Grand-Master Flash!

User's Guide

Artistic Licence (UK) Ltd.

Manual Revision V4.08 for Software Revision V4.12

PRODUCT REGISTRATION FORM

Product: Grand-Master Flash!	Version No. V4.
Serial No.	Date Purchased:
Supplier:	Output Device:

Name:	
Company Name:	
Address:	
Post/Zip Code:	Phone No.

Comments:

Please return to: Artistic Licence (UK) Ltd.
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C O N T E N T S

INTRODUCTION

OVERVIEW

Throughout the development of Grand-Master Flash! we have attempted to provide a user interface that will be familiar to lighting people but also add the elegance of the Windows interface.

The intention behind Grand-Master Flash! is to use the power of the PC to add flexibility to the control concepts used and proved by the last generation of conventional lighting consoles.

Grand-Master Flash! has found many applications within the lighting industry. Anywhere that you do not want a control room cluttered by a huge console full of mechanical faders is the perfect place for Grand-Master Flash!

To check for future software releases and lamp library updates, go to:

www.ArtisticLicence.com/Download.htm

PHYSICAL OUTPUT

Grand-Master Flash! is a sophisticated PC based lighting console. It provides two options for physical output of the lighting control data:

1. Art-Net Ethernet
2. DMX-Dongle II

ART-NET

Art-Net is a new standard in Ethernet communication. The protocol is a public domain standard that is supported by a number of vendors including ADB, Avab Transtechnic, Avolites, Barco, Cameleon, Compulite, Doug Fleenor Design, Electronics Diversified, Flying Pig, Goddard Design Co, Green Hippo, High End Systems, Horizon, IES, I-Light Group, Jands Electronics Pty, LewLight, MA Lighting, Martin Professional, Medialon, Mediamation, Robe Show Lighting, Stage Research, Theatrelight Ltd, Touchlight Systems Ltd, VNR, Zero 88 and Artistic Licence.

Grand-Master Flash can output Art-Net via the 10BaseT network card installed in your PC. When configured for Art-Net operation, Grand-Master Flash! can control a total of 2048 channels.

DMX-DONGLE

Grand-Master Flash can also output DMX512 via the DMX-Dongle II. This device connects via the parallel port of the PC. Please refer to the DMX-Dongle II User's Guide for the Dongle installation procedure.

When configured for operation with the DMX-Dongle II, Grand-Master Flash! can transmit and receive 512 channels.

INSTALLATION

Grand-Master Flash! is a 32 bit application specifically designed to operate with Windows 95, Windows 98, Windows ME, Windows NTv4, Windows 2000 & Windows XP.

The minimum specification PC is:

- Processor: Pentium
- Speed: 133MHz
- RAM: 128MB
- Operating System: Windows 95 / 98 / ME / 2K / XP
- Graphics: 800 x 600 8 bit Colour

A significant improvement in performance will be seen with the following specification:

- Processor: Pentium
- Speed 1.6GHz
- RAM 512MB
- Operating System: Windows 95 / 98 / ME / 2K / XP
- Graphics 1280 x 1024 32 bit Colour

Windows 2000, NT & XP Users

The Windows 2000, Windows NT and Windows XP operating systems provide the concept of User Rights. This allows different users to be granted different access rights to the computer.

The highest level of access rights is called 'Administrator'. Grand-Master Flash! will NOT install correctly unless you are logged onto the computer with Administrator rights.

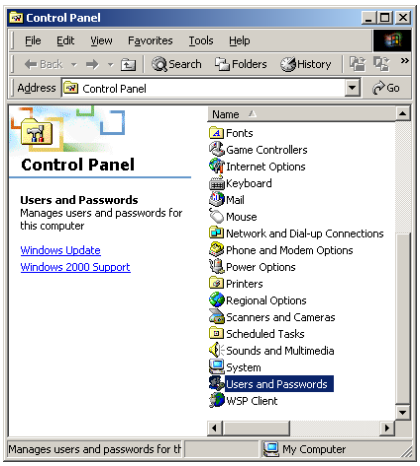
If your computer is part of a network, you must ask your system administrator to set the computer for Administrator rights.

If you are a single user, the following sequence shows how to change the settings:

Administrator Rights

Administrator rights are set in the Windows Users & Passwords section:

To access this, select the Start Menu – Settings – Control Panel menu.



In the Control Panel, double click on the Users & Passwords icon. The following dialogue will be displayed:

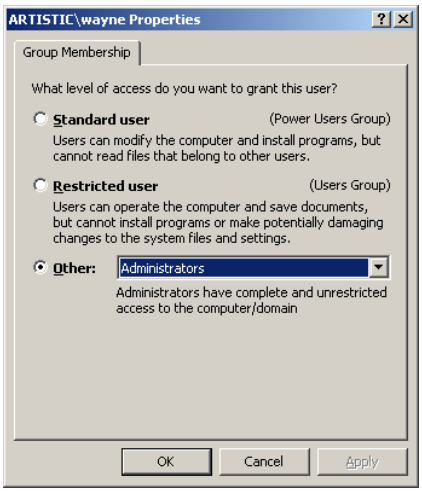
Select the user who will install Grand-Master Flash! In this example it is Benoit. Then press the Properties button.

The following dialogue will then be displayed:

Select the 'Other' checkbox.

Select 'Administrators' from the pull down list.

Press OK. You should now restart Windows and then log on as the user name that you have edited.



Software Installation

Grand-Master Flash! is supplied on CD. To install use the following procedure:

If you are upgrading, first uninstall the existing copy of Grand-Master Flash! and DMX-Workshop.

- Shutdown any applications running on your computer
- Insert the CD in drive.
- Wait for CD to start, then select 'Enter CD'.
- Select the 'Software' button.
- Select the 'Grand-Master Flash!' button.
- Install Shield will then guide you through the remainder of the procedure.
- When the installation completes, return to the CD menu and install DMX-Workshop.
- Now follow the registration procedure.

If you are installing an upgrade, we recommend that you backup all Grand-Master Flash! Data first.

The installation procedure is identical for installation of the demonstration version and the licensed version.

Software Registration

Grand-Master Flash! is copy protected and must be registered prior to use of all features. Without registration, both save and output functions are disabled.

A PIN number is required to register the software. If you have already purchased the full software, a PIN number will be shown on the CD cover.

If you are working from a demonstration disc, you can order the PIN number via the Artistic Licence web site. To do this, click on the hot link at the bottom of the register dialogue box.

To proceed, start Grand-Master Flash! and select the Register menu.

Type the PIN number into the box provided and press the Register button.

You will then be prompted to close the program and restart Grand-Master Flash. When the program restarts, the serial number will be displayed in the status bar. The status bar will also confirm whether the system is enabled for 100 channel or 2048 channel operation.

The 2048 channel system can only provide 512 channel output when used with the DMX-Dongle II.

CONFIGURATION

Before starting to use the system you will need to configure your chosen hardware. The process is very simple and is described below.

DMX-Dongle II

Installation of the DMX-Dongle II is described fully in the DMX-Dongle User Guide.

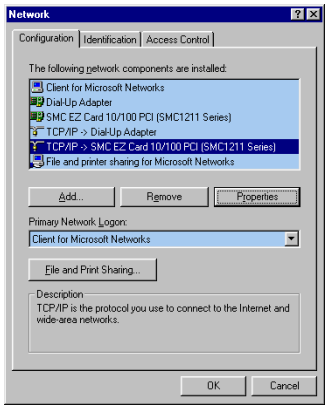
Grand-Master Flash! is compatible with both the DMX-Dongle II and the Vision 500.

The earlier product DMX-Dongle I can also be used, however the output is limited to 256 channels.

Art-Net

To use Grand-Master Flash! with an Art-Net device, such as DMX-Hub, Down-Link or Net-Link O/P, you must configure the PC Ethernet card. It is necessary to set two parameters, the IP address and the Subnet Mask.

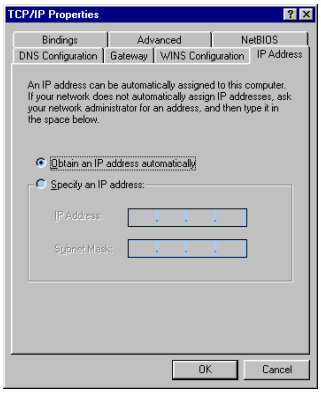
These settings are adjusted in the Windows Network Settings Dialogue. To access this, select the Start Menu – Settings – Control Panel menu.



In the Control Panel, double click on the Network Icon. The following dialogue will be displayed:

Select the TCP/IP protocol line and then press the properties button.

The following dialogue will then be displayed:

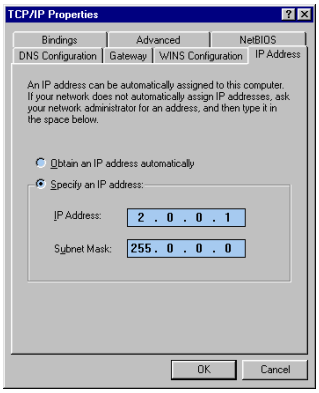


Select the radio button marked 'Specify an IP Address'.

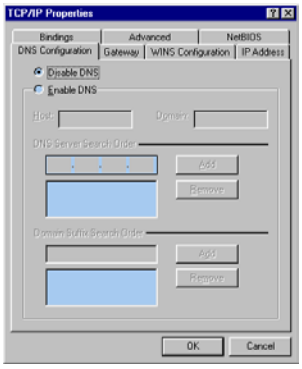
Type the number 2.0.0.1 into the first box.

Type the number 255.0.0.0 into the second box.

The display should be as follows:

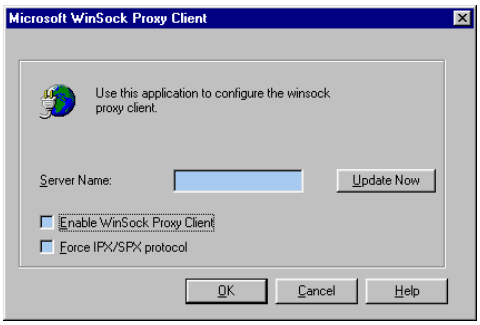


Select the DNS Tab and click on disable DNS.



Press the OK button but do not restart the computer yet.

Double click on the 'WSP Client' icon in control panel.



Un-tick both boxes.

Press OK.

Now restart the computer.

When using the Art-Net output, ensure that your network is not connected to the Internet.

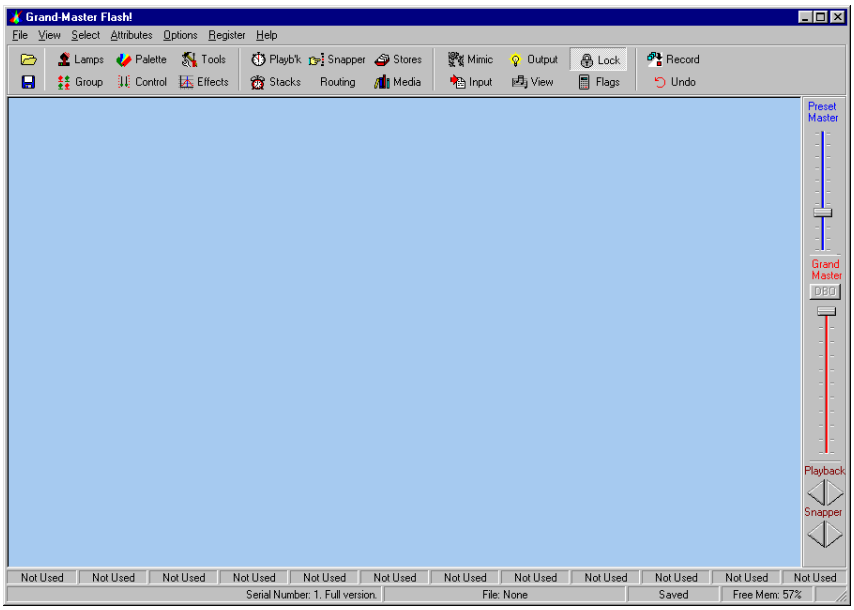
THE CONCEPTS

OVERVIEW

This section is intended for those users who prefer to just 'dig in' to the software, and only pick up the manual for reference!

The following description provides the information necessary to build a basic show and discusses some of the more important concepts.

When first started, Grand-Master Flash! presents a large empty area called the workspace. This represents the stage or building that you plan to light.

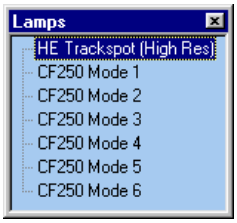


LAMP LIBRARY

Grand-Master Flash is a very versatile system and is equally able to control both intelligent and conventional lamps.

In both scenarios, the lamp or fixture library is the key control element. Grand-Master Flash! is supplied with an extensive library of commonly used fixtures. Updates and new fixtures are regularly posted on our web site for download.

The lamp library contains information about both the channel allocation of the lamp and also preset information for colours and gobos. Grand-Master Flash! also provides a sophisticated lamp editor so that you can enter new lamps and modify existing lamps for your requirements.



The lamp library is viewed as a tool palette. To access this, press the Lamp button at the top of the screen.

The Lamp Palette displays a small set of the available lamps. You can freely add and delete entries in the palette so that only the lamps you require for a particular show are visible.

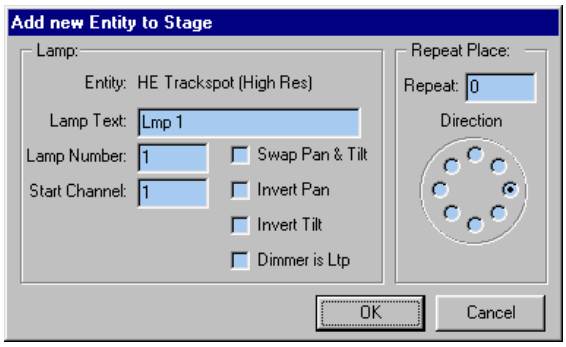
Right click the mouse inside the palette to display the popup menu that provides these functions.

Popup menus are used extensively in Grand-Master Flash! Frequently used functions are always available by right clicking the mouse.

Patching A Lamp

Building a show starts by placing the required lamps on stage. To do this, simply drag the required lamp from the Lamp Palette onto the stage.

When the mouse key is released, the Add Lamp to Stage dialogue is displayed:



The right hand section allows multiple lamps to be placed on stage.

The left hand section is used to define how the lamps are controlled. All of the parameters displayed here can be edited by right clicking on the lamp after patching.

The start channel number will be automatically allocated such that the lamped are patched to consecutive addresses. You can override this operation if required.

One of the most important controls in this dialogue is 'Dimmer is Ltp.

LTP AND HTP DIMMERS

In the process of building a show, perhaps the most significant decision is whether to operate dimmer or intensity channels as HTP or LTP.

If you are new to Grand-Master Flash! it is worth experimenting with both modes of operation as both have specific benefits for different types of show.

Lamps that are patched with LTP dimmers have their intensity level displayed in red, if the dimmers are set to HTP, the intensity is shown in black. The LTP/HTP decision is made on a per lamp basis, it is therefore viable to use a mixture of modes.

LTP is the abbreviation for Latest Takes Precedence. In this mode, the dimmer level is set by the last event that occurs.

HTP is the abbreviation for Highest Takes Precedence. In this mode, the dimmer level is set by the highest level from all of the playback devices that can control the channel.

The following chart describes the benefits of the two modes in different scenarios.

Benefits

LTP Benefits	HTP Benefits
Allows simpler programming in an event driven environment. For example when playback is triggered by MIDI remote control.	Allows the full use of 'Sub-Master' mixing.
Allows intensity move fades. This means that you can trigger a fade that reduces the intensity channel.	Allows the use of timed down fades after a cue is executed.
Stack programming is simplified as it is only necessary to trigger 'In Fades' .	Allows the use of the Grand Master fader.

The decision on which mode to use is largely a personal preference. However, customer feedback suggests that most use LTP mode when playback is primarily Stack based. HTP mode is used when playback is mainly via the Sub-masters.

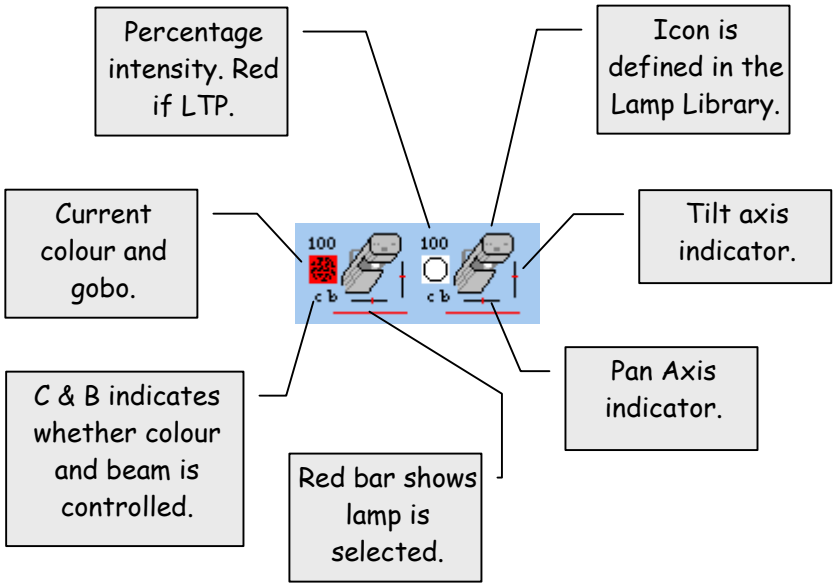
CONTROLLING THE LAMPS

The stage will now show one or more lamp icons. Click on any lamp to select it, this is indicated by a red bar below the lamp.

Selection of groups of lamps is achieved using the 'rubber banding' technique. Left click above and left of the first lamp in the group, then drag the box to cover the required lamps.

The shift and control keys can also be used to modify how lamps are selected.

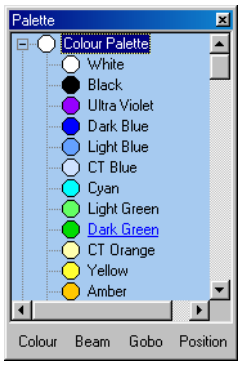
The diagram below shows the display detail associated with each lamp.



Two key palettes are provided for control of the lamps, the Colour Palette and the Control Palette.

Colour Palette

The Colour-Palette contains short cuts for colour, beam and position information. The colour and beam information is loaded for a specific lamp when it is first placed on stage.



Click on the Speed-Bar entry for Colour, to display the palette.

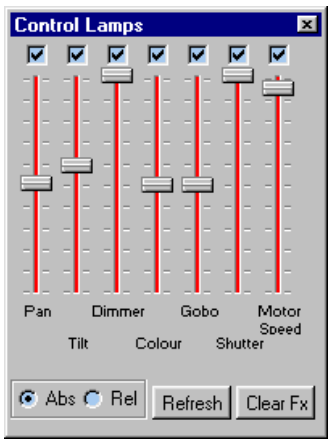
Click on any entry in the palette to change the attributes of the selected lamps.

The buttons at the base of the palette provide shortcuts to the four sections of the palette.

Control Palette

The Control-Palette provides a higher level of control by allocating a fader for each channel of the lamp.

Click on the speed bar entry for Control, to display the palette.



When a single lamp is selected, the Control Palette changes to reflect the lamp's current state.

When a group of lamps is selected, the faders are all centred.

The radio buttons select the mode of editing. When Absolute is selected, the lamp parameter will jump to match the fader as soon as it is moved. When Relative is selected, the lamp parameter is varied relative to its current value.

The tick boxes above each fader show whether the lamp attribute is currently included. By excluding lamp attributes and even entire lamps, cues can be built that only affect one zone of the stage.

As a fader is moved, the status bar displays the lamp channel level in both decimal and percentage form.

RECORD

Grand-Master Flash! provides three mechanisms for record and playback: Cues, Sequences and Stacks:

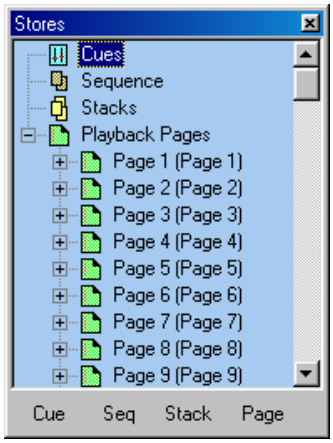
Cue Cues contain the level information for an entire look of the stage including all lamps. Cues also contain detailed timing information for their associated fade profile.

Sequence A sequence is a list of steps containing entire stage states. Sequences also contain the rate playback information.

Stacks Stacks are the most sophisticated form of playback. They can be used to play simple sequences of cues or to automate the entire system.

Stacks can also be set to auto-load when the software is first started, allowing fully automatic operation.

Store Palette



Grand-Master Flash! Uses a WYSIWYG system of recording. Whatever you see in the workspace, is recorded.

The Store-Palette is key to the recording process.

Click on the Speed-Bar entry for Stores, to display the palette.

The first three entries in the palette contain the three categories described above, Cues Sequences and Stacks.

The lower section allows the Playback Pages to be programmed. The Playback Pages are used to allocate cues or sequences to the Playback Window.

The Record button of the Speed-Bar and the Store-Palette are intimately linked. When Record is pressed, the workspace is recorded to the entity selected in the Store-Palette. The following table indicates the detailed operation:

Record Button

Store-Palette Selection	Record Operation
Cue Heading	Next consecutive Cue added. Workspace recorded to Cue.
Cue	Next consecutive Cue added. Workspace recorded to Cue.
Sequence Heading	Next consecutive Sequence added. Step 1 added to new Sequence. Workspace recorded to step 1.
Sequence	New step addended to end of Sequence. Workspace recorded to new step.
Sequence Step	New step inserted after selected step. Workspace recorded to new step.
Stack Heading	New Stack added. First step of new Stack added. Next consecutive Cue added. New stack step set to trigger new Cue. Workspace recorded to new Cue.
Stack	New step appended to end of Stack. Next consecutive Cue added. New stack step set to trigger new Cue. Workspace recorded to new Cue.
Stack Step	New step inserted after selected step. Next consecutive Cue added. New stack step set to trigger new Cue. Workspace recorded to new Cue.
Playback Page Heading	Next consecutive Cue added. First playback of first page assigned to new Cue. Workspace recorded to new Cue.
Playback Page	Next consecutive Cue added. First playback of selected page assigned to new Cue. Workspace recorded to new Cue.
Playback Entry	Next consecutive Cue added. Selected playback of selected page assigned to new Cue. Workspace recorded to new Cue.

When the workspace is recorded, the last edited timing values are used for the new recording. It therefore saves programming time to set your preferred Cue and Sequence times after the first recording. As with all areas of Grand-Master Flash! - the right click menu provides access to more detailed controls.

PLAYBACK

Cues and Sequences are played back using the Playback-Panel. Stacks are played back in their own control panel.

Playback Panel

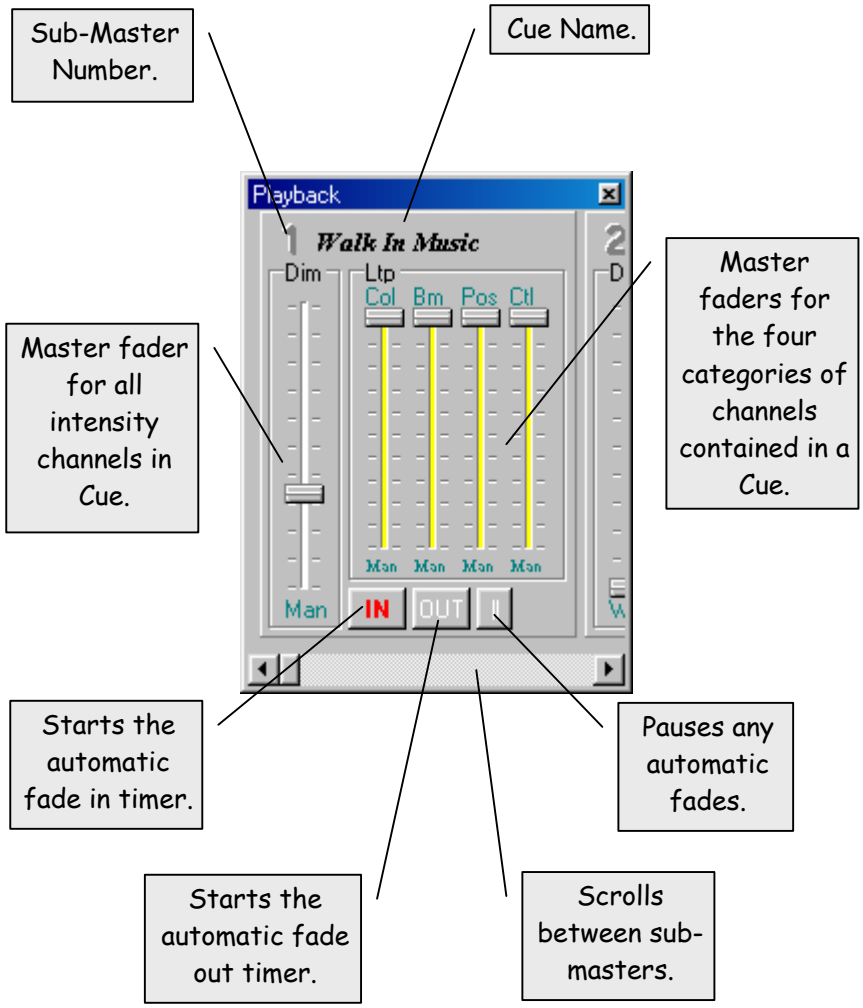
The Playback-Panel provides twelve independent, automated sub-masters. Each sub-master is able to playback a Cue or a Sequence. The allocation of Cues and Sequences to Playback Pages is set in the Store-Palette.

The active Playback Page is selected with the two arrow keys in the lower right of the screen. The Cue or Sequence assigned to a sub-master only changes when the Dimmer master fader is at zero.

The operation of the Playback-Panel changes depending upon Cue or Sequence selection.

