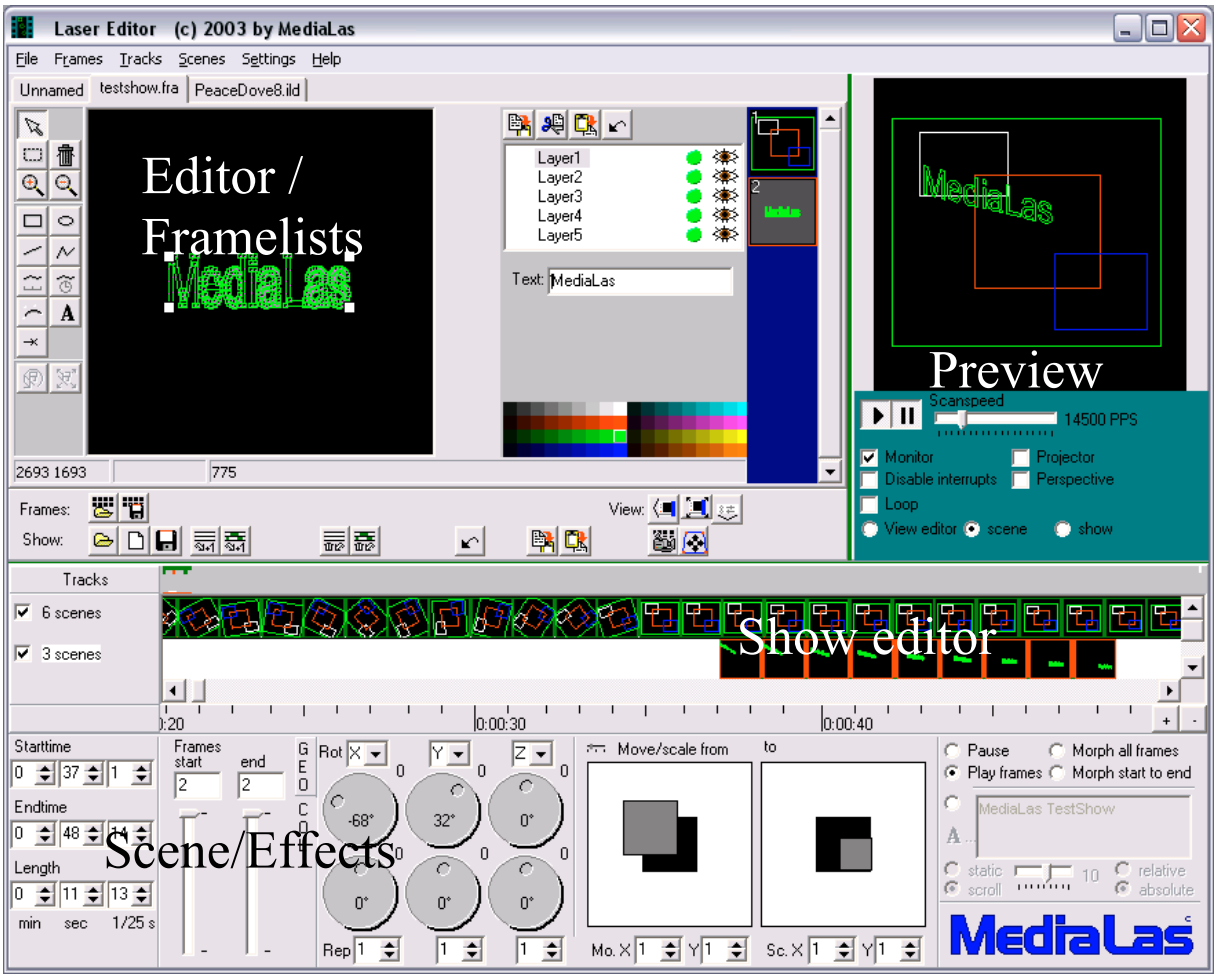
Mamba 2004 V. 1.19b

First steps

The 4 major parts of Mamba



Editor/Framelists: this area shows the currently loaded frame lists plus an initially empty frame list with the frame editor opened.

Tracks: here you can edit the tracks. Tracks contain the scenes, that are part of the show (animation).

Scene/Effects: here you can edit the effects of the currently selected scene.

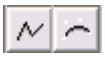
Preview: shows you either an overview of the editor, or plays back the current scene/show.

Editor/Framelists:

The tools:

Rectangle, ellipse, line 

click and drag to desired size.

