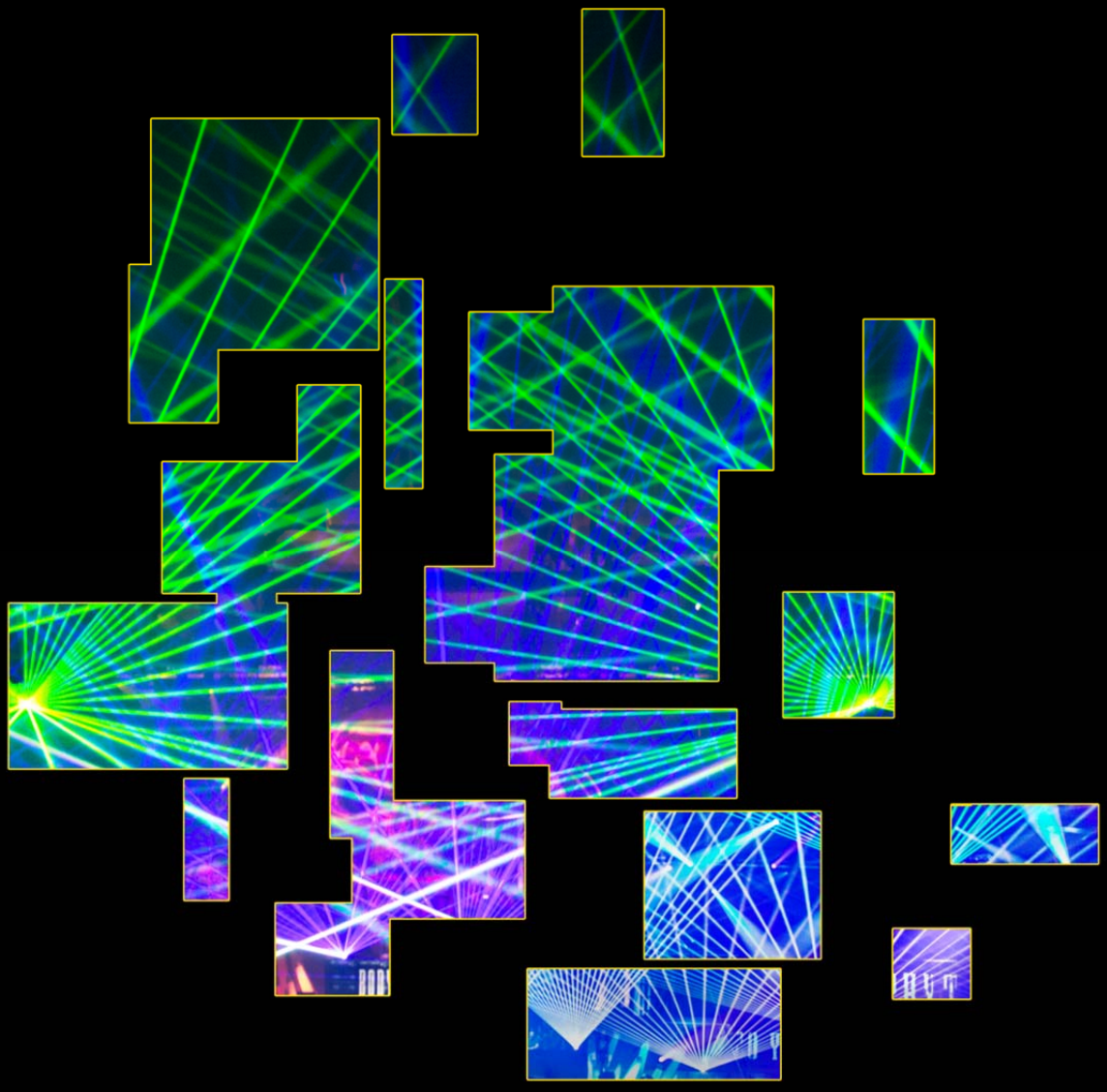
Laserworld Showeditor

professional laser show software

User Manual

(Version 2015/1.0)



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1. Preface

To get started with Showeditor quickly, we recommend having a look at our Quick-Start-Guide (last pages of this document). This Quick-Start-Guide helps you in understanding the major features of Software without explaining too many details – so it's perfect for everyone who likes to learn the software by doing.

The software Laserworld Showeditor is under permanent development. Thus it is not possible to describe every single feature, as with nearly every update new features are added. The manual will be updated with major new releases, so minor feature updates might not be included yet.

Please always make sure you're working with the latest software version of Laserworld Showeditor. Laserworld does not force you to update, but we of course recommend to always using the latest stable version. It is recommended to not update just before a live event or show starts where the software should be used. It is recommended to always do a general system test of software and corresponding hardware prior to laser operation at a show.

When you find any mistakes in this manual or in the software, please contact our bug trackers – bugs@showeditor.com . Ideas for improving the software, new ideas for features, interfaces or hardware support are highly welcome at any time: Please add them to our development list on http://www.showeditor.com/devlopment . The permanent improvement of this software is only possible with your help!
If you're facing any urgent issues, please contact our support team at support@showeditor.com – we try to help you as quickly as possible.

1.1. Liability

Laserworld (Switzerland) AG or any other legal entity or person involved in the process of development and publication of this piece of software is not responsible nor liable for damages to show laser hardware and components like e.g. galvanometer scanners or for the health of people or animals like eye-damages due to focused laser beams or projection with too high intensity or for any other occasions that may arise from the use of the software Laserworld Showeditor.
Every user of Laserworld Showeditor must respect the very laser safety regulations of the country the laser systems are operated in. In general, the IEC 60825 is the international regulation for this; however there may be state or local regulations or laws that require additional laser safety related measures.

It is possible to create still standing beams / static beams with this software! The laser safety for the laser-device(s) controlled through this software must be ensured by the operator. The operator must be aware of potential risks arising from the use of show laser devices, especially when people or animals can be hit by laser radiation.

Every laser operator should bear in mind that **he is at any time responsible** for damages that may arise from his use of laser gear.

1.2. Versions

There are different versions of the software available:

DEMO:
A DEMO Version of the software is available. The features of this version are limited and it is not possible to output to any hardware interfaces..

Full Version:
The full software package is active as soon as a licensed hardware device is connected, like the ShowNET.

With the full version of the software all options are enabled. Up to 16 output interfaces (DAC's) can be used, controlled via 12 figure tracks including the corresponding effects tracks. Furthermore, the "intelligent" DMX controller (DMX is generally used for controlling lighting systems) can be used. Show protection against unauthorized access can also be limited to the license number of the very interface connected.

1.3. Minimum Hardware Requirements

Minimum hardware requirements for the computer Showeditor should run on, are:

- Microsoft Windows (XP, Vista, Windows 7 - 32 or 64 bit version, Windows 8 - 32 or 64 bit version)
- CPU: Pentium 4, 1GHz or faster (a faster computer allows for smoother laser output)
- 500 MB working memory or more
- 5 GB memory on hard drive and memory for the shows (possibly less)
- Sound card
- Graphics resolution minimum 1152 * 864 pixels (otherwise parts of the software window are not visible), installed openGL driver

  Attention Netbook user! Some Netbook displays may not meet the minimum resolution specifications! Make sure to use a proper laptop/netbook for best user experience!
- LAN port 100MBit

Suggestions:
Two screens simplify the work with Laserworld Showeditor – we suggest using a second screen, at least for programming. It simply makes things much easier.

It's difficult to specify the "ideal" setup for running Laserworld Showeditor. Some users work with Showeditor even on different operating systems (MAC and Linux, both with emulators). The program is created for Windows XP (service packs 1 to 3), Windows Vista (SP1 and SP2 with 32 or 64 bit) and also for Windows 7 and Windows 8 (both 32 and 64 bit versions). Also many computer systems with Macintosh operating system with Windows emulation are possibly able to run the program. However, Laserworld

does not provide any support for Showeditor installations on non-native Microsoft Windows systems.

The more DACs are controlled from one computer, the more "power" is required.

"Comfortable Working":
The laser output is calculated in real time. Dependent upon load of the computer it could happen, that animations will show short stops or will hang up. Therefore we recommend a better equipped system than the above described minimal requirements.

To run a laser show with 4 independent projectors and DMX as well as video output via video projector and sound you should have at least an Intel Core Duo with 2 GHz CPU, 2 GB RAM, and a fast hard drive. A separate graphics board also makes sense (better than on-board graphics).

Laserworld Showeditor can control up to 16 output cards simultaneously. It is possible to even control more laser systems individually by configuring the output matrix appropriately.
The following show setups have been tested with good results:

- 16 ShowNET interfaces, each connected to an RGB projector.

2. Installation

2.1. New Installation

First step: Download of the latest installation-file from the website:
http://www.showeditor.com

Second step: Start the installation file Laserworld_Showeditor_2015.msi and follow the instructions.

Third step: A Quick-Start-Guide or video tutorials are available, if only the basic information on how Showeditor works is needed. Video tutorials can be found at:
http://www.showeditor.com/tutorials

2.2. Updates / New Versions

There are no updates for Laserworld Showeditor, but new versions (releases)! If a **new version** shall be installed, the old version **must be removed** from the computer prior to the installation.
To do so, start the downloaded installer from Laserworld. The following dialog (Fig.2) will be displayed:

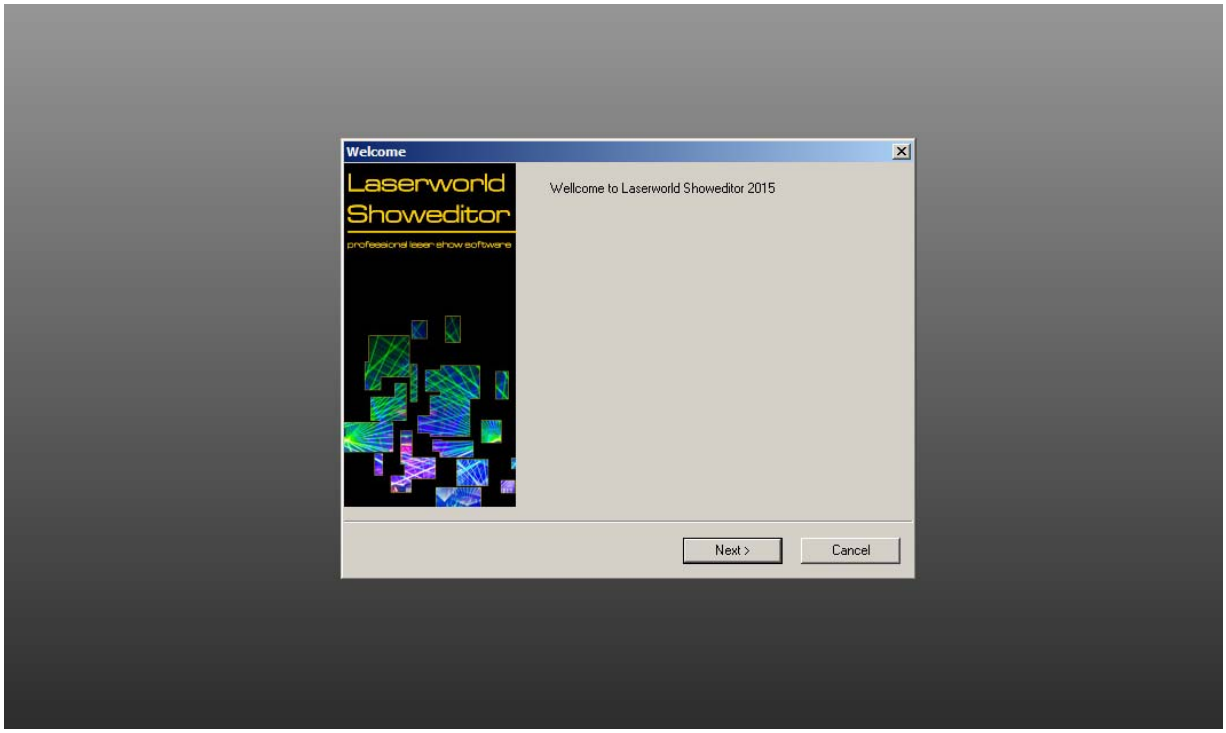


Fig. 1: Setup-Wizard of Laserworld Showeditor.

Now select the option "Remove Laserworld Showeditor" with a mouse click on the respective radio button. After confirmation via a click on "Finish", the old program will be removed. The *.ini-file remains in the Windows folder (operating system folder). Thus all settings will be conserved (serial number, hardware setup etc.).

Now the "update" can be carried out like a new installation. In the case of major installation issues, the old program folder and possibly the *.ini file should be removed prior to the new installation. This usually helps with fixing issues, however standard settings get lost hen deleting the *.ini file.

An exact location where the *.ini file is stored cannot be given, because since Windows 7 the location is dependent on the settings of the operating system. Thus the option to delete the old *.ini file via the program is added under Options → Reset. To determine the location of the file use Options → Others → Button "Show Software Paths". Normally it is not necessary to remove the *.ini file(s), except problems at software start-up or major installation issues occur.

2.3. Different Versions of Laserworld Showeditor on one PC

On the same PC different versions of Laserworld Showeditor can be installed at the same time. That is not given for the smaller bug-fixes, but applies to the major releases, like Showeditor 2011 and Showeditor 2015.
Each version has its own *.ini-file. This *.ini-file can be copied from one version to another, but it is not recommended due to potential incompatibilities.

2.4. DLL-Files and Error-Messages during Installation

In the case any error messages show up during the installation process, please have a closer look at our troubleshooting hints on
http://www.showeditor.com/troubleshooting

2.5. Laser Output Hardware (DAC)

Laserworld strongly recommends to only using the ShowNET interfaces with Laserworld Showeditor. The software is optimized for this DAC, and the licensing is also handled through it.

The interfaces (DAC) can be selected at Options → Hardware. In the drop down lists the connected interfaces can be selected. For special applications it is possible to select the same interface in two lists (matrix-match). This is especially useful, if two different settings (e.g. output options) will be applied. Output should only be made to one of the selected lists per interface, as otherwise the signals overlay and may lead to flickering output.

An example for such an application would be a mixed show with graphics and beams: For the graphics display, the output is set to fit to a screen, for the beams a setting with different parameters is chosen.

Another possible application could be the use of a playlist containing a mixture of different show types (e.g. graphics, 1 projector beam, 3 projector beam, 1+2 projector beam etc.). This kind of use is explained in the chapter "Playlist".

The different hardware interfaces can be custom named, to make them easier to identify. (e.g. "Main Projector", "Satellite 1", "Graphics Projector"…).

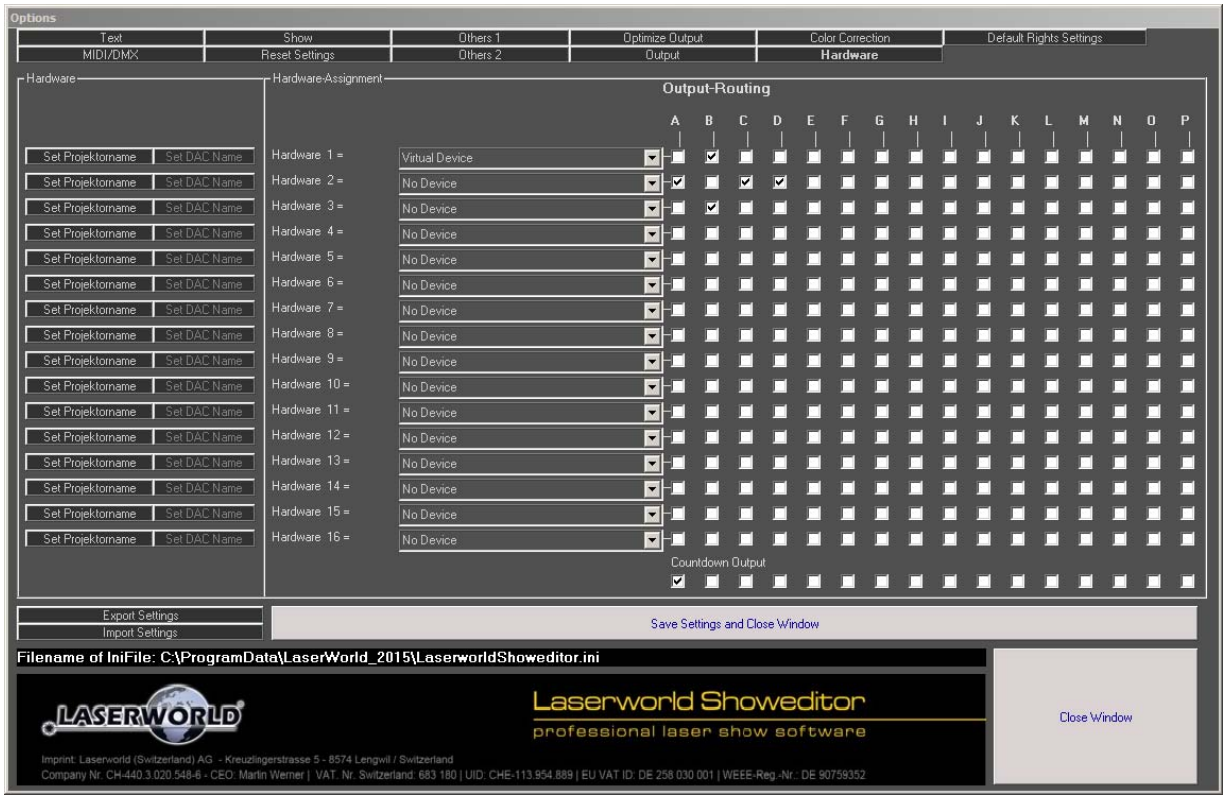


Fig. 2: Menu "Options/Hardware" for the selection of the hardware interfaces (DAC). Up to 16 interfaces can be used. The shown setup is useful for a simulation of a 1 + 2 projector show (typical setup).

2.5.1. Simulation and Virtual Device

For a simulation/visualization of the laser show, no real output hardware device is required. But it is essential, that the "Virtual Device" is assigned to the respective output channels in "Options → Hardware". If there is no real hardware device detected, at least one "Virtual Device" is selected as standard.
If the software detects any DAC, it will be automatically added to the list in the order they are detected. The automatically assigned positions can of course be changed according to user requirements.
Independent of the type of connected "hardware", the simulation can be started by opening the respective window (see Fig.9). In case only virtual devices are connected, the simulation window is opened automatically when clicking on "Laser ON".
The simulation of course also works with real hardware interfaces connected, however only visualization or real laser output can run – they cannot both be run at the same time.

To start the simulation, click on the "Simulation" button. A window opens that displays the actually selected figure(s).
The window title bar shows the number of points currently shown. This can help to flicker-optimize the output of the laser projector(s) used.

The simulation must be started prior to starting the show. The simulation window will automatically be attached to the top layer and thus stays in the foreground.

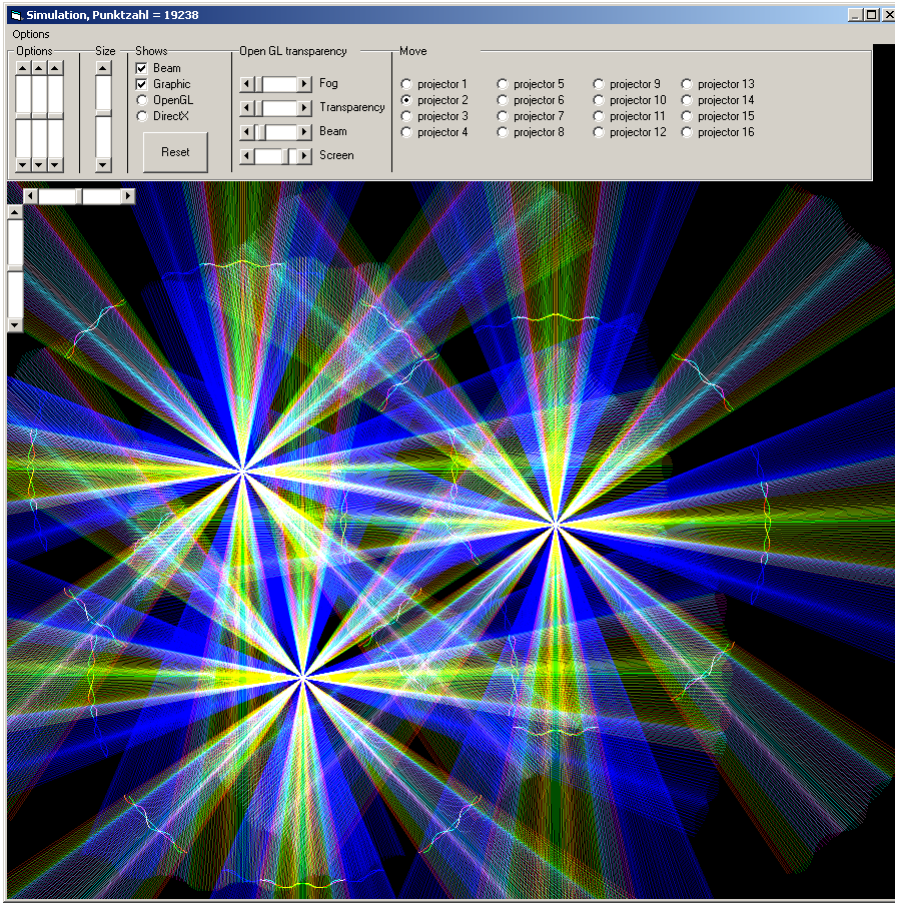


Fig. 3: Simulation of figures and laser-shows. Use right mouse button to open the setup dialog (above).

The simulation uses Direct-X 8.0 (or newer) or OpenGL. With Direct-X, the simulation works quicker, but is not as accurate. It is possible to simulate beam shows as well as graphics shows. Also a combination of beam and graphic is possible (like used in Fig.5).

Up to sixteen simulated projectors are possible. To open the dialog to adjust the simulation, click **the right mouse button** in the simulation window or use the menu "Options". A second right mouse button click will close the dialog. A click and hold on the center position of the selected projector allows to move it's position. The selection of a projector is done with the radio buttons on the right side of the dialog. On closing the window, the settings are stored to the *.ini-file.

The Fig.5 shows an example for a simulation setup with 1 plus 2x2 projectors (one main projector and two satellite pairs).

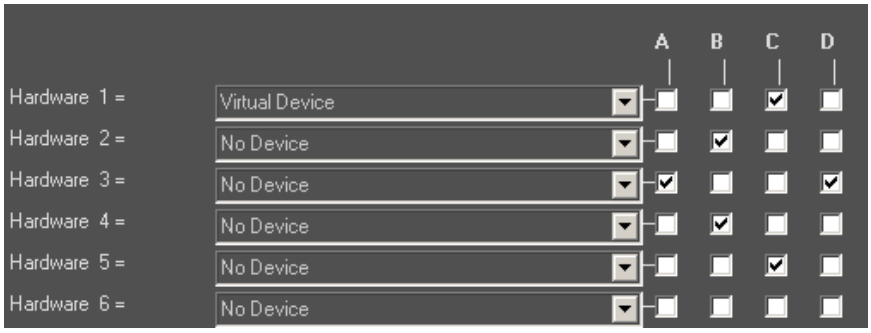


Fig. 4: Simulation with virtual devices.

Hint: It is also possible to start Laserworld Showeditor by double-click on a Showeditor *.ini file. So it may make sense to create a separate *.ini file for the settings of the simulation (virtual devices, positions of projectors, movements, etc.) and to export these settings to e.g. "simulation.ini". This way several *.ini files could be saved with different simulation settings. Simulations with the respective settings then can simply be started with a double click on the corresponding *.ini file.

Troubleshooting – Simulation is not working or not displaying correctly:

- If the simulation is displayed incorrectly or distorted, a click on the reset button may fix the display error.
- After a new installation of the software, the parameters for the simulation display may not 100% fit the requirements. Please use the reset button to fix this issue.
- If the color correction setup for the hardware is not done correctly or missing at all, the simulation can not visualize properly.
- The drivers for the graphics board need to be installed correctly. The simulation requires the OpenGL engine.
- During the laser show simulation, a laser output through DACs is not possible: The output is redirected to the simulation – including output parameters like x-axis mirroring or output size.

To end the simulation, just click on the cross in the upper right corner of the window. If you click on "Laser Off" (or you stop the show), the simulation window disappears, but will automatically reappear on restart of the output.

2.5.2. Friendly Names

Each DAC interface can be named individually. The name can be set in the hardware options (Options → Hardware) with click on the button "**Set Device Name**". This "Friendly Name" is stored on the DAC, so it shows when connecting it to a different computer too.

2.5.3. MIDI / DMX (Hardware and Driver)

The setup of the MIDI and DMX-hardware is done in the dialog Options→MIDI/DMX (Fig.6)

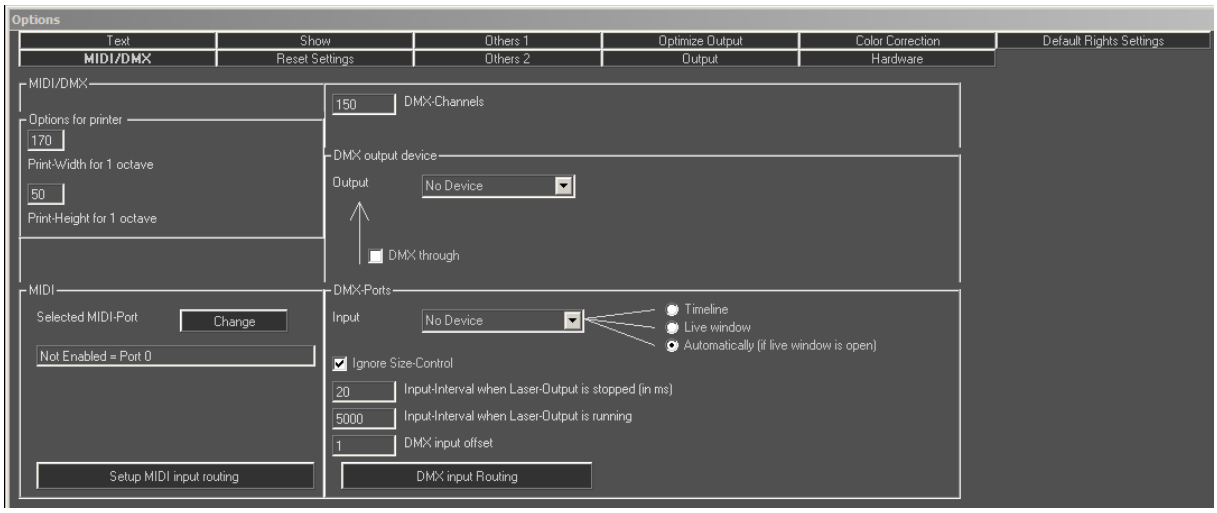


Fig. 5: Menu Options/MIDI/DMX: Selection of DMX-ports for input and output, selection of MIDI-device and setup of printer.

***Fig.6:** Menu Options/MIDI/DMX: Selection of DMX-ports for input and output, selection of MIDI-device and setup of printer.*

Different output interfaces can be assigned for DMX input and DMX output. The duration of the request-interval for the input can be adjusted (dependent on the laser output).

2.5.4. DMX Settings

Laserworld Showeditor supports DMX input as well as DMX output. With DMX in it is possible to remote-control most features of the software with a DMX controller (or a DMX software). This is especially useful in Live-Mode, as real faders could be used for controlling the effects, brightness and speed assigned to the patterns.
DMX out can be used for controlling DMX fixtures of any type, e.g. moving lights, pyrotechnical effects or fog machines.

For using the DMX features of the ShowNET interface, it is necessary to connect the DMX-Adapter to the ILDA line. The DMX Adapter can be purchased through Laserworld or their distribution partners.

2.5.5. MIDI Settings

Each installed MIDI-port on the PC should be automatically recognized by Laserworld Showeditor, including virtual ones. MIDI can be used to control the Live Window, the Timeline as well as the playlist. It is especially useful for recording a show in the timeline window, e.g. can figures be assigned by "playing" on a MIDI keyboard.

MIDI ports must be assigned manually before they can be used.
Laserworld offers several MIDI presets for a selection of MIDI devices; those configurations can be downloaded in the download section on http://www.showeditor.com

A MIDI-port can be selected at Options→MIDI-DMX-Printer (Fig.6), then "Change". A dialog for selecting the desired MIDI-port opens. Only the MIDI-IN-port is used! In many cases the MIDI routing must be adapted to the very device in use.

2.6. Routing of Hardware-Output

The routing of the hardware output is very simple but nevertheless incredibly flexible and powerful. Up to **sixteen** different interfaces can be assigned.

The routing allows for a matrix setup:
Each single route transmits the data-stream of the four sequencer-pages (A, B, C and D with each 3 figure-tracks and their effect-sub-tracks) of the timeline editor to the assigned DAC interface (Fig.7 and 8).

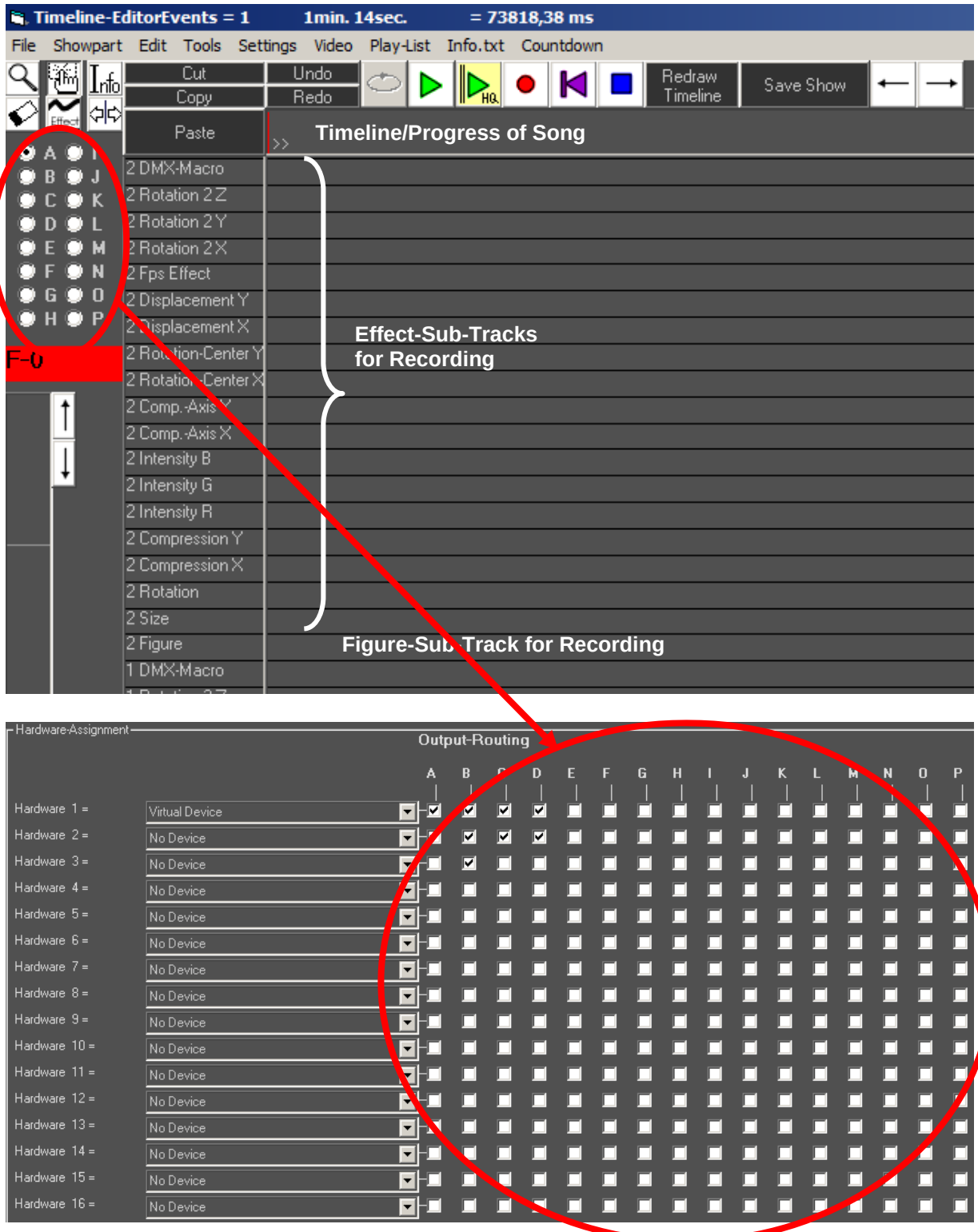
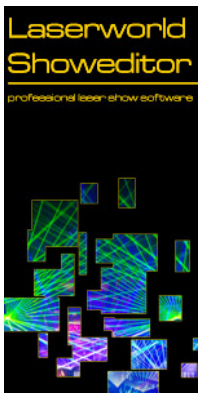


Fig. 6 (above): Timeline: Pages A–P (red circle) with each 3 figure-tracks and their effect-sub-tracks. These pages are assigned to the hardware-output-routing for up to sixteen DAC (red arrow).

(below): Options/Hardware: Output routing of pages A-P (see Fig.7; with each 3 figure-tracks and their effect-sub-tracks) to the hardware with up to sixteen DAC.

2.7. Starting the Program



To start the program, just click on its icon (small pictures) on your computer-screen, which the installation has generated on the desktop automatically. After the start of the program, you should see the main-window on your screen like shown in the picture below.

On startup of Showeditor, a window opens that allows for selecting the operation mode of Showeditor. No matter which option is chosen, it is possible to seamlessly switch between the modes directly from the user interface later.