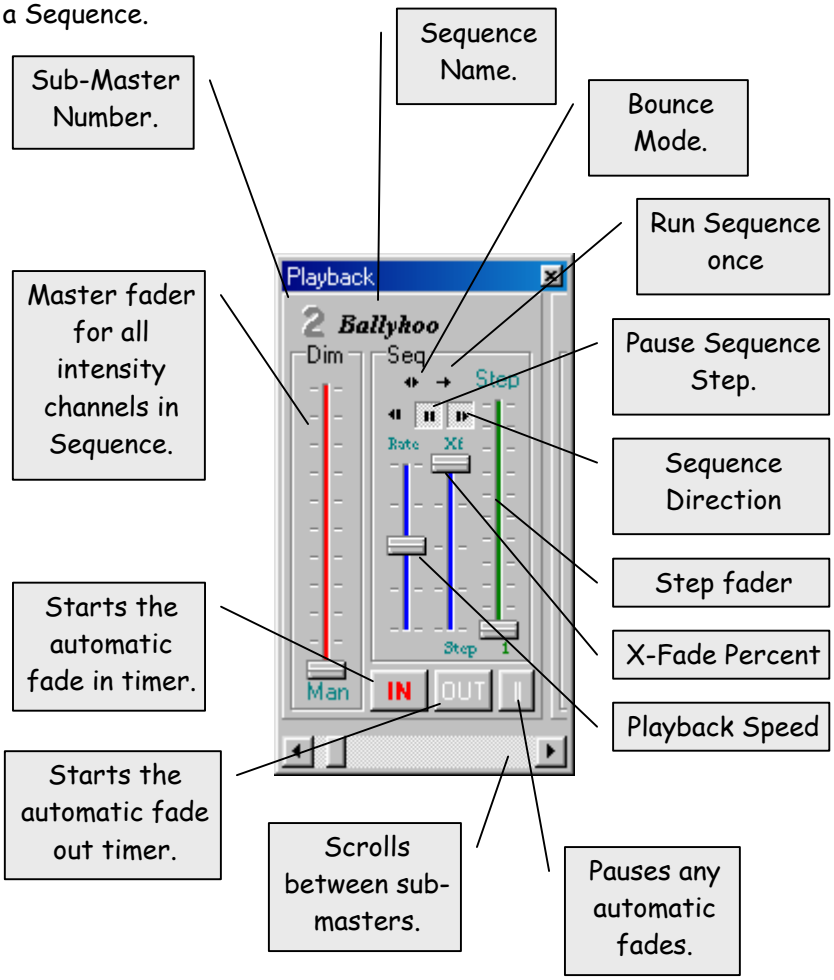
Cue Playback

The screen shot below shows the Playback-Panel configuration for a Cue.



Sequence Playback

The screen shot below shows the Playback-Panel configuration for a Sequence.



SUMMARY

The previous section provides a brief introduction to the operation of Grand-Master Flash! It is intended to allow anyone who is familiar with both Windows and lighting consoles, to start programming a show.

TIP

Grand-Master Flash! Is supplied with a number of example shows. It is strongly recommended that new users examine the samples.

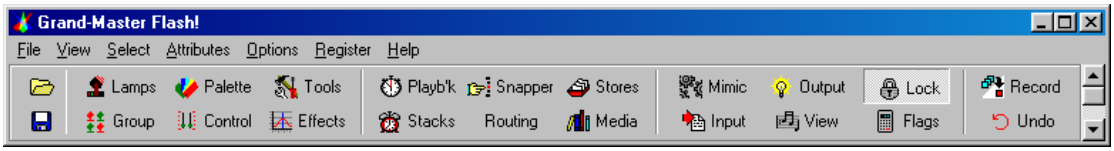
The remainder of this manual discusses the features of Grand-Master Flash! In detail.

THE SPEED BAR

The regularly used controls are all accessed from the Speed-Bar.

This is the row of buttons at the top of the screen. The functions can also be accessed from the View menu.

The following table provides a summary of the functions that are accessed from the Speed-Bar:



QUICK REFERENCE

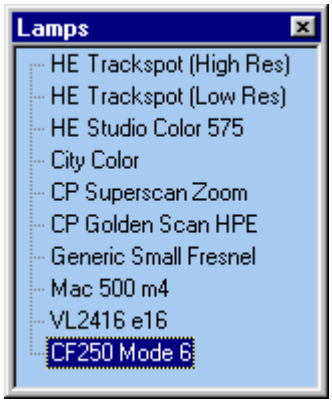
Icon	Name	Purpose
	Open	Opens a Grand-Master Flash! file from disc.
	Save	Saves a Grand-Master Flash! file to disc.
	Lamps	Displays the Lamp Library-Palette. Allows lamps to be patched into the workspace.
	Group	Displays the Group-Palette. Allows groups of lamps to be selected for easier editing.
	Palette	Displays the Colour-Palette. Allows Colour, Beam and Position attributes to be set.
	Control	Displays the Control-Panel. Allows all channels of selected lamps to be edited.
	Tools	Displays the Tools-Palette. Allows functions such as Rotate, Shift and Fan to be applied to groups of lamps.
	Effects	Displays the Effects-Palette. Allows Dynamic effects to be applied to any channels of any lamps.
	Playback	Displays the Playback-Panel. This is used to playback Cues and Sequences.
	Stacks	Displays the Stack-Panel. This is used to playback Stacks.
	Snapper	Displays the Snapper-Panel. This is used to playback the LTP content of the Playback-Panel.
	Routing	Displays the Routing-Panel. This is used to configure the Art-Net Ethernet patching.

Icon	Name	Purpose
	Stores	Displays the Stores-Palette. This is used to record Cues, Sequences, Stacks and Playback Pages.
	Media	Displays the Media-Palette. This is used to program Multi-Media events.
	Mimic	Displays the Output-Mimic. It shows all output levels and lamp patch information.
	Input	Displays the Input-Mimic. This is also used to monitor network data when using Art-Net output.
	Output	The Output button latches in two states. When pressed, the workspace shows the intensity levels of the final output. When released, the workspace shows the current edit state of the intensity levels.
	View	Displays the Multimedia-Viewer. This is used to preview video content of multimedia events.
	Lock	The Lock button latches in two states. When pressed, the lamp icons are locked to the workspace. Dragging the mouse will edit the lamp. When released, dragging the mouse moves the lamp icon.
	Flags	The Flags button latches in two states. When pressed, information flags are briefly displayed when the mouse stops over a control or a lamp icon. When released, flags are disabled.
	Record	Records the workspace into the entity selected in the Store-Palette.
	Undo	Reverses the last workspace edit.

The remainder of this section discusses each function in detail.

LAMPS BUTTON

The lamps button displays the Lamp-Palette. It is used to place lamps on stage and also to edit or create new lamp entries.



The Lamp-Palette displays the lamps that are in use for a particular show.

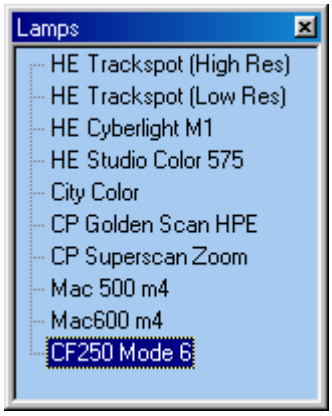
The right click popup menu provides access to the lamp control functions:

Lamp Popup Menu

Menu Item	Purpose
Edit This Definition	Starts the lamp library editor for the selected entry.
Create New Entity	Creates a new lamp library entry, allowing details of a new fixture to be entered.
Remove Entity from Show	Removes the lamp library from the Lamp-Palette. This does NOT delete the lamp library.
Include New Entity (Before)	Add a lamp library entry to the Lamp-Palette before the selected lamp.
Include New Entity (After)	Add a lamp library entry to the Lamp-Palette after the selected lamp.

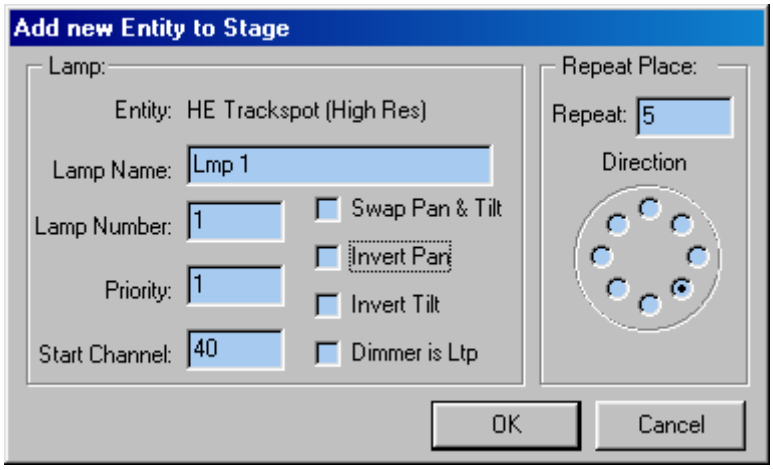
Patching a Lamp

Lamps are patched by dragging an entry from the Lamp-Palette onto the workspace.
When the mouse button is released, the Add new Entity To Stage dialogue is displayed.



This dialogue allows entry of the lamp start channel. It also allows the placement to be repeated any number of times in one of eight directions.

The example shown here will add five Trackspots diagonally to the workspace, starting at channel number 40.



Once a lamp is positioned in the workspace, it can be moved by dragging the lamp icon. The lock button on the Speed-Bar prevents this operation in order to ensure that lamps are not moved accidentally during the selection process.

Options Summary

The following table summarises all of the options available.

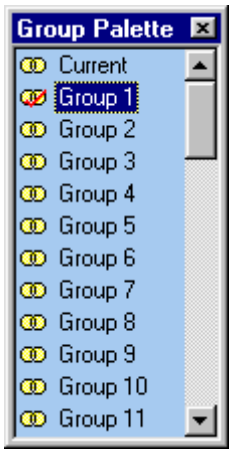
Dialogue Item	Purpose
Entity	The type of lamp that will be added to the workspace.
Lamp Name	The user's name for the lamp. This text is displayed below the lamp icon.
Lamp Number	The Lamp Number is incremented for each lamp that is patched. It is not editable.
Priority	The Priority Number defines the position of a lamp in an Effects sequence. For example: If a group of 5 lamps are running a 'Walking Kick' effect, the lamp with the lowest Priority Number will be first in the sequence.
Start Channel	The Start Channel is the DMX512 address to which the lamp will be patched. Grand-Master Flash! sets the default value for the next available channel that is not in use by lamps that are already patched.
Repeat	The Repeat number allows multiple lamps to be patched in one operation. A value of '0' or '1' is identical and will add a single lamp to the workspace.

Dialogue Item	Purpose
Direction	The Direction control is used when patching multiple lamps. The circular 'compass' selects the direction in which the lamps will be placed on the workspace.
Swap Pan & Tilt	This function allows the operation of Pan and Tilt to be reversed. This is useful when some lamps are mounted at right angles to the others. Selecting this option ensures that the beam movement direction is consistent when all lamps are moved as a group.
Invert Pan	This function allows the operation of Pan to be reversed. This is useful when some lamps are mounted facing each other. Selecting this option ensures that the beam movement direction is consistent when all lamps are moved as a group.
Invert Tilt	This function allows the operation of Tilt to be reversed. This is useful when some lamps are mounted facing each other. Selecting this option ensures that the beam movement direction is consistent when all lamps are moved as a group.
Dimmer is LTP	This option sets the operation of the lamp's intensity channel to be LTP – Latest Takes Precedence, as opposed to HTP – Highest Takes Precedence.

The parameters described above can also be edited after the lamp is patched. To do this, right click on the lamp icon.

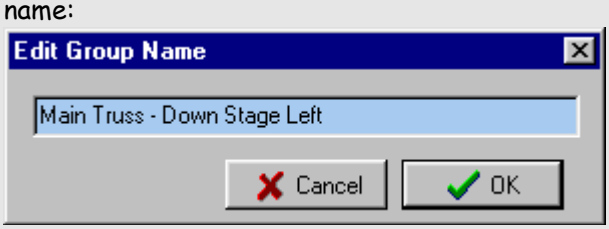
GROUP PALETTE BUTTON

The Groups button displays the Group-Palette. This is used to record and select groups of lamps. Groups do not directly affect the output; they are a programming aid.



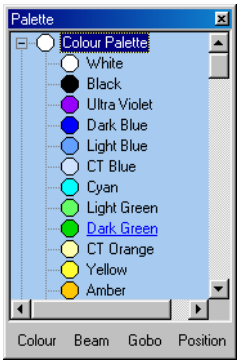
Groups that contain a selection are displayed with a red tick superimposed on the group icon. Clicking on an active group will select that set of lamps in the workspace. Selected lamps are denoted by a red horizontal bar below the icon.

Additional group functions are available from the right click popup menu. These functions are summarised in the table below:

Item	Description
Add Group to Workspace	The lamps contained in the group are selected in addition to those already selected in the workspace.
Copy Group to Workspace (PLAYBACK)	This is identical to simply clicking the group icon. The lamps contained in the group are selected instead of those already selected in the workspace.
Subtract Group from Workspace	The lamps contained in the group are deselected in the workspace.
Add Workspace to Group	Lamps that are selected in the workspace are added to the lamps contained in this group.
Replace Group with Workspace (RECORD)	Lamps that are selected in the workspace replace the list of lamps contained in this group.
Subtract Group from Workspace	Lamps that are selected in the workspace are removed from the list of lamps contained in this group.
Delete Group	The list of lamps contained in this group is deleted.
Edit Name	Displays a dialogue allowing entry of the group name: 

COLOUR PALETTE BUTTON

The Colour-Palette contains short cuts for colour, beam and position information. The colour and beam information is loaded for a specific lamp when it is first placed on stage.



The Colour-Palette is applied to all selected lamps within the workspace. Simply click on the required icon.

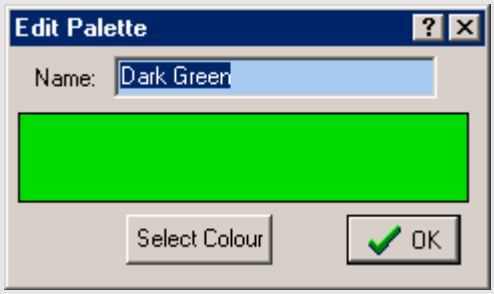
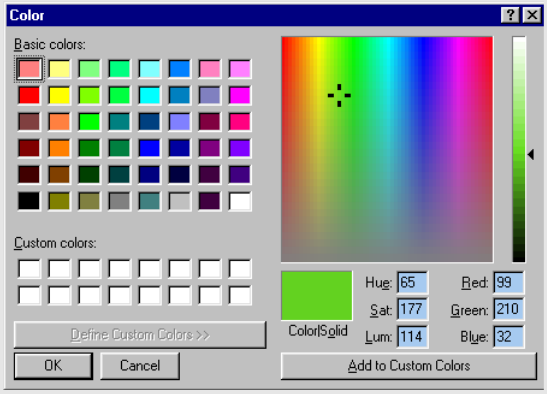
The buttons at the base of the palette provide shortcuts to the four sections of the palette as summarised in the following table:

Palette Section	Description
Colour	The colour section is used to control colour attributes of the selected lamps. The affect of applying a colour palette to a lamp is defined in the lamp library. This allows the use of colour palettes across differing lamp manufacturers.
Beam	The beam section is used to control beam attributes of the selected lamps, such as iris, zoom, frost etc. The affect of applying a beam palette to a lamp is defined in the lamp library. This allows the use of beam palettes across differing lamp manufacturers.
Gobo	The gobo section is simply a subset of the beam palette. It is provided as a shortcut for convenience.
Position	The position section is used to control the pan and tilt attributes of the selected lamps. Position palettes are different from colour and beam in that they are not defined in the lamp library. Position palettes reference a Cue memory for the lamp position information. This allows a number of Cues to be used as 'Preset Focuses'.

A palette is selected by simply clicking on the icon. Right clicking on the icon displays a popup menu with additional functions. These functions are summarised in the tables below:

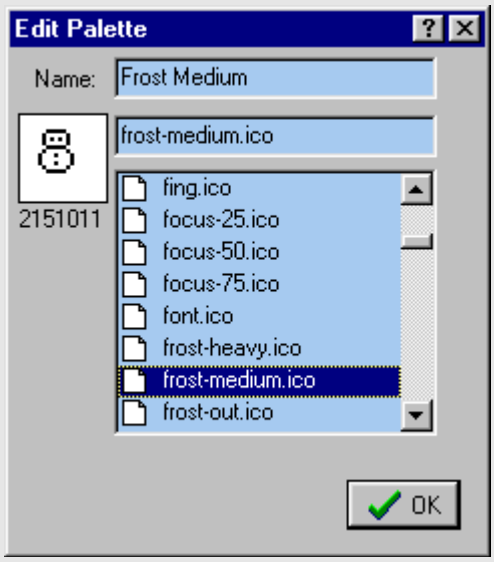
COLOUR POPUP

Item	Description
Apply palette to selected lamps	This is identical to clicking the palette entry. The palette is applied to all lamps selected in the workspace.
Apply palette to workspace (Playback)	The palette is applied to all lamps in the workspace, whether selected or not.
Copy selected lamps to palette	The colour channel attributes of the selected lamps are recorded to the palette. If more than one lamp of the same lamp type is selected, the colour attributes of the lamp with the highest lamp number are used. This function overrides the colour attributes defined in the lamp library.
Copy workspace to palette (Record)	The colour channel attributes of all lamps in the workspace are recorded to the palette. If more than one lamp of the same lamp type is in the workspace, the colour attributes of the lamp with the highest lamp number are used. This function overrides the colour attributes defined in the lamp library.

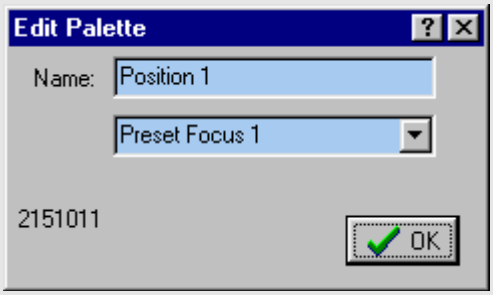
Item	Description
Edit Palette	This function displays a dialogue that allows the palette name and colour to be edited. The default values of the first twenty palettes are set to coincide with the default values of the lamp library. For this reason, the colour setting of the first twenty palettes should not normally be modified unless the user plans to generate custom lamp libraries. The following dialogue is displayed:  The numeric value shown is the decimal representation of the selected colour. The select colour button displays a colour selection dialogue: 
Delete Palette	The Delete Palette function clears the palette name to the default value and clears all information in the palette.

BEAM POPUP

Item	Description
Apply palette to selected lamps	This is identical to clicking the palette entry. The palette is applied to all lamps selected in the workspace.
Apply palette to workspace (Playback)	The palette is applied to all lamps in the workspace, whether selected or not.
Copy selected lamps to palette	The beam channel attributes of the selected lamps are recorded to the palette. If more than one lamp of the same lamp type is selected, the beam attributes of the lamp with the highest lamp number are used. This function overrides the beam attributes defined in the lamp library.
Copy workspace to palette (Record)	The beam channel attributes of all lamps in the workspace are recorded to the palette. If more than one lamp of the same lamp type is in the workspace, the beam attributes of the lamp with the highest lamp number are used. This function overrides the beam attributes defined in the lamp library.

Item	Description
Edit Palette	This function displays a dialogue that allows the palette name and icon to be edited. The default values of palettes are set to coincide with the default values of the lamp library. For this reason, the beam setting of the palettes should not normally be modified unless the user plans to generate custom lamp libraries. The following dialogue is displayed:   Beam icons use the standard Windows '.ico' format. User generated beam icons should be placed in directory: C:\Program Files\Artistic Licence\Grand-Master Flash!\LampLib\Beam
Delete Palette	The Delete Palette function clears the palette name to the default value and clears all information in the palette.

POSITION POPUP

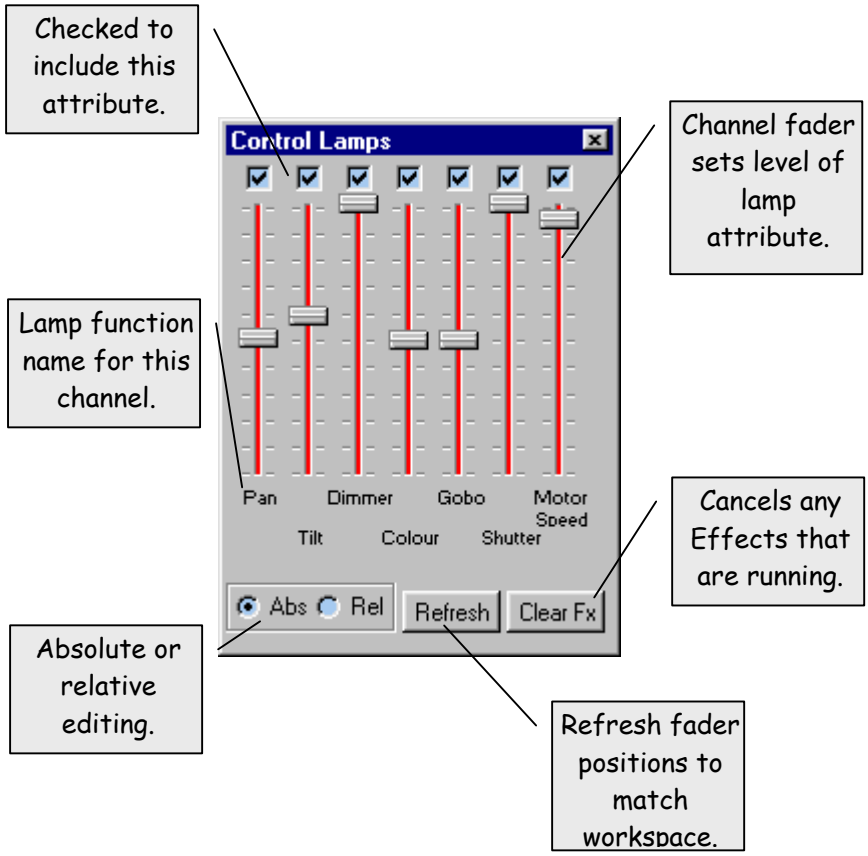
Item	Description
Apply palette to selected lamps	This is identical to clicking the palette entry. The palette is applied to all lamps selected in the workspace.
Apply palette to workspace (Playback)	The palette is applied to all lamps in the workspace, whether selected or not.
Edit Palette	This function displays a dialogue that allows the palette name and Cue to be edited. The default values are set to incrementing Cue numbers. The following dialogue is displayed: 

CONTROL PALETTE BUTTON

The Control-Palette provides individual control over selected lamps within the workspace. Each channel of all selected lamps is displayed as a fader.

When a single lamp is selected, the Control-Palette changes to reflect the lamp's current state.

When a group of lamps is selected, the faders are all centred.



TIP

The Control-Palette is used in conjunction with the Colour-Palette to build up a 'look' in the workspace. When the required look is complete, the workspace is then recorded.

The following table summarises Control-Palette operation:

Control	Purpose	
Check Box	The check box above each fader is used to include or exclude the channel from selected lamps in the workspace. This is a particularly powerful feature. It allows Cues or Sequences to be built that control selected lamps or selected attributes of lamps. This in turn allows simultaneous sequences to control different aspects of the lamps. For example: one Sequence can control pan and tilt movement whilst another sequence controls colour.	
Fader	The fader operation is modified by the Abs/ Rel control.	
	Absolute	The fader position sets the channel level directly.
	Relative	The fader position increments or decrements the channel level.
Name	The fader name is defined by the lamp library of the selected lamps.	
Abs / Rel	Modifies the fader operation as described above.	
Refresh	Refreshes the fader levels to match the workspace.	
Clear Fx	Cancels all Effects that are currently assigned to the workspace.	

TOOLS PALETTE BUTTON

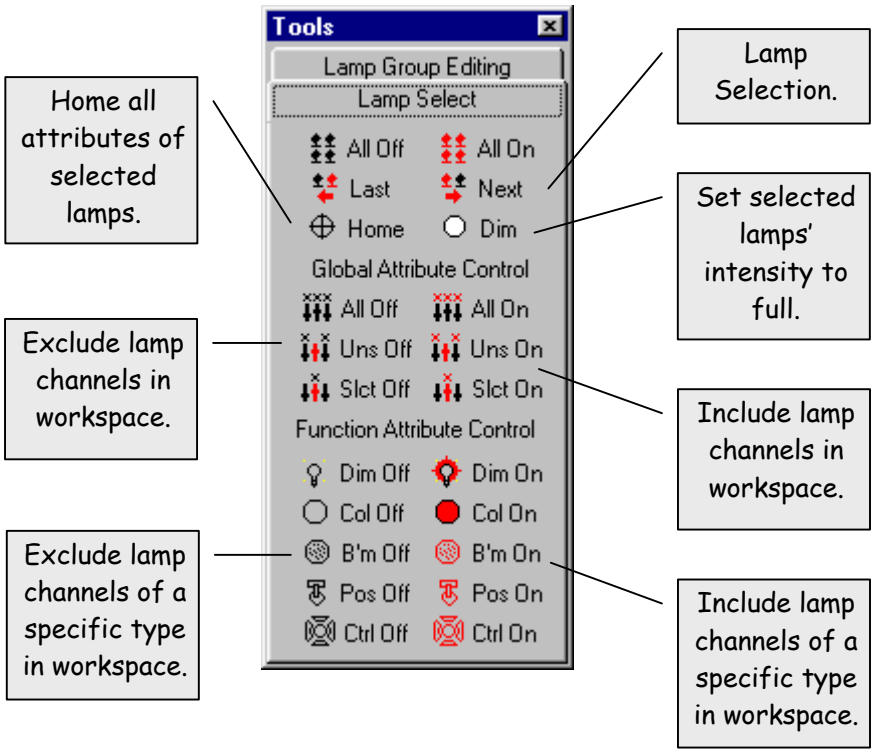
The Tools-Palette provides a range of editing facilities for the workspace.

The palette is divided into two pages; Lamp Select and Lamp Group Editing.

LAMP SELECT

The Lamp Select page is primarily concerned with selection of lamps and inclusion of lamp attributes within the workspace.

The page is grouped into three sections.



The Lamp Select page is particularly important when programming Cues and Sequences that are designed to control only a specific group of lamps or lamp attributes.

TIP

The Mask function provides a global method of including and excluding lamp attributes in Cues and Sequences.

