes.

- Live (Chase) - Faders activate Cue Stacks. When recording, all data in the programmer is stored in recorded cues. When recording multiple cues on playbacks – defaults to chase timing.
- Live (Cue Stack)- Faders activate Cue Stacks. When recording, all data in the programmer is stored in recorded cues. When recording multiple cues on playbacks – defaults to Cue timing.
- Theatre non- track- Faders operate levels only. When recording, all data in the programmer is stored in recorded cues. When recording multiple cues on playbacks – defaults to cue timing
- Theatre tracking - faders operate levels only. When recording only data in the programmer that has changed since the last record is stored in recorded cues.
- Hog II warp – Like Theatre Tracking but with some extra features to make the programming more familiar to Hog II users. When recording multiple cues on playbacks – defaults to cue timing
- Custom Settings- Allows the user to select settings saved on another show file. In Theatre and Hog II modes, heads return to their default values when not under control of a playback or the programmer. The keypad is set up to enable selection of Palettes using Palette numbers, and Cue Stack timing defaults to being stepped timing rather than chase timing.

The mode can be changed at any time by using the Programming Mode soft button in the Setup Window. In addition each individual option / default value can be customised by the user and saved as their personal settings file.

Starting a show clears all patching, all programming and all palettes. It does not clear console specific options such as the configuration of the DMX outputs or the calibration of the touch screen.

See <_programming_mode,Programming Mode> for more details.

5.4 Enabling Outputs

VIEW SETTINGS	VIEW SYSTEM	VIEW DMX I/O	NET MANAGER		SET UNIVERSES		ZONE		TAKE CONTROL		RELEASE CONTROL		GRAB SHOW		INHIBIT ALL		QUIT	
SETUP (C:/Users/Flaviu/Documents/MagicQ/show/demos/chauvetdemo.shw)																		
Play Mode	Uni	Name	Status	Out Type	Out Uni	In Type	In Uni	Test	Copy	Visualiser	Hot T/O	Unicast	Unicast2	Zone	In last rx	In last change	In last byte	In ms
	1	Main Rack	Disabled	Art-Net	Art 0	Art-Net	Art 0	None	No	MagicVis	No	Broadcast	Broadcast	1	0.00s	0.00s	0	0.00s
Normal	2	Truss 1	Disabled	Art-Net	Art 1	Art-Net	Art 1	None	No	MagicVis	No	Broadcast	Broadcast	1	0.00s	0.00s	0	0.00s
	3	Truss 2	Disabled	Art-Net	Art 2	Art-Net	Art 2	None	No	MagicVis	No	Broadcast	Broadcast	1	0.00s	0.00s	0	0.00s
Safe/Normal	4		Enabled	Art-Net	Art 3	Art-Net	Art 3	None	No	MagicVis	No	Broadcast	Broadcast	1	0.00s	0.00s	0	0.00s
	5		Enabled	Art-Net	Art 4	Art-Net	Art 4	None	No	MagicVis	No	Broadcast	Broadcast	1	0.00s	0.00s	0	0.00s
Prog Mode	6		Enabled	Art-Net	Art 5	Art-Net	Art 5	None	No	MagicVis	No	Broadcast	Broadcast	1	0.00s	0.00s	0	0.00s
	7		Enabled	Art-Net	Art 6	Art-Net	Art 6	None	No	MagicVis	No	Broadcast	Broadcast	1	0.00s	0.00s	0	0.00s
Normal	8		Disabled	Art-Net	Art 7	Art-Net	Art 7	None	No	MagicVis	No	Broadcast	Broadcast	1	0.00s	0.00s	0	0.00s
	9		Disabled	Art-Net	Art 8	Art-Net	Art 8	None	No	MagicVis	No	Broadcast	Broadcast	1	0.00s	0.00s	0	0.00s
(Live)	10		Disabled	Art-Net	Art 9	Art-Net	Art 9	None	No	MagicVis	No	Broadcast	Broadcast	1	0.00s	0.00s	0	0.00s
	11		Disabled	Art-Net	Art 10	Art-Net	Art 10	None	No	MagicVis	No	Broadcast	Broadcast	1	0.00s	0.00s	0	0.00s
Set Mode	12		Disabled	Art-Net	Art 11	Art-Net	Art 11	None	No	MagicVis	No	Broadcast	Broadcast	1	0.00s	0.00s	0	0.00s
	13		Disabled	Art-Net	Art 12	Art-Net	Art 12	None	No	MagicVis	No	Broadcast	Broadcast	1	0.00s	0.00s	0	0.00s
User Default	14		Disabled	Art-Net	Art 13	Art-Net	Art 13	None	No	MagicVis	No	Broadcast	Broadcast	1	0.00s	0.00s	0	0.00s
	15		Disabled	Art-Net	Art 14	Art-Net	Art 14	None	No	MagicVis	No	Broadcast	Broadcast	1	0.00s	0.00s	0	0.00s
Set User	16		Disabled	Art-Net	Art 15	Art-Net	Art 15	None	No	MagicVis	No	Broadcast	Broadcast	1	0.00s	0.00s	0	0.00s
	17		Disabled	Art-Net	Art 16 (1-0)	Art-Net	Art 16 (1-0)	None	No	MagicVis	No	Broadcast	Broadcast	1	0.00s	0.00s	0	0.00s
TC SIM	18		Disabled	Art-Net	Art 17 (1-1)	Art-Net	Art 17 (1-1)	None	No	MagicVis	No	Broadcast	Broadcast	1	0.00s	0.00s	0	0.00s
	19		Disabled	None						None	No							
Off	20		Disabled	None						None	No							
	21		Disabled	None						None	No							
On/Off	22		Disabled	None						None	No							
	23		Disabled	None						None	No							
	24		Disabled	None						None	No							
	25		Disabled	None						None	No							
	26		Disabled	None						None	No							
	27		Disabled	None						None	No							
DESKTOP-SNE24PT 27 Jul 2020 17:37:12 1.8.7.2																		
P1 Add A Inv Net																		
Set Ext TC																		

To enable output of channel data select the DMX IO VIEW in the Setup Window. This window enables modification of the inputs and outputs for all the universes. MagicQ consoles support DMX directly from the console or via an external Ethernet to DMX convertor. On MagicQ PC or Mac you can output via USB to DMX interfaces (such as MagicDMX) or via DMX outputs from the Wings.

5.4.1 Using Direct DMX Outputs

All current MagicQ consoles have DMX output ports directly on the rear panel.

The four DMX outputs on the rear panel automatically output universes 1 to 4 unless they are configured otherwise. The DMX will be output regardless of the "Status" enabled or disabled in the Setup DMX I/O window. On Pro consoles there is a green LED on the rear panel that indicates when DMX is being output.

If you wish to choose alternative universes to be output to the four DMX outputs on the rear panel then you will need to configure the outputs manually. For each of the Universes you wish to output on the rear panel, select Out Type as "MagicQ Direct" and Port 1, Port 2, Port 3 and Port 4 and enable the universes.

The picture below shows the direct ports to output Universes 5 to 8.

VIEW SETTINGS	VIEW SYSTEM	VIEW DMX I/O	NET MANAGER		SET UNIVERSES		ZONE		TAKE CONTROL	RELEASE CONTROL	GRAB SHOW	INHIBIT ALL	QUIT					
<div>Play Mode</div> <div>Normal</div> <div>Safe/Normal</div> <div>Prog Mode</div> <div>Normal</div>	SETUP (C:/Users/Flaviu/Documents/MagicQ/show/demos/chauvetdemo.shw)													<div>⊞</div> <div>✕</div>				
	Uni	Name	Status	Out Type	Out Uni	In Type	In Uni	Test	Copy	Visualiser	Hot T/O	Unicast	Unicast2	Zone	In last rx	In last change	In last byte	In ms
	1		Enabled	Art-Net	Art 0	Art-Net	Art 0	None	No	MagicVis	No	Broadcast	Broadcast	1	0.00s	0.00s	0	0.00s
	2		Enabled	Art-Net	Art 1	Art-Net	Art 1	None	No	MagicVis	No	Broadcast	Broadcast	1	0.00s	0.00s	0	0.00s
	3		Enabled	Art-Net	Art 2	Art-Net	Art 2	None	No	MagicVis	No	Broadcast	Broadcast	1	0.00s	0.00s	0	0.00s
	4		Enabled	Art-Net	Art 3	Art-Net	Art 3	None	No	MagicVis	No	Broadcast	Broadcast	1	0.00s	0.00s	0	0.00s
	5		Enabled	Art-Net	Art 4	Art-Net	Art 4	None	No	MagicVis	No	Broadcast	Broadcast	1	0.00s	0.00s	0	0.00s
	6		Enabled	Art-Net	Art 5	Art-Net	Art 5	None	No	MagicVis	No	Broadcast	Broadcast	1	0.00s	0.00s	0	0.00s
	7		Enabled	Art-Net	Art 6	Art-Net	Art 6	None	No	MagicVis	No	Broadcast	Broadcast	1	0.00s	0.00s	0	0.00s
	8		Disabled	Art-Net	Art 7	Art-Net	Art 7	None	No	MagicVis	No	Broadcast	Broadcast	1	0.00s	0.00s	0	0.00s
	9		Disabled	Art-Net	Art 8	Art-Net	Art 8	None	No	MagicVis	No	Broadcast	Broadcast	1	0.00s	0.00s	0	0.00s
	10		Disabled	Art-Net	Art 9	Art-Net	Art 9	None	No	MagicVis	No	Broadcast	Broadcast	1	0.00s	0.00s	0	0.00s

5.4.2 Using Outputs via network

MagicQ supports output via the network ports using Art-Net, Pathport or ACN Streaming DMX.

To output Art-Net on a Universe enable it and ensure that the output type is set to Art-Net. Choose which Art-Net Universe you wish to Output the MagicQ Universe on. MagicQ defaults to outputting MagicQ universe 1 on the first Art-Net Universe (Art 0-0).

If you are using Ethernet to DMX512 conversion boxes then you will need to configure the boxes to respond to the correct Art-Net sub-net and Art-Net universe.

With ChamSys SnakeSys B4 or R4 you need to set up the two rotary switches to the correct values – the left one for Art-Net sub-net and the right one for Art-Net universe. The interface will then decode the four Art-Net universes starting from that Art-Net subnet and universe.

In most networks the Art-Net sub-net is set to 0. If you are using only one Ethernet to DMX512 interface then you can normally use subnet 0 universe 0.

If you are using multiple Ethernet Interfaces then you will need to set each Ethernet Interface to a different Art-Net Universe – for example when using two ChamSys SnakeSys B4 Interfaces set the first Interface to Art-Net Universe 0 and the second one to Art-Net Universe 4.

MagicQ includes a DMX viewer for monitoring Art-Net on the Network – select Tools, DMX View.

5.5 Connecting a MagicQ Playback Wing

To connect a MagicQ Playback or Extra Wing, simply connect the Wing to the MagicQ console via USB. In the Setup Window, View System, View Wings set the first Wing to be type USB Wing.

By default the Playback Wings are set so that the Wings change page when the Next Page / Prev Page button are pressed on the MagicQ console. It is possible to make the Wings operate completely independently of the main MagicQ console by changing the "Lower Bank Tie" and "Upper Bank Tie".

To use multiple Playback Wings simply connect them and change the type to USB wing. Note not all Wings connect to all MagicQ consoles. The Stadium Connect can only connect to a computer, and the MQ500M Stadium Wing, only connects to the MQ500M.

5.5.1 Setting Playback Wing IDs

When using MagicQ consoles with multiple Playback / Extra Wings (or multiple Execute Wings) a Wing ID can be set for each Wing. The required wing ID can then be set in Setup, View Wings to ensure that the Wings are identified correctly and control the correct Playbacks.

Hold down the lower NEXT PAGE and PREV PAGE buttons when powering on the Wing to get into the Wing config mode. From the menus you can then set a Wing ID.

All Extra Wing Compacts, and Extra Wings and Playback Wings manufactured since 2012 support setting of Wing ID. Older Extra Wings including those with yellow displays do not support Wing ID.

5.6 Connecting External Monitors

MagicQ consoles have DVI or HDMI connectors for connecting external monitors. The monitor should be plugged in before starting the console.



5.7 Patching

Open the Patch Window by pressing the PATCH button. The Patch Window has four views, VIEW HEADS, VIEW CHANS, VIEW DMX and VIEW VIS. In this section we describe patching in VIEW HEADS.

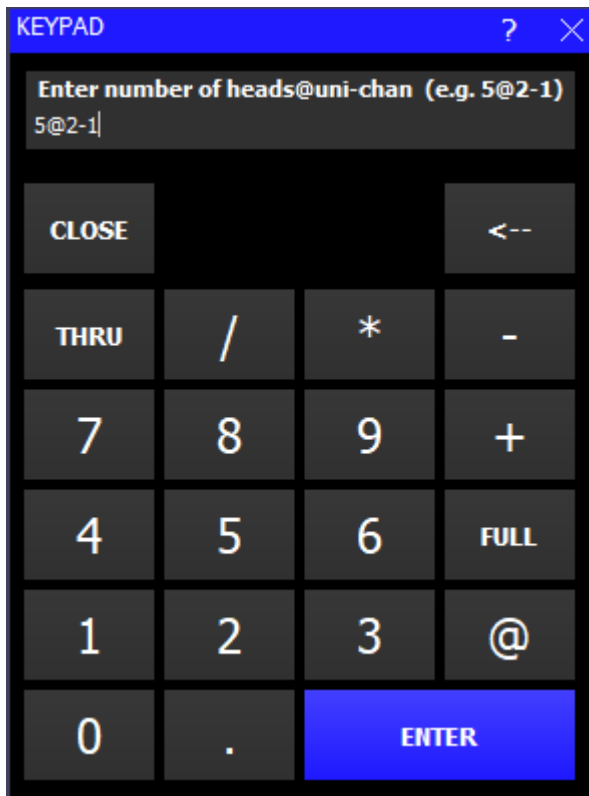


Choose the fixture you wish to patch by pressing the CHOOSE HEAD soft button. The Window will change to give you a list of manufacturers and fixtures. Select a fixture by pressing the touch screen. Alternatively scroll around the Window using the cursor keys, and press ENTER when the cursor is over the correct fixture.

Once you have chosen the fixture, a window will view different mode options. Select the correct mode the fixture is being used in.



You will then be returned to the Patch Window. Press the PATCH IT soft button to patch the fixture. You will be prompted for the number of fixtures you wish to patch and the universe and address where you wish to patch them to. Use @ to patch at a specific universe and address.



For example to patch 12 Chauvet Professional Maverick MK3 Spots in advanced (39 channels) mode, at universe 1 start address 1:

12 @ 1 - 1

If you wish to patch multiple channels at fixed offsets e.g. 3 Chauvet Professional Maverick Silens 2 Profiles on universe 2, with an offset of 35 channels between each fixture:

3 @ 2 - 1 / 35

Patching multiple fixtures in any of the theatre modes is slightly different. When starting a new show, if you choose ‘Theatre Track’ or ‘Theatre non track’ some of the programming settings will change. patching requires the fixture (or head) number @ universe number – channel number. For e.g. if you wanted to patch in 3 standard dimmers, on universe 1 and start channel 1 you would use the THRU button and type in the following: 3 > 1@1-1

VIEW HEADS	VIEW CHANS	VIEW DMX	VIEW VIS	CHOOSE HEAD	CHOOSE DIM/MEDIA	PATCH IT	EDIT HEAD	CURVE EDITOR	IMPORT USITT	IMPORT HEADS	EXPORT HEADS		
	PATCH (Martin Mac250 Mode 4 free 1-041 [Martin_Mac250_Mode 4.hed])												
Universe 1	DMX	Head type	Attrib	Chan name	Hid no	Min	Max	Curve	Invert	Merge	From	Type	16bit
	1-001	Generic Dimmer	No col	Key	1	0%	100%	Linear	no	Norm	HTP	no	
	1-002	Generic Dimmer	No col	Key	2	0%	100%	Linear	no	Norm	HTP	no	
	1-003	Generic Dimmer	No col	Key	3	0%	100%	Linear	no	Norm	HTP	no	
	1-004	Generic Dimmer	No col	Key	4	0%	100%	Linear	no	Norm	HTP	no	
	1-005	Generic Dimmer	Indigo	PAR 64	5	0%	100%	Linear	no	Norm	HTP	no	
	1-006	Generic Dimmer	R312	PAR 64	6	0%	100%	Linear	no	Norm	HTP	no	
	1-007	Generic Dimmer	R356	PAR 64	7	0%	100%	Linear	no	Norm	HTP	no	
	1-008	Generic Dimmer	L27	PAR 64	8	0%	100%	Linear	no	Norm	HTP	no	
	1-009	Generic Dimmer	R312	PAR 64	9	0%	100%	Linear	no	Norm	HTP	no	
	1-010	Generic Dimmer	L27	PAR 64	10	0%	100%	Linear	no	Norm	HTP	no	
	1-011	Generic Dimmer	Indigo	PAR 64	11	0%	100%	Linear	no	Norm	HTP	no	
	1-012	Generic Dimmer	R312	PAR 64	12	0%	100%	Linear	no	Norm	HTP	no	
	1-013	Generic Dimmer	R356	PAR 64	13	0%	100%	Linear	no	Norm	HTP	no	

To patch a dimmer, simply press CHOOSE DIM/MEDIA, select Generic Dimmer and then patch one or more dimmers as above.

In the Patch Window there are columns that can be configured, such as the DMX address, head name and head number. To modify, select the data in one of the columns, then input the new value using the keypad, and press ENTER.

5.7.1 Naming and Numbering Fixtures

Once you have patched all the Fixtures you can then name and number them as you wish. It is recommended that you name the dimmer or the fixture based on its location (e.g. front wash / back truss SL). For dimmers you may wish to configure the gel. This makes programming easier – enabling the console to auto program cues for you.

PATCH

AI

Dimmer (24)

RogueR2Wash (6)

NexusAQ5x5 (625)

RogueR1Beam (8)

Bitmap (3)

MavMK2Spot (12)

Head type	DMX	Hd no	Tag	Name	Gel	P Inv	T Inv	Swap	Merge	From	P Off	T Off	(256-----1)	Shape	Angle	Hang type	Ind Ele
Generic Dimmer	1-001	1	●	FOH	● No col				Norm				000000001	Profile	20 deg	Normal	
Generic Dimmer	1-002	2	●	FOH	● No col				Norm				000000010	Profile	20 deg	Normal	
Generic Dimmer	1-003	3	●	FOH	● No col				Norm				000000011	Profile	20 deg	Normal	
Generic Dimmer	1-004	4	●	FOH	● No col				Norm				000000100	Profile	20 deg	Normal	
Generic Dimmer	1-005	5	●	FOH	● No col				Norm				000000101	Profile	20 deg	Normal	
Generic Dimmer	1-006	6	●	FOH	● No col				Norm				000000110	Profile	20 deg	Normal	
Generic Dimmer	1-007	7	●	FOH	● No col				Norm				000000111	Profile	20 deg	Normal	
Generic Dimmer	1-008	8	●	FOH	● No col				Norm				000001000	Profile	20 deg	Normal	
Generic Dimmer	1-009	9	●	Red	● L026 Bright Red				Norm				000001001	None	Default	Normal	
Generic Dimmer	1-010	10	●	Green	● L026 Bright Red				Norm				000001010	None	Default	Normal	
Generic Dimmer	1-011	11	●	Blue	● L026 Bright Red				Norm				000001011	None	Default	Normal	
Generic Dimmer	1-012	12	●	Amber	● L026 Bright Red				Norm				000001100	None	Default	Normal	
Generic Dimmer	1-013	13	●	Red	● L124 Dark Green				Norm				000001101	None	Default	Normal	
Generic Dimmer	1-014	14	●	Green	● L124 Dark Green				Norm				000001110	None	Default	Normal	
Generic Dimmer	1-015	15	●	Blue	● L124 Dark Green				Norm				000001111	None	Default	Normal	
Generic Dimmer	1-016	16	●	Amber	● L124 Dark Green				Norm				000010000	None	Default	Normal	
Generic Dimmer	1-017	17	●	Amber	● L105 Orange				Norm				000010001	None	Default	Normal	
Generic Dimmer	1-018	18	●	Blue	● L105 Orange				Norm				000010010	None	Default	Normal	
Generic Dimmer	1-019	19	●	Green	● L105 Orange				Norm				000010011	None	Default	Normal	
Generic Dimmer	1-020	20	●	Red	● L105 Orange				Norm				000010100	None	Default	Normal	
Generic Dimmer	1-021	21	●	Amber	● L721 Berry Blue				Norm				000010101	None	Default	Normal	
Generic Dimmer	1-022	22	●	Blue	● L721 Berry Blue				Norm				000010110	None	Default	Normal	
Generic Dimmer	1-023	23	●	Green	● L721 Berry Blue				Norm				000010111	None	Default	Normal	
Generic Dimmer	1-024	24	●	Red	● L721 Berry Blue				Norm				000011000	None	Default	Normal	
Chauvet MavMK2Spot Advanced	2-001	25	●	MavMK2Spot	● Mix	no	no	no	Norm				000000001	None	Default	Normal	
Chauvet MavMK2Spot Advanced	2-033	26	●	MavMK2Spot	● Mix	no	no	no	Norm				000100001	None	Default	Normal	
Chauvet MavMK2Spot Advanced	2-065	27	●	MavMK2Spot	● Mix	no	no	no	Norm				001000001	None	Default	Normal	
Chauvet MavMK2Spot Advanced	2-097	28	●	MavMK2Spot	● Mix	no	no	no	Norm				001100001	None	Default	Normal	

The gel field uses gel numbers. For Lee colours enter the gel number directly (e.g. 181 for Lee 181). For Rosco colours enter the gel number preceded by a dot (e.g. .14 for Rosco 14). For no colour enter 0. If you would prefer to use colour names rather than gel numbers then simply enter the colour name.

To test a patched head or dimmer, simply press the TEST MODE soft button (soft button encode C) and the head which the cursor is over will be tested. For heads it locates the whole head; for dimmers it sets the dimmer to 100%. Press the TEST MODE soft button again to turn test mode off.

5.8 Controlling Heads

5.8.1 Selecting Heads

In order to control intelligent heads it is necessary to be able to select which heads to use. The MagicQ console keeps track of the currently selected heads to enable it to determine which heads to apply changes to. The operator can select head individually or can use groups to recall configurations of heads that are used frequently.

In "Hog Warp" mode or when the Setup option "Keypad always selects head is set" you can select heads from the keypad – for instance to select heads 1 through 4.

1 THRU 4 ENTER

In other modes, you can select the heads using

1 THRU 4 @ @

5.8.2 Selecting heads from the Group/Heads Window

The console automatically generates a group for all the heads of a particular head type. In addition new groups can easily be recorded.

The Group Window has two views. VIEW GROUPS enables selection of heads using groups whilst VIEW HEADS enables individual selection of heads.

In VIEW GROUPS, pressing the touch screen for a particular group selects all the heads associated with that group. All other heads are deselected. To select multiple groups, press SHIFT and a group to toggle the group in and out of selection.

In VIEW HEADS, individual heads are selected / deselected by pressing the touch screen. Use PG UP and PG DN to scroll through the heads.

5.8.3 Recording a Group

Select the heads you want in a group using keypad selection or in the VIEW HEADS view of the Group Window.

Change to the VIEW GROUPS view.

Press RECORD and then select the group you wish to record either by pressing the touch screen or by using the cursor keys and then pressing ENTER.

5.9 Naming a Group

When recording a group, if you key in a name before pressing the touch screen (or pressing ENTER) then the group will be named at the same time as it is recorded.

You can name a group at any time by keying in the name, pressing SET, and pressing the touch screen.

If you do not have a keyboard then press SET and select the group to name by pressing the touch screen (or using cursor keys and ENTER). A keyboard window will be displayed for you to enter the name on screen.

5.10 Recalling a Group

Once a group has been recorded then pressing the touch screen for the group will make all the heads in the group selected. All other heads will be deselected. Use SHIFT to select multiple groups. There is a Setup option to allow the user to default to selecting multiple groups.