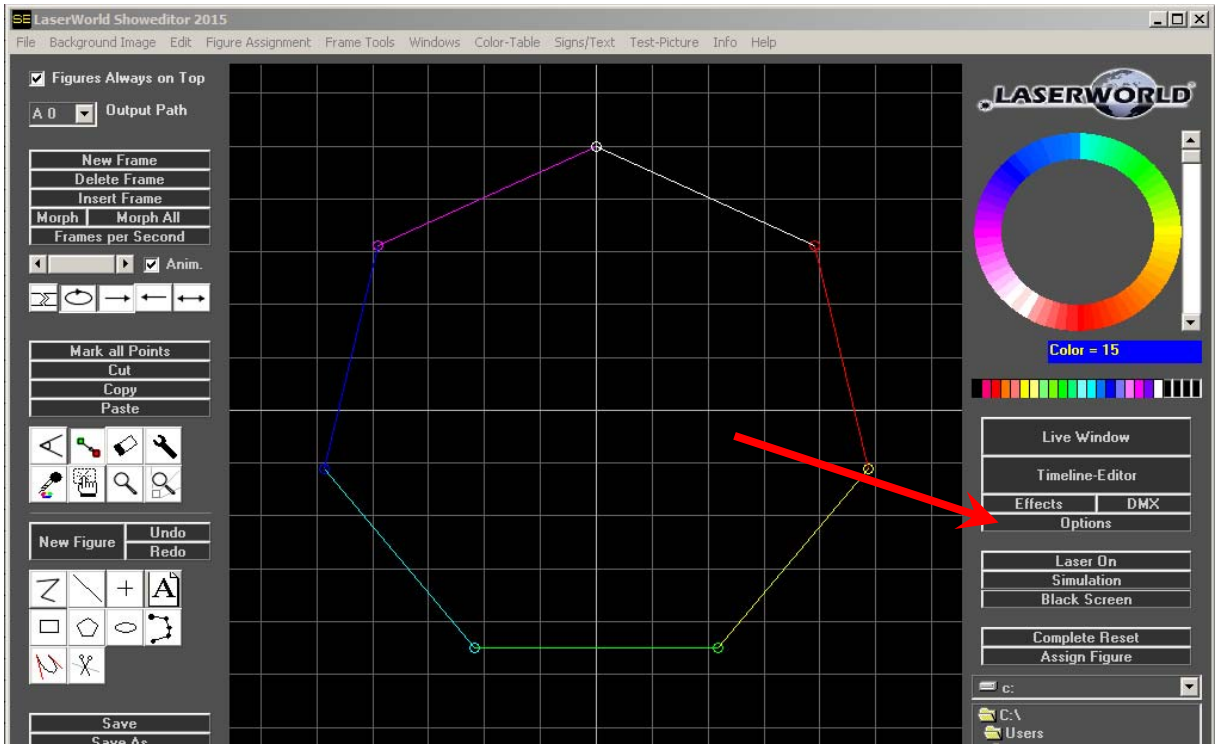


Fig. 7: Main window of Laserworld Showeditor. Click on Options for hardware setup (see red arrow)!

Laserworld Showeditor can also start through a double click on files assigned to Laserworld Showeditor (*.ini or *.shw). Remember that this only works, if the very file resides in a folder path that does not have any spaces in it's name. Please use underscores instead. Showeditor cannot handle spaces in folder and file names properly due to technical restrictions.

2.8. Initial Settings

On first start of Laserworld Showeditor it is suggested to adapt the Settings to the very needs: Language, hardware, output behaviour and many more features can be defined there.

Usually any supported hardware interface that is connected to the computer is automatically detected by the Showeditor software. To make sure everything is connected and assigned correctly, please verify the settings.

Important information on Settings and their effect:
Changes to any parameter have immediate effect. To preserve the settings even after a restart of Showeditor, a click on "Save Settings and Close Window" writes them to the startup configuration file.

2.8.1. Setting "Others":

Settings can be accessed in the *Options* menu, then change to the tab *Others.* If you require to changing the interface language of Laserworld Showeditor, this can be done here (e.g. English, see Fig.10).

If a correctly licensed ShowNET interface is detected, the corresponding serial number of this interface is shown here.

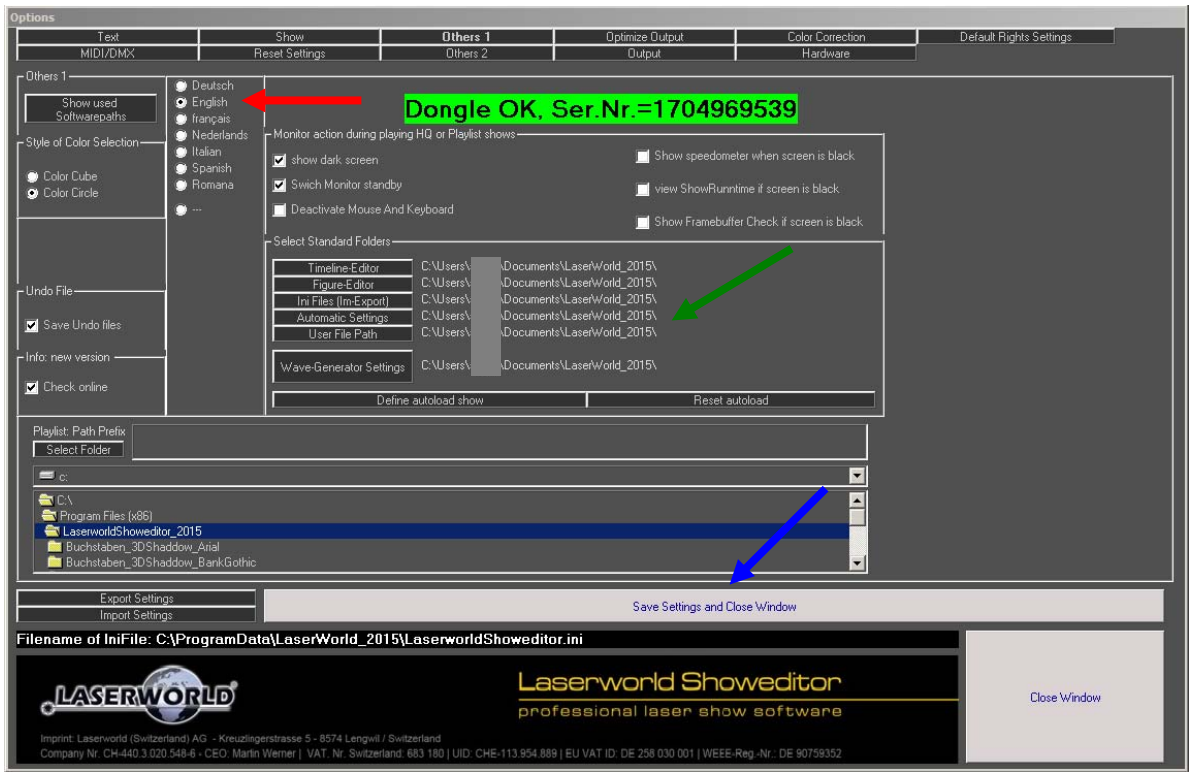


Fig. 8: Menu: Options. Language selection, licensing information

In the lower part of this settings tab the standard paths of Showeditor are defined. The standard settings are fine in most cases.

2.8.2. Setting "Hardware":

Change to the tab *Hardware*. Hardware devices are detected automatically, but can be custom assigned per channel in this tab.
Up to 16 Digital-Analogue-Converters are supported by the software, so the very hardware device can be routed to the respective output channels.

It is also possible to assign a "Virtual Device" to the hardware channels. This is required if no real hardware output interface is connected to the computer or if more than the connected hardware interfaces shall be used for programming and 3D preview.
If Laserworld Showeditor is run in Freeware/Demo Mode, only one hardware channel can be assigned and only the virtual device can be chosen.

The Output Routing describes which hardware interface should output which programmed track, so it's also possible to route several tracks to one hardware interface or vice versa.

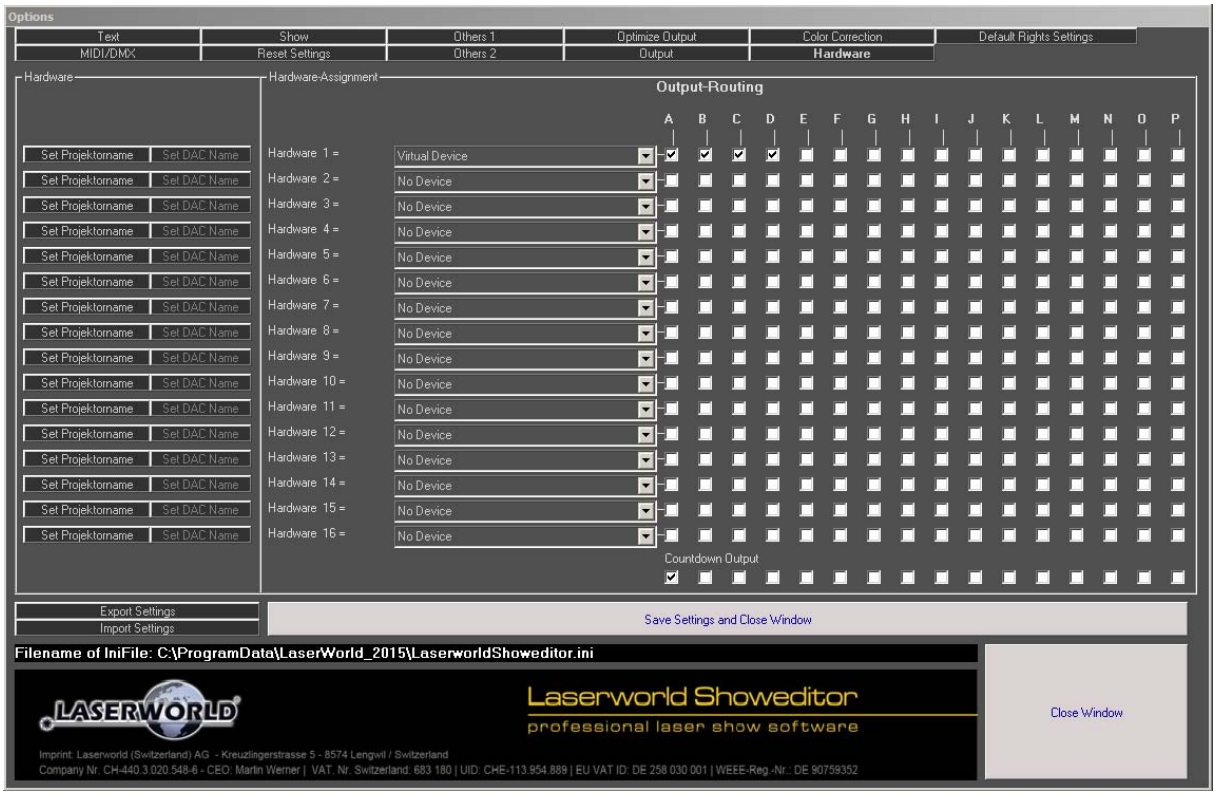


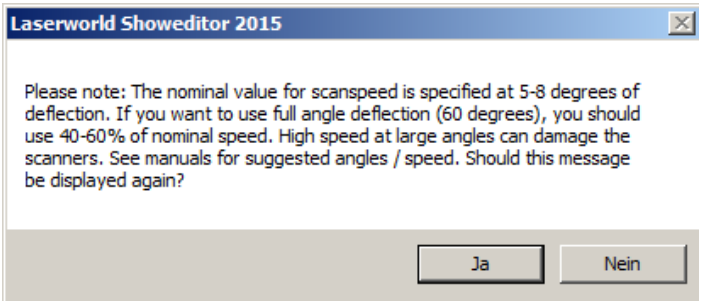
Fig. 9: Options: Hardware Output Routing

2.8.3. Optimize Output

The tab *Optimize Output* allows for configuring the output settings of the very hardware output device. These settings are important as they impact the output quality. Settings that do not fit the scanners used in the very laser projector may lead to damage of these scanners, so always read the user manual of the show laser system you're using at the respective hardware interface first!

Most important is to set the PPS-rate (PPS is an acronym for points per second) for the respective Galvo system/scanner-system used in the laser system that is controlled with the very hardware interface.
To get started it is recommended to set this value to 2/3 of the maximum given PPS rate of the Galvo system/scanner system (see user manual of the show laser system).
Setting the scan rate too high may damage the scanners, so extra care needs to be taken when setting this.

If scan speed settings of more than 25'000pps are selected, a warning message shows up, explaining that this may damage scanners if not used with precaution. You can stop this dialog box from opening up again by clicking "No" ("Nein"):



INFOBOX:
It is strongly recommended to not daisy-chain an ILDA signal line to connect laser systems with different scanner systems. Either the slower scanner system is overdriven when optimizing settings to the faster one, or the faster one can only run at the speed of the slower one when settings are optimized for this.
Use two different hardware interfaces instead and set the scanner settings per interface.

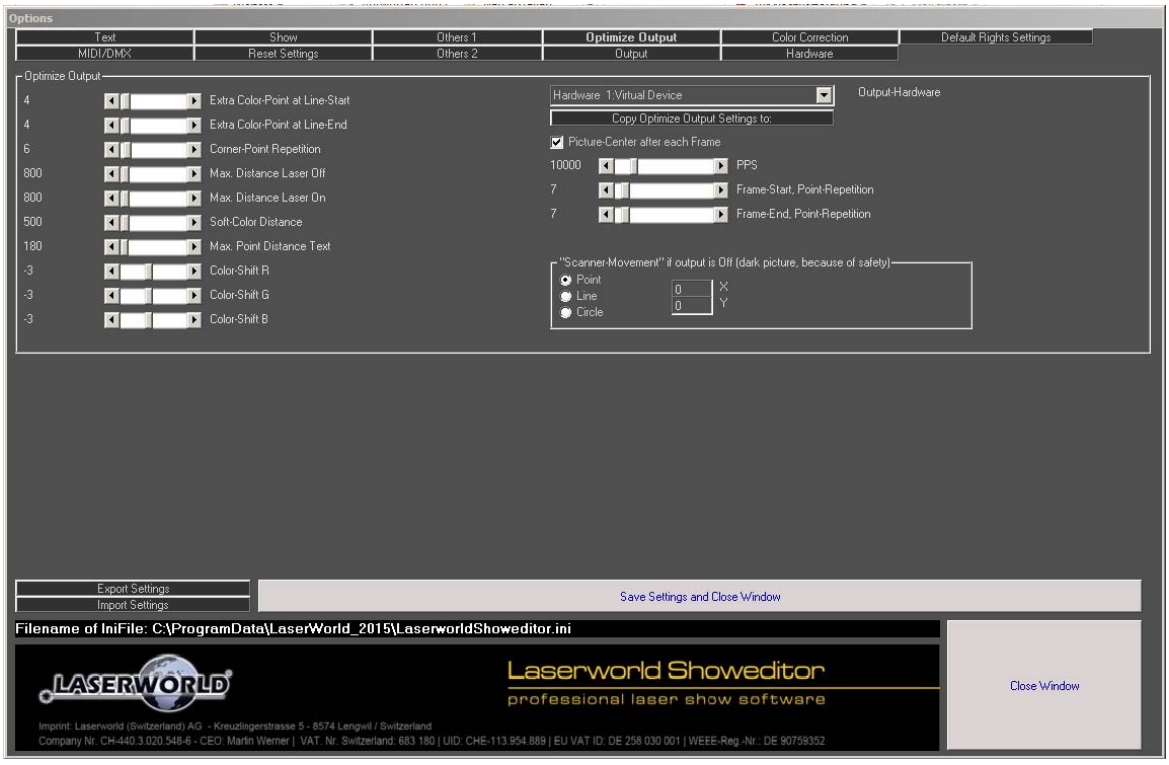


Fig. 10: Tab Optimize Output. Setting of hardware interface parameters

After having set the scan speed, different adaption to the general scanner behaviour can be made. It is suggested to project a test pattern while adjusting these fine tuning settings:

The left column of faders in this Tab is especially suited for fine tuning of the output. It is recommended to follow the "Scanner Optimization" guide when applying settings here. See chapter 8.8 for details.

A reset of each fader position can be done by double-clicking on the explanatory text next to it.

2.8.4. Save your settings

Changes to any parameter have immediate effect. To preserve the settings even after a restart of Showeditor, a click on "Save Settings and Close Window" writes them to the startup configuration file.

3. First Steps / Quick Start

For many applications it is not necessary to work through the whole manual for getting started. The following explanations only give a brief overview of how basic features can be accessed and run. However, it's of course recommended to read the manual in whole, as there are very many features in Laserworld Showeditor.

Tutorial videos are available as well:
http://www.showeditor.com/tutorial-videos

Laserworld Showeditor offers two different operation modes: The "Live Show" mode, which is usually suitable for accompanying live DJ Sets or live music, and the "Timeline Show" mode, which allows for pre-programming music/video synchronized laser shows and then playback them later.
This second operation mode is explained first:

3.1. Playback a pre-programmed music-synchronous laser show

To playback an existing show, the show file needs to be loaded. Showeditor Laser shows are stored in a folder, whereas each show resides in its own folder. This folder contains the show data (figures, assignments, etc.) and the corresponding sound file.

To get started it is necessary to copy the whole show to a folder on the hard disc. The corresponding sound file should be placed in the same folder. Especially when show and sound file are acquired separately, this is an important step to be done!

Open Laserworld Showeditor and switch to the Timeline window. Then click *File -> Open Laser* Show. The dialog box allows for selecting the show file, it should have the extension *.shw. If all necessary files are present (and if you have the rights to play the show), the show will be loaded and is ready to be played.

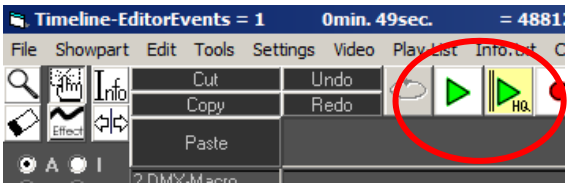


Fig. 11: Playback shows

To play the show, two options can be chosen:

- **Play button**:

The laser will be switched on; the show is running, starting from the current position. More information to this is given below. This feature is mainly useful when editing the show.

- **Play HQ:**

This is the best option to choose if the show should just be played. It's recommended to use the Play-HQ option for any real playback output.
The Play-HQ option is more performant and starts the show from the very beginning. All features are re-initiated before the show start, so the output quality is best.
By right-clicking on the Play-HQ button it's also possible to set a show start delay.

Audio file of the show:
If the audio file is present in the show folder BUT is not recognized by the program correctly, a message is displayed ("Audio file not present"). In most cases this indicates that the file name of the audio file is different to the one the show was programmed with initially. To correct this, go to *Options -> Show -> Select new Audio file* and choose the correct one.

3.2. Create Own Figures and Shows

IMPORTANT! When a new figure is to be created, it is essential to ALWAYS click on "New Figure". Otherwise the figure created before will be overwritten!

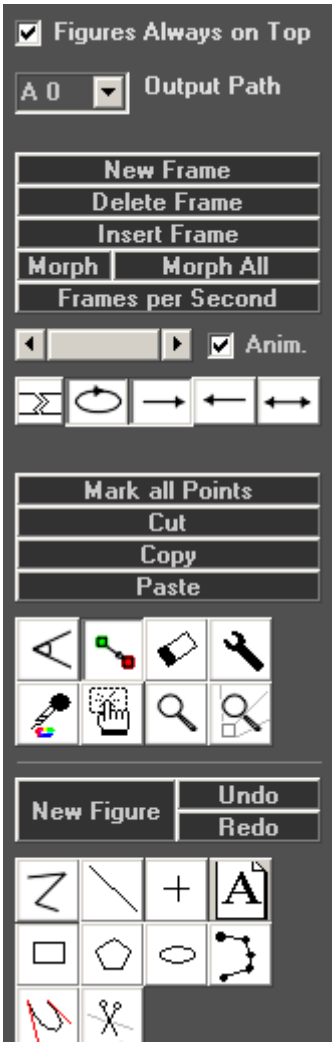


Fig. 12: Buttons for editing

Different tools for drawing a picture in the central drawing window are provided:

"**Poly-Line**"
Standard active is the Poly-Line tool. With **left mouse clicks** in the drawing area, **colored** points will be set; with the **right** mouse button **invisible** (blanked) points will be set.
The created forms are vector graphics. So if an object shall be created that cannot be drawn with one line, but is "separate" to other object, a blank path need to be created, meaning a path the scanners of the laser move but without laser output. Use the right mouse button to set one or more blank points to do so.
This mainly applies if using the Poly-Line tool. If other drawing tools are used, blank lines usually are added automatically.

With holding the mouse button, the poly-line shape draws an end-to-end line with different positions in between. This tool is used e.g. to draw bent laser planes.

"**Ellipse**" With this tool the "tunnel effect" is created. The circle or the ellipse, respectively, will be interpolated from a multi-cornered polygon. The number of points of the figure depends on its size. This impacts the "Morph" feature, so this must be kept in mind. The lines between the polygon points can be re-colored.

"**Point**" Drawing a point will create a still standing laser beam. Please use points very carefully! Point / "Hot Beams" are extremely dangerous, so use with care. Always respect your local laser safety regulations. Laserworld Showeditor automatically generates three points: Two invisible ones (blanked) and the one visible. With a right mouse click on the tool the number of repeated points per beam can be adjusted.

"**Rectangle**" This tool is used to create rectangular "tunnels" within the laser show. The four sides can be colored as desired.

. "**Polygon**" This tool is used to create polygon tunnels with plane sides. The number of corners can be changed with right mouse click on the tool. A polygon with very many corners will look like a circle. A polygon with four corners will display a rectangle; three corners display a triangle. The sides of the polygon can be colored separately.

"**Line**" This tool is used to create laser planes in your show. The line is generated with blanked points at start and end point.

"**Freehand**" This tool is used to draw freehand figures. Automatically blanked points at start and end will be set. Some parameters can be adjusted with right mouse click on the tool.

"**Text**" This tool is used to create texts. Please read the respective chapter below for more information.

"**Bezier Tool**" is used to create curves and Beziers. Please read the respective chapter in the main manual for more information.

The tools like Ellipse, Rectangle, Polygon and Freehand are very easy to use:

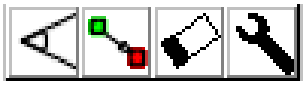
→ click the left mouse button at center-position → hold it
→ size the figure by dragging the mouse → release the mouse button

The handling of the Bezier tool is more complex: Two control lines are created. These lines define the resulting Bezier curve (see respective chapter for more explanations).

The desired **drawing color** is easily chosen by a click on the **color palette** in the right upper corner of the software. The 20 "brightest" colors are available in a palette, more can be chosen from the color wheel or color cube. The view of the color selection can be altered via *Options -> Others*. The display of the cube can be changed by a click on one of the three radio buttons. The depth of the cube can be selected by the scrollbar. By using this it is also possible to select darker (more greyish) colors, too. Colors from the cube or wheel can be applied to the palette by simple drag-and-drop.

By using the "**HAND**" feature, points can be marked and repositioned with **right click** and drag. To select several points of the figure, drag open a marking square with left mouse buttons. To mark additional points, hold the "Ctrl"-key while marking points. To select ALL points of a picture (frame), you can also use the *Edit -> Mark All Points*.

In some cases it may be necessary to deactivate the grid for selecting points, as some may not be reachable otherwise. To do so, enter the value "1" into the textbox for the adjustment of the grid.

The features  "**Rotate**", "**Change Color**", "**Delete**" and "**Optimize**" can be used similar. They immediately apply for the points marked.

The "**Magnifying Glass"** is used to magnify regions of the drawing window. Magnification can be done either by drag-zoom or use of the scroll wheel at the mouse. Left mouse click on the tool returns magnification to 100%. Right mouse clicks preserves the actual magnification settings.

All features are explained more in detail in the main manual.

Marked points can also be copied, cut and pasted – this works like in a normal text editor – shortcuts like "**Strg-C**" (copy), "**Strg-X**" (cut) and "**Strg-V**" (paste) do **NOT** work here, because they are used for the figure-to-key assignments.

In the case that a figure should consist of several single pictures (series of frames), which later can be displayed as an animated cartoon, a new empty frame (picture) via a click on "**New Frame**" must be created. Thus a new frame is generated after the existing ones. "**Add Frame**" will add an empty frame before the active frame.

The "Morph" is explained in the main manual.

A newly created figure can directly be visualized to the hardware (displayed by the laser projector) by a click on "**Laser On**", or visualized in the simulation window.

3.3. Show Folder / Save Figures

To use already existing figures/patterns/frames, they need to be saved to a physical folder on the hard disc. Even if new frames should be created, it makes sense to create a new show folder in the Windows Explorer first.
This folder holds all figures/patterns/frames and media files that belong to the very show. It is recommended to organize all folders in a suitable structure.
The folder tree shown bottom right in the figure editor window allows for selecting the right show folder. Whole shows can also be loaded through the menu *File -> Open Lasershow*

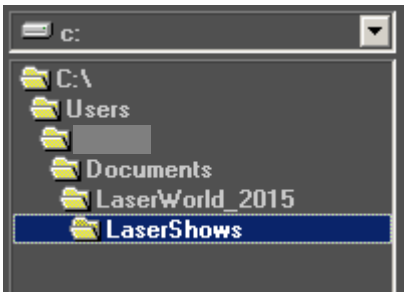


Fig. 13: Figure Editor, folder window: Structure of folders (example)

Any newly created figure is saved to the active folder when hitting "**Save**" or "**Save As**". If the figure has not yet been saved, a dialog (Fig.16) for entering the name opens up.

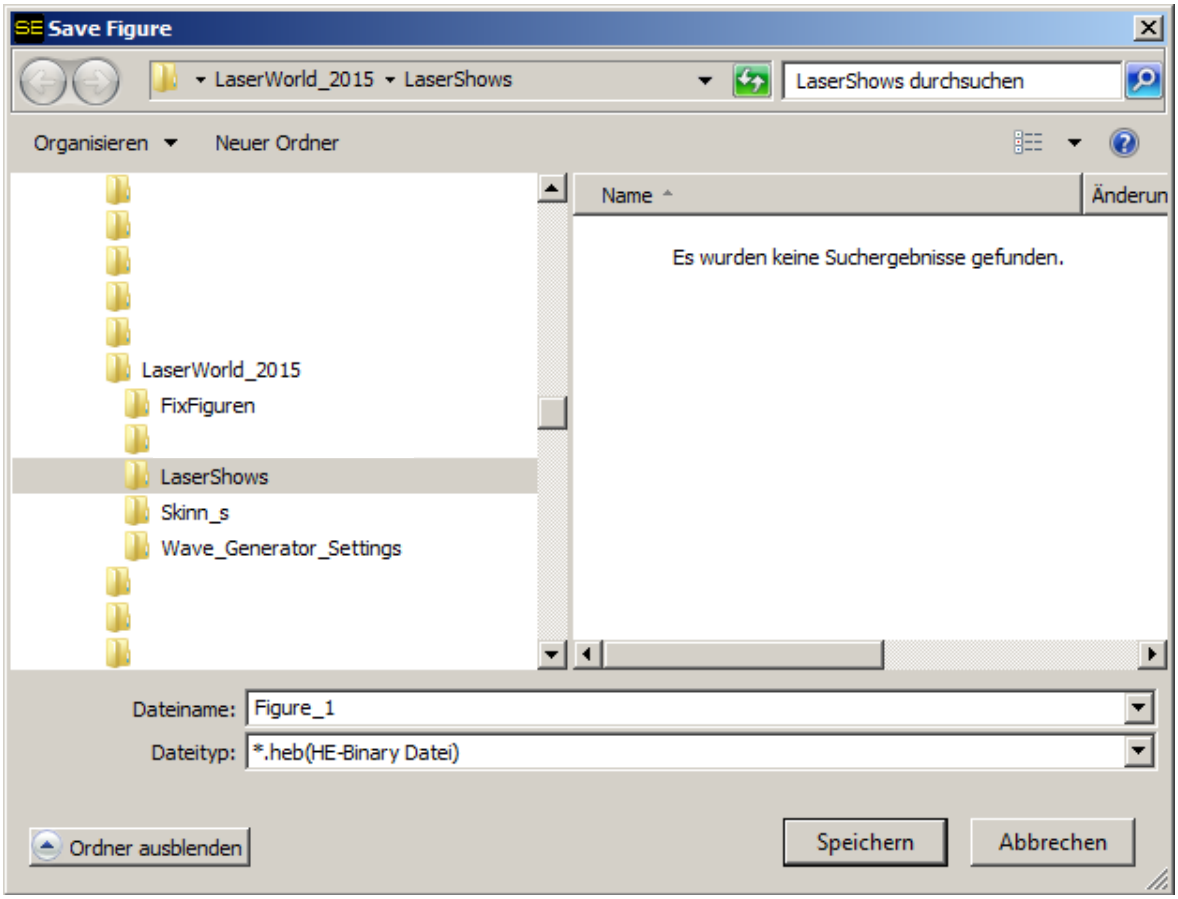


Fig. 14: "Save Figure" – dialog: opens on first saving of a figure. It's also possible to create a new folder

Already existing figures will be overwritten **without** any warning, so be careful.

On saving single figures, the show file itself is not generated. On creating a new show in the Timeline editor, a new show is created and can then be saved. More information on this is in the main manual.

The button "**Save as**" can be used to save an already existing figure (perhaps modified) a second time with a different file name or to save it to another folder.

The button "**Save all**" is used to save all figures present in the active show folder. This option allows for making changes to several figures (e.g. changes done on the effects), and then save them all at once.

3.4. Assignment of Figures to Keys

After the creation of the figures they have to be assigned to a key of the PC-keyboard or MIDI-keyboard respectively. This is required as the Live Window as well as the Timeline window requires the figures being assigned to keys. The same applies for the DMX and MIDI window.
The process of creating a show in the Timeline editor requires the figures to be called by pushing the respective keys when recording the show. Afterwards the recorded draft can be edited and rearranged, but the initial process of assigning the figures to the timeline requires the figures to be assigned to keys.

There are several ways of assigning figures to keys:

3.4.1. Manual Assignment

To assign a figure to a key of the PC or the MIDI keyboard it has to be selected: Right-click on its icon in the Figure Table (Fig.17). Then click "Assign Figure". A message will be displayed until a key was pressed. If this key is already assigned to another figure, a warning will be displayed.

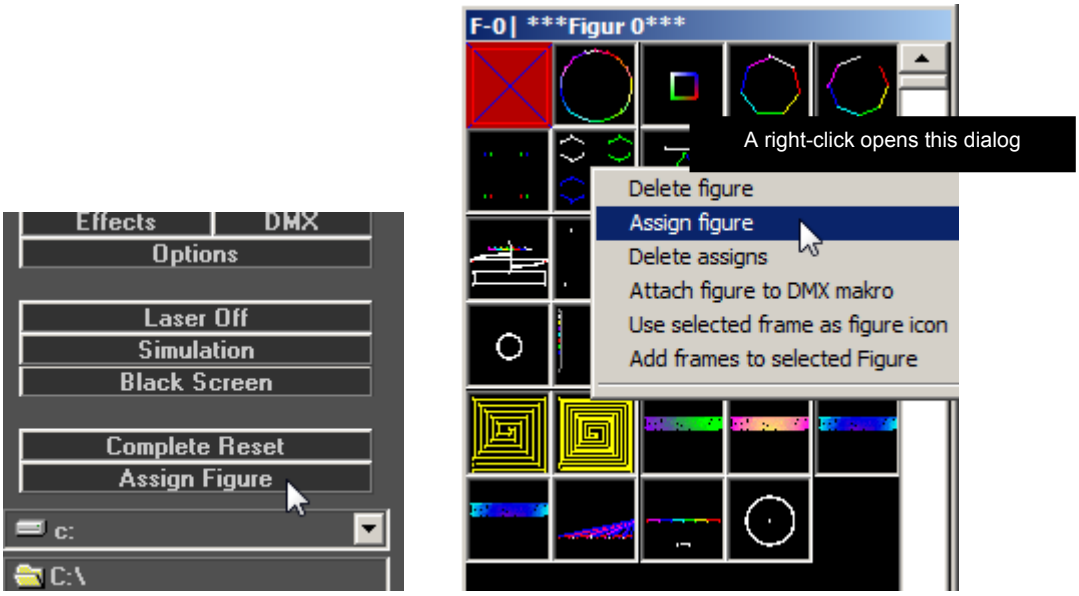


Fig. 15: Assignment of keys to figures. Right-click on an icon or click on "Assign Figure" (red arrows). The selected figure has a red square.

3.4.2. Assignment by Drag and Drop to the Live Window

This way of assignment is quite easy, because drag-and-drop can be used.
First open the Live Window (Fig.18). It is possible to drag-and-drop the very figures to the key-spaces in the live window, assigning the figure to that key this way.

The assignment of figures to keys is saved automatically to a file named "key.ord" within the same folder as the figures. Changes of the assignments are possible by simple re-assignment. Duplicate assignments are possible (several keys for the same figure, but not the other way round). To call several figures with one key, "Showparts" can be used (more about this in the main manual).

When overwriting a figure with another one in the show folder (the other figure is given the same name within the Windows Explorer), the key assignment will be preserved. The system links key and figure through the figure name.