The following table provides a detailed description of each function:

Selection

Control	Purpose
All Off	Deselect all lamps in the workspace. This is purely for lamp selection and does not affect the output.
All On	Select all lamps in the workspace. This is purely for lamp selection and does not affect the output.
Last	The previous lamp in the last selected group is selected in the workspace. If the last group is *Current* the previous lamp from all lamps on stage is selected. This is purely for lamp selection and does not affect the output.
Next	The next lamp in the last selected group is selected on stage. If the last group is *Current* the next lamp from all lamps on stage is selected. This is purely for lamp selection and does not affect the output.

Home

Control	Purpose
Home	All selected lamps are set to the default levels defined in the lamp library. Generally, this will be white beam pointed at centre of stage.
Dim	The dimmer channel of all selected lamps is set to full power.

Global Attribute

Control	Purpose
All Off	Sets all channels of all lamps in the workspace to 'excluded'. 'Excluded' channels are excluded from cues and sequence steps when recording. This control should be used before editing a new look in order to ensure that extraneous lamps are not recorded.
All On	Sets all channels of all lamps in the workspace to 'included', at the channel level currently seen on the DMX output. 'Included' channels are included in cues and sequence steps when recording. This control should be used when recording of all lamps in the workspace is required.
Unselected Off	Sets all channels of all lamps that are not selected to 'excluded'.
Unselected On	Sets all channels of all lamps that are not selected to 'included', at the channel level currently seen on the DMX output.
Selected Off	Sets all channels of all selected lamps to 'excluded'.
Selected On	Sets all channels of all selected lamps to 'included', at the channel level currently seen on the DMX output.

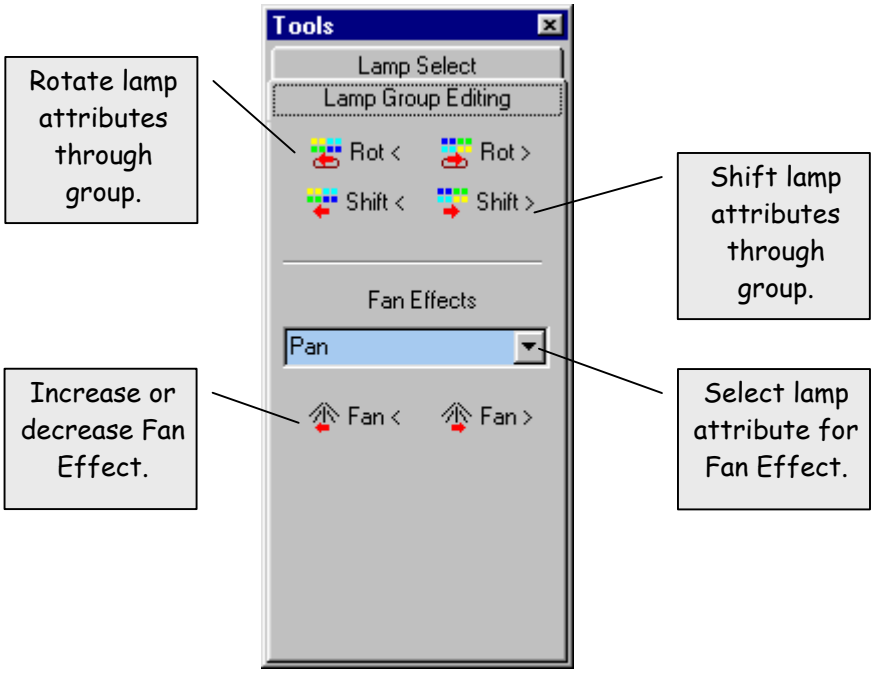
Function Attribute

Control	Purpose
Intensity Off	Sets all intensity channels associated with all selected lamps to 'excluded'. These channels will then not be recorded in subsequent record operations.
Colour Off	Sets all colour channels associated with all selected lamps to 'excluded'. These channels will then not be recorded in subsequent record operations.
Beam Off	Sets all beam (Gobo, Iris etc) channels associated with all selected lamps to 'excluded'. These channels will then not be recorded in subsequent record operations.
Position Off	Sets all position (Pan & Tilt) channels associated with all selected lamps to 'excluded'. These channels will then not be recorded in subsequent record operations.
Control Off	Sets all control (lamp strike etc) channels associated with all selected lamps to 'excluded'. These channels will then not be recorded in subsequent record operations.
Intensity On	Sets all intensity channels associated with all selected lamps to 'included' at the level of the current DMX output. These channels will be recorded in subsequent record operations.
Colour On	Sets all colour channels associated with all selected lamps to 'included', at the level of the current DMX output. These channels will be recorded in subsequent record operations.
Beam On	Sets all beam channels associated with all selected lamps to 'included', at the level of the current DMX output. These channels will be recorded in subsequent record operations.
Position On	Sets all position channels associated with all selected lamps to 'included', at the level of the current DMX output. These channels will be recorded in subsequent record operations.
Control On	Sets all control channels associated with all selected lamps to 'included', at the level of the current DMX output. These channels will be recorded in subsequent record operations.

LAMP GROUP EDITING

The Lamp Group Editing page is primarily concerned with controlling individual lamps within a group.

Three functions are provided: Rotate, Shift and Fan.

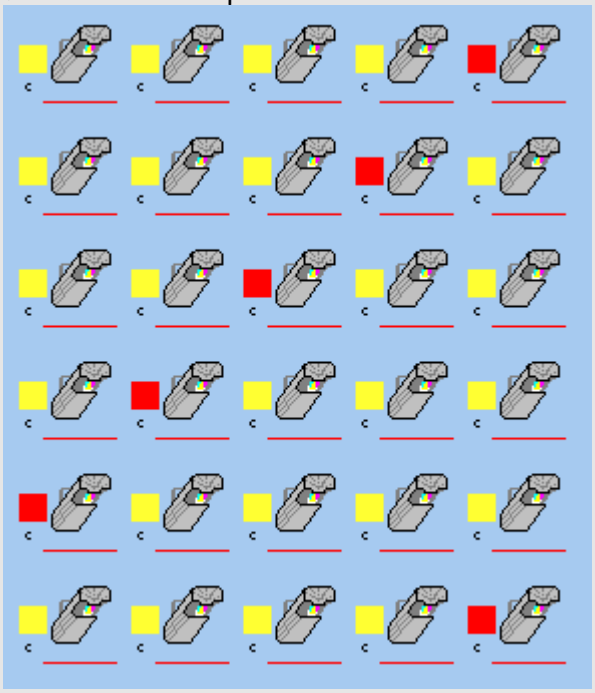


TIP

The Lamp Group Editing functions are very useful for creating quick sequences. Open the Store-Palette and click on the Sequence Header. Then click Record after using each Lamp Group function.

The following table provides a detailed description of each function:

Lamp Group Summary

Control	Purpose
Rotate <<<	The rotate left macro copies all included attributes of a selected lamp to the (numerically) previous selected lamp. The macro is symmetric in that multiple presses of the key will return the selected lamps to their initial state. The rotate macro provides a very fast method of programming sequences with for example, alternating colour patterns. The following screen shot shows the effect of five consecutive operations:  Note that in the example shown, all lamp attributes apart from colour are excluded from the workspace.
Rotate >>>	Provides the reverse of the function described above.

Control	Purpose
Shift <<<	The shift left macro copies all included attributes of a selected lamp to the (numerically) previous selected lamp. The macro is asymmetric in that multiple presses of the key will cause all lamps to take on the original state of the highest selected lamp number. The shift macro provides a very fast method of programming sequences with for example, a wiping colour pattern. The screen shot below shows the effect of four consecutive operations:  In this example, the beam (Gobo 4) attributes are gradually included as the shift operation proceeds.
Shift >>>	Provides the reverse of the function described above.

Fan <<< 	The Fan effect is primarily aimed at generating fan shapes from a group of beams using pan and tilt. The function can be applied to any attribute, allowing creation of intensity comet trails and colour spectrums. The example below shows the effect of incrementally applying the fan function to a group of five lamps. 
Fan >>>	Provides the reverse of the function described above.

PLAYBACK BUTTON

The playback button displays the Playback-Panel.

The Playback-Panel provides twelve independent, automated sub-masters. Each sub-master is able to playback a Cue or a Sequence.

The allocation of Cues and Sequences to Playback Pages is set in the Store-Palette. The active Playback Page is selected with the two arrow keys in the lower right of the screen. The Cue or Sequence assigned to a sub-master only changes when the Dimmer master fader is at zero.

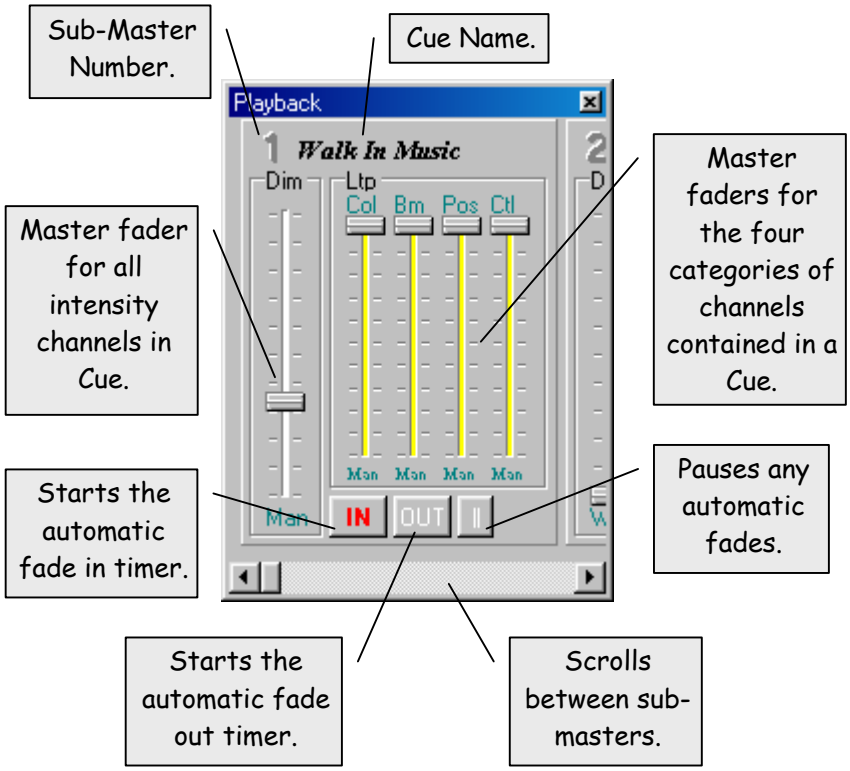
The operation of the Playback-Panel changes depending upon Cue or Sequence selection.

CUE PLAYBACK

A Cue contains both level and timing information. The level information is divided into the lamp attribute categories of Intensity, Colour, Beam, Position and Control. Each of these categories has separate timing information. The five faders shown below are used to master each of these lamp attribute categories for playback. The faders operate as a mimic during automatic playback and allow user control during manual playback.

TIP

The timing profile for each lamp attribute category is accessed by right click popup menu in the Store-Palette.



The table below summarises the Cue Playback controls:

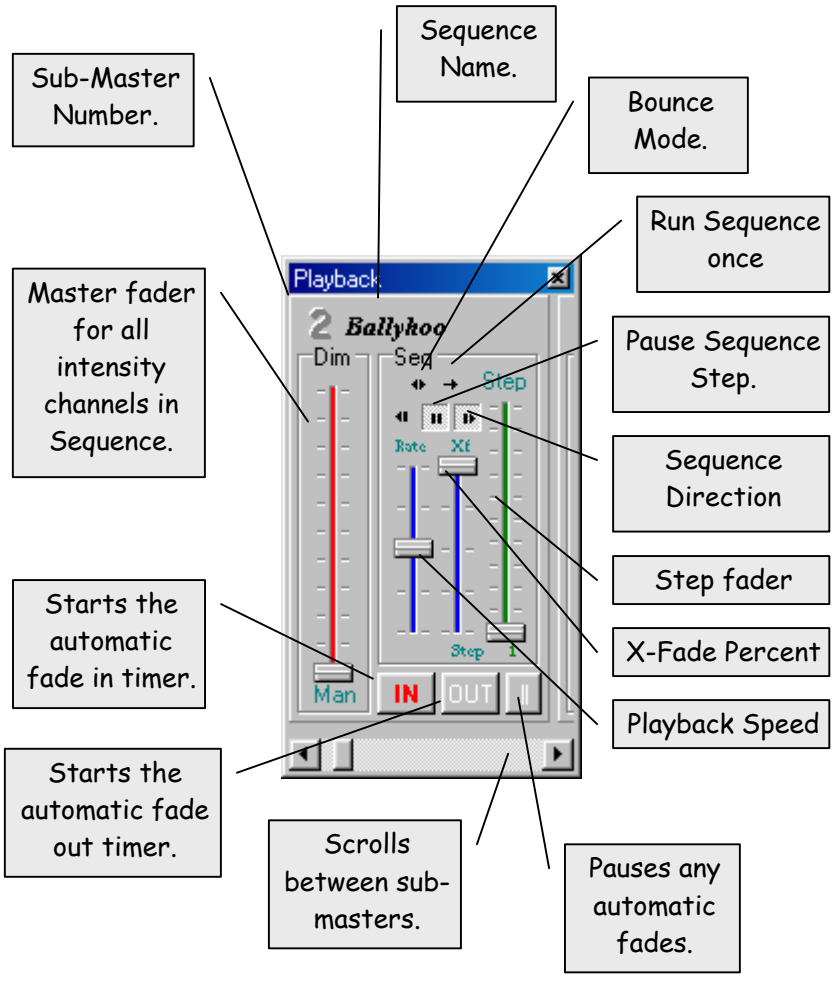
Control	Description	
Sub-Master Number  	The Sub-Master number indicates the playback channel in the range 1 to 12. Sub-Master channels can playback simultaneously. Clicking on the Sub-Master number enables or disables the Ganging Mode. Sub-Masters that are ganged, automatically fade out when another ganged auto-fade starts. Ganged Sub-Masters are indicated by a light grey background.	
Cue Name	The Cue Name indicates the Cue assigned to the Sub-Master. This assignment is made via the Store-Palette Playback Page.	
Dim Master	The Dim Master controls all intensity channels within the Cue, independent of whether they are assigned as HTP or LTP. The Dim Master moves automatically during an auto-fade. The user can take manual control of the Dim Master at any time by clicking on the fader. The text below the fader changes to show the fader status.	
	Man	The auto-fade is not running and the Dim Master is in manual mode.
	Wait	The auto-fade is running. Intensity channels are in the 'wait before fade up' period. During this phase, this Sub-Master is not affecting the intensity output.
	Up	The auto-fade is running. Intensity channels are in the 'fade up' period.
	Hold	The auto-fade is running. Intensity channels are in the 'hold before fade down' period. During this phase, the full level of all intensity channels within this Cue is output.
	Dwn	The auto-fade is running. Intensity channels are in the 'fade down' period.

Control	Description	
Col Master Beam Master Pos Master Ctrl Master	The Attribute Masters controls each group of attribute channels within the Cue. The Dim Master moves automatically during an auto-fade. The user can take manual control at any time by clicking on the fader. The text below the fader changes to show the fader status. As the Attribute Masters always contain LTP channels, there is no Hold or Down fade.	
	Man	The auto-fade is not running and the Attribute Master is in manual mode.
	Wait	The auto-fade is running. Attribute channels are in the 'wait before fade up' period.
	Up	The auto-fade is running. Attribute channels are in the 'fade up' period.
In  	The In button starts the auto-fade. During the auto-fade, the Pause button can be used to cancel the auto-fade and return all faders to manual mode. The user can take manual control of a single fader at any time by clicking on the fader. The auto-fade runs through the four phases of Wait – Up – Hold –Down. The Hold – Down phases can be disabled in the Cue setup dialogue.	
Out	The Out button starts the Hold – Down phase of the auto-fade. This control can be used at any time during the auto-fade.	
Pause	The Pause button cancels the auto-fade and returns the faders to manual control.	

SEQUENCE PLAYBACK

A Sequence contains both level and timing information. The timing information is both for the rate at which steps are played back and also the auto-fade, which controls the overall intensity of the playback. The four faders shown below are used to control these playback features. The Dim and Step faders operate as a mimic during automatic playback and allow user control during manual playback.

The timing profile for each lamp attribute category is accessed by right click popup menu in the Store-Palette.



The table below summarises the Sequence Playback controls:

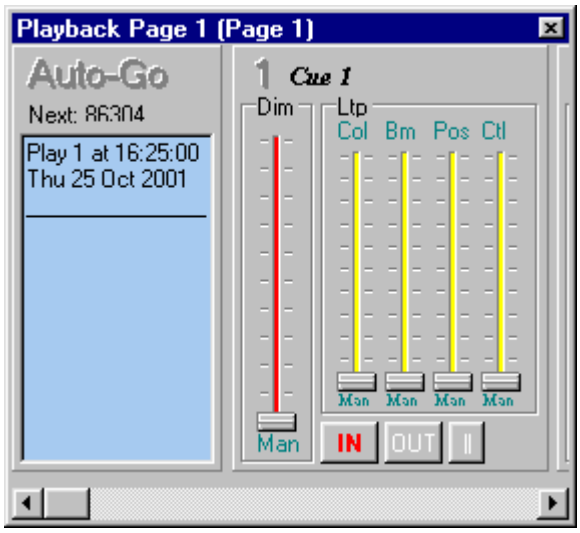
Control	Description	
Sub-Master Number  	The Sub-Master number indicates the playback channel in the range 1 to 12. Sub-Master channels can playback simultaneously. Clicking on the Sub-Master number enables or disables the Ganging Mode. Sub-Masters that are ganged, automatically fade out when another ganged auto-fade starts. Ganged Sub-Masters are indicated by a light grey background.	
Sequence Name	The Sequence Name indicates the Sequence assigned to the Sub-Master. This assignment is made via the Store-Palette Playback Page.	
Dim Master	The Dim Master controls all intensity channels within the Sequence, independent of whether they are assigned as HTP or LTP. The Dim Master moves automatically during an auto-fade. The user can take manual control of the Dim Master at any time by clicking on the fader. The text below the fader changes to show the fader status.	
	Man	The auto-fade is not running and the Dim Master is in manual mode.
	Wait	The auto-fade is running. Intensity channels are in the 'wait before fade up' period. During this phase, this Sub-Master is not affecting the intensity output.
	Up	The auto-fade is running. Intensity channels are in the 'fade up' period.
	Hold	The auto-fade is running. Intensity channels are in the 'hold before fade down' period. During this phase, the full level of all intensity channels within this Sequence is output.
	Dwn	The auto-fade is running. Intensity channels are in the 'fade down' period.

Control	Description
Step Master	The Step Master shows the transition between consecutive steps in the Sequence. The Step Master moves automatically during Sequence operation. The user can take manual control at any time by clicking on the fader. The text below and above the fader changes to show the current and next step.
Rate	The Rate fader controls the speed of Sequence playback. When the fader is in the centre position, playback is at the programmed speed. The Rate fader is used to make temporary changes to the speed. Use the Edit Settings dialogue to change the programmed playback speed.
XF	The XF fader controls the percentage crossfade of the step transition. At the top of travel, step transitions are full cross-fade. At the bottom of travel, step transitions are snap changes. The cross-fade percentage does not affect the transition time, just the style of the transition. The XF fader is used to make temporary changes. Use the Edit Settings dialogue to change the programmed cross-fade.
In  	The In button starts the auto-fade. During the auto-fade, the Pause button can be used to cancel the auto-fade and return all faders to manual mode. The user can take manual control of a single fader at any time by clicking on the fader. The auto-fade runs through the four phases of Wait – Up – Hold –Down. The Hold – Down phases can be disabled in the Sequence setup dialogue.
Out	The Out button starts the Hold – Down phase of the auto-fade. This control can be used at any time during the auto-fade.

Control	Description
Pause	The Pause button cancels the auto-fade and returns the faders to manual control. It does not pause the sequence.
Bounce	When the button is selected, the Sequence plays back alternately in forward and then reverse direction.
One Shot	When the button is selected, the Sequence plays back one cycle only.
Reverse	The Sequence plays back in reverse order.
Seq Pause	Pauses the Sequence. (Does not affect the auto-fade).
Forward	The Sequence plays back in the programmed order.

PLAYBACK PANEL WITH REAL TIME TRIGGER

When the active page contains either cues or sequences that have an associated Real Time Trigger, the Playback Panel is displayed as shown.

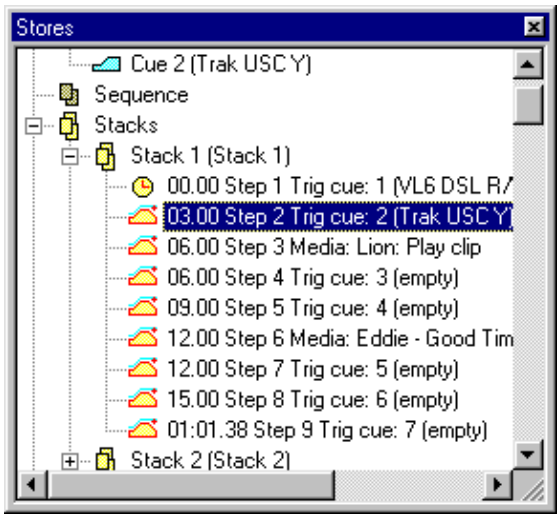


The Auto-Go window shows up to twelve pending triggers with their date and time. The time in seconds to the next trigger is also displayed.

STORES BUTTON

The Stores button accesses the store palette. It is used to record and playback cues, sequences, stacks and pages.

The table below details the four store types:



Type	Description
Cue	Used to record a basic look with fade time information. A cue can contain any or all lamps and any or all channels of those lamps.
Sequence	Records a list of steps that can contain the same information as Cues. The Sequence contains timing information to control the speed and methods of playback.
Stack	Records a list of steps that can contain Cues, Sub-master triggers, Page Changes and Multimedia events. The Stack provides a significantly more sophisticated timing system compared to Sequences. A stack can also be selected to auto-load when the program starts which provides a method of fully automated playback.
Page	Defines the order of the Cues and Sequences on the playback panel. Pages can be defined such that there is a single page change at the end of each scene or song.

EDITING STORES

Left click on any entry in the palette to preview the contents.

The store popup menu is accessed by right clicking on the entry. The menu contents varies depending on the type of entry:

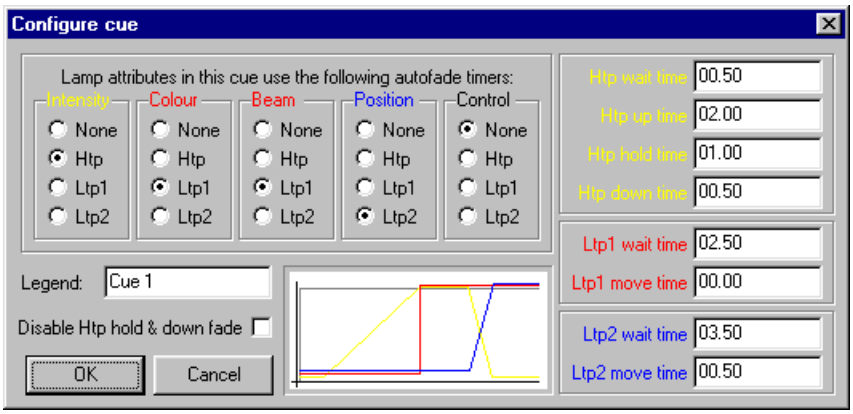
Cues

The Cues menu contains the following options:

Function	Description
Add cue to workspace	All channels contained in the cue are copied to the workspace but channels excluded from the cue are not changed in the workspace. This option allows a number of cues to be merged to the workspace before recording a composite cue.
Copy cue to workspace (Playback)	All channels contained in the cue are copied to the workspace and channels excluded from the cue are set to excluded in the workspace. This option is used when a cue is to be edited on stage.
Add workspace to cue	All channels included in the workspace are copied to the cue, but any channels excluded from the workspace are unaffected in the cue. This option allows, for example, a new lamp to be merged into a cue.
Copy workspace to cue (Record)	This is the main record function. The workspace settings are recorded into the cue.
Edit Settings	Provides access to all the timing information for the cue.
Real Time Go	Allows automatic triggering at a specific date and time.
Mask all cues	Allows specific categories of channels to be excluded from the all Cues. This is a powerful but dangerous function. Save the show before using it.
Mask cue	Allows specific categories of channels to be excluded from the Cue.
Delete cue	Deletes the Cue.
Duplicate cue	Makes a duplicate of the selected Cue.
Add new cue	Adds a new empty Cue.

Cue Timers

A Cue can be programmed with independent playback timing for each of the five types of channel category.



This is done using the Edit Settings dialogue as shown below. The dialogue provides a graphic preview of the selected timings. The example shown will provide the following playback events:

- Cue triggered - Waits 0.5S before any action.
- Intensity channels start a 2S fade up.
- As intensity reaches full, colour and beam channels snap change.
- Intensity holds at full for 1S
- As intensity starts a 0.5S fade down, position channels start a 0.5S move fade.

The table below describes the timer categories.

Timer	Description
None	Rises instantly to full value when the cue is triggered. Normally used for Control attributes. Displayed in grey.
Htp	May be programmed for either a two stage (Wait-Up) or a four stage (Wait-Up-Hold-Down) sequence. Normally used for Intensity. Displayed in yellow.
Ltp1	May be programmed for a two stage (Wait-Move) sequence. Normally used for Colour and Beam. Displayed in red.
Ltp2	May be programmed for a two stage (Wait-Move) sequence. Normally used for Position. Displayed in blue.

Real Time Trigger

A cue can be programmed to run automatically at a predefined date and time and optionally repeat at any interval between one minute and one month.