5.11 Setting Levels for Dimmers

From the keypad you can enter commands such as

1 @ 50 ENTER

1 THRU 4 @ FULL ENTER

It is also possible to use the Intensity Window by pressing the INT button. This window displays a fader for each dimmer and head patched onto the console. Pressing the slider part of the fader sets the appropriate level. When a fader is moved from 0 the channel in the programmer is activated – and the fader will turn red.

The Window has two views, View Prog and View Preset – faders changed in the Prog View affect the intensity levels in the programmer and are recorded into Cues. Faders changed in the Preset View are like traditional "one per channel" preset faders on older lighting consoles – this enables levels on channels to be set without affecting programming. This is equivalent to "Parking" on other consoles.

The SQUARE OFF soft button enables fast programming of intensities. Using the touch panel select the channels you wish to have at full and at zero – but don't bother being exactly accurate with the level of the selection. Pressing SQUARE OFF finishes the job by setting all channels that are less than 50% to 0 whilst setting channels above 50% to full.

Use the ALL TO FULL and ALL TO ZERO buttons to change the level of all the channels.

Press the CLEAR soft button to clear the programmer.



5.12 Locating Heads

The first action you are likely to want to do is to locate the heads – i.e. to put them into a starting position. Select the required heads and then press the LOCATE button. Locating a head brings all the attributes for that head into the programmer.

If the heads enable DMX control of the striking of the lamp then you may need to "Lamp On" the head in order to see the beam. Select the heads and then press SHIFT LOCATE. This runs the "Lamp On" macro.

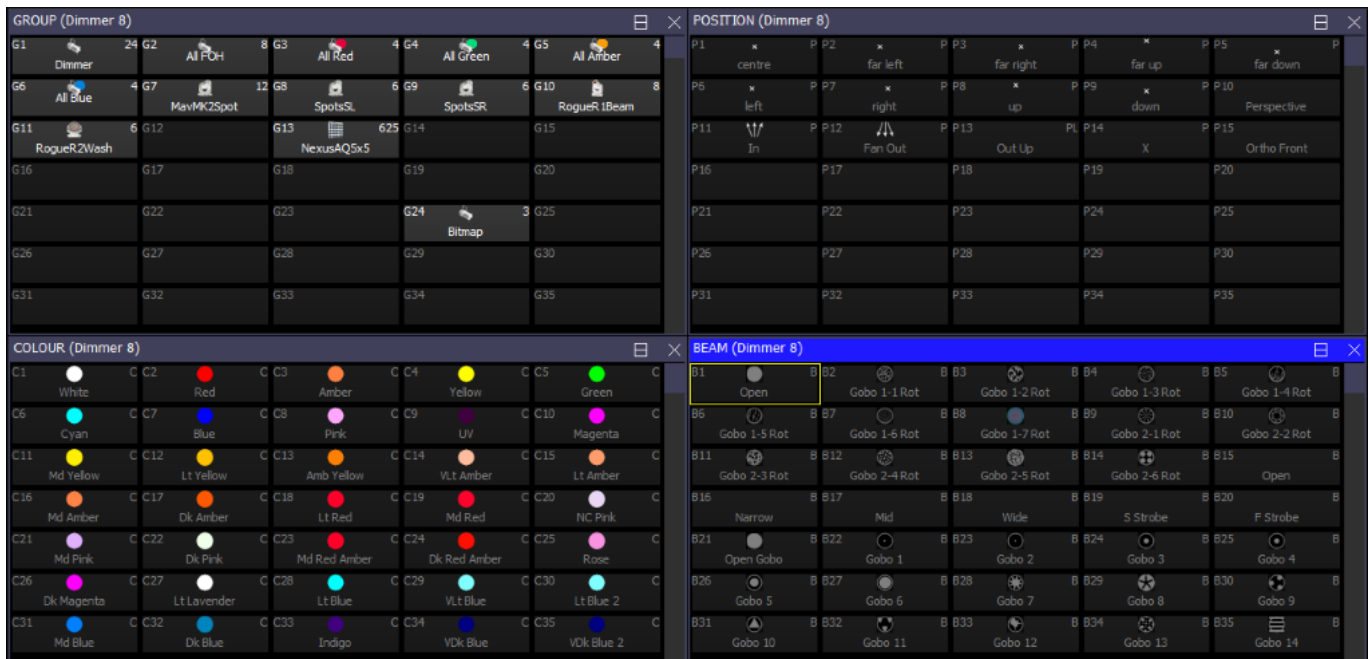
5.13 Modifying Attributes

Intelligent heads have several different attributes typically including pan and tilt, colour, gobo and iris. When the MagicQ lighting console patches an intelligent head it maps the head parameters to standard attributes to enable easy access of the features of the head.

Attributes are categorised into four types – Intensity, Position, Colour and Beam. On MagicQ there is a window for each of these attribute types. Select the required heads, then open the required window.



You can quickly open all the Palette Windows by pressing Layout 1 or holding CTRL and pressing the top soft button marked Palettes – this opens the windows in the layout below.

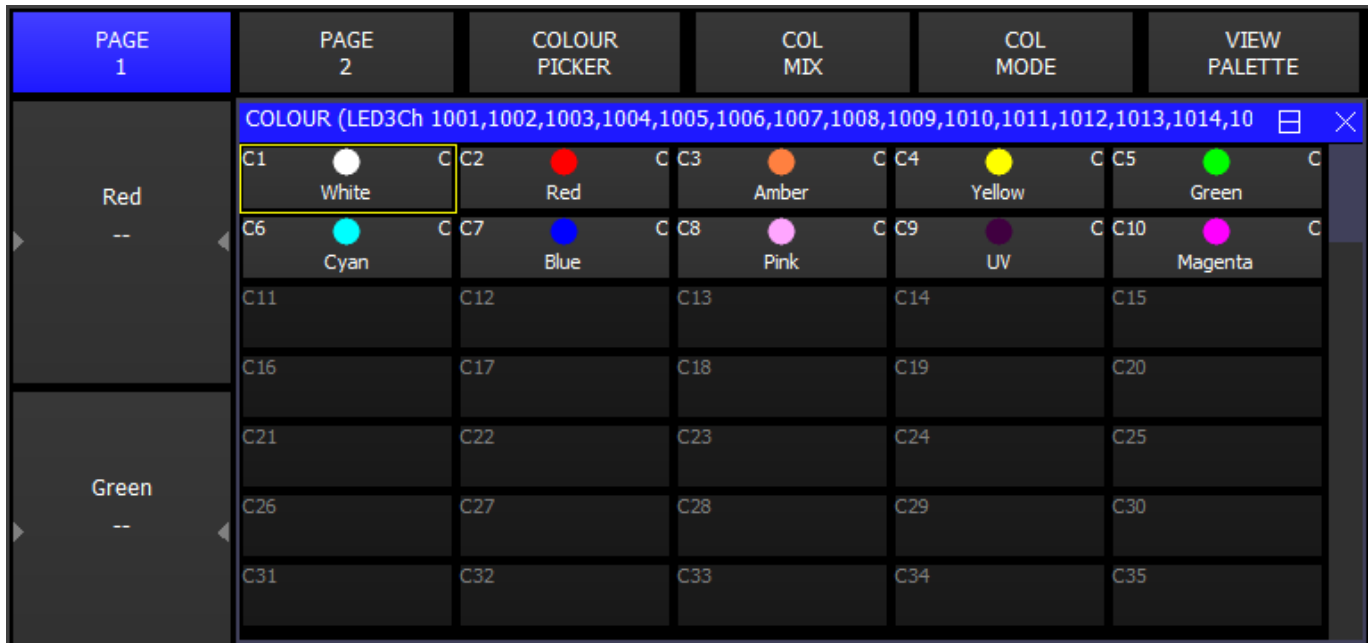


The highlighted window enables controls the soft buttons and rotary encoders. In each of the Windows the X and Y encoders control the most important attributes – Pan and Tilt in Position Window, Col Wheel 1 and Col Wheel 2 in the Colour Window and Gobo Wheel 1 and Gobo Wheel 2 in the Beam Window. In the Beam Window there are more than eight attributes to be controlled – these are accessed using multiple pages of encoders – by pressing the NEXT PAGE soft button.

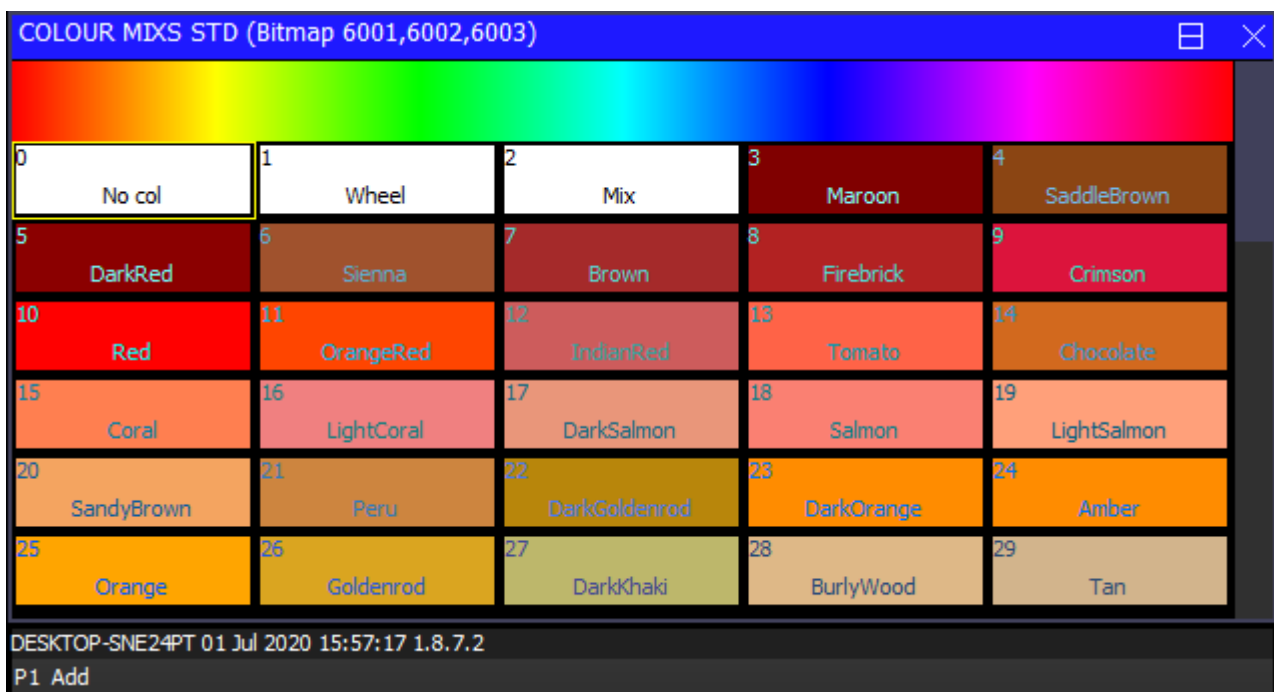


For indexed attributes such as colour wheels and gobo wheels, the button associated with each encoder can be used to bump the attribute value to the next range. Pressing SHIFT and the button bumps back to the previous range.

In addition the window enables selection of palette values for the attribute type using the touch screen. When heads are recorded the system automatically generates palettes for each attribute type. You can record new palette entries, or modify existing ones as you see fit.



In the Colour Window pressing the COL MIX / COL ATTRIBS button changes to the colour picker. Press COL TYPE to select standard colours, Lee colours, Rosco colours or HIS model.



5.14 Recording a Palette

To record a favourite combination of attributes into a palette (e.g. a rotating triangle with a prism on a MAC500), first modify the attributes to the values you wish to record. Then press RECORD and select the palette entry you wish to record. By default only selected heads get recorded into a palette (this can be changed by pressing SHIFT + RECORD and choosing Record options).



To name the palette, key in the name on the external keyboard, then press SET and select the palette entry you wish to name. To use the on screen keyboard, first move the cursor over the palette entry, then press SET and key in the name followed by ENTER.

5.15 Adding in FX

To add a FX to some heads, select the heads then from the Group Window or the Prog Window press the ADD FX soft button. Choose the FX to add.

Once you have chosen a FX you are returned to the Prog Window. Use the encoders to modify the parameters of the FX such as the speed, size and spread between heads.

You can add multiple FX to a head, provided that the FX uses different attributes - e.g. you can mix a Pan Sine with a Tilt Sine.

5.16 Recording a Cue

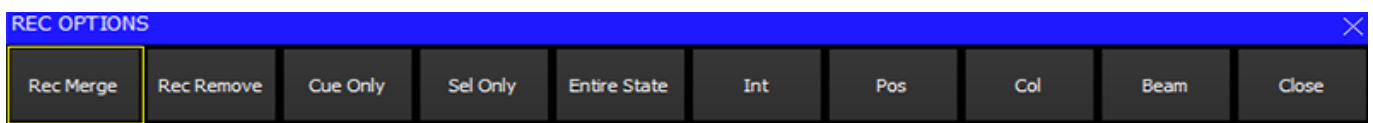
To record a look onto a Cue, first set up the look, then press RECORD and press the S button of the Playback to record the Cue onto.

To test the Cue, first clear the programmer by pressing CLEAR then raise the Playback fader or press the Playback flash button.

Note that recording a Cue onto a Playback, generates a Cue Stack with a single Cue. However, as there is only one step, it behaves as though it is just the Cue on the Playback.

To view a recorded Cue, press the S button for the Playback, and then press CUE to open the Cue Window.

To configure options when recording, press SHIFT + RECORD and a toolbar of record options will be displayed. Choose the options you require then press the S button of the Playback as above.



5.17 Recording a Cue Stack (Chase or Theatre Stack)

Recording a Cue Stack is the same as recording a Cue - you simply record multiple Cues onto a Playback and you end up with a Cue Stack.

So, for example to record a stack of two looks, the first yellow dots, the second blue triangles:

- Generate the yellow dots look.
- Press RECORD and press the S button of the playback.
- Generate the blue triangles look.
- Press RECORD and press the S button of the playback.

To test the Cue, clear the programmer by pressing CLEAR then raise the Playback fader or press the Playback flash button.

View the Cue Stack by selecting the Playback and pressing CUE STACK to open the Cue Stack Window.

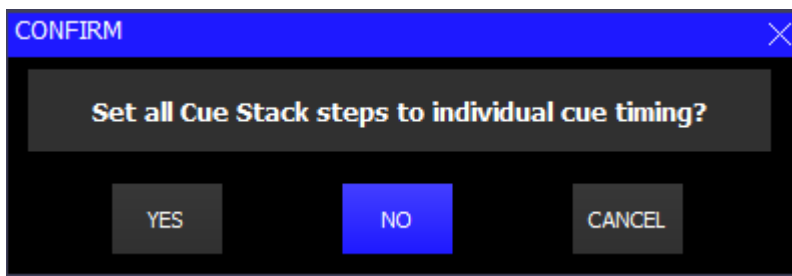
When you record more than one Cue onto a Playback the Cue Stack controls the transition from one Cue to another. In Normal mode by default the Cue Stack operates like a chase - i.e. each Cue is executed in turn, with timing being handled by a Chase Speed for the whole Cue Stack.

CUE STACK (CS14: pars chase)															
Status	Cue id	Cue text	Wait	Halt	Delay	Fade	Cue	Next cue	Timing	Track	Block FX	Cue Only	Macro	Comment	
*	1.00		Chase	No	Chase	Chase	Q29	Next	Chase	L	No	No			
	2.00		Chase	No	Chase	Chase	Q30	Next	Chase	L	No	No			
	3.00		Chase	No	Chase	Chase	Q31	1.00	Chase	L	No	No			
End (0.00s)															

In Theatre Modes the default timing is Cue Timing – individual Fade times on each step with GO stepping from one step to the next.

CUE STACK (CS14: pars chase)															
Status	Cue id	Cue text	Wait	Halt	Delay	Fade	Cue	Next cue	Timing	Track	Block FX	Cue Only	Macro	Comment	
*	1.00		Chase	No	Chase	Chase	Q29	Next	Chase	L	No	No			
	2.00		Chase	No	Chase	Chase	Q30	Next	Chase	L	No	No			
	3.00		Chase	No	Chase	Chase	Q31	1.00	Chase	L	No	No			
End (0.00s)															

The timing mode can be changed, so that the Cues play back in a theatre style using the GO / STOP buttons. Select the VIEW OPTIONS view and press the CUE TIMING and CHASE TIMING soft buttons to modify the timing mode.



5.18 Selecting and recording complete window layouts

The console enables complete window layouts to be recorded and selected. The console incorporates several standard window layouts including Palettes and Cue Stacks.

There are physical buttons for Layout 1, 2 and 3. Layouts 1 to 12 can also be accessed by holding CTRL and selecting one of the top soft buttons.

To select a Window layout press one of the Layout buttons, or hold down CTRL and select one of the top soft buttons.

To record a Window layout first close all windows (SHIFT + CLOSE). Then open the required Windows and size them appropriately. Press RECORD and then press a Layout button or hold down CTRL and select one of the top soft buttons.

To name the Window layout, press SET and then press a Layout button or hold down CTRL and select one of the top soft buttons. Enter a name for the layout.

5.19 Saving the Show

When programming a show the show is stored in memory. In order to store your show on the disk you need to press the SAVE SHOW soft button in the Setup Window.

Whilst programming, you should regularly save your show, so that if the power fails your show data is not lost. You can chose any filename - MagicQ will automatically set the file extension to .shw.

By default, MagicQ periodically saves a backup of your show to disk. It uses the same show name but with the file extension .sbk.

It is a good idea to save your show to different file names so that you have various points you can back-track to if things go wrong. For example, save the show as myshow-patch.shw after you have patched and then as myshow-final.shw after you have finished programming.

When you shut down MagicQ through the QUIT soft button in the Setup Window, MagicQ automatically saves a backup copy of your show with a .sbk extension. When you subsequently restart MagicQ this file will be re-loaded. This ensures that MagicQ starts up as it was when the QUIT soft button was pressed.

MagicQ show files are typically only a few megabytes in size so many different shows or versions of a show can be saved without problem.

5.20 Playback

Now you have Cues and Cue Stacks recorded you can play back your show using the Playback faders and buttons. You can control how each Cue Stack is played back using the Cue Stack options – for example you can set the fader to control LTP fades or FX size and speed.

Make sure the master faders are raised!

Note that if you have a large show file you may wish to turn auto backups off during playback. Remember to turn them back on when you are programming.

If you get stuck at any point, just press the HELP button!

Chapter 6

Handy Hints

- Use the "Lamp On All" and "Lamp Off All" soft buttons in the Macro Window to make turning on/off an entire lighting rig easier.
 - Use a pan offset and/or tilt offset in Patch to adjust all the programming for some heads.
 - Use SHIFT or CTRL and the cursor keys to carry out actions on multiple items in a Window.
 - When recording items, type in a name for the item on the external keyboard before pressing the REC button.
 - To force a minimum look on stage (e.g. during a changeover) whilst allowing full programming capability got to Intensity, View Preset and set up a minium look.
 - When using encoders, to bump to the next range value (e.g. next colour), press the button associated with the encoder. To bump back, hold SHIFT and press the button.
 - To modify a playback, press and hold the SELECT button associated with the playback and then use the encoders or key in new values.
 - If your CMY colours are coming out inverted – i.e. red is cyan, green is purple, blue is yellow, then you need to set the CMY Invert option for that personality in the Head Editor.
 - To restart the look in the programmer press BLIND twice.
 - If you find yourself constantly changing Windows to perform an action, try sizing the required Windows and recording it as a Layout.
 - After you have cleared the programmer you can reselect the heads that were selected when you pressed CLEAR by pressing the ALL button.
 - To remove attributes from an entire Cue Stack (e.g. position information) activate those attributes in the programmer and use the RECORD REMOVE option.
 - To add attributes into an entire Cue Stack (e.g. position information) activate those attributes in the programmer and use the RECORD MERGE option.
 - To Record Merge the current contents of the programmer into the current Cue on a Cue Stack, press and hold the Select button of the playback and press RECORD.
 - Copy palettes to Playbacks to make Cue Stacks of palettes.
-

Chapter 7

MagicQ Shortcuts

Table 7.1: Saving / Loading

New show	SETUP <View Settings> <New Show>
Save show	SETUP <View Settings> <Save Show>
Load show	SETUP <View Settings> <Load Show>
Save settings	SETUP <View Settings> <Save Setting>
Load settings	SETUP <View Settings> <Import Settings>
Save partial show	SETUP <View Settings> <SHIFT + Export Show>
Merge in show	SETUP <View Settings> <SHIFT + Import Show>
Load archived backup	SETUP <View Settings> <SHIFT + Load Backup>
Export patch list	PATCH <View Chans> <Export Patch>
Import patch list	PATCH <View Chans> <Import Head>
Import ASCII file	PATCH <View Chans> <Import USITT>
Reset console	SETUP, <SHIFT + QUIT>
Save show to current show file name	SHIFT + CTRL + REC

Table 7.2: Patching

Select head for patching	PATCH <Choose Head>
Patch 1 head, next free address	1 <Patch It>
Patch 5 heads, next free address	5 <Patch It>
Patch 1 head, next free channel on universe 2	1 @+2-1 <Patch It>
Patch 1 head at uni 1 address 1	1 @ 1-1 <Patch It>
Patch 5 heads at uni 2 address 1	5 @ 2-1 <Patch It>
Patch 5 heads at uni 2 address 1, head 100	5 @ 2-1*100 <Patch It>
Patch 5 heads with offset 20	5/20 <Patch It>
Patch after uni 3 address 50	5 @+3-50 <Patch It>
Reselect head Cursor to head	<SHIFT + Choose Head>
Edit patched head Cursor to head	<SHIFT + Edit Head>
Repatch selected heads without changing offset	3-1 / ENTER

Table 7.3: Select Heads

Select head 1	1 @ @
Sub Select element 2	.2 NEXT HEAD

Table 7.3: (continued)

Select heads 1 to 4	1 THRU 4 @@
Select heads 1 to 10, not 5	1 THRU 10 – 5 @@
Deselect all heads	0 @@
Select all heads	NEXT HEAD + PREV HEAD
Reselect last heads after CLEAR	ALL
Select Group 1	1 * *
Select Groups 1 to 4	1 THRU 4 * *
Sub select 1st head	1 NEXT HEAD
Sub select 1st and 2nd head in selection	1 + 2 NEXT HEAD
Sub select 3rd, 4th and 5th head	3 THRU 5 NEXT HEAD
Sub select element 2	. 2 NEXT HEAD
Sub select pair	SHIFT + SINGLE
Sub select heads using palette above 0%	NEXT HEAD + Palette
Select all heads using palette	ALL + <Palette entry>
Select heads active in Playback	ALL + <S>
Select heads above 20% intensity	20 ALL + INT
Select all heads active in prog	CTRL + ALL
Reselect last heads after CLEAR	ALL
Change selection order	Press and hold ALL
Pair Selection	SHIFT + SINGLE
Invert current sub selection of heads	0 + NEXT HEAD

Table 7.4: Lamp On / Lamp Off / Reset

Lamp On entire rig	MACRO <Lamp on all>
Lamp Off entire rig	MACRO <Lamp off all>
Lamp On selected heads	SHIFT + LOCATE
Lamp Off selected heads	CTRL + SHIFT + LOCATE
Reset selected heads	CTRL + LOCATE
Lamp on selected heads	<select head> * + +
Lamp off selected heads	<select head> * - -
Reset selected heads	<select head> * / /

Table 7.5: Setting Intensities

Set head 1 to 100%	1 @ FULL (Also 1 FULL)
Set head 1 to 50%	1 @ 50 ENTER
Set heads 1 to 4 to 100%	1 THRU 4 @ FULL
Set head 1 +10%	1 @ + 10 ENTER
Set head 1 –1%	1 @ - 01 ENTER
Set head 1 at 50, all others at 0%	1 @ 50 - -
Set head 1 to 50% time 3 secs	1 @ 50 / 3 ENTER
Set 2nd element from head 1 to 50%	1 . 2 @ 50
Set 2nd element from head 1 to 10 to 50%	1 THRU 10 . 2 @ 50
Set element 2 and 3 from head 1 to 50%	1 . 2 THRU 3 @ 50
Heads 1 to 10, 100% split delays 4s to 1s, 1s fade	1 THRU 10 @ FULL / 4 THRU 0 / 1