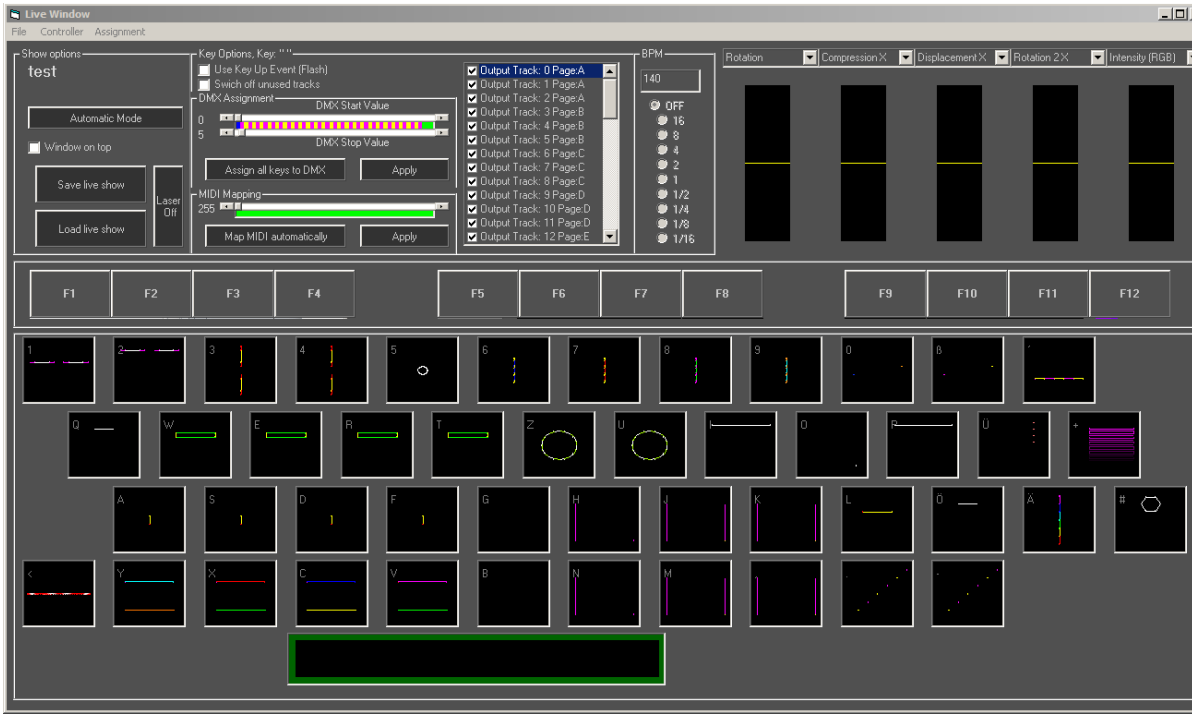


Fig. 16: Key assignment within the Live Window.

It is also possible to do the assignments automatically by using the menu *Figure Assignment -> Assign figures automatically* in the Figure Editor.

The already made assignments can be viewed or printed by a click on the respective item within the menu *Figure Assignment* in the Figure Editor.

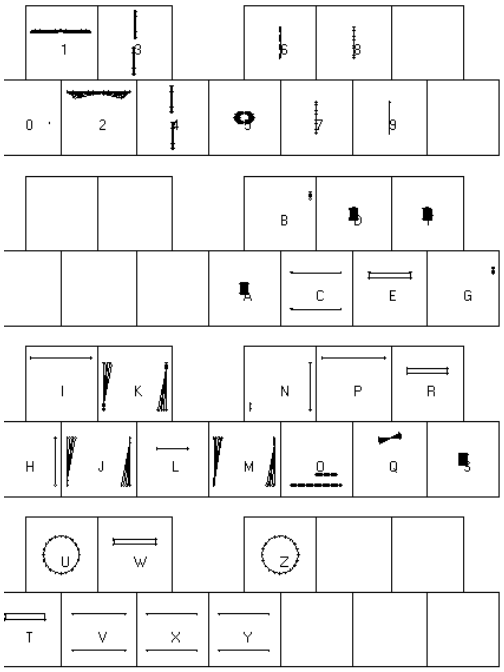


Fig. 17: Assignment tables for computer- or MIDI-keyboards

3.5. Use of Function Keys (F0 to F12)

This is important!

To use figures within a show, they have to be assigned to a key before. Laserworld Showeditor figures are always triggered by pressing keys. "Keys" can also be Timeline feedback, MIDI, DMX, etc..

All keys can be used in combination with the function ("F") keys. The keys F1 to F12 can be used, but the software also can respond to F0, which means "NO function key used".

The behaviour of the function keys is dependent on the setting of the feature "Use Key up event → Figure off" in the menu *Settings* of the Timeline window.

If the option is not set (default setting), the predefined F-page is selected by pushing the respective F-key. All program windows will show the selected F-page. By pushing the active F-key again, the selection is cancelled and the F0-page is selected.

If the option "Use Key up event → Figure off" is chosen, then the respective F-key must be pushed and held during pushing the figure key!

Try to avoid using the F10 key, as native Microsoft Windows features may be assigned to this (depending on the Windows version in use).

3.6. Create Music Synchronous Shows

Fig. 18: Main System Buttons in the right column of the Figure Editor

After all figures are created and assigned to the keys, the creation of a show can begin.

To get started select "Timeline-Editor" (Fig.20) or open the Timeline-Editor via the menu *Windows*.

First step is to select *File -> Create New Show* (see Fig.21).
Second, an audio file has to be assigned for the show. A dialog will show up asking to choose a supported media file. If a *.wav-file is used, a volume preview is generated in the timeline.

After the audio file has been selected is correct implementation can be tested with a click on "Play" (button with a green arrow).

The Show programming can now begin.
Two different methods can be used:

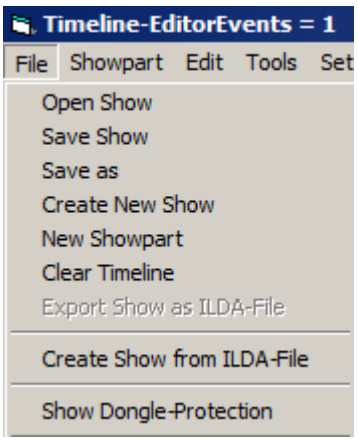


Fig. 19: Menu "File" of the Timeline Editor.

Method 1 – Drag and Drop:
The figures in the figure table are dragged to the very timeline position with the mouse. The difficult thing with doing this is to arrange the figures

synchronous to the sound file.
As the Timeline consists of many different rows – most of them used for effects – it's important to understand that the figures must be placed on the line named "figure". The featured "Grid" and "Zoom" help with proper music synchronous positioning of the figures.

It is possible to put figures to several figure tracks per output channel.

With using the "Effect Tool" (see red arrow in next Fig.22) it is possible to change the effect values and create additional figure animations.
After a click on "Effect Tool", the area the effects shall be applied to must be marked. When having marked the area, a dialog box shows up (Fig. 22).
This dialog allows for drawing the effects behaviour. This method is not really accurate, but does the job in many cases.

Detailed information on effects and how to use them is given in the main manual.

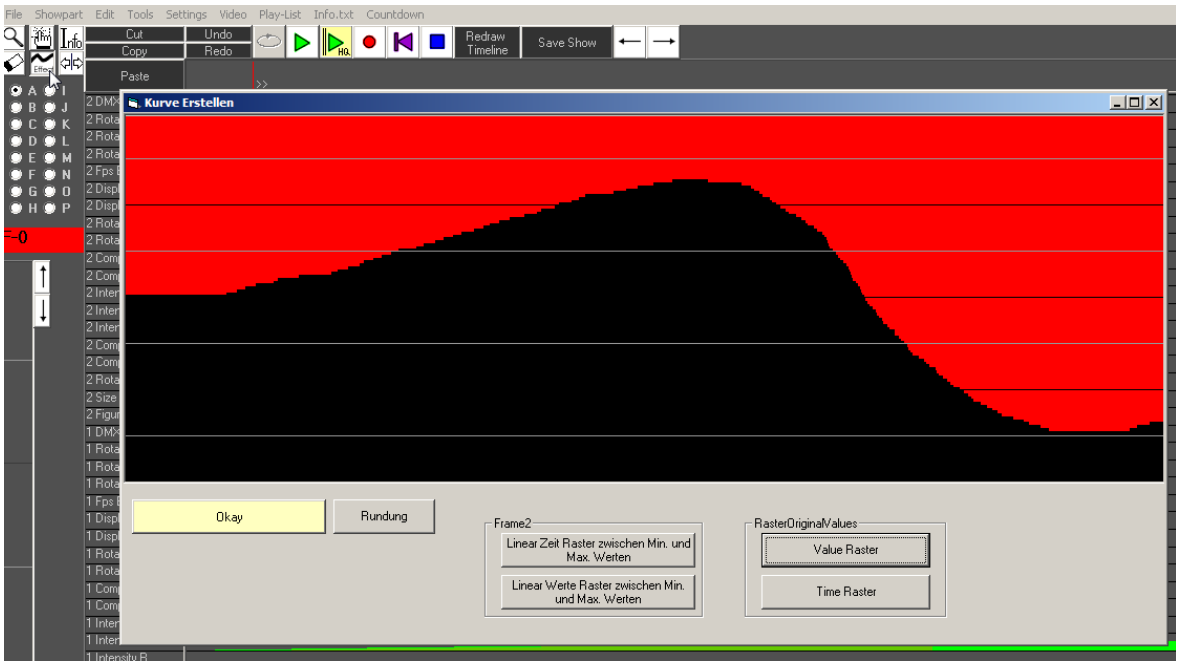


Fig. 20: Dialog of the "Effect-Tool" (Timeline-Editor).

Method 2 – Live Recording (recommended):
Live recording, like it is done with a MIDI-sequencer or multi-track-recorder, is the recommended method of programming a laser show with Laserworld Showeditor.

Figures and Effects can be recorded by marking the very track-line, then press "record" (the button with the red dot), after that play the keys with the appropriate figure / effects level.
Several tracks can be marked by holding the Ctrl key while selecting the desired tracks. Multi-Track recording is only possible for effects, not for figures (for obvious reasons).

Fig. 21: "Direct-recording" of laser-shows. Button with red circle: Start of recording

Two recording modes for figures are possible: To only record figure start points but then let run until the next figure starts or the Space-bar is pressed, use the standard settings. If the figure should only be recorded as long as the appropriate key is pressed, change *Use key-up event => figure off* in the *Settings.*

The position on the timeline for the start of the recording can be set by a click at the very position in the Timeline bar (right of the "Paste" button).
If the music source file is in *.wav file format, the volume level of the music is displayed there too.

During the programming process it is recommended to save the laser show from time to time. This can be done at *File -> Save Show*. If the show hasn't been given a name yet, a dialog box for entering the name of the show opens up.

Hint: The software permanently writes backup files, so in case of an abnormal program termination it is possible in many cases that the previous state of a show can be recovered. However, this should not be relied on, so frequent saving is highly recommended.

3.7. Make a Live Laser Show

Laserworld Showeditor has an implemented Live Laser Show window.
When doing a live laser show, the figures assigned to keys can be triggered by pressing the respective key on the keyboard, DMX-controller or MIDI controller (depending on the setup). The use of a touch screen monitor is also possible.

3.7.1. Load figure set

Before a live laser show can be run, either an existing show must be loaded to the Figure Editor already, or an existing Live Show must be loaded. As standard Laserworld Showeditor comes with a basic set of live show patterns, however own pattern sets can be created.
A Live Show basically consists of a set of figures which are assigned to certain keys.
Like with Timeline shows, all contents of a live show need to be stored in one folder (figure files, key set, etc.). Live shows have the file extension *.live.

When a live show was successfully loaded, the live window looks similar to this – showing previews of the very figures at their respective position on the keyboard (Figure 24).

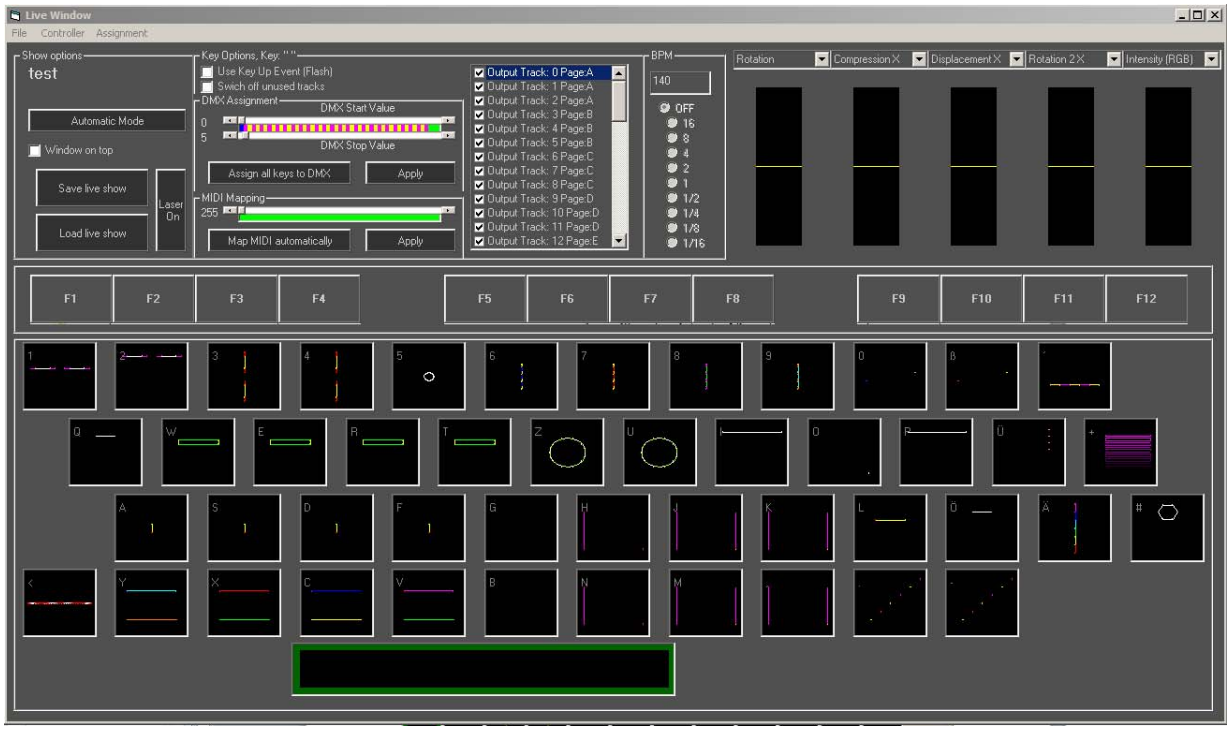


Fig. 22: Live Window after loading a live show

3.7.2. Faders/Sliders:

In the upper right corner of the Live Window, several faders are available. These faders can be assigned to different effects.
They can either be dragged with the mouse or assigned to a DMX controller or MIDI controller.
For easy show operation it is recommended to use a DMX or MIDI controller for the fader control, as it allows for quicker reaction and smoother operation as with the normal mouse.

3.7.3. Starting the live show:

The live show starts with a click on "Laser ON". As soon as the laser output is activated this way, the show can be played. The individual figures can be selected by:

a) Mouse click (left button)
b) Pushing the respective key on the keyboard
c) Touchscreen
d) DMX
e) MIDI

The active selected figure can be identified by its green frame (see Fig.24, key "Spacebar"). The "Space" key switches off any output.

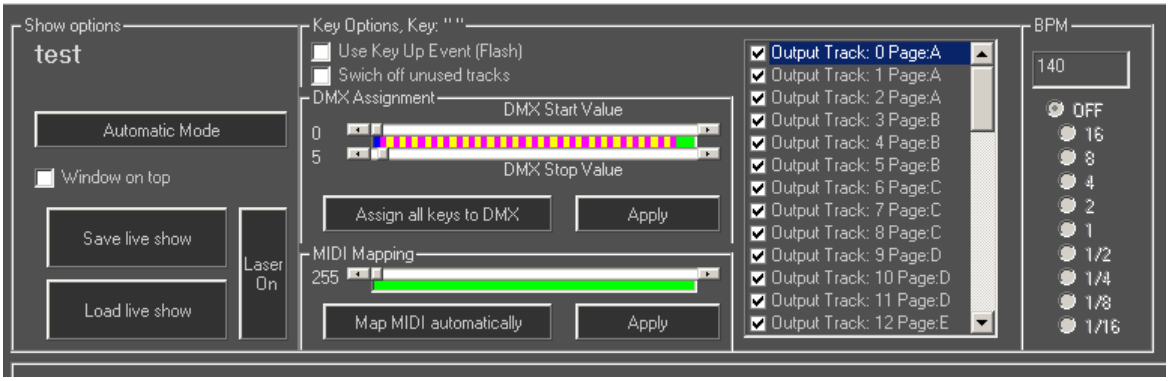


Fig. 23: Detail view of the Live Window after having loaded a live show

3.7.4. Setup options per key

Individual settings can be assigned per key. This are some examples:

"Use Key Up Event (Flash)": Only plays the figure as long as the corresponding key is pressed. Output stops, as soon as the key is released, when this option is active.

"Switch off unused tracks": Switches off all other figures that output on other channels, if they are different from the figure selected.

Output Track 0 to 47: Specifies which output channel the very figure shall be routed to.

Selection of effects 0 to 5 (sliders): The effects that should be predefined per slider can be assigned per key, so the layout of the sliders can change depending on the active key.

DMX assignment: Each key can be assigned to a specific DMX value. Consider the DMX input mapping for doing this. The first DMX channel is set for selecting the figures per default. DMX control requires prior DMX assignment, otherwise it will not work.

MIDI assignment: The figures and faders can also be triggered by MIDI. Laserworld Showeditor already comes with some standard MIDI setups for common controllers. Of course, custom MIDI settings can be created as well.

3.7.5. Summary of "routings", "mappings" and "assignments":

Assignment of keys:
Figures are assigned to keys. Pushing the assigned key calls the figure for output.

MIDI or DMX assignment:
This assignment determines which MIDI controller value or DMX channel calls which figure.

Routing (Output routing):
This assignment determines which track pages A-P (each with three output tracks) is routed to which hardware interface (DAC).

All changes have to be saved! If you want to use your settings (new show) again, then click now on "**Save Live Show**".

All features (especially MIDI) will be explained in detail in the Main Manual.

3.7.6. Live Show - Get started quickly

The creation of a live show is similar to the creation of a "normal" laser show.
These are the main steps to follow:

1) Make a new show folder on your hard disk

2) Create figures with the Figure Editor and save them to this folder

3) Assign figures to keys (best is to do it by Drag and Drop into the Live Window)

4) Verify the settings for EACH key and eventually correct them

5) Save the new live show by a click on "Save Live Show".

4. The Windows of Laserworld Showeditor

Laserworld Showeditor uses several windows to provide different workspaces for certain applications.
This multi-window configuration makes it easy to use many features at the same time with a multi monitor setup. For best programming experience it is recommended to use a Two- or Three-Monitor setup.

The minimum requirements for screen resolution are 1152 x 768 pixels. However it's recommended to use a bigger screen resolution for professional timeline programming. Live Shows usually don't require a bigger screen; also a single monitor is completely sufficient to play a live laser show.

Laserworld Showeditor saves window positions on program exit. If this causes any problem, e.g. when switching between different monitor setups, this can be reset: *Options -> Reset Settings -> Reset only Window Positions*

4.1. The Figure Editor

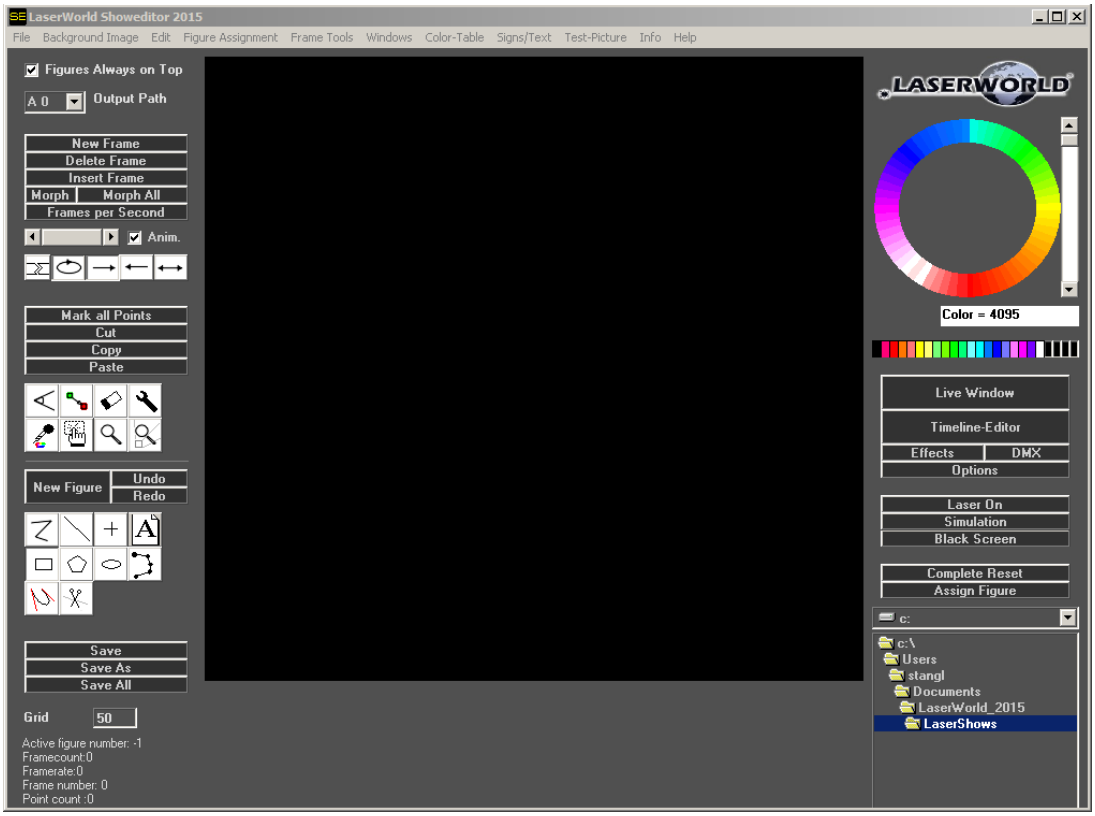


Fig. 24: The Figure Editor

The Figure Editor window is the core Showeditor window. There figures are created and managed. All other windows can be accessed from the Figure Editor window.

4.2. The Options window

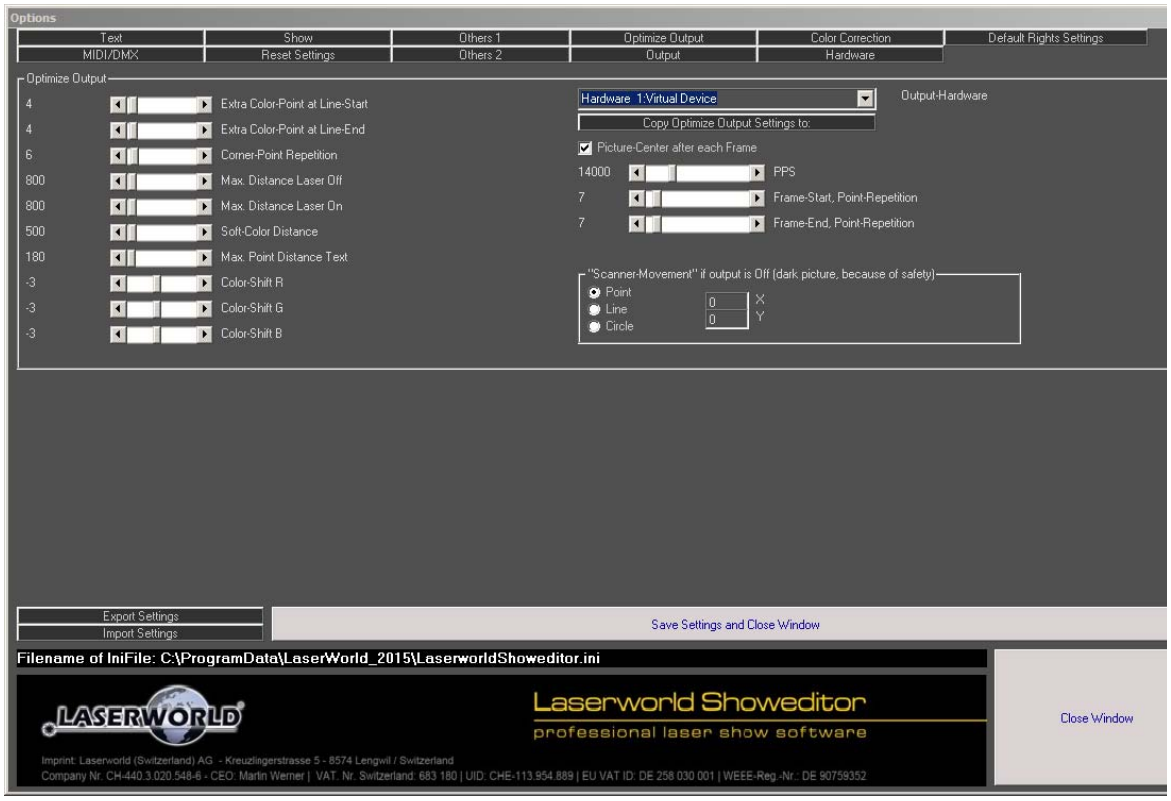


Fig. 25: Options Window

The Options window offers a wide variety of different settings and adjustment options. This window is structured with several tabs which provide thematically arranged setting that apply for laser output configuration as well as for programming.

4.3. The Effects Window

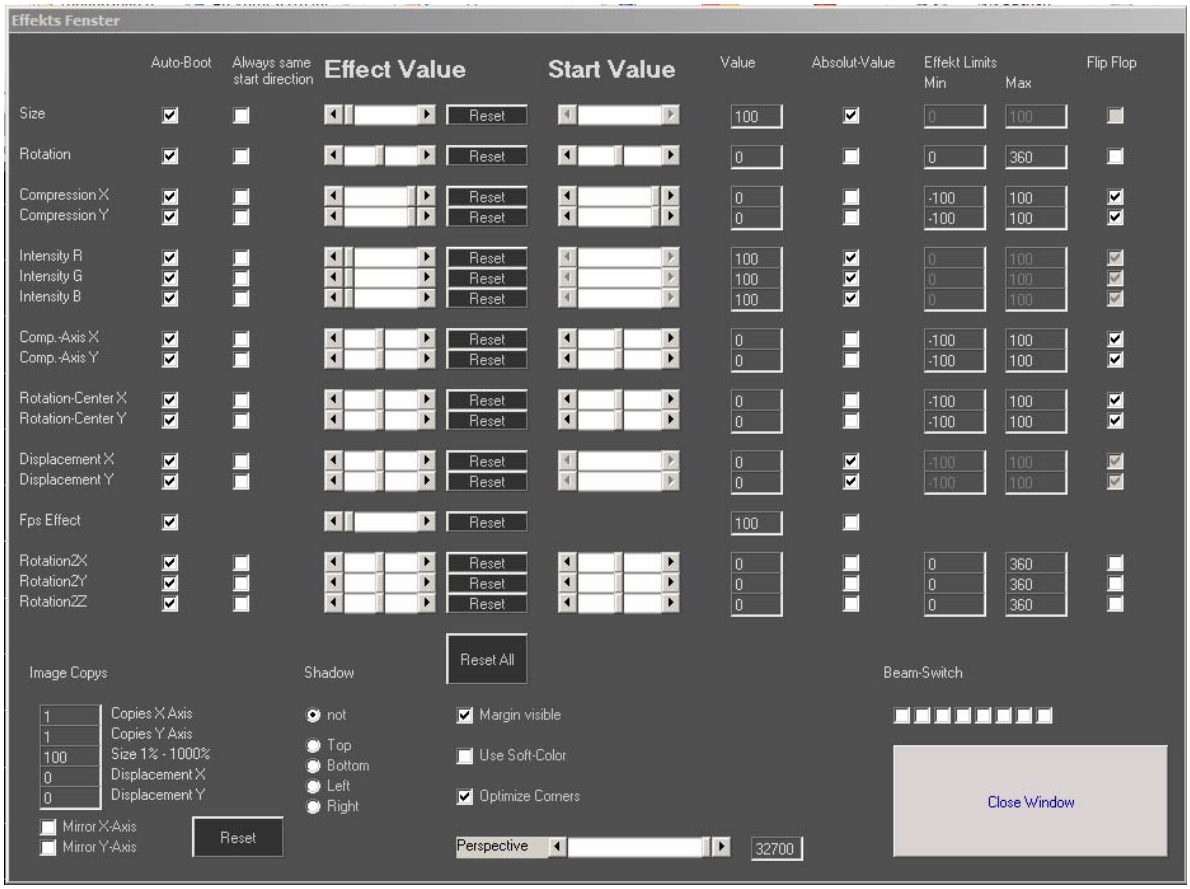


Fig. 26: The Effects Window

The Effects window provides all the animation effects that can be applied to figures including some output optimization features to improve figure output quality.

4.4. The Timeline-Editor

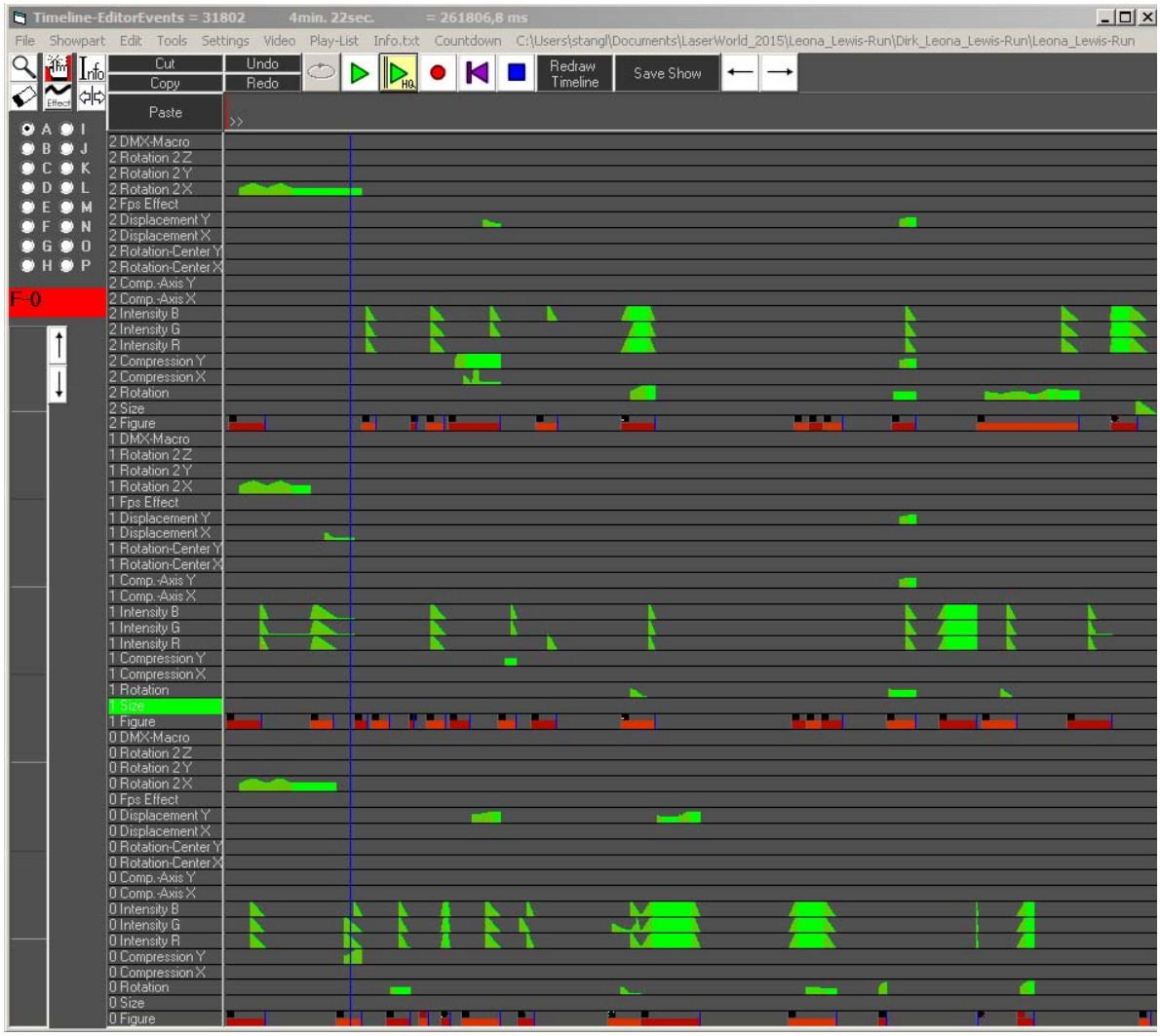


Fig. 27: The Timeline-Editor

The Timeline-Editor is the main window for arranging a laser show, synchronous to a music file. The Timeline consists of "tracks". Figures and effects to these figures are arranged in these tracks. Figures and effects can be programmed on the timeline by using different programming methods. The figures created in the Figure Editor window and in the Figure Table are available to being arranged on the timeline tracks.

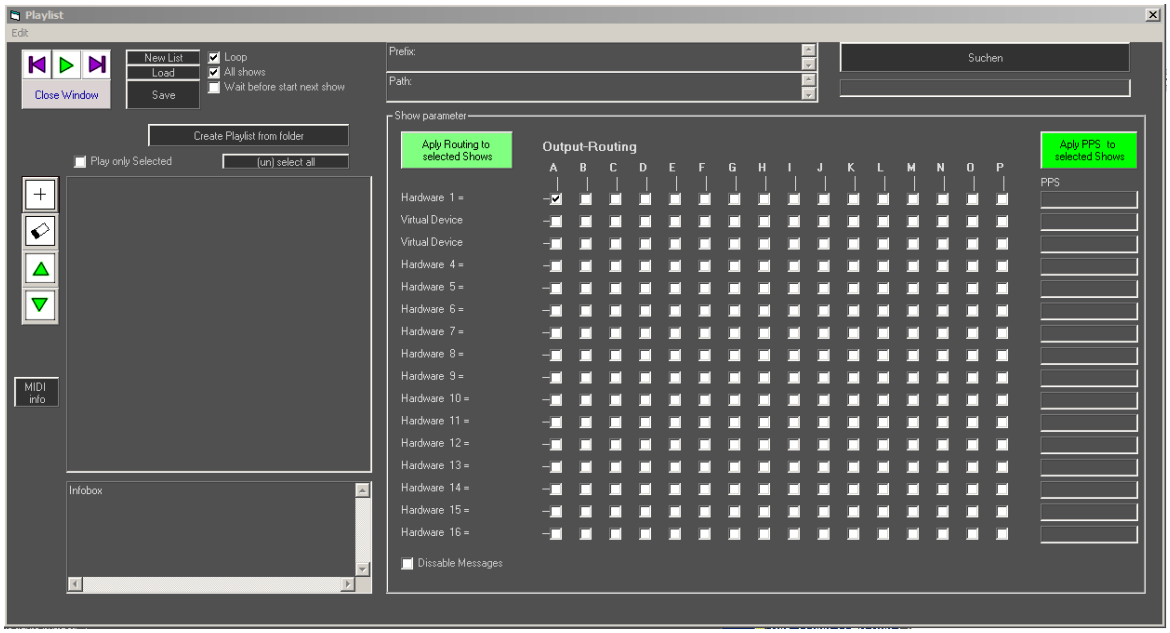


Fig. 28: The Play List

The Timeline-Editor window also provides the Playlist tool, a playback system for existing shows. They can be loaded to a list and then played in a certain order or when triggered.