Polyline, Bspline 

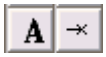
left click for each point, right click to set last point.

Free hand 

press left mouse button and drag along canvas.

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.

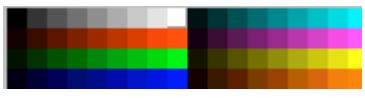
If you want to draw logos, you can add an image of the logo to the drawing area, and then draw over it.
To load a background image click 
Turn the background image on/off with 

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 multiple objects hold 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. 

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.

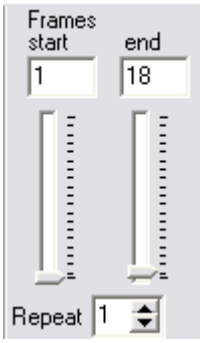
If you select a text object you can edit the text.
If you want to colour only parts of the frame use the "Select rectangle" tool  to select a rectangular region, then click on a colour.

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 will have red numbers. To copy/paste click the right mouse button.

Adding frames to your show

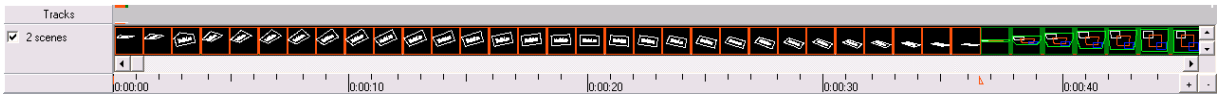


Drag a frame to a scene/track to include the frame in the current show. To add multiple frames, add one as described before then adjust the frames start/end value of the scene to the desired values. The frames that currently are used in the selected scene are marked with a red frame in the frame list.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

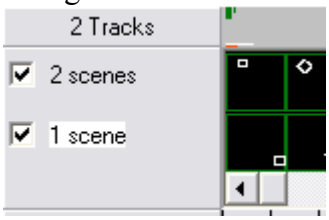
Show editor

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  (Mamba 2004 is limited to 2 tracks.) To select a track click on the text to the left of it ("1 scene" in the image below.) The text of the selected track will be displayed on white background.



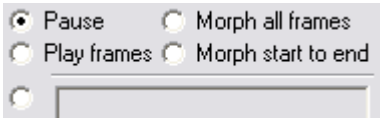
The checkbox to the left controls visibility of the track, uncheck to temporarily disable the track.

Scenes:

To add 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.

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

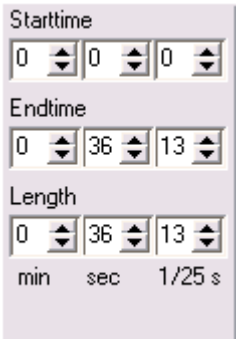


The radio buttons on the bottom right let you select the type of scene:
Pause: nothing will be displayed. Use this to temporarily disable a scene.
Play frames: the scene will display the frames sequentially from start to end value.
Morph all frames: the scene will morph each two consecutive frames, from 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.)

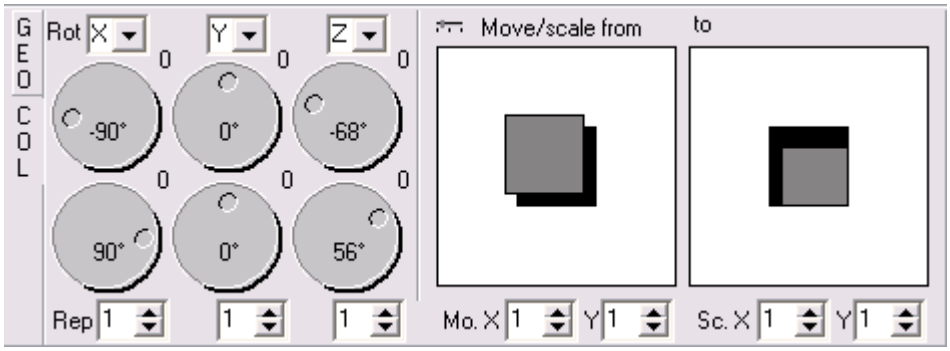
Each scene has a position and length on the track, which is shown on the lower left of the screen. Adjust the values with the spin edits, or drag the scene or it's borders to the desired values. Holding the ctrl key while dragging a scene or it's start/end will snap the values to the tick marks.



To select a scene simply click it.