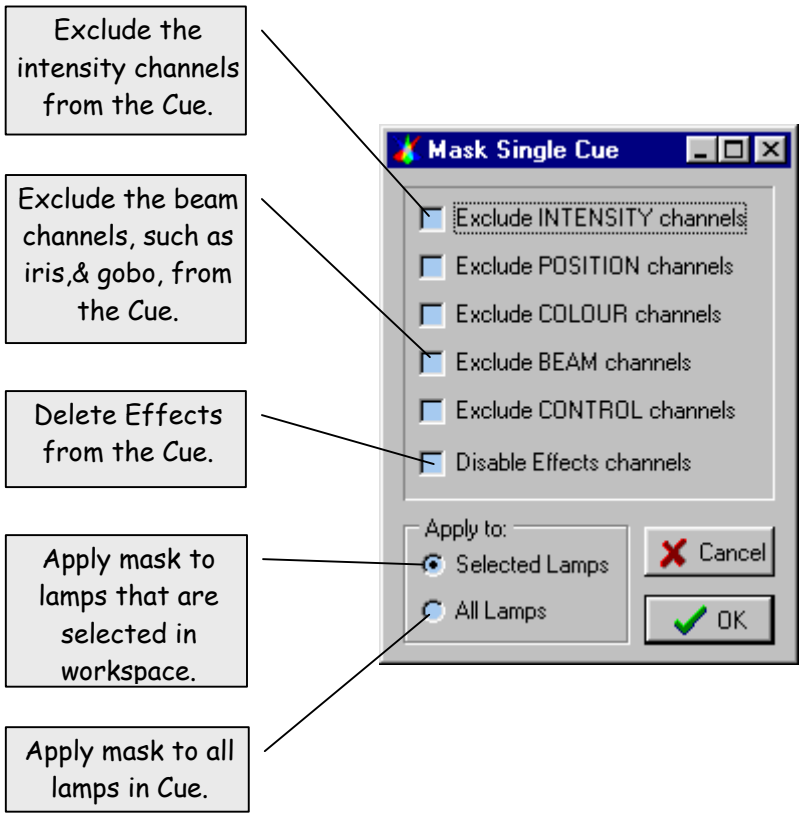
The option buttons (Month, Week etc.) preset the repeat times, which can then be edited as necessary.

Cues must still be allocated to a playback page for the real time trigger to operate.

Masking

Allows specific categories of channels to be excluded from the Cue. This is particularly useful in conjunction with the Duplicate function. A Cue can be recorded – duplicated and then masked into constituent parts.

The dialogue operates as shown below:



Sequence

The Sequence menu contains the following options:

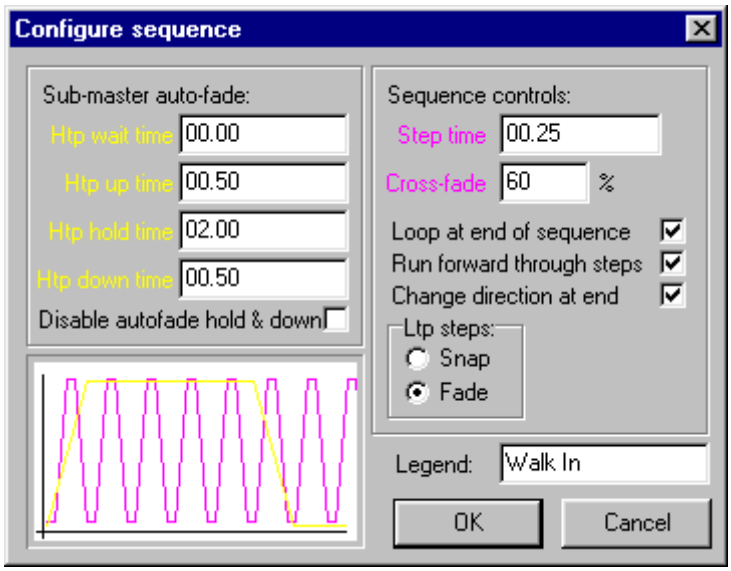
Function	Description
Add step to workspace	All channels contained in the sequence step are copied to the workspace but channels excluded from the step are not changed in the workspace. This option allows a number of steps and cues to be merged to the workspace before recording a composite.
Copy step to workspace (Playback)	All channels contained in the sequence step are copied to the workspace and channels excluded from the step are set to excluded in the workspace. This option is used when a step is to be edited on stage.
Add workspace to step	All channels included in the workspace are copied to the sequence step, but any channels excluded from the workspace are unaffected in the step. This option allows, for example, a new lamp to be merged into a sequence step.
Copy workspace to step (Record)	This is the main record function. The workspace settings are recorded into the sequence step.
Insert step before	A new blank step is inserted in the sequence before the selected step.
Insert step after	A new blank step is inserted in the sequence after the selected step.
Append step	A new blank step is added to the end of the sequence.
Edit Settings	Provides access to all the timing and control information for the sequence.
Real Time Go	Allows automatic triggering at a specific date and time.
Mask all sequences	Allows specific categories of channels to be excluded from the all sequences. This is a powerful but dangerous function. Save the show before using it.
Mask sequence	Allows specific categories of channels to be excluded from all steps in the sequence.
Mask step	Allows specific categories of channels to be excluded from the current step.
Delete sequence	Deletes the current sequence and all of the steps that it contains.
Delete step	Deletes the current step.

Sequence Timers

A sequence can be programmed with a global step time and an overall intensity profile. The yellow intensity timer profile operates identically to the cue timer.

The Step time sets the total time for each step change.

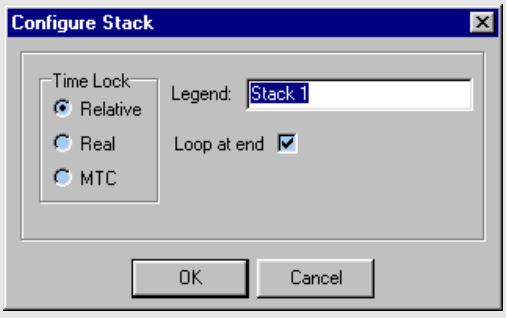
The Cross-fade defines the extent to which the HTP part of the step change should fade. Set to 100%, the HTP step transitions will be full dip-less cross-fades. Set to 0%, the HTP step transitions will snap with a delay time.



The LTP channels can be set to either snap change or follow the HTP transition. The graphic shows the number of sequence steps that will run within the overall intensity profile.

Stack

The Stack menu contains the following options:

Function	Description
Add step to workspace	All channels contained in the stack step are copied to the workspace but channels excluded from the step are not changed in the workspace. This option allows a number of steps and cues to be merged to the workspace before recording a composite.
Copy step to workspace (Playback)	All channels contained in the stack step are copied to the workspace and channels excluded from the step are set to excluded in the workspace. This option is used when a step is to be edited on stage.
Add workspace to cue in this step	All channels included in the workspace are copied to the cue in this stack step, but any channels excluded from the workspace are unaffected in the cue. This option allows, for example, a new lamp to be merged into a sequence step. If the selected stack step does not contain a cue, the function has no action.
Copy workspace to cue in this step (Record)	This is the main record function. The workspace settings are recorded into the cue in this stack step. If the selected stack step does not contain a cue, the function has no action.
Insert step before	A new blank step is inserted in the stack before the selected step.
Insert step after	A new blank step is inserted in the stack after the selected step.
Append step	A new blank step is added to the end of the stack.
Edit Settings	Provides access to the overall controls for this stack: 

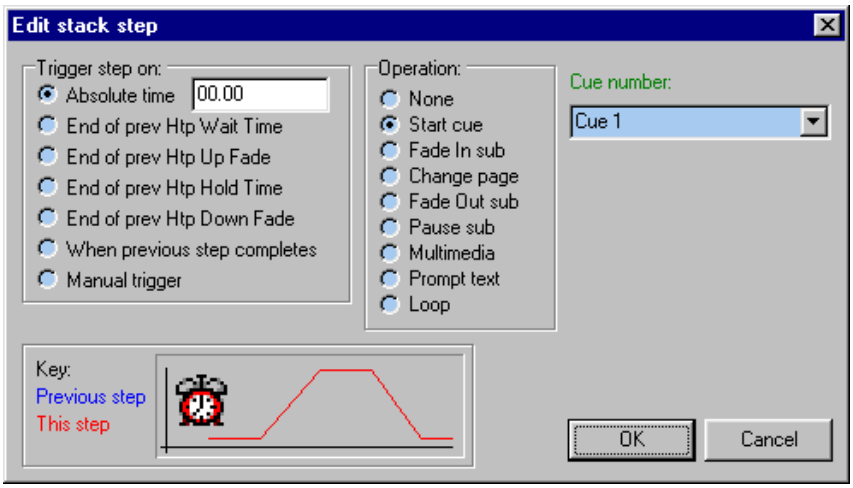
Function	Description
Edit stack step	Edits the contents and timing of this stack step. See below for details.
Delete stack	Deletes the current sequence and all of the steps that it contains.
Delete step	Deletes the current step.

Edit Stack Step

Stacks are the most sophisticated form of playback. They can be used to play simple sequences of cues or to automate the entire system.

The screen shot below shows the dialogue used to program each step of the stack.

The right panel is used to define the operation of the step, whilst the left panel defines the timing.



A stack step can produce any of the following operations:

Operation	Description
None	The step has no affect. This is useful as a place holder during the programming phase.
Start Cue	Starts a specific cue fade. The stack can process twelve simultaneous and overlapping cue fades. The timing for the Cue fade profile is defined by the Cue. The difference between playing a Cue from a stack step and a sub-master is that the option for 'up-fade only' is not available within the Stack step.
Fade In Sub	This is identical to pressing the In button for a specific playback. It allows the stack to automate the playback panel.
Fade Out Sub	This is identical to pressing the Out button for a specific playback. It allows the stack to automate the playback panel.
Change Page	This changes the currently selected playback page.
Pause Sub	This is identical to pressing the Pause button for a specific playback.
Multimedia	Trigger: Starts playback of one of the multimedia events. Stack playback supports simultaneous playback of up to eight multimedia channels.
Prompt	This simply displays a line of text in the prompt window of the Stack playback dialogue. It is useful for operator reminders during the show.
Loop	Causes execution of the stack to jump to another step. The jump uses a loop counter so that the number of jumps can be controlled. Loop operations can be nested.
Jump	Causes execution of the stack to jump to another stack.

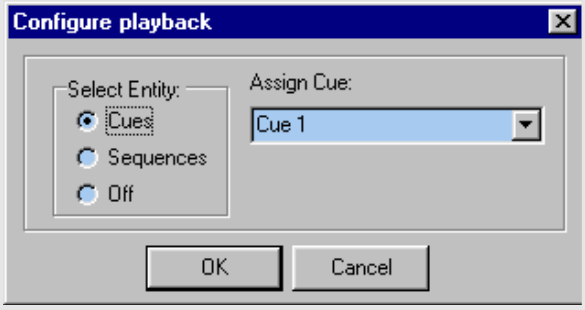
A stack step can be triggered with the following options:

Time	Description
Absolute	The step triggers at an absolute time. Absolute time is zeroed at the start of Stack playback. When absolute time triggers are used, the operator is responsible for ensuring that consecutive steps have increasing absolute times.
End of previous Htp wait	The step is triggered when the previous step completes the Htp Wait phase of it's timing. If the previous step does not contain a Cue, this option defaults to trigger at end of operation.
End of previous Htp up fade	The step is triggered when the previous step completes the Htp Up Fade phase of it's timing. If the previous step does not contain a Cue, this option defaults to trigger at end of operation.
End of previous Htp hold	The step is triggered when the previous step completes the Htp Hold phase of it's timing. If the previous step does not contain a Cue, this option defaults to trigger at end of operation.
End of previous Htp down fade	The step is triggered when the previous step completes the Htp Down Fade phase of it's timing. If the previous step does not contain a Cue, this option defaults to trigger at end of operation.
End of previous step	The step is triggered when the previous step completes. If the previous step is a Cue, triggering occurs when the previous step completes all aspects of it's timing. If the previous step is a multimedia trigger, triggering occurs when the multimedia playback finishes. Other types of previous step cause triggering to occur instantly.
Manual Trigger	The step will not trigger until the operator presses the Go button.

The lower section of the dialogue shows a graphic display of the selected timing.

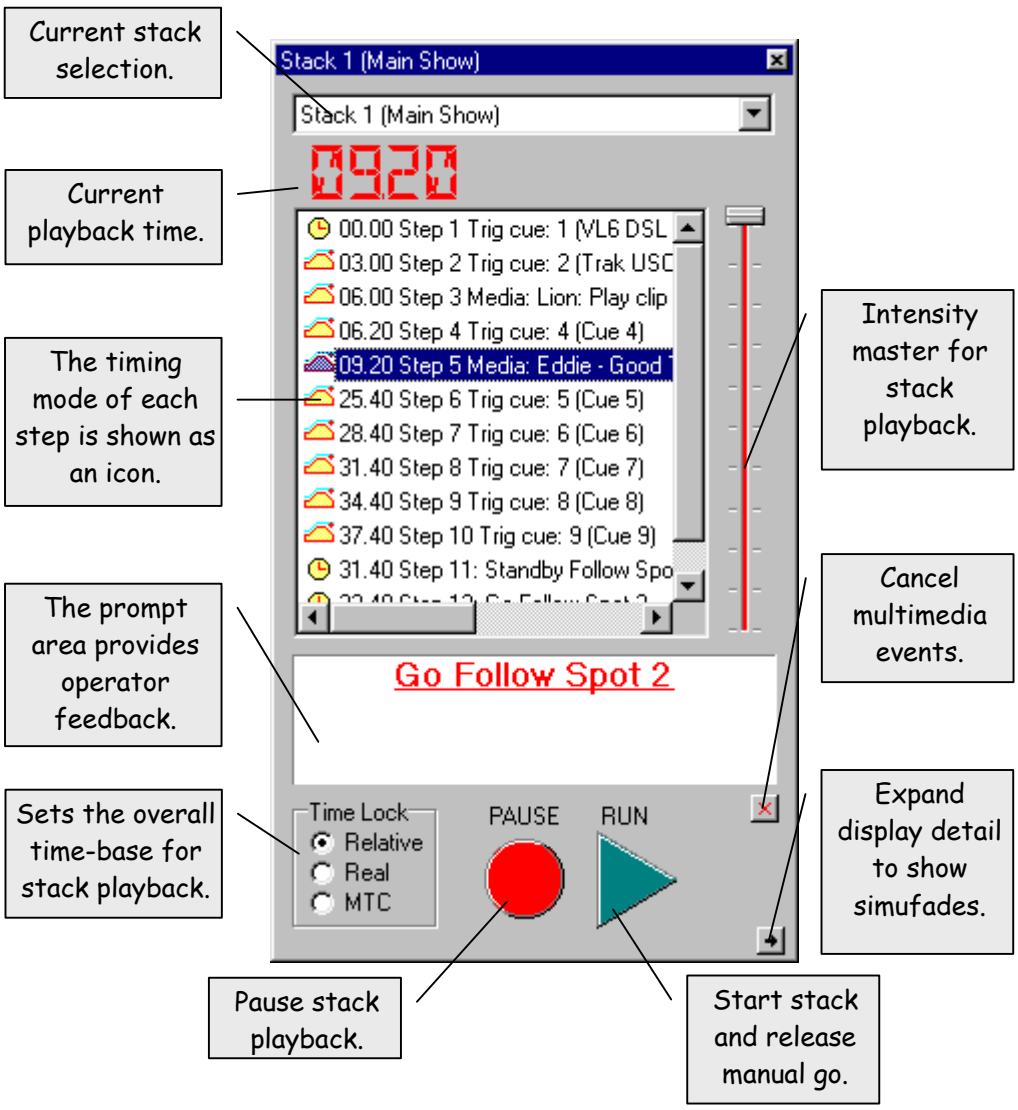
Page

The Page menu contains the following options:

Function	Description
Configure playback	Set any one of the twelve playback channels to operate a Cue, a Sequence or as inactive. 
Insert playback before this one	Inserts a blank playback before the current one and moves the remainder up.
Insert playback after this one	Inserts a blank playback after the current one and moves the remainder up.
Preset remaining playbacks	Sets all playbacks in the page from the current playback to a consecutive range of cues or sequences.
Delete playback	Deletes the current playback and moves the remainder of page down.

STACKS BUTTON

The Stacks button displays the stack playback panel as shown by the screen shot below. The stack playback panel can be displayed in two formats, controlled by the small arrow icon in the lower right of the panel.



STACK PLAYBACK PANEL

The current stack is selected from the pull down list at the top of the panel. The stack content is displayed in the scrolling display, whilst the next step to execute is indicated by the blue highlight bar.

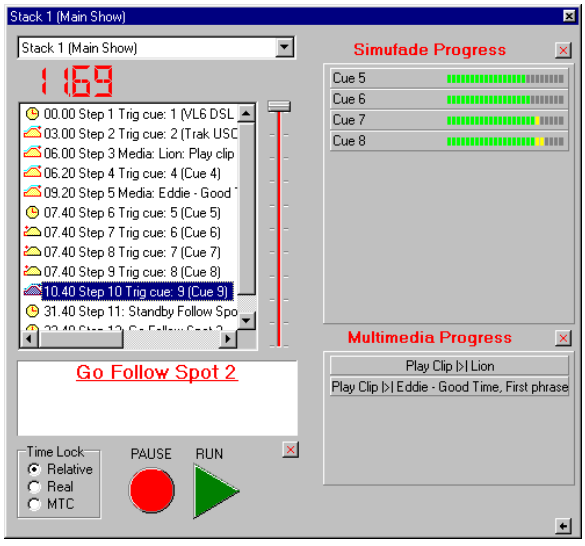
The following table describes each control in detail.

Control	Description	
Stack Select	Pull down list used to select a stack for playback. The options menu provides an auto-load option that allows a specified stack to load and run as soon as Grand-Master Flash! is started.	
Playback Time	Displays the current execution time of the stack. The display format can be selected in the options menu. The time displayed is dependent upon the Time Lock Setting:	
	Relative	The display starts from zero time at the beginning of stack execution.
	Real	The display shows real time as set by the PC's internal clock. The PC can be fitted with a Rugby, Frankfurt radio receiver to convert PC time into astronomical time.
	MTC	The display shows MIDI Time Code as received from the MIDI input of the PC sound card.
Step List	Displays the list of steps contained in the current stack. Each line displays an icon that represents the time trigger mode of that step. The blue highlight bar indicates the current step. To set the starting step of the stack to a value other than step 1, click on the required step. If the stack is already running, a dialogue will be displayed requesting confirmation.	
Master Fader	The master fader provides intensity control of all cues being played back by the stack. The master fader does not affect cues or sequences that the stack triggers in the Playback-Panel.	

Control	Description
Time Lock	This is used to set the time base of stack playback. This is normally programmed with the stack, but can be set manually with this control. This is particularly useful when testing a stack that is programmed for real time mode.
Cancel Multimedia	This button is used to cancel any pending multimedia triggers. This is normally only used during rehearsal to clear items such as a DVD trigger that cannot process because of a disc change.
Expand Button	The expand button re-displays the Stack Playback Panel in detail mode. This is a wider display that includes mimics for multimedia events and the 12 simufaders.
Pause Button	The pause button is used to pause execution of the stack. This does not pause any simufades or multimedia events that have already been triggered.
Run Button	The run button is used to start execution of the stack or to continue execution after a manual wait for go step is reached.
Prompt	The prompt window is used for visual text cues and reminders for the operator, during the show.

SIMUFADE & MULTIMEDIA DISPLAY

Stack playback supports 12 simultaneous cue playback channels and 8 multimedia playback channels.



This is in addition to the Cue and Sequence triggering options provided by automating the Playback-Panel.

MULTIMEDIA BUTTON

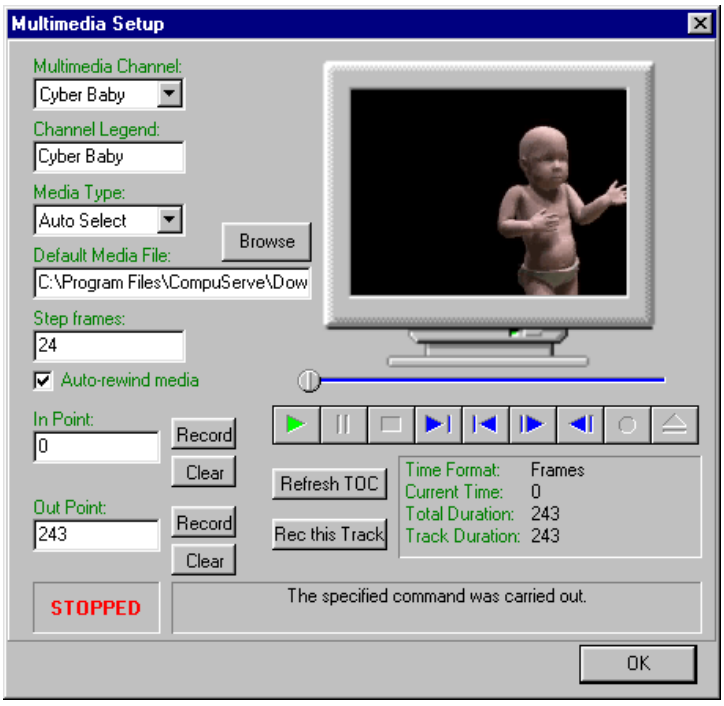
The Multimedia button displays the multimedia library editor. The multimedia library is a list of multimedia clips with specific start and end points. Any multimedia data type supported by Windows can be incorporated into the library.

Examples of this include:

- Audio MP3 files: In a theatre environment this could be used to accurately trigger sound effects such as door bells, lighting etc.
- Audio CD: Specific excerpts of audio tracks can be played back. Walk in music for a conference or seminar is a likely example.
- DVD: Video projection effects during a live show.
- Laserdisc: Video playback of a corporate advert in a conference or a sequence of film clips in a cinema foyer.
- Video AVI: Assuming that your PC is equipped with a video card which allows direct video output, video clips can be played back direct from hard disc.

MULTIMEDIA LIBRARY

The Multimedia Library is built using the Multimedia Setup dialogue as shown in the screen shot below:



The Multimedia Library consists of 400 multimedia channels. Each channel can be programmed to contain a single audio or video clip. The multimedia channels are then triggered for playback via the stack.

Multimedia Setup Dialogue

The table below describes the operation of each control provides by the dialogue:

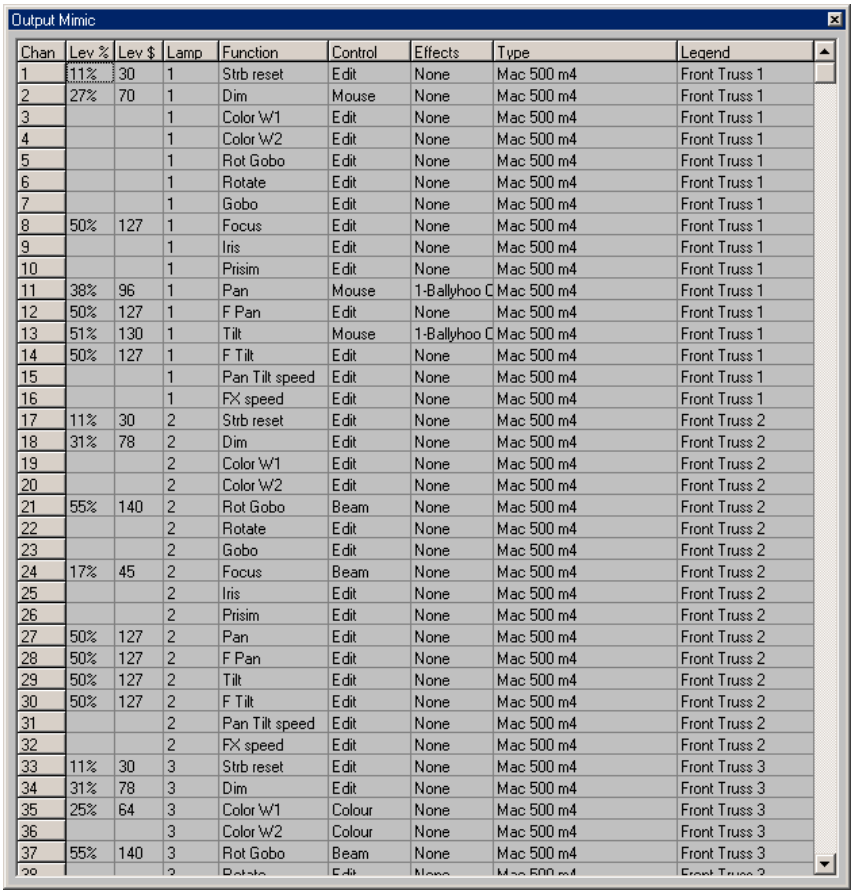
Control	Description
Multimedia Channel	The current multimedia channel is selected from the pull down list at the top of the window. A total of 400 multimedia channels can be programmed with assorted media clips for playback in the stack.
Channel Legend	The channel legend is simply used to enter the name for this multimedia channel. The channel legend is displayed when selecting multimedia channels both in this dialogue and also when editing stacks.
Media Type	The media type selects the type of data that this multimedia channel controls. This field can be left at it's default value of Auto Select if a file based media is to be used. When the media is hardware based, for example CD, you must select the relevant media here.
Media File	The media file selects the media if it is to be file based. The browse button opens the standard Windows dialogue allowing the file to be located. When the media is to be hardware based, for example CD, this field should be set to the relevant logical drive letter. For CD playback, the field would usually contain 'D:'.
Step Frames	The step frames field defines the number of frames to jump forward or backward when the skip forward or skip reverse buttons are pressed.
Auto-Rewind	The auto-rewind box should be ticked if you wish the media to automatically rewind to the beginning when an end of data condition is encountered. It is useful to leave this option selected when the media is hardware based. This will provide a much faster seek time when the device is next triggered.

Control	Description	
In-Point	The in point is the time offset into the media at which playback will start. The units of the in time are dependent upon the media type. The value can be typed in manually or set by pressing the record button. This will enter the current play position as the in point.	
Out-Point	The out point is the time offset into the media at which playback will end. The units of the in time are dependent upon the media type. The value can be typed in manually or set by pressing the record button. This will enter the current play position as the out point.	
Video Monitor	The video monitor screen shows the playback output of media that is video based.	
Position Fader	The position fader is located directly below the video monitor. The length of the fader represents the overall length of the media. Dragging the fader knob will fast scan the media to a new position.	
Transport Ctrl	The transport control is located directly below the position fader. The control buttons operate identically to those found in the Windows media player application.	
Time Panel	The time panel displays four pieces of information about the currently selected media:	
	Units	The type of time units used by the currently selected media.
	Current Time	The current playback position in this media expressed as time units.
	Total Time	The total playback time available in the selected media.
	Track Time	The total playback time available in the current track. If the current media is not track based, then this field also displays the total time.