4.5. The DMX-Window

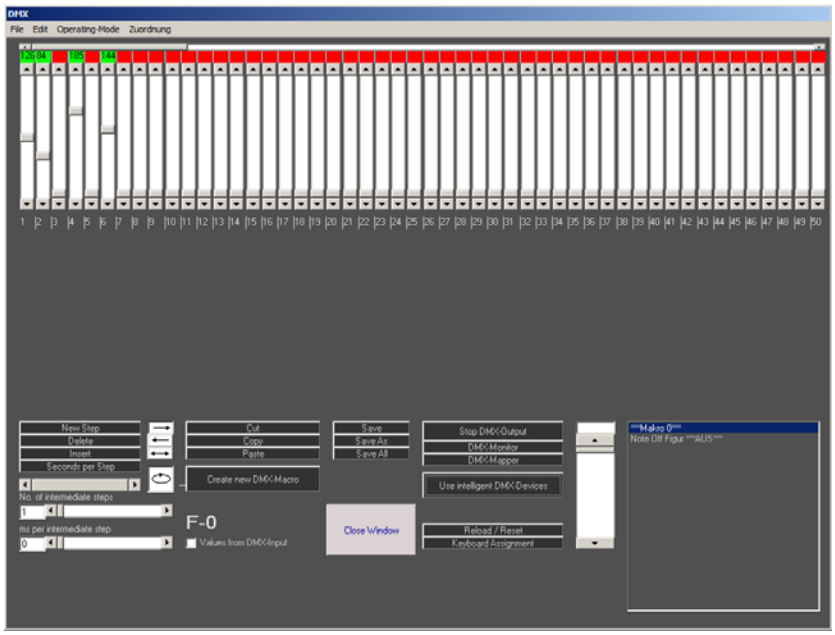


Fig. 29: The DMX Window

The DMX window is used for the configuration of DMX control and the creation and management of the DMX-Macros. These are used for the control of DMX devices, such as moving lights, DMX-spotlights, projectors and other devices, which can be controlled by DMX. Furthermore the setup of the DMX-Output-Hardware is done here.

4.6. The Live Window

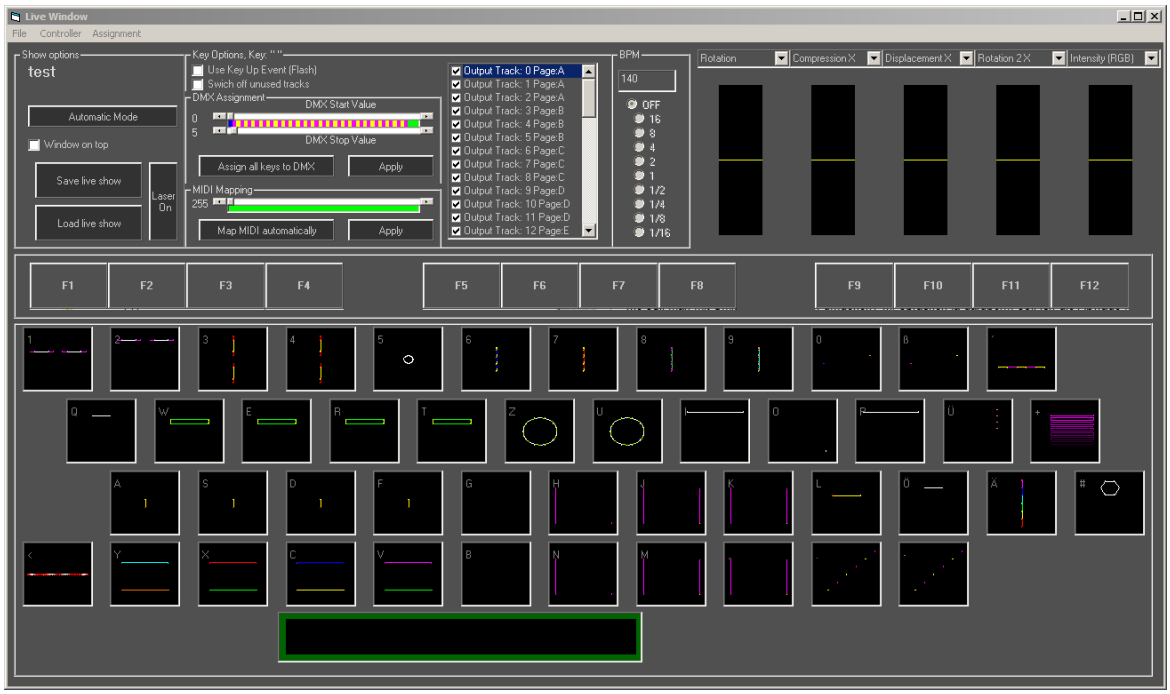


Fig. 30: The Live Window

The Live window is used for creating live laser shows. Its design is similar to the position of the keys on a computer keyboard and the figures are assigned to these keys. Thus it is possible to easily play lasers and DMX live to the music.

5. Main Manual

The following part of this manual describes the features of Laserworld Showeditor in detail. Even though most of the features can be explained in this manual, there are always more possibilities that cannot be shown in the manual properly.
Please feel encouraged to have a look at http://www.showeditor.com to learn more about Laserworld Showeditor, ask the community or the developers, and share your experience with others.

6. Figure Editor (Main Window)

The Main Window of Laserworld Showeditor is the Figure Editor. From there all other windows can be accessed (see section 4).

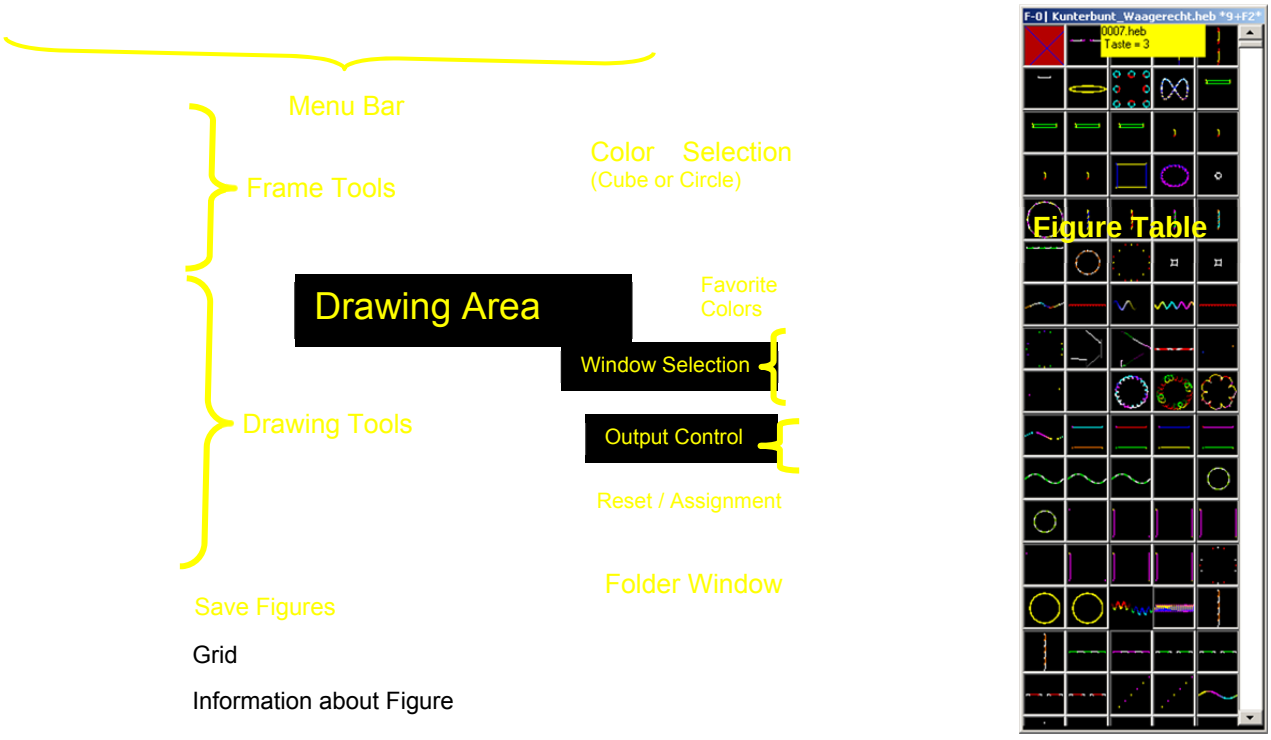


Fig. 31: Figure Editor: Main Window of Laserworld Showeditor

The look of the figure editor can be adapted and is dependent on the actual screen size and resolution. See some example in Fig. 31.

As shown, the main part of this window is the **Drawing Area**. The left column holds the **tools for drawing** like frame tools, working tools for modifying points of the figure, buttons to select the kind of drawing function (line, circle, etc.) and **buttons to save** the created or edited figures. Below the save buttons the grid size of the drawing area can be specified.

The **Menu** in the head section of the window holds all the configuration and control features that are not accessible through buttons or mouse actions. A detailed explanation of each menu item follows in chapter 6.12.

The right column of the Figure Editor window provides the option for color selection for the drawing tools: A **color circle / color wheel** and a **color cube** are available, as well as a palette with 20 preset bright laser colors (can be changed and customized).

The main control button set for handling the **different windows** is situated right below the color selection options.
Besides that, the main **Laser On/Off** control as well as the **laser simulator** and the blackout button are situated just below the window selection.

The lowest block of buttons has one for a **complete reset** of the settings and another one for **assigning figures to keys**.

The window below this button set is very important: It shows the **active folder-path** on the hard disc. As every show and every figure set always relate to a certain, physical folder on the hard disc, this folder can and must be selected here. By selecting different folders, different figure sets and shows can be made accessible.

A second window opens together with the Figure Editor: This is the Figure Table – the overview table that holds all figures that are available in this very show folder (shows all *.heb files that reside in a physical folder on the hard disc).

6.1. Create and Edit Figures

To create a new figure, the *New Figure* button is the first thing to click. (see Fig. 32). If this step is skipped it might happen that an already existing figure is modified accidently.

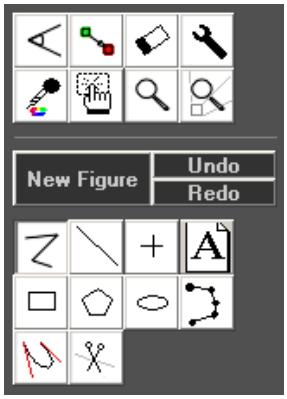


Fig. 32: Figure Editor: Drawing features

When "New Figure" was clicked, the buttons description will change its color to grey (inactive), so it can be determined that the button has been clicked.

"New Figure" is preparing all conditions to draw a new figure. The figure 0 is selected from the figure table and the following values are set:

- Number of frames are set to zero
- Number of points are set to zero
- The current effect settings are preserved

If an already existing figure shall be edited, select the very figure with a left mouse click on its icon in the figure table. The selected figure is indicated by a red square around its icon (see for example Fig.17) and it is shown in the drawing area.
The name of the figure is displayed at the top of the Figure Table. If present, its key assignment is shown, too.
The name and the assignment of a figure is as well displayed in a hover-window, if the mouse cursor is placed on an icon for some seconds.

6.2. Graphics Features

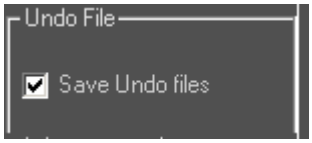
Drawings in Laserworld Showeditor are vector-graphics. This means, that pictures are drawn from one point to the next one. Normal, visible points are set with a left mouse click, where blanked, invisible points are set with right mouse click.
The tools for drawing figures (already explained in chapter 4.1) are shown in Fig.25. Detailed explanation of each drawing option:

6.2.1. New Figure:

This creates a completely new figure

6.2.2. UNDO:

"UNDO" of previous action. This makes the figure return to the state it had one step back. Providing the undo-option can be resource-intense for the computer, especially if large ILDA figures are handled, so this feature can be switched off in *Options -> Others1.*



Important to know about the behaviour of the UNDO feature:
Example: Ellipse is selected. 4 ellipses are drawn. Then rectangle is selected and 4 rectangles are drawn. If assuming, that the last rectangle was not placed correctly and "UNDO" is used, then ALL 4 rectangles are "un-done" - not only the last one!
So the undo feature applies to all consequent uses of the specific drawing tool.

6.2.3. REDO:

If "REDO" is clicked, the program returns to the version of the figure, as it was before the click on "UNDO".

6.2.4. Poly-Line:

This tool allows for creating connected lines. Every click created a point which is automatically linked to the previous point by a line.
Left-click creates a visible point, right click creates an invisible (blanked) point.

A blanked point is automatically set at the position where the drawing starts at first, before the first visible point. To draw two single lines with this tool, a blanked point has to be set at the start point of the second line prior to setting the visible point, so the scanner of the laser system knows where to move without outputting laser light (blanked).

Blanked lines / points are important, as they are used to tell the scanners what position they should move to start drawing the next points. It is essential to understand that every picture that is displayed with a show laser system is created by very fast repeated drawing of one single laser beam – comparable to a pen, that

has to be lifted so no line is drawn, if not every drawn object should be linked by a drawn line.

If the use of the Poly-Line tool is finished (when selecting different drawing tool), Showeditor automatically checks if an invisible end point exists. If not, a dialog box opens up asking if one should be set.

6.2.5. Line:

A single line can be drawn with this tool. Only one line is drawn and start as well as end points are automatically set. A line consists of blanked start, colored start, colored end and blanked end of the line. Thus at least 4 points are generated to create the line – one visible and one invisible per end.

6.2.6. Point:

This tool allows for drawing single points – which are displayed as single beams / hot beams by the laser.

ATTENTION! A single point shows as a hot beam in laser output! These single beams can be very bright! Never point hot beams towards the audience!

Laserworld Showeditor automatically creates three points when a single point is drawn: One blanked start point, the visible point and one blanked end point.

To see the points in the drawing area it is necessary to set the option "show points" in *Edit.*

If the option "blanking visible" is set in *Options*, visible points can eventually not be seen properly in the drawing area, as they may be overlapped by invisible ones.

6.2.7. "A":

Text tool: Writing texts with lasers is a basic demand for many applications. This tool offers different options for creating text. Depending on the desired "animation" or design of the text, different procedures for the creation have to be used.

Adjustments to the text tool can be made with a right click on the A-Symbol:

Simple words and signs, not animated
To use this kind of design, the text option "Morphing Text" should be selected.

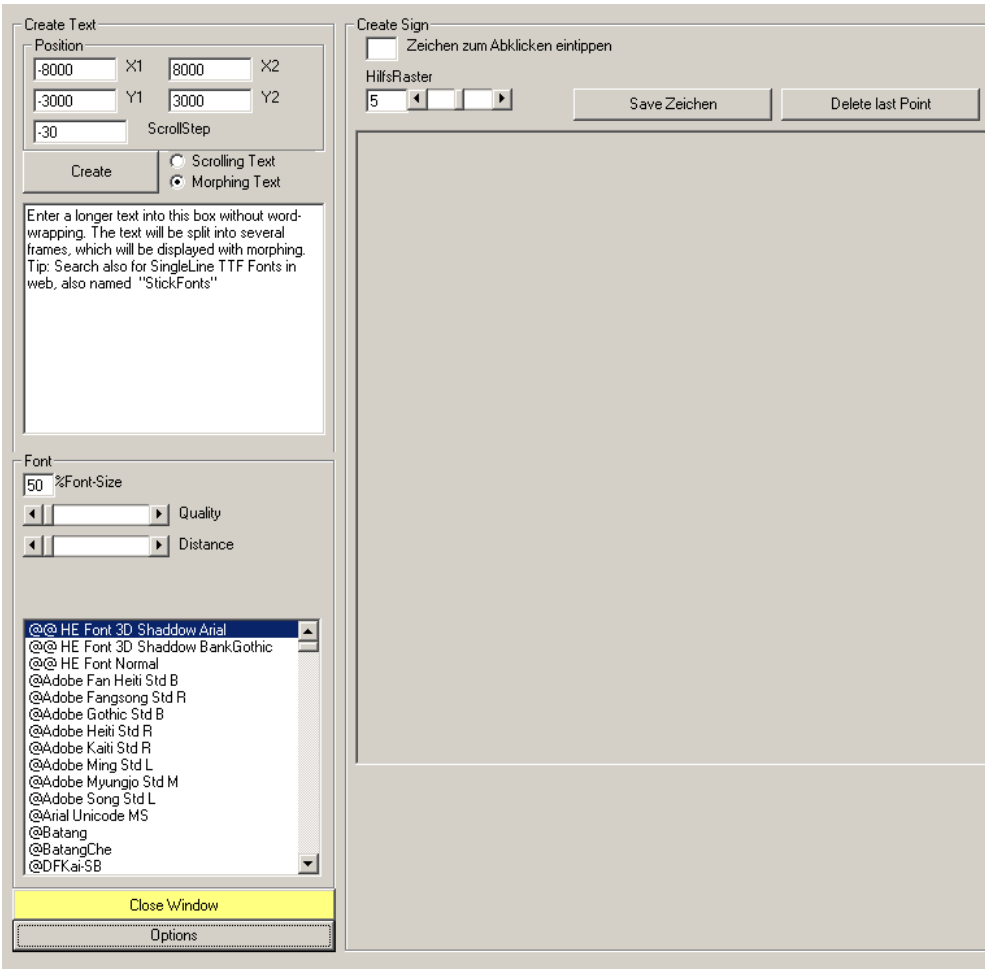


Fig. 33: Figure Editor: Dialog for text options (click with right mouse button on the text tool)

After having made the appropriate adjustments, click "Close Window".
When activating the text tool with left mouse click, the new settings have effect: In the drawing area, click at the starting point of the first letter: The dialog box for entering the desired text shows up. Please confirm with OK after having typed the text.

This procedure is good if only single words shall be projected. Longer texts will be cut at their end. If longer texts should be displayed and text wrap is necessary, please repeat the above procedure per text line or use the following text creation method.

Long texts, animated → Morphing Text
Long texts and animated texts need to be created directly in the text dialog. The checkbox "Morphing Text" needs to be checked.
Right click on the A symbol to open the Text Editor.
The text can then be entered into the text box in the left column:

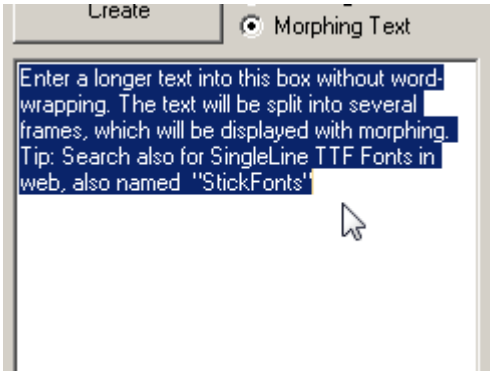


Fig. 34: Text Editor: Write longer texts here

When having entered the text, Showeditor automatically shapes the text correctly when "Create" is clicked. The continuous text is automatically wrapped in a way that not too many characters must be displayed at one – this avoids flickering of the text projection, as it doesn't stress the scanner motors too much. When clicking "Create", a dialog box opens asking, if the characters should morph. This effect makes the transition from one text line to the next one much smoother, as the characters seem to re-shape from the old character to the new one. So if this is a desired effect, click yes.

The Drawing Area shows the first frame of the text animation sequence. To see all frames of the figure, drag the horizontal scroll bar in the left column of the Figure Editor, just under the "Frames per Second" button. This allows for checking each frame of the figure individually.

IMPORTANT: If a text is created within the Text Editor, a New Figure is generated automatically when "Create" is clicked. This means that any changes to the previous figure, that haven't been saved, will be erased!

Long texts, animated → Scrolling Text
Scrolling, animated text can be created in two different ways:

A: Using the text box in the Text Editor window (Right click on the A symbol to opens the Text Editor), just enter the text and change the radio button from "Morphing Text" to "Scrolling Text".
An additional setting is important to be made for Scrolling Text: The coordinates of the area in which the text shall scroll must be specified. The X and Y values can be directly entered in the area above the "Create" button. As it's not easy to guess the X and Y values for the desired position, there is another option for proper positioning – see B.

IMPORTANT: If a text is created within the Text Editor, a New Figure is generated automatically when "Create" is clicked. This means that any changes to the previous figure, that haven't been saved, will be erased!

B: To create a running text without the need to enter X and Y coordinates for the scroll-area definition, first settings in the Text tool options should be checked for being set to "Scrolling Text" (Right click on the A symbol to opens the Text Editor). Then do

not click on "Create", but just close the window. Again select the text tool ("A") with a left click and then draw the scrolling area by click and drag in the drawing are.
The text-entry dialog opens and the scrolling text can be entered.
This method is the most convenient one, and used in most cases.

IMPORTANT: As this method does not use the Text-Editor for the creation of a multi-frame figure, but uses the direct text feature of the Figure Editor, existing frames are not erased and no new figure is created on using the tool. Due to this it is possible to display several running texts in one figure - even different scroll speeds per scrolling text line are possible!

Special Characters handling

Special characters may not be displayable with the desired font. As there are many different characters possible, the Text-Editor comes with an additional drawing area for special characters. The Character can be entered (or copy-pasted) into the input box and then the visible points as well as blank points for this very character can be drawn – and saved. If they have been saved, it is possible to use this special character within the text as if it was possible to display it with the very font – the Text Editor will substitute the special character (which didn't display properly before) with the hand drawn one.

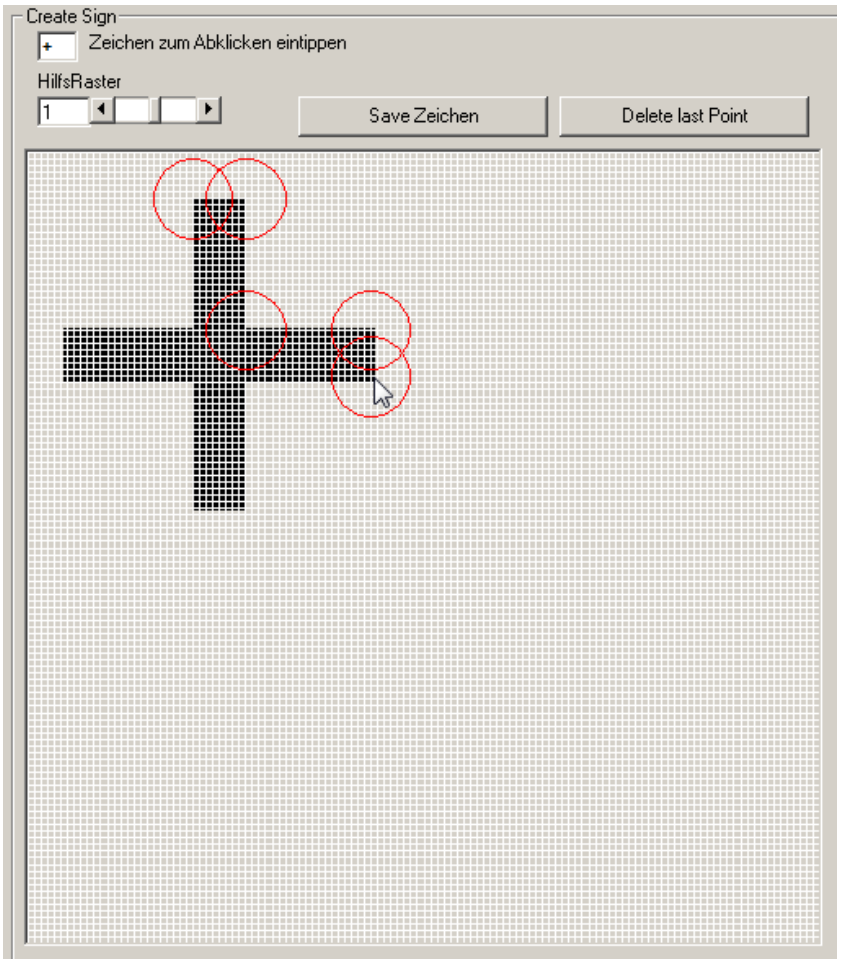


Fig. 35: Text Editor: Special Characters can be copy-pasted to the input box and then be redrawn manually in the drawing grid

6.2.8. Rectangle:

The rectangle tool allows for drawing rectangular shapes. The rectangles consist of a blanked start and a blanked end point as well as a visible point in every corner, connected by lines.
Select the rectangle tool, click at the desired position in the drawing area and drag the shape to the desired size.

6.2.9. Polygon:

Polygons are multi cornered shapes with equally long sides. With a right click on the icon the number of corners can be set. To draw the polygon, click at the desired position in the drawing area (this will be the center of the polygon) and drag the shape to the desired size. On releasing the button, the dialog to enter the number of overlapping edges opens.

If the default value is accepted, virtually 2 overlaying polygons are created. The advantage of this is that the polygons are drawn in a "closed" way and the intensity of the shape appears homogenous.
However, if the "morph" feature shall be used on the polygon, it could be better to set the number of overlapping edges to zero.

Information:
Polygons and circles can look very similar if a Polygon has very many corners. The difference of a polygon and a circle is the multiple repetitions of the corners in a polygon, dependent on the output optimization. Circles have no repeated points. A polygon with about 100 corners without optimization looks very similar to a circle.

6.2.10. Ellipse/Circle:

The Ellipse/Circle tool is used for creating Ellipses or circles as a special form of an ellipse. With the tool selected, click in the drawing area at the desired center point of the ellipse, hold and drag
The points drawn per ellipse can be set with a right mouse click on the icon. A dialog opens (Fig. 36), values between 7 and 40 are possible. Smaller numbers mean more points, meaning the feed rate uses smaller steps.

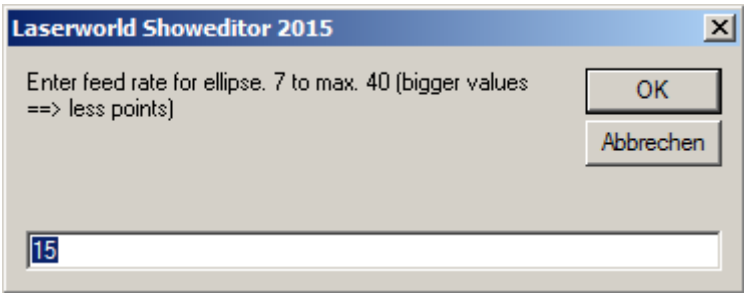


Fig. 36: Figure Editor: Dialog settings for ellipse tool

Important:
Points of ellipses (circles) have very special characteristics. The lines between the points are **not** optimized (interpolated) on laser output. Therefore it is not a good

idea to just delete half of the points to get a half ellipse. To make a half ellipse it is better to set the color of one half of the points to black and thus make them invisible. Furthermore the points of an ellipse should not be moved, as this could lead to very large drawing distances – which can destroy the scanner system!

In case such adaptions need to be made, it is better to use a polygon with about 50 points. The optimization method for the dangerous points can also be changed with a click on the *Wrench Tool → change properties of points.* For more information see the description of the wrench tool (see Chapter 56).

6.2.11. Freehand:

By using the Freehand Tool, lines can be directly drawn with the mouse (or other drawing input sources like drawing tables). Blanked points are automatically added to the start and the end point of the freehand line.

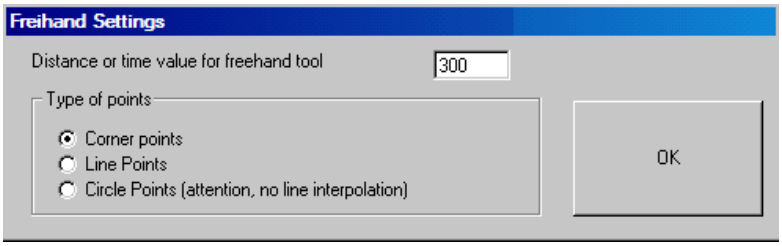


Fig. 37: Figure Editor/Painting Tools/Freehand: Dialog to set up freehand parameters.

This tool was developed to allow for the creation of complex figures, e.g. if pictures shall be redrawn. Easiest use is with a drawing tablet.

A click with the right mouse button opens a dialog (Fig. 37Fig. 37: Figure Editor/Painting Tools/Freehand: Dialog to set up freehand parameters.) for setting the tool specifications. The drawing type can be specified (corner-, line- or circle-points) as well as the distance- or time value for the drawing of the points.

Left mouse button, right mouse button:
These values refer either to distance if drawing is made with clicked left mouse button, or to time, if drawing is done with clicked right mouse button.

6.2.12. Bezier:

Bezier curves can be describes as "bent lines". This is quite a mighty feature, however it requires the user's capability to imagine how the initial drawn line modifies to the bent curve.
A Bezier curve consists of a drawn line and two control lines. Both control lines are used for "bending" the drawn line – this can happen in four coordinates.
The two control lines are shown in red, where the drawn line appears in the selected color. Of course the control lines are not visible in the figure, but are needed for proper drawing.

Draw the Bezier line:

1. Select the tool (left mouse click on icon)

2. Draw the first control line (defines starting point) – it will NOT be visible, but it's position and angle defines the left part of the line
3. Draw the second control line (defines end point) – this one will be visible now, as well as the first control line. Plus the drawn line becomes visible as well.
4. A dialog opens asking if a blanked end point should be set. Choose "yes" in case there should be a blank between the Bezier's end point and the next line/point. Select "no" if the next line/point should continue the line after the last Bezier point.

Important: It is very important to understand the 4 coordinates of the two control lines, as there are more ways of using Bezier curves. To change those options, right click on the icon. The dialog shown in Fig. 38 opens.
Different settings, like the Bezier type, the point rate or point density can be specified.

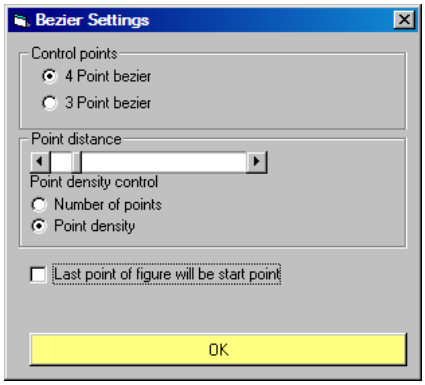


Fig. 38: Bezier settings

Bezier Type:
The 3-point-Bezier is a special form of Bezier, where the two control lines have one point in common. This slightly changes the drawing procedure described previously.

Please try the tool out to get to know this special behaviour of the Bezier tool.

Point Distance:
The point distance defines the number of points drawn to create the curve. The difference between "density of points" and "number of points":
"Number of points" means that every Bezier curve consists of the same number of drawn points. This is of advantage if the curve shall be morphed later.
"Density of Points" means that the number of the actually drawn points depends on the length of the curve.

The option **"last point of figure will be start point"** allows for seamless drawing of several Bezier shapes. Please test this feature to learn about the behaviour.

6.2.13. Separator:

The Separator Tool can be used for separating a line between two points by adding an additional point in between. For using the tool, select the Separator Tool. Then choose the color for the new point. Click on the target point of the line that shall be separated and hold the mouse button. Drag (still hold the mouse button clicked) the cursor to the position where the new point shall be inserted.
Supporting lines help in anticipating the result. With releasing the mouse button the point is inserted at the defined position.

6.3. Marking- and Editing-Tools

New or already existing figures can be edited. A set of different marking- and editing-tools are implemented in Laserworld Showeditor (Fig. 39).

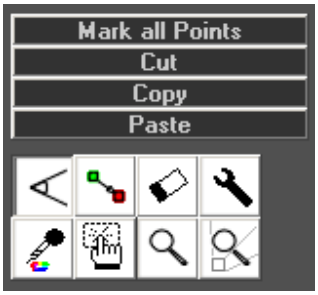


Fig. 39: Figure Editor: Marking & Editing tools

6.3.1. Hand:

The hand-tool is the most important tool for creating figures. With this tool points of a figure can be marked. To mark points, select the tool and left-click and drag a selection square in the drawing area, so all points in the desired region become selected. (Fig. 40).