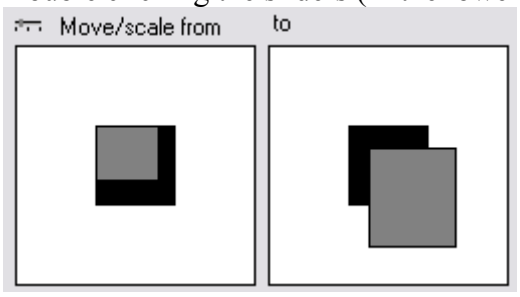
Effects:

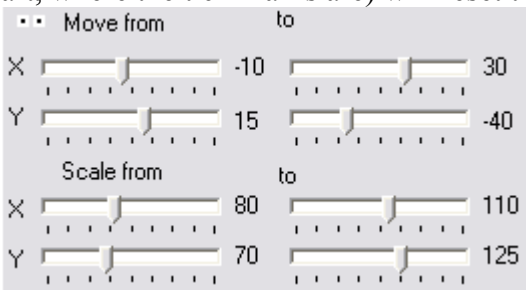
The content of each scene can be manipulated by assigning effects. The effect editor appears underneath the timeline when a scene is selected.
The tab labelled GEO contains adjustments for rotations, size, and position of the scene, each with a start and end value. The scene content will smoothly change 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.

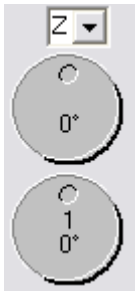
Click on the  Button to change Move/scale controls to sliders, as in the image below
Double clicking the sliders (in the lower part, where the tick marks are) will reset the values.





Rotations

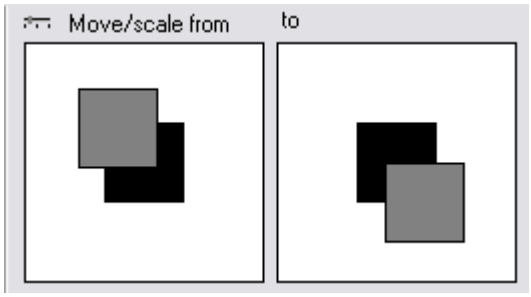
The following example uses a small rectangle in the upper half of the frame.
Let's add a full rotation about z. The scene will the look as following:



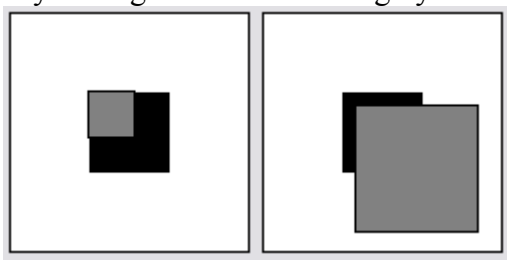
To Change the centre of the rotation you can right click on the rotation handle. From the menu select "center from selection". This allows you to change the rotation centre to the corner points or the centre of the currently selected object(s) in the editor window. So select the rectangle in the editor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