PC Keyboard THRU = '>' FULL = '#'

Table 7.6: FX

Add FX	Select heads, FX <ADD FX>
Convert chase to FX	CUE STACK <SHIFT + Make FX>
Force Cue to have no FX	Select heads, <SHIFT + Add FX 0 Size>

Table 7.7: Playback

Step through Cue Stack	>
Step back up Cue Stack	II or also SHIFT + >
Go to next step without time	>>
Go back a step without time	<<
Reassert Playback	S + FLASH button
Take manual control of Playback	S + move manual fader
Change chase / FX speed live	S + turn encoder X
Go to Cue ID 2	S 2 ENTER
Release Playback with 3 sec time	S 3 REL
Release all Playbacks	SHIFT + RELEASE
Release heldover Playbacks	ALT + RELEASE
Release all test Playbacks/Cues/Cue Stacks	CTRL + RELEASE
Enter/exit Blind with 3 sec time	3 BLIND
Make Cue Stack default all pages	Change to Page 1, PLAYBACK, <Default Cue Stack>
Transfer a Cue Stack to other playback	SHIFT + SEL select source > select target

Table 7.8: Loading Values into the Programmer

Default all attribs	Select heads, LOCATE
Default position attribs	Select heads <POS + LOCATE>
Default colour attribs	Select heads <COLOR + LOCATE>
Default beam attribs	Select heads <BEAM + LOCATE>
Default intensity attribs	Select heads <INT + LOCATE>
Make active all attribs	Select heads, <* + SET>
Make active pos attribs	Select heads, <POS + SET>
Make active colour attribs	Select heads, <COLOR + SET>
Make active beam attribs	Select heads, <BEAM + SET>
Make active int attribs	Select heads, <INT + SET>
Make hard all attribs	Select heads, <* + MOVE>
Make hard pos attribs	Select heads, <POS + MOVE>
Make hard colour attribs	Select heads, <COLOR + MOVE>
Make hard beam attribs	Select heads, <BEAM + MOVE>
Make hard int attribs	Select heads, <INT + MOVE>
Load Cue from Playback	INC <S>
Load Cue ID 2	INC 2 <S>
Load Cue ID 2 on current Cue Stack	INC CUE 2 ENTER
Load Cue at 40%	INC @ 40 <S>
Load Cue at current level	INC @ <S>
Load entire state of Cue Stack	ALL + INCLUDE
Load selected heads from Cue	<* + INC> <S>
Load int from Cue	INC INT <S>
Load pos from Cue	INC POS <S>
Load colour from Cue	INC COLOR <S>
Load beam from Cue	INC BEAM <S>

Table 7.8: (continued)

Load FX from Cue	INC FX <S>
Load heads from Cue	101 INC <S>
Load Group of heads from Cue	GROUP 8 INC <S>
Load Group of heads from Cue ID 2	GROUP 8 INC / 2 <S>
Load from DMX	Select heads, <CTRL + INC> ENTER
Snapshot output cues	PROG, <Snapshot>
Snapshot active values	THRU RECORD
Snapshot selected heads	* + SET
Copy Heads	<from Head No> COPY <to Head No> ENTER
Copy Groups of Heads	GROUP <from Group ID> COPY GROUP <to Group ID> ENTER

Table 7.9: Removing Values from the Programmer

Clear all values	CLEAR
Clear with 3 sec time	3 CLEAR
Clear selected heads	Select heads, SHIFT + CLEAR
Clear to default vals	CTRL + CLEAR
Clear to 0 vals	SHIFT + CTRL + CLEAR
Remove attrib	<REM + turn encoder>
Remove attrib	<soft button + REM>
Remove position attribs	<POS + REM>
Remove colour attribs	<COLOR + REM>
Remove beam attribs	<BEAM + REM>
Remove intensity attribs	<INT + REM>
Remove all attribs	<* + REM>

Table 7.10: Recording Cues

Record Cue on Playback	REC S
Record Cue ID 2.5	2.5 REC S
Record Cue to current Playback	REC ENTER
Record to Playback 2	REC 2 ENTER
Record to Cue ID 2.5 Playback 2	REC 2 / 2.5 ENTER
Record to Cue ID 2.5 on current Cue Stack	REC CUE 2.5 ENTER
Record sel heads only	<SHIFT + REC> <Sel Only> S
Record sel heads only	* + REC
Record sel attribs	<SHIFT + REC>, select attribs, S
Record entire state of programmer	ALL + REC
Record Cue Only	/ + REC
Record Snapshot	THRU + REC

Table 7.11: Record Merging / Removing

Record Merge	<+ + REC> S
Record Merge current Cue	S + REC
Record Merge current Cue	REC UPD
Record Merge selected head only	Hold * and + and press REC

Table 7.11: (continued)

Record Merge all Cue Stack	<SHIFT + REC> <Record Merge> S
Record Merge Cue Id 2 to 4	<+ + REC> 2 THRU 4 S
Record Remove	← + REC> S
Record Remove selected head only	Hold * and - and press REC
Record Remove all Cue Stack	<SHIFT + REC> <Record Remove> S
Record Remove Cue Id 2 to 4	← - REC> 2 THRU 4 S
Record Select Heads	* + REC
Record into current cue	REC 0 ENTER
Set Head 2 at 50% into current cue	S + <2 @ 50>
Set Head 2 at +10% into current cue	S + <2 @ + 10>
Set Head 2 at 50% all cues	S + <2 @ 50 THRU>
Set Head 2 at +10% all cues	S + <2 @ + 10>

Table 7.12: Editing Cues

Edit in Programmer	INC S, make change, UPDATE
Record merge current cue	Change vals in Prog, <S> + REC>
Record Merge all cues in Stack	<+ + REC><S>
Record Merge all cues in Stack	<SHIFT + REC> <Rec Merge> <S>
Remove Cue Stack	REM S
Remove Cue ID 2.5	REM 2.5 S
Remove Intensity from Cue	Hold S + Enter Level e.g <S> 1 @ 20 ENTER
Remove Cue 2 from current Cue Stack	REM CUE 2 ENTER
Move Cues	Move CUE <Cue ID> @ <Cue ID>
Copy Playback	COPY <source S> <dest S>
Copy Playback unlinked	<SHIFT + COPY> <Unlinked> <source S> <dest S>
Copy Cue to end of Cue Stack	COPY CUE <Cue ID> @
Copy Multiple Cues	COPY CUE <Cue ID> THRU <Cue ID> @ <Cue ID>
Copy Heads in Cues	<from Head No> COPY <to Head No> <S>
Copy Groups of Heads in Cues	GROUP <from Group ID> COPY GROUP <to Group ID> <S>
Copy Heads in Cues	Hold + and COPY or SHIFT COPY select COPY HEADS
Replace Palette in Cues	Hold - and COPY or SHIFT COPY select REPLACE PALETTE

Table 7.13: Palettes

Record Palette	Select heads, REC, select item
Palette using keypad	POS <palette number> ENTER
Re-record Palette	Select heads, REC, select item
Name Palette	Type name, SET
Name Palette (no keyboard)	SET SET, type name, sel item
Edit Palette	Select heads, INC, select item, make changes, UPD
Copy Palettes to Playback	<SHIFT + cursor> to select Palettes, COPY S
Set icon for a Palette	SHIFT + SET

Table 7.14: Palette Times

Table 7.14: (continued)

Palette with 3 secs	3 select item
Palette with 3 secs fanned	3 * select item
Palette with 3 secs reverse fan	3 * / select item
Palette with 3 secs into centre fan	3 * + select item
Palette with 3 secs centre out fan	3 * - select item
Palette with 3 secs Random fan	3 * . select item
Palette with 10 secs total 2 secs per Head	10 / 2 * select item
Palette with 10 secs into centre total 2 secs per Head	10 / 2 * + select item
Use last fan timing	*
Palette fan fade 0 to 3s	0 THRU 3 select item
Fan delay 0 to 3s, 1s fade	0 THRU 3 / 1 select item
Palette using keypad with time	<Palette type - INT/POS/COL/BEAM/FX> <palette ID> TIME <time> ENTER
Palette using keypad with time	<Palette type - INT/POS/COL/BEAM/FX> <palette ID> / <time> ENTER
Palette with 3 secs fade left to right across Group Grid	3 * . . select item
Palette with 3 secs fade right to left across Group Grid	3 * // select item
Palette with 3 secs fade out to in on Group Grid	3 * - - select item
Palette with 3 secs fade in to out on Group Grid	3 * + + select item
Palette with 3 secs fade centre in to out on Group Grid	3 * + - select item
Palette with 3 secs fade centre out to in on Group Grid	3 * - + select item
Palette with 3 secs fade top to bottom across Group Grid	3 * . . . select item
Palette with 3 secs fade bottom to top across Group Grid	3 * /// select item
Palette with 3 secs fade top out to in on Group Grid	3 * + + + select item
Palette with 3 secs fade top in to out on Group Grid	3 * - - - select item

Table 7.15: Information Windows

Additional Output Windows	2 OUT 3 OUT 4 OUT
Programmer Info Window	CTRL + PROG or 2 PROG
Cue Stack Info Window	CTRL + CUE STACK or 2 CUE STACK
Send text message	! delay , duration , ! message
Send text display 5 seconds	! 0 , 5 ! message
Send text stay visible	! message
Multiple Execute windows	2 EXEC, 3 EXEC
Multiple Group windows	2 GROUP, 3 GROUP

Table 7.16: Net Session

Resync SLAVE console	Hold Cursor Left Right Down + SET
----------------------	-----------------------------------

Table 7.17: Wing / Keypad short cuts

Select position palette	<POS + S>
Select colour palette <COLOR + S>	Select beam palette <BEAM + S>
Select position palette 4	POS 4 ENTER
Select colour palette 5	COLOR 5 ENTER
Select position 4 time 5 secs	POS 4 / 5 ENTER

Table 7.17: (continued)

Select position 4 time 5 secs fan	POS 4 / 5 * ENTER
Default intensity attribs	<ALL + LOCATE>
Make active intensity attribs	<ALL + SET>
Remove intensity attribs	<ALL + REMOVE>
Enter/exit test mode PC/Mac	Type test and press CTRL + SHIFT

Table 7.18: Console

Start up	Start button on rear
Shut down	SETUP, <QUIT>
Soft reset	SETUP, <SHIFT + QUIT>
Calibrate touch screen	SETUP, <View Settings> <Cal Touch> or CTRL + SET
Hard reset	Hold rear reset button 5 seconds
Hard power off MQ100 MQ40/50/60/70	Hold rear reset button 15 seconds
Hard power off MQ80	Unplug powercon + Hold reset button 10 seconds
Shut down console	CTRL + SHIFT + DBO
Lock/unlock console	<CTRL + SOFT button Encoder A>
Console lights on/off	<CTRL + SOFT button Encoder B>
Console screen save, stealth mode	SHIFT + BLIND
Home on Compact consoles	ALT + Lay 1
End on Compact consoles	ALT + Lay 3
Home on Stadium consoles	ALT + HEAD
End on Stadium consoles	ALT + TIME
Enter/exit test mode MQ100	SHIFT + SHIFT
Enter/exit test mode MQ40/50/60/70/80	ATL + CTRL + SHIFT
Text Search in current window(consoles)	CTRL + > (Right cursor key)
Text Search in current window(MagicQ PC)	CTRL + F
Copy to Clipboard	CTRL + COPY
Paste from Clipboard	CTRL + UPDATE

Table 7.19: Cue Stack Macros

Activate Playback	A <Playback no>
Activate playback at level	A <Playback no> / <Level>
Run Keyboard Macro	B <Macro no> (0 = stop all macros)
Release Playback	R <Playback no> (0 = release this playback)
Release playback with time	R <Playback no> / <fade time>
Release All Heldover Playbacks	R1000
Release Heldover Cue Stack on this Playback	R999
Activate Playback 100%	T <Playback no>
Release Playback 0%	U <Playback no>
Go on playback	G <Playback no>
Go to Cue id on playback (when <preload flag> is set to 1, cue is preloaded)	G <playback number> / <cue id> / <preload flag> / <fade time>
Go on current playback when the MagicHD layer is the given number of frames from the end	G 0 / 1 / <frames> / <layer>
Stop Playback	S <Playback no>
Choose Playback	C <Playback no>
Set level last Cue Stack activated	K <level> / <fade time>
Set level current Playback	L <level> / <fade time>
Set level of this Playback	M <level> / <fade time>

Table 7.19: (continued)

Jump to Cue id current Playback	J <Cue Id>
Activate Cue Stack (Stack Store)	E <Cue Stack ID from Stack Store>
Activate Cue Stack (Stack Store) at level	E <Cue Stack ID from Stack Store> / <level>
Activate Cue Stack (Stack Store) at level and Cue	E <Cue Stack ID from Stack Store> / <level> / <Cue ID>
Releases Cue Stack (Stack Store)	F <Qid from Stack Store>
Activate Exec Grid item	E 0/<Exec Page>/<Item>
Release Exec Grid item	F 0/<Exec Page>/<Item>
Change Page	P <Page no> (0 is next)
Open view (window layout)	V <View no>
Set decoded time code	O <Time code>
Enable/disable external time code gen	W <Enable> (1 enable, 0 dis)
Set current time code (gen only)	Q <Time code> e.g Q100
Set current time code (internal)	I <Time Code> e.g. I100
Activate Playback 18 on wing 1	A1-18
Go on Playbacks 3 to 5	G3THRU5
Set the level of Playback 6 to 60%	C6L60
Lamp on all heads	H1
Reset all heads	H2
Lamp off all heads	H3
Cancel screen save	H4
Enable Zone	H5<zone number>
Disable Zone	H6<zone number>
Trigger 10Scene - Zone id 1 to 20, Button id 1 to 10, State is 0 for button release 1 for button pressed 2 for button activate and 3 for release	T0 / <Zone id> / <Button id> / <State>
Transmit data on the serial port	X <Data>
Transmit data on the network port over ChamSys Remote Ethernet Protocol	Y <Data>
Transmit data over MIDI	N <Data>
Transmit data over OSC	K <Data>
Audio Command, supported commands are stop, close, jump, dev, Param1,g (gain)	D <Audio command>
Scheduled Events Date	Z<DDMMYYYY>Z

Table 7.20: Window Control

Cue window positioned on attribute	<S> + Pos Beam Col Int or FX button
Open Playback Cue Stack Window	Double click S button playback
Open Playback Cue Stack Options	Triple click S button playback
Open Cue Window current playback	SHIFT + Double click S button playback
Close all Windows	SHIFT + CLOSE
All Windows to internal screen	SHIFT + EXT

Table 7.21: Stadium Shortcuts

Change Execute buttons function	SHIFT+NEXT/PREV Page
Move windows between monitors	ALT+SETUP
Change Faders mode	Hold Faders NEXT/PREV Page button
Change Faders mode on PC	SHIFT + Faders NEXT/PREV Page button
Page through one by one instead of pages	SHIFT + NEXT/PREV Page button
Deactivate all faders for the mode across pages	SHIFT + Big Pause button

Table 7.21: (continued)

Record current fader mode/state to an execute button	NEXT/PREV Page + Rec
Next/Prev Bank	ALT + NEXT/PREV Page

Chapter 8

MagicQ Consoles

8.1 MagicQ MQ500 Stadium Console



The MagicQ MQ500M Stadium is the latest control console from ChamSys designed to operate at the highest level of show control. MagicQ MQ500M Stadium enables shows to be designed from concept to reality including lighting, media, LED and scenic design.

MQ500M Key Features:

- 256 universes onboard direct from the console without the need for external processing.
- Motorised playback faders and playback encoders
- Backlit keys, illuminated faders and encoders
- Dual multi touch displays in full HD with adjustable viewing angle and gesture support.
- Inbuilt MagicVis 3D visualiser with high quality beam and gobo rendering.
- Intensity wheel and 100mm split crossfaders for theatre control

The picture below shows the connections on the MagicQ MQ500 Stadium console.

The MQ500M rear panel has:

- 4 port Network switch
- 4 Direct DMX ports

- LTC In and Out
- Midi In and Out
- Remote input
- RS232 Port
- DVI-D monitor output
- Audio Input
- 3 x USB ports



8.2 MagicQ Compact Series

In 2020 the MagicQ Compact series comprises the MagicQ MQ50, MagicQ MQ70, and MagicQ MQ80 consoles together with the MagicQ Extra Wing for more faders and buttons.

Previous models included the MQ40N, MQ60 and the original MQ70.

8.3 MagicQ Wings for use with PC/Mac

The MagicQ Mini Connect, MagicQ Compact Connect and MagicQ Stadium Connect products connect directly to a PC or Mac. The PC or Mac runs the MagicQ software and processes the Cues whilst the wing acts as a physical surface with faders, buttons and encoders and outputs DMX.

Previous models included the MagicQ Mini Wing, MagicQ PC Wing and MagicQ Maxi Wing.

8.4 Plugging Up

All MagicQ consoles and SnakeSys interfaces have auto ranging power supplies and can accept 110V to 240V AC on the powercon socket.

- Connect the power lead to the power socket labelled LINE INPUT.
- Put the console lamp(s) into the console lamp socket(s)

MagicQ consoles support USB keyboards and mice. It is not necessary to connect the mouse. The mouse is only required if the touch screen becomes damaged.

Note that the power cable lead should be connected before other connectors and should remain connected at all time that other connections such as DMX, network, serial, USB or video are connected to the console. This ensures that the console is correctly grounded.

8.5 DMX Connections

MagicQ consoles have 4 direct DMX outputs on the rear of the panel so you can connect your DMX cables direct to the console. Alternatively you can connect to an Ethernet network using the Art-Net, Pathport or ACN Streaming DMX protocols and use external Ethernet to DMX converters to output the DMX.

The network ports on MagicQ consoles all have auto MDI/MDIX detection so a normal or inverted network cable can be used to connect to other network devices. Most modern laptops and computers also have auto MDI/MDIX detection.

ChamSys offer a range of Ethernet to DMX convertors branded SnakeSys. These can be used to convert any of the 200 Art-Net or ACN Streaming DMX universes to be output on DMX512 serial. For systems requiring all 200 universes on DMX512, multiple interfaces may be used connected via network switches.

8.6 Powering Up

To power up the console press the power switch on the rear panel. The blue LEDs on the ten S buttons will light up in turn. After a few seconds the screen will come to life and you will see the operating system quickly performing self tests. Once the self tests are completed the MagicQ application is started.

8.7 Powering Down

To power down the console it is necessary to quit the MagicQ application. The console operating system then performs an automatic shutdown and turns itself off when complete. To quit the MagicQ application, press the SETUP button and then the QUIT soft button. When asked for confirmation, press YES.



Note that just removing the power cord to the console will not have the desired effect since the internal UPS continues to provide power.

If for some reason you are unable to power off the console then you may need to reset it as below.

Note that the power cable should remain connected at all time that other connections such as DMX, network, serial, USB or video are connected to the console. This ensures that the console is correctly grounded. The power cable should be the last connection removed.

On MQ500 it is possible to press the rear power button to power off the console.

8.8 Resetting the Console

Under rare circumstance it may be necessary to reset the console.

To reset the console, press SETUP to go to the Setup Window and press SHIFT and QUIT. This performs an immediate soft reset of the console - the MagicQ application will be running the show again within about 2-3 seconds.

If for some reason the console does not respond to button presses then try pressing CTRL BREAK on the external keyboard (hold CTRL whilst pressing BREAK).

8.9 Hard Reset

If a software reset has no effect then a hard reset may be required. Hard resets should be avoided as they bypass the operating system shutdown procedures and may cause problems with the file system.

To perform a hard reset, press and hold the reset button on the back panel for 5 seconds. On Compact consoles the reset button is inset, so a thin object like a pen is needed to operate the button.

To force the console to power off completely, press and hold the reset button on the back panel until it powers off (approximately 10 seconds.)

To force a MQ80 to power off, remove all the cables from the rear panel except the powercon connector. Then remove the powercon connector and then hold the reset button for 10 seconds. For safety reasons the powercon cable should be the last cable removed.

8.10 Power Supply Protection

MagicQ MQ60, MQ70, MQ80, MQ250M, MQ500 and MQ500M consoles have an internal battery designed to protect the system against short term power losses on troublesome power supplies. The internal battery is not designed to support the running of the console for long periods of time. If the power is lost then the console will prompt the user to fix the problem or to shut down the console. The battery when fully charged will support the console for between 5 and 15 minutes.

To maintain the life of the UPS battery, the console should be run for a period of at least 12 hours constantly every 2 months to ensure the battery remains fully charged at all. Note that the console needs to be powered on and running MagicQ for the battery to charge.

If your version of the console does not have an internal battery then we recommend the use of a UPS (Un-interruptible Power Supply).

8.11 Care of your MagicQ console

- To keep your MagicQ console in best condition please observe the following recommendations:
- Keep liquids away from the MagicQ. Drinks spilt over your console may cause irreparable damage.
- Keep the console out of direct sunlight – place the console in the shade.
- Do not use the console outside its operating temperature range.
- Handle the console with care when moving or transporting it. The console contains components that may be damaged by shock. Always use a padded flight case or padded bag wherever possible.
- Do not use solvents or cleansers to clean the console. Do not rub firmly on the metal or plastic surfaces – this may cause the paint or lettering to be removed. Gently use a damp cloth to clean the panels.
- On consoles with motorised faders avoid creating macros or automation that causes excessive or repeated movement of faders - this can cause reduced life of the faders.

8.12 Safety Information

- Do not open the front, rear or lower panels of the console unless you have electrical expertise. The console contains components with voltages that may shock.
 - Always disconnect the power cable before opening any panels.
 - Do not use the console if the power cables are damaged in any way.
 - Repairs should only be undertaken by authorised service representatives.
 - If liquids are spilt over the console then remove power immediately, and seek advice from your authorised service representative.
 - On motorised consoles be aware that faders may move in response to macros/timed events or other networked consoles.
-

8.13 Security Information

Lighting consoles are designed to be used on private networks which are assumed to be secured. Where consoles are used remotely over the internet we recommend the use of secure network tunnels to protect the lighting network from access from the internet.

ChamSys explicitly denies any responsibility for security of MagicQ consoles or their use in safety critical roles. Users must assure themselves of the security of their networks - if in doubt ensure the WIFI options are disabled and do not connect to the console network ports.

In situations where the network is not secure then we recommend ensuring that only the required network protocols are enabled in order to reduce the likelihood of unauthorised access. See the **System Management** → **Security** section in the MagicQ manual for full details.

8.14 Disposal Information

Please be aware that ChamSys products must be disposed of in accordance with the WEEE disposal and recycling regulations. ChamSys products must not be disposed of through normal household waste. For non UK customers please contact your local distributor. For UK customers, please contact us on +44 (0)23 8023 8666, or email support@chamsys.co.uk.

WEEE Producer registration number WEE/FF5605UX.

Chapter 9

Software & Firmware Upgrade

MagicQ software versions are fully compatible and show files can be created and loaded into any software version.

9.1 Changing MagicQ Console Software

MagicQ consoles store all versions of software that have been loaded onto the console allowing easy changing between different versions. To change software version go to Setup, View System, View Status, Change Software. It is also possible to enter the software utility by pressing ENTER during boot up when prompted to enter the software upgrade utility.

To upgrade to a new version of software, download the software file from ChamSys web site and store it onto a USB stick (FAT32 Formatted, up to 16GB).

MQ50, MQ70, MQ250M	.cdz
MQ40*, MQ40N*, MQ60*, old MQ70*, MQ80, MQ500 Stadium, MQ500M Stadium, Pro 2014*, Expert 2014	.cdc
Pro 2010	.cdx
pre Pro, Expert, rack mount	.cde (versions 1.5.6.0 and above not supported)

Note that MQ40, MQ40N, MQ60, old MQ70 and Pro2014 consoles support software versions up to v1.9.3.8 only, they cannot be upgraded past this version.