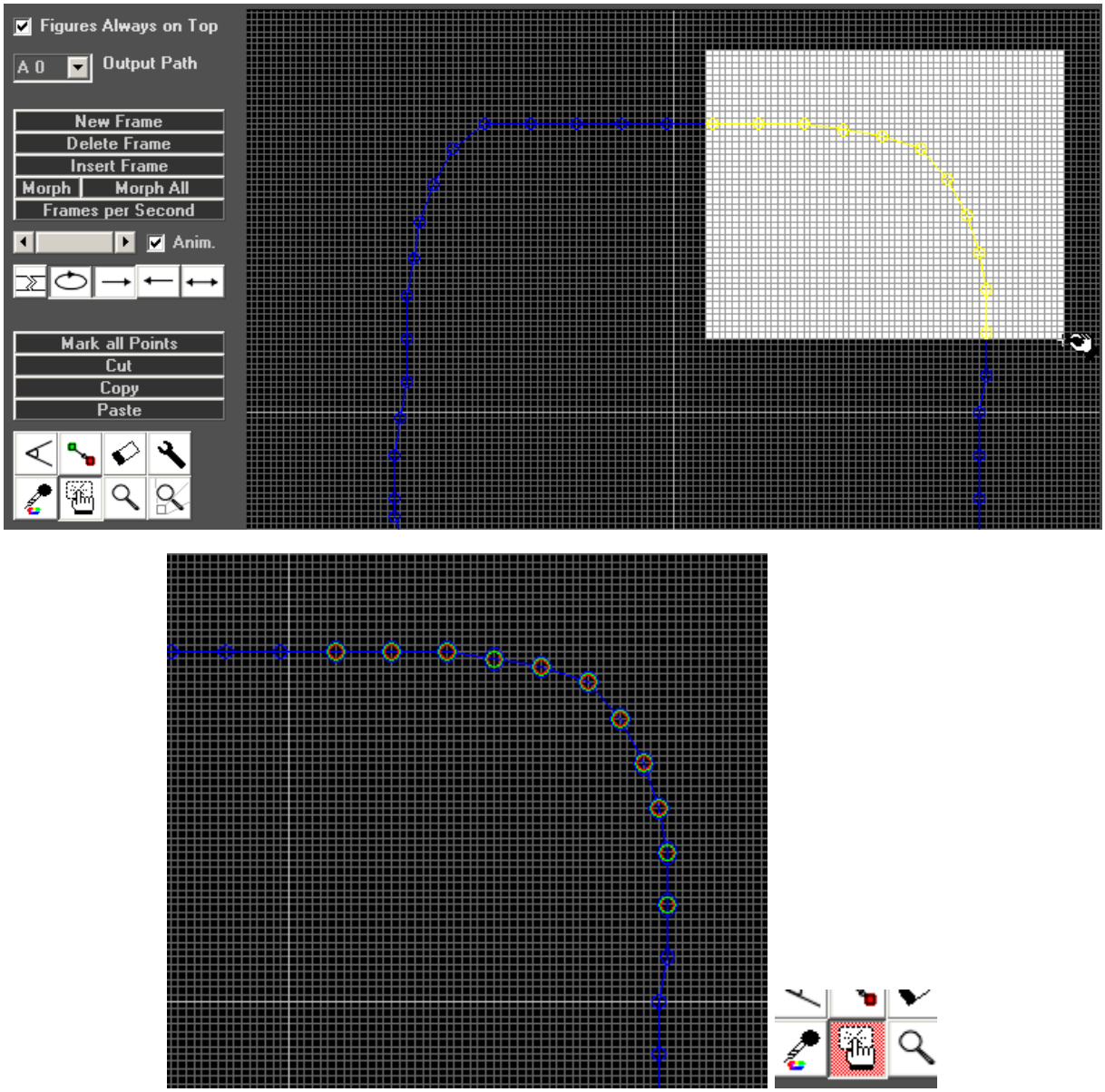


Fig. 40: Figure Editor: Tool "Hand". Point selection by left-click and dragging of selection square. The marked points are indicated by coloured circles: The hand-tool gets a red background to indicate that a region is marked.

Sometimes it may be necessary to set the grid to 1 to be able to select points which are not easily accessible as lying in another layer.

If the hand tool gets a red background, this indicates that there are already one or more points marked. (see Fig. 40) The marked points get a colored circle.

Additional points can be marked by holding the "Ctrl"-key. To mark ALL points use the appropriate button "Mark all points".

Marked points can be moved by using the right mouse button: right-click, hold and drag.
If no specific point is marked yet, the point under the mouse pointer can be moved with right-click, hold and drag – this obviously only moves one point.

6.3.2. Cut/Copy/Paste:

The Cut / Copy /Paste buttons simply do what would be expected. Pasted points are automatically marked and can be moved immediately with using the hand tool. If points are pasted to the same frame, make sure to drag the marked points away before unselecting them, as otherwise the points overlap. This usually is no problem if points are pasted to another frame of course.

To copy or cut and paste a series of frames, use the menu item *Frame-Tools* (see chapter 6.17 for further information on the Frame Tools).

Cut or copied points or frames can be pasted into other figures and frames, too. This can be very helpful if animated figures shall be created.

The commonly known shortcuts "Ctrl" + C for Copy, "Ctrl"+ X for cut and "Ctrl" + V for paste work as well.

6.3.3. Rotation Tool:

The rotation tool allows for rotating marked points. The rotation-center is the position where the mouse button is clicked within the drawing area. A horizontal movement with clicked mouse button results in a rotation with angle zero. A movement down means a +90 degree rotation, a movement up means -90 degree rotation etc. The rotation will be applied on release of the mouse button.

6.3.4. Change-Color Tool:

The color of points and corresponding lines can be custom changes, also after drawing. The Change-Color Tool can be used for recoloring existing points. To apply a color change, first mark the points to be changed. Then select the desired new color from the color circle, cube or palette and finish the re-coloring with a click on the Change-Color tool button.

This procedure works for single points as well as for several points with connecting lines.
If there are no points marked and the tool is selected, the color of the point just under the mouse cursor is changed. Besides that it is possible to hold the mouse button and change the color of all points that are hit by the cursor by dragging the mouse.

By using the **left** mouse button for the re-coloring procedure, only visible points are changed. Use the **right** mouse button to recolor blanked (invisible) points.
To work on blanked points, they should be made visible in the in the drawing area by setting *Edit -> Blanked Lines Visible*. If an endpoint has been made visible with any of the procedures above, a dialog shows up asking if a blank point shall be inserted.

6.3.5. Eraser Tool (Delete):

Marked points can be deleted with this tool. If no points are marked, the point under the mouse cursor is deleted. By clicking and dragging the mouse, all points hit by the cursor will be erased.

6.3.6. Wrench-Tool (Optimize Output):

The point and line output behavior can be controlled with the wrench tool. A click on the icon opens a dialog that offers different options for selection (Fig. 41):

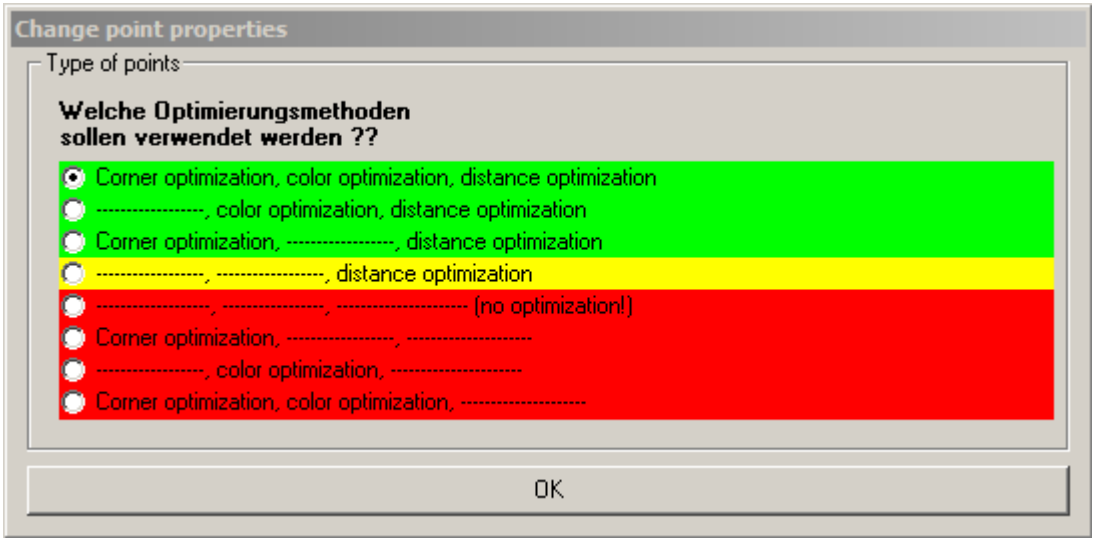


Fig. 41: Wrench Tool: Point Optimization

There are different ways of optimizing the points of a frame for proper output.
Each point has specific "properties" which especially mean their relation to other points.
Three main optimization methods and their combinations can be selected.
Please remember, that some optimization methods may destroy your Galvo scanner system! These methods are marked with a red background color. The methods with green and yellow background should not harm normal Galvo scanner system (depending on properly set scan-rate).

Properties of points – explanation:

A rectangle consists of 4 corner points and the lines between them. A Galvo scanner system is, without optimization, not able to simply project these 4 coordinates, because of its resonances and its physically given inertia (mainly of the mirrors that need to move very very fast. The bigger and heavier the mirrors are, the higher is the inertia). Too slow Galvo scanners are not able to display the corners correctly. The rectangle then becomes something like a circle. Too fast Galvo scanners fast mainly display the corner points, but the lines are missing or too less intense. Thus it is necessary to optimize the ways of movement for each Galvo system. The optimization "interpolates" the 4 lines between the corners – which means that the lines are virtually split to small pieces. The corner points are repeated several times for an intense and precise projection. The number of small line peaches necessary and of the corner repetitions depends on the Galvo scanner system.
For these kind of optimizations the term "properties of points" applies: line points have other properties than corner points. Each element (circle, square, letters etc.) has its own properties.
In order for Laserworld Showeditor to understanding how to work with the respective points and lines, each point has certain properties. These properties define how to optimize the output for the very Galvo scanner system.

6.3.7. Pipette (copy color):

If colors of one point shall be used for another point, the Pipette tool is used. First select the desired points where the color should be picked up, and then click on the pipette tool icon. By selecting other points of the figure, they get the same color as the original point(s).

6.3.8. Magnifying Glass:

The magnifying glass tool is used for zooming-in to the drawing area. This allows for much more detailed work, as it can zoom down to the very pixel.

Hint:
If the Grid size is set to 0, the frames can be drawn exact by pixel.

There are several ways for using the magnifying glass:

A) Select the magnifying glass and select an area with clicked left mouse button. The selected area is displayed magnified. The marked region is stretched to fit the drawing area. Thus distortions may occur.

B) Select the magnifying glass and move the mouse cursor to the point where the magnification is needed. Use the mouse wheel for zooming.

When a zoom is set, the frame can be reset to normal 100% view by left-clicking on the magnifying glass icon again. With a right click on the icon, it is just re-selected and the click does not affect the current zoom level.

6.4. Frame Tools

A figure consists of one or several frames. Like a video sequence, the consecutive frames show an animation.
These Multi-frame figures are quite common and Laserworld Showeditor provides many features for animations and frame settings.

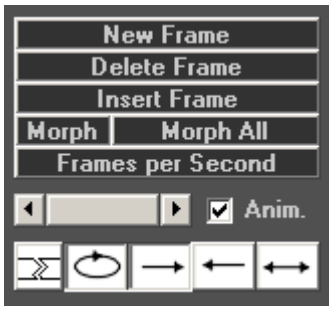


Fig. 42: Frame Tools

Different terms may be used to specify these "multiframe" figures: Sometimes they are called "multiframe", sometimes "Animations" or just "Frames". All terms mean the same.

When a single or multiframe figure is played, there is a special time sub-track that has control over the actual speed the animation is played. The speed is given in "Frames per Second" and is manually assigned per figure. The more frames are played per second, the smoother is the animation later (assuming that the frames are different – see chapter 6.4.4 and 6.4.5 to understand the morph feature).

On creation of a "New figure" (see chapter 6.2.1) only one frame is created, it has the number 0. Additional frames can be added with using the Frame Tools (Fig. 42):

6.4.1. New Frame:

Left mouse click: Adds a new, empty frame at the end of the actual frame series. The scrollbar below the Frame Tools buttons automatically jumps to the last frame (which is the new one).

Right mouse click: Adds a new, empty frame at the end of the actual frame-series. In addition to this, all points of the active frame are copied to the new frame. This is very helpful if only slight modifications shall be made for the animation or the whole frame shall be transformed.

6.4.2. Delete Frame:

A click on "Delete Frame" deletes the active frame. The next frame will be displayed after the active one was deleted. If several frames shall be deleted, it may be easier to use menu item *Frame Tools -> Cut Frames A=>B to Clipboard*

6.4.3. Insert Frame:

This button adds a new frame at the actual frame position. It will be inserted just in front of the active frame. All following frames shift by one frame. When clicking with the right mouse button, the content of the active frame is copied to the new one on insertion.

6.4.4. Morph:

Morph effects create a smooth transition between single frames in a figure. However, the transition effects are limited, so color transitions work best with the original colors from the palette.

The morph tool "calculates" the values of ne frames in between of two existing frames, make the frames look like smoothly transiting von frame one to frame two. By

doing so, more frames are embedded in between frame A and B creating a smooth animation.

Technically spoken, this is what Laserworld Showeditor does when morphing frames:
The two frames – beginning frame and end frame - are calculated with the same number of points, adapting each frame to the one with the most points.
The points of the frame are the shifted gradually from their start position in frame A to their end point in Frame B. The color values are morphed respectively.
So what happens is that every single point changes its position and thus creates the desired effect.

Several important aspects need to be considered when using the Morph tool: As only points are moved from A to B, it may happen that the points are moved to a different position as expected – because if frame A and frame B are very different, the software cannot determine which point in A should end up in which point in B.

When morphing Polygons, make sure to have entered "0" in the Overlapping Edges dialog (see the explanation of the Polygon tool in 6.2.9), so no overlapping edges are set.

"Morph" calculates the specified number of frames that are inserted between two frames (A and B). So before this tool can be used, at least two frames must exist.
When clicking on the "Morph" button, a dialog shows up, asking for the number of the start frame, the end frame and the number of morphed frames:

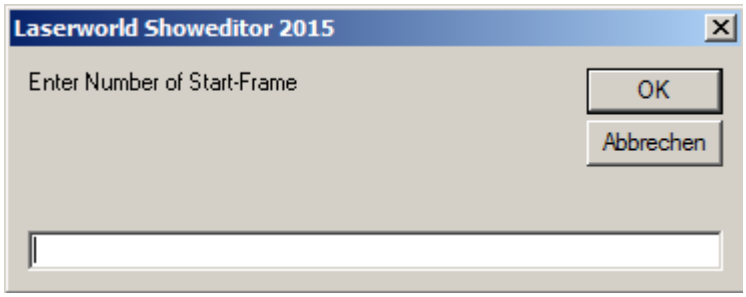


Fig. 43: Enter number of start frame. If only two frames are in the figure, this would be "0"

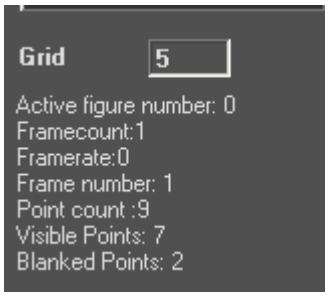


Fig. 44: The number of the active frame can be found in the info box in the left lower corner

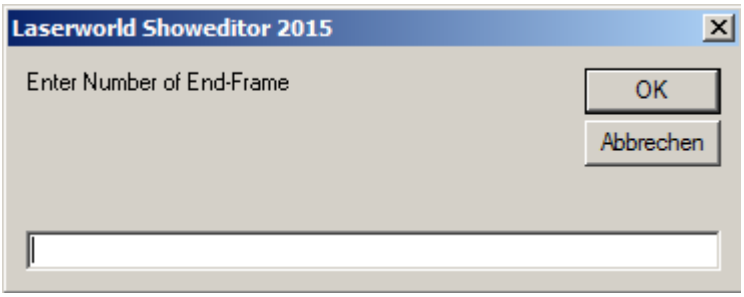


Fig. 45: The number of the end frame must be entered. If only two frames are in the figure, this would be "1"

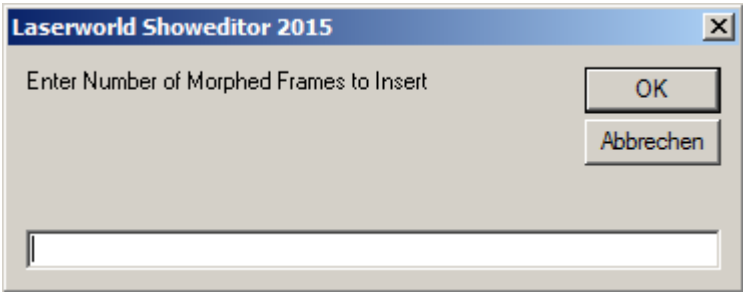


Fig. 46: The number of morphed frames that should be inserted must be specified. The more frames are inserted, the smoother the transition. The required number of frames also depends on the speed the morphed figure shall be played later. A value of "10" is good to lean how the tool works, but even 50 or more frames are possible – depending on what is required.

6.4.5. Morph All:

The "Morph All" figure works similar to the Morph tool, but applies the morph procedure to all frames in the active figure. This tool only opens one dialog that asks for the number of frames that should be inserted. Then the morphing will be calculated between frame 0 (the first one) and the last frame of the figure.

This tool is often used to create smooth transitions between frames of an animated cartoon, so e.g. if a walking person has been drawn on 5 frames, each one showing a part of the movement, then the "Morph All" tool makes the person walk smoothly.

Important:
The assignment of the points is essential, as like with the morph tool, the transition is made point-wise – which means that point 1 in the start frame will morph to point 1 in the end frame. If these are at very different positions, this may lead to unwanted effects.
To avoid these effects, it makes sense to use frame copies of the first frame in the following ones, so the order of the points remains the same even if adaptions are made.

Important Information: If "Morph" is used between e.g. frame number 10 and frame number 15 of a frame series (e.g. 20 frames are present), then the frames 11, 12, 13, 14 are overwritten!

6.4.6. Frames per Second:

"Frames per Second" defines how many frames of a figure shall be displayed per second. This is the actual speed the figure is played in. Depending on the number of frames the figure consists of, the speed needs to be adjusted: If too few frames are played too slowly, the output has a stuttering look, as each frame stays visible for too long. Setting the correct frame rate is important, especially for graphics and text animated figures.

A click on "Frames per Second" opens a dialog where the number of frames per second can be entered. A frame series consisting of 50 single frames will last exactly 1 second, if the speed is 50 fps (= frames per second).
This value has absolutely nothing to do with the scan speed and the picture repetition rate of the laser projector.
The value simply specifies how fast the frames of a figure shall be played (exactly like the frame rate of a video). If the frame rate is higher than the repetition rate of the laser projector, then some of the frames are simply dropped – which will not influence the display. If the frame rate is lower than the picture repetition rate of the laser projector, then frames are displayed multiple times, so no gaps happen.

The speed can be entered in three different ways:

- **Frame rate without any unit specified:**
  If only a number is entered, without specifying a unit, the software takes the input as standard "frames per second (fps)". For example, if "20" is entered, 20 fps will be displayed.

- **Frame rate with unit "ms" -> duration:**
  If a number and the unit "ms" is entered, then every frame will be displayed for the entered duration of milliseconds. For example, if "20ms" is entered, every frame is displayed for 20 milliseconds (resulting in this being a frame-rate of 50 fps then).

- **Frame-rate with unit "bpm":**
  If a number and the unit "bpm" is entered, then all frames are displayed xx times per minute.

  For example, if "20bpm" is entered, the software adapts the frame-rate in that way that the series of frames (the figure) is displayed 20 times per minute. The "bpm" unit has been implemented especially for the requirements of laser shows that are synchronized to music.
  The BPM rate of a song can be terminated using *Tools -> Beat Counter* in the Timeline window.

Information:
PPS and FPS
If a figure consists of multiple frames, the speed of the output of these frames is specified by "Frames per Second".
Assuming that every frame shows a picture consisting of 500 points and the DAC outputting at 5000pps, then 10 frames per second can be displayed by the projector. If a frame-rate of 20fps is selected, then every second frame is dropped. In contrast, if 5fps are selected, every frame will be displayed twice.

This way the output speed of the figure is independent of the DAC as well as of the laser system in use. The animation speed of the displayed figure remains the same.
If a short stutter is recognized on output, a slight adjustment of the fps rate can fix this.

6.4.7. Scroll-Bar (Frame Selection):

The scroll-bar below the button "Frames per Second" is used for changing between the single frames of a figure. The respective frame-number is displayed in the info box of the Figure Editor in the lower left corner (See Fig. 44).

6.4.8. Buttons for editing the frame display order:

The buttons below the frame selection scrollbar specify the running order and behaviour of the frames playing. With the three buttons

"right",

"left" and

"back and forth"

the direction of display of the frames can be specified.

The "Loop" button sets the repetition of the frames to loop.

If the direction of display is set to "back and forth", the frames may run asynchronously after a while if the frame rate is defined in combination with the unit "bpm" (See 6.4.6), as the first and the last frame are doubling on output with this method.

The button on the left activates a cutting tool, which can be used for splitting up longer animated figures. The active frame is used as cutting point, and this frame becomes the first frame of the second figure and the last one of the first figure.

6.5. File (Buttons Save, Save As and Save All)

These buttons are used to save the created figure(s) (Fig. 47).

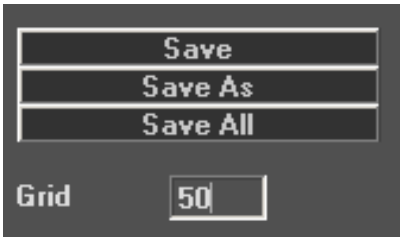


Fig. 47: File save buttons and grid

6.5.1. Save

Saves the active figure. If this figure has already been given a name and has been saved already, the figure is saved automatically, overwriting the existing file without notice. If no file name has been given and the

figure hasn't been saved yet, the "Save as" dialog opens and the figure can be named and then saved.

6.5.2. Save As

This opens the standard "Save as" dialog, asking where the file should be saved to and offering the possibility to enter a file name. Figures created with Laserworld Showeditor are saved in the *.heb file format. Export to *.ild file format is possible as well. Please refer to section 6.13.8 for further details on this.

Important: Special Characters in file names and file paths:
Due to the software being used internationally, it is not possible to use special characters like ä, ö, ß, é etc.. If any of these characters are used for naming a file or a file path, an error message is displayed.
It is also important to not use any blank spaces in file or folder names, this is likely not to work.

6.5.3. Save All

"Save All" saves all figures of the Figure Table, so changes that have been made to several figures are saved all at once.

6.6. Textbox „Grid“

The textbox "Grid" (see Fig. 47) is used for changing the grid size of the drawing area.
The smaller the number, the more detailed is the grid. Values between 1 and 300 are possible. Value 1 means "no grid at all". This setting is sometimes necessary for modifying points that cannot be reached otherwise.

6.7. Output Path

The output of the figure that is worked on can be routed to different hardware output with the output path selection tool.
The hardware interfaces (DACs) must have been specified and assigned to output paths in *Options -> Hardware* before they can be addressed (See 2.8.2). Of course this feature is not meant for being used at live shows, it's a feature used for testing the output of a certain figure on different laser projectors.
The paths directly refer to the output routing settings made in *Options -> Hardware*.

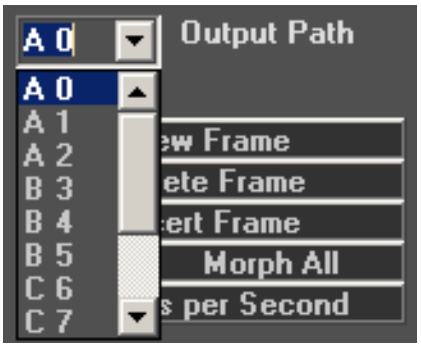


Fig. 48: Setting of Output Path

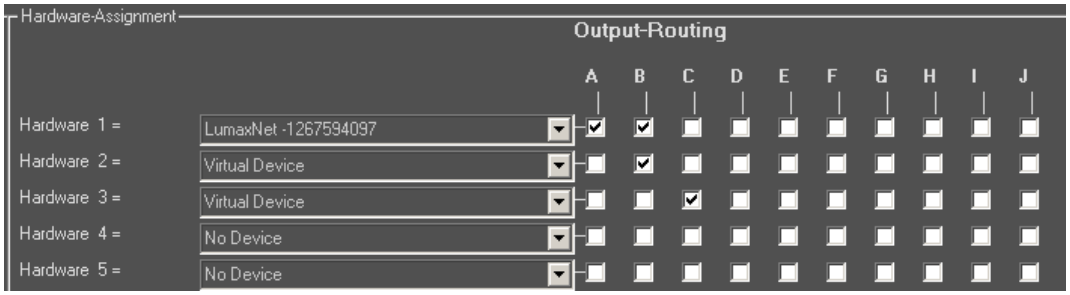


Fig. 49: Options->Hardware: Setting of Output Routing

6.8. Color Selection

Laserworld Showeditor offers three different color selection options for drawing frames ad figures: The Color Circle (Fig. 50), the Color Cube (Fig. 51) and the Color Palette (Fig. 52).
The setting of the desired color selection mode can be done at *Options -> Others*.

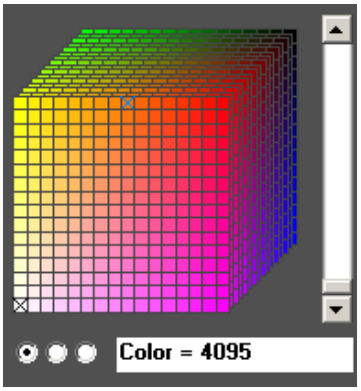


Fig. 51: Color Cube

Fig. 50: Color Circle

Fig. 52: Color Palette

6.8.1. Color Cube

The Color Cube is the most versatile tool for color selection, as it offers all possible colors for selection. The scrollbar at the side of the Color Cube allows for switching to different layers of the third dimension of the cube.
The viewing angle to the color cube can be changed by using the three radio buttons next to the Color field. Selecting another radio button does not change the color selection – only the viewing perspective.

6.8.2. Color Circle

The Color Circle is a simplified version of the Color Cube and only offers the most important colors. With using the scroll bar at the side, the intensity of the colors can be set. The Color Circle is meant for quick and easy programming, for professional applications it is recommended to use the Color Cube instead.

6.8.3. Color Palette – favorite colors

Under the Color Cube or the Color Circle 20 colored areas are shown. This is the quick access palette, and it's preset with the 20 most intense colors – the one where

at least one color channel runs at full power. The Color Palette can be customized by just drag-and-drop of colors from the Color Cube or Color Circle to a palette field.

6.9. Checkbox "Figures Always on Top"

If "Figures always on top" (Fig. 53) is selected, the Figure Table always stays in the foreground. This is very useful if the figures are used for drag-and-drop programming and also for figure creating in the Figure editor.

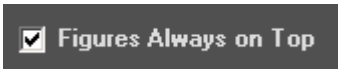


Fig. 53: Figure Editor: Checkbox "Figures Always on Top"

The box unchecks automatically if the black background of the Figure Table is double-clicked (don't click on a figure) or if the checkbox is unchecked.
The setting is preserved in the configuration, so remains the same on program restart.

6.10. Folder-Area

To use already existing figures/patterns/frames, they need to be saved to a physical folder on the hard disc. Even if new frames should be created, it makes sense to create a new show folder in the Windows Explorer first.
This folder holds all figures/patterns/frames and media files that belong to the very show. It is recommended to organize all folders in a suitable structure.
The folder tree shown bottom right in the figure editor window allows for selecting the right show folder. Whole shows can also be loaded through the menu *File -> Open Lasershow*

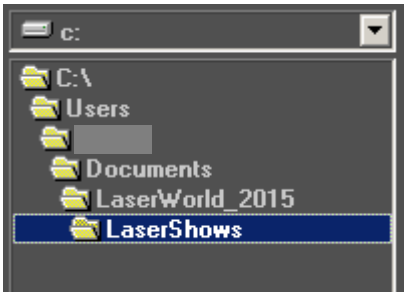


Fig. 54: Figure Editor, folder window: Structure of folders (example).

On selecting an existent folder, all figures which can be handled by Laserworld Showeditor, will be to the Figure Table.

ILDA-figures are no Laserworld Showeditor files and must be imported manually (See chapter 6.13.7).

If a show is loaded through the *File -> Open Lasershow* menu item, the content of the area will automatically be updated with the corresponding path of the show folder.

Some special folders are preset in Laserworld Showeditor.
Folders named "Buchstaben_XXXXX" contain hand-drawn letters.

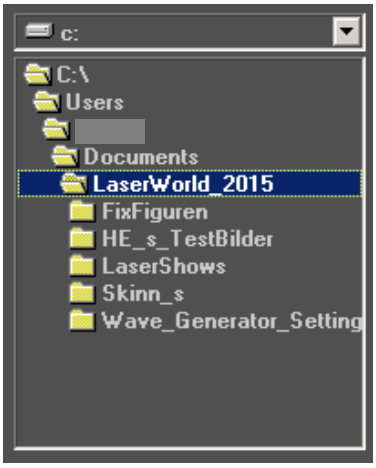


Fig. 55: Special Folders.

6.10.1. Global Figures

The folder "FixFiguren" can be used to store figures which can be called from every show (Global Figures). These figures are displayed together with the test

pictures in the table of the Test Pictures (*Test Pictures -> Show Test Pictures*).

6.10.2. Test Pictures

The folder "**HE_s_Testbilder**" contains some very useful test pictures for laser projector setup. Please find some a more detailed explanation them in Chapter 6.21.
Laserworld Showeditor also come with some tutorial PDF files that explain the use of test pictures more in detail.

IMPORTANT:
The test picture figures have no point properties and are not optimized as usual on laser output! Thus it is **not** recommended to use them for optimizing the laser output. The ILDA test picture is used to determine the speed of the Galvo system. This picture is put out without changes, thus the detected pps rate is correct.

6.11. Buttons in the right column

The buttons in the right column of Laserworld Showeditor (Fig. 56) either open a certain sub-program window or allow to directly accessing major control features.

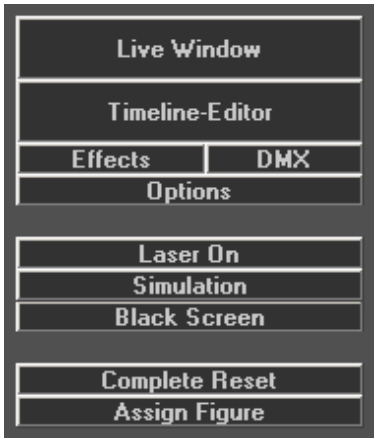


Fig. 56: Figure Editor: Buttons in the right column

6.11.1. Live Window:

A click on this button opens the live laser show control window. To use the Live Window features it is necessary to assign the figures that should be used, to keys.
The Live window offers a powerful user interface for creating spectacular live laser shows. Please see chapter 13 for details on the use of the Live window.

6.11.2. Timeline:

This button opens the Timeline Editor window – a great feature for creating timeline based, music (or generally media) synchronous laser shows. Please see chapter 9 for details on the Timeline Editor

6.11.3. Effects:

This button opens the Effects Dialog. Please look at chapter "Effects Dialog" (Chapter 7) for more information. The settings of the Effect Window always refer to the active figure!

6.11.4. DMX:

The DMX-Window allows for DMX control of DMX fixtures or other DMX controllable units. Please refer to chapter 11 "DMX-Editor" for more information.

6.11.5. Options:

The Options window is used for the basic configuration of Laserworld Showeditor. Hardware setting, usability features and performance settings etc. can be made here. Please refer to chapter 8 "Options" for further information.

6.11.6. Laser ON:

"Laser ON" switches on the laser output (if the hardware is properly configured and able to output). By deactivating "Laser ON", the laser output is stopped immediately.

In the case the Simulation Window is opened, maybe also minimized, then this window will come to front and the output is directed to it – so no real output to the hardware happens. Close the simulation window for proper real laser output.

If nor hardware interface (DAC) is connected or mapped properly (only Virtual Devices in use), the simulation window will open on click on "Laser ON".

6.11.7. Simulation:

This button opens the Simulation Window. The chapter "Simulation" provides further detail on this feature. As long as the simulation is in use, no output to the laser projector is possible.

6.11.8. Black Screen:

This button switches the computer monitor to black screen mode.

This can increase the output speed of the laser output, because the calculations, which are necessary for the display on the screen (updating the effects, figures, etc.), are obsolete then. And: The light of the screen does not disturb the laser show display, too.

In Options -> Others it is possible to specify the blackout type: Only a black screen or monitor to standby mode.
In some cases it's advantageous to set the monitors to standby mode, as this affects not only the main monitor, but all screens in use. A disadvantage of the Standby blackout is that PlayHQ playback may be slightly delayed in start.
The Standby black out ends if any key is pressed or the mouse is moved.

If a show is started via PlayHQ, via Count-Down-Timer or via the "Start xx Seconds"-feature, the button "Black Screen" will be activated automatically.

A speedometer can be activated for the normal black screen mode (Options -> Others) to show some basic information about the frame actualization during black out mode.

Hints for working with blackout mode:

Deactivate standby:	Move mouse or push a key.
Deactivate black screen:	Click with right mouse button.
Deactivate black screen and stop the show:	Click with left mouse button or push the ESC key.

6.11.9. Complete Reset:

"Complete Reset" updates all figures by reloading them to the Figure Table. This resets all unsaved changes that have been done to any figures.

6.11.10. Assign Figure:

Key assignment can be done by using this button. The assignment of figures to keys on the keyboard is essential for further work in the Live Window and the Timeline Window. There are several other ways to assign figures to keys. Those will be explained in the following chapters.

6.12. Menus and options

Nearly every feature and window is accessible through the menu of the Figure Editor. Besides the buttons and mouse click actions, there are many more features and tools residing there. (Fig. 57), e.g. the Wave Generator or the Path Tool etc.

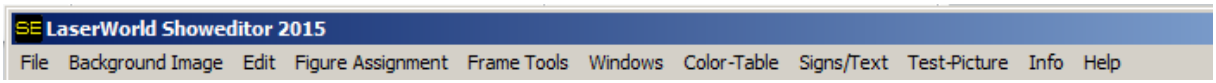


Fig. 57: Figure Editor: Menu

6.13. Menu: File

6.13.1. Open Laser Show

This automatically opens the Timeline and the Windows standard dialog for opening a file. Select the desired, already existing laser show and it is loaded to the timeline. When doing so, the active show folder changes to the one of the new laser show – and so do the figures in the Figure Table. So save your work prior to opening a laser show.

Fig. 58: Menu: File

6.13.2. Play-List Load

This automatically opens the Timeline and the Windows standard dialog for opening a file. Select the desired, already existing Playlist. It loads in a new playlist window and is ready to use.

6.13.3. Load Live Show

This menu item opens a dialog for loading an already existing live show. The Live Window automatically opens on loading the show.

6.13.4. New Figure

This menu item does the same as the "New Figure"-button (see chapter 6.2.1) – it creates a new figure.

6.13.5. Save, Save As, Save All

These menu items do the same as the "Save"-, "Save As" and "Save All"- buttons (see chapter 6.5.1, 6.5.2, 6.5.3): They offer different saving options for figures.

