



Preliminary – December 9th 2004

Content

Content.....	2
Installation.....	3
The 4 major parts of Mamba.....	3
Editor/Framelists:.....	3
The tools:.....	3
Background images.....	4
Selecting objects:.....	4
Changing colour.....	4
Local menu.....	4
The frame area.....	5
Edit framelists.....	5
Adding frames to your show.....	5
Show editor.....	6
Scenes:.....	6
Effects:.....	7
Rotations.....	8
Position/Size.....	8
Colour/intensity effects.....	8
Compose a show from multiple scenes:.....	9
Playback control.....	11
Music playback:.....	11
Hardware support.....	13

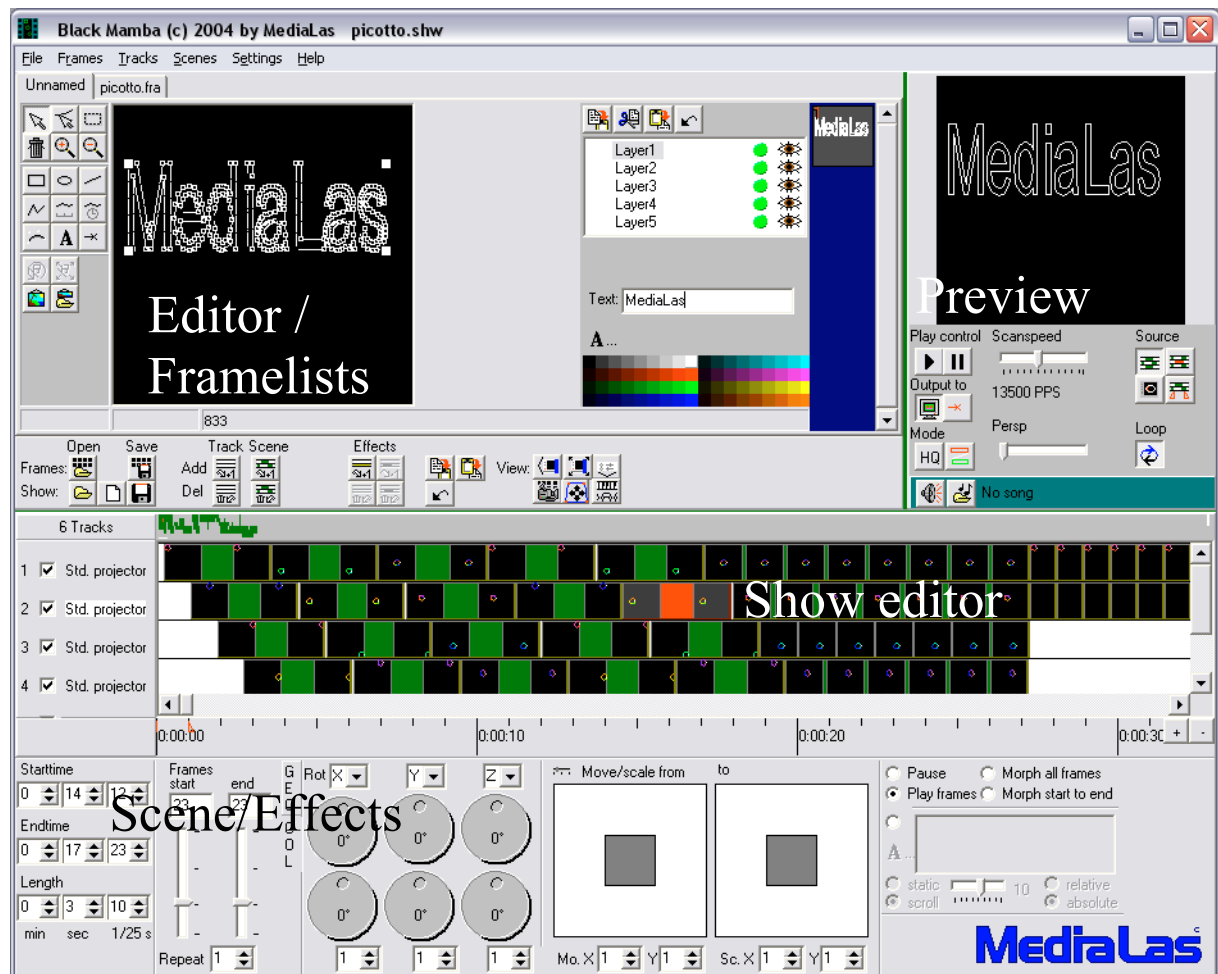
Installation

Start the program setup.exe from the CD and select the appropriate hardware. If your hardware is not shown use the standard installation. On the CD you will find a folder “drivers” containing drivers for various hardware, copy the appropriate driver to your Mamba Black program folder.

Connect the dongle to a USB connector of your computer. The drivers for the dongle will be installed on first program start.

Note: Win98 will search a driver for the dongle. Cancel the installation then start Mamba. You may have to start a second time to activate the driver.

The 4 major parts of Mamba




Editor/Framelists:

The tools:

Rectangle, ellipse, line  click and drag.

Polyline, Bspline  left click for each point, right click to set last point.



Free hand  press left mouse button and drag.

Holding down the ctrl key will round the current coordinates to multiples of 100.