Control	Description
Status Panel	The status panel displays the text message received back from Windows when multimedia operations are processed. Any errors that may occur, such as CD drawer open, will be displayed here.
Refresh TOC  	Some media types such as CD base their play times on a table of contents that is recorded on part of the disc. In normal operation, Grand-Master Flash will retrieve this information transparently. However in some circumstances, such as when the CD is changed during programming, you will need to force this data to be refreshed in order that any relative stack playback timing is interpreted correctly.
Rec this Track	This button copies the earliest start time and longest play time into the in time and out time fields.

MIMIC BUTTON

The mimic button displays a dialogue that shows individual output channel level along with a range of additional information.



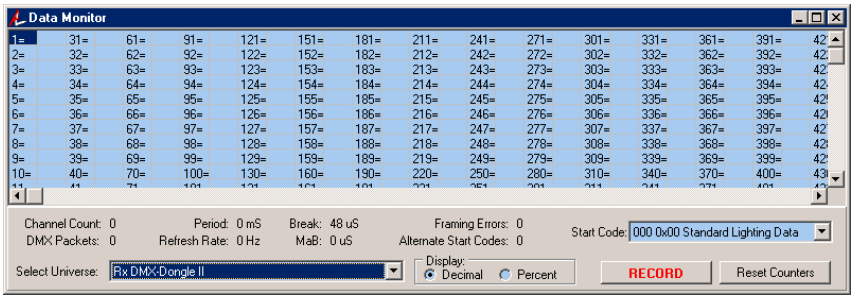
Chan	Lev %	Lev $	Lamp	Function	Control	Effects	Type	Legend
1	11%	30	1	Strb reset	Edit	None	Mac 500 m4	Front Truss 1
2	27%	70	1	Dim	Mouse	None	Mac 500 m4	Front Truss 1
3			1	Color W1	Edit	None	Mac 500 m4	Front Truss 1
4			1	Color W2	Edit	None	Mac 500 m4	Front Truss 1
5			1	Rot Gobo	Edit	None	Mac 500 m4	Front Truss 1
6			1	Rotate	Edit	None	Mac 500 m4	Front Truss 1
7			1	Gobo	Edit	None	Mac 500 m4	Front Truss 1
8	50%	127	1	Focus	Edit	None	Mac 500 m4	Front Truss 1
9			1	Iris	Edit	None	Mac 500 m4	Front Truss 1
10			1	Prisim	Edit	None	Mac 500 m4	Front Truss 1
11	38%	96	1	Pan	Mouse	1-Ballyhoo C	Mac 500 m4	Front Truss 1
12	50%	127	1	F Pan	Edit	None	Mac 500 m4	Front Truss 1
13	51%	130	1	Tilt	Mouse	1-Ballyhoo C	Mac 500 m4	Front Truss 1
14	50%	127	1	F Tilt	Edit	None	Mac 500 m4	Front Truss 1
15			1	Pan Tilt speed	Edit	None	Mac 500 m4	Front Truss 1
16			1	FX speed	Edit	None	Mac 500 m4	Front Truss 1
17	11%	30	2	Strb reset	Edit	None	Mac 500 m4	Front Truss 2
18	31%	78	2	Dim	Edit	None	Mac 500 m4	Front Truss 2
19			2	Color W1	Edit	None	Mac 500 m4	Front Truss 2
20			2	Color W2	Edit	None	Mac 500 m4	Front Truss 2
21	55%	140	2	Rot Gobo	Beam	None	Mac 500 m4	Front Truss 2
22			2	Rotate	Edit	None	Mac 500 m4	Front Truss 2
23			2	Gobo	Edit	None	Mac 500 m4	Front Truss 2
24	17%	45	2	Focus	Beam	None	Mac 500 m4	Front Truss 2
25			2	Iris	Edit	None	Mac 500 m4	Front Truss 2
26			2	Prisim	Edit	None	Mac 500 m4	Front Truss 2
27	50%	127	2	Pan	Edit	None	Mac 500 m4	Front Truss 2
28	50%	127	2	F Pan	Edit	None	Mac 500 m4	Front Truss 2
29	50%	127	2	Tilt	Edit	None	Mac 500 m4	Front Truss 2
30	50%	127	2	F Tilt	Edit	None	Mac 500 m4	Front Truss 2
31			2	Pan Tilt speed	Edit	None	Mac 500 m4	Front Truss 2
32			2	FX speed	Edit	None	Mac 500 m4	Front Truss 2
33	11%	30	3	Strb reset	Edit	None	Mac 500 m4	Front Truss 3
34	31%	78	3	Dim	Edit	None	Mac 500 m4	Front Truss 3
35	25%	64	3	Color W1	Colour	None	Mac 500 m4	Front Truss 3
36			3	Color W2	Colour	None	Mac 500 m4	Front Truss 3
37	55%	140	3	Rot Gobo	Beam	None	Mac 500 m4	Front Truss 3

The table below details the operation of each column:

Column	Description
Lev %	The channel output level displayed as a percentage. For clarity, levels below 1% are blanked.
Lev $	The channel output level displayed as a decimal value in the range 0 to 255. For clarity, levels below 5 are blanked.
Lamp	The Lamp Number is a consecutive number assigned automatically by Grand-Master Flash! during the patching process.
Function	Describes the moving lamp attribute controlled by this channel.
Control	Describes the last playback control that adjusted the level of this channel.
Effect	Displays the Effect that is currently assigned to this channel.
Type	Displays the lamp library name of this moving lamp.
Legend	Displays the operator assigned name of this lamp.

INPUT BUTTON

The Input button displays the level mimic provided by the hardware device driver.



The pull down list allows any input or output universe of DMX512 to be displayed and recorded.

The record button operates in an identical manor to the main record button on the Speed-Bar.

See the DMX-Workshop User Guide for further details of this dialogue.

STAGE BUTTON

The Stage button defines whether the percentage intensity levels displayed with each lamp icon in the workspace, represent the actual output levels or preview the current programmed levels. When the button is pressed, the levels show actual output levels.

View Button

The View button displays a multimedia video mimic that allows the most recently triggered video media event to be viewed.

LOCK BUTTON

The Lock button defeats the dragging of lamps in the workspace. It's purpose is to ensure that lamps are not moved accidentally during the selection process.

FLAGS

The Flags button enables the display of information flags or hints when the mouse cursor stops over a lamp icon or control.

RECORD BUTTON

The Record button is a very fast method of recording the workspace. The record button is directly linked to the Stores Panel. The result of the Record button depends upon the highlighted entry in the Stores Panel as follows:

Store-Palette Selection	Record Operation
Cue Heading	Next consecutive Cue added. Workspace recorded to Cue.
Cue	Next consecutive Cue added. Workspace recorded to Cue.
Sequence Heading	Next consecutive Sequence added. Step 1 added to new Sequence. Workspace recorded to step 1.
Sequence	New step addended to end of Sequence. Workspace recorded to new step.
Sequence Step	New step inserted after selected step. Workspace recorded to new step.
Stack Heading	New Stack added. First step of new Stack added. Next consecutive Cue added. New stack step set to trigger new Cue. Workspace recorded to new Cue.
Stack	New step appended to end of Stack. Next consecutive Cue added. New stack step set to trigger new Cue. Workspace recorded to new Cue.
Stack Step	New step inserted after selected step. Next consecutive Cue added. New stack step set to trigger new Cue. Workspace recorded to new Cue.
Playback Page Heading	Next consecutive Cue added. First playback of first page assigned to new Cue. Workspace recorded to new Cue.
Playback Page	Next consecutive Cue added. First playback of selected page assigned to new Cue. Workspace recorded to new Cue.
Playback Entry	Next consecutive Cue added. Selected playback of selected page assigned to new Cue. Workspace recorded to new Cue.

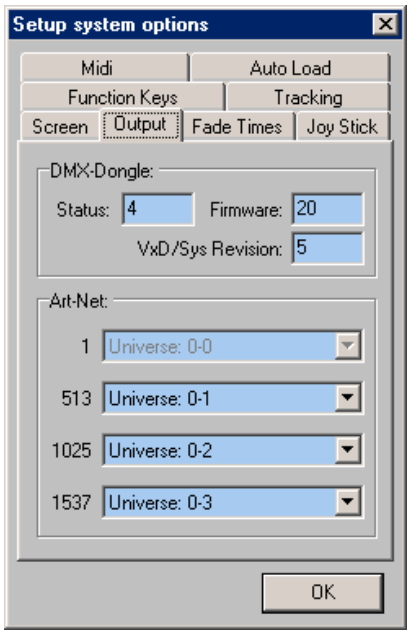
UNDO

The Undo button reverses any edits performed in the workspace. A list of 20 most recent edits is maintained by the undo function.

PREFERENCES

OPTIONS

The Preferences dialogue is opened from the Options menu. The dialogue is a multi-page display that provides access to all of the key configuration items in Grand-Master Flash!



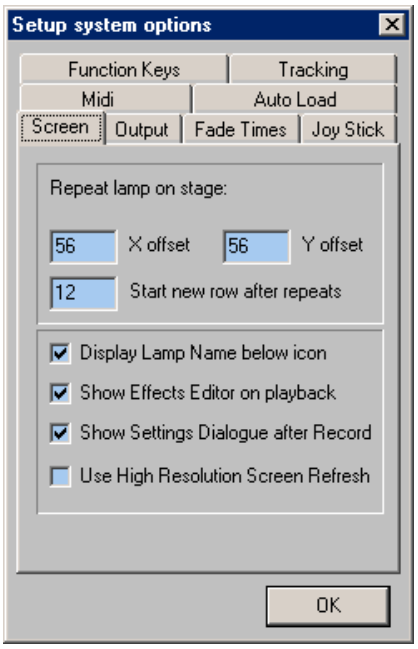
The following table provides an overview of each page:

Page	Description
Screen	The Screen page provides control over numerous editing functions within the workspace.
Output	The Output page is used to configure the DMX512 output using either the DMX-Dongle II or Art-Net Ethernet.
Fade Times	The Fade Time page selects the global time display format.
Joy Stick	The Joy Stick page configures the operation and resolution of the Joy Stick.
Function Keys	The Function Key page is used to assign macro triggers to the function keys and also the Alt, Shift and Control variants.
Tracking	The Tracking Page is used to define which lamp attributes are controlled when the mouse is dragged in the workspace. It also configures the mouse wheel if available.
MIDI	The MIDI Page is used to select the required MIDI hardware device and select the MIDI channel.
Auto-Load	The Auto-Load page is used to select a Stack to be automatically loaded on program start.

SCREEN SETUP

The Screen page provides control over numerous editing functions within the workspace.

The following table describes each control:

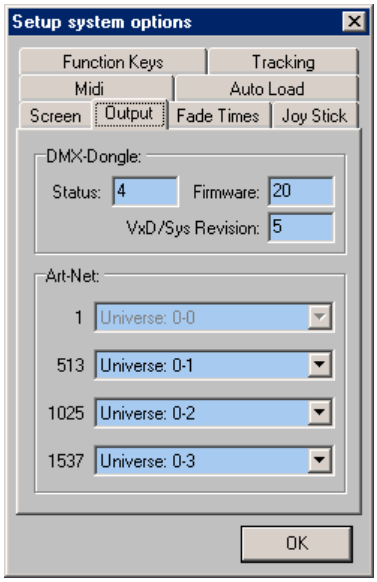


Control	Description
X offset	When lamps are patched in the workspace, it is possible to automatically patch a group. The three 'Repeat Lamp' controls are used for this. X offset defines the horizontal space between lamp icons in the workspace. It is measured in screen pixels.
Y offset	The vertical distance between lamp icons in the workspace.
Row Repeat	The number of consecutive horizontally patched lamps in the workspace, prior to starting a new row. For example, if a total of 36 lamps are patched in one operation, if this value is set to 12, the result is a grid of 12 by 3 lamps in the workspace.
Display Lamp Name below icon	The lamp names can be disabled in the workspace. This is useful when the colour only option is used in the lamp library as it provides a less cluttered display.
Show Effects Editor on Playback TIP	The Effects Editor is used for both programming Effects and also live control. When ticked, the Effects Editor will be displayed when ever a new Effect starts. This is useful in a live situation as it removes the need to select the most recent Effect.
Show Settings Dialogue after Record	When ticked, the Edit Setting dialogue will be displayed whenever the Record button is pressed.

OUTPUT

The Output page is used to configure the DMX512 output using either the DMX-Dongle II or Art-Net Ethernet.

The following table describes each control:

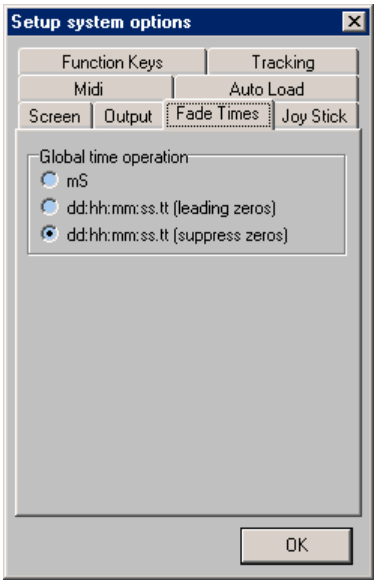


Control	Description	
DMX-Dongle	The three data fields provide information about the DMX-Dongle II or Vision 500 installed. If these fields are blank, Grand-Master Flash! Has not detected the hardware. Please refer to the Troubleshooting Guide. When the DMX-Dongle is installed, it will always be used for the first 512 channels of output.	
	Status	Reads back the DMX-Dongle status number. This is normally 5.
	Firmware	Reads back the DMX-Dongle firmware revision. Three revisions exist: 16, 17 and 20 of which 20 is the most recent.
	VxD / Sys	The revision number of the 32 bit Windows device driver. Windows 95 /98 & ME return the VxD driver number. Windows NT, 2000 and XT return the Sys driver number.
Art-Net 	This section is used to configure the Art-Net Ethernet output of Grand-Master Flash! A total of 2048 channels can be output via Art-Net, divided into 4 universes of 512 channels. If the DMX-Dongle II is detected, the first Art-Net output is disabled. The pull down list is used to select the Art-Net Universe for each group of 512 channels. The universe number is shown as two digits that match the wheel settings of Net-Link or Down-Link.	

FADE TIMES

The Fade Time page selects the global time display format.

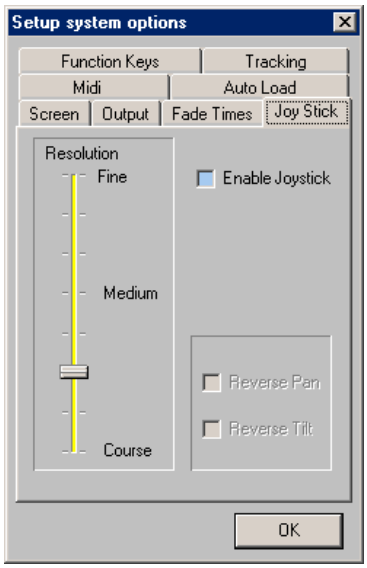
The following table describes each option:



Control	Description
mS	All time values are displayed in milliseconds. 1000mS = 1S.
Dd:hh:mm:ss.tt (leading zeros)	All time values are shown in Day – Hour – Minute – Second – Tenth format.
Dd:hh:mm:ss.tt (suppress zeros)	All time values are shown in Day – Hour – Minute – Second – Tenth format, leading zeroes are blanked out.

JOY STICK

The Joy Stick page configures a PC joystick for use with pan and tilt editing within the workspace.



The joystick is activated for pan and tilt editing when button one is held down.

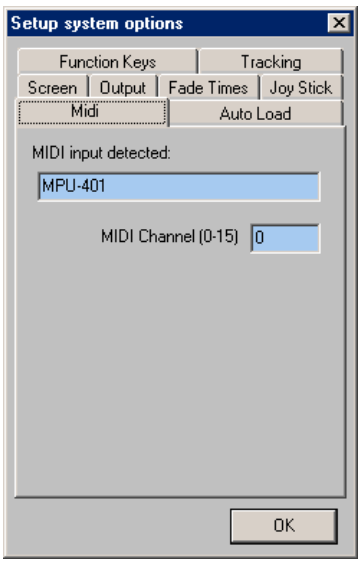
Joystick button 2 is used to select the next lamp from the most recently selected group.

The following table describes each option:

Control	Description
Resolution	The resolution fader defines the relationship between lamp pan and tilt and joystick movement.
Enable	Select this option to enable joystick pan and tilt editing.

MIDI

The MIDI page configures Grand-Master Flash to operate with the PC MIDI input.



The MIDI input is usually part of the sound card interface. The physical connection is via the 15 pin 'DB' connector on the rear panel of the PC. You will require an adapter cable to convert this to the MIDI 5 pin DIN connection.

TIP

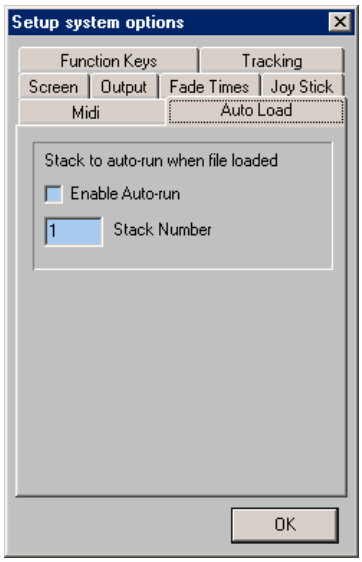
This adapter is rarely included with the PC, however it can be purchased from many electrical stores such as Maplin and Tandy.

The following table describes each option:

Control	Description
MIDI Input	If a MIDI interface is displayed, MIDI can be used to remote control Grand-Master Flash! This provides a simple means of adding physical faders and buttons to the system. See Appendix B for MIDI implementation details.
MIDI Channel	Set the Midi Channel to a value between 0 and 15 as required by the MIDI Control Equipment to be used.

AUTO LOAD

The Auto Load page is used to select a Stack that will be automatically loaded and executed when Grand-Master Flash! starts.



This feature is used in conjuction with the automatic file loading facility. If the show is saved under the name "Autoload.gmf", Grand-Master will automatically load the file on program start.

TIP

The three steps required to set Grand-Master Flash! for automatic operation are:

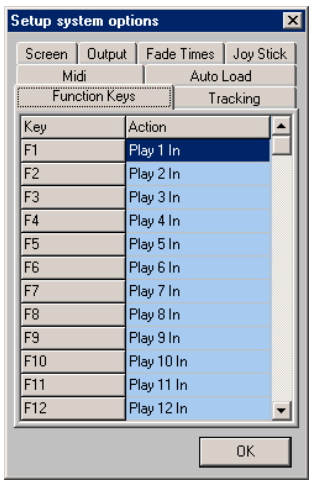
1. Place a shortcut to Grand-Master Flash! in the Windows start folder.
2. Select a Stack and enable the Auto-run button.
3. Save show as "Autoload.gmf"

The following table describes each option:

Control	Description
Enable Auto-run	Tick this box to enable automatic Stack execution.
Stack Number	Select the Stack number for automatic execution.

FUNCTION KEYS

The Function Key page is used to select the operation of the keyboard function keys. In addition to the standard 12 keys, the following shifted combinations are also available:



- Shift Function Key
- Ctrl Function Key
- Alt Function Key

A total of 48 key combinations is available. The function key combinations can also be triggered by MIDI events.

To change a selection, simply click on the required entry. A drop down list is displayed with a range of possible options.

The function key macros are displayed in the status bar at the bottom of the workspace.

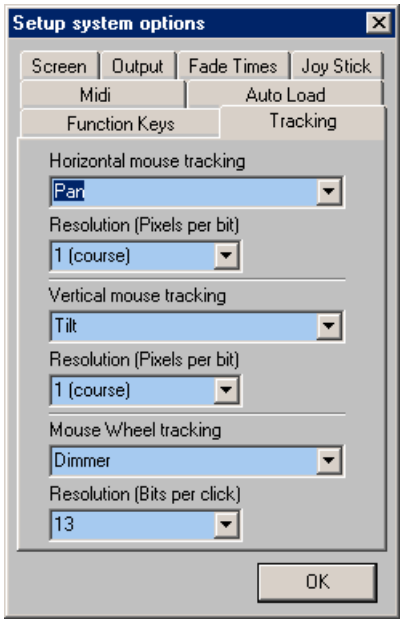
The following table describes the available options:

Macro Option	Description
Play In	Start Playback-Panel sub-master In fade. Identical to clicking the Playback-Panel 'In' button.
Play Out	Start Playback-Panel sub-master Out fade. Identical to clicking the Playback-Panel 'Out' button.
Play Pause	Pause Playback-Panel sub-master. Identical to clicking the Playback-Panel 'Pause' button.
Flash	While the function key is held down, the sub-master is forced to full, when the function key is released, the sub-master returns to zero level.
Solo	When the function key is pressed, all other sub-masters, the stack master and preset master are zeroed and the function key sub-master is forced to full. When the function key is released, the sub-master returns to zero level.
Ltp Go	Triggers the latest takes precedence faders of the Playback-Panel sub-master.
Go Solo	When the function key is pressed, all other sub-masters, the stack master and preset master are zeroed, all sequences are stopped and the function key sub-master In fade is started.

Macro Option	Description
Seq Pause	Pauses the sequence assigned to this playback.
Stack Go	Starts or un-pauses the stack playback.
Stack Pause	Pauses stack playback
Stack Flash	While the function key is held down, the stack master is forced to full, when the function key is released, the stack master returns to zero level.
Stack Solo	When the function key is pressed, all sub-masters and the preset master are zeroed and the stack master is forced to full. When the function key is released, the stack master returns to zero level.
Stack Clr Fade	Cancels all simufades running on the stack playback
Stack Clr Media	Cancels any multimedia events running on the stack playback.
Stack Clr Prompts	Clears the prompt text displayed in the stack window.
Not Active	No affect.

TRACKING

The Tracking page is used to define the effect of dragging the mouse and rolling the mouse wheel when the cursor is in the workspace.



These three axes of mouse movement can be used for edit control of any lamp attributes. By default, mouse dragging controls pan and tilt, whilst the mouse wheel controls intensity.

Dragging the mouse and rolling the wheel affect all selected lamps in the workspace.

The following table describes the available options:

Macro Option	Description
Horizontal Mouse Tracking	Sets the action of dragging the mouse left to right. By default this controls pan.
Horizontal Resolution	Sets the gearing ratio between the mouse and the controlled lamp attribute. Increasing the number causes less lamp movement for more mouse movement. That is, a larger number gives finer control.
Vertical Mouse Tracking	Sets the action of dragging the mouse up and down. By default this controls tilt.
Vertical Resolution	Sets the gearing ratio between the mouse and the controlled lamp attribute. Increasing the number causes less lamp movement for more mouse movement. That is, a larger number gives finer control.
Mouse Wheel Tracking	Sets the action of rolling the mouse wheel. By default this controls dimmer or intensity.
Wheel Resolution	Sets the gearing ratio between the mouse wheel and the controlled lamp attribute. Increasing the number causes more lamp movement per 'click' or the wheel. That is, a smaller number gives finer control.

THE MENUS

OVERVIEW

In general, the menu functions are all accessed from shortcuts on the Speed-Bar.

Those functions not described in the Speed-Bar chapter are detailed below.

FILE

The File menu accesses the following options:

Open

The Open menu is used to load a previously recorded show from disc.

The file name must end with the extension '.gmf'.

If the current show has not been saved, a prompt is displayed offering the option to save the current show prior to loading the new show.

The Open menu also loads the lamp library saved with this show.

Save

The Save menu is used to save a show to disc.

The file name must end with the extension '.gmf'.

The Save menu also saves the current lamp library. This ensures that future edits or additions to the lamp library will not affect the saved show.

New Show

The New menu is used to delete all information prior to starting a new show. A confirmation dialogue box is displayed to provide a second chance to change your mind.

If the current show has not been saved, a prompt is displayed offering the option to save the current show prior to deleting the show.

Export Spreadsheet

The Export menu allows show information to be transferred to other applications, formatted and then printed.

You may select the file format to be either space, comma or tab character delimited.

The files produced import into applications such as Excel, Word and Dbase.

The types of data which can be exported are:

1. Lamp Patch: This provides information about the DMX channel assignments for each lamp. The start address of each lamp is also shown in binary to aid the setup of lamps that use DIP switches for base address.

2. Cues: Contains the channel level settings for all cues that have been programmed.

3. Sequences: Contains the channel level settings for all steps of all sequences that have been programmed.

Exit

Exit the program. A dialogue is displayed, that provides the option to save your work or cancel the operation.

VIEW MENU

The View Menu simply duplicates the functions of the Speed Bar. For a detailed description please see the Speed Bar chapter.

SELECT MENU

The Select Menu duplicates the lamp selection functions of the Tools-Palette. For a detailed description please see the Tools section.

ATTRIBUTE MENU

The Attribute Menu duplicates the lamp attribute functions of the Tools-Palette. For a detailed description please see the Tools section.

OPTIONS MENU

The Options Menu duplicates the function of the Options Speed Bar. For a detailed description please see the Speed Bar chapter.

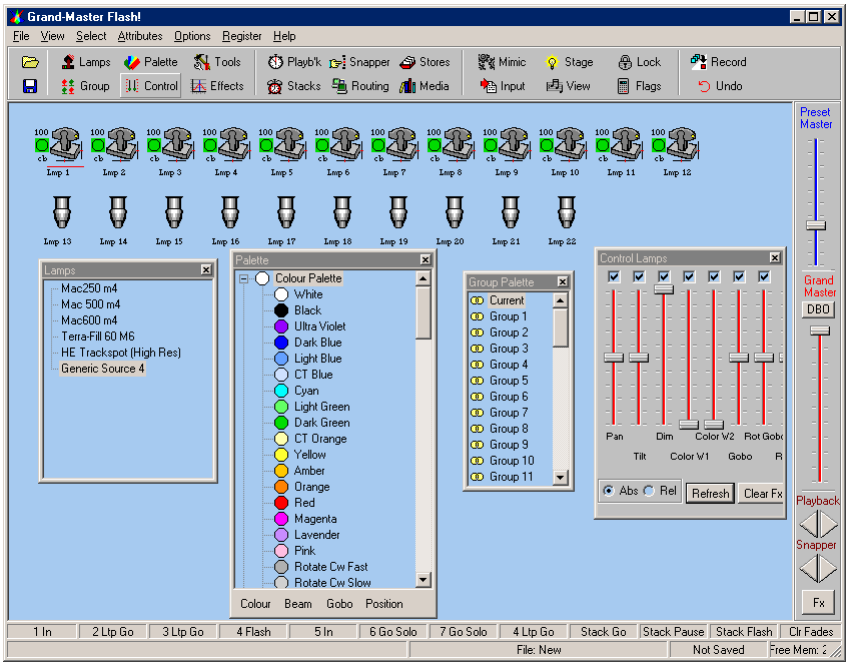
REGISTER MENU

The Register Menu is described in detail in the installation chapter.