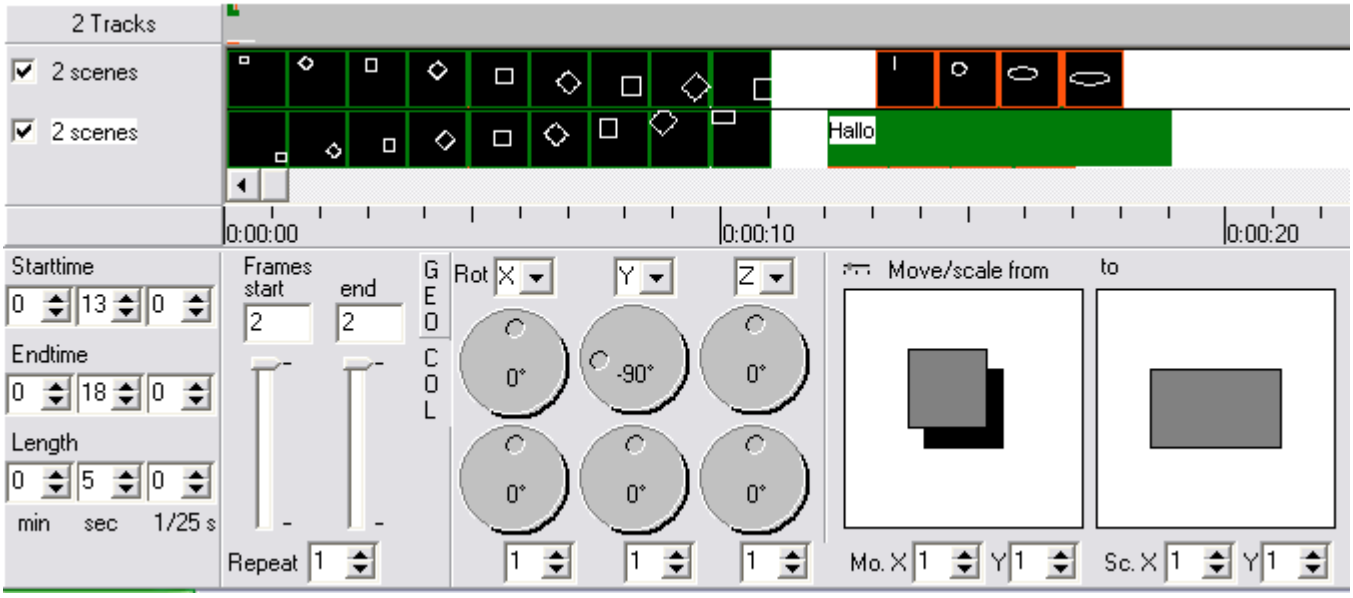


If you drag the border of the grey areas you can change the size of the frame:



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 streching. And a scrolling text together with it.



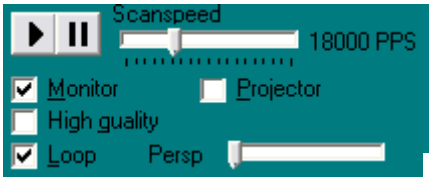
Please note when saving shows that use frames from the (unnamed) “editor” frame list, you should first save the frame list. Otherwise the show has no reference to the frames, and you will have to assign frames to scenes manually when reloading that show.

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.

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. A red line on the bottom shows begin/end of the show. 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.

To add/delete scenes/tracks right click on the track area or use the speed buttons and the menu.

Preview:



Push the play button to start playback. Monitor will show playback on the preview screen (top right), projector will output to an attached laser projector. Push pause to freeze playback, you can then drag the time marker on the timeline ruler or overview area to scroll to a position.

Use the radio buttons to select playback of the whole show (from begin to end marker), the currently selected scene or the frame that is currently edited.

If not in playback mode the preview area shows an overview of the frame editor. When zoomed in you can drag the visible area.

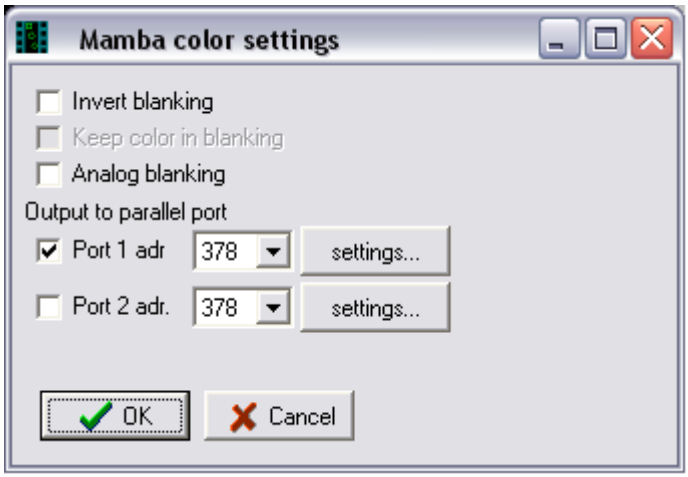
Preview outputs to monitor and/or an attached laser projector. If you want to export a show to use it with MediaLas Avatar/Hotboard devices, use the “Save output to file” button. 

Known bugs:

Win ME/98: tracks are not displayed correctly when zoomed in/out.
Layers in the editor do not work correctly.
Undo isn’t working correctly.