6.13.6. Delete File

"Delete File" can be used for deleting the active figure. It is deleted from the hard disc and thus also disappears from the Figure Table. On deleting a figure, the Figure Table is reloaded.

6.13.7. Import ILDA

The "Import ILDA" menu item is used for importing ILDA files (*.ild) to Laserworld Showeditor. 2D and 3D ILDA files can be imported as well as ILDA files with or without color table or RGB data. On import, the ILDA files will be converted to the Showeditor file format, so they become editable in Laserworld Showeditor.

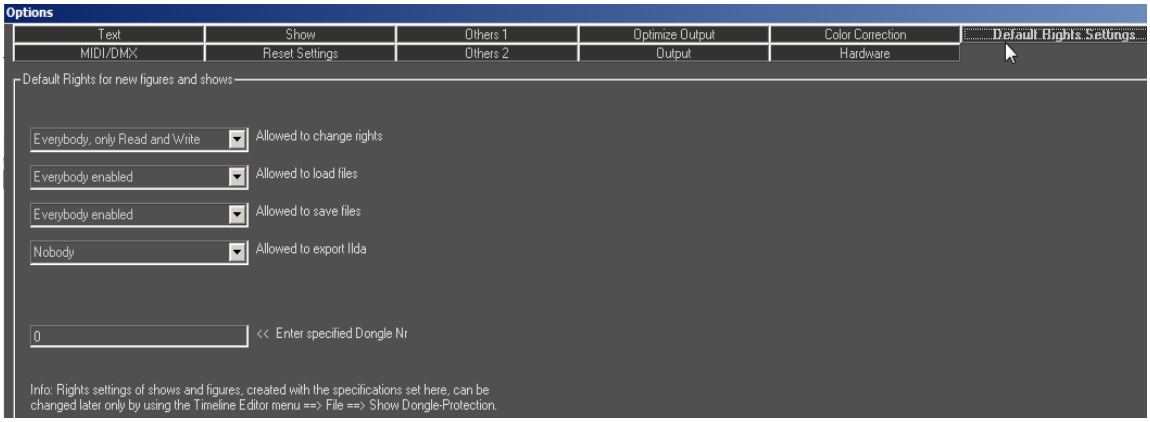
Importing ILDA-files can cause issues in rare cases, as the "ILDA Standard" is not always respected by every programmer – some *.ild files do not provide the standardized protocol in full or come with additional information that is not meant to be included. In such a case a message with further detail is displayed.
However, Utmost imports of ILDA files work very well.

Supported ILDA standard file format is any version up to version 5.

Information:
Depending on the program they have been created with, some ILDA files are defective, as the storage byte order for the colors is red – green - blue instead of the correct blue - green – red. If blue and read appear to be swapped, change the color order in *Options -> Others*. This setting applies for the import as well as for the export of ILDA files.
Many existing ILDA files use the Pangolin color table. If this is the case, load the Pangolin color table first (*Color-table*) and then convert to Laserworld Showeditor colors (*Windows -> Special features - > Change color handling to Showeditor color table values*)

6.13.8. Save ILDA

Export a figure as ILDA-file (*.ild) using this menu item. This only works for figures you have the permission to export. Export permissions can be set in *Options -> Default Rights Settings*



Ve

Fig. 59: Options -> Default Rights Settings: Set the file and figure access rights

Important:
On using the ILDA export feature, only the basic coordinates are exported. An optimization or interpolation is not done. If this is required or if a complete show shall be exported, use the show export feature *File -> Export Show as ILDA-File*.
Different ILDA-formats are offered for export. The recommended one is: Type 5 ILDA-file (RGB).
Please consider that not every program can read every ILDA-format correctly.

6.13.9. Import *.AI file (Adobe Illustrator)

It is possible to import Adobe Illustrator (*.ai) files to Laserworld Showeditor. Drawings made in Adobe Illustrator or Corel Draw are saved as vectors – so they have the same characteristics as ILDA files have.
It is important to use *.ai files in the correct file version, as not every version can be imported to Laserworld Showeditor. It is also essential that only true vectors are used in the *.ai file, as e.g. colored areas or color transitions in areas can of course not be properly imported. Line-only drawings are the best choice for import.
If the elements of the *.ai file are not compatible vectors, the import may fail.

6.13.10. End

A click on this menu item closes the program.

6.13.11. Entries below “End”

This list shows the history of the 10 most recently loaded laser shows (*.shw) or playlists (*.pll). This allows for quick access to the last used files.

6.14. Menu: Background Image

Background images are very useful if custom shapes shall be drawn.

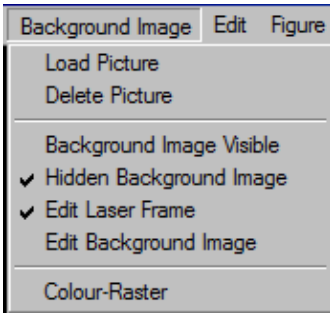


Fig. 60: Menu Background Image.

6.14.1. Load Picture

Load a picture (*.jpg or *.bmp) as background for the drawing area (Fig. 61). As the area has a square shape, the background image should also have equal height and length to avoid distortion.
The loaded picture can then be processed via the function “Color Raster” or copied by hand (the outlines).

6.14.2. Delete Picture

This removes the background image from the drawing area.

6.14.3. Background Image Visible

The background image is set to "visible" and is displayed.

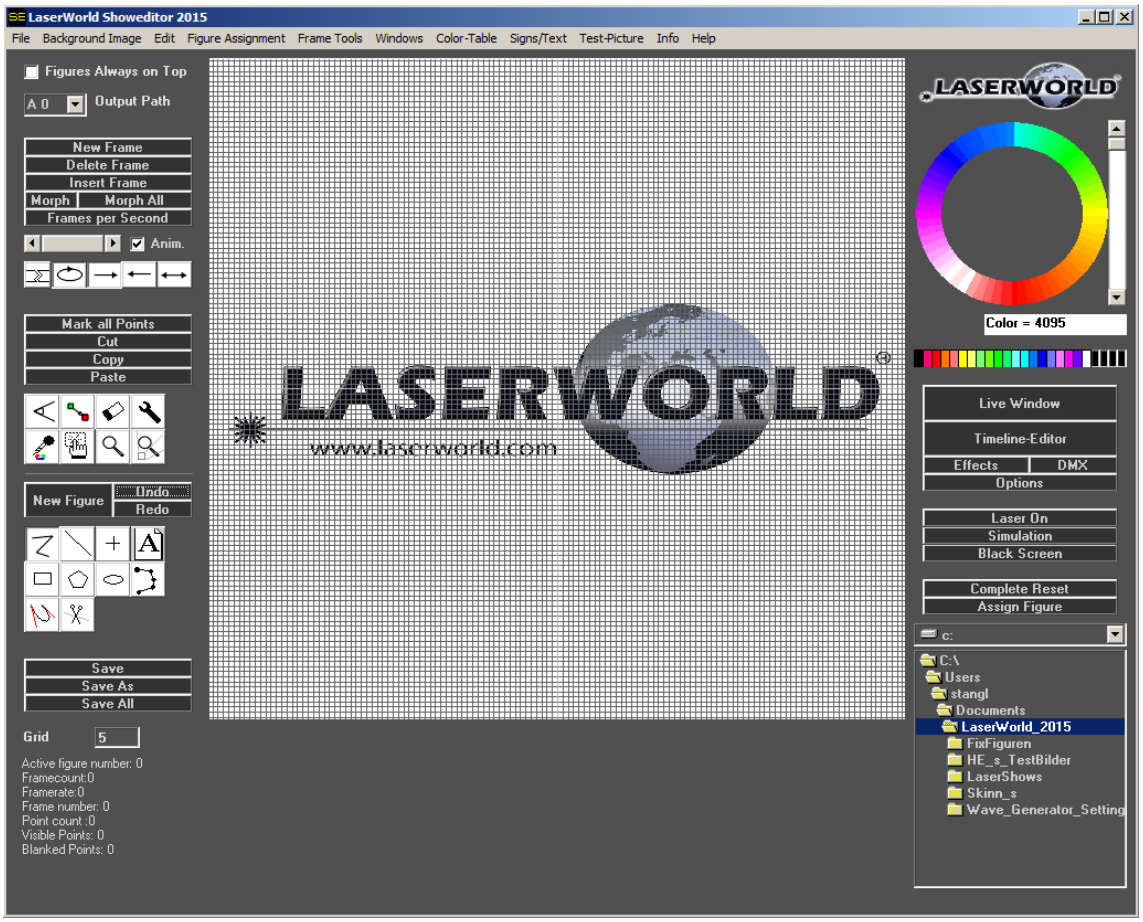


Fig. 61: Figure Editor: Background image

6.14.4. Hidden Background Image

The background image can be hidden by activating this menu item

6.14.5. Edit Laser Frame / Edit Background Image

There is the option to either edit the laser frame or the background image. Selecting one of the options unselects the other one.
Editing the background image allows for changing the image with using the drawing tools – it only changes the image, not the drawn laser figure. Selecting "Edit Laser Frame" allows for directly drawing lines and vectors for the actual laser output. This is the standard setting and needed in most cases.

6.14.6. Raster-framing: The Raster Color Tool

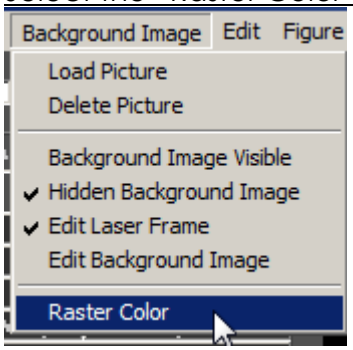
Raster-framing is the projection of "real" images with laser – not only the outlines, but also filled areas. As this method of image projection is very demanding for the scanners, it is highly suggested to be very careful when creating and displaying raster frames.
The Laserworld Showeditor has an automatic raster frame conversion tool built-in – it's called "Raster Color".
The tools works in 3 steps:

a) Select the image to be displayed
Click on *Background Image -> Load* Image to load the desired image as background of the drawing area. The part of the image that should actually be converted to a raster frame can be selected in the next steps.

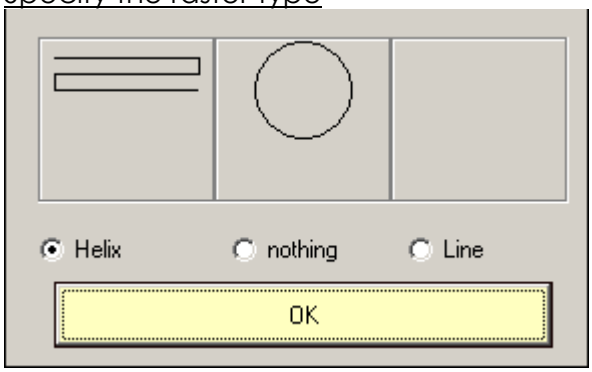
b) Define the grid size
It's very essential to properly define the grid size before continuing with the raster frame process. This is important as the grid size specifies the number of points that are drawn during the conversion. The more point are drawn, the harder it is for the scanners to actually display the figure. Grid sizes from 8 to 10 usually give good results.

c) Specify the area of the background image that shall be rastered
Drag a selection square around the parts of the background image that shall be rastered. Use the Hand tool for doing so (with left click and drag):

d) Select the "Raster Color" tool



e) Specify the raster type



The standard selection is "Helix", but especially for circular objects "nothing" can be an option too.

When having followed all the steps above, the raster frame is generated automatically by creating the corresponding points in the respective color in the density specified with the Grid size before.

Important:
It is very hard for scanners to project raster frames, as the requirements are really high. Si it is recommended to project raster frames as small as possible and better

mount the laser in a bigger distance to the projection surface. This makes it easier for the scanners to handle the high point density, as the inertia doesn't affect the scanning in small angles too much.
As raster frames are so difficult to handle for scanners, they are very likely to flickering if the scan speed is too low. This is a normal behaviour. To reduce flickering, either use a bigger grid size to reduce the number of points, or use a faster scanning system. Reducing the size of the projection can also help with significantly reducing the flicker effect.

6.15. Menu Edit

6.15.1. Color change

This tool allows for changing the color of several points (of the same color), or to change the color of points (of the same color) in a series of frames. This is how it works:

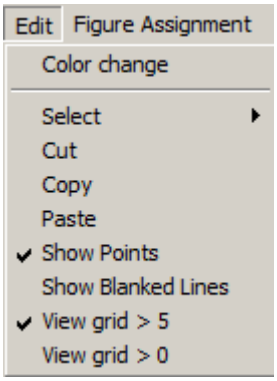


Fig. 62: Menu Edit

1. Select the desired new color of the points (see 6.3.4 for details on color selection).
2. Mark one of the points of the figure that should be recolored (perhaps it is necessary to activate "Show Points" first to make single points visible).
3. A click on *Edit->Color change* opens a dialog to set the options (see Fig. 63). Make the selections of your choice there. If "Color of actually selected point" or "Destination color" are not correct, click "Cancel" and change your selection.

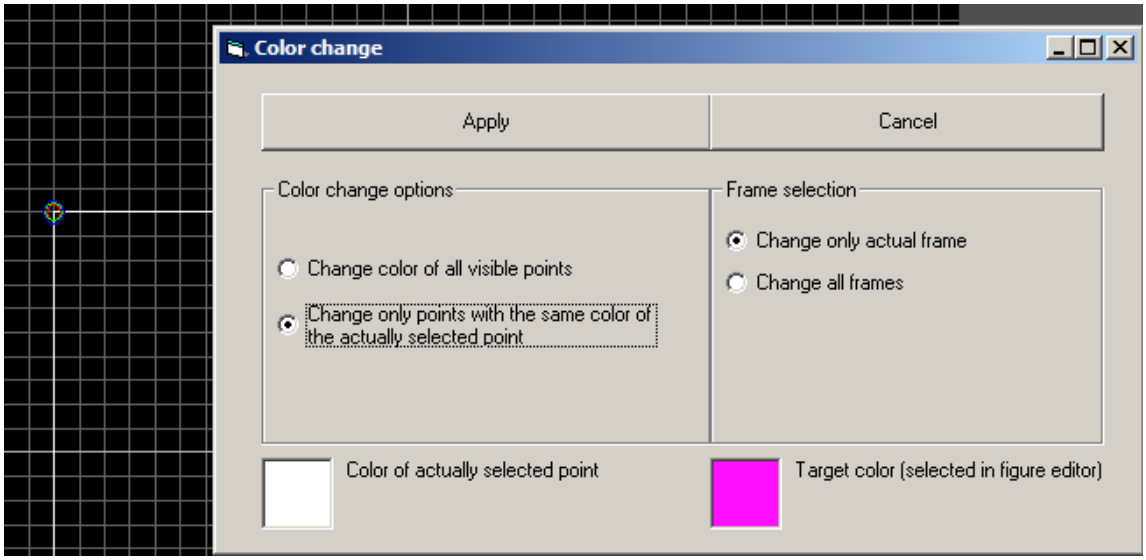


Fig. 63: Menu Edit/Color change. Dialog to change colors of points.

6.15.2. Mark all Points

Mark all points of the actual frame by using this menu item. Having all points of a frame marked allows for easy copying, moving or distorting of the whole frame.

6.15.3. Cut

This item does what it says and has the same function as the button "Cut".

6.15.4. Copy

This item does what it says and has the same function as the button "Copy".

6.15.5. Paste

This item does what it says and has the same function as the button "Paste".

6.15.6. Show Points

With *Edit->Show Points* activated, all drawn visible points of the frame are shown in the drawing area. This menu item is standard activated.

6.15.7. Show Blanked Lines

Blanked line and points, meaning the moving path of the laser beam without output, can be made visible in the drawing area by activating this menu item. Thus they can be modified, repositioned or deleted.

6.15.8. View Grid > 5 or View Grid > 0

This menu items control the visibility of the grid lines. Toggling these is helpful when zooming in to a frame, but still having the grid visible.

6.16. Menu: Figure Assignment

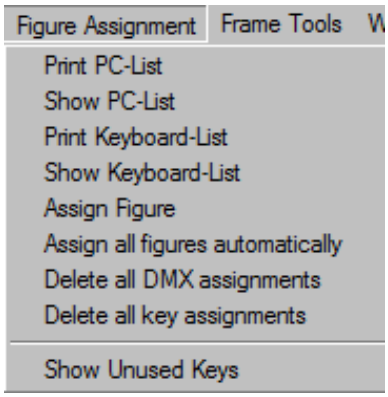


Fig. 64: Menu Figure Assignment

This menu provides information and configuration tools for the figure assignment to keys. As this is a central feature in Laserworld Showeditor, it is recommended to take advantage of the tools offered here working with the software.

6.16.1. Print PC-List

Print a list of the assigned figures per key. It is helpful to have an overview in print sometimes when programming quickly or only by using a keyboard. The list also shows which keys haven't been used for assignments yet.

6.16.2. Show PC-List

Display a list of the assigned figures per key. The list shows which keys haven't been used for assignments yet. In many cases it's easier to open the Live Window instead and see which keys have already been assigned.

6.16.3. Print Keyboard-List

The MIDI-keyboard key assignment list can be printed with using this menu item. The print-out can be attached to the keyboard then.

6.16.4. Show Keyboard-List

The MIDI-keyboard key assignment list can be displayed with using this menu item.

6.16.5. Assign Figure

This provides the same features as the "Assign Figure" Button. Please refer to Chapter 6.11.10 for details.

6.16.6. Assign all Figures automatically

By using this menu item, all existing assignments are reset and the actually loaded figures (Figure Table) are assigned automatically to keys. If there are more figures than can fit on one keyboard set, the figures, which do not fit any more, are assigned to the next tab of figures (switchable by the F-keys). The assignment does not happen in a special order, so it is recommended to manually assign the figures to have better control over the order.
When automatically having assigned the figures, a dialog shows up asking if MIDI and DMX shall be assigned as well.

6.16.7. Delete all DMX Assignments

Delete all present DMX assignments.

6.16.8. Delete all MIDI Assignments

Delete all present MIDI assignments.

6.16.9. Delete all key assignments

Delete all key assignments. Be careful: It is necessary to have figures assigned to keys to use them with most of the output features of Laserworld Showeditor.

6.16.10. Show Unused Keys

As only one figure can be assigned to a certain key (per Tab, switchable by F-keys), it is important to know which keys have been assigned already. The Live Window also offers an overview of the unused keys: Open the window – free key positions are marked as "free". Already assigned keys show the preview picture of the figure.

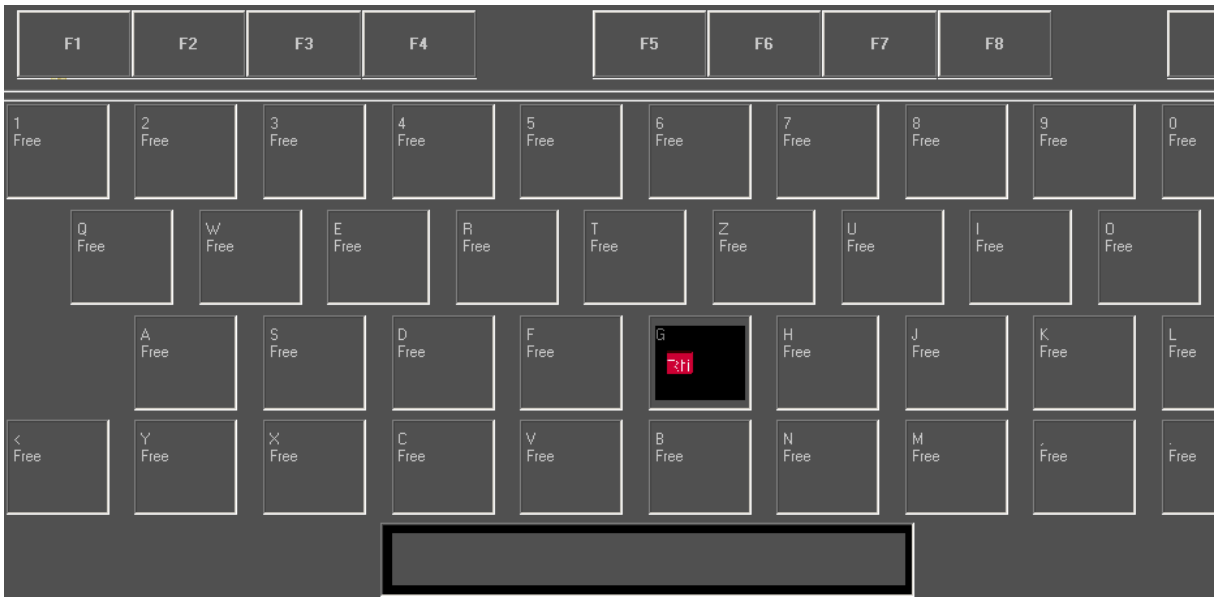


Fig. 65: Free keys shown in the Live Window

6.17. Menu: Frame Tools

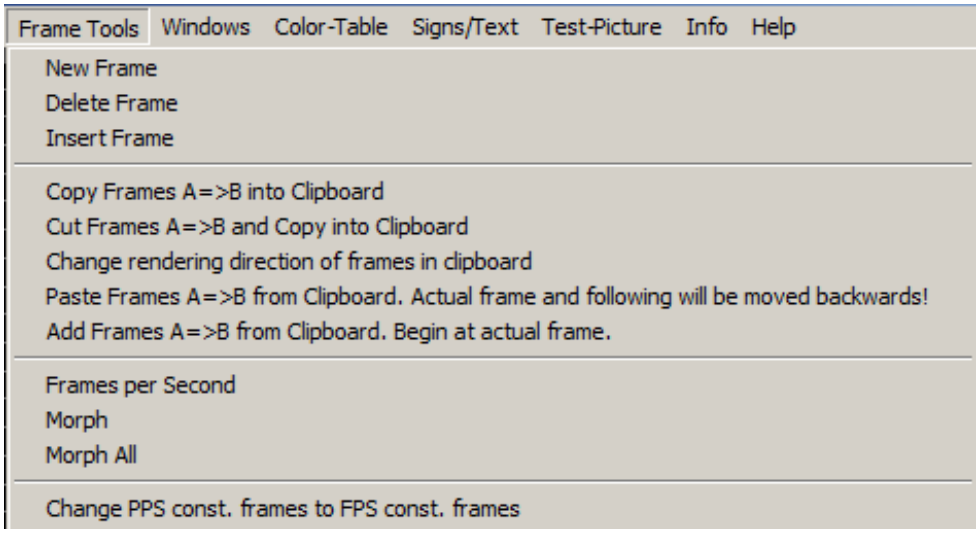


Fig. 66: Figure Editor: Menu Frame Tools

6.17.1. New Frame

New Frame feature, as described in Chapter 6.4.1

6.17.2. Delete Frame

Delete Frame feature, as described in Chapter 6.4.2.

6.17.3. Insert Frame

Insert Frame feature, as described in Chapter 6.4.3.

6.17.4. Copy Frames A=>B to Clipboard

A series of frames can be copied to the clipboard with this menu item. A dialog opens, asking for the start and the end frame to be copied. Of course this feature is only available if the figure consists of more than one frame.

6.17.5. Cut Frames A=>B and Copy to Clipboard

A series of frames can be cut and moved to the clipboard with this menu item. A dialog opens, asking for the start and the end frame to be cut. Of course this feature is only available if the figure consists of more than one frame. It can also be used for deleting of a series of frames by just cutting them, but not pasting them anywhere.

6.17.6. Change rendering direction of frames in clipboard

This feature inverts the render direction of the frames in the clipboard, meaning that the first frame becomes the last one and vice versa (same with the frames in between). It is necessary to copy or cut a series of frames to the clipboard first (see 6.17.4 or 6.17.5).

6.17.7. Paste Frames A=>B from Clipboard

Frames copied or cut to the clipboard (See 6.17.4 or 6.17.5) can be pasted to the active figure with this menu item. The pasted frames are placed before the active frame.

6.17.8. Add Frames A=>B from Clipboard

The "Add Frame" feature works similar to the Paste feature (See 6.17.7), but it pastes the frames from the clipboard to existing frames – so the drawings are added to those frames. The first "added" frame is added to the active one.

Example: We assume that the frames 0 to 100 show a rotating plane. Frame number 50 is selected / active. Another, 100 frames lasting animation is copied to the clipboard (e.g. a jumping ball).
With using the "Add Frames" feature, the result would be: Frames 0 to 49 show the rotating plane, frame 50 to 100 show the rotating plane AND the jumping ball, frame 101 until 150 show the rest of the ball animation, but no rotating plane (as this animation finished at frame 100 already).

6.17.9. Frames per Second

This menu item provides the same features as the "Frames per Second" button (See 6.4.6).

6.17.10. Morph

This menu item provides the same features as the "Morph" button (See 6.4.4).

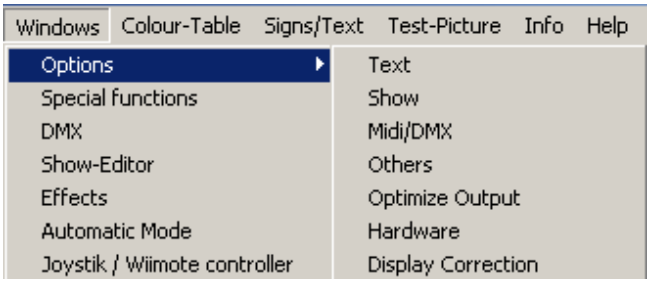
6.17.11. Morph All

This menu item provides the same features as the "Morph All" button (See 6.4.5).

6.18. Menu: Windows

6.18.1. Options

This menu and its sub-menus provide direct access to the settings in "Options" (described in 8, also compare to 6.11.5 and the initial settings in 2.8). It is also possible to reset the window positions through one of the sub-menus.



6.18.2. Special Functions

This menu item offers access to special additional features of Laserworld Showeditor. Some of these special features can be very helpful especially for the conversion of ILDA. A click on the menu item opens a dialog (Fig.62) to access the features.
The most important tools are:

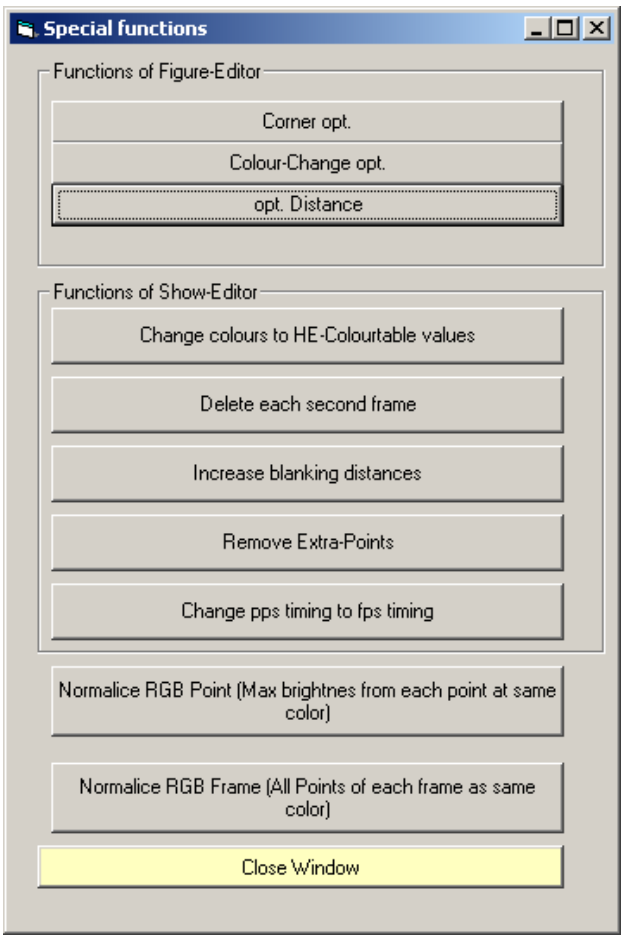


Fig. 67: Special Functions: Dialog to access special tools

- **"opt. Distance"** can be used for optimizing a figure. The optimization works in combination with the "Path-Tool" (See 6.18.9). First apply the "opt. Distance", then the "Path Tool" . "Opt. Distance" splits the distances of a line into shorter pieces to sizes that match the setting in *Options->Optimize Output->Max. Distance Laser ON*

- **"Change colors to Colortable values":** If an ILDA file with custom color palette is imported, e.g. from Pangolin, this button allows for changing the color palette to the standard Laserworld Showeditor one. After the conversion the ILDA file/frame is fully compatible for further use in Laserworld Showeditor, including saving it as *.heb file.

- **"Normalize RGB Point/Frame":** This feature enhances the color values of points to achieve maximum brightness. The color values are thus adapted to the closest color with at least one laser source on full power.
Two optimization options are possible: "enhance brightest point of frame to maximum" or "enhance each point to maximal brightness". Try the two versions on the very frame to see the results.

6.18.3. DMX

This menu item provides the same features as the "DMX" button: It opens the DMX-Window (See 6.11.4).

6.18.4. Timeline

This menu item provides the same features as the "Timeline" button: It opens the Timeline window (See 6.11.2).

6.18.5. Effects

This menu item provides the same features as the "Effects" button: It opens the Effects Window (See 6.11.3 and 7).

6.18.6. Automatic / Sound Mode

This menu item opens the window of the Automatic-Laser-Player (Fig. 68).

It offers two modes of operation:

1) Automatic Mode:
Automatic mode operation can output to paths A-D, each with 3 tracks. With rhythmically clicking on "Klick Beat", the speed of the very output track can be specified. A generator then calls a random figure from the active Figure Table on every beat. With "Start" the output on the very track is activated.

2) Sound Mode:
Laserworld Showeditor allows for sound active laser control in combination with WinAmp VB Link. If the music tracks are played through WinAmp, Showeditor can automatically analyse the music signal frequency and then adapt the speed of the laser figures to the beat.

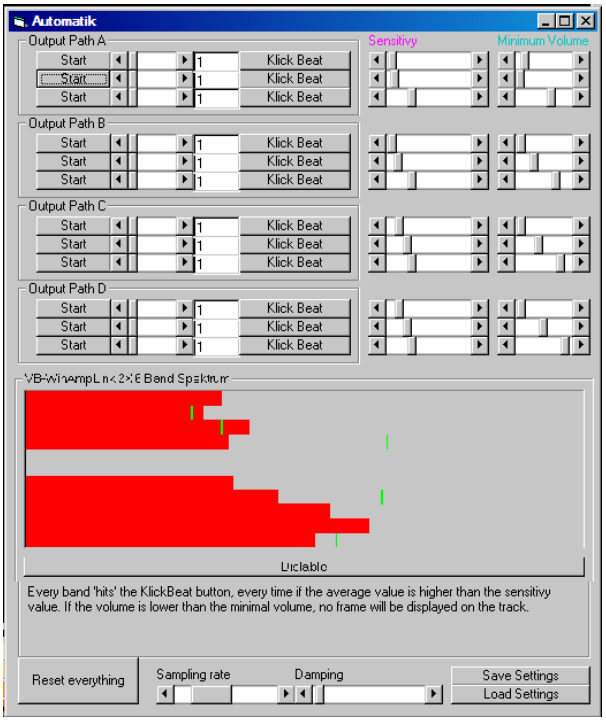


Fig. 68: Automatic Mode: Automatic-Laser-Player

To get this feature going, a WinAmp-plugin called "WinAmp VB Link" is required. It is not included with Laserworld Showeditor, but must be installed separately. It can either be downloaded form the download section on the website (http://www.showeditor.com/en/downloads) or the version included with the installation package of Laserworld Showeditor can be used.

Search for the file "vblink10.zip" within the program folder of this software. The file "readme.txt" describes the installation of the plugin. On http://www.showeditor.com there are tutorials on how to use this plugin, also on different operating systems. In some rare cases it may be necessary to use some special tricks to get the drivers working. This is explained in the tutorials.

A "Softwarecave" logo in the upper left corner shows that the plugin is active.
Click "enable" in the automatic mode window, so the plugin can start to analyse the frequencies. It is necessary to start the tracks by clicking on the "Start" button of the very track. If music is playing in WinAmp, the incoming frequency tracks should be visible in the VB-WinAmp Link area. (See Fig. 69).

The assignment of the tracks to the frequencies is split by frequency range, so track A is assigned to the lower frequencies, B to the middle frequencies and D to the high ones. Six of the tracks are triggered by the left sound signal, the others are triggered by the right sound one.

Many different features and settings are possible, but the description here is kept on a basic level. It is recommended to try and find out.

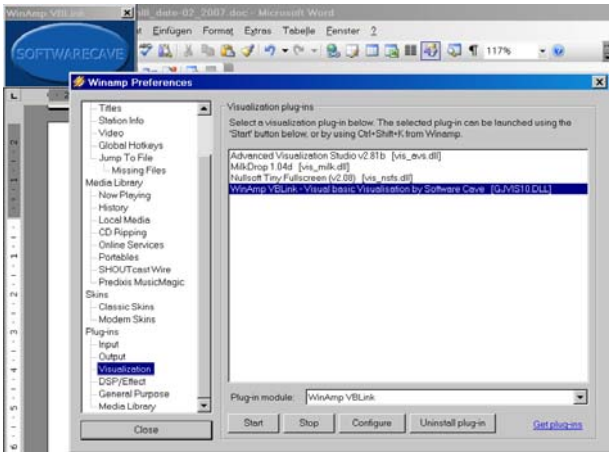


Fig. 69: Setup of WinAmp-plugin (WinAmp/Options/ Visualizations/Select plugin) and "Softwarecave" logo (upper left corner)

The buttons "**Save**" and "**Load**" allow for saving or loading of the specific settings. "**Reset everything**" does a full reset of the settings, be careful. The scrollbar "**Sampling Rate**" sets the interval for updating the intensity value through the frequency analyser. It is recommended to increase the sampling rate value on fast computers.

LineIn Sound Mode

WinAmp can also handle the LineIn input of the PC (for DJ´s music, from a mixer etc.). To use this feature, simply enter "linein://" as URL.

6.18.7. Beatcounter

The "Beatcounter" helps with determining the beats per minute (bpm) of a song. On clicking this menu item, a dialog opens (Fig. 70). This tool is also available in the Timeline Window via the menu "Tools".