When finished drawing, the object is selected and the tool “Select” is activated. If you want to draw multiple objects of the same kind, you can hold down the shift key while clicking the tool button. It is then locked until you select another tool.

Text, beam   click on the canvas to position.

Background images



You can load a background image by clicking on the  button. This is useful when creating logos. Turn the background image on/off with the  button.

Selecting objects:

Click on, or close to the object (at a corner point or the lines in between) to select objects. You can drag an object to another place, or change the shape by dragging the markers on the corner points.

When you hold down the alt key while selecting an object you can change the size of the object.

To select/unselect multiple objects hold down the ctrl-key.

You can group objects by pressing the “group objects” button. Ungroup with the “ungroup objects” button.  

To select a single object within a group hold down the shift key.

Copy/cut/paste objects with the buttons above the layer list.



If you select a text object you can edit the text, or change the font.

Changing colour


Colour selected objects by clicking a colour on the colour pick.

The colour in the top left corner is black, by colouring objects (or parts of them) black, they will be blanked.



Double click to change a colour. You can save / load a palette from the local menu (right mouse button) of the colour pick area.

The selected colour stays active, new objects will be drawn in the active colour.

If you want to colour only parts of the frame use the “Select rectangle” tool  to select a rectangular region, and then click on a colour.

Local menu

You can also use background images to recolour objects. In the folder “colors” of the program folder you will find example background images. When the background image is loaded select “Recolor from background” from the local menu (right mouse button) of the editor area. If no selection is active all objects will be recoloured. You can select objects and/or regions, to recolor the selected objects/regions/regions of the selected objects only.

You can center selected objects by choosing “Center objects” from the local menu.

“Copy point” from the local menu lets you anotate a point from the selected objects or the current location for later use in the show editor, for example as rotation centers.

The frame area

Edit framelists

The frame area shows all the frames in the current frame list. Right click on a frame, or use the menu, to add/delete/clear frames or open/save frame lists.

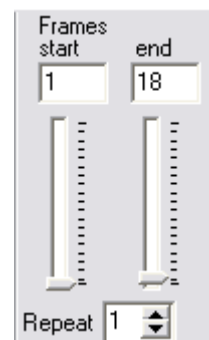
Double click on a frame to open it in the editor.

You can copy/paste frames between framelists. To select the frames click on the start frame, then hold shift and click on the end frame, the selected frames are marked with red frame numbers. To copy/paste click the right mouse button.

Use Ctrl+Tab and Shift+Ctrl+Tab to move to the next/previous frame list. Ctrl+F4 closes the current framelist.

Adding frames to your show

Drag a frame to a scene/track to include the frame in the current show. To add multiple frames, add one as described before then adjust the frames start/end value of the scene to the desired values. The frames that currently are used in the selected scene are marked with a red frame in the frame list. Change the repeat value if you want to repeat the frame sequence more then once within that scene.

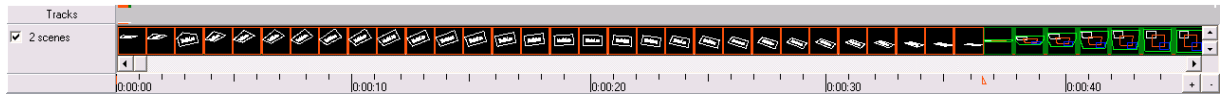


Frames are saved in the .FRA format. This format saves the object information.

You can also save in ILDA (.ild) or MediaLas' older frame formats (.FL*). The object information will then be lost; the frames are saved as an (unstructured) list of points. Use this option to export to other editors or for playback (on MediaLas' Avatar or Hotboard devices). To export complete shows use the “Save output to file” button (see “Preview” further below).

Show editor

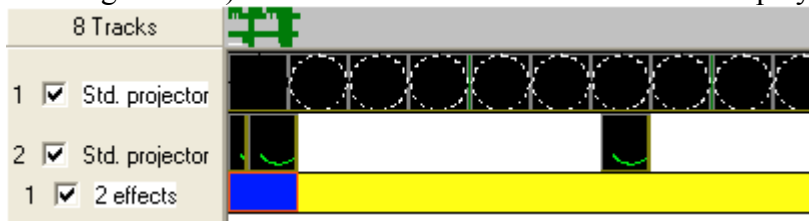
A show is a collection of scenes. Scenes can be added onto tracks that are shown on the timeline:



Tracks:

On start up you will see one track on the timeline (the white rectangle).

To add tracks use To select a track click on the text to the left of it (“Std. projector” in the image below.) The text of the selected track will be displayed on white background.



The checkbox to the left controls visibility of the track, uncheck to temporarily disable the track.

Scenes:



To add a scene to the timeline use

The scene will be added on the leftmost empty spot of the selected track and will be 1 second long. You can also add a scene by dropping a frame onto the timeline. The frame will then automatically become the start frame of that scene.

A scene can contain frames from the open frame lists or text (both static and scrolling).

The radio buttons on the bottom right let you select the type of scene:

Pause: nothing will be displayed. Use this to temporarily disable a scene.

Play frames: the scene will display the frames sequentially from start to end value.

Morph all frames: the scene will morph each two consecutive frames, from start to end value.