If you are downloading using a Mac then you need to be aware that OSX often creates additional files with an underscore "_" at the start when it attempts to copy files to USB drives. For example, if you are copying magicq_v1_6_7_0.cdc to a USB drive it may also make a file _magicq_v1_6_7_0cdc. At first glance this file looks the same, but it contains file information only and can not be loaded into a MagicQ console. It is easy to tell the files apart as the real MagicQ software file is around 100MB whereas the underscore file is only a few bytes. Make sure to use the file without the underscore at the start.

Ensure you have saved your current show file to a USB memory stick or to an external computer via network before you change software version. Also, ensure any personalities that you have customised have been saved to a different file name of your choice - the new software will install the latest version of the standard personalities. We recommend you only upgrade to new versions of software when you have plenty of time to recover the system - we don't recommend you change it two minutes before doors!

On the MagicQ console select Setup, File Manager and change to USB DRIVE. Click on the software version, then confirm the update. The console then automatically upgrade the software.

It is also possible to copy the software directly via networking to the magicq folder on the MagicQ console and then to click on the file in File Manager, HARD DRIVE.

In case of a problem where MagicQ can not be started or where it resets then the software upgrade utility can be entered on start up, by pressing a key when prompted on the screen.

9.2 Console Kernel Update

It is not normally necessary to update the kernel version on MagicQ consoles. Below contains Kernel update instructions for specific MagicQ consoles.

9.3 MQ80 Kernel v2 upgrade

This is recommended if using USB ethernet or USB audio devices.

Download this CDC file:

https://secure.chamsys.co.uk/bugtracker/download_file.php?file_id=209&type=doc

Copy to a USB stick and install on the console, by going to Setup, View Settings, File Manager, USB Drive and selecting the file. The console will restart when completed successfully.

Go to *SETUP* → *VIEW SYSTEM* → *VIEW STATUS* → *System*

Kernel version should contain **4.4.261**.

9.4 Resetting a MagicQ console to factory defaults

The console software upgrade utility has two other functions - reset to factory defaults and erase console.

"Reset to factory defaults" changes settings back to factory settings but does not erase any user data. It is recommended that the current show is saved to a known file name before carrying out a factory reset. As a consequence of the reset to factory defaults, the console will reload the default show.

"Erase console" erases all user data and reloads the newest software on the system. All show data, custom personalities, and settings will be erased. Ensure all user data is saved before carrying out this action.

To carry out the above functions on MagicQ consoles enter the software upgrade utility by going to: -Setup, View System, View Status, Change software. -Select yes to enter the software utility. -Once in the software utility follow on screen instructions for "Factory Reset" or "Erase All"

For "Factory reset" enter *999 followed by Enter.

For "Erase All" enter *777 followed by Enter and 1 followed by Enter to confirm.

Note once the Erase all is carried out user data e.g. show files cannot be recovered later. You must back these up if needed before carrying out the "Erase all".

9.5 Firmware

Each panel and interface on a MagicQ console and MagicQ wing runs separate firmware files, separate from the main MagicQ software.

It is not normally necessary to update firmware on consoles and PC Wings / Interfaces, unless advised by ChamSys support.

The latest firmware files are included in the latest MagicQ software release in the firmware folder.

In MagicQ, the currently installed firmware for each panel / interface can be viewed in the Hardware tab in Setup, View System, View Status. If there is newer firmware available for an interface it will indicate there is a newer version available.

To upgrade a panel / interface to the latest firmware version place the cursor on the item and press the LATEST FIRMWARE soft button.

A listing of the latest firmware version for each product can also be found in the firmware change log in the section below.

9.6 MQ50, MQ70 and MQ80 front panel firmware

MQ50, MQ70 and MQ80 Consoles all share the same front panel firmware. The firmware file name for these products starts CH346. The firmware is also used for the MQ250M display controller and MQ500 and MQ500M MIDI interfaces.

For the original MQ50 and MQ70 (sold in 2015 or before) see Upgrading original Compact series as these do not use CH346 firmware for the above products.

The latest firmware is included with each MagicQ software release in the firmware folder under the name CH346_xxx.hex.

To check the version of firmware in use go to Setup, View System, View Status and select the Hardware tab. The Programmer panel row will show the current firmware.

To upgrade to latest firmware put the cursor on the Programmer panel row and press LATEST FIRMWARE.

9.6.1 Pre v1.9.5.3 software

We recommend to upgrade the console software to the latest stable (which should be v1.8.9.0 or a higher version) before upgrading front panel firmware on these products.

To check the version of firmware in use go to Setup, View System, View Status and select the USB Links tab. The software version is shown as the 7th number in the list of parameters as shown in the image below. The complete list of parameters is:

<link drops> <time link has been up> <tx packets> <rx packets> <tx errors> <tx retries> <sw version> <hw version> <build number>



Some MagicQ installers will not include every version of the CH346 firmware, however a higher version will include fixes and features of a lower version. i.e. CH346 V1.25 will include all fixes and features of the lower versions.

Note that versions equal to or above V1.20 can be installed on MQ80, MQ70 and MQ50.

Note, some early MQ80s had pre-production firmware versions left in the firmware folder. These can be identified as versions prior to CH324_V0.25.hex or with a name such as CH342_V80.69. Do not select these versions - these were pre-production firmware versions and are not compatible with the MagicQ software. They should be deleted from the firmware folder.

9.7 MQ250M Stadium firmware

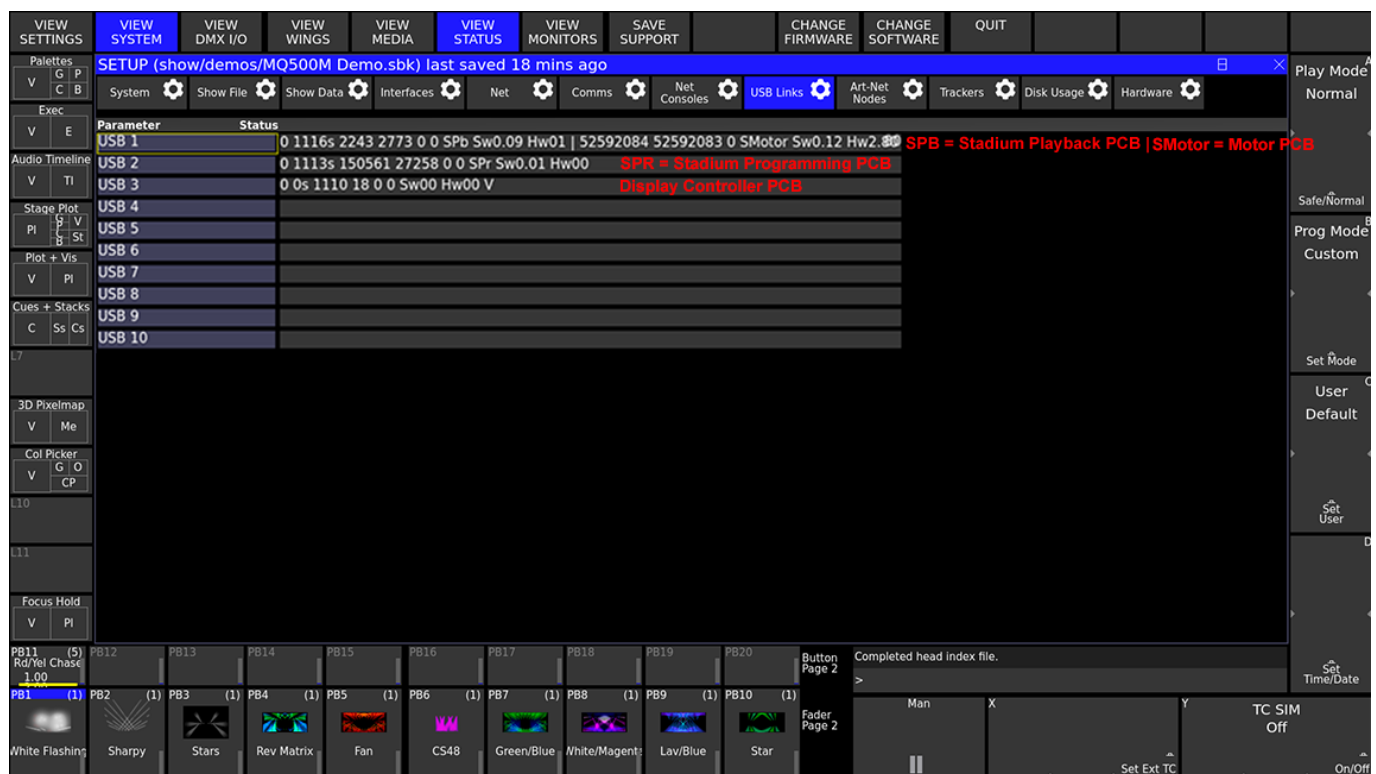
The MQ250M Stadium console has four boards that firmware can be user updated.

Programmer panel	Firmware 310-025_VX.YZ.hex via SP _r USB link
Playback panel	Firmware 310-022_VX.YZ.hex via SP _b USB link
Motor board	Firmware 310-021-VX.YZ.hex via SP _b USB link
Display controller	Firmware CH346_X.YZ.hex via S2Dsp USB link

Note that the playback panel and the motor board use the same USB link - the motor board is itself connected to the playback panel. When upgrading the playback panel passes the motor firmware onto the motor board.

Where date is the date, e.g. CH355A_2017_05_23.hex and X.YZ is version number e.g. CH346_V0.33.hex.

The below image shows the firmware versions for each board highlighted.



To check the version of firmware in use go to Setup, View System, View Status and select the Hardware tab. For each panel/board it shows current version, available highest firmware version and current update status.

It is possible to see more details in the USB links tab - the software version is shown as the 7th number in the list of parameters. The complete list of parameters is:

<link drops> <time link has been up> <tx packets> <rx packets> <tx errors> <tx retries> <sw version> <hw version> <build number>

The latest firmware versions for each board can be found in the firmware change log in the section below.

9.8 MQ500 Stadium firmware

The MQ500 Stadium console has four boards where the firmware can be user updated.

Programmer panel	Firmware CH355A_date.hex via SP _r USB link
Playback panel	Firmware CH355B_date.hex via SP _b USB link
MIDI controller	Firmware CH346_VX.YZ.hex via S _m idi USB link
Display controller	SDsp USB link not user upgradeable. V2 of the controller board can use Firmware CH346_VX.YZ.hex via S5Dsp USB link

Where date is the date, e.g. CH355A_2017_05_23.hex and X.YZ is version number e.g. CH346_V0.33.hex.

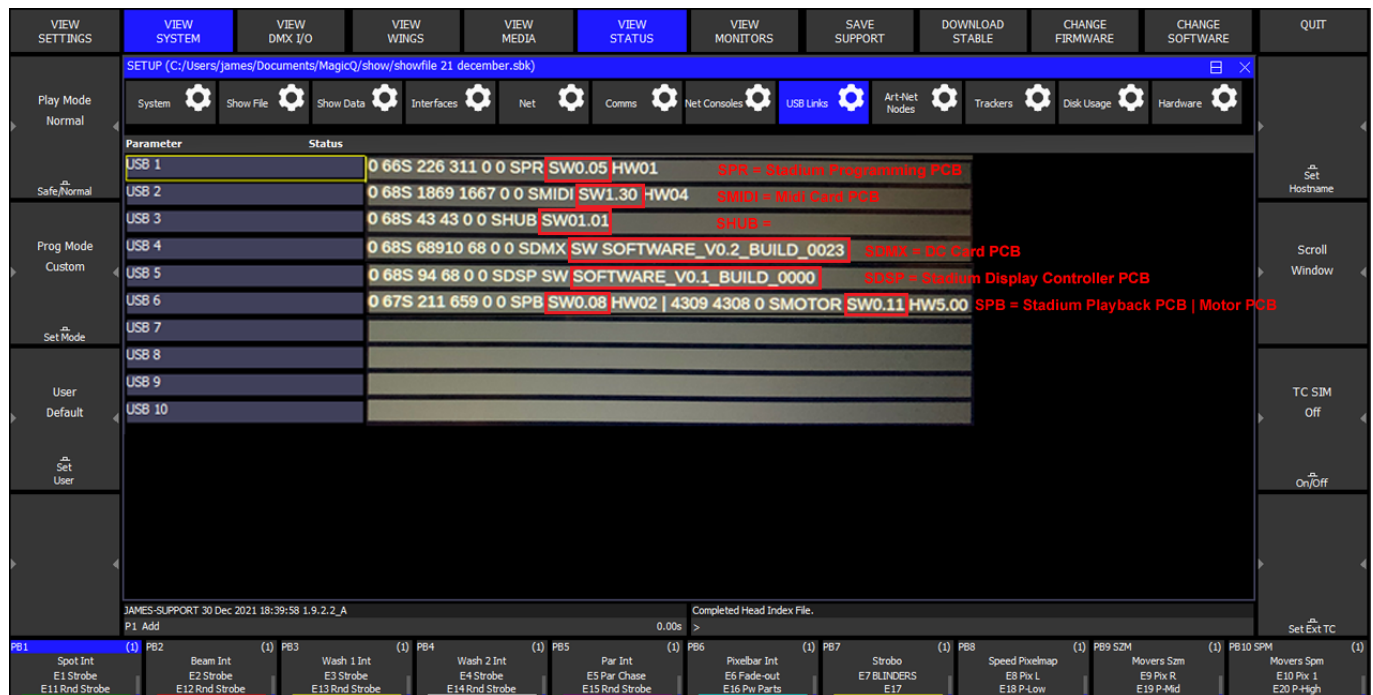
To check the version of firmware in use go to Setup, View System, View Status and select the Hardware tab. For each panel/board it shows current version, available highest firmware version and current update status.

It is possible to see more details in the USB links tab - the software version is shown as the 7th number in the list of parameters. The complete list of parameters is:

<link drops> <time link has been up> <tx packets> <rx packets> <tx errors> <tx retries> <sw version> <hw version> <build number>

The below image shows the firmware versions with each board highlighted.

Note the SDMX USB link is for the DMX Card which is not user upgradeable and users should not attempt to firmware update this card.



The latest firmware versions for each board can be found in the firmware change log in the section below.

9.9 MQ500M Stadium firmware

The MQ500M Stadium console has the following boards:

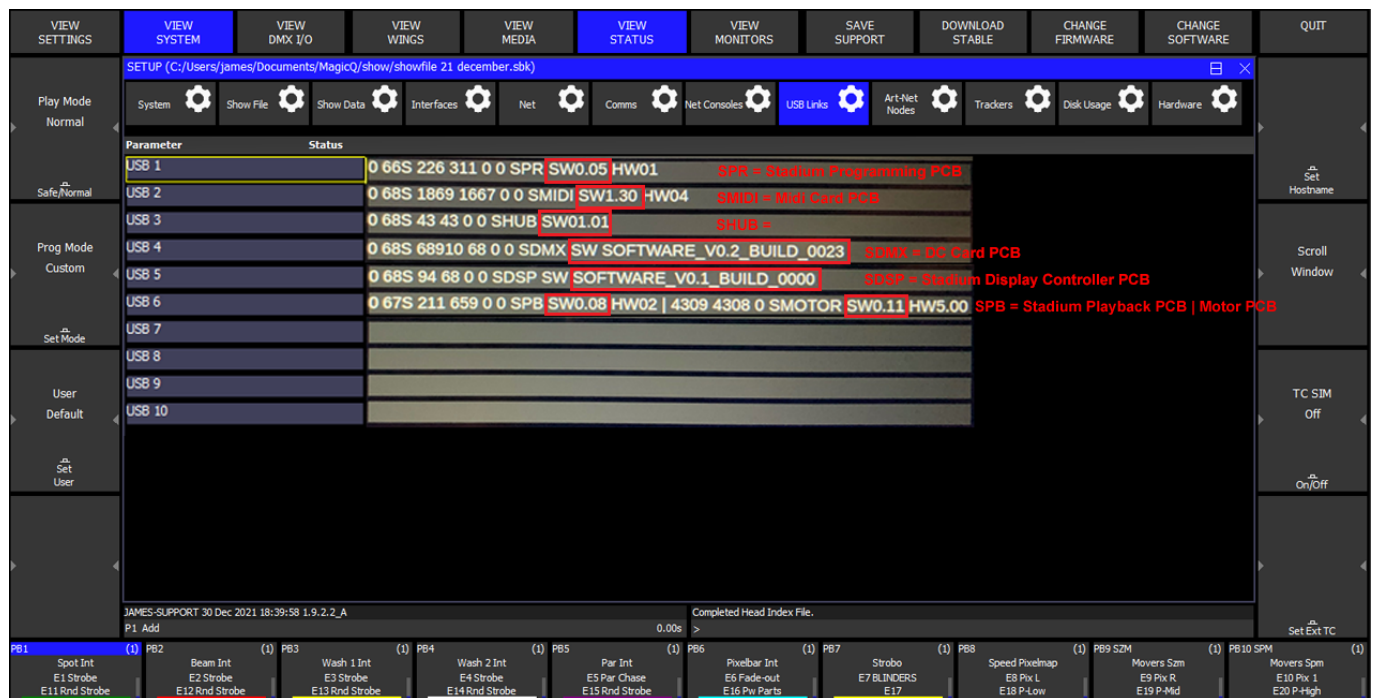
Programmer panel	Firmware 310-023_VX.YZ.hex via SP _r USB link
Playback panel	Firmware 310-022_VX.YZ.hex via SP _b USB link
Motor board	Firmware 310-021_VX.YZ.hex via SP _b USB link
MIDI controller	Firmware CH346_VX.YZ.hex via S _m idi USB link
Display controller	SDsp USB link not user upgradeable. V2 of the controller board can use Firmware CH346_VX.YZ.hex via S5Dsp USB link

Hub controller	SHub USB link not user upgradable
----------------	-----------------------------------

Note that the playback panel and the motor board use the same USB link - the motor board is itself connected to the playback panel. When upgrading the playback panel passes the motor firmware onto the motor board.

Where date is the date, e.g. CH355A_2017_05_23.hex and X.YZ is version number e.g. CH346_V0.33.hex.

The below image shows the firmware versions for each board highlighted. Note the SDMX USB link is for the DMX Card which is not user upgradable and users should not attempt to firmware update this card.



To check the version of firmware in use go to Setup, View System, View Status and select the Hardware tab. For each panel/board it shows current version, available highest firmware version and current update status.

It is possible to see more details in the USB links tab - the software version is shown as the 7th number in the list of parameters. The complete list of parameters is:

<link drops> <time link has been up> <tx packets> <rx packets> <tx errors> <tx retries> <sw version> <hw version> <build number>

The latest firmware versions for each board can be found in the firmware change log in the section below.

9.10 MQ500M Wing firmware

The MQ500M Wing has the following boards:

Playback panel	Firmware 310-022_VX.YZ.hex via SWPb USB link
Motor board	Firmware 310-021-VX.YZ.hex via SWPb USB link
Hub controller	SWHub USB link not user upgradable

Follow the same procedure as for the MQ500M console above except using the Stadium Playback, Stadium Wing base card and Stadium Wing motor links.

The latest firmware versions for each board can be found in the firmware change log in the section below.

9.11 Compact & Mini Connect firmware

The Compact Connect used 310-028 Firmware and Mini Connect uses 310-033 firmware.

Latest firmware for these products is included with MagicQ PC and firmware is updated via MagicQ in the same way as updating firmware for MagicQ Consoles

9.12 Firmware Change Log

9.12.1 CH346 Firmware (MQ50, MQ70, MQ80, MQ500(M) Midi Card, MQ500(M) V2 Display Controller and MQ250M Display controller)

CH346_V0.25	Original Production firmware for MQ80
CH346_V0.32	Improvements to DMX, MIDI, LTC and faders. Upgrade to this version if you are seeing periodic DMX flicks with some fixtures such as SGM P5. Upgrade to this version if you wish to use MIDI or LTC inputs.
CH346_V0.33	Fix for display not recovering from screen save
CH346_V0.35	No Changes - used for Production
CH346_V1.00	Support for RDM on the four DMX ports
CH346_V1.01	Fixes an RDM issue where the DMX port does not reset correctly after a RDM discovery collision.
CH346_V1.20	Initial Support of MQ70 and MQ50 (2019).
CH346_V1.22	Added Fader and Encoder brightness adjustment for the MQ70.
CH346_V1.23	Fixed DMX output stopping when MQ Direct is selected for less than 4 ports.
CH346_V1.24	Fixes Midi show control and Midi System Exclusive messages for the MQ500 Midi Card.
CH346_V1.25	Fixes Midi issues for MQ80 consoles, the Midi communication issue was introduced in versions greater than and equal to V1.00.
CH346_V1.30	Fixes direct RDM Break and MaB (MQ80/MQ70/MQ50). Fixed RDM discovery times to help find large number nodes (MQ80/MQ70/MQ50). Fixed front panel drop outs when MagicQ is doing time consuming tasks (MQ80/MQ70/MQ50/MQ500 Midi). Updates to low level USB driver code from a third party (MQ80/MQ70/MQ50/MQ500 Midi).
CH346_V1.40	MQ250M display PCB code added.
CH346_V1.41	MQ250M tilt sensor function added.
CH346_V1.42	DMX USB message alignment fix.
CH346_V1.43	Fix for intermittent firmware update failure.
CH346_V1.45	Added support for V2 MQ500(M) Display Controller, and HW revision 3 of MQ250M Display Controller. These require MagicQ 1.9.2.4 and above.
CH346_V1.46	Fixed the self test on the HW revision 3 of the MQ250M Display controller not starting.
CH346_V1.47	Fixed issue with MQ250 Displays not turning on sometimes when lid is opened.
CH346_V1.48	Updated MQ250 startup sequence to blank the smaller screen until MagicQ starts.
CH346_V1.49	Updated MQ250 display board firmware to match tilt sensor hardware change.

CH346_V1.50	Updated MQ250+MQ500 display board firmware to turn off the backlight until MagicQ starts.
CH346_V1.52	Rebuild for compiler change.

9.12.2 CH310-021 Firmware (MQ250M & MQ500M Motor board)

310-021_V0.10	Initial release.
310-021_V0.11	Adds support of 12-bit moves to support cross fader tracking, needs 310-022_V0.07 or greater on the Playback board.
310-021_V0.13	Adds explicit reset for the capacitive touch sense on the faders in cases where the console has failed calibration due to faders being touched on startup.
310-021_V0.14	Improved fader positioning if fader belt contains more slack.

9.12.3 CH310-022 Firmware (MQ250M & MQ500M Playback Panel)

310-022_V0.05	Initial release.
310-022_V0.07	Fixed Motor stats filling up MagicQ USB RX buffer. Adds support of 12-bit cross fader moves for cross fader tracking, needs 310-021_V0.11 or greater on the motor control board.
310-022_V0.08	Fixed drop outs when MagicQ is doing time consuming tasks.
310-022_V0.09	MQ250M Fader control added.
310-022_V0.10	WinUSB USB descriptors added.
310-022_V0.11	USB timeout fix.
310-022_V0.12	Fix for intermittent firmware update failure.
310-022_V0.15	Made changes to LED production tests. MagicQ v1.9.3.0
310-022_V0.17	Made changes to LED production tests. (dim down leds etc)
310-022_V0.19	Rebuild for compiler changed.

9.12.4 CH310-023 Firmware (MQ500M Programmer Panel)

310-023_V0.03	Initial release.
310-023_V0.05	Fixed drop outs when MagicQ is doing time consuming tasks.
310-023_V0.06	WinUSB USB descriptors added.
310-023_V0.07	USB timeout fix.
310-023_V0.08	Fix for intermittent firmware update failure.
310-023_V0.11	Made changes to LED production tests. (dim down leds etc)
310-023_V0.13	Rebuild for compiler change.