If a music file is loaded to the Timeline editor (via "New Show"), a click on "**Play Song**" starts playing it. Any key except Space or a right mouse click in the black area resets the counter. By either rhythmically left clicking in the black area or rhythmically pressing the space bar, the clicks are counted. Above the window the actually calculated bpm-rate is shown.
The red bar on the right side shows the tapping speed related to a calculated average, so if the red bar is above the black line, the tapping is too fast, if it's below it's too slow.

Fig. 70: Beatcounter: Dialog to count beats. (see also "Show Editor/ Tools")

Click "**Stop Song**" to stop the sound output.
The longer the beat is recorded, the more precise is the calculated BPM.

6.18.8. Tool: Wave-Generator

The "Wave-Generator" is a special tool for automatically creating waves and other periodic figures. The tool appears to be complex, but it isn't: It provides a multitude of features that result in stunning, automatically created animations that would take plenty of time if they would be created manually.

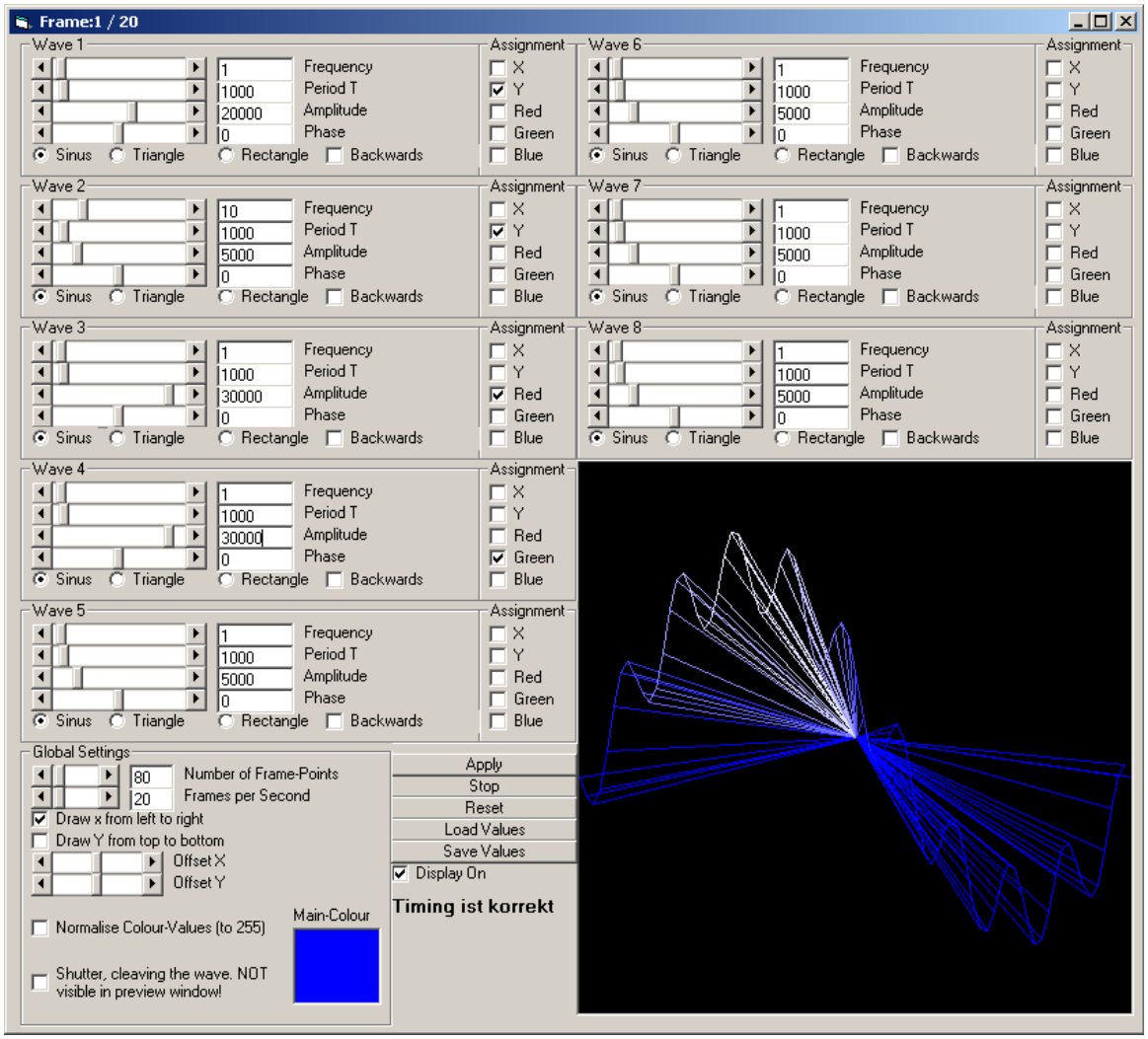


Fig. 71: Extra Tools: Wave-Generator

The working principle of the Wave Generator is as follows (very technical, not directly necessary for just using the tool):
The Wave Generator consists of 8 single generators. Each can generate its own waveform. The amplitudes of the waveforms are dependent on space and time.
The amplitudes theoretically begin with a range from -100% to 100%, because the "real" amplitude (height of signal) at least arises from the combination with a point property (compare to "Wrench Tool" chapter 6.3.6). The amplitudes can be assigned to a point property like X/Y coordinates or color. All generators work in a similar way.

Every wave is characterized by amplitude, frequency (in space), period (in time) and phase.

The **frequency** describes the number of peaks and wave trough in the space. In Fig. 71 the frequency is 1 for wave 1 and it is assigned to the y coordinates with amplitude 20000. Thus the generated wave has 1 peak and 1 wave trough in total. The generator for wave 2 is also assigned to the y coordinates, but has a frequency of 10 and smaller amplitude of 5000. That generates the smaller wave with 10 peaks, which is interfering the big wave (see preview window in Fig.72).

The **period T** describes the time one point on the wave needs to reach the peak after being in the wave trough. The duration is entered in milliseconds. In the example in Fig.72 for the wave 1 the duration for one oscillation is 1000ms, thus it needs 1 second for the oscillating points to fulfil one complete period (to go up and come down again).

The **amplitude** describes the "intensity" of the wave (or the color when used). In other words: It describes the height and the depth of the peak and wave trough. The generator internally calculates in relative values (in %), because the amplitudes can be assigned to different point properties. Colors are described internally by values from 0 to 255 for each of the base colors RGB, coordinates can have values from -32767 to +32767. You see in Fig. 71 the big wave with amplitude 20000 and the interfering smaller wave with amplitude 5000. Furthermore you see in the picture the generators 3 and 4, which are assigned to red and green, respectively. Because they have the frequency 1 and amplitudes of 30000, they generate the white color (in combination with blue), which is partly dying the wave.

The **phase** describes, how much degrees the oscillation is shifted (in comparison to a wave with phase = 0). An example should explain the property of the phase: Let us take a sinus oscillation for the x-axis and for the y-axis, too. The result will be a line, rotated by 45° to the axes. To get a circle, we need a cosines oscillation for one of the axes. Now remember the basics of trigonometry: A cosine-function is the same as a sinus-function with a phase shift of 90° (when sin(x) = 1 then cos(x) = 0 and sin(x+90°) = 0 and the other way round).

All waves can be created as triangle- or rectangle-oscillations and the display can be altered in the direction (backwards), too.

HINT: The generator is designed to be very flexible. There were some requests of users to accept only certain conditions in order to simplify the handling. But this would restrict the flexibility. Because the flexibility has higher priority, some circumstances have to be taken into account:

Problem 1: Long times for calculations and very big files:
If values for the frequency and/or duration are used for the different generators, which are not integer multiples from each other, then the time to calculate the wave can be very, very long! Furthermore the size of the file significantly increases due to the large number of frames that need to be created.

Please feel encouraged to try and find out the effects of the very settings.
It's not necessary to calculate any frame numbers – just pay attention to the warning:

It is suggested to not exceed 1000 frames.

Global Settings:

The "**Global Settings**" apply to all generator tracks.

"**Number of Frame Points**" determines the number of points of the wave (of one frame).

"**Frames per Second**" adjusts the frame rate for the. This value can be changed later as well by adjusting the "Frames per Second", see chapter 6.4.6. If the warning "Framecount >1000" is shown, reducing the frame rate to e.g. 30 may solve the problem of creating too many frames.

Activating "**Draw x from left to right**" creates a horizontally oriented wave (used in the example shown in Fig. 71).

Activating "**Draw y from top to bottom**" creates a vertically oriented wave.

Both options activated results in a diagonally oriented wave. If one of the options is chosen, then all amplitudes assigned to the other axis are ignored.

"**Normalize Color Values (to 255)**" sets the color values to at least have one of the laser sources in the laser operate at full power – this increases the visibility of the colors, but may change the color shade a bit.

The "**Shutter**" cleaves the waves to beams. The wave consists of many single beams following the course of the wave without having any links in between the points.

The button "**Apply**" starts the calculation of the wave and imports it to the Figure Table as figure 0. There it can be modified further (e.g. by applying morphing to get a smoother output) and saved to the hard disk.

The button "**Preview**" (toggles to "Stop" if Preview is active) displays a simulation of the created wave in the preview area. Another click on the button stops the simulation.

The button "**Reset**" resets all values.

The button "**Load Values**" allows for loading previously saved generator settings.

The button "**Save Values**" allows for saving wave generator settings.

6.18.9. Tool: Path Tool

A new animated multi-frame figure can be created with this tool, showing a moving frame alongside an animation path.
The tool consists of several modules for the input:

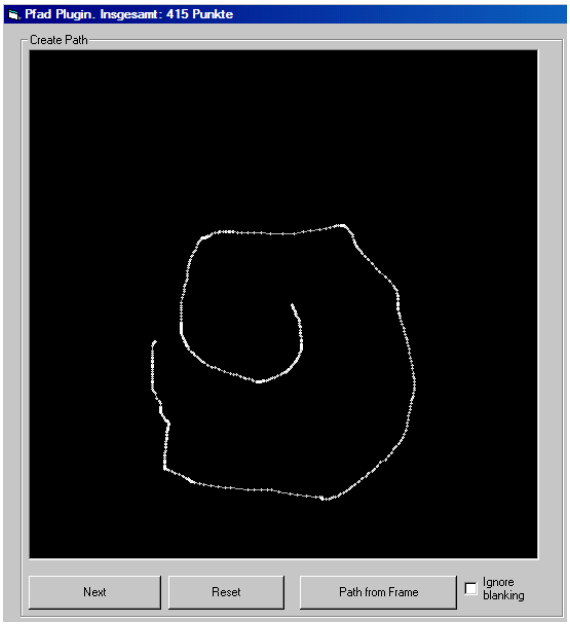


Fig. 72: Extra Tools: Path-Tool. Input of path

A) Input of Path
Fig. 72 shows the dialog for drawing the animation path. It is either possible to draw the animation path with the mouse or to import the animation path from the active figure in the figure editor by clicking "**Path from Frame**". For verifying the results, activating of "**Ignore Blanking**" can help.

Hint:
The colors of the figure for the path (Path from Frame) can be transferred as well. Figures with color gradient can give very nice results.

To draw the path, click the button "**Next**" to go on with the process. If the drawing failed, click "**Reset**" to clear the window and try again. If the path shall be taken from a figure of the Figure Editor, it is useful to apply the function "Optimize Distance" via the menu *Windows -> Special Features -> Opt.Distance* to add intermediate points on straight parts of the path.

B) **Path Edit Window**
With the Path Edit Window (Fig. 73) it is possible to smoothen the course of the drawn path via the button "**Smooth**". The number of points defining the path can be specified (button "**Number of Points**"). If the path was taken from a figure of the Figure Editor, it is usually not recommended to use the smoothening option, as the corners of the shape become round. After all editing has been done, click on the button "**Next**" to move on to the last module of the Path Tool.

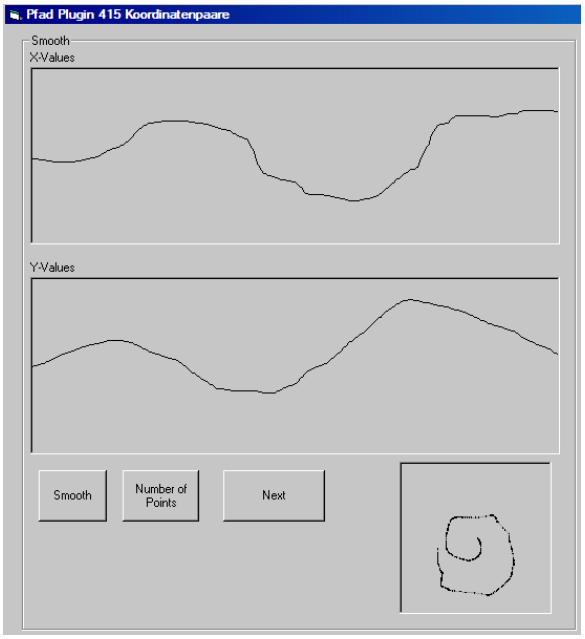


Fig. 73: Extra-Tools: Path-Tool. Path Edit Window

C) **Selection of Figure and Options**
With this module (Fig. 74) the figure that shall move along the path can be selected. This can be the actively selected figure from the Figure Editor (Option "**Source/ Use frame from main-window**") or a "Snake" line (Option "**Source/Snake/Line**").

If "Snake" line is selected, a path line is created. The length of the path line is specified by the number entered in "**Count of Pictures**".

If "**Use frame from main window**" is selected, the active figure from the Figure Editor will be displayed in the window of the module and thus is selected as figure for the movement on the path.

If the figure has not been chosen yet, it must be done at this point. If the window does not update the figure automatically, click on "Snake" and then again on "Use frame from main window".

The red-green colored circle indicated the anchor point and can be positioned with a mouse click on the new position. This anchor point moves on the movement path later.

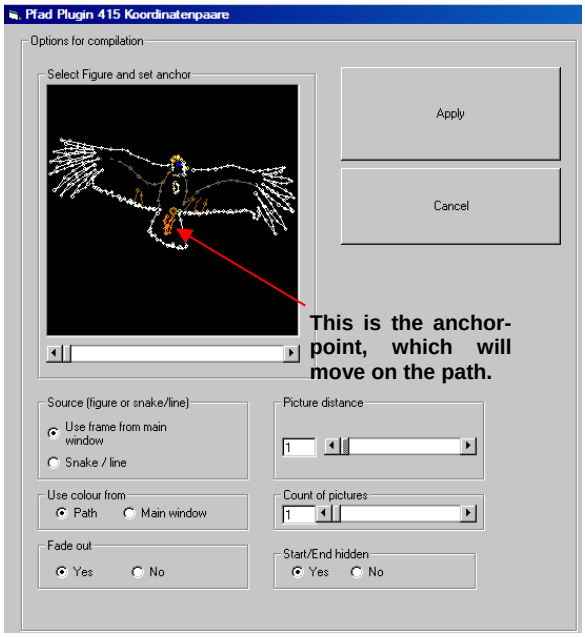


Fig. 74: Extra-Tools: Path-Tool. Selection of Figure and Options.

The "**Use color from**" option is used when creating a Snake line. It specifies if the color values are taken from the colored path ("Path") or from the Figure Editor ("Main Window").

Activating the option "**Fade out**" reduces the brightness (fades out) at the end of the path line or the last figures.

"Picture Distance" (upper scrollbar) specifies the distance of the points drawn for the path line, or, if a figure is moved, the distance between the copies of the figure.

"**Count of pictures**" (lower scrollbar) specifies the length of the path line or, if a figure is moved, the number of figure repetitions that are moved on the path.

"**Start/End hidden**" (blanking on start and end) specifies if the first and the last figure of the path are shown.

6.18.10. Tool: Stretch Lines Tool

The Stretch Line Tool creates a new, animated figure with multiple frames. This new animation must base on an existing figure (has to be active in the Figure Editor). The effects applied with the Stretch Lines Tool make the figure appear as just being drawn (lines are slowly appearing from the single points and end up as final figure)

"**Line Stretch for each line**" means that the drawing of the figure is simultaneously done from each point. Lines are drawn at the same time. Click "Apply" to use the

effect with the active figure. The textbox allows for specifying the number of frames to be drawn.

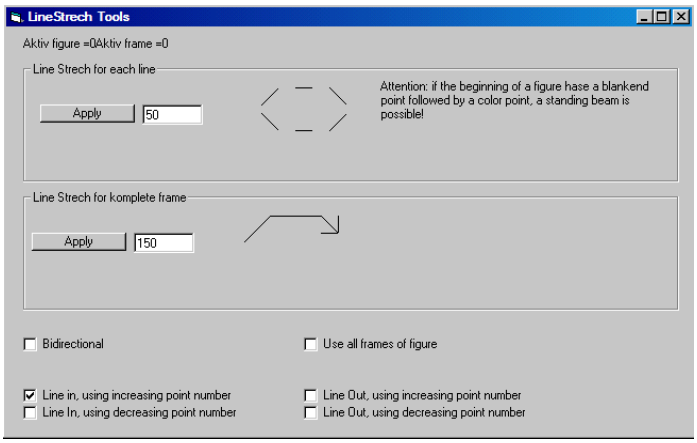


Fig. 75: Extra Tools: Stretch Lines Tool.

"**Line Stretch for complete frame**" starts drawing the figure in one point and then draws the lines until the figure is completed. Click "Apply" to use the effect with the active figure. The textbox allows for specifying the number of frames to be drawn.

If the option "**Bidirectional**" is checked, the figure is drawn line by line, and when it's complete it is erased line by line again. (reverse order of the drawing).

The option "**use all frames of figure**" is applicable for multiframe figures only. If this option is checked, the next frame of the source figure is used for the next drawing step.

The options "**Line in, using increasing (decreasing) point number**" are used to specify the creation type of the figure. "Increasing" or "decreasing" defines the direction of the process.

The options "**Line out, using increasing (decreasing) point number**" are used to let the figure slowly disappear. "Increasing" or "decreasing" determines the direction of the process.

6.18.11. Tool: Bitmap Trace Tool

The Bitmap Trace Tool allows for easy conversion of simple logos and graphics to ILDA readable files. The more complex the picture, the more difficult is it for the software to output a proper result. Best results can be achieved with using line graphics.

Adaptions to the way Showeditor interprets and converts the pictures can be made by adjusting the slider settings in the tool window.

This is how it works:

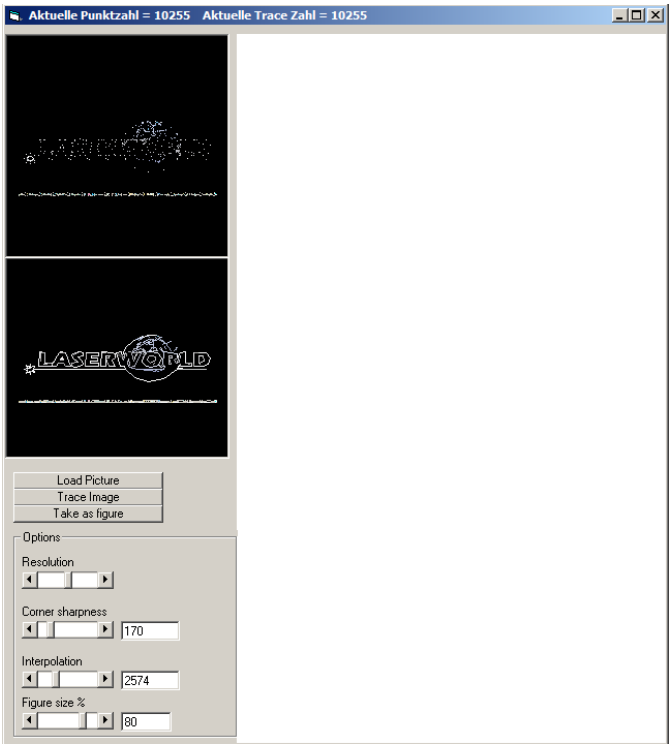


Fig. 76: Extra Tools: Bitmap Trace

First load a picture by using the button "**Load Picture**". Then click on "**Trace Image**" to start the tracing. With the tracing the system tries to automatically convert the pixel image to a vector graphics.

To avoid getting a flickering projection later, it is recommended to not exceed a limit of 2000 points in total for a 30kpps Galvo system.

The number of "trace points" can be controlled with the four scrollbars: Moving them to the right means "more points", to the left means "fewer points".
The challenge is to find the ideal setting with as few points a possible but still achieving a good result.
It is helpful if the image that shall be converted has a width of about 800px and any unnecessary parts should have been already deleted with graphics software prior to tracing.

If the converted result is acceptable and shall be imported, a click on "**Apply to figure**" creates the respective figure in the drawing area of the Figure Editor.

6.18.12. Tool: Color Shove

The Color Shove tool creates a multi-frame animated figure from a single frame by animating the colors of the figure: The different colors are shoved through the figure point by point (one point per frame), so the figure gets kind of a color sparkling effect – but only with the colors it consists of.

Example of how this tool works:
A triangle is given – side 1 is red, side 2 is green and side 3 is blue. In total there are 3 colors (4, if the blanked points are respected). When applying the Color Shove, a new figure is created consisting of 3 (4) frames. The triangle shape remains the same, but on each change of a frame, the respective color moves on by one point. So the sides of the triangle change their color by every frame change.

This of course also works with more complex graphics. As the tool only uses the colors already present in the figure, the animation created by the Color Shove looks homogenous and matches the general color set.

The Color Shove Tool also works for multi frame figures, but only the colors of the first frame are shifted. For the following frames the original x/y coordinates of the animation stay the same, but the colors set from the first frame is pushed through. Due to this it is necessary that the number of points should be the same per frame, otherwise the software needs to interpolate points that are missing – which may lead to unwanted results.

Hint:
To decrease the distance between points, it is recommended to use the "Opt. Distance" tool. (See chapter 6.3.6 and especially 7, shown in Fig. 77).

Important:
For using the tool, an already existing and saved figure is needed.
Remember to save all changes to an existing figure prior to applying this tool!

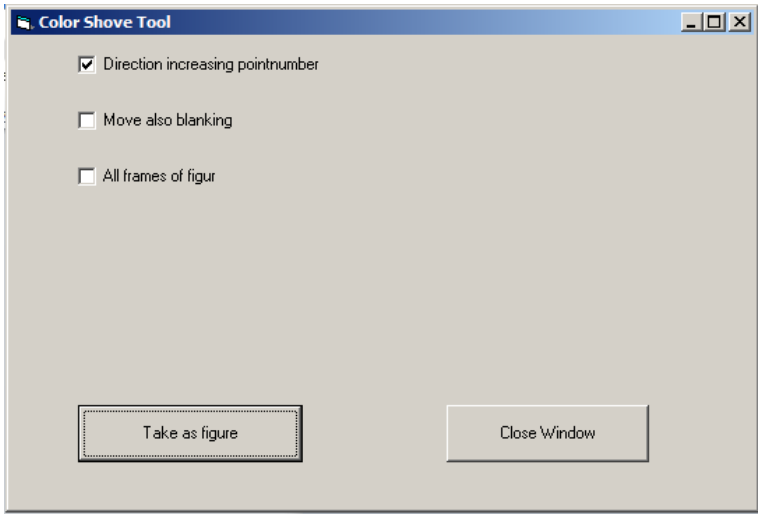


Fig. 77: Extra Tools: Color Shove

When using the Color Shove Tool, several choices are possible:

● **"Direction increasing point number"**
This option determines the direction to shoving the colors.

● **"Move also blanking"**
When active, also the blanked points are shoved (the property "invisible" is regarded as color and is shoved through the figure).

● **"All frames of figure"**
This option works for multi-frame figures. It adds a special color shove, consisting of two effects:
1) The colors of the first frame are shifted through all points the frames created by the Color Shove Tool.
2) The coordinates of the points reference to the ones in the existing frames of the figure.

It is recommended to test the different features of the Color Shove Tool to understand their behaviour and to learn more about their potential.

6.18.13. Tool: Insert Color Gradient / Insert Smooth Colors

This tool inserts a color gradient to the figure. There is already an option "Use Soft Color" within the Effects Window (See chapter 4.3.) and indeed, this function does the same, except for one main difference: The "Use Soft Color" effect is processed just before the output of the figure. If it is e.g. intended to shift colors of a figure with color gradient or to use a colour gradient for the path tool, then "Use Soft Colour" has no effect.
The Insert Color Gradient Tool allows for directly creating color gradients and adding them to the figure. As the color gradient is then applied to the very frame, further tools and modifications can be applied with respect of the applied gradient.

It is necessary that the active figure has been saved, before applying the tool.

With using the tool a new figure is created. A dialog opens, asking for the desired transition effect for the color gradient.

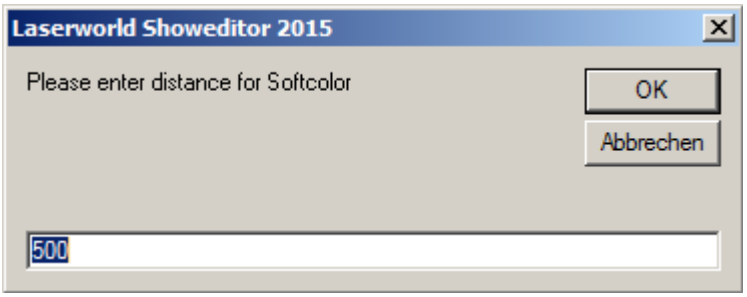


Fig. 78: Extra Tools: Dialog of "Insert Color Gradient"

6.18.14. Live Window

Opens the Live Window (See chapter 13).

6.19. Menu: Color Table

The color table is the central part of the software to handle color in- and output. Different color table settings are possible, so this menu offers different options for customizing the settings.
The color table adaptions are not necessary for the utmost of shows and figures, but especially older files may require it.

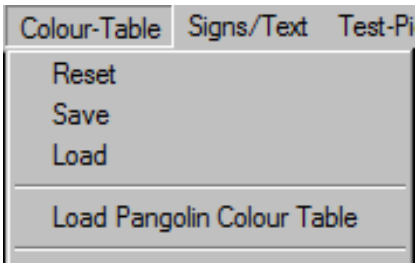


Fig. 79: Figure Editor: Menu Color-Table.

6.19.1. Reset

"Reset" resets the Color Table to default colors (Laserworld Showeditor Table).

6.19.2. Save

"Save" saves the active Color Table. This is useful if a different ILDA color table is imported.
Each show can use its own color table, which will automatically be saved together with saving the show.

6.19.3. Load

Load a previously saved Color Table.

6.19.4. Load Pangolin Color Table

Pangolin color tables were often used for ILDA frames in the past.
To convert a file that uses the Pangolin color table to using the standard Showeditor table, open the file, apply the "Load Pangolin Color Table" and export the file as ILDA file again. With doing so, the standard Showeditor color table is applied.
It is also possible to separately convert frames to the Showeditor Color Table by using the *Special Features->Change Colour Values to SE Values* feature (See chapter 6.18.2)

6.20. Menu: Signs/Text

6.20.1. New Text or Sign

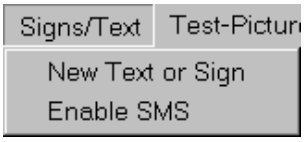


Fig. 80: Figure Editor: Menu Signs/Text

Simple words and signs, not animated
To use this kind of design, the text option "Morphing Text" should be selected.

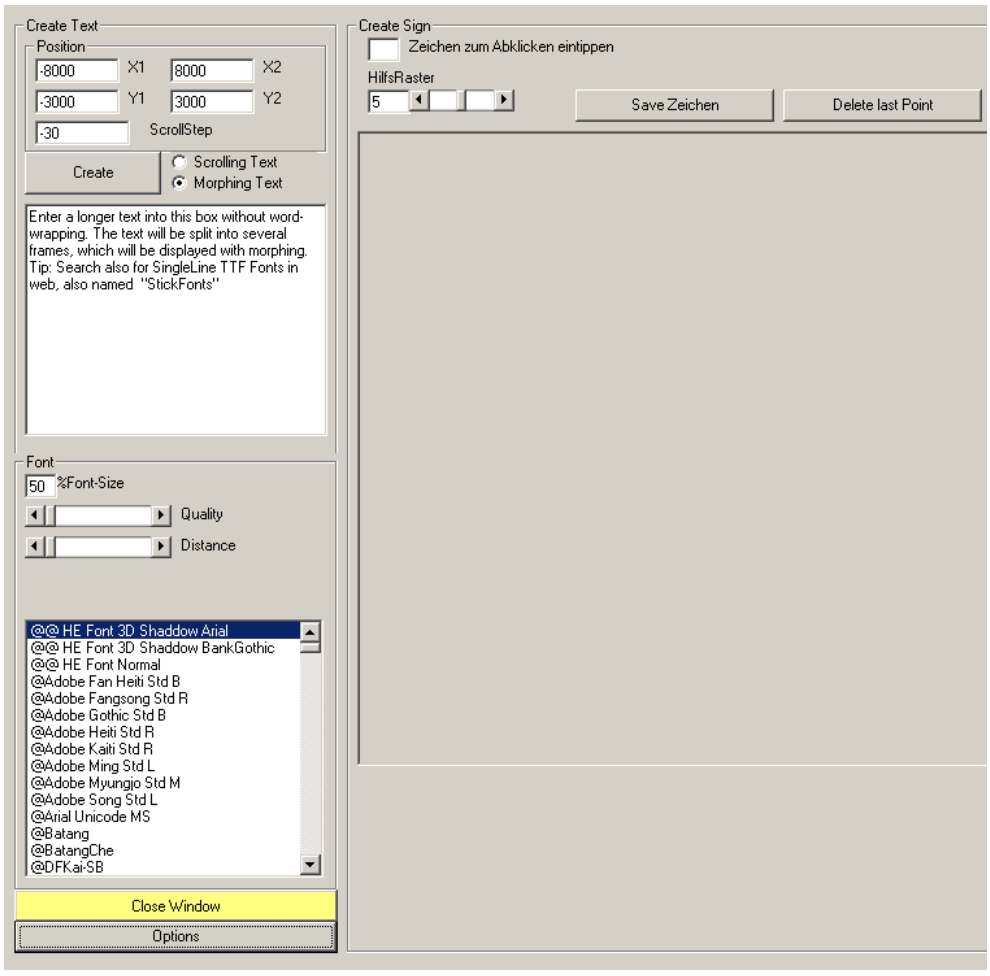


Fig. 81: Figure Editor: Dialog for text options

After having made the appropriate adjustments, click "Close Window".
When activating the text tool with left mouse click, the new settings have effect: In the drawing area, click at the starting point of the first letter: The dialog box for entering the desired text shows up. Please confirm with OK after having typed the text.

This procedure is good if only single words shall be projected. Longer texts will be cut at their end. If longer texts should be displayed and text wrap is necessary, please repeat the above procedure per text line or use the following text creation method.

Long texts, animated → Morphing Text
Long texts and animated texts need to be created directly in the text dialog. The checkbox "Morphing Text" needs to be checked.

Right click on the A symbol to open the Text Editor.
The text can then be entered into the text box in the left column:

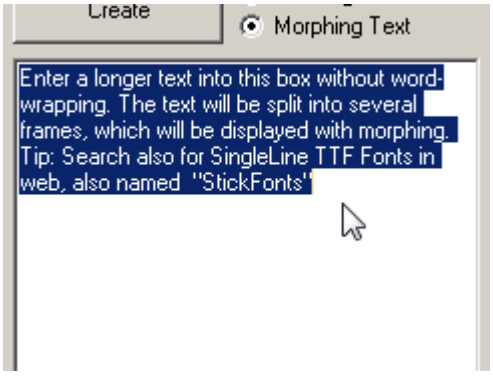


Fig. 82: Text Editor: Write longer texts here

When having entered the text, Showeditor automatically shapes the text correctly when "Create" is clicked. The continuous text is automatically wrapped in a way that not too many characters must be displayed at one – this avoids flickering of the text projection, as it doesn't stress the scanner motors too much. When clicking "Create", a dialog box opens asking, if the characters should morph. This effect makes the transition from one text line to the next one much smoother, as the characters seem to re-shape from the old character to the new one. So if this is a desired effect, click yes.

The Drawing Area shows the first frame of the text animation sequence. To see all frames of the figure, drag the horizontal scroll bar in the left column of the Figure Editor, just under the "Frames per Second" button. This allows for checking each frame of the figure individually.

IMPORTANT: If a text is created within the Text Editor, a New Figure is generated automatically when "Create" is clicked. This means that any changes to the previous figure, that haven't been saved, will be erased!

Long texts, animated → Scrolling Text
Scrolling, animated text can be created in two different ways:

A: Using the text box in the Text Editor window (Right click on the A symbol to opens the Text Editor), just enter the text and change the radio button from "Morphing Text" to "Scrolling Text".
An additional setting is important to be made for Scrolling Text: The coordinates of the area in which the text shall scroll must be specified. The X and Y values can be directly entered in the area above the "Create" button. As it's not easy to guess the X and Y values for the desired position, there is another option for proper positioning – see B.

IMPORTANT: If a text is created within the Text Editor, a New Figure is generated automatically when "Create" is clicked. This means that any changes to the previous figure, that haven't been saved, will be erased!

B: To create a running text without the need to enter X and Y coordinates for the scroll-area definition, first settings in the Text tool options should be checked for being set to "Scrolling Text" (Right click on the A symbol to opens the Text Editor). Then do not click on "Create", but just close the window. Again select the text tool ("A") with a left click and then draw the scrolling area by click and drag in the drawing are.
The text-entry dialog opens and the scrolling text can be entered.
This method is the most convenient one, and used in most cases.

IMPORTANT: As this method does not use the Text-Editor for the creation of a multi-frame figure, but uses the direct text feature of the Figure Editor, existing frames are not erased and no new figure is created on using the tool. Due to this it is possible to display several running texts in one figure - even different scroll speeds per scrolling text line are possible!

Special Characters handling

Special characters may not be displayable with the desired font. As there are many different characters possible, the Text-Editor comes with an additional drawing area for special characters. The Character can be entered (or copy-pasted) into the input box and then the visible points as well as blank points for this very character can be drawn – and saved. If they have been saved, it is possible to use this special character within the text as if it was possible to display it with the very font – the Text Editor will substitute the special character (which didn't display properly before) with the hand drawn one.