Morph start to end: the scene will morph start to end frame, ignoring all frames in between (in case the frames you want to morph are not consecutive in your frame list).

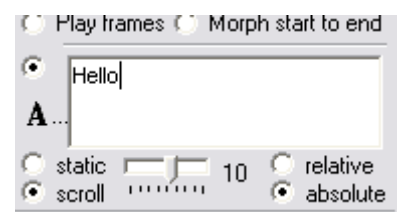
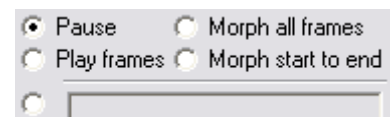
See “Frame area” above on how to add frames to scenes.

If the scene shall display a text, click the fifth radio button.

You can then enter text in the text area.

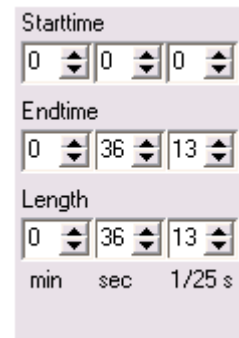
You can select whether the text should be scrolling or static.

For scrolling text you can adjust the speed with the slider either relative to the scene’s length (a value of 10 means once from right to left, -20 2 times from left to right, etc.), or



absolute (so if you change the length of the scene the scrolling speed won't change). For static text the slider will change the horizontal position of the text. To change the font click **A...** (Currently the same font will be used for all scenes displaying text.)

Each scene has a position and length on the track, which is shown on the lower left of the screen. Adjust the values with the spin edits, or drag the scene or its borders to the desired values. Holding the Ctrl key while dragging a scene or its start/end will snap the values to the tick marks.

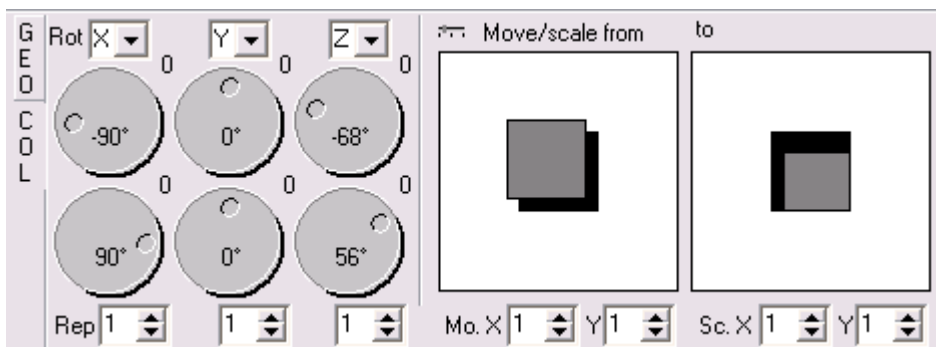


To select a scene simply click on it.


Effects:

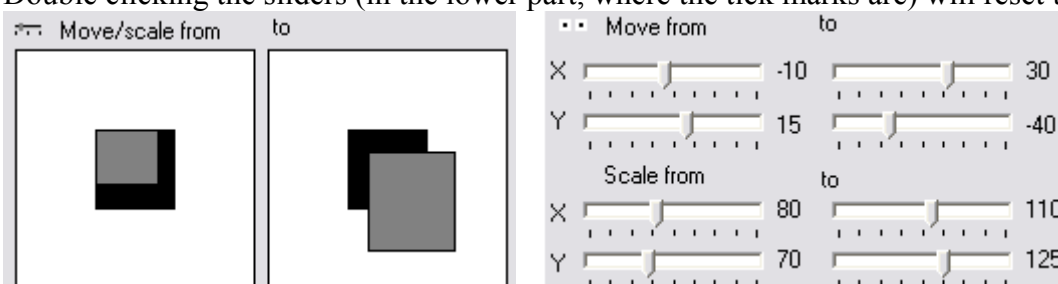
The content of each scene can be manipulated by assigning effects. The effect editor appears underneath the timeline when a scene is selected.

The tab labelled GEO contains adjustments for rotations, size, and position of the scene, each with a start and end value. The scene content will smoothly change from start to end value over its duration.



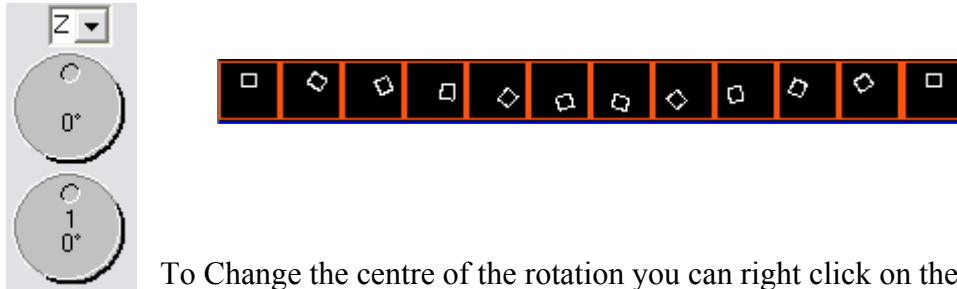
To lock start/end value while changing, hold shift key while changing the start value. To repeat the effect more than once adjust the “Rep” spin edit next to that value pair. Double clicking the rotation handles sets the value to 90, 180, 270, 360 degrees if the value was 0, 90, 180, 270 degrees respectively, and to 0 otherwise. Holding the Ctrl key when changing will round the values to multiples of 5 degrees. Double clicking the move/size areas will rest the size to 100/100% if it was changed, otherwise the position will be set to center.