THE WORKSPACE

OVERVIEW

The screen shot below shows the main Grand-Master Flash! stage just after the lamps for an imaginary show have been placed on stage.

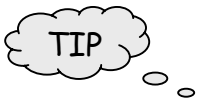


PLACING LAMPS ON STAGE

1. Click on the Lamps button to display the Lamp Palette.
2. If the lamp you require is not displayed, right click and select 'Include New Entity'. Select the lamp that you require from the file list.
3. Click and drag (that means keep the left mouse button held down) the required lamp onto the workspace. Release the mouse button when you have positioned the cursor where you want the lamp to appear.
4. A patching dialogue will appear, accept the default values by pressing the OK button.
5. Answer OK to the next dialogue.
6. The lamp will appear in the workspace and the lamp on stage will illuminate at full with a white centred beam.

MOVING LAMPS IN THE WORKSPACE

1. Click and drag the lamp to be moved.
2. Release the mouse button when the new position is reached.
3. If multiple lamps are selected (when selected the lamp icon is underlined in red) this operation will move all selected lamps.



The Lock button on the Speed-Bar must be off to move lamps in the workspace.

CHANGING THE COLOUR OF A LAMP

1. Select the lamp that you wish to control by clicking on the lamp icon.
2. Click on the Palette button to display the Colour-Palette.
3. Click on one of the colours in the palette.
4. The lamp will display the selected colour to the left of it's icon.

If the lamp colour does not change it is because the selected lamp is not capable of displaying the selected colour.

CHANGING THE GOBO OF A LAMP

1. Select the lamp that you wish to control by clicking on the lamp icon.
2. Click on the Palette button to display the Colour-Palette.
3. Click on the Gobo shortcut button.
4. Click on one of the gobo patterns in the palette.
5. The lamp will display the selected gobo to the left of it's icon.

If the lamp gobo does not change it is because the selected lamp is not capable of displaying the selected gobo.

CHANGING THE PAN AND TILT OF A LAMP

1. Select the lamp that you wish to control by clicking on the lamp icon.
2. Click on the Control button to display the Lamp Control-Panel.
3. The control panel will show faders for each of the possible attributes of the selected lamp.
4. Move the pan or tilt fader.
5. The lamp will display the new pan and tilt values on the horizontal and vertical indicators below and to the right of it's icon.

THE LAMP EDITOR

OVERVIEW

The Lamp Editor is used to edit existing lamp libraries or to create new ones.

New lamp libraries are regularly posted on the Artistic Licence web site at:

http://www.artisticlicence.com/downloadgmf.htm

The Lamp Editor is started from the right click menu of the Lamp-Palette. Select the 'Edit this Definition…' entry.

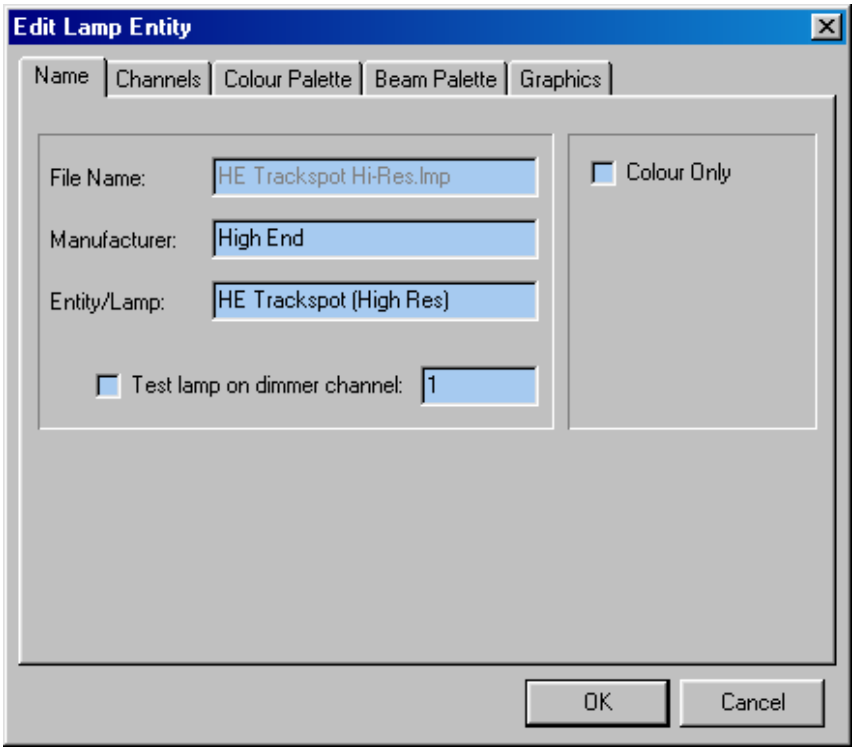
The Edit Lamp Entity dialogue will be displayed. The dialogue contains five pages that are used to set the different lamp parameters.

The following table summarises the pages:

Page	Function
Name	The Name page is used to set the general lamp information.
Channels	The Channels page provides a spreadsheet used to set the channel allocation.
Colour Palette	The Colour page is used to select the channel levels required to emulate the correct colour for each entry in the Colour-Palette.
Beam Palette	The Beam page is used to select the channel levels required to emulate the correct gobo selection for each entry in the Beam-Palette.
Graphics	The Graphics page is used to select the icon that will be displayed in the workspace.

NAME PAGE

The Name page is used to set the general lamp information.

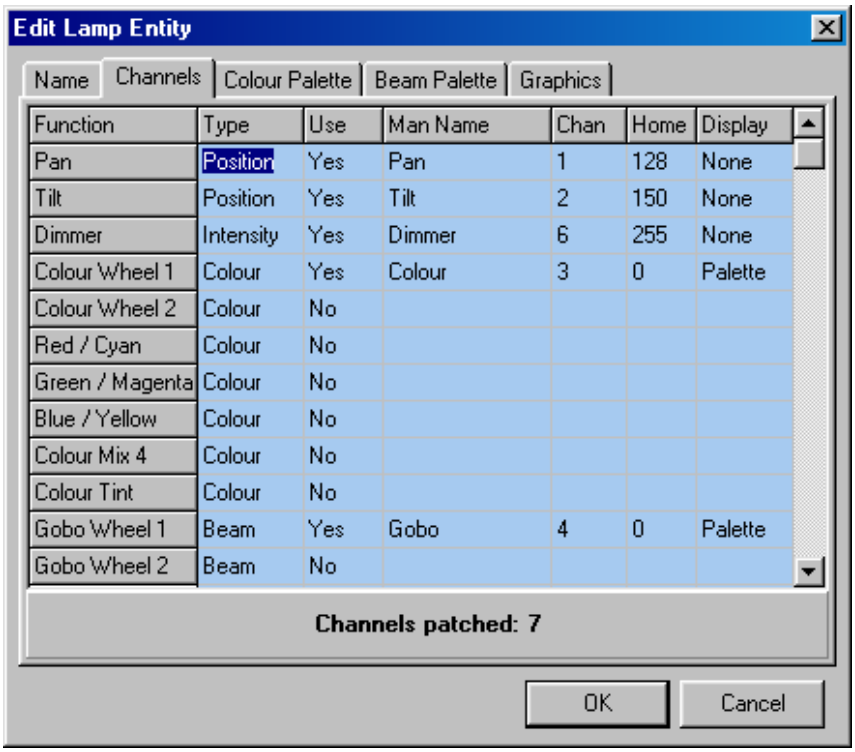


The following table details each control.

Control	Function
File Name	The filename of the lamp that is being edited.
Manufacturer	Enter the lamp manufacturer here.
Entity / Name	Enter the name of the lamp here.
Test Lamp on Channel	When selected, the current settings are output as DMX512 at the selected base address. This allows 'live' entry of the lamp configuration.

CHANNELS PAGE

The Channels page provides a spreadsheet used to set the channel allocation.



In the vertical axis the spreadsheet details the 42 possible lamp channel functions. In the horizontal axis, the spreadsheet shows the data categories for each channel function.

The categories are detailed in the following table:

<table>
<tr><th>Control</th><th colspan="2">Function</th></tr>
<tr><td>Type</td><td colspan="2">This field cannot be edited. It shows the palette category to which the function is allocated. When entering a new lamp it is important to consider this grouping in order to ensure that when you record palettes for the lamp, functions are split correctly between colour and beam etc. The palette categories are:</td></tr>
<tr><td></td><td>Type</td><td>Purpose</td></tr>
<tr><td></td><td>Intensity</td><td>The intensity channel.</td></tr>
<tr><td></td><td>Colour</td><td>Includes all colour wheel, mix, tint, temperature channels.</td></tr>
<tr><td></td><td>Beam</td><td>Includes all gobo, iris, shutter channels.</td></tr>
<tr><td></td><td>Position</td><td>Includes pan, tilt and motion speed.</td></tr>
<tr><td></td><td>Control</td><td>Anything which doesn’t fit logically in the above categories. Specifically checksum, lamp re-strike etc.</td></tr>
<tr><td>Use</td><td colspan="2">Set to Yes if the channel is used in the lamp.</td></tr>
<tr><td>Man Name</td><td colspan="2">The manufacturer’s name for the selected channel.</td></tr>
<tr><td>Chan</td><td colspan="2">The channel number within the lamp. The numbering system starts from 1.</td></tr>
<tr><td>Home</td><td colspan="2">The decimal (0-255) value that will set the selected channel to it’s home position. For pan and tilt channels this is usually 128. Intensity is usually 0.</td></tr>
</table>

Control	Function		
Display	This field defines the method of display for this channel within the workspace. The selection is made by typing the first letter of the word. The options are:		
	Option	**Purpose**	**Type**
	None	The channel is not displayed.	All
	Red	Display as the red channel of a RGB additive colour mixing lamp.	Colour
	Green	Display as the green channel of a RGB additive colour mixing lamp.	Colour
	Blue	Display as the blue channel of a RGB additive colour mixing lamp.	Colour
	Cyan	Display as the cyan channel of a CMY subtractive colour mixing lamp.	Colour
	Magenta	Display as the magenta channel of a CMY subtractive colour mixing lamp.	Colour
	Yellow	Display as the yellow channel of a CMY subtractive colour mixing lamp.	Colour
	Palette	Display as a beam or colour icon. This is used for lamps that select colour or gobo from a discrete option wheel.	Colour & Beam

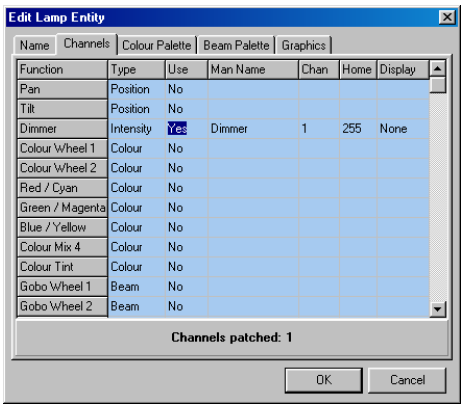
DISPLAY LIMITS

Colour attributes can only be displayed with either colour mixing or colour wheel (Palette) attributes. This means that when entering data for a lamp that contains both colour mixing and colour wheels, the colour wheel channels should be set to a Display Mode of None.

DATA ENTRY

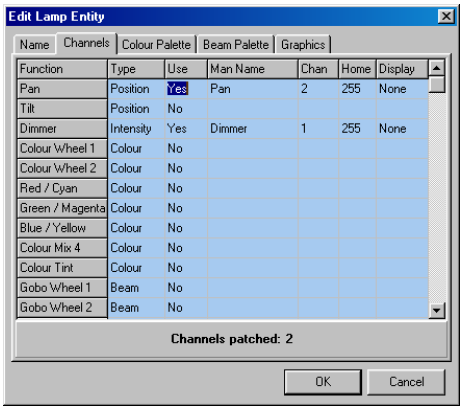
Grand-Master Flash! will attempt to do the maximum work on your behalf! To make the best use of this, enter data in the following sequence:

Click on the Use field for the lamp's channel 1 and type Y. In the example, this is the intensity channel.



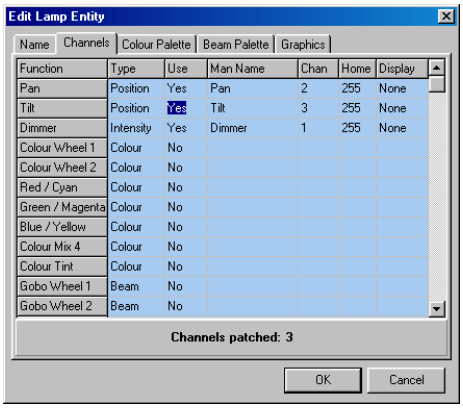
Grand-Master Flash! will fill in the default values.

Click on the Use field for the lamp's channel 2 and type Y. In the example this is Pan.



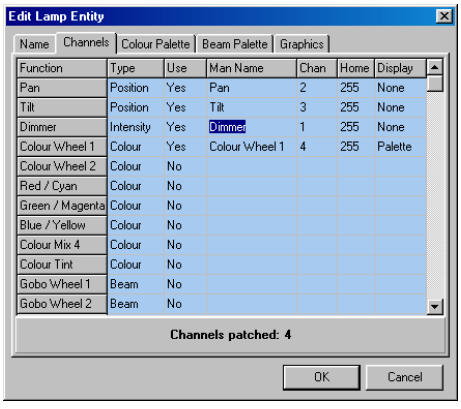
Again, Grand-Master Flash! fills in the default values.

Continue, the process, entering the channels in the order of channel number.



Finally, adjust the Display field as required.

The key lamp information is now complete, so you can move on to setting the palettes.

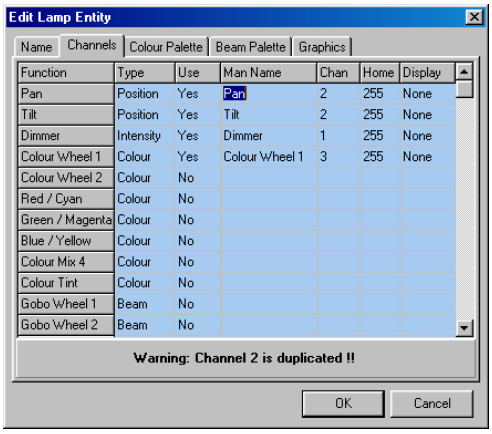


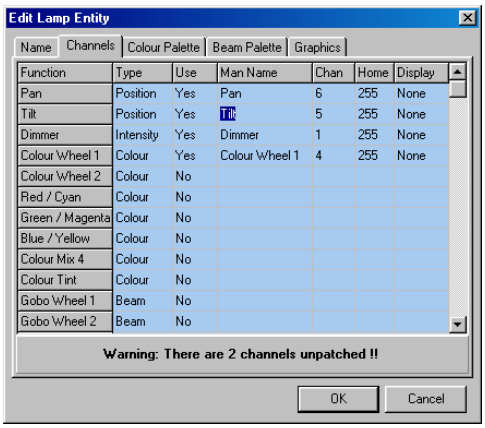
WARNINGS

The base of the Channel Page displays an analysis of the channel information that has been entered.

If all is well, the display will show the total number of channels used by the lamp. It is important to confirm that this matches the manufacturer data.

This field will also display warnings to indicate that partial or incorrect data has been entered. This is usually due to mistyping a channel number of forgetting to enter a channel.





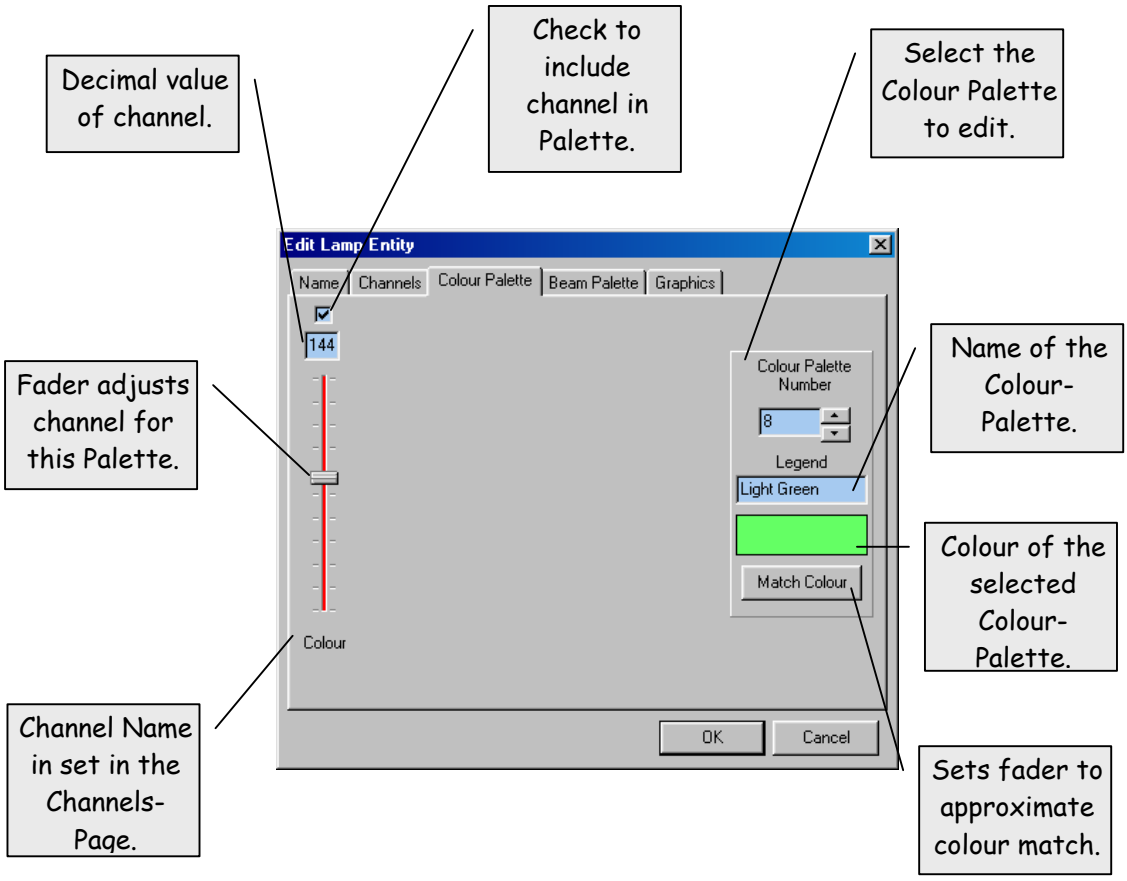
COLOUR PALETTE

The Colour page is used to define the 50 lamp specific colour palette entries.

The page displays a fader for all channels that are selected as type: Colour in the Channels Page.

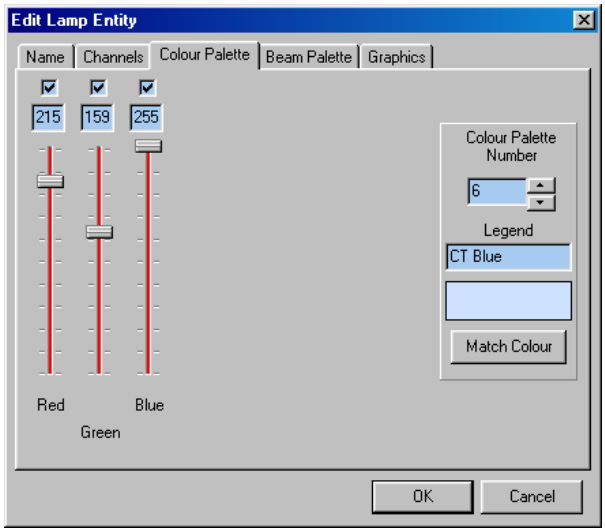
The Colour Palette is selected by the up – down buttons to the right of the dialogue. The displayed colour is set in the Colour-Palette.

Each palette is selected in turn, and then the faders are adjusted to match the actual lamp colour to the display colour set for the palette. This information can be entered from manufacturer data, but it is simpler to use the 'Test Lamp on Channel' function. In this mode, the lamp will show the actual setting as the faders are moved.



The screen shot above shows a lamp that has a single colour wheel. Setting the palette involves finding the correct fader position for each colour.

The screen shot below shows a lamp that used RGB additive colour mixing.



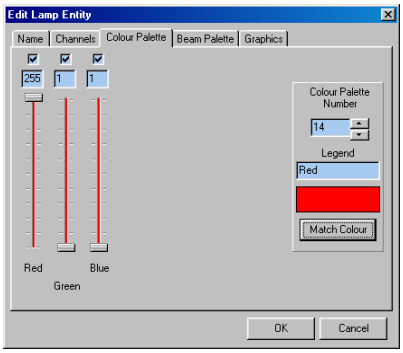
Matching colour

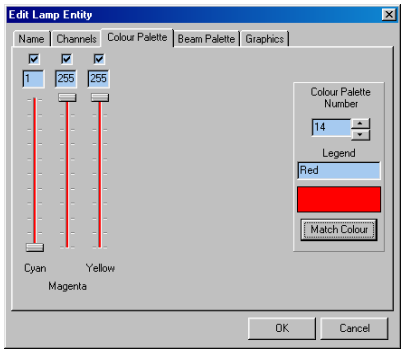
The Match Colour button is used with lamps having either RGB or CMY colour mixing. The function will set the colour channels to values required to mix the selected Palette's colour.

This is only an approximation, but provides a good starting point for manual editing.

The Display values in the Channel-Page must be set in order to use this function. It is the Display values that define whether Match Colour operates in RGB or CMY mode.

The screen shots below show the results of matching red in both RGB and CMY.



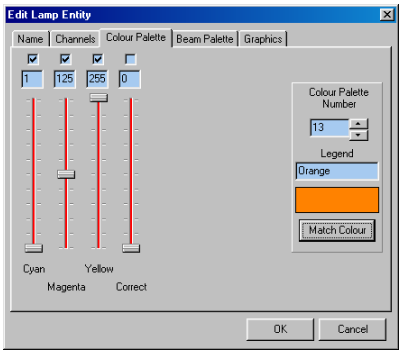


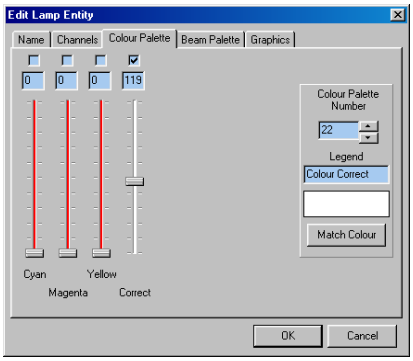
Excluding Channels

The tick box above each fader is used to exclude a channel from a specific Palette. In the simple examples discussed above, this would make no sense! Excluding blue from a colour mix would produce interesting but not very useful results.

However, in more complex lamps, this is a very powerful feature. Consider for example a lamp that has colour mixing plus a colour correction wheel. In this situation, the colour correction wheel would be excluded from all of the standard colour palettes.

A series of palettes could then be programmed that only include the correction wheel. The screen shots below show this:





Exclusion of channels is also useful for lamps that use colour wheels.

It may be that you regularly use lamps from different manufacturers, some will almost certainly provide colours that are not available on the other lamp.

Colours that cannot be produced by a particular lamp can then be excluded from the Palette.

This ensures that if the Palette is used, when lamps incapable of producing the colour are selected, there will be no change in the workspace.

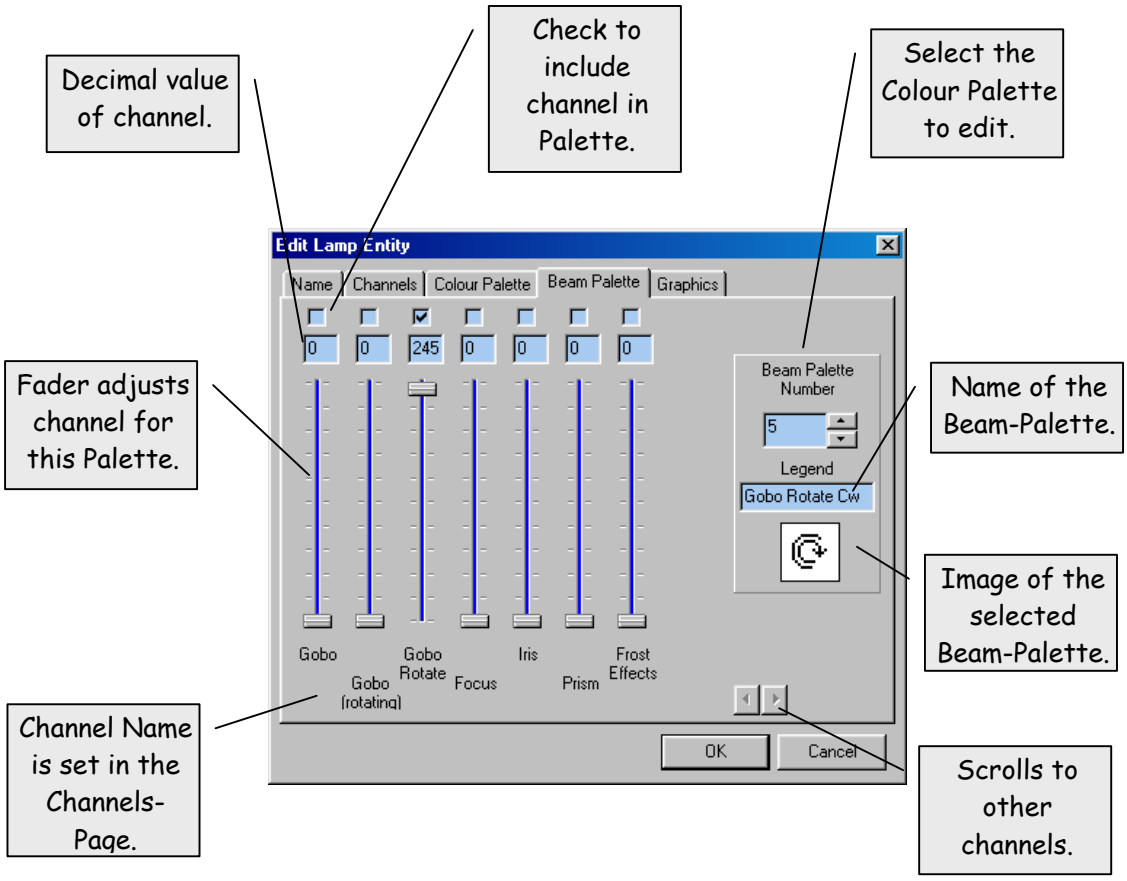
BEAM PALETTE

The Beam page is used to define the 50 lamp specific beam palette entries.