9.12.5 CH310-025 Firmware (MQ250M Programmer Panel)

310-025_V0.04	Initial release.
310-025_V0.07	Made changes to LED production tests. (dim down leds etc)
310-025_V0.10	Rebuild for compiler change.

9.12.6 CH310-028 Firmware (Compact Connect)

310-028_V1.01	Initial release.
310-028_V1.03	Resolved an issue with the keyboard locking up after a long period of time.
310-028_V1.04	Fix for fader levels changing without moving faders.
310-028_V1.05	Fix for Compact Connect locking up when Flash toggles was enabled
310-028_V1.06	Fix for an issue with the input levels on the S2L Audio input.

9.12.7 CH310-033 Firmware (Mini Connect)

310-033_V1.01	Initial release.
310-033_V1.03	Resolved an issue with the keyboard locking up after a long period of time.
310-033_V1.04	Fix for fader levels changing without moving faders.
310-033_V1.05	Fix for Compact Connect locking up when Flash toggles was enabled
310-033_V1.06	Fix for an issue with the input levels on the S2L Audio input.

9.13 Updating Firmware

9.13.1 Upgrading to latest firmware

The Hardware tab in Setup, View System, View Status shows available firmware versions and current update status.

The LATEST FIRMWARE menu option enables a hardware item to be updated to the latest hardware version without manually selecting the file. Move the cursor to the required row and press LATEST FIRMWARE.

It is possible to press SHIFT and ALL FIRMWARE to upgrade all boards to the latest available firmware. A dialog gives the option to force upgrade all boards, or to only upgrade boards that are at lower firmware versions.

Each board is upgraded in turn - the current board being upgraded shows as "upgrading" and the others show as "queued". Sometimes it may be needed to run ALL FIRMWARE twice to ensure all boards get upgraded.

It is also possible to automatically change firmware direct from USB stick / firmware files copied to the console. In File Manager click on the file and a dialog will appear to ask whether to update all boards that use that firmware type.

9.13.2 Manual firmware update

Before updating firmware disconnect any Wings and USB interfaces & drives from the console.

Press Setup, View System, View Status and change to the USB Links tab.

Put the cursor on the line for USB link to be updated. Press the CHANGE FIRMWARE top soft button and select the new firmware file - e.g. CH346_V1.43.hex.

MagicQ will report "Starting firmware upgrade" then "Sent start upgrade".

Do not touch anything or power off the console whilst the update is in progress – interrupting the upgrade could leave the Console in an unusable state and it will have to be returned to ChamSys for repair.

MagicQ will then display "Sent firmware 1000", "Sent firmware 2000" and so on, the front Panel playback LEDs will also light in sequence to show the firmware update progress.

The console will report "Sent all firmware" and "Programmed Ok" once firmware has been updated.

Should the upgrade timeout or fail for the motor board the string "Boot" will appear after SMotor in the USB link, this indicates it is in boot-loader mode. A retry of the firmware upgrade should rectify this.

9.14 Upgrading Legacy product firmware

9.14.1 Original Compact series MQ40/MQ40N/MQ60/MQ70 firmware

To check the version of firmware in use go to Setup, View System, View Status and select the USB Links tab. The software version is shown as the 7th number in the list of parameters. The complete list of parameters is:

<link drops> <time link has been up> <tx packets> <rx packets> <tx errors> <tx retries> <sw version> <hw version> <build number>

Alternatively check the front panel version field in Setup, View System, View Status, System tab.

To upgrade the MQ40/40N/60/70 front panel firmware you must first be running a software version higher then v1.5.9.9 MagicQ software on the console. Do NOT use versions v1.7.0.1 to v1.7.0.4. Upgrade software to v1.7.1.0 or higher first.

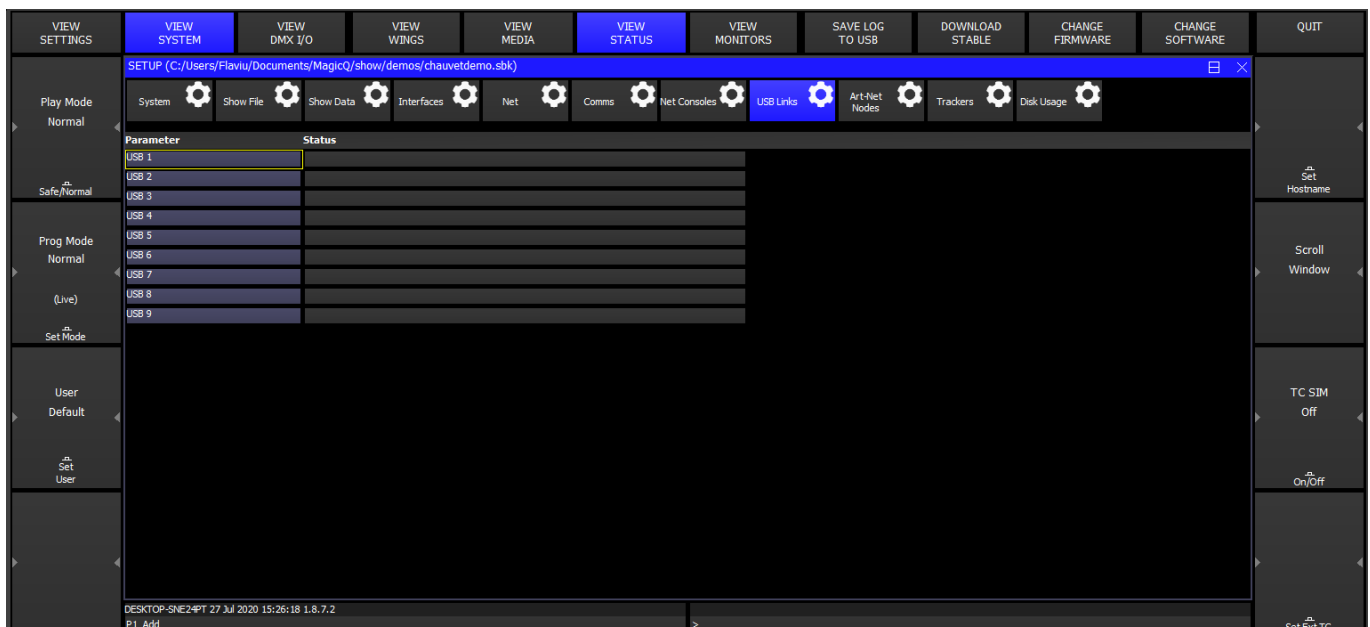
Some consoles have front panel firmware have a file version 2.0 in the firmware folder. Do NOT use this version. Only use version 1.0, 1.1 or 1.2.

Failure to update to a valid version before performing the firmware upgrade could result in the console needing to be returned to ChamSys for repair. The latest MQ40/40N/60/70 firmware is included with each release in the firmware folder under the name CH331_xxx.hex

CH331_V0	Original firmware
CH331_V1.0	Added audio support
CH331_V1.1	Added MIDI and LTC timecode support (MQ70 only - not for MQ40/60)
CH331_V1.2	Fixed RS232 serial port communications

Disconnect any Wings and network devices and remove any USB drives from the console.

Press Setup, View System, View Status and change to the USB Links tab. If more than one USB device is shown then disconnect all other MagicQ Wings and interfaces.



Put the cursor on the line for USB 1 as above. Press CHANGE FIRMWARE and select the new firmware file - e.g. CH331_V1.0.hex. MagicQ should then say "Starting firmware upgrade" and then a few seconds later "Sent start upgrade".

Sent start upgrade
>

Do not touch anything or power off whilst the update is in progress – interrupting the upgrade will leave the Console in an unusable state and it will have to be returned to ChamSys for repair.

MagicQ will then wait between 5 and 10 seconds and then display messages "Sent firmware 1000", "Sent firmware 2000" and so on up to about "Sent firmware 76000".



```
Sent firmware 3000
>
```

It will then briefly say "Sent all firmware" and "Programmed Ok".



```
Programmed ok
>
```

If all is ok then it will say "Programmed OK" and you are ok to power off the Console and restart it. Note that the console front panel is sometimes unresponsive at this point, so you may need to shut down from the touch screen using Setup, View Settings, Quit. If there is no response at all then you will need to hold the reset button to power off the console.

If it gets stuck on "Fails to Load Firmware" and the console continues to loop in the Load firmware screen the console should be powered off and will need to be returned to ChamSys UK for re-programming.

Chapter 10

Troubleshooting

10.1 No outputs

Check whether MagicQ is operating correctly by opening the Outputs Window and looking at the data in View Heads. If the intensity or other attributes are not at their correct levels then check:

- Are the Grand Master and Playback Master faders up?
- Are Playback faders raised?
- Is there channel data recorded in the Cues on the playbacks?
- Is BLIND mode on?
- Heads and dimmers are patched to the correct universe?

If the Outputs Window shows correct values then check the Outputs are configured and enabled correctly in the View DMX I/O view of the Setup Window. If you are using an Ethernet convertor box check that it is receiving data correctly. Check:

- Outputs are configured correctly
- Outputs are enabled
- Is test mode active in DMX/IO?
- If using network outputs check the IP address and subnet address are configured correctly

Try putting a test pattern on the entire DMX output - in DMX I/O set the test field to Ramp. The Outputs, View Chans, View DMX shows exactly what is being output on each universe.

10.2 MagicQ not responding

Is the time changing in the Status Display? If so then MagicQ is running o.k. Check

- Master faders up
- Correct playback pages selected
- Playback has a Cue stored on it
- MagicQ is not locked (CTRL top left soft button)
- Is button test mode on (Press CNTRL+ALT+SHIFT or hold top left SHIFT button and press top right SHIFT button on older MQ100 series consoles)

If the time is not changing then you will have to perform a hard reset on the console.

10.3 MagicQ responding slowly

Check memory usage in Setup, View System, View Status. Try

- Closing all windows (SHIFT + CLOSE)
- Ensure you have saved your show to hard disk not to a USB stick
- Remove any USB devices especially USB Sticks
- Disable network connections to media servers

10.4 Strange key presses, unexpected window changes

Enter board test mode to determine the cause of the fault press CTRL + ALT + SHIFT keys to enter and exit this mode. On older MQ100 Series console press the SHIFT buttons either side of the display together.

- Check a button has not become stuck down
- Check nothing / no-one is leaning on the keyboard or other buttons
- Check a keyboard macro has not been accidentally recorded / played back

10.5 MagicQ console not booting

There are quite a few different reasons for the console not to boot - it could be a problem with the system operating system software or a hardware problem.

10.5.1 MQ100 series console not booting

If the console is cycling the boot sequence continually or showing "kernel panic" then this normally indicates a hardware problem. Get a qualified service technician to remove the rear panel and reseal cables and processor daughter card (transition card). On a Pro 2014 console if the console is showing "lynxfb" then get a qualified service technician to remove the rear panel and remove the graphics card from underneath the processor module.

Check out the [Software Upgrade](#) section for repair of the operating system.

10.5.2 MQ80 console blank screen and not booting

When the BIOS settings are lost on the MQ80 console the internal display will not function, this can also cause MagicQ to not start correctly. An indication that this has happened would be when the console is powered on the blue soft button LEDs either side of the display illuminate, but the console display remains blank. To reset BIOS settings on the MQ80 console an external monitor and a USB keyboard connected to the lower Neutrik USB port are required.

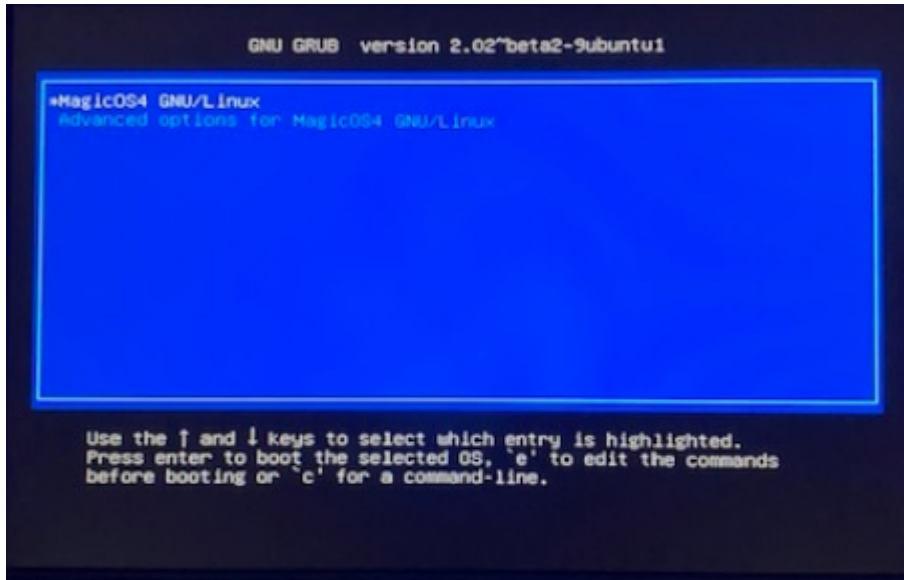
Once connected:

- Start up the console and Enter the BIOS using the 'Delete' key on the external keyboard.
- Go to Advanced, Chipset Configuration
- Select the primary output to be the LVDS output
- Select the "1440x900 24bit 2ch LED" option for the resolution (should be one above the 1280x900 option near the middle.
- Select the secondary output to be HDMI
- Press F10 to save and reboot the console

Note these settings are for the MQ80 console only and should not be used on ANY other MagicQ console. A BIOS update is available to default the correct settings if BIOS setting are lost in future - contact ChamSys support to obtain this.

10.5.3 MQ80 console MagicQ not starting

If the console is not correctly shutdown or for some reason MagicQ is not closed correctly (for example by using the reset button on the console), the console may boot into the GNU GRUB display pictured below. To boot MagicQ when in this state a USB keyboard is required, connect a USB keyboard to the console and select the top option *MagicOS4 GNU/Linux* using the cursor keys on the keyboard and press *Enter* to select to boot this option. The console should then boot MagicQ and start correctly. When the console has booted into the GNU GRUB display do NOT attempt to reset the console by power cycling or resetting the console as this will cause damage to the consoles Solid State Drive.



10.5.4 MQ50 / MQ70 / MQ250M console MagicQ not starting

MagicQ MQ50, MQ70 and MQ250M consoles feature a Recovery Mode allowing for the operating system to be re-installed. The Recovery button is located on the rear of the consoles. Recovery should only be used if the console is powering on, but MagicQ is not starting. Note the use of Recovery mode may erase user show files during the process.

To use Recovery:

- Power off the console
- Hold down the recovery button on the rear of the console
- Power on the console while continuing to hold the Recovery button
- After ~20 seconds release the recovery button, console will boot into Recovery Mode
- Select System Format in the Recovery menu
- Select Restore Boot partition
- After this completes, select back and shutdown the console, then Power back on the console.

If console doesn't boot into MagicQ after following the above these steps can be followed:

- Download the latest MQ50/MQ70/MQ250M software installer from the ChamSys website (.cdz file) and copy onto a USB drive.
- Power off the console
- Hold down the recovery button on the rear of the console
- Power on the console while continuing to hold the Recovery button

- After ~20 seconds release the recovery button, console will boot into Recovery Mode
- Select System Format in the Recovery menu
- Select Format Internal Flash and Confirm, once complete select Back and shutdown the console
- Power on the console normally
- Console will boot automatically the MagicQ factory menu
- Select Update from USB stick and select the .cdz file on USB drive.
- Once complete console should then boot into MagicQ.

10.5.5 MQ40/60 console not starting

MQ40/60 series consoles feature an OS recovery mode. When powering on the console the *s* buttons should light in sequence and then start flashing until MagicQ has started. If MagicQ does not start this may indicate a problem with the OS.

Recovery should only be used if the console is powering on, but MagicQ is not starting.

To recover the OS on these consoles:

- Power off the console
- Hold down || keys of playbacks 1 and 3, and > key of playback 2
- While holding down these 3 keys, power on the console
- Continue to hold these keys for around 30 seconds
- MagicQ should then recover and reload an older version of the MagicQ OS

If the console continue to not boot after this contact ChamSys Support

10.6 MagicQ console blank screen

If the screen is blank then this may be because of the screen saver. Try pressing SHIFT.

If the screen remains blank even after pressing buttons then try holding CTRL and pressing the X Encoder wheel soft button (Illuminated button closest to the X encoder wheel) twice. This attempts to restart the screen backlight.

The screen may have been turned off and locked by a user. Press CTRL and the second soft button down on the left (soft button B). If this does not help then press CTRL and the second soft button a second time.

If the screen still remains blank then try connecting an external monitor.

Avoid using the white reset button to shut down the console - hold down the three cursor keys (< V >) and press DBO to shut down the console.

10.7 MagicQ console white screen

MagicQ console white screen indicates that the display has power but no data signal. This could be because the main processor has halted or because the display signal cable is broken/disconnected.

Try pressing S buttons. If the blue LED follows the S button then the main processor is running correctly - check display cable. Get a qualified service technician to open the console to verify this.

If the S buttons are not responding then it is likely there is a bad connection in the rear panel. Get a qualified service technician to remove the rear panel and reseal the power and disc cables and ensure processor daughter card (transition card) is firmly pressed onto the processor card.

Avoid using the white reset button to shut down the console - use the three cursor keys (< V >) and press DBO to shut down the console.

10.8 MagicQ console distorted screen

If the screen image is distorted, has multiple lines through it or has incorrect colours then this indicates that the graphics hardware has not started correctly.

Hold the three cursor keys (< V >) and press DBO to shut down the console.

10.9 MagicQ console internal touch screen not working

- Try to calibrate the touch screen (CTRL + SET)
- Check it is giving correct values in board test mode (SHIFT + SHIFT)
- Check there is no dirt around the edges of the screen
- Check that liquid has not been spilt into the touch screen
- Check the metalwork is not catching on the screen

10.10 All 10 S buttons flashing blue

If all 10 S buttons are flashing blue this indicates that the console front panel is not communicating with the console main processor.

This could be caused by a problem with the console main processor or the cable/connection between the console main processor and the console front panel. If the main processor is running and showing MagicQ on the screen then the problem is with the cable/connection.

It is possible to check whether the main processor is running:

- Is there any output on the main screen? Do you see the boot procedure?
- Connect an external monitor. Do you see anything on the external monitor during boot?
- Connect a keyboard. If you press CAPS LOCK does the LED on the CAPS LOCK key come on?
- Is the console fan running?

Note that on a MQ100/200/300 the touch screen is controlled through the front panel so the touch will not work in this situation. Connect an external mouse to click items on the screen.

To shut down the console use a mouse, or if there is no output on the screen using the reset button.

As the front panel is not communicating with the main processor it will not be able to shut down using buttons on the front panel.

10.11 Fader, Encoder or Button not working correctly

- Go into board test mode (CNTRL+ALT+SHIFT or SHIFT + SHIFT) to test the hardware.

If none of the buttons and faders are working then check that the front panel is running ok. If there are no LEDs lit on the front panel then it is possible that the front panel is not running correctly.

On MQ500, MQ100 series console and Playback and Execute Wings there are 4 LEDs underneath the arm-rest. The red LED indicates power whilst the green LED should flash to indicate that the front panel CPU is running. The two yellow LEDs show messages from/to the front panel. One of them should turn on when you move faders, the other should flash periodically when it receives messages from the console main processor.

10.12 Unable to save shows or patch heads after performing a *777 erase all on the console

This is caused by using the *777 Erase all function on MagicQ console is versions prior to v1.5.9.2.

To fix:

Go to Setup, file manager and press the *up dir* soft button a number of times. This will then take you into the root folder (folders will appear on screen). Find the folder called *home* go into it Create a folder called *magicq*. Using the Create Dir soft button. Restart the console.

10.13 "MagicQ needs to write to the install folder..." message on Mac

If you get a message on Mac about incorrect permissions, please try the following steps:

1. Open the "Applications" folder in finder
2. Right click on the "MagicQ" folder and select "Get Info"
3. Click on the padlock in the bottom right corner and enter your password
4. If your username isn't in the list of permissions, add it with the + button
5. Set the permissions of your username to "Read & Write"
6. Click on the settings icon underneath the permissions list, select "Apply to enclosed items...", and accept the warning message
7. Restart the Mac

If you still see this error message, perform a clean install of MagicQ:

1. Open the "Applications" folder
2. Delete the "MagicQ" folder
3. Open Finder, choose "Go" > "Go to folder" from the toolbar
4. Type in "~/Library/Application Support/"
5. If a "MagicQ" folder exists, delete it
6. Restart the Mac
7. Download the latest version from <https://secure.chamsys.co.uk/download>
8. Open the .dmg file. Hold down shift, right click on the MagicQ package, select "Open" and click "Open".
9. Follow the installer steps

10.14 Linux: MagicQ fails to start / libGL error

If MagicQ is failing to start on Linux, try running it from the command line (with /opt/magicq/runmagicq.sh). If errors appear similar to the following:

```
libGL error: MESA-LOADER: failed to open swrast (search paths /usr/lib/x86_64- ↵
    linux-gnu/dri:\${ORIGIN}/dri:/usr/lib/dri)
libGL error: failed to load driver: swrast
```

Then this is likely caused by your graphics drivers being built for a newer version of `libc` than MagicQ is distributed with. Try renaming `/opt/magicq/lib/libstdc.so.6` to `libstdc.so.6~` (this may require root) and running again; this will allow MagicQ to use the system version of `libstdc.so.6`. If this fails, rename the file back again and contact support.

Chapter 11

Licensing

MagicQ consoles use the Debian and Ubuntu Operating Systems. Details and links to sources can be found at <https://www.debian.org/> and <https://www.ubuntu.com/>. The following are distributed alongside the MagicQ application.

Versions prior to v1.5.6.0 of MagicQ the software also used the MicroWindows library, details can be found at <http://www.microwindows.com/>.

Art-Net™ Designed by and Copyright Artistic Licence Holdings Ltd".

Demos show files may contain audio and other media. Users are not permitted to extract audio or media files, or to use them for any other purpose except training.

11.1 Qt

<https://qt.io/>

The Qt Company Qt LGPL Exception version 1.1

As an additional permission to the GNU Lesser General Public License version 2.1, the object code form of a "work that uses the Library" may incorporate material from a header file that is part of the Library. You may distribute such object code under terms of your choice, provided that:

- (i) the header files of the Library have not been modified; and
- (ii) the incorporated material is limited to numerical parameters, data structure layouts, accessors, macros, inline functions and templates; and
- (iii) you comply with the terms of Section 6 of the GNU Lesser General Public License version 2.1.

Moreover, you may apply this exception to a modified version of the Library, provided that such modification does not involve copying material from the Library into the modified Library's header files unless such material is limited to (i) numerical parameters; (ii) data structure layouts; (iii) accessors; and (iv) small macros, templates and inline functions of five lines or less in length.

Furthermore, you are not required to apply this additional permission to a modified version of the Library.

GNU LESSER GENERAL PUBLIC LICENSE

The Qt Toolkit is Copyright (C) 2016 The Qt Company Ltd.
Contact: <http://www.qt.io/licensing/>

You may use, distribute and copy the Qt Toolkit under the terms of
GNU Lesser General Public License version 2.1, which is displayed below.

GNU LESSER GENERAL PUBLIC LICENSE
Version 2.1, February 1999

Copyright (C) 1991, 1999 Free Software Foundation, Inc.
51 Franklin Street, Fifth Floor, Boston, MA 02110-1301 USA
Everyone is permitted to copy and distribute verbatim copies
of this license document, but changing it is not allowed.

[This is the first released version of the Lesser GPL. It also counts
as the successor of the GNU Library Public License, version 2, hence
the version number 2.1.]

Preamble

The licenses for most software are designed to take away your
freedom to share and change it. By contrast, the GNU General Public
Licenses are intended to guarantee your freedom to share and change
free software--to make sure the software is free for all its users.

This license, the Lesser General Public License, applies to some
specially designated software packages--typically libraries--of the
Free Software Foundation and other authors who decide to use it. You
can use it too, but we suggest you first think carefully about whether
this license or the ordinary General Public License is the better
strategy to use in any particular case, based on the explanations below.