Click on the  Button to change Move/scale controls to sliders, as in the image below. Double clicking the sliders (in the lower part, where the tick marks are) will reset the values.



Rotations

The following example uses a small rectangle in the upper half of the frame. Let's add a full rotation about z. The scene will look as following:



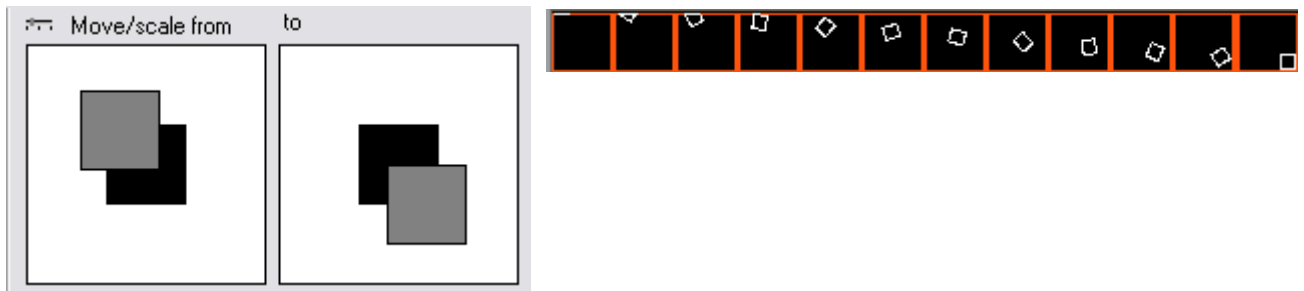
To Change the centre of the rotation you can right click on the rotation handle. From the menu select "center from selection". This allows you to change the rotation centre to the corner points or the centre of the currently selected object(s) in the editor window. So, select the rectangle in the editor and use "center" form the local menu of the rotation handle.

The scene will look like this:



Position/Size

To move the frames you drag the grey areas in the Move/Scale area. For example, to move the frame (the one we have rotated in the example before) from top left to bottom right:

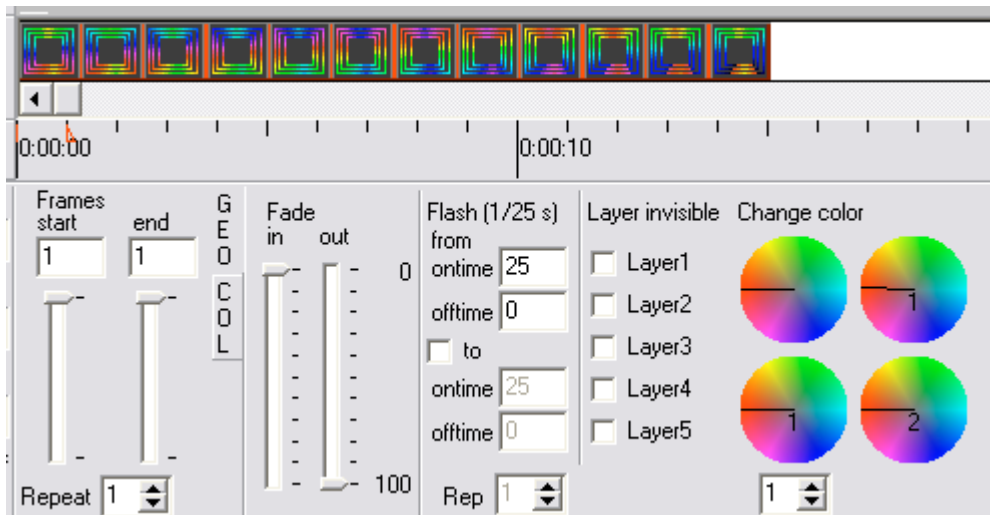


If you drag the border of the grey areas you can change the size of the frame:



Colour/intensity effects

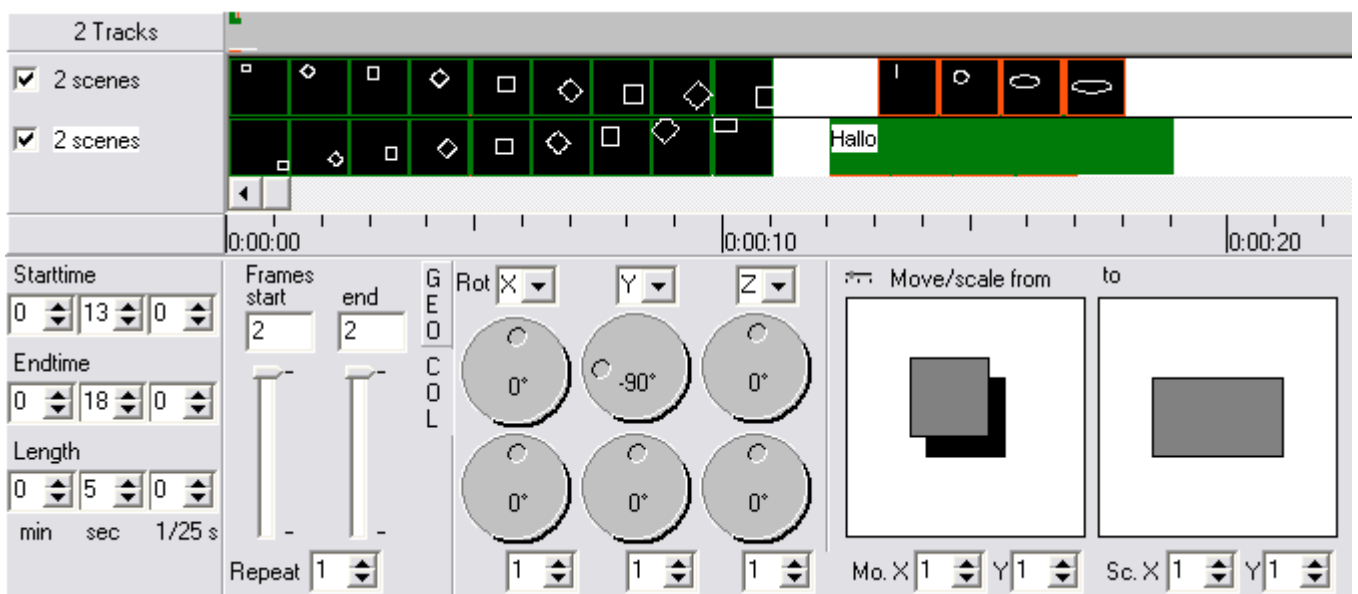
The tab labelled "COL" selects colour and intensity effects for the selected scene. Use the Fade in/out sliders to fade in/out the scene from/to black. The sliders show percent of the scene length. Add a flashing by entering the desired on and of time, values of 25/25 give one second on and one second off. Check "To" to change flashing speed, values of 0/25 and 25/0 will start with a black scene, then increase flashing until the scene is permanently on. Check layers that you want to disable in the scene. With the colour morpher you can select a colour range that is changed into another colour range. The settings in the image below select the



whole range (second dial is tuned one time), to be morphed once around the colour circle (the lower two dials are turned one and two times respectively).

Compose a show from multiple scenes:

Here we have our example from above copied to the second track and then changed movement from bottom right to top left. An ellipse rotating around Y-axis with movement and stretching. And a scrolling text together with it.



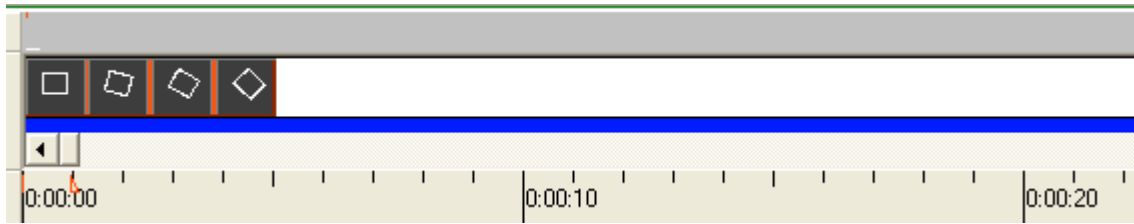
Please note when saving shows that use frames from the (unnamed) “editor” frame list, you should first save the frame list. Otherwise the show has no reference to the frames, and you will have to assign frames to scenes manually when reloading that show.

A selected scene can be copied/pasted. It will be pasted at the current time position on the current track (to change these see below) if you use the paste button. You can also right click and paste at the current mouse position.

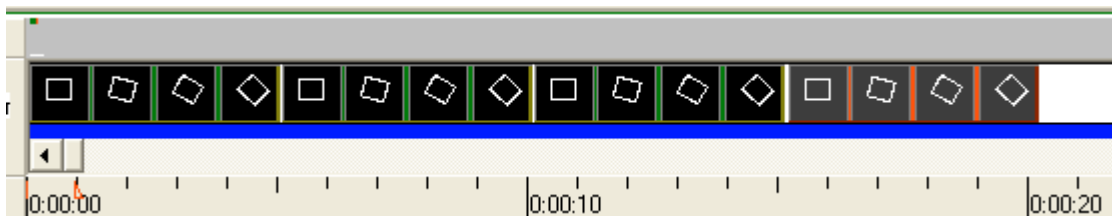
You can select/unselect multiple scenes by holding the Ctrl button. Multiple scenes can be moved or copied/pasted.

From the local menu you can swap/assign the start/end effects of a scene. This can be helpful when copying scenes as in the following simple example:

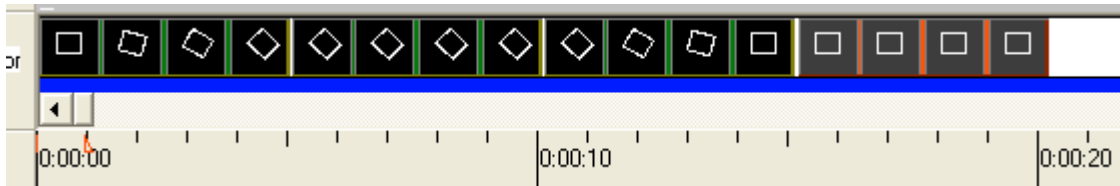
We start with a simple rotation:



Copy the scene 3 times:



Now from the local menu select “Change effects” and then “Set all to end vals” for the second scene, “Reverse all effects” for the third and “Set all to start vals” for the last scene



Now we have a rotation to the right followed by a static picture, then rotation back, and static again.