The page displays a fader for all channels that are selected as type: Beam in the Channels Page.

The Beam Palette is selected by the up – down buttons to the right of the dialogue. The icon that is displayed in the workspace, to represent this palette, is set in the Beam-Palette.

Each palette is selected in turn, and then the faders are adjusted to match the purpose of the palette. This information can be entered from manufacturer data, but it is simpler to use the 'Test Lamp on Channel' function. In this mode, the lamp will show the actual setting as the faders are moved.



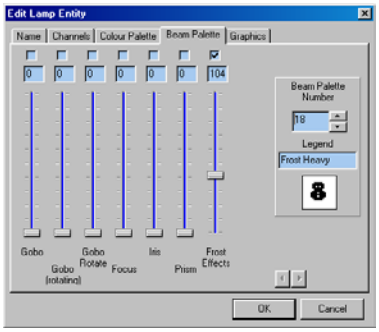
The screen shot above shows the palette setting for a slow gobo rotate in a Golden Scan HPE.

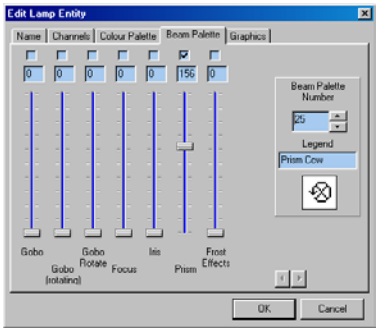
Excluding Channels

The tick box above each fader is used to exclude a channel from a specific Palette.

This feature is very important to Beam-Palettes as is allows a palette to affect only a subset of the available beam channels.

The screen shot below shows palette entries for Frost and Prism respectively.





Exclusion of channels is also useful for disabling a particular palette if a lamp is not capable of achieving the required effect.

It may be that you regularly use lamps from different manufacturers, some will almost certainly provide gobos that are not available on the other lamp.

Gobos that cannot be produced by a particular lamp can then be excluded from the Palette.

GRAPHICS PAGE

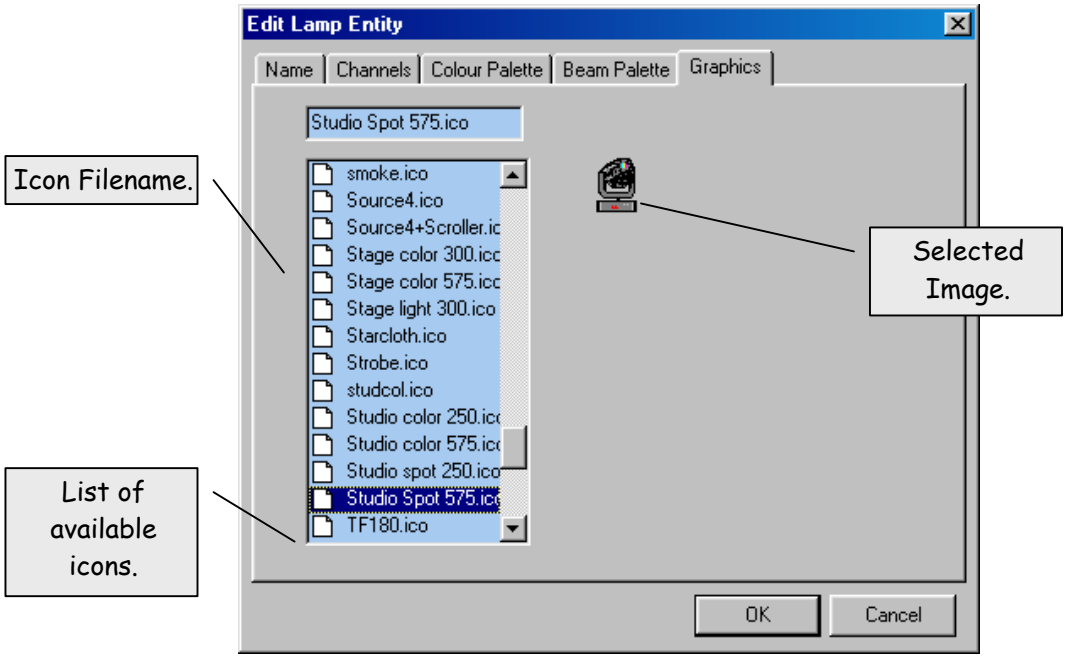
The Graphics page is used to select the icon that will be used to display the lamp within the workspace.

The icons are standard Windows '.ico' files and can be produced with most 'Paint' packages.

The library of icons is located in the folder:

C:\Program Files\Artistic Licence\Grand-Master Flash!\LampLib

New icons should be placed in this folder.



THE EFFECTS EDITOR

OVERVIEW

The Effects Editor is used to edit existing effects libraries or to create new ones.

New effects libraries are regularly posted on the Artistic Licence web site at:

http://www.artisticlicence.com/downloadgmf.htm

Customers are welcome to provide new libraries for addition to the web site. Please email to:

Support@ArtisticLicence.com

Effects allow dynamic control of a lamp or group of lamps. At the simplest level, they save the effort of programming a sequence.

They are, however, much more powerful. The effects allow mathematical functions such as circles and spirals to be applied. Effect can also be superimposed on other playbacks. So it becomes possible to program, for example, a move with the lamp beam spiralling at the same time.

The Lamp Editor is started from the right click menu of the Effects-Palette. Select the 'Edit Effects' entry.

The Edit Lamp Entity dialogue will be displayed. The dialogue contains five pages that are used to set the different lamp parameters.

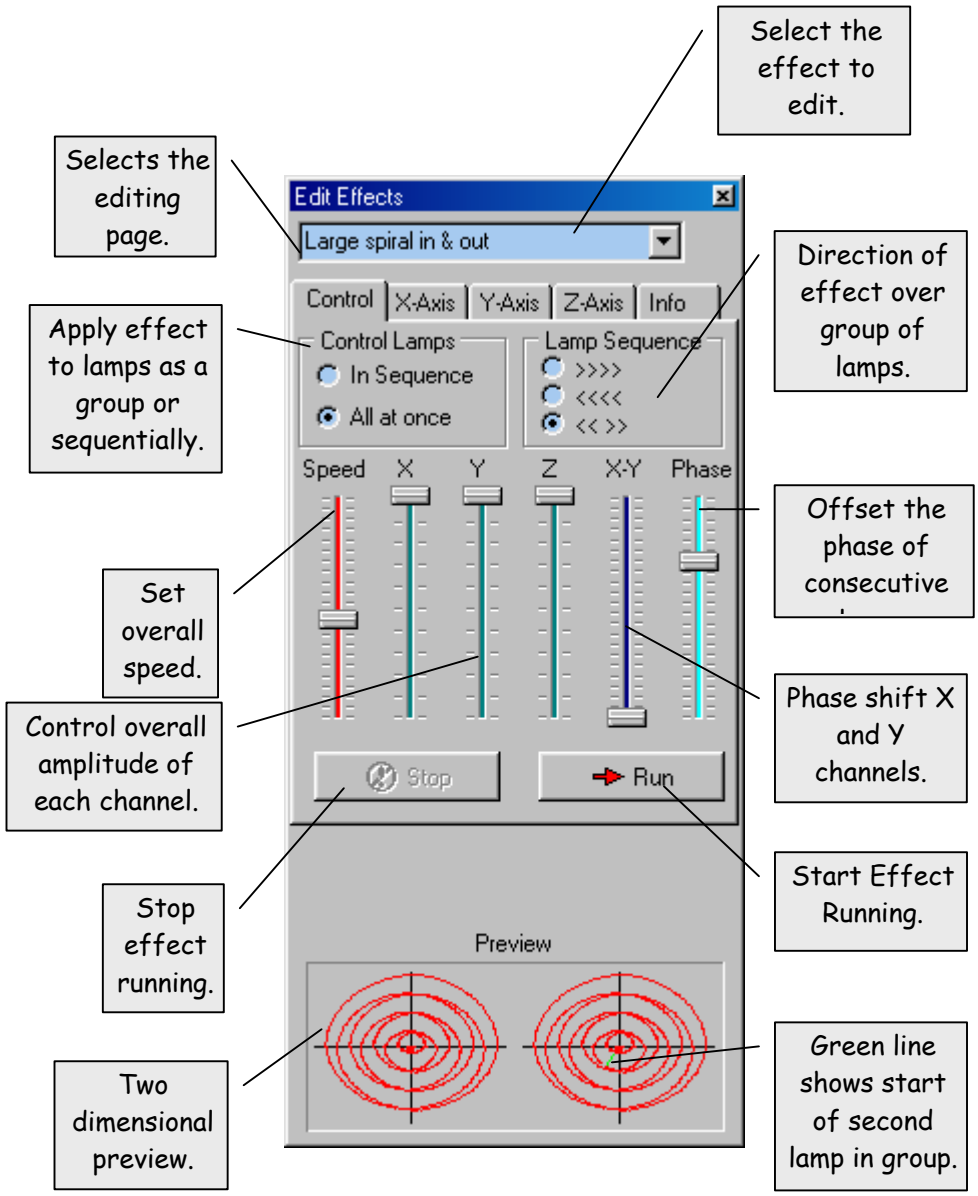
The following table summarises the pages:

Page	Purpose
Control	Sets the overall effects parameters such as speed.
X-Axis	Each effect can control up to three lamp channels. This could be pan, tilt and intensity or red green and blue. Each axis is completely programmable.
Y-Axis	
Z-Axis	
Info	Text description of the effect.

CONTROL PAGE

The control page is used to set the overall operating parameters of the effect. It is also the page that provides the 'show-time' controls.

The screen shot below shows the key controls:



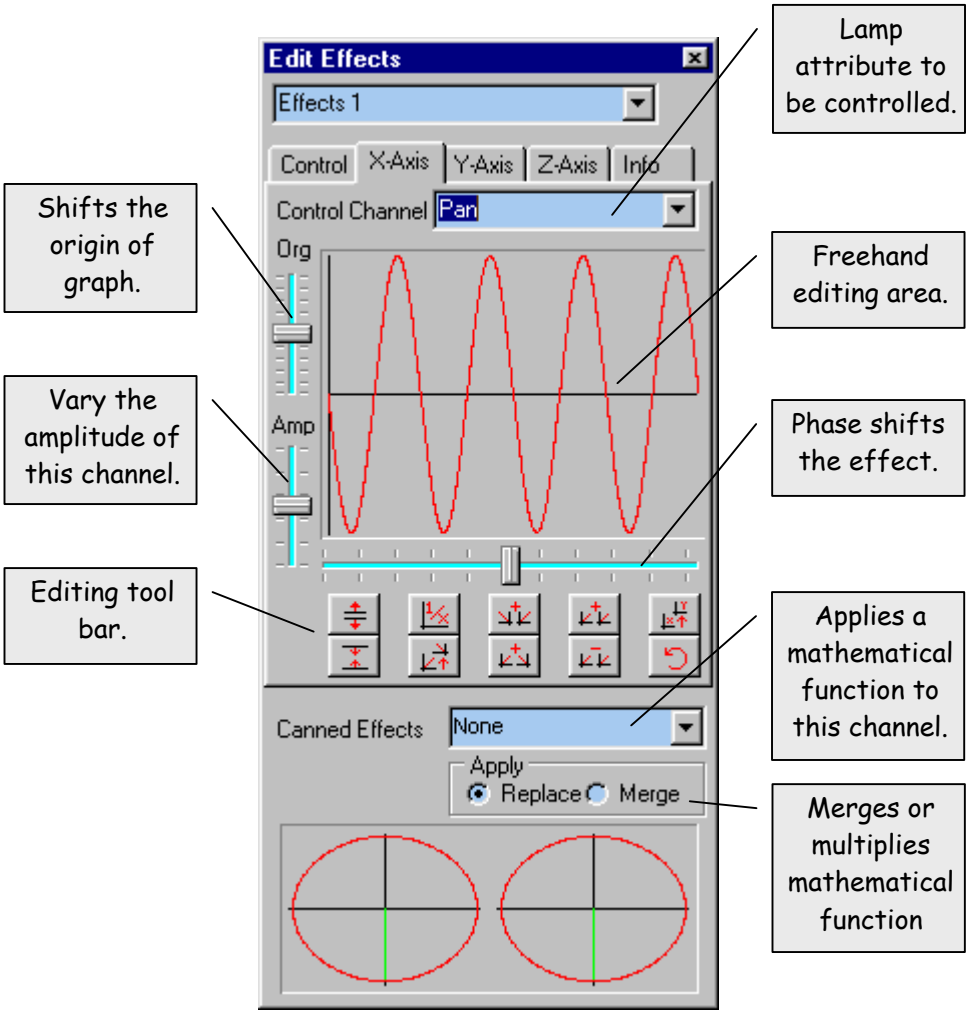
The following table provides a detailed description of each control:

Control	Purpose	
Selector	The drop down list selects the effect to be edited.	
Control Lamps	In Sequence	When the effect is applied to a group of lamps, the effect operates on each lamp in sequence. This is used to produce effects such as a single kicking lamp running along a group.
	All At Once	The effect is applied to all lamps at the same time. This would be used for a ballyhoo effect.
Lamp Sequence	Lamp Sequence is only used when Control Lamps is set to In Sequence.	
	>>>>	Effects runs forward through lamps.
	<<<<	Effect runs backwards through lamps.
	<< >>	Effect changes direction at the first and last lamps within a group.
Stop	Stops the effect running.	
Start	Starts the effect running.	
Speed	Sets the overall speed of the effect. Speed increases as the fader is pushed up.	
X Y Z	These faders set the overall amplitude of each channel of the effect. For example: if the X channel controls pan and the Y channel controls tilt and a circle effect is selected. The X and Y faders will control the two diameters of the circle, stretching it into an ellipse.	
X-Y	This fader sets the phase difference between the X and Y channels.	
Phase	This fader sets the phase difference between consecutive lamps in a group. It is only used when Control Lamps is set to In Sequence.	
Preview	The preview display shows either a two dimensional view of the X and Y channels or a colour sequence.	

AXIS PAGE

The three axis pages, X,Y and Z are used to program the operation of up to three lamp channels.

The screen shot below shows the key controls:

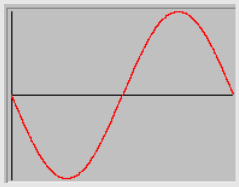
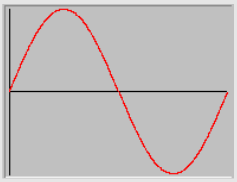
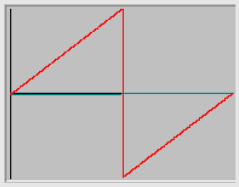
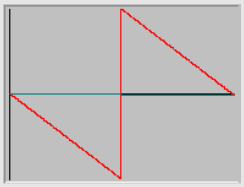
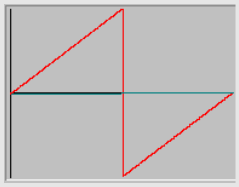
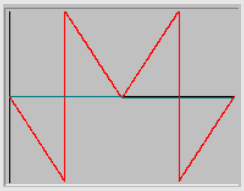
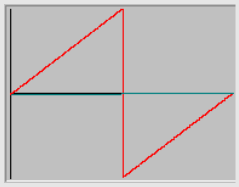
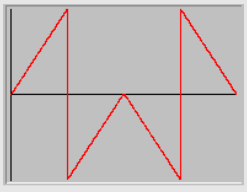


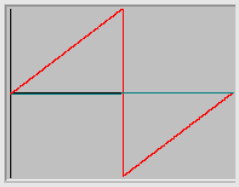
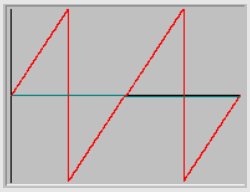
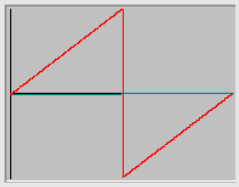
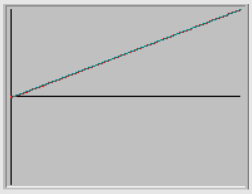
The table below summarises the controls:

Control	Purpose	
Editing Area	The editing area serves two purposes. It can be used to draw the effects curve freehand. This is achieved by moving the mouse whilst the left key is held. The editing area also serves as a mimic display whilst using the other editing controls.	
Org	The vertical origin control, shifts the effects curve up or down against the axis.	
Amp	The vertical amplitude control increases or decreases the size or vertical amplitude of the effects curve.	
Phase Shift	This control is used to shift the effects curve horizontally along the axis.	
Editing Tool Bar	The editing tools provide a range of functions that are applied to the Editing Area. See the table below for a detailed description.	
Canned Effects	The pull down list provides a selection of mathematical functions, such as sine and cosine, that can be added to the Editing Area.	
Apply	This control defines how the Canned Effects are added to the Editing Area.	
	Replace	The contents of the Editing Area are replaced with the selected effect.
	Merge	The selected effect is merged into (multiplied) the Editing area. This is very useful for creating effects such as spirals.

EDITING TOOL BAR

The Editing Tool Bar provides a selection of frequently used editing functions. The following table provides a summary:

Icon	Name	Purpose
	Increase Amplitude	Each click increases the vertical amplitude by 1%.
	Decrease Amplitude	Each click decreases the vertical amplitude by 1%.
	Invert	Inverts the effects curve in the vertical direction. Before:  After: 
	Reverse	Reverses the effects curve in the horizontal direction. Before:  After: 
	Mirror Left	Duplicates the effects curve by mirroring from left axis. Before:  After: 
	Mirror Right	Duplicates the effects curve by mirroring from right axis. Before:  After: 

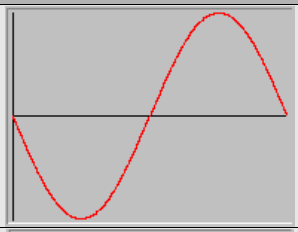
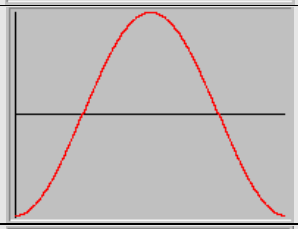
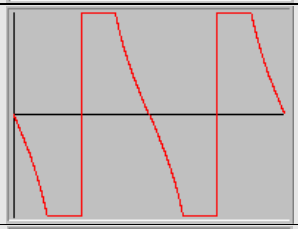
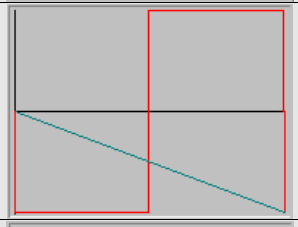
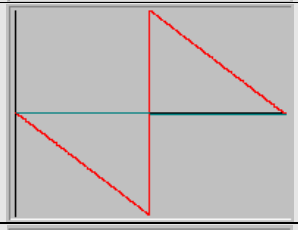
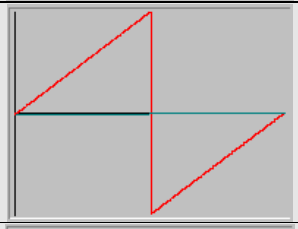
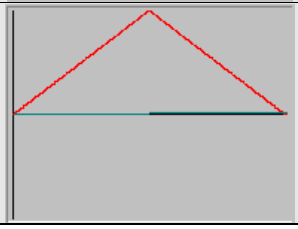
Icon	Name	Purpose
	Expand	Expands the effects curve by duplicating. Before:  After: 
	Compress	Compresses the effects curve by halving the horizontal resolution. Before:  After: 
	Copy to next Axis	Copies the current effects curve to the next axis. This is useful when creating complex lissajous figures.
	Undo	Undo the last action. There are twenty levels of undo.

CANNED EFFECTS

Canned Effects provide a useful starting point for generation of a new effect. The effect can be either copied or merged into the Editing Area.

Each Canned Effect is available in sixteen increments of half 'rotations'. Using the higher rotation number produces a faster effect but also allows more detail to be added to the effects curve.

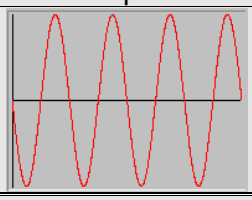
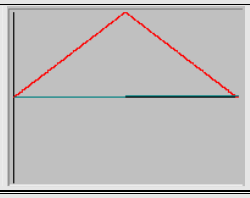
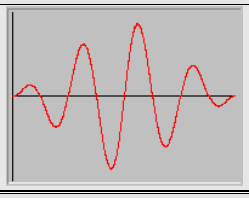
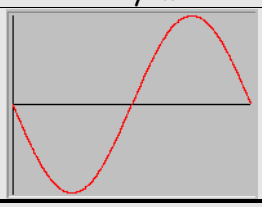
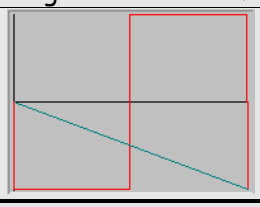
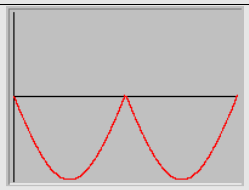
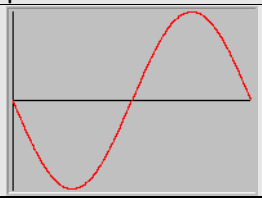
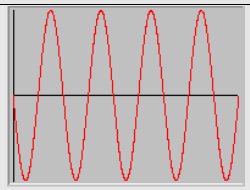
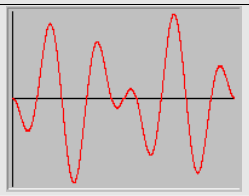
The following table shows the available Canned Effects:

Name	Effects Curve
Sine	
Cosine	
Tangent	
Square	
Saw	
Rev Saw	
Triangle	

MERGING

The ability to merge Canned Effects into the Editing Area is very important for creating sophisticated effects.

The range of effects that can be created is almost limitless. The following table shows some combinations that will be used frequently:

Initial Effects Curve	Merged Effects Curve	Resultant Effects Curve
Merging the triangle curve is very useful for ensuring that the beam returns to the centre at the end of one cycle. In this example, a sine is merged with a triangle to form the basis of a circular spiral.		
		
Merging the square curve can be used to reverse the direction of one half of a curve. In this example, a sine curve is translated such that it only moves in the negative direction.		
		
Merging sine waves is a useful way to create seemingly random patterns.		
		

CREATING EFFECTS

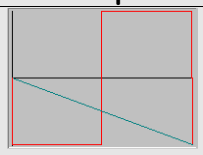
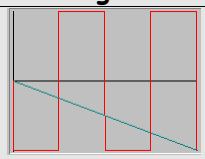
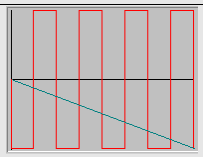
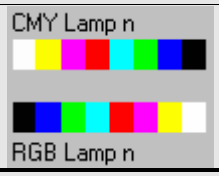
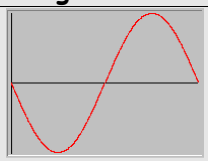
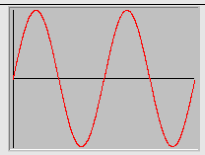
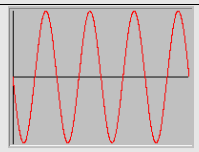
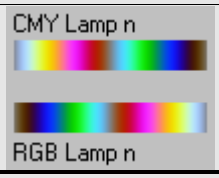
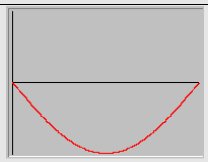
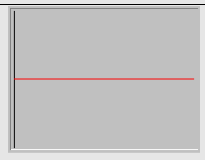
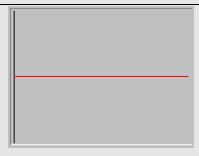
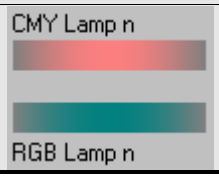
The previous section provides an overview of the tools available for effects editing. This section discusses creation of effects.

Whilst the effects engine is capable of controlling any lamp channels, the two most frequently used effects are beam motion and colour mixing.

COLOUR MIXING

Beam motion effects control the pan and tilt axes of the lamp. By convention theses are assigned to the X and Y channels off the effect. This leaves the Z channel available to control another attribute if required.

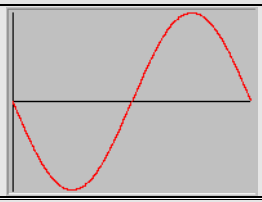
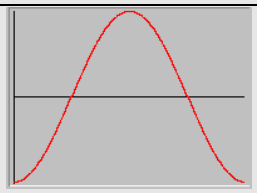
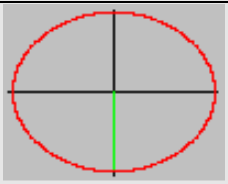
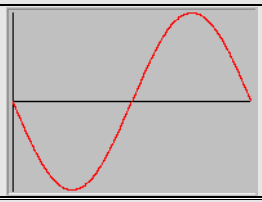
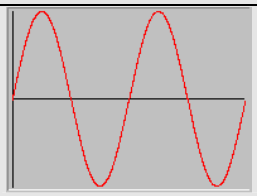
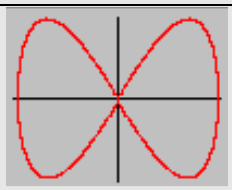
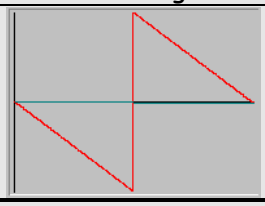
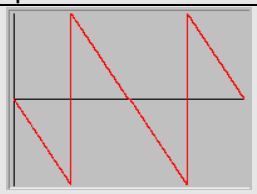
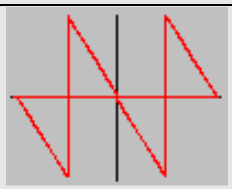
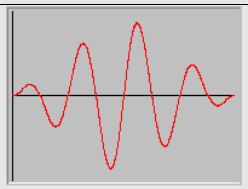
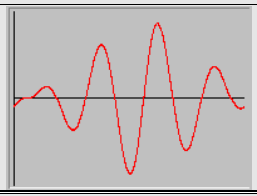
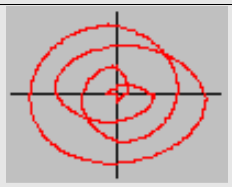
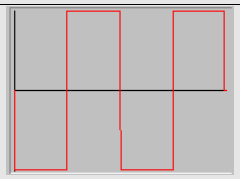
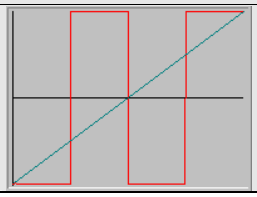
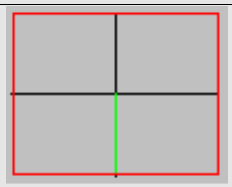
The following table shows how the pan and tilt effects curves can be combined.