When we speak of free software, we are referring to freedom of use,
not price. Our General Public Licenses are designed to make sure that
you have the freedom to distribute copies of free software (and charge
for this service if you wish); that you receive source code or can get
it if you want it; that you can change the software and use pieces of
it in new free programs; and that you are informed that you can do
these things.

To protect your rights, we need to make restrictions that forbid
distributors to deny you these rights or to ask you to surrender these
rights. These restrictions translate to certain responsibilities for
you if you distribute copies of the library or if you modify it.

For example, if you distribute copies of the library, whether gratis
or for a fee, you must give the recipients all the rights that we gave
you. You must make sure that they, too, receive or can get the source
code. If you link other code with the library, you must provide
complete object files to the recipients, so that they can relink them
with the library after making changes to the library and recompiling
it. And you must show them these terms so they know their rights.

We protect your rights with a two-step method: (1) we copyright the

library, and (2) we offer you this license, which gives you legal permission to copy, distribute and/or modify the library.

To protect each distributor, we want to make it very clear that there is no warranty for the free library. Also, if the library is modified by someone else and passed on, the recipients should know that what they have is not the original version, so that the original author's reputation will not be affected by problems that might be introduced by others.

Finally, software patents pose a constant threat to the existence of any free program. We wish to make sure that a company cannot effectively restrict the users of a free program by obtaining a restrictive license from a patent holder. Therefore, we insist that any patent license obtained for a version of the library must be consistent with the full freedom of use specified in this license.

Most GNU software, including some libraries, is covered by the ordinary GNU General Public License. This license, the GNU Lesser General Public License, applies to certain designated libraries, and is quite different from the ordinary General Public License. We use this license for certain libraries in order to permit linking those libraries into non-free programs.

When a program is linked with a library, whether statically or using a shared library, the combination of the two is legally speaking a combined work, a derivative of the original library. The ordinary General Public License therefore permits such linking only if the entire combination fits its criteria of freedom. The Lesser General Public License permits more lax criteria for linking other code with the library.

We call this license the "Lesser" General Public License because it does Less to protect the user's freedom than the ordinary General Public License. It also provides other free software developers Less of an advantage over competing non-free programs. These disadvantages are the reason we use the ordinary General Public License for many libraries. However, the Lesser license provides advantages in certain special circumstances.

For example, on rare occasions, there may be a special need to encourage the widest possible use of a certain library, so that it becomes a de-facto standard. To achieve this, non-free programs must be allowed to use the library. A more frequent case is that a free library does the same job as widely used non-free libraries. In this case, there is little to gain by limiting the free library to free software only, so we use the Lesser General Public License.

In other cases, permission to use a particular library in non-free programs enables a greater number of people to use a large body of free software. For example, permission to use the GNU C Library in non-free programs enables many more people to use the whole GNU operating system, as well as its variant, the GNU/Linux operating system.

Although the Lesser General Public License is Less protective of the users' freedom, it does ensure that the user of a program that is

linked with the Library has the freedom and the wherewithal to run that program using a modified version of the Library.

The precise terms and conditions for copying, distribution and modification follow. Pay close attention to the difference between a "work based on the library" and a "work that uses the library". The former contains code derived from the library, whereas the latter must be combined with the library in order to run.

GNU LESSER GENERAL PUBLIC LICENSE
TERMS AND CONDITIONS FOR COPYING, DISTRIBUTION AND MODIFICATION

0. This License Agreement applies to any software library or other program which contains a notice placed by the copyright holder or other authorized party saying it may be distributed under the terms of this Lesser General Public License (also called "this License"). Each licensee is addressed as "you".

A "library" means a collection of software functions and/or data prepared so as to be conveniently linked with application programs (which use some of those functions and data) to form executables.

The "Library", below, refers to any such software library or work which has been distributed under these terms. A "work based on the Library" means either the Library or any derivative work under copyright law: that is to say, a work containing the Library or a portion of it, either verbatim or with modifications and/or translated straightforwardly into another language. (Hereinafter, translation is included without limitation in the term "modification".)

"Source code" for a work means the preferred form of the work for making modifications to it. For a library, complete source code means all the source code for all modules it contains, plus any associated interface definition files, plus the scripts used to control compilation and installation of the library.

Activities other than copying, distribution and modification are not covered by this License; they are outside its scope. The act of running a program using the Library is not restricted, and output from such a program is covered only if its contents constitute a work based on the Library (independent of the use of the Library in a tool for writing it). Whether that is true depends on what the Library does and what the program that uses the Library does.

1. You may copy and distribute verbatim copies of the Library's complete source code as you receive it, in any medium, provided that you conspicuously and appropriately publish on each copy an appropriate copyright notice and disclaimer of warranty; keep intact all the notices that refer to this License and to the absence of any warranty; and distribute a copy of this License along with the Library.

You may charge a fee for the physical act of transferring a copy, and you may at your option offer warranty protection in exchange for a fee.

2. You may modify your copy or copies of the Library or any portion

of it, thus forming a work based on the Library, and copy and distribute such modifications or work under the terms of Section 1 above, provided that you also meet all of these conditions:

- a) The modified work must itself be a software library.
- b) You must cause the files modified to carry prominent notices stating that you changed the files and the date of any change.
- c) You must cause the whole of the work to be licensed at no charge to all third parties under the terms of this License.
- d) If a facility in the modified Library refers to a function or a table of data to be supplied by an application program that uses the facility, other than as an argument passed when the facility is invoked, then you must make a good faith effort to ensure that, in the event an application does not supply such function or table, the facility still operates, and performs whatever part of its purpose remains meaningful.

(For example, a function in a library to compute square roots has a purpose that is entirely well-defined independent of the application. Therefore, Subsection 2d requires that any application-supplied function or table used by this function must be optional: if the application does not supply it, the square root function must still compute square roots.)

These requirements apply to the modified work as a whole. If identifiable sections of that work are not derived from the Library, and can be reasonably considered independent and separate works in themselves, then this License, and its terms, do not apply to those sections when you distribute them as separate works. But when you distribute the same sections as part of a whole which is a work based on the Library, the distribution of the whole must be on the terms of this License, whose permissions for other licensees extend to the entire whole, and thus to each and every part regardless of who wrote it.

Thus, it is not the intent of this section to claim rights or contest your rights to work written entirely by you; rather, the intent is to exercise the right to control the distribution of derivative or collective works based on the Library.

In addition, mere aggregation of another work not based on the Library with the Library (or with a work based on the Library) on a volume of a storage or distribution medium does not bring the other work under the scope of this License.

3. You may opt to apply the terms of the ordinary GNU General Public License instead of this License to a given copy of the Library. To do this, you must alter all the notices that refer to this License, so that they refer to the ordinary GNU General Public License, version 2, instead of to this License. (If a newer version than version 2 of the ordinary GNU General Public License has appeared, then you can specify that version instead if you wish.) Do not make any other change in these notices.

Once this change is made in a given copy, it is irreversible for that copy, so the ordinary GNU General Public License applies to all subsequent copies and derivative works made from that copy.

This option is useful when you wish to copy part of the code of the Library into a program that is not a library.

4. You may copy and distribute the Library (or a portion or derivative of it, under Section 2) in object code or executable form under the terms of Sections 1 and 2 above provided that you accompany it with the complete corresponding machine-readable source code, which must be distributed under the terms of Sections 1 and 2 above on a medium customarily used for software interchange.

If distribution of object code is made by offering access to copy from a designated place, then offering equivalent access to copy the source code from the same place satisfies the requirement to distribute the source code, even though third parties are not compelled to copy the source along with the object code.

5. A program that contains no derivative of any portion of the Library, but is designed to work with the Library by being compiled or linked with it, is called a "work that uses the Library". Such a work, in isolation, is not a derivative work of the Library, and therefore falls outside the scope of this License.

However, linking a "work that uses the Library" with the Library creates an executable that is a derivative of the Library (because it contains portions of the Library), rather than a "work that uses the library". The executable is therefore covered by this License. Section 6 states terms for distribution of such executables.

When a "work that uses the Library" uses material from a header file that is part of the Library, the object code for the work may be a derivative work of the Library even though the source code is not. Whether this is true is especially significant if the work can be linked without the Library, or if the work is itself a library. The threshold for this to be true is not precisely defined by law.

If such an object file uses only numerical parameters, data structure layouts and accessors, and small macros and small inline functions (ten lines or less in length), then the use of the object file is unrestricted, regardless of whether it is legally a derivative work. (Executables containing this object code plus portions of the Library will still fall under Section 6.)

Otherwise, if the work is a derivative of the Library, you may distribute the object code for the work under the terms of Section 6. Any executables containing that work also fall under Section 6, whether or not they are linked directly with the Library itself.

6. As an exception to the Sections above, you may also combine or link a "work that uses the Library" with the Library to produce a work containing portions of the Library, and distribute that work under terms of your choice, provided that the terms permit modification of the work for the customer's own use and reverse engineering for debugging such modifications.

You must give prominent notice with each copy of the work that the Library is used in it and that the Library and its use are covered by this License. You must supply a copy of this License. If the work during execution displays copyright notices, you must include the copyright notice for the Library among them, as well as a reference directing the user to the copy of this License. Also, you must do one of these things:

- a) Accompany the work with the complete corresponding machine-readable source code for the Library including whatever changes were used in the work (which must be distributed under Sections 1 and 2 above); and, if the work is an executable linked with the Library, with the complete machine-readable "work that uses the Library", as object code and/or source code, so that the user can modify the Library and then relink to produce a modified executable containing the modified Library. (It is understood that the user who changes the contents of definitions files in the Library will not necessarily be able to recompile the application to use the modified definitions.)
- b) Use a suitable shared library mechanism for linking with the Library. A suitable mechanism is one that (1) uses at run time a copy of the library already present on the user's computer system, rather than copying library functions into the executable, and (2) will operate properly with a modified version of the library, if the user installs one, as long as the modified version is interface-compatible with the version that the work was made with.
- c) Accompany the work with a written offer, valid for at least three years, to give the same user the materials specified in Subsection 6a, above, for a charge no more than the cost of performing this distribution.
- d) If distribution of the work is made by offering access to copy from a designated place, offer equivalent access to copy the above specified materials from the same place.
- e) Verify that the user has already received a copy of these materials or that you have already sent this user a copy.

For an executable, the required form of the "work that uses the Library" must include any data and utility programs needed for reproducing the executable from it. However, as a special exception, the materials to be distributed need not include anything that is normally distributed (in either source or binary form) with the major components (compiler, kernel, and so on) of the operating system on which the executable runs, unless that component itself accompanies the executable.

It may happen that this requirement contradicts the license restrictions of other proprietary libraries that do not normally accompany the operating system. Such a contradiction means you cannot use both them and the Library together in an executable that you distribute.

7. You may place library facilities that are a work based on the

Library side-by-side in a single library together with other library facilities not covered by this License, and distribute such a combined library, provided that the separate distribution of the work based on the Library and of the other library facilities is otherwise permitted, and provided that you do these two things:

- a) Accompany the combined library with a copy of the same work based on the Library, uncombined with any other library facilities. This must be distributed under the terms of the Sections above.
- b) Give prominent notice with the combined library of the fact that part of it is a work based on the Library, and explaining where to find the accompanying uncombined form of the same work.

8. You may not copy, modify, sublicense, link with, or distribute the Library except as expressly provided under this License. Any attempt otherwise to copy, modify, sublicense, link with, or distribute the Library is void, and will automatically terminate your rights under this License. However, parties who have received copies, or rights, from you under this License will not have their licenses terminated so long as such parties remain in full compliance.

9. You are not required to accept this License, since you have not signed it. However, nothing else grants you permission to modify or distribute the Library or its derivative works. These actions are prohibited by law if you do not accept this License. Therefore, by modifying or distributing the Library (or any work based on the Library), you indicate your acceptance of this License to do so, and all its terms and conditions for copying, distributing or modifying the Library or works based on it.

10. Each time you redistribute the Library (or any work based on the Library), the recipient automatically receives a license from the original licensor to copy, distribute, link with or modify the Library subject to these terms and conditions. You may not impose any further restrictions on the recipients' exercise of the rights granted herein. You are not responsible for enforcing compliance by third parties with this License.

11. If, as a consequence of a court judgment or allegation of patent infringement or for any other reason (not limited to patent issues), conditions are imposed on you (whether by court order, agreement or otherwise) that contradict the conditions of this License, they do not excuse you from the conditions of this License. If you cannot distribute so as to satisfy simultaneously your obligations under this License and any other pertinent obligations, then as a consequence you may not distribute the Library at all. For example, if a patent license would not permit royalty-free redistribution of the Library by all those who receive copies directly or indirectly through you, then the only way you could satisfy both it and this License would be to refrain entirely from distribution of the Library.

If any portion of this section is held invalid or unenforceable under any particular circumstance, the balance of the section is intended to apply, and the section as a whole is intended to apply in other circumstances.

It is not the purpose of this section to induce you to infringe any patents or other property right claims or to contest validity of any such claims; this section has the sole purpose of protecting the integrity of the free software distribution system which is implemented by public license practices. Many people have made generous contributions to the wide range of software distributed through that system in reliance on consistent application of that system; it is up to the author/donor to decide if he or she is willing to distribute software through any other system and a licensee cannot impose that choice.

This section is intended to make thoroughly clear what is believed to be a consequence of the rest of this License.

12. If the distribution and/or use of the Library is restricted in certain countries either by patents or by copyrighted interfaces, the original copyright holder who places the Library under this License may add an explicit geographical distribution limitation excluding those countries, so that distribution is permitted only in or among countries not thus excluded. In such case, this License incorporates the limitation as if written in the body of this License.

13. The Free Software Foundation may publish revised and/or new versions of the Lesser General Public License from time to time. Such new versions will be similar in spirit to the present version, but may differ in detail to address new problems or concerns.

Each version is given a distinguishing version number. If the Library specifies a version number of this License which applies to it and "any later version", you have the option of following the terms and conditions either of that version or of any later version published by the Free Software Foundation. If the Library does not specify a license version number, you may choose any version ever published by the Free Software Foundation.

14. If you wish to incorporate parts of the Library into other free programs whose distribution conditions are incompatible with these, write to the author to ask for permission. For software which is copyrighted by the Free Software Foundation, write to the Free Software Foundation; we sometimes make exceptions for this. Our decision will be guided by the two goals of preserving the free status of all derivatives of our free software and of promoting the sharing and reuse of software generally.

NO WARRANTY

15. BECAUSE THE LIBRARY IS LICENSED FREE OF CHARGE, THERE IS NO WARRANTY FOR THE LIBRARY, TO THE EXTENT PERMITTED BY APPLICABLE LAW. EXCEPT WHEN OTHERWISE STATED IN WRITING THE COPYRIGHT HOLDERS AND/OR OTHER PARTIES PROVIDE THE LIBRARY "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE ENTIRE RISK AS TO THE QUALITY AND PERFORMANCE OF THE LIBRARY IS WITH YOU. SHOULD THE LIBRARY PROVE DEFECTIVE, YOU ASSUME THE COST OF ALL NECESSARY SERVICING, REPAIR OR CORRECTION.

16. IN NO EVENT UNLESS REQUIRED BY APPLICABLE LAW OR AGREED TO IN

WRITING WILL ANY COPYRIGHT HOLDER, OR ANY OTHER PARTY WHO MAY MODIFY AND/OR REDISTRIBUTE THE LIBRARY AS PERMITTED ABOVE, BE LIABLE TO YOU FOR DAMAGES, INCLUDING ANY GENERAL, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OR INABILITY TO USE THE LIBRARY (INCLUDING BUT NOT LIMITED TO LOSS OF DATA OR DATA BEING RENDERED INACCURATE OR LOSSES SUSTAINED BY YOU OR THIRD PARTIES OR A FAILURE OF THE LIBRARY TO OPERATE WITH ANY OTHER SOFTWARE), EVEN IF SUCH HOLDER OR OTHER PARTY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

END OF TERMS AND CONDITIONS

How to Apply These Terms to Your New Libraries

If you develop a new library, and you want it to be of the greatest possible use to the public, we recommend making it free software that everyone can redistribute and change. You can do so by permitting redistribution under these terms (or, alternatively, under the terms of the ordinary General Public License).

To apply these terms, attach the following notices to the library. It is safest to attach them to the start of each source file to most effectively convey the exclusion of warranty; and each file should have at least the "copyright" line and a pointer to where the full notice is found.

```
<one line to give the library's name and a brief idea of what it does.>
Copyright (C) <year> <name of author>
```

```
This library is free software; you can redistribute it and/or
modify it under the terms of the GNU Lesser General Public
License as published by the Free Software Foundation; either
version 2.1 of the License, or (at your option) any later version.
```

```
This library is distributed in the hope that it will be useful,
but WITHOUT ANY WARRANTY; without even the implied warranty of
MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the GNU
Lesser General Public License for more details.
```

```
You should have received a copy of the GNU Lesser General Public
License along with this library; if not, write to the Free Software
Foundation, Inc., 51 Franklin Street, Fifth Floor, Boston, MA 02110-1301 USA
```

Also add information on how to contact you by electronic and paper mail.

You should also get your employer (if you work as a programmer) or your school, if any, to sign a "copyright disclaimer" for the library, if necessary. Here is a sample; alter the names:

```
Yoyodyne, Inc., hereby disclaims all copyright interest in the
library `Frob' (a library for tweaking knobs) written by James Random Hacker.
```

```
<signature of Ty Coon>, 1 April 1990
Ty Coon, President of Vice
```

That's all there is to it!

11.2 LibPNG

<http://www.libpng.org/>

This copy of the libpng notices is provided for your convenience. In case of any discrepancy between this copy and the notices in the file png.h that is included in the libpng distribution, the latter shall prevail.

COPYRIGHT NOTICE, DISCLAIMER, and LICENSE:

If you modify libpng you may insert additional notices immediately following this sentence.

This code is released under the libpng license.

libpng versions 1.0.7, July 1, 2000 through 1.6.27, December 29, 2016 are Copyright (c) 2000-2002, 2004, 2006-2016 Glenn Randers-Pehrson, are derived from libpng-1.0.6, and are distributed according to the same disclaimer and license as libpng-1.0.6 with the following individuals added to the list of Contributing Authors:

Simon-Pierre Cadieux
Eric S. Raymond
Mans Rullgard
Cosmin Truta
Gilles Vollant
James Yu

and with the following additions to the disclaimer:

There is no warranty against interference with your enjoyment of the library or against infringement. There is no warranty that our efforts or the library will fulfill any of your particular purposes or needs. This library is provided with all faults, and the entire risk of satisfactory quality, performance, accuracy, and effort is with the user.

Some files in the "contrib" directory and some configure-generated files that are distributed with libpng have other copyright owners and are released under other open source licenses.

libpng versions 0.97, January 1998, through 1.0.6, March 20, 2000, are Copyright (c) 1998-2000 Glenn Randers-Pehrson, are derived from libpng-0.96, and are distributed according to the same disclaimer and license as libpng-0.96, with the following individuals added to the list of Contributing Authors:

Tom Lane
Glenn Randers-Pehrson
Willem van Schaik

libpng versions 0.89, June 1996, through 0.96, May 1997, are Copyright (c) 1996-1997 Andreas Dilger, are derived from libpng-0.88, and are distributed according to the same disclaimer and license as libpng-0.88, with the following individuals added to the list of

Contributing Authors:

John Bowler
Kevin Bracey
Sam Bushell
Magnus Holmgren
Greg Roelofs
Tom Tanner

Some files in the "scripts" directory have other copyright owners but are released under this license.

libpng versions 0.5, May 1995, through 0.88, January 1996, are Copyright (c) 1995-1996 Guy Eric Schalnat, Group 42, Inc.

For the purposes of this copyright and license, "Contributing Authors" is defined as the following set of individuals:

Andreas Dilger
Dave Martindale
Guy Eric Schalnat
Paul Schmidt
Tim Wegner

The PNG Reference Library is supplied "AS IS". The Contributing Authors and Group 42, Inc. disclaim all warranties, expressed or implied, including, without limitation, the warranties of merchantability and of fitness for any purpose. The Contributing Authors and Group 42, Inc. assume no liability for direct, indirect, incidental, special, exemplary, or consequential damages, which may result from the use of the PNG Reference Library, even if advised of the possibility of such damage.

Permission is hereby granted to use, copy, modify, and distribute this source code, or portions hereof, for any purpose, without fee, subject to the following restrictions:

1. The origin of this source code must not be misrepresented.
2. Altered versions must be plainly marked as such and must not be misrepresented as being the original source.
3. This Copyright notice may not be removed or altered from any source or altered source distribution.

The Contributing Authors and Group 42, Inc. specifically permit, without fee, and encourage the use of this source code as a component to supporting the PNG file format in commercial products. If you use this source code in a product, acknowledgment is not required but would be appreciated.

END OF COPYRIGHT NOTICE, DISCLAIMER, and LICENSE.

TRADEMARK:

The name "libpng" has not been registered by the Copyright owner as a trademark in any jurisdiction. However, because libpng has been distributed and maintained world-wide, continually since 1995,

the Copyright owner claims "common-law trademark protection" in any jurisdiction where common-law trademark is recognized.

OSI CERTIFICATION:

Libpng is OSI Certified Open Source Software. OSI Certified Open Source is a certification mark of the Open Source Initiative. OSI has not addressed the additional disclaimers inserted at version 1.0.7.

EXPORT CONTROL:

The Copyright owner believes that the Export Control Classification Number (ECCN) for libpng is EAR99, which means not subject to export controls or International Traffic in Arms Regulations (ITAR) because it is open source, publicly available software, that does not contain any encryption software. See the EAR, paragraphs 734.3(b)(3) and 734.7(b).

Glenn Randers-Pehrson
glennrp at users.sourceforge.net
December 29, 2016

11.3 LibJPEG

<http://www.ijg.org/>

This software is based in part on the work of the Independent JPEG Group.

The authors make NO WARRANTY or representation, either express or implied, with respect to this software, its quality, accuracy, merchantability, or fitness for a particular purpose. This software is provided "AS IS", and you, its user, assume the entire risk as to its quality and accuracy.

This software is copyright (C) 1991-2016, Thomas G. Lane, Guido Vollbeding. All Rights Reserved except as specified below.

Permission is hereby granted to use, copy, modify, and distribute this software (or portions thereof) for any purpose, without fee, subject to these conditions:

- (1) If any part of the source code for this software is distributed, then this README file must be included, with this copyright and no-warranty notice unaltered; and any additions, deletions, or changes to the original files must be clearly indicated in accompanying documentation.
- (2) If only executable code is distributed, then the accompanying documentation must state that "this software is based in part on the work of the Independent JPEG Group".
- (3) Permission for use of this software is granted only if the user accepts full responsibility for any undesirable consequences; the authors accept NO LIABILITY for damages of any kind.

These conditions apply to any software derived from or based on the IJG code, not just to the unmodified library. If you use our work, you ought to acknowledge us.

Permission is NOT granted for the use of any IJG author's name or company name in advertising or publicity relating to this software or products derived from it. This software may be referred to only as "the Independent JPEG Group's software".

We specifically permit and encourage the use of this software as the basis of commercial products, provided that all warranty or liability claims are assumed by the product vendor.

The Unix configuration script "configure" was produced with GNU Autoconf. It is copyright by the Free Software Foundation but is freely distributable. The same holds for its supporting scripts (config.guess, config.sub, ltmain.sh). Another support script, install-sh, is copyright by X Consortium but is also freely distributable.

The IJG distribution formerly included code to read and write GIF files. To avoid entanglement with the Unisys LZW patent (now expired), GIF reading support has been removed altogether, and the GIF writer has been simplified to produce "uncompressed GIFs". This technique does not use the LZW algorithm; the resulting GIF files are larger than usual, but are readable by all standard GIF decoders.

We are required to state that

"The Graphics Interchange Format(c) is the Copyright property of CompuServe Incorporated. GIF(sm) is a Service Mark property of CompuServe Incorporated."

11.4 LibJPEG-Turbo

<https://github.com/libjpeg-turbo/libjpeg-turbo>

Copyright (C)<YEAR> <AUTHOR>. All Rights Reserved.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.

Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution. Neither the name of the libjpeg-turbo Project nor the names of its contributors may be used to endorse or promote products derived from this software without specific prior written permission.

THIS SOFTWARE IS PROVIDED BY THE COPYRIGHT HOLDERS AND CONTRIBUTORS "AS IS", AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE COPYRIGHT HOLDERS OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER

CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

11.5 LibICU

<http://site.icu-project.org/>

ICU License - ICU 1.8.1 and later

COPYRIGHT AND PERMISSION NOTICE

Copyright (c) 1995-2016 International Business Machines Corporation and others

All rights reserved.

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, provided that the above copyright notice(s) and this permission notice appear in all copies of the Software and that both the above copyright notice(s) and this permission notice appear in supporting documentation.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT OF THIRD PARTY RIGHTS. IN NO EVENT SHALL THE COPYRIGHT HOLDER OR HOLDERS INCLUDED IN THIS NOTICE BE LIABLE FOR ANY CLAIM, OR ANY SPECIAL INDIRECT OR CONSEQUENTIAL DAMAGES, OR ANY DAMAGES WHATSOEVER RESULTING FROM LOSS OF USE, DATA OR PROFITS, WHETHER IN AN ACTION OF CONTRACT, NEGLIGENCE OR OTHER TORTIOUS ACTION, ARISING OUT OF OR IN CONNECTION WITH THE USE OR PERFORMANCE OF THIS SOFTWARE.

Except as contained in this notice, the name of a copyright holder shall not be used in advertising or otherwise to promote the sale, use or other dealings in this Software without prior written authorization of the copyright holder.

All trademarks and registered trademarks mentioned herein are the property of their respective owners.

Third-Party Software Licenses

This section contains third-party software notices and/or additional terms for licensed third-party software components included within ICU libraries.

1. Unicode Data Files and Software

COPYRIGHT AND PERMISSION NOTICE

Copyright © 1991-2016 Unicode, Inc. All rights reserved.
Distributed under the Terms of Use in
<http://www.unicode.org/copyright.html>.

Permission is hereby granted, free of charge, to any person obtaining a copy of the Unicode data files and any associated documentation (the "Data Files") or Unicode software and any associated documentation (the "Software") to deal in the Data Files or Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, and/or sell copies of the Data Files or Software, and to permit persons to whom the Data Files or Software are furnished to do so, provided that

- (a) this copyright and permission notice appear with all copies of the Data Files or Software,
- (b) this copyright and permission notice appear in associated documentation, and
- (c) there is clear notice in each modified Data File or in the Software as well as in the documentation associated with the Data File(s) or Software that the data or software has been modified.

THE DATA FILES AND SOFTWARE ARE PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT OF THIRD PARTY RIGHTS.

IN NO EVENT SHALL THE COPYRIGHT HOLDER OR HOLDERS INCLUDED IN THIS NOTICE BE LIABLE FOR ANY CLAIM, OR ANY SPECIAL INDIRECT OR CONSEQUENTIAL DAMAGES, OR ANY DAMAGES WHATSOEVER RESULTING FROM LOSS OF USE, DATA OR PROFITS, WHETHER IN AN ACTION OF CONTRACT, NEGLIGENCE OR OTHER TORTIOUS ACTION, ARISING OUT OF OR IN CONNECTION WITH THE USE OR PERFORMANCE OF THE DATA FILES OR SOFTWARE.

Except as contained in this notice, the name of a copyright holder shall not be used in advertising or otherwise to promote the sale, use or other dealings in these Data Files or Software without prior written authorization of the copyright holder.

2. Chinese/Japanese Word Break Dictionary Data (cjdict.txt)

```
# The Google Chrome software developed by Google is licensed under
# the BSD license. Other software included in this distribution is
# provided under other licenses, as set forth below.
#
# The BSD License
# http://opensource.org/licenses/bsd-license.php
# Copyright (C) 2006-2008, Google Inc.
#
# All rights reserved.
#
# Redistribution and use in source and binary forms, with or without
# modification, are permitted provided that the following conditions are met:
#
# Redistributions of source code must retain the above copyright notice,
# this list of conditions and the following disclaimer.
# Redistributions in binary form must reproduce the above
```



```
# copyright notice, this list of conditions and the following
# disclaimer in the documentation and/or other materials provided with
# the distribution.
# Neither the name of Google Inc. nor the names of its
# contributors may be used to endorse or promote products derived from
# this software without specific prior written permission.
#
#
# THIS SOFTWARE IS PROVIDED BY THE COPYRIGHT HOLDERS AND
# CONTRIBUTORS "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES,
# INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF
# MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE
# DISCLAIMED. IN NO EVENT SHALL THE COPYRIGHT OWNER OR CONTRIBUTORS BE
# LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR
# CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF
# SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR
# BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF
# LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING
# NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS
# SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.
#
#
# The word list in cjdict.txt are generated by combining three word lists
# listed below with further processing for compound word breaking. The
# frequency is generated with an iterative training against Google web
# corpora.
#
# * Libtabe (Chinese)
#   - https://sourceforge.net/project/?group\_id=1519
#   - Its license terms and conditions are shown below.
#
# * IPADIC (Japanese)
#   - http://chasen.aist-nara.ac.jp/chasen/distribution.html
#   - Its license terms and conditions are shown below.
#
# -----COPYING.libtabe ---- BEGIN-----
#
# /*
#  * Copyright (c) 1999 TaBE Project.
#  * Copyright (c) 1999 Pai-Hsiang Hsiao.
#  * All rights reserved.
#  *
#  * Redistribution and use in source and binary forms, with or without
#  * modification, are permitted provided that the following conditions
#  * are met:
#  *
#  * . Redistributions of source code must retain the above copyright
#  *   notice, this list of conditions and the following disclaimer.
#  * . Redistributions in binary form must reproduce the above copyright
#  *   notice, this list of conditions and the following disclaimer in
#  *   the documentation and/or other materials provided with the
#  *   distribution.
#  * . Neither the name of the TaBE Project nor the names of its
#  *   contributors may be used to endorse or promote products derived
#  *   from this software without specific prior written permission.
#  *
#  * THIS SOFTWARE IS PROVIDED BY THE COPYRIGHT HOLDERS AND CONTRIBUTORS
```

```

# * "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT
# * LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS
# * FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE
# * REGENTS OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT,
# * INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES
# * (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR
# * SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION)
# * HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT,
# * STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE)
# * ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED
# * OF THE POSSIBILITY OF SUCH DAMAGE.
# */
#
# /*
# * Copyright (c) 1999 Computer Systems and Communication Lab,
# *      Institute of Information Science, Academia
# *      *      Sinica. All rights reserved.
# *
# * Redistribution and use in source and binary forms, with or without
# * modification, are permitted provided that the following conditions
# * are met:
# *
# * . Redistributions of source code must retain the above copyright
# *   notice, this list of conditions and the following disclaimer.
# * . Redistributions in binary form must reproduce the above copyright
# *   notice, this list of conditions and the following disclaimer in
# *   the documentation and/or other materials provided with the
# *   distribution.
# * . Neither the name of the Computer Systems and Communication Lab
# *   nor the names of its contributors may be used to endorse or
# *   promote products derived from this software without specific
# *   prior written permission.
# *
# * THIS SOFTWARE IS PROVIDED BY THE COPYRIGHT HOLDERS AND CONTRIBUTORS
# * "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT
# * LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS
# * FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE
# * REGENTS OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT,
# * INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES
# * (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR
# * SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION)
# * HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT,
# * STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE)
# * ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED
# * OF THE POSSIBILITY OF SUCH DAMAGE.
# */
#
# Copyright 1996 Chih-Hao Tsai @ Beckman Institute,
#      University of Illinois
# c-tsai4@uiuc.edu  http://casper.beckman.uiuc.edu/~c-tsai4
#
# -----COPYING.libtabe-----END-----
#
# -----COPYING.ipadic-----BEGIN-----
#
# Copyright 2000, 2001, 2002, 2003 Nara Institute of Science

```

```
# and Technology. All Rights Reserved.
#
# Use, reproduction, and distribution of this software is permitted.
# Any copy of this software, whether in its original form or modified,
# must include both the above copyright notice and the following
# paragraphs.
#
# Nara Institute of Science and Technology (NAIST),
# the copyright holders, disclaims all warranties with regard to this
# software, including all implied warranties of merchantability and
# fitness, in no event shall NAIST be liable for
# any special, indirect or consequential damages or any damages
# whatsoever resulting from loss of use, data or profits, whether in an
# action of contract, negligence or other tortuous action, arising out
# of or in connection with the use or performance of this software.
#
# A large portion of the dictionary entries
# originate from ICOT Free Software. The following conditions for ICOT
# Free Software applies to the current dictionary as well.
#
# Each User may also freely distribute the Program, whether in its
# original form or modified, to any third party or parties, PROVIDED
# that the provisions of Section 3 ("NO WARRANTY") will ALWAYS appear
# on, or be attached to, the Program, which is distributed substantially
# in the same form as set out herein and that such intended
# distribution, if actually made, will neither violate or otherwise
# contravene any of the laws and regulations of the countries having
# jurisdiction over the User or the intended distribution itself.
#
# NO WARRANTY
#
# The program was produced on an experimental basis in the course of the
# research and development conducted during the project and is provided
# to users as so produced on an experimental basis. Accordingly, the
# program is provided without any warranty whatsoever, whether express,
# implied, statutory or otherwise. The term "warranty" used herein
# includes, but is not limited to, any warranty of the quality,
# performance, merchantability and fitness for a particular purpose of
# the program and the nonexistence of any infringement or violation of
# any right of any third party.
#
# Each user of the program will agree and understand, and be deemed to
# have agreed and understood, that there is no warranty whatsoever for
# the program and, accordingly, the entire risk arising from or
# otherwise connected with the program is assumed by the user.
#
# Therefore, neither ICOT, the copyright holder, or any other
# organization that participated in or was otherwise related to the
# development of the program and their respective officials, directors,
# officers and other employees shall be held liable for any and all
# damages, including, without limitation, general, special, incidental
# and consequential damages, arising out of or otherwise in connection
# with the use or inability to use the program or any product, material
# or result produced or otherwise obtained by using the program,
# regardless of whether they have been advised of, or otherwise had
# knowledge of, the possibility of such damages at any time during the
# project or thereafter. Each user will be deemed to have agreed to the
```

```
# foregoing by his or her commencement of use of the program. The term
# "use" as used herein includes, but is not limited to, the use,
# modification, copying and distribution of the program and the
# production of secondary products from the program.
#
# In the case where the program, whether in its original form or
# modified, was distributed or delivered to or received by a user from
# any person, organization or entity other than ICOT, unless it makes or
# grants independently of ICOT any specific warranty to the user in
# writing, such person, organization or entity, will also be exempted
# from and not be held liable to the user for any such damages as noted
# above as far as the program is concerned.
#
# -----COPYING.ipadic-----END-----
```

3. Lao Word Break Dictionary Data (laodict.txt)

```
# Copyright (c) 2013 International Business Machines Corporation
# and others. All Rights Reserved.
#
# Project: http://code.google.com/p/lao-dictionary/
# Dictionary: http://lao-dictionary.googlecode.com/git/Lao-Dictionary.txt
# License: http://lao-dictionary.googlecode.com/git/Lao-Dictionary-LICENSE.txt
#         (copied below)
#
# This file is derived from the above dictionary, with slight
# modifications.
#
# -----
# Copyright (C) 2013 Brian Eugene Wilson, Robert Martin Campbell.
# All rights reserved.
#
# Redistribution and use in source and binary forms, with or without
# modification,
# are permitted provided that the following conditions are met:
#
#
# Redistributions of source code must retain the above copyright notice, this
# list of conditions and the following disclaimer. Redistributions in
# binary form must reproduce the above copyright notice, this list of
# conditions and the following disclaimer in the documentation and/or
# other materials provided with the distribution.
#
#
# THIS SOFTWARE IS PROVIDED BY THE COPYRIGHT HOLDERS AND CONTRIBUTORS
# "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT
# LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS
# FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE
# COPYRIGHT HOLDER OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT,
# INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES
# (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR
# SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION)
# HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT,
# STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE)
# ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED
# OF THE POSSIBILITY OF SUCH DAMAGE.
#
# -----
```

4. Burmese Word Break Dictionary Data (burmesedict.txt)

```
# Copyright (c) 2014 International Business Machines Corporation
# and others. All Rights Reserved.
#
# This list is part of a project hosted at:
#   github.com/kanyawtech/myanmar-karen-word-lists
#
# -----
# Copyright (c) 2013, LeRoy Benjamin Sharon
# All rights reserved.
#
# Redistribution and use in source and binary forms, with or without
# modification, are permitted provided that the following conditions
# are met: Redistributions of source code must retain the above
# copyright notice, this list of conditions and the following
# disclaimer. Redistributions in binary form must reproduce the
# above copyright notice, this list of conditions and the following
# disclaimer in the documentation and/or other materials provided
# with the distribution.
#
#   Neither the name Myanmar Karen Word Lists, nor the names of its
#   contributors may be used to endorse or promote products derived
#   from this software without specific prior written permission.
#
# THIS SOFTWARE IS PROVIDED BY THE COPYRIGHT HOLDERS AND
# CONTRIBUTORS "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES,
# INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF
# MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE
# DISCLAIMED. IN NO EVENT SHALL THE COPYRIGHT HOLDER OR CONTRIBUTORS
# BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL,
# EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED
# TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE,
# DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON
# ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR
# TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF
# THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF
# SUCH DAMAGE.
# -----
```

5. Time Zone Database

ICU uses the public domain data and code derived from Time Zone Database for its time zone support. The ownership of the TZ database is explained in BCP 175: Procedure for Maintaining the Time Zone Database section 7.

```
# 7. Database Ownership
#
# The TZ database itself is not an IETF Contribution or an IETF
# document. Rather it is a pre-existing and regularly updated work
# that is in the public domain, and is intended to remain in the
# public domain. Therefore, BCPs 78 [RFC5378] and 79 [RFC3979] do
# not apply to the TZ Database or contributions that individuals make
# to it. Should any claims be made and substantiated against the TZ
# Database, the organization that is providing the IANA
# Considerations defined in this RFC, under the memorandum of
```

```
# understanding with the IETF, currently ICANN, may act in accordance
# with all competent court orders. No ownership claims will be made
# by ICANN or the IETF Trust on the database or the code. Any person
# making a contribution to the database or code waives all rights to
# future claims in that contribution or in the TZ Database.
```

11.6 FFmpeg Binary

<https://ffmpeg.org/>

GNU GENERAL PUBLIC LICENSE Version 2, June 1991

Copyright (C) 1989, 1991 Free Software Foundation, Inc.,
51 Franklin Street, Fifth Floor, Boston, MA 02110-1301 USA
Everyone is permitted to copy and distribute verbatim copies
of this license document, but changing it is not allowed.

Preamble

The licenses for most software are designed to take away your freedom to share and change it. By contrast, the GNU General Public License is intended to guarantee your freedom to share and change free software--to make sure the software is free for all its users. This General Public License applies to most of the Free Software Foundation's software and to any other program whose authors commit to using it. (Some other Free Software Foundation software is covered by the GNU Lesser General Public License instead.) You can apply it to your programs, too.

When we speak of free software, we are referring to freedom, not price. Our General Public Licenses are designed to make sure that you have the freedom to distribute copies of free software (and charge for this service if you wish), that you receive source code or can get it if you want it, that you can change the software or use pieces of it in new free programs; and that you know you can do these things.

To protect your rights, we need to make restrictions that forbid anyone to deny you these rights or to ask you to surrender the rights. These restrictions translate to certain responsibilities for you if you distribute copies of the software, or if you modify it.

For example, if you distribute copies of such a program, whether gratis or for a fee, you must give the recipients all the rights that you have. You must make sure that they, too, receive or can get the source code. And you must show them these terms so they know their rights.

We protect your rights with two steps: (1) copyright the software, and (2) offer you this license which gives you legal permission to copy, distribute and/or modify the software.

Also, for each author's protection and ours, we want to make certain that everyone understands that there is no warranty for this free

software. If the software is modified by someone else and passed on, we want its recipients to know that what they have is not the original, so that any problems introduced by others will not reflect on the original authors' reputations.

Finally, any free program is threatened constantly by software patents. We wish to avoid the danger that redistributors of a free program will individually obtain patent licenses, in effect making the program proprietary. To prevent this, we have made it clear that any patent must be licensed for everyone's free use or not licensed at all.

The precise terms and conditions for copying, distribution and modification follow.

GNU GENERAL PUBLIC LICENSE
TERMS AND CONDITIONS FOR COPYING, DISTRIBUTION AND MODIFICATION

0. This License applies to any program or other work which contains a notice placed by the copyright holder saying it may be distributed under the terms of this General Public License. The "Program", below, refers to any such program or work, and a "work based on the Program" means either the Program or any derivative work under copyright law: that is to say, a work containing the Program or a portion of it, either verbatim or with modifications and/or translated into another language. (Hereinafter, translation is included without limitation in the term "modification".) Each licensee is addressed as "you".

Activities other than copying, distribution and modification are not covered by this License; they are outside its scope. The act of running the Program is not restricted, and the output from the Program is covered only if its contents constitute a work based on the Program (independent of having been made by running the Program). Whether that is true depends on what the Program does.

1. You may copy and distribute verbatim copies of the Program's source code as you receive it, in any medium, provided that you conspicuously and appropriately publish on each copy an appropriate copyright notice and disclaimer of warranty; keep intact all the notices that refer to this License and to the absence of any warranty; and give any other recipients of the Program a copy of this License along with the Program.

You may charge a fee for the physical act of transferring a copy, and you may at your option offer warranty protection in exchange for a fee.

2. You may modify your copy or copies of the Program or any portion of it, thus forming a work based on the Program, and copy and distribute such modifications or work under the terms of Section 1 above, provided that you also meet all of these conditions:

a) You must cause the modified files to carry prominent notices stating that you changed the files and the date of any change.

b) You must cause any work that you distribute or publish, that in whole or in part contains or is derived from the Program or any part thereof, to be licensed as a whole at no charge to all third parties under the terms of this License.

c) If the modified program normally reads commands interactively when run, you must cause it, when started running for such interactive use in the most ordinary way, to print or display an announcement including an appropriate copyright notice and a notice that there is no warranty (or else, saying that you provide a warranty) and that users may redistribute the program under these conditions, and telling the user how to view a copy of this License. (Exception: if the Program itself is interactive but does not normally print such an announcement, your work based on the Program is not required to print an announcement.)

These requirements apply to the modified work as a whole. If identifiable sections of that work are not derived from the Program, and can be reasonably considered independent and separate works in themselves, then this License, and its terms, do not apply to those sections when you distribute them as separate works. But when you distribute the same sections as part of a whole which is a work based on the Program, the distribution of the whole must be on the terms of this License, whose permissions for other licensees extend to the entire whole, and thus to each and every part regardless of who wrote it.

Thus, it is not the intent of this section to claim rights or contest your rights to work written entirely by you; rather, the intent is to exercise the right to control the distribution of derivative or collective works based on the Program.

In addition, mere aggregation of another work not based on the Program with the Program (or with a work based on the Program) on a volume of a storage or distribution medium does not bring the other work under the scope of this License.

3. You may copy and distribute the Program (or a work based on it, under Section 2) in object code or executable form under the terms of Sections 1 and 2 above provided that you also do one of the following:

- a) Accompany it with the complete corresponding machine-readable source code, which must be distributed under the terms of Sections 1 and 2 above on a medium customarily used for software interchange; or,
- b) Accompany it with a written offer, valid for at least three years, to give any third party, for a charge no more than your cost of physically performing source distribution, a complete machine-readable copy of the corresponding source code, to be distributed under the terms of Sections 1 and 2 above on a medium customarily used for software interchange; or,
- c) Accompany it with the information you received as to the offer to distribute corresponding source code. (This alternative is allowed only for noncommercial distribution and only if you received the program in object code or executable form with such an offer, in accord with Subsection b above.)

The source code for a work means the preferred form of the work for making modifications to it. For an executable work, complete source code means all the source code for all modules it contains, plus any associated interface definition files, plus the scripts used to

control compilation and installation of the executable. However, as a special exception, the source code distributed need not include anything that is normally distributed (in either source or binary form) with the major components (compiler, kernel, and so on) of the operating system on which the executable runs, unless that component itself accompanies the executable.

If distribution of executable or object code is made by offering access to copy from a designated place, then offering equivalent access to copy the source code from the same place counts as distribution of the source code, even though third parties are not compelled to copy the source along with the object code.

4. You may not copy, modify, sublicense, or distribute the Program except as expressly provided under this License. Any attempt otherwise to copy, modify, sublicense or distribute the Program is void, and will automatically terminate your rights under this License. However, parties who have received copies, or rights, from you under this License will not have their licenses terminated so long as such parties remain in full compliance.

5. You are not required to accept this License, since you have not signed it. However, nothing else grants you permission to modify or distribute the Program or its derivative works. These actions are prohibited by law if you do not accept this License. Therefore, by modifying or distributing the Program (or any work based on the Program), you indicate your acceptance of this License to do so, and all its terms and conditions for copying, distributing or modifying the Program or works based on it.

6. Each time you redistribute the Program (or any work based on the Program), the recipient automatically receives a license from the original licensor to copy, distribute or modify the Program subject to these terms and conditions. You may not impose any further restrictions on the recipients' exercise of the rights granted herein. You are not responsible for enforcing compliance by third parties to this License.

7. If, as a consequence of a court judgment or allegation of patent infringement or for any other reason (not limited to patent issues), conditions are imposed on you (whether by court order, agreement or otherwise) that contradict the conditions of this License, they do not excuse you from the conditions of this License. If you cannot distribute so as to satisfy simultaneously your obligations under this License and any other pertinent obligations, then as a consequence you may not distribute the Program at all. For example, if a patent license would not permit royalty-free redistribution of the Program by all those who receive copies directly or indirectly through you, then the only way you could satisfy both it and this License would be to refrain entirely from distribution of the Program.

If any portion of this section is held invalid or unenforceable under any particular circumstance, the balance of the section is intended to apply and the section as a whole is intended to apply in other circumstances.

It is not the purpose of this section to induce you to infringe any

patents or other property right claims or to contest validity of any such claims; this section has the sole purpose of protecting the integrity of the free software distribution system, which is implemented by public license practices. Many people have made generous contributions to the wide range of software distributed through that system in reliance on consistent application of that system; it is up to the author/donor to decide if he or she is willing to distribute software through any other system and a licensee cannot impose that choice.

This section is intended to make thoroughly clear what is believed to be a consequence of the rest of this License.

8. If the distribution and/or use of the Program is restricted in certain countries either by patents or by copyrighted interfaces, the original copyright holder who places the Program under this License may add an explicit geographical distribution limitation excluding those countries, so that distribution is permitted only in or among countries not thus excluded. In such case, this License incorporates the limitation as if written in the body of this License.

9. The Free Software Foundation may publish revised and/or new versions of the General Public License from time to time. Such new versions will be similar in spirit to the present version, but may differ in detail to address new problems or concerns.

Each version is given a distinguishing version number. If the Program specifies a version number of this License which applies to it and "any later version", you have the option of following the terms and conditions either of that version or of any later version published by the Free Software Foundation. If the Program does not specify a version number of this License, you may choose any version ever published by the Free Software Foundation.

10. If you wish to incorporate parts of the Program into other free programs whose distribution conditions are different, write to the author to ask for permission. For software which is copyrighted by the Free Software Foundation, write to the Free Software Foundation; we sometimes make exceptions for this. Our decision will be guided by the two goals of preserving the free status of all derivatives of our free software and of promoting the sharing and reuse of software generally.