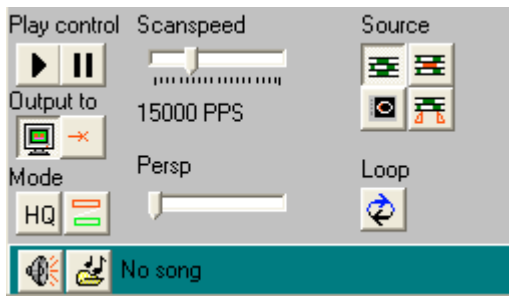
Scenes can overlap, although this is not recommended. When scenes overlap you may not be able to access a scene by clicking it, you can use “Bring to front” and “Send to back” from the local menu to change the stacking order of the scenes.

Overview area



Located above the track area there is an overview of the current show. Green lines indicate scenes, the currently selected scene is shown in red. On the bottom and right a white line shows the currently visible track area (the “ruler” below the tracks). A red line on the bottom shows the begin/end marker. You can also click on the overview to position the time marker. In the image above you can see one scene on track one and 3 scenes (the second of which is selected) on track two.

Playback control



The buttons labeled “Play control” start/end / pause the playback.

“Output to” lets you select monitor and/or output to laser projector.

In the “Mode” section you can select high quality playback and whether blanked lines shall be visible.


Note: If you want to export a show to use it with MediaLas Avatar/Hotboard devices, use the “Save output to file” button.

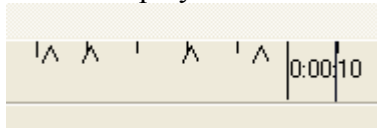


When both play and pause buttons are pressed you can set and/or drag a position marker by clicking on the “ruler” below the tracks or the overview area above the tracks. You can press Ctrl+B and Ctrl+E to set a begin/end marker.

The buttons in the “Source” section select the part of the timeline that is displayed: all of the show, the currently selected scene, the current editor frame or from start to end marker.

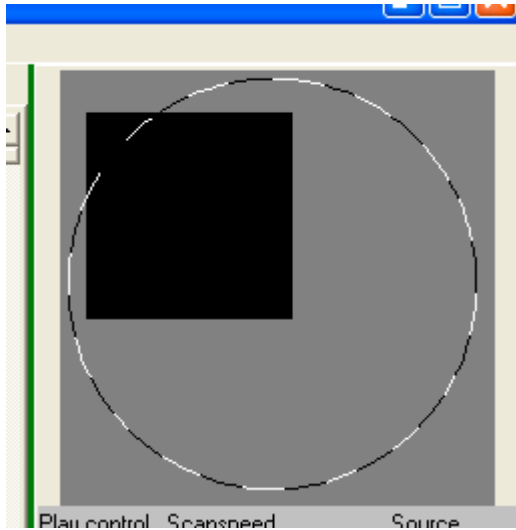
Music playback:

You can load a song to be played with the show. Press the  button to enable music playback. You can press the space key to put markers on the timeline while the show is played back. This allows you to put scenes to specific positions along the music. The marks will be displayed as black triangles on the “ruler”.



To delete the marks press Ctrl+space.

Preview:



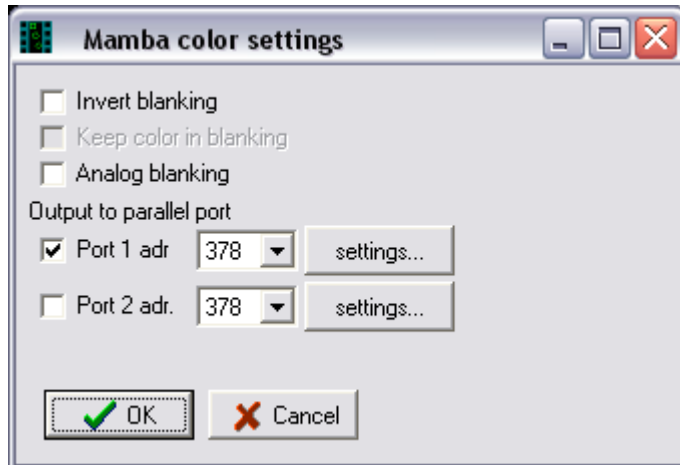
If not in playback mode the preview area shows an overview of the frame editor. When zoomed, as in the image above, you can drag the visible area. Otherwise the preview area will display the current show when monitor output is enabled.

Known bugs:

Win ME/98: tracks are not displayed correctly when zoomed in/out.
Undo isn't working correctly.