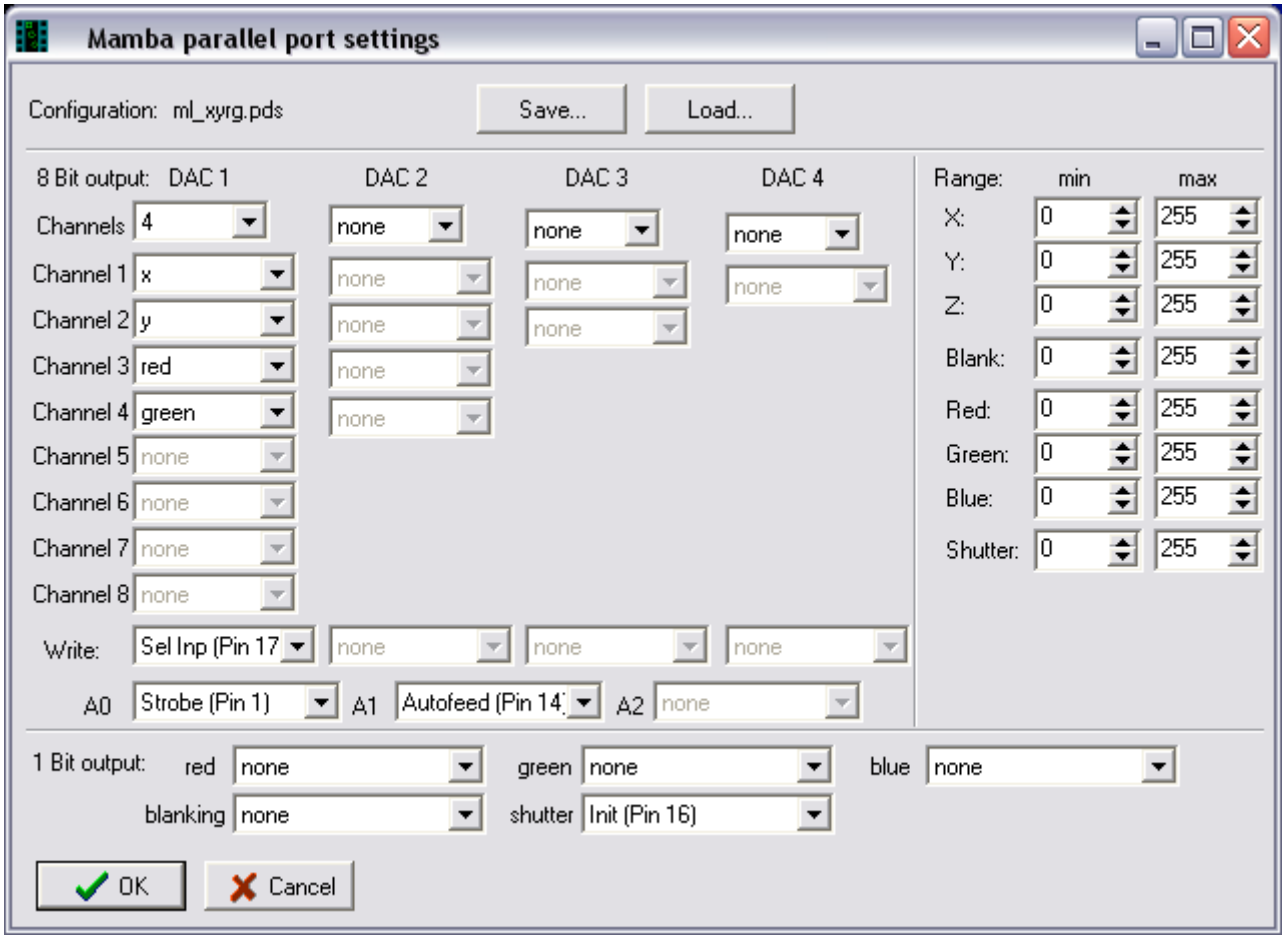
Hardware support

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.



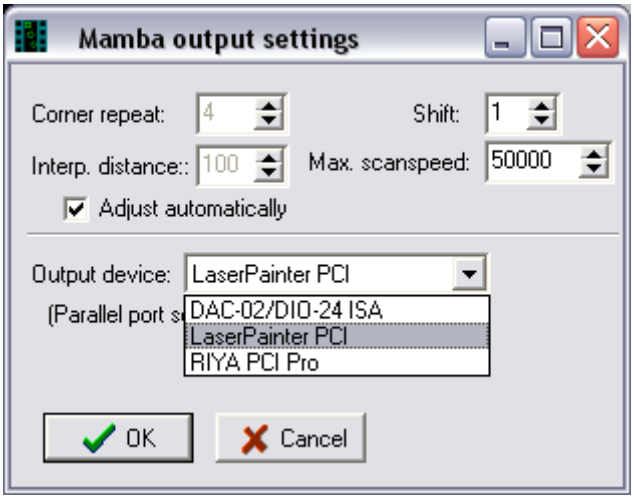
Example: output to one parallel port at address 378

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 color, blanking, and shutter signals.
The above example shows outputing 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).
An example for a parallel port DAC is shown further below.

Drivers:
Mamba supports drivers for different hardware. Driver files have the extension .mld and have to 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 on the 37 Pin sub-D connector.)