X (Red) Channel	Y (Green) Channel	Z (Blue) Channel	Preview – The lamp traces this pattern on the stage.
Assigning increasing frequency square curves to each of the colour mix channels produces switching colour effects.			
			
Assigning increasing frequency sine curves produces soft edged spectrum changes.			
			
Controlling a single channel only produces effects that vary hue.			
			

BEAM MOTION

Beam motion effects control the pan and tilt axes of the lamp. By convention theses are assigned to the X and Y channels off the effect. This leaves the Z channel available to control another attribute if required.

The following table shows how the pan and tilt effects curves can be combined.

X (Pan) Channel	Y (Tilt) Channel	Preview – The lamp traces this pattern on the stage.
Combining sine and cosine produces circle effects.		
		
Combining sine curves of differing wavelength produces some of the most effective effects.		
		
Combining saw-tooth curves of differing wavelength produces effects that give the impression of acceleration.		
		
Merging either saw-tooth or triangle curves with sine or cosine forms the basis of spiral effects.		
		
Merging square curves produces rectangular boundary effects.		
		

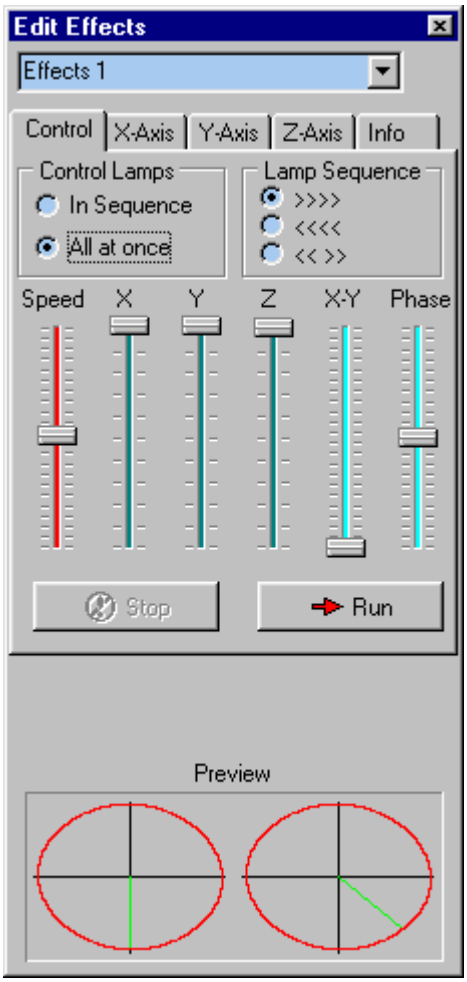
PHASING

The phase control is used when effects are applied to a group of lamps. Phasing allows each lamp in a group to start from a different point on the effects curve.

Used with beam motion, phasing generates a comet trail effect where all the lamps appear to follow the first.

Used with colour mixing, each lamp starts at a different colour. This allows effects such as walking a spectrum along a group of lamps.

The green bar displayed in the preview window indicates the phasing effect.

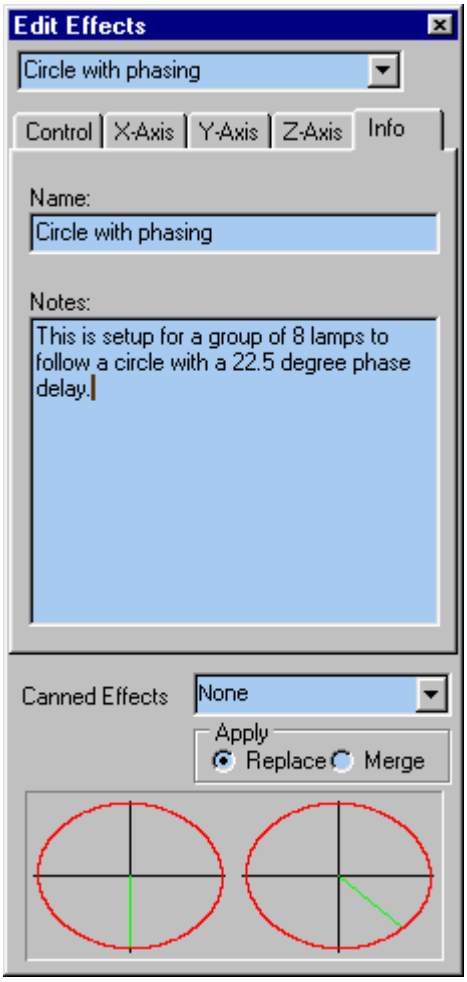


In the example shown, the phasing is set to 22.5 degrees. Applying this effect to a group of eight lamps would cause each lamp to rotate in a circle with an equal beam spread.

INFO PAGE

The Info Page is used to set the name of the effect and a description.

The description text is displayed on the Artistic Licence web site listing for effects downloads.



MIDI REMOTE CONTROL

MIDI REMOTE CONTROL

Grand-Master Flash! V1.5 onwards provides a basic form of MIDI remote control. MIDI is received via the sound card of the PC. Grand-Master Flash! automatically detects the MIDI input if it is present.
The current implementation is subject to change and expansion in future versions.
The current implementation provides the ability to remote control the sub-master htp and ltp faders as well as trigger the Go buttons.
Operation is as follows:

Playback Faders

MIDI Command	Channel	Data 1 (Hex)	Data 2 (Hex)	Example MIDI string (Hex)	Function
Note On	X	00	7f	9X 00 7f	Playback 1 Htp level at full
Note On	X	01	7f	9X 01 7f	Playback 2 Htp level at full
Note On	X	02	7f	9X 02 7f	Playback 3 Htp level at full
Note On	X	03	7f	9X 03 7f	Playback 4 Htp level at full
Note On	X	04	7f	9X 04 7f	Playback 5 Htp level at full
Note On	X	05	7f	9X 05 7f	Playback 6 Htp level at full
Note On	X	06	7f	9X 06 7f	Playback 7 Htp level at full
Note On	X	07	7f	9X 07 7f	Playback 8 Htp level at full
Note On	X	08	7f	9X 08 7f	Playback 9 Htp level at full
Note On	X	09	7f	9X 09 7f	Playback 10 Htp level at full
Note On	X	0a	7f	9X 0a 7f	Playback 11 Htp level at full
Note On	X	0b	7f	9X 0b 7f	Playback 12 Htp level at full
Note On	X	20	7f	9X 20 7f	Playback 1 Ltp level at full
Note On	X	21	7f	9X 21 7f	Playback 2 Ltp level at full
Note On	X	22	7f	9X 22 7f	Playback 3 Ltp level at full
Note On	X	23	7f	9X 23 7f	Playback 4 Ltp level at full
Note On	X	24	7f	9X 24 7f	Playback 5 Ltp level at full
Note On	X	25	7f	9X 25 7f	Playback 6 Ltp level at full
Note On	X	26	7f	9X 26 7f	Playback 7 Ltp level at full
Note On	X	27	7f	9X 27 7f	Playback 8 Ltp level at full
Note On	X	28	7f	9X 28 7f	Playback 9 Ltp level at full
Note On	X	29	7f	9X 29 7f	Playback 10 Ltp level at full
Note On	X	2a	7f	9X 2a 7f	Playback 11 Ltp level at full
Note On	X	2b	7f	9X 2b 7f	Playback 12 Ltp level at full

Playback Go Trigger

MIDI Command	Channel	Data 1 (Hex)	Data 2 (Hex)	Example MIDI string (Hex)	Function
Aftertouch	X	00	10	aX 00 10	Playback 1 Go
Aftertouch	X	01	10	aX 01 10	Playback 2 Go
Aftertouch	X	02	10	aX 02 10	Playback 3 Go
Aftertouch	X	03	10	aX 03 10	Playback 4 Go
Aftertouch	X	04	10	aX 04 10	Playback 5 Go
Aftertouch	X	05	10	aX 05 10	Playback 6 Go
Aftertouch	X	06	10	aX 06 10	Playback 7 Go
Aftertouch	X	07	10	aX 07 10	Playback 8 Go
Aftertouch	X	08	10	aX 08 10	Playback 9 Go
Aftertouch	X	09	10	aX 09 10	Playback 10 Go
Aftertouch	X	0a	10	aX 0a 10	Playback 11 Go
Aftertouch	X	0b	10	aX 0b 10	Playback 12 Go

Playback Page Select

MIDI Command	Channel	Data 1 (Hex)	Example MIDI string (Hex)	Function
Program Change	X	00	cX 00	Select Page 1
Program Change	X	01	cX 01	Select Page 2
Program Change	X	02	cX 02	Select Page 3
Program Change	X	03	cX 03	Select Page 4
Program Change	X	63	cX 63	Select Page 100

Function Key - Emulate press

MIDI Command	Channel	Data 1 (Hex)	Data 2 (Hex)	Example MIDI string (Hex)	Function
Aftertouch	X	00	03	aX 00 03	Fun Key 1 Down
Aftertouch	X	01	03	aX 01 03	Fun Key 2 Down
Aftertouch	X	02	03	aX 02 03	Fun Key 3 Down
Aftertouch	X	03	03	aX 03 03	Fun Key 4 Down
Aftertouch	X	04	03	aX 04 03	Fun Key 5 Down
Aftertouch	X	05	03	aX 05 03	Fun Key 6 Down
Aftertouch	X	06	03	aX 06 03	Fun Key 7 Down
Aftertouch	X	07	03	aX 07 03	Fun Key 8 Down
Aftertouch	X	08	03	aX 08 03	Fun Key 9 Down
Aftertouch	X	09	03	aX 09 03	Fun Key 10 Down
Aftertouch	X	0a	03	aX 0a 03	Fun Key 11 Down
Aftertouch	X	0b	03	aX 0b 03	Fun Key 12 Down

Shift Function Key - Emulate press

MIDI Command	Channel	Data 1 (Hex)	Data 2 (Hex)	Example MIDI string (Hex)	Function
Aftertouch	X	0c	03	aX 0c 03	Shift - Fun Key 1 Down
Aftertouch	X	0d	03	aX 0d 03	Shift - Fun Key 2 Down
Aftertouch	X	0e	03	aX 0e 03	Shift - Fun Key 3 Down
Aftertouch	X	0f	03	aX 0f 03	Shift - Fun Key 4 Down
Aftertouch	X	10	03	aX 10 03	Shift - Fun Key 5 Down
Aftertouch	X	11	03	aX 11 03	Shift - Fun Key 6 Down
Aftertouch	X	12	03	aX 12 03	Shift - Fun Key 7 Down
Aftertouch	X	13	03	aX 13 03	Shift - Fun Key 8 Down
Aftertouch	X	14	03	aX 14 03	Shift - Fun Key 9 Down
Aftertouch	X	15	03	aX 15 03	Shift - Fun Key 10 Down
Aftertouch	X	16	03	aX 16 03	Shift - Fun Key 11 Down
Aftertouch	X	17	03	aX 17 03	Shift - Fun Key 12 Down

Control Function Key - Emulate press

MIDI Command	Channel	Data 1 (Hex)	Data 2 (Hex)	Example MIDI string (Hex)	Function
Aftertouch	X	18	03	aX 18 03	Control - Fun Key 1 Down
Aftertouch	X	19	03	aX 19 03	Control - Fun Key 2 Down
Aftertouch	X	1a	03	aX 1a 03	Control - Fun Key 3 Down
Aftertouch	X	1b	03	aX 1b 03	Control - Fun Key 4 Down
Aftertouch	X	1c	03	aX 1c 03	Control - Fun Key 5 Down
Aftertouch	X	1d	03	aX 1d 03	Control - Fun Key 6 Down
Aftertouch	X	1e	03	aX 1e 03	Control - Fun Key 7 Down
Aftertouch	X	1f	03	aX 1f 03	Control - Fun Key 8 Down
Aftertouch	X	20	03	aX 20 03	Control - Fun Key 9 Down
Aftertouch	X	21	03	aX 21 03	Control - Fun Key 10 Down
Aftertouch	X	22	03	aX 22 03	Control - Fun Key 11 Down
Aftertouch	X	23	03	aX 23 03	Control - Fun Key 12 Down

Alt Function Key - Emulate press

MIDI Command	Channel	Data 1 (Hex)	Data 2 (Hex)	Example MIDI string (Hex)	Function
Aftertouch	X	24	03	aX 24 03	Alt - Fun Key 1 Down
Aftertouch	X	25	03	aX 25 03	Alt - Fun Key 2 Down
Aftertouch	X	26	03	aX 26 03	Alt - Fun Key 3 Down
Aftertouch	X	27	03	aX 27 03	Alt - Fun Key 4 Down
Aftertouch	X	28	03	aX 28 03	Alt - Fun Key 5 Down
Aftertouch	X	29	03	aX 29 03	Alt - Fun Key 6 Down
Aftertouch	X	2a	03	aX 2a 03	Alt - Fun Key 7 Down
Aftertouch	X	2b	03	aX 2b 03	Alt - Fun Key 8 Down
Aftertouch	X	2c	03	aX 2c 03	Alt - Fun Key 9 Down
Aftertouch	X	2d	03	aX 2d 03	Alt - Fun Key 10 Down
Aftertouch	X	2e	03	aX 2e 03	Alt - Fun Key 11 Down
Aftertouch	X	2f	03	aX 2f 03	Alt - Fun Key 12 Down

Function Key - Emulate release

MIDI Command	Channel	Data 1 (Hex)	Data 2 (Hex)	Example MIDI string (Hex)	Function
Aftertouch	X	00	04	aX 00 04	Fun Key 1 Release
Aftertouch	X	01	04	aX 01 04	Fun Key 2 Release
Aftertouch	X	02	04	aX 02 04	Fun Key 3 Release
Aftertouch	X	03	04	aX 03 04	Fun Key 4 Release
Aftertouch	X	04	04	aX 04 04	Fun Key 5 Release
Aftertouch	X	05	04	aX 05 04	Fun Key 6 Release
Aftertouch	X	06	04	aX 06 04	Fun Key 7 Release
Aftertouch	X	07	04	aX 07 04	Fun Key 8 Release
Aftertouch	X	08	04	aX 08 04	Fun Key 9 Release
Aftertouch	X	09	04	aX 09 04	Fun Key 10 Release
Aftertouch	X	0a	04	aX 0a 04	Fun Key 11 Release
Aftertouch	X	0b	04	aX 0b 04	Fun Key 12 Release

Shift Function Key - Emulate release

MIDI Command	Channel	Data 1 (Hex)	Data 2 (Hex)	Example MIDI string (Hex)	Function
Aftertouch	X	0c	04	aX 0c 04	Shift - Fun Key 1 Release
Aftertouch	X	0d	04	aX 0d 04	Shift - Fun Key 2 Release
Aftertouch	X	0e	04	aX 0e 04	Shift - Fun Key 3 Release
Aftertouch	X	0f	04	aX 0f 04	Shift - Fun Key 4 Release
Aftertouch	X	10	04	aX 10 04	Shift - Fun Key 5 Release
Aftertouch	X	11	04	aX 11 04	Shift - Fun Key 6 Release
Aftertouch	X	12	04	aX 12 04	Shift - Fun Key 7 Release
Aftertouch	X	13	04	aX 13 04	Shift - Fun Key 8 Release
Aftertouch	X	14	04	aX 14 04	Shift - Fun Key 9 Release
Aftertouch	X	15	04	aX 15 04	Shift - Fun Key 10 Release
Aftertouch	X	16	04	aX 16 04	Shift - Fun Key 11 Release
Aftertouch	X	17	04	aX 17 04	Shift - Fun Key 12 Release

Control Function Key - Emulate release

MIDI Command	Channel	Data 1 (Hex)	Data 2 (Hex)	Example MIDI string (Hex)	Function
Aftertouch	X	18	04	aX 18 04	Control - Fun Key 1 Release
Aftertouch	X	19	04	aX 19 04	Control - Fun Key 2 Release
Aftertouch	X	1a	04	aX 1a 04	Control - Fun Key 3 Release
Aftertouch	X	1b	04	aX 1b 04	Control - Fun Key 4 Release
Aftertouch	X	1c	04	aX 1c 04	Control - Fun Key 5 Release
Aftertouch	X	1d	04	aX 1d 04	Control - Fun Key 6 Release
Aftertouch	X	1e	04	aX 1e 04	Control - Fun Key 7 Release
Aftertouch	X	1f	04	aX 1f 04	Control - Fun Key 8 Release
Aftertouch	X	20	04	aX 20 04	Control - Fun Key 9 Release
Aftertouch	X	21	04	aX 21 04	Control - Fun Key 10 Release
Aftertouch	X	22	04	aX 22 04	Control - Fun Key 11 Release
Aftertouch	X	23	04	aX 23 04	Control - Fun Key 12 Release

Alt Function Key - Emulate release

MIDI Command	Channel	Data 1 (Hex)	Data 2 (Hex)	Example MIDI string (Hex)	Function
Aftertouch	X	24	04	aX 24 04	Alt - Fun Key 1 Release
Aftertouch	X	25	04	aX 25 04	Alt - Fun Key 2 Release
Aftertouch	X	26	04	aX 26 04	Alt - Fun Key 3 Release
Aftertouch	X	27	04	aX 27 04	Alt - Fun Key 4 Release
Aftertouch	X	28	04	aX 28 04	Alt - Fun Key 5 Release
Aftertouch	X	29	04	aX 29 04	Alt - Fun Key 6 Release
Aftertouch	X	2a	04	aX 2a 04	Alt - Fun Key 7 Release
Aftertouch	X	2b	04	aX 2b 04	Alt - Fun Key 8 Release
Aftertouch	X	2c	04	aX 2c 04	Alt - Fun Key 9 Release
Aftertouch	X	2d	04	aX 2d 04	Alt - Fun Key 10 Release
Aftertouch	X	2e	04	aX 2e 04	Alt - Fun Key 11 Release
Aftertouch	X	2f	04	aX 2f 04	Alt - Fun Key 12 Release

Stack Select & Run

MIDI Command	Channel	Data 1 (Hex)	Example MIDI string (Hex)	Function
Chan Pressure	X	00	dX 00	Run Stack 1
Chan Pressure	X	01	dX 01	Run Stack 2
Chan Pressure	X	02	dX 02	Run Stack 3
Chan Pressure	X	03	dX 03	Run Stack 4
Chan Pressure	X	63	dX 63	Run Stack 100

X is the MIDI Channel set in the options menu. Range 0 - 15 or 0x00 - 0x0f

CONVERSION TABLES

Dec	Hex	Binary	Dec	Hex	Binary	Dec	Hex	Binary
0	00	0000 0000	32	20	0010 0000	64	40	0100 0000
1	01	0000 0001	33	21	0010 0001	65	41	0100 0001
2	02	0000 0010	34	22	0010 0010	66	42	0100 0010
3	03	0000 0011	35	23	0010 0011	67	43	0100 0011
4	04	0000 0100	36	24	0010 0100	68	44	0100 0100
5	05	0000 0101	37	25	0010 0101	69	45	0100 0101
6	06	0000 0110	38	26	0010 0110	70	46	0100 0110
7	07	0000 0111	39	27	0010 0111	71	47	0100 0111
8	08	0000 1000	40	28	0010 1000	72	48	0100 1000
9	09	0000 1001	41	29	0010 1001	73	49	0100 1001
10	0A	0000 1010	42	2A	0010 1010	74	4A	0100 1010
11	0B	0000 1011	43	2B	0010 1011	75	4B	0100 1011
12	0C	0000 1100	44	2C	0010 1100	76	4C	0100 1100
13	0D	0000 1101	45	2D	0010 1101	77	4D	0100 1101
14	0E	0000 1110	46	2E	0010 1110	78	4E	0100 1110
15	0F	0000 1111	47	2F	0010 1111	79	4F	0100 1111
16	10	0001 0000	48	30	0011 0000	80	50	0101 0000
17	11	0001 0001	49	31	0011 0001	81	51	0101 0001
18	12	0001 0010	50	32	0011 0010	82	52	0101 0010
19	13	0001 0011	51	33	0011 0011	83	53	0101 0011
20	14	0001 0100	52	34	0011 0100	84	54	0101 0100
21	15	0001 0101	53	35	0011 0101	85	55	0101 0101
22	16	0001 0110	54	36	0011 0110	86	56	0101 0110
23	17	0001 0111	55	37	0011 0111	87	57	0101 0111
24	18	0001 1000	56	38	0011 1000	88	58	0101 1000
25	19	0001 1001	57	39	0011 1001	89	59	0101 1001
26	1A	0001 1010	58	3A	0011 1010	90	5A	0101 1010
27	1B	0001 1011	59	3B	0011 1011	91	5B	0101 1011
28	1C	0001 1100	60	3C	0011 1100	92	5C	0101 1100
29	1D	0001 1101	61	3D	0011 1101	93	5D	0101 1101
30	1E	0001 1110	62	3E	0011 1110	94	5E	0101 1110
31	1F	0001 1111	63	3F	0011 1111	95	5F	0101 1111

Dec	Hex	Binary	Dec	Hex	Binary	Dec	Hex	Binary
96	60	0110 0000	128	80	1000 0000	160	A0	1010 0000
97	61	0110 0001	129	81	1000 0001	161	A1	1010 0001
98	62	0110 0010	130	82	1000 0010	162	A2	1010 0010
99	63	0110 0011	131	83	1000 0011	163	A3	1010 0011
100	64	0110 0100	132	84	1000 0100	164	A4	1010 0100
101	65	0110 0101	133	85	1000 0101	165	A5	1010 0101
102	66	0110 0110	134	86	1000 0110	166	A6	1010 0110
103	67	0110 0111	135	87	1000 0111	167	A7	1010 0111
104	68	0110 1000	136	88	1000 1000	168	A8	1010 1000
105	69	0110 1001	137	89	1000 1001	169	A9	1010 1001
106	6A	0110 1010	138	8A	1000 1010	170	AA	1010 1010
107	6B	0110 1011	139	8B	1000 1011	171	AB	1010 1011
108	6C	0110 1100	140	8C	1000 1100	172	AC	1010 1100
109	6D	0110 1101	141	8D	1000 1101	173	AD	1010 1101
110	6E	0110 1110	142	8E	1000 1110	174	AE	1010 1110
111	6F	0110 1111	143	8F	1000 1111	175	AF	1010 1111
112	70	0111 0000	144	90	1001 0000	176	B0	1011 0000
113	71	0111 0001	145	91	1001 0001	177	B1	1011 0001
114	72	0111 0010	146	92	1001 0010	178	B2	1011 0010
115	73	0111 0011	147	93	1001 0011	179	B3	1011 0011
116	74	0111 0100	148	94	1001 0100	180	B4	1011 0100
117	75	0111 0101	149	95	1001 0101	181	B5	1011 0101
118	76	0111 0110	150	96	1001 0110	182	B6	1011 0110
118	77	0111 0111	151	97	1001 0111	183	B7	1011 0111
119	78	0111 1000	152	98	1001 1000	184	B8	1011 1000
120	79	0111 1001	153	99	1001 1001	185	B9	1011 1001
121	7A	0111 1010	154	9A	1001 1010	186	BA	1011 1010
122	7B	0111 1011	155	9B	1001 1011	187	BB	1011 1011
123	7C	0111 1100	156	9C	1001 1100	188	BC	1011 1100
124	7D	0111 1101	157	9D	1001 1101	189	BD	1011 1101
125	7E	0111 1110	158	9E	1001 1110	190	BE	1011 1110
126	7F	0111 1111	159	9F	1001 1111	191	BF	1011 1111

Dec	Hex	Binary	Dec	Hex	Binary
192	C0	1100 0000	224	E0	1110 0000
193	C1	1100 0001	225	E1	1110 0001
194	C2	1100 0010	226	E2	1110 0010
195	C3	1100 0011	227	E3	1110 0011
196	C4	1100 0100	228	E4	1110 0100
197	C5	1100 0101	229	E5	1110 0101
198	C6	1100 0110	230	E6	1110 0110
199	C7	1100 0111	231	E7	1110 0111
200	C8	1100 1000	232	E8	1110 1000
201	C9	1100 1001	233	E9	1110 1001
202	CA	1100 1010	234	EA	1110 1010
203	CB	1100 1011	235	EB	1110 1011
204	CC	1100 1100	236	EC	1110 1100
205	CD	1100 1101	237	ED	1110 1101
206	CE	1100 1110	238	EE	1110 1110
207	CF	1100 1111	239	EF	1110 1111
208	D0	1101 0000	240	F0	1111 0000
209	D1	1101 0001	241	F1	1111 0001
210	D2	1101 0010	242	F2	1111 0010
211	D3	1101 0011	243	F3	1111 0011
212	D4	1101 0100	244	F4	1111 0100
213	D5	1101 0101	245	F5	1111 0101
214	D6	1101 0110	246	F6	1111 0110
215	D7	1101 0111	247	F7	1111 0111
216	D8	1101 1000	248	F8	1111 1000
217	D9	1101 1001	249	F9	1111 1001
218	DA	1101 1010	250	FA	1111 1010
219	DB	1101 1011	251	FB	1111 1011
220	DC	1101 1100	252	FC	1111 1100
221	DD	1101 1101	253	FD	1111 1101
222	DE	1101 1110	254	FE	1111 1110
223	DF	1101 1111	255	FF	1111 1111

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