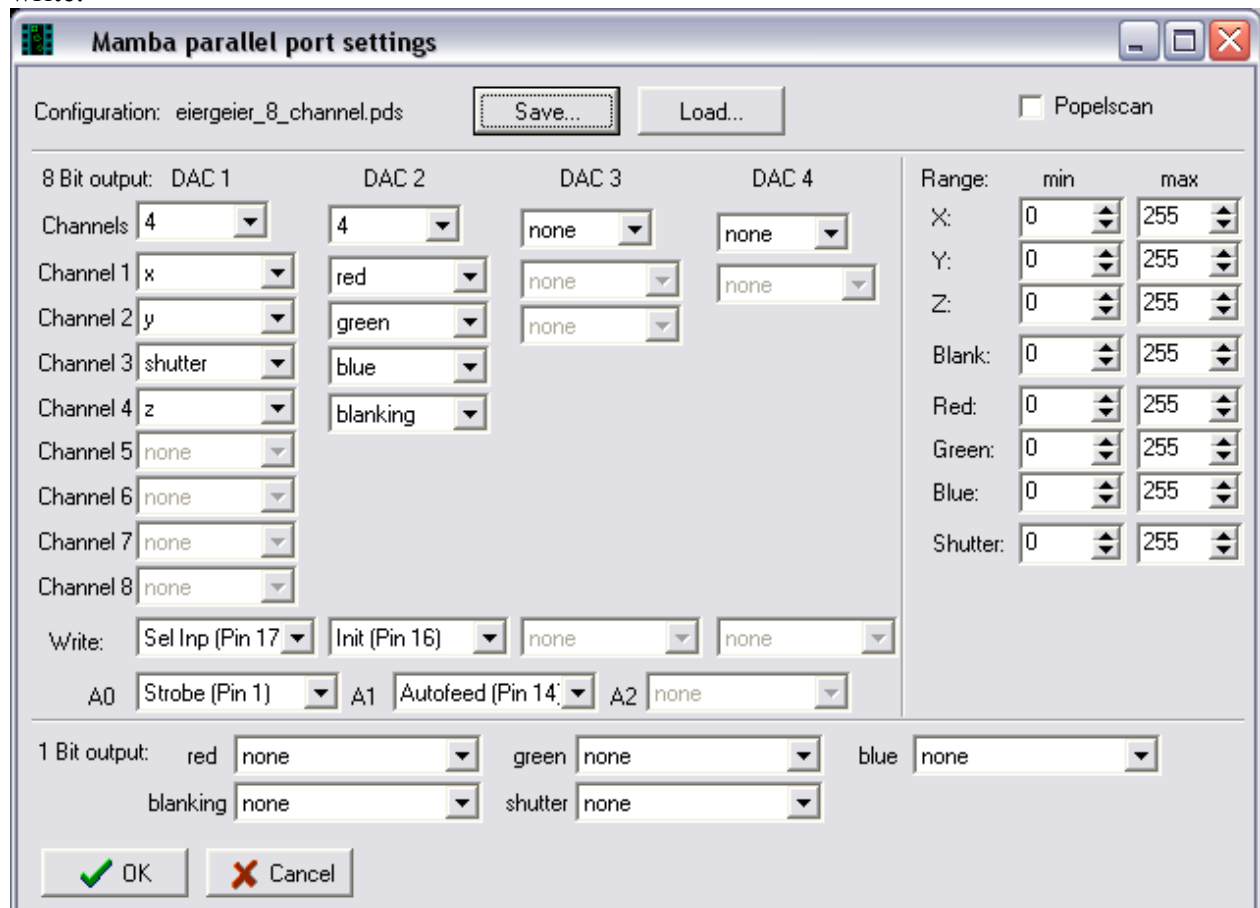
Hardware support

Mamba supports parallel port DA converters. In “settings/color settings” you can select whether laser output should go to parallel port as well. Output can be directed to one or two parallel ports, simply check the appropriate box and select the printer port (which you can look up in the windows device manager). Note if you check both port 1 and 2 and select the same address for both, the second will be ignored.



Example: output to one parallel port at address 378

When turning on parallel port output for the first time, you will have to enter the settings dialog. Here you can select the number of DACs and which lines are used for addressing and write.



In addition (or instead of using DACs) you can also select one bit output for colour, blanking, and shutter signals.

The above example shows outputting x, y, red, and green signals to one 4 channel DAC using “Strobe” and “Autofeed” lines for addressing, “Select Input” as write line, and outputting (1 bit) shutter signal on the remaining “Init” line of the LPT port.

The Range min/max lets you adjust the output signal, for example if you use 10 V reference voltage for the DAC, but want to output colour signals from 0 to 5V you could adjust the max values for the colours to 50% (127).

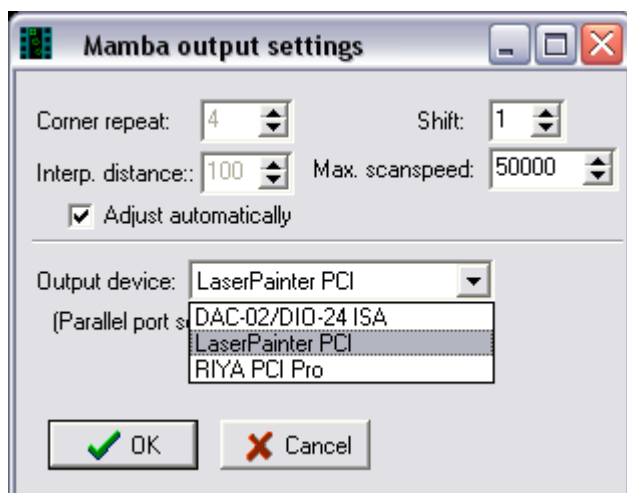
Note: pressing OK will not save changes to disk. To make them permanent you will have to save. On start up mamba will try to load the last settings file (with full path name, if you move the settings to a different directory, you will have to reload it).