NO WARRANTY

11. BECAUSE THE PROGRAM IS LICENSED FREE OF CHARGE, THERE IS NO WARRANTY FOR THE PROGRAM, TO THE EXTENT PERMITTED BY APPLICABLE LAW. EXCEPT WHEN OTHERWISE STATED IN WRITING THE COPYRIGHT HOLDERS AND/OR OTHER PARTIES PROVIDE THE PROGRAM "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE ENTIRE RISK AS TO THE QUALITY AND PERFORMANCE OF THE PROGRAM IS WITH YOU. SHOULD THE PROGRAM PROVE DEFECTIVE, YOU ASSUME THE COST OF ALL NECESSARY SERVICING, REPAIR OR CORRECTION.

12. IN NO EVENT UNLESS REQUIRED BY APPLICABLE LAW OR AGREED TO IN WRITING WILL ANY COPYRIGHT HOLDER, OR ANY OTHER PARTY WHO MAY MODIFY AND/OR REDISTRIBUTE THE PROGRAM AS PERMITTED ABOVE, BE LIABLE TO YOU FOR DAMAGES,

INCLUDING ANY GENERAL, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OR INABILITY TO USE THE PROGRAM (INCLUDING BUT NOT LIMITED TO LOSS OF DATA OR DATA BEING RENDERED INACCURATE OR LOSSES SUSTAINED BY YOU OR THIRD PARTIES OR A FAILURE OF THE PROGRAM TO OPERATE WITH ANY OTHER PROGRAMS), EVEN IF SUCH HOLDER OR OTHER PARTY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

END OF TERMS AND CONDITIONS

How to Apply These Terms to Your New Programs

If you develop a new program, and you want it to be of the greatest possible use to the public, the best way to achieve this is to make it free software which everyone can redistribute and change under these terms.

To do so, attach the following notices to the program. It is safest to attach them to the start of each source file to most effectively convey the exclusion of warranty; and each file should have at least the "copyright" line and a pointer to where the full notice is found.

```
<one line to give the program's name and a brief idea of what it does.>
Copyright (C) <year> <name of author>
```

```
This program is free software; you can redistribute it and/or modify
it under the terms of the GNU General Public License as published by
the Free Software Foundation; either version 2 of the License, or
(at your option) any later version.
```

```
This program is distributed in the hope that it will be useful,
but WITHOUT ANY WARRANTY; without even the implied warranty of
MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the
GNU General Public License for more details.
```

```
You should have received a copy of the GNU General Public License along
with this program; if not, write to the Free Software Foundation, Inc.,
51 Franklin Street, Fifth Floor, Boston, MA 02110-1301 USA.
```

Also add information on how to contact you by electronic and paper mail.

If the program is interactive, make it output a short notice like this when it starts in an interactive mode:

```
Gnomovision version 69, Copyright (C) year name of author
Gnomovision comes with ABSOLUTELY NO WARRANTY; for details type `show w'.
This is free software, and you are welcome to redistribute it
under certain conditions; type `show c' for details.
```

The hypothetical commands `show w' and `show c' should show the appropriate parts of the General Public License. Of course, the commands you use may be called something other than `show w' and `show c'; they could even be mouse-clicks or menu items--whatever suits your program.

You should also get your employer (if you work as a programmer) or your school, if any, to sign a "copyright disclaimer" for the program, if necessary. Here is a sample; alter the names:

```
Yoyodyne, Inc., hereby disclaims all copyright interest in the program
```

`Gnomovision' (which makes passes at compilers) written by James Hacker.

<signature of Ty Coon>, 1 April 1989
Ty Coon, President of Vice

This General Public License does not permit incorporating your program into proprietary programs. If your program is a subroutine library, you may consider it more useful to permit linking proprietary applications with the library. If this is what you want to do, use the GNU Lesser General Public License instead of this License.

11.7 FFmpeg Library

<https://ffmpeg.org/>

GNU LESSER GENERAL PUBLIC LICENSE Version 2.1, February 1999

Copyright (C) 1991, 1999 Free Software Foundation, Inc.
51 Franklin Street, Fifth Floor, Boston, MA 02110-1301 USA
Everyone is permitted to copy and distribute verbatim copies
of this license document, but changing it is not allowed.

[This is the first released version of the Lesser GPL. It also counts
as the successor of the GNU Library Public License, version 2, hence
the version number 2.1.]

Preamble

The licenses for most software are designed to take away your
freedom to share and change it. By contrast, the GNU General Public
Licenses are intended to guarantee your freedom to share and change
free software--to make sure the software is free for all its users.

This license, the Lesser General Public License, applies to some
specially designated software packages--typically libraries--of the
Free Software Foundation and other authors who decide to use it. You
can use it too, but we suggest you first think carefully about whether
this license or the ordinary General Public License is the better
strategy to use in any particular case, based on the explanations below.

When we speak of free software, we are referring to freedom of use,
not price. Our General Public Licenses are designed to make sure that
you have the freedom to distribute copies of free software (and charge
for this service if you wish); that you receive source code or can get
it if you want it; that you can change the software and use pieces of
it in new free programs; and that you are informed that you can do
these things.

To protect your rights, we need to make restrictions that forbid
distributors to deny you these rights or to ask you to surrender these
rights. These restrictions translate to certain responsibilities for
you if you distribute copies of the library or if you modify it.

For example, if you distribute copies of the library, whether gratis or for a fee, you must give the recipients all the rights that we gave you. You must make sure that they, too, receive or can get the source code. If you link other code with the library, you must provide complete object files to the recipients, so that they can relink them with the library after making changes to the library and recompiling it. And you must show them these terms so they know their rights.

We protect your rights with a two-step method: (1) we copyright the library, and (2) we offer you this license, which gives you legal permission to copy, distribute and/or modify the library.

To protect each distributor, we want to make it very clear that there is no warranty for the free library. Also, if the library is modified by someone else and passed on, the recipients should know that what they have is not the original version, so that the original author's reputation will not be affected by problems that might be introduced by others.

Finally, software patents pose a constant threat to the existence of any free program. We wish to make sure that a company cannot effectively restrict the users of a free program by obtaining a restrictive license from a patent holder. Therefore, we insist that any patent license obtained for a version of the library must be consistent with the full freedom of use specified in this license.

Most GNU software, including some libraries, is covered by the ordinary GNU General Public License. This license, the GNU Lesser General Public License, applies to certain designated libraries, and is quite different from the ordinary General Public License. We use this license for certain libraries in order to permit linking those libraries into non-free programs.

When a program is linked with a library, whether statically or using a shared library, the combination of the two is legally speaking a combined work, a derivative of the original library. The ordinary General Public License therefore permits such linking only if the entire combination fits its criteria of freedom. The Lesser General Public License permits more lax criteria for linking other code with the library.

We call this license the "Lesser" General Public License because it does Less to protect the user's freedom than the ordinary General Public License. It also provides other free software developers Less of an advantage over competing non-free programs. These disadvantages are the reason we use the ordinary General Public License for many libraries. However, the Lesser license provides advantages in certain special circumstances.

For example, on rare occasions, there may be a special need to encourage the widest possible use of a certain library, so that it becomes a de-facto standard. To achieve this, non-free programs must be allowed to use the library. A more frequent case is that a free library does the same job as widely used non-free libraries. In this case, there is little to gain by limiting the free library to free software only, so we use the Lesser General Public License.

In other cases, permission to use a particular library in non-free programs enables a greater number of people to use a large body of free software. For example, permission to use the GNU C Library in non-free programs enables many more people to use the whole GNU operating system, as well as its variant, the GNU/Linux operating system.

Although the Lesser General Public License is Less protective of the users' freedom, it does ensure that the user of a program that is linked with the Library has the freedom and the wherewithal to run that program using a modified version of the Library.

The precise terms and conditions for copying, distribution and modification follow. Pay close attention to the difference between a "work based on the library" and a "work that uses the library". The former contains code derived from the library, whereas the latter must be combined with the library in order to run.

GNU LESSER GENERAL PUBLIC LICENSE TERMS AND CONDITIONS FOR COPYING, DISTRIBUTION AND MODIFICATION

0. This License Agreement applies to any software library or other program which contains a notice placed by the copyright holder or other authorized party saying it may be distributed under the terms of this Lesser General Public License (also called "this License"). Each licensee is addressed as "you".

A "library" means a collection of software functions and/or data prepared so as to be conveniently linked with application programs (which use some of those functions and data) to form executables.

The "Library", below, refers to any such software library or work which has been distributed under these terms. A "work based on the Library" means either the Library or any derivative work under copyright law: that is to say, a work containing the Library or a portion of it, either verbatim or with modifications and/or translated straightforwardly into another language. (Hereinafter, translation is included without limitation in the term "modification".)

"Source code" for a work means the preferred form of the work for making modifications to it. For a library, complete source code means all the source code for all modules it contains, plus any associated interface definition files, plus the scripts used to control compilation and installation of the library.

Activities other than copying, distribution and modification are not covered by this License; they are outside its scope. The act of running a program using the Library is not restricted, and output from such a program is covered only if its contents constitute a work based on the Library (independent of the use of the Library in a tool for writing it). Whether that is true depends on what the Library does and what the program that uses the Library does.

1. You may copy and distribute verbatim copies of the Library's complete source code as you receive it, in any medium, provided that you conspicuously and appropriately publish on each copy an appropriate copyright notice and disclaimer of warranty; keep intact

all the notices that refer to this License and to the absence of any warranty; and distribute a copy of this License along with the Library.

You may charge a fee for the physical act of transferring a copy, and you may at your option offer warranty protection in exchange for a fee.

2. You may modify your copy or copies of the Library or any portion of it, thus forming a work based on the Library, and copy and distribute such modifications or work under the terms of Section 1 above, provided that you also meet all of these conditions:

- a) The modified work must itself be a software library.
- b) You must cause the files modified to carry prominent notices stating that you changed the files and the date of any change.
- c) You must cause the whole of the work to be licensed at no charge to all third parties under the terms of this License.
- d) If a facility in the modified Library refers to a function or a table of data to be supplied by an application program that uses the facility, other than as an argument passed when the facility is invoked, then you must make a good faith effort to ensure that, in the event an application does not supply such function or table, the facility still operates, and performs whatever part of its purpose remains meaningful.

(For example, a function in a library to compute square roots has a purpose that is entirely well-defined independent of the application. Therefore, Subsection 2d requires that any application-supplied function or table used by this function must be optional: if the application does not supply it, the square root function must still compute square roots.)

These requirements apply to the modified work as a whole. If identifiable sections of that work are not derived from the Library, and can be reasonably considered independent and separate works in themselves, then this License, and its terms, do not apply to those sections when you distribute them as separate works. But when you distribute the same sections as part of a whole which is a work based on the Library, the distribution of the whole must be on the terms of this License, whose permissions for other licensees extend to the entire whole, and thus to each and every part regardless of who wrote it.

Thus, it is not the intent of this section to claim rights or contest your rights to work written entirely by you; rather, the intent is to exercise the right to control the distribution of derivative or collective works based on the Library.

In addition, mere aggregation of another work not based on the Library with the Library (or with a work based on the Library) on a volume of a storage or distribution medium does not bring the other work under the scope of this License.

3. You may opt to apply the terms of the ordinary GNU General Public License instead of this License to a given copy of the Library. To do this, you must alter all the notices that refer to this License, so that they refer to the ordinary GNU General Public License, version 2, instead of to this License. (If a newer version than version 2 of the ordinary GNU General Public License has appeared, then you can specify that version instead if you wish.) Do not make any other change in these notices.

Once this change is made in a given copy, it is irreversible for that copy, so the ordinary GNU General Public License applies to all subsequent copies and derivative works made from that copy.

This option is useful when you wish to copy part of the code of the Library into a program that is not a library.

4. You may copy and distribute the Library (or a portion or derivative of it, under Section 2) in object code or executable form under the terms of Sections 1 and 2 above provided that you accompany it with the complete corresponding machine-readable source code, which must be distributed under the terms of Sections 1 and 2 above on a medium customarily used for software interchange.

If distribution of object code is made by offering access to copy from a designated place, then offering equivalent access to copy the source code from the same place satisfies the requirement to distribute the source code, even though third parties are not compelled to copy the source along with the object code.

5. A program that contains no derivative of any portion of the Library, but is designed to work with the Library by being compiled or linked with it, is called a "work that uses the Library". Such a work, in isolation, is not a derivative work of the Library, and therefore falls outside the scope of this License.

However, linking a "work that uses the Library" with the Library creates an executable that is a derivative of the Library (because it contains portions of the Library), rather than a "work that uses the library". The executable is therefore covered by this License. Section 6 states terms for distribution of such executables.

When a "work that uses the Library" uses material from a header file that is part of the Library, the object code for the work may be a derivative work of the Library even though the source code is not. Whether this is true is especially significant if the work can be linked without the Library, or if the work is itself a library. The threshold for this to be true is not precisely defined by law.

If such an object file uses only numerical parameters, data structure layouts and accessors, and small macros and small inline functions (ten lines or less in length), then the use of the object file is unrestricted, regardless of whether it is legally a derivative work. (Executables containing this object code plus portions of the Library will still fall under Section 6.)

Otherwise, if the work is a derivative of the Library, you may distribute the object code for the work under the terms of Section 6.

Any executables containing that work also fall under Section 6, whether or not they are linked directly with the Library itself.

6. As an exception to the Sections above, you may also combine or link a "work that uses the Library" with the Library to produce a work containing portions of the Library, and distribute that work under terms of your choice, provided that the terms permit modification of the work for the customer's own use and reverse engineering for debugging such modifications.

You must give prominent notice with each copy of the work that the Library is used in it and that the Library and its use are covered by this License. You must supply a copy of this License. If the work during execution displays copyright notices, you must include the copyright notice for the Library among them, as well as a reference directing the user to the copy of this License. Also, you must do one of these things:

- a) Accompany the work with the complete corresponding machine-readable source code for the Library including whatever changes were used in the work (which must be distributed under Sections 1 and 2 above); and, if the work is an executable linked with the Library, with the complete machine-readable "work that uses the Library", as object code and/or source code, so that the user can modify the Library and then relink to produce a modified executable containing the modified Library. (It is understood that the user who changes the contents of definitions files in the Library will not necessarily be able to recompile the application to use the modified definitions.)
- b) Use a suitable shared library mechanism for linking with the Library. A suitable mechanism is one that (1) uses at run time a copy of the library already present on the user's computer system, rather than copying library functions into the executable, and (2) will operate properly with a modified version of the library, if the user installs one, as long as the modified version is interface-compatible with the version that the work was made with.
- c) Accompany the work with a written offer, valid for at least three years, to give the same user the materials specified in Subsection 6a, above, for a charge no more than the cost of performing this distribution.
- d) If distribution of the work is made by offering access to copy from a designated place, offer equivalent access to copy the above specified materials from the same place.
- e) Verify that the user has already received a copy of these materials or that you have already sent this user a copy.

For an executable, the required form of the "work that uses the Library" must include any data and utility programs needed for reproducing the executable from it. However, as a special exception, the materials to be distributed need not include anything that is normally distributed (in either source or binary form) with the major components (compiler, kernel, and so on) of the operating system on which the executable runs, unless that component itself accompanies

the executable.

It may happen that this requirement contradicts the license restrictions of other proprietary libraries that do not normally accompany the operating system. Such a contradiction means you cannot use both them and the Library together in an executable that you distribute.

7. You may place library facilities that are a work based on the Library side-by-side in a single library together with other library facilities not covered by this License, and distribute such a combined library, provided that the separate distribution of the work based on the Library and of the other library facilities is otherwise permitted, and provided that you do these two things:

- a) Accompany the combined library with a copy of the same work based on the Library, uncombined with any other library facilities. This must be distributed under the terms of the Sections above.
- b) Give prominent notice with the combined library of the fact that part of it is a work based on the Library, and explaining where to find the accompanying uncombined form of the same work.

8. You may not copy, modify, sublicense, link with, or distribute the Library except as expressly provided under this License. Any attempt otherwise to copy, modify, sublicense, link with, or distribute the Library is void, and will automatically terminate your rights under this License. However, parties who have received copies, or rights, from you under this License will not have their licenses terminated so long as such parties remain in full compliance.

9. You are not required to accept this License, since you have not signed it. However, nothing else grants you permission to modify or distribute the Library or its derivative works. These actions are prohibited by law if you do not accept this License. Therefore, by modifying or distributing the Library (or any work based on the Library), you indicate your acceptance of this License to do so, and all its terms and conditions for copying, distributing or modifying the Library or works based on it.

10. Each time you redistribute the Library (or any work based on the Library), the recipient automatically receives a license from the original licensor to copy, distribute, link with or modify the Library subject to these terms and conditions. You may not impose any further restrictions on the recipients' exercise of the rights granted herein. You are not responsible for enforcing compliance by third parties with this License.

11. If, as a consequence of a court judgment or allegation of patent infringement or for any other reason (not limited to patent issues), conditions are imposed on you (whether by court order, agreement or otherwise) that contradict the conditions of this License, they do not excuse you from the conditions of this License. If you cannot distribute so as to satisfy simultaneously your obligations under this License and any other pertinent obligations, then as a consequence you may not distribute the Library at all. For example, if a patent

license would not permit royalty-free redistribution of the Library by all those who receive copies directly or indirectly through you, then the only way you could satisfy both it and this License would be to refrain entirely from distribution of the Library.

If any portion of this section is held invalid or unenforceable under any particular circumstance, the balance of the section is intended to apply, and the section as a whole is intended to apply in other circumstances.

It is not the purpose of this section to induce you to infringe any patents or other property right claims or to contest validity of any such claims; this section has the sole purpose of protecting the integrity of the free software distribution system which is implemented by public license practices. Many people have made generous contributions to the wide range of software distributed through that system in reliance on consistent application of that system; it is up to the author/donor to decide if he or she is willing to distribute software through any other system and a licensee cannot impose that choice.

This section is intended to make thoroughly clear what is believed to be a consequence of the rest of this License.

12. If the distribution and/or use of the Library is restricted in certain countries either by patents or by copyrighted interfaces, the original copyright holder who places the Library under this License may add an explicit geographical distribution limitation excluding those countries, so that distribution is permitted only in or among countries not thus excluded. In such case, this License incorporates the limitation as if written in the body of this License.

13. The Free Software Foundation may publish revised and/or new versions of the Lesser General Public License from time to time. Such new versions will be similar in spirit to the present version, but may differ in detail to address new problems or concerns.

Each version is given a distinguishing version number. If the Library specifies a version number of this License which applies to it and "any later version", you have the option of following the terms and conditions either of that version or of any later version published by the Free Software Foundation. If the Library does not specify a license version number, you may choose any version ever published by the Free Software Foundation.

14. If you wish to incorporate parts of the Library into other free programs whose distribution conditions are incompatible with these, write to the author to ask for permission. For software which is copyrighted by the Free Software Foundation, write to the Free Software Foundation; we sometimes make exceptions for this. Our decision will be guided by the two goals of preserving the free status of all derivatives of our free software and of promoting the sharing and reuse of software generally.

NO WARRANTY

15. BECAUSE THE LIBRARY IS LICENSED FREE OF CHARGE, THERE IS NO WARRANTY FOR THE LIBRARY, TO THE EXTENT PERMITTED BY APPLICABLE LAW.

EXCEPT WHEN OTHERWISE STATED IN WRITING THE COPYRIGHT HOLDERS AND/OR OTHER PARTIES PROVIDE THE LIBRARY "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE ENTIRE RISK AS TO THE QUALITY AND PERFORMANCE OF THE LIBRARY IS WITH YOU. SHOULD THE LIBRARY PROVE DEFECTIVE, YOU ASSUME THE COST OF ALL NECESSARY SERVICING, REPAIR OR CORRECTION.

16. IN NO EVENT UNLESS REQUIRED BY APPLICABLE LAW OR AGREED TO IN WRITING WILL ANY COPYRIGHT HOLDER, OR ANY OTHER PARTY WHO MAY MODIFY AND/OR REDISTRIBUTE THE LIBRARY AS PERMITTED ABOVE, BE LIABLE TO YOU FOR DAMAGES, INCLUDING ANY GENERAL, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OR INABILITY TO USE THE LIBRARY (INCLUDING BUT NOT LIMITED TO LOSS OF DATA OR DATA BEING RENDERED INACCURATE OR LOSSES SUSTAINED BY YOU OR THIRD PARTIES OR A FAILURE OF THE LIBRARY TO OPERATE WITH ANY OTHER SOFTWARE), EVEN IF SUCH HOLDER OR OTHER PARTY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

END OF TERMS AND CONDITIONS

How to Apply These Terms to Your New Libraries

If you develop a new library, and you want it to be of the greatest possible use to the public, we recommend making it free software that everyone can redistribute and change. You can do so by permitting redistribution under these terms (or, alternatively, under the terms of the ordinary General Public License).

To apply these terms, attach the following notices to the library. It is safest to attach them to the start of each source file to most effectively convey the exclusion of warranty; and each file should have at least the "copyright" line and a pointer to where the full notice is found.

```
<one line to give the library's name and a brief idea of what it does.>  
Copyright (C) <year> <name of author>
```

```
This library is free software; you can redistribute it and/or  
modify it under the terms of the GNU Lesser General Public  
License as published by the Free Software Foundation; either  
version 2.1 of the License, or (at your option) any later version.
```

```
This library is distributed in the hope that it will be useful,  
but WITHOUT ANY WARRANTY; without even the implied warranty of  
MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the GNU  
Lesser General Public License for more details.
```

```
You should have received a copy of the GNU Lesser General Public  
License along with this library; if not, write to the Free Software  
Foundation, Inc., 51 Franklin Street, Fifth Floor, Boston, MA 02110-1301 USA
```

Also add information on how to contact you by electronic and paper mail.

You should also get your employer (if you work as a programmer) or your school, if any, to sign a "copyright disclaimer" for the library, if necessary. Here is a sample; alter the names:

Yoyodyne, Inc., hereby disclaims all copyright interest in the library 'Frob' (a library for tweaking knobs) written by James Random Hacker.

<signature of Ty Coon>, 1 April 1990
Ty Coon, President of Vice

That's all there is to it!

11.8 LibArchive

<http://www.libarchive.org/>

Copyright (c) 2003-2010 Tim Kientzle
All rights reserved.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

1. Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.
2. Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.

THIS SOFTWARE IS PROVIDED BY THE AUTHOR(S) ``AS IS'' AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE AUTHOR(S) BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

11.9 Zlib

<http://www.zlib.net/>

Copyright (C) 1995-2013 Jean-loup Gailly and Mark Adler

This software is provided 'as-is', without any express or implied warranty. In no event will the authors be held liable for any damages arising from the use of this software.

Permission is granted to anyone to use this software for any purpose, including commercial applications, and to alter it and redistribute it freely, subject to the following restrictions:

1. The origin of this software must not be misrepresented; you must not
-

claim that you wrote the original software. If you use this software in a product, an acknowledgment in the product documentation would be appreciated but is not required.

2. Altered source versions must be plainly marked as such, and must not be misrepresented as being the original software.
3. This notice may not be removed or altered from any source distribution.

Jean-loup Gailly
jloup@gzip.org

Mark Adler
madler@alumni.caltech.edu

The data format used by the zlib library is described by RFCs (Request for Comments) 1950 to 1952 in the files <http://tools.ietf.org/html/rfc1950> (zlib format), [rfc1951](http://tools.ietf.org/html/rfc1951) (deflate format) and [rfc1952](http://tools.ietf.org/html/rfc1952) (gzip format).

11.10 PortAudio

<http://www.portaudio.com/>

PortAudio Portable Real-Time Audio Library
Copyright (c) 1999–2011 Ross Bencina and Phil Burk

Permission is hereby granted, free of charge, to any person obtaining a copy of ↵
this software and associated documentation files (the "Software"), to deal in ↵
the Software without restriction, including without limitation the rights to ↵
use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies ↵
of the Software, and to permit persons to whom the Software is furnished to do ↵
so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in all ↵
copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED ↵
, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A ↵
PARTICULAR PURPOSE AND NONINFRINGEMENT.

IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT HOLDERS BE LIABLE FOR ANY CLAIM, ↵
DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE ↵
, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER ↵
DEALINGS IN THE SOFTWARE.