A (hardware) example for a parallel port DAC is shown further below.

Support for Popelscan (from mylaserpage.de): check the appropriate field, all other settings are then ignored. Again, you will need to save the settings to make them permanent.

Drivers:

Mamba supports drivers for different hardware. Driver files have the extension .mld and have to be copied into the mamba directory. On start up mamba will try to load the drivers and check whether the hardware is present. You can select the output device from the available drivers in “Settings/Output settings”. (Not for LaserPainter PCI Version.)



Drivers are simply Windows DLLs. If you want to write your own driver, you will have to implement and export the following functions (Delphi syntax):

function MLRegisterDriver(b: PChar): word stdcall;

This function has to copy the characters MLDevice into the buffer b. This is to make sure the DLL is a valid driver. The function can return a number, which will then be passed to as parameter h in the functions below (in case the hardware driver supports multiple clients, and has to keep track of them).

function MLDevicePresent: boolean; stdcall;

This function should return true if the device is present (or if there is no way to determine it).

function MLKind: word; stdcall;

Returns 1 for a frame oriented device, 2 for a point oriented device, 4 for an animation oriented device. (For the different devices see MLDraw.) If the function is not present a frame oriented device will be assumed.

Mamba calls these functions on program start, so it can list all output devices that are available.

The following functions are used to do output to the device. The parameter h is the above mentioned return value from MLRegisterDriver, c is the channel number (in case the hardware can support multiple output channels, mamba always uses channel 0).

function MLGetName(n: pchar): boolean; stdcall;

When called the driver should copy a name (20 chars max) to n

function MLInitDevice(h: word): boolean; stdcall;

Called once when the driver is selected.

function MLInitShow(h, c: word): boolean; stdcall;

Called immediately before output starts

function MLDraw(h, c: word; d: PChar; n: integer): boolean; stdcall;

For a frame oriented device (Riya PCI Pro for example) this function is called for each frame.

D is a pointer to an array with n points

Point= packed record

 x,y,z: word;

 r,g,b: byte;

 reserved1, reserved2, reserved3: byte;

 intensity, reserved4, repeatpoint: byte;

end;

if repeatpoint is greater than 0 it should be displayed 1+repeatpoint times.

For a point oriented device (MediaLas PCI 12 for example) this function is called once for each point (same data format).

For animation oriented devices (MediaLas HotBoard for example) there will be a call to MLInitShow, followed by calls to MLDraw for each frame, after the show is through MLHaltShow will be called, and the data can be sent to the device.

function MLHaltShow(h, c: word): boolean; stdcall;

Called when output stops.

function MLHalt: boolean; stdcall;

Called when the driver is unloaded

function MLParams(h: word; c: word; p: PChar): boolean; stdcall;

p is a pointer to a Params structure

Params= packed record

 size: word;

 pointrate: longint;

 invertblanking: boolean;

end;

size is the size in bytes of the complete structure (right now values of 6 or 7 are used, please make sure you driver checks for this parameters). For a frame oriented driver this function is

used to set the scanrate in points per second. If invertblanking is set, the driver should invert all intensity values (if possible). The driver should use safe default values.

Using a driver with your own software

If you plan to use a MediaLas driver with your own software you should at least call the following functions:

MLDevicePresent (on startup)

MLInitDevice (before first output)

MLInitShow (before output starts)

MLHaltShow (to end output)

MLHalt (before closing program)

It is highly recommended to call MLKind (if present) to check whether the device is point, frame, or animation oriented.

When calling MLName please make sure the buffer you pass is at least 21 bytes long. When calling MLParams, set the size parameter correctly.

A simple example driver and program (in Delphi) is available, please contact MediaLas technical support.

Suggested parallel port DAC with Maxim MAX506ACPP:

D0-D7 (Pin2-9) Data

Strobe (Pin 1) A0

Autofeed (Pin 14) A1

Select Input (Pin 17) Write

LPT pin -> MAX 506 pin

1 -> 17 (A0)

2 -> 14 (D0)

3 -> 13 (D1)

4 -> 12 (D2)

5 -> 11 (D3)

6 -> 10 (D4)

7 -> 9 (D5)

8 -> 8 (D6)

9 -> 7 (D7)

14 -> 16 (A1)

17 -> 15 (-WR)

25 -> 6 (DGND)

MAX 506:

3 (Vss), 5 (AGND), 6 (DGND) -> Ground

4 (VREF), 18 (Vdd) -> +5V

Output pins on the MAX506

2 (VoutA): Channel 1 (0..+5V)

1 (VoutB): Channel 2 (0..+5V)

20 (VoutC): Channel 3 (0..+5V)

19 (VoutD): Channel 4 (0..+5V)

(With MediaLas PCI Board 5V can be obtained from Pin 37 of the 37 Pin sub-D connector.)