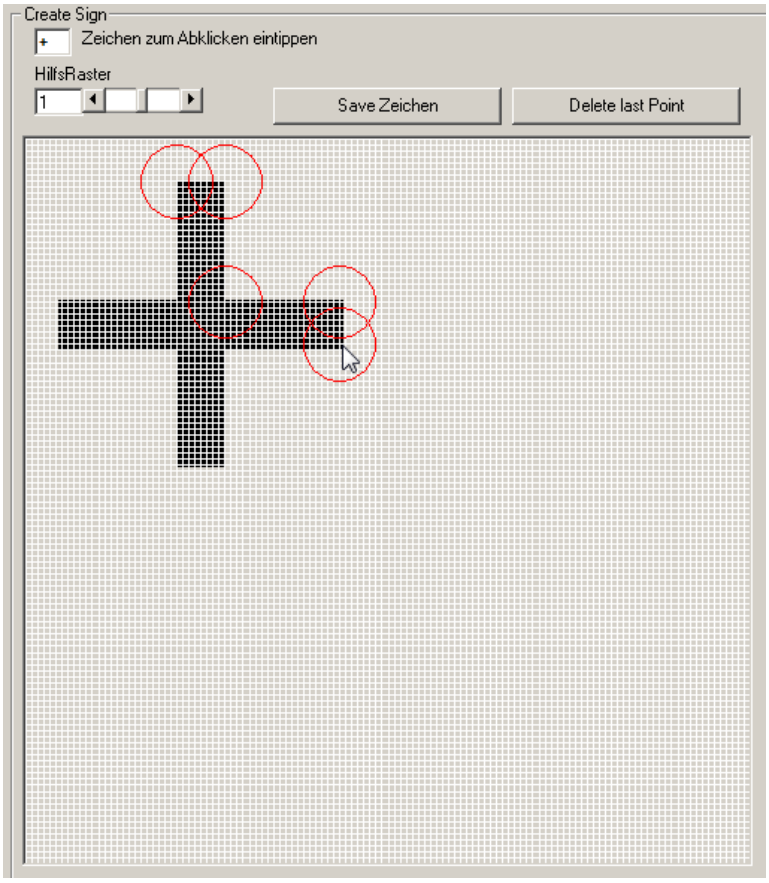


Fig. 83: Text Editor: Special Characters can be copy-pasted to the input box and then be redrawn manually in the drawing grid

6.20.2. Enable SMS

Laserworld Showeditor supports the handling of Text Messages (SMS) for laser projection interactivity. The mobile SIEMENS TC35I GSM module is supported. Other mobile receivers haven't been tested yet, but may work.

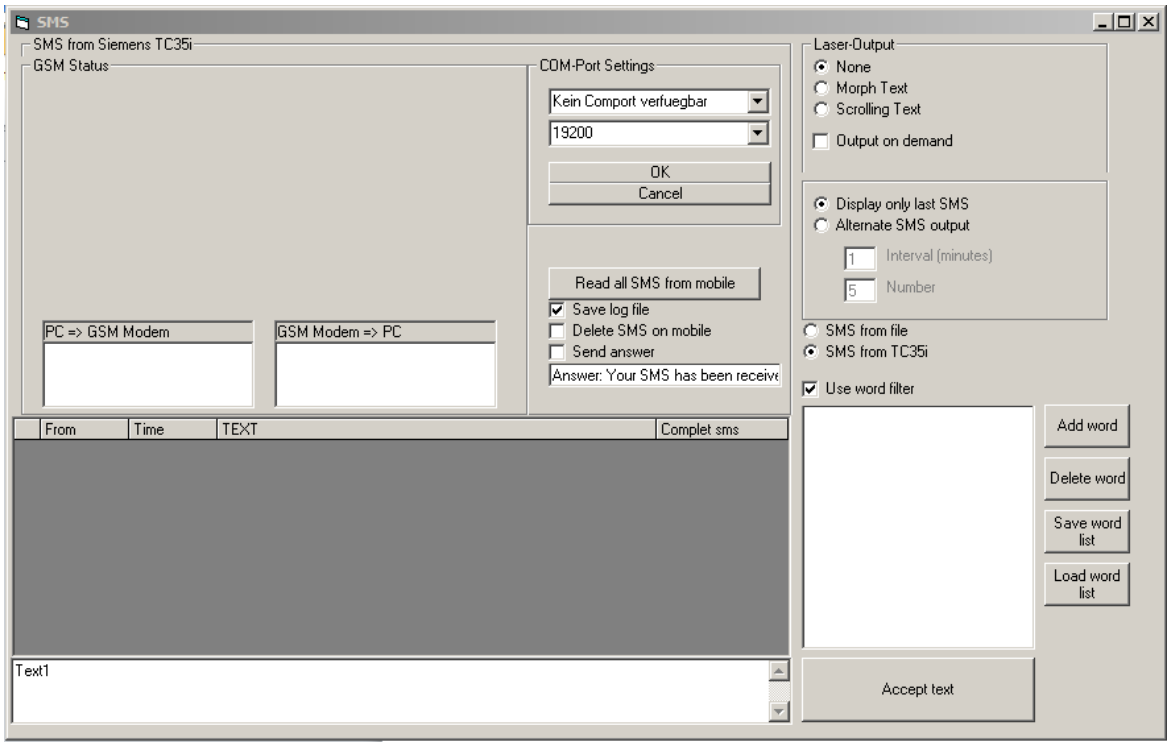


Fig. 84: Figure Editor: Menu Signs/Text Enable SMS

A control window for the SMS display shows. Choose the COM port the mobile receiver is connected to. A baud-rate of 19200 should be sufficient. If distortions happen, a slower baud-rate is recommended.

A click on "OK" establishes the connection to the mobile receiver and (if not done yet) to the mobile provider (requires PIN code of the mobile card). It is recommended to switching on the mobile in advance and entering the PIN-code.
If this has already been done, the request of the software asking for the PIN can be skipped by entering "xxxx".
It should work to enter the PIN in the software as well, but in case of a transmission error the mobile receiver might become locked unintendedly.

The **upper left area** of the dialog (GSM Status) shows the **actual status information**.

The **lower left area** shows the received messages. The currently displayed message with the laser is marked in the message table. Clicking on the very message allows for editing it.

The way of displaying the messages can be set in the **upper right area** of the dialog (Laser output): morphed or scrolling text are options for output, "None" suppresses any output.

A "**bad word filter**" can be set in the text area on the lower right. Words of this list show as XXX in the output. Bad word lists can also be saved and loaded again.

The "Read all SMS from mobile" area provides several logging and reply features.

SMS from File or **SMS from TC53i**
In general the SMS should be handled by the TC35i. In addition to that there are several programs available that convert SMS to *.txt-files (e.g. http://www.t2slive.co.uk). These *.txt-files then can be imported into the program and handled like original TC35i messages.

6.21. Menu: Test Pictures (and Fix Figures)

The menu Test Pictures opens a second figure table that contains standard test patterns. In addition to this, all figures that are stored in the folder "FixFiguren" are loaded in this second table.

6.21.1. Test Pictures

The test pictures are stored in the folder "TestBilder" and have the file extension *.bin. Test pictures created specifically for Laserworld Showeditor have the *.heb file format.

Important: The DAC output of the test pictures is **not optimized**! They are meant for Galvo scanner driver tuning only! Software settings, especially optimization settings in the software, have no effect!
For optimizing the software output to the DAC, use the test pictures that reside in the folder "HE_s_TestBilder". Those are most suitable ones for configuring the output optimization.

Any figure can be assigned to keys and thus be used in shows.

The test picture table closes when the menu item is unchecked.

6.21.2. Fixed Figures

Laserworld Showeditor allows for storing basic figures that can be accessed and used independently of the loaded show. Those are called "Fixed Figures". Any figure that is saved in the "FixFiguren" folder is considered a Fixed Figure and is treated by Showeditor accordingly.

6.22. Menu: Info

6.22.1. Version

This menu item provides information about the installed software version and the release date.

6.22.2. Imprint

Displays the Imprint and Disclaimer

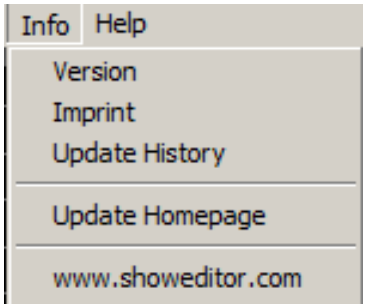


Fig. 85: Figure Editor: Menu Info

6.22.3. Update History

This menu item opens the Changelog on the www.showeditor.com website that lists all the latest software improvements per software version.

6.22.4. Update Homepage

Directly opens the Showeditor website with the latest software versions.

6.22.5. www.showeditor.com

Link to the website of Laserworld Showeditor

7. Effects & Animation

The Effects Window provides mighty features for animating and modifying the active figure. The Effects Window opens with a click on the button "Effects" in the right column of the Figure Editor.

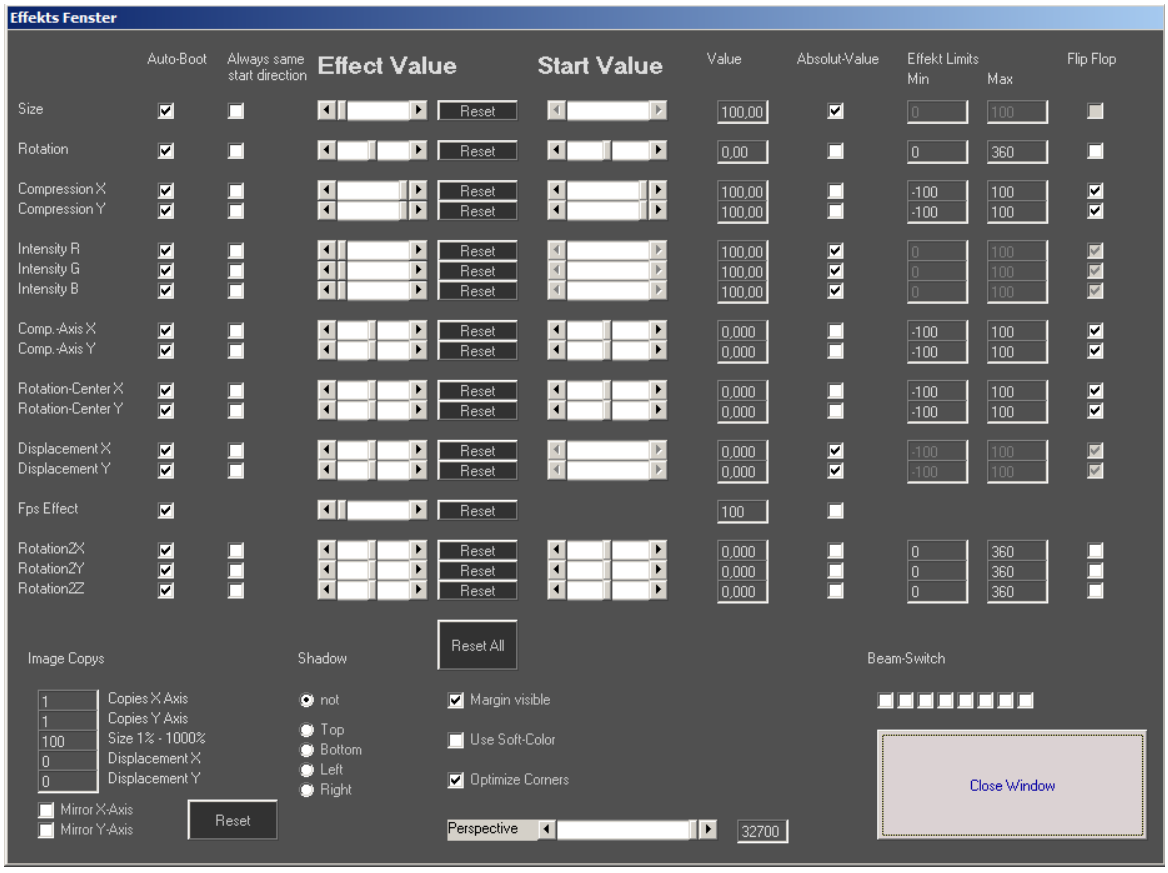


Fig. 86: Figure Editor: Effects Dialog

Any settings made in the Effects Window are stored together with the figure, so they are preserved.

Effects can be applied to a figure the following way:

- Create the figure.
- Change the desired settings in the Effects Window
- Save the figure.

- On calling the figure afterwards: Depending on the settings, the effects are applied to the figure as "Start Values" or not.

Start Value means, that this is the initial position the laser starts on first call. If the behaviour of the figure is modified during the calling of the figure, it should restart with those modified settings on second call. This behaviour can be manipulated with selecting the "Auto Boot" checkbox (see below for details)

Description of the Effects Window:
Any **Effect Value can be specified from** –100% to +100%, if the effect is bidirectional (can have positive and negative values). Rotation effects use a wider spread of values from –180° to +180° or from 0 to 360° (or even more).

The **Reset-Button** next to a specific value resets it to standard.
The **Reset-All-Button** resets all values with individual reset buttons to standard.

Auto Boot:
Selecting this option specifies that on recalling a figure, the previously selected effects state, specified as Effect Value, shall not be preserved but the Start Value shall be called instead.
This means that if e.g. the rotation speed has been changed for a figure during a show, it is not preserved when the figure is called again – the figure restarts with the presets set as Start Value.

Always same start direction:
This is only available if Auto Boot is activated and toggles with the Auto Boot settings too. Selecting this option means that the direction of the effect is also bound to the Start Value on recalling the figure.

Absolute Value:
If checked, Absolute Value defines the chosen values are considered as being absolute, e.g. a certain angle, and the animation stops as soon as this position is reached.
If unchecked, the values are considered to being relative to the prior value, e.g. a percentage of a circle (for rotation effects), and the effect continues to being applied and thus does the animation.

Example: Effect Rotation, the Effect Value is set to 10. If Absolute Value is activated, then the figure is rotated by +10 degrees. In that position it stops and stands still. The figure can be rotated further with the Timeline Editor or the Live Window, but only by defined angles. If Absolut Value is not activated, the Effect Value describes a certain speed of rotation.

"**Effects Limits**" specify the limits for the respective effect. Setting limits only makes sense, if the option Absolute Value is not activated.

"**FlipFlop**" allows for the effect to alternate. E.g.: The effect Displacement Y standard only goes upwards. With selecting "Flip Flop" it alternates vertically.

"**Margin visible**" keeps the figure visible within the projection area, even if the applied effects would move it out. Margin Visible compresses the points that would

normally not be visible and displays them at the side where they would have left the projection area.

"**Use Soft Color**" activates smooth color transitions between points. The settings made in *Options->Optimize Output->Soft Color Distance* (see 8.8.6) are used for the fade effects. The Color Gradient is calculated and displayed in real time during the output.

Activated "**Optimize Corners**" adds additional points at corners to improve the display of corners. The settings made in *Options/Optimize Output/Corner Point Repetitions* (see 8.8.3) apply.
Hint: In case the figure is a wave, it is recommended to uncheck this option.

"**Perspektive**" scrollbar allows for changing the viewing perspective on the figure.

Multiplication Effect:
To create a multiplication effect to a figure or mirrored figures, "**Image Copies**" can be specified: The value for "**Copies X-Axis**" and the one for "**Copies Y-Axis**" describe the number of copies of the figure that are displayed.
On applying values greater than 1, no copies are visible at first, as they overlap the initial figure. The copies become visible at the time a displacement or a mirroring is applied.

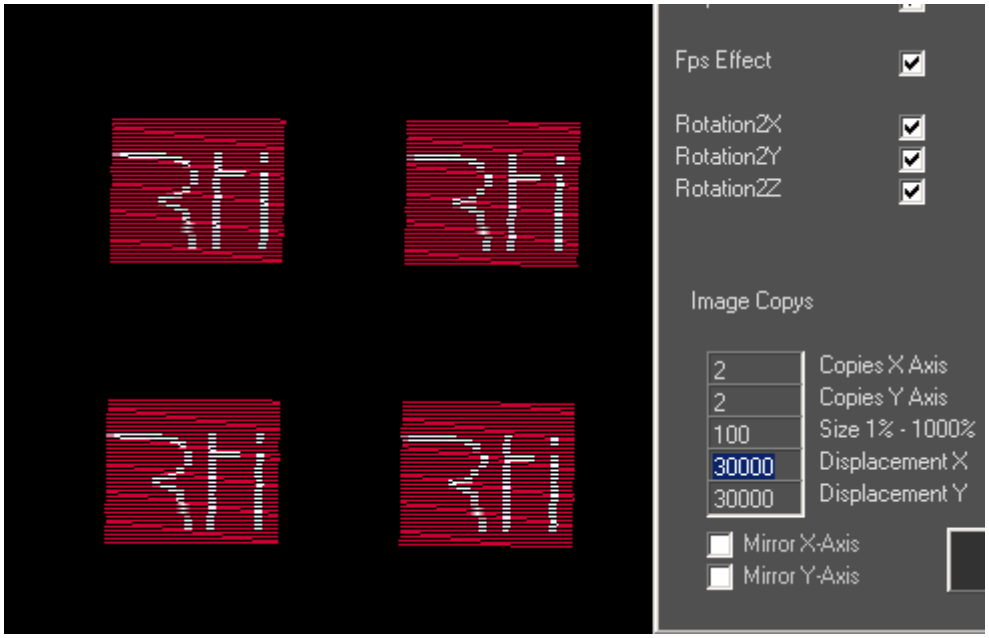


Fig. 87: Effect Window: Multiplication Effect

The Multiplication effect can be compared to the prism effects known from conventional lighting systems.

At "**Size 1%-1000%**" it is possible to specify the size of the copies. With "**Displacement X (Y)**" the displacement of the copies can be adjusted in X and/or Y-direction. With "**Mirror X(Y) Axis**" the figure can be mirrored on the X and/or Y-axis.

The button "**Reset**" is used to reset all Multiplication Effect settings.

"**Shadow**" suppresses the output of a part of the figure depending on the selected option. The shadowing refers to the geometrical center of the drawing area. A shift of the scan area in *Options->Output* has no influence on this effect.

Important:
On creation of a new figure, the Effects settings of the previous figure are applied as pre-configuration. On saving the program settings via Options, the active effect settings are saved as default settings, as well.

8. Options / Settings

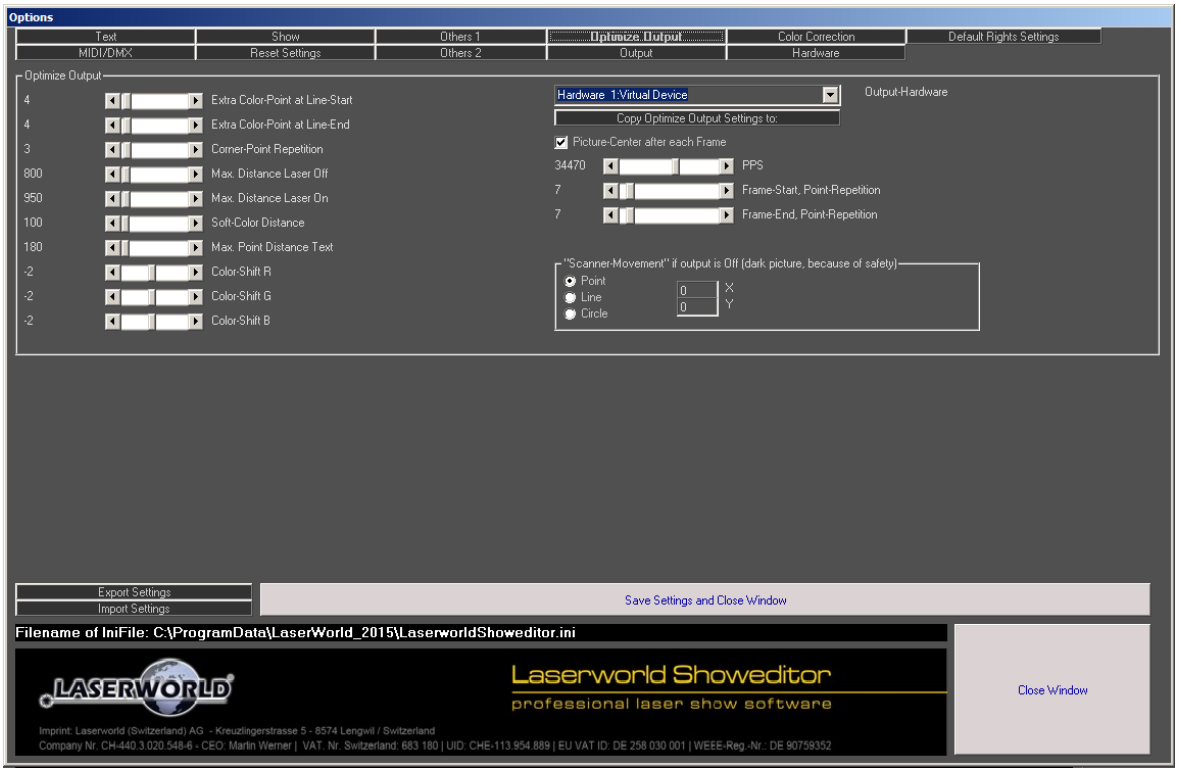


Fig. 88: Options Window

The Options Window offers a wide variety of different settings and adjustment options. This window is structured with several tabs which provide thematically arranged setting that apply for laser output configuration as well as for programming.

8.1. Settings – Import, Export

The settings (except the show options) are saved to an *.ini-file. The place where the *.ini-file is stored, depends on the operation system of the computer. Windows XP e.g. stores the file in the Windows folder. Windows 7 and 8 use a more complex path for saving the file. An overview of all paths used by Laserworld Showeditor can be accessed through *Options->Others 1->Show used Softwarepaths*.

In case of an error caused by a defective *.ini file, it is recommended to simply delete this *.ini file – a new one with the standard, basic settings is automatically created on restart of the software.
The Options Window also has a "Reset Settings" tab which provides similar but also more extended options for resetting the configuration file.

The file path to the active and loaded *.ini file is shown at the bottom of the Options window, white letters on black background. This is a useful information, as it is possible to create different *.ini files and thus store different configurations for future easy access. So several configurations can easily be saved and re-loaded by using the buttons **"Export Settings"** / **"Import Settings"**.
It is also possible to directly start Laserworld Showeditor with double-click on the very *.Laser_ini file, which makes it very easy to handle different settings for e.g. different venues, different hardware configurations, etc.
On importing other settings, they are automatically applied and stored. As the previous configuration is overwritten with the new configuration being applied, it is recommended to save this previous configuration if it should be preserved – prior to importing new settings.
After the import has been successfully completed, a restart of the software is done automatically.
The restart is necessary as a change in the hardware settings requires a re-initialization, which can only happen on program startup.

8.2. Tab "Hardware"

The **tab "Hardware"** has already been explained in a previous chapter, details can be found in chapter 2.8.2

8.3. Tab "Text"

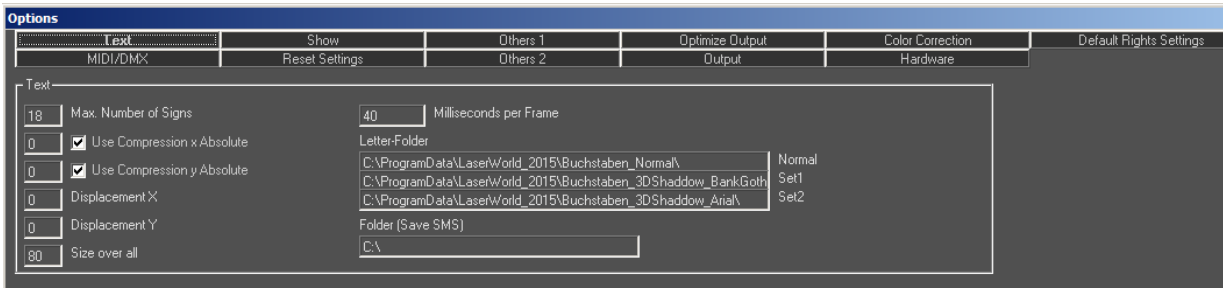


Fig. 89: Options Window, Tab "Text"

The Tab "Text" provides basic configuration options for the text handling in Laserworld Showeditor. Different options for creating text for use in frames and figures are explained in Chapters 6.2.7 and 6.20.1.
The settings in this tab are general ones and apply for longer texts as well as for SMS to laser display.

8.3.1. Max. Number of Signs

Laserworld Showeditor automatically splits up longer texts to avoid flickering effects on display. The Max. Number of Signs value specifies the number of characters the software should start at searching for a space in the text for creating a frame break. It starts counting from the end of the text. Fig.90 shows the value 18, which means that the program starts at letter 18 and then moves on character by character searching for a space key to do the automatic frame break. A higher value for the "Max. Number of Signs" leads to more options for doing the frame break, however it may display more characters at once and thus may lead to more flickering of the projection. If no space key can be found by the software, the text is truncated at the sign with the specified number and the next frame is generated.

Text morphing between the created frames can be specified with the very text creation tools.

8.3.2. Use Compression x (y) Absolute

The entered x (y)-value applies to the effects generated through the effects window for text. Toggling this checkbox handles automatic mirroring of the output figure. So e.g. projections can be seen from both sides of a screen.

8.3.3. Displacement x (y)

Text can be displaced with this feature to target a certain projection screen – without the need of defining an additional, specific zone. To determine the position values, a text in the text window is created and moved to the desired position by using the positioning scrollbars of the Effects Window. The end values shown can be noted and entered in the Displacement fields as target position values.
An additional option for text displacement is available via the Tab *Output* (explained in Chapter 8.9)

8.3.4. Size over All

This option specifies the maximum overall size of the text.

8.3.5. Milliseconds per Frame

Sets the display duration per frame in milliseconds.

8.3.6. Letter-Folder and Folder (Save SMS)

The letter-folder is the file path, where signs and texts are stored. Adaptions here are only necessary if non-TTF-fonts are used.
On installation of Laserworld Showeditor, a folder with basic letters is created automatically. It is possible to edit the characters later.

The folder specified in ***Folder (save SMS)*** holds the SMS text messages.

8.4. Tab "Show"

The settings in the Show Tab affect the currently loaded show. They are stored in the show file (*.shw) and are preserved for the very show.

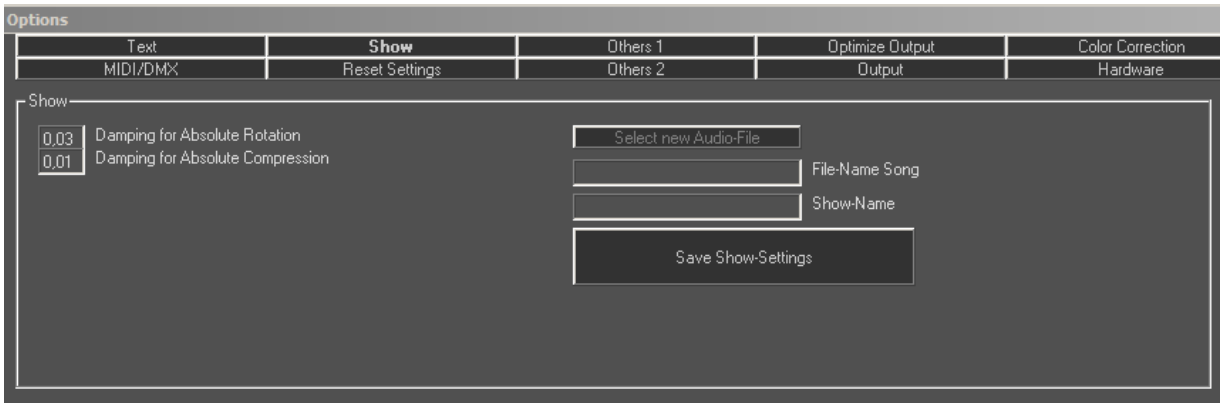


Fig. 90: Options Window, Tab "Show"

8.4.1. Damping for Absolute Rotation (Compression)

If the "Absolute" option is used with effects, the values entered in this field apply. The damping avoids having stuttering effects in the laser projection. Smaller values result in more aggressive damping. Value one completely switches damping off. Values greater than 1 result in a discontinuous projection and/or overshooting of the scanners.
It is recommended to preserve the standard values for most shows.

8.4.2. Select new Audio File

Each laser show has a specifically assigned audio file. This file path to this audio file is stored in the show file. However, if the path has changed or the audio file has been moved, Laserworld Showeditor cannot find the file any more. If this is the case, this button allows for re-assigning the sound file again.
Important: Always store the audio file in the same folder as the corresponding show is saved in.

8.4.3. File Name Song

For information purposes only: This displays the file name of the active audio file.

8.4.4. File Name Show

For information purposes only: This displays the name of the active show.

8.4.5. Save Show Settings

This button saves the show specific changes made in this Tab. It has the same function as "Save Show" of the Timeline Editor.

8.5. Tab "MIDI/DMX"

Please also see chapter 2.5.3 about DMX (Hardware and Driver).

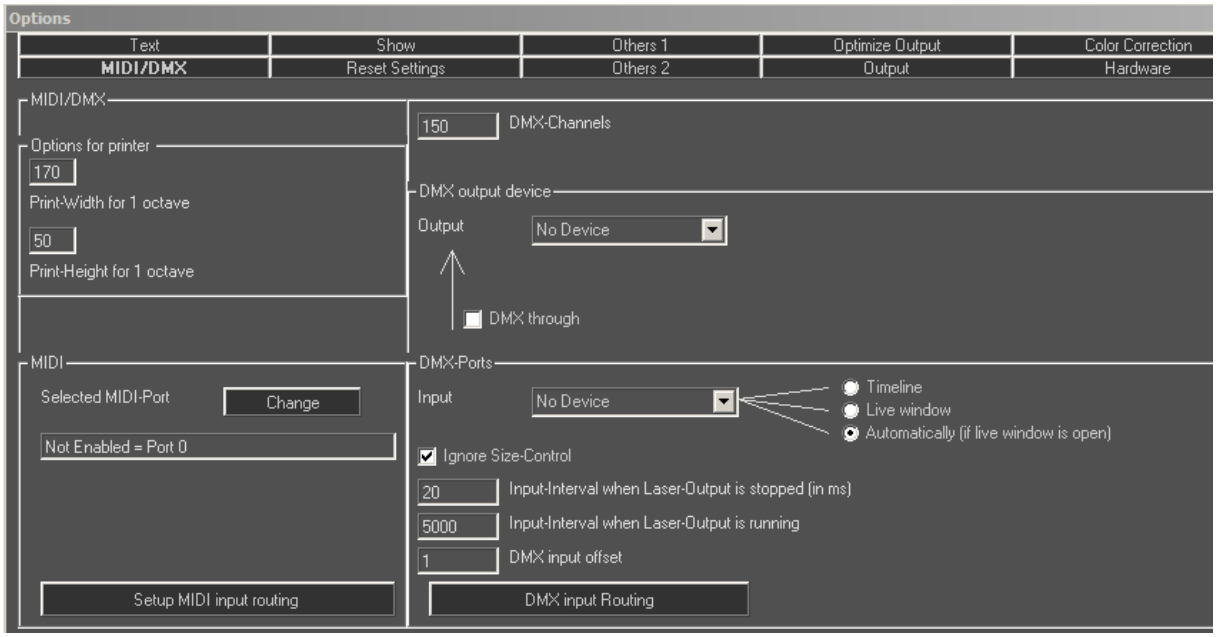


Fig. 91: Options Window, Tab "Midi/DMX"

8.5.1. Print Width (or Height) for 1 octave

The width and height per octave for the printout of the key assignments for the MIDI-keyboard can be specified here. As standard, 5 octaves are printed per page, together with small thumbnails of the figures. The values can be changed to make the printout fit keyboards with smaller keys as well.

8.5.2. Selected MIDI-Port

The MIDI-device that shall be used can be specified with the button "Change". See details on the configuration of the MIDI device in chapter 12.2.

8.5.3. Setup MIDI input routing

Please see a detailed description of the MIDI setup in chapter 12.2.

8.5.4. DMX-Channels

This option specifies the maximum number of DMX-input and -output channels in use. Reducing the number of channels can improve the performance of the software; however most of the modern computers should be able to handle all channels without any performance issues at all. Maximum are 512 channels.

8.5.5. DMX-Ports (Input and Output)

"DMX-Ports" provides configuration options for the input and output DMX devices.
It is possible to use different hardware for input and output. The incoming DMX values can also be routed to either the Timeline window, the Live window or set to automatic select, depending on opened windows (if opened, routing goes to the Live window, if it's closed the routing goes to the Timeline).

8.5.6. DMX through

DMX trough allows for daisy-chaining DMX signals through the software. This means that one DMX interface receives a DMX signal and the other interface re-outputs it.

Thus it is e.g. possible to transfer DMX signals from one rig to another one using the convenient LAN connection of the ShowNET interfaces.
It is also possible to use the "start-channel" setting to offset the DMX values and thus shift the whole DMX signal on transmission.

8.5.7. DMX input offset

The DMX input offset specifies the start channel Laserworld Showeditor uses for DMX input signal reception. This is comparable to Addressing a lighting fixture; it is giving Laserworld Showeditor a "DMX Start Address". The higher the offset value, the less overall channels are available for control, so it is suggested to not specify a too high offset value.

8.5.8. Input Interval when Laser Output is stopped (running)

The input intervals in ms define the repetition frequency of the DMX-input signal. To avoid irritation of the laser control signal, two values can be specified: Live Shows with DMX it is recommended to use short intervals for both - running and stop – is recommended (test the behaviour with different values!).

8.5.9. Ignore Size Control

It is possible to create a single beam via DMX with the size control channels. To prevent this, this option can be activated. If checked, all channels that may result in single beams are deactivated. The option is activated as default.

8.5.10. DMX Input Routing

Please see a detailed description of the DMX setup in chapter 12.1.

8.6. Tab "Others 1"

Additional information can be found in chapter 2.8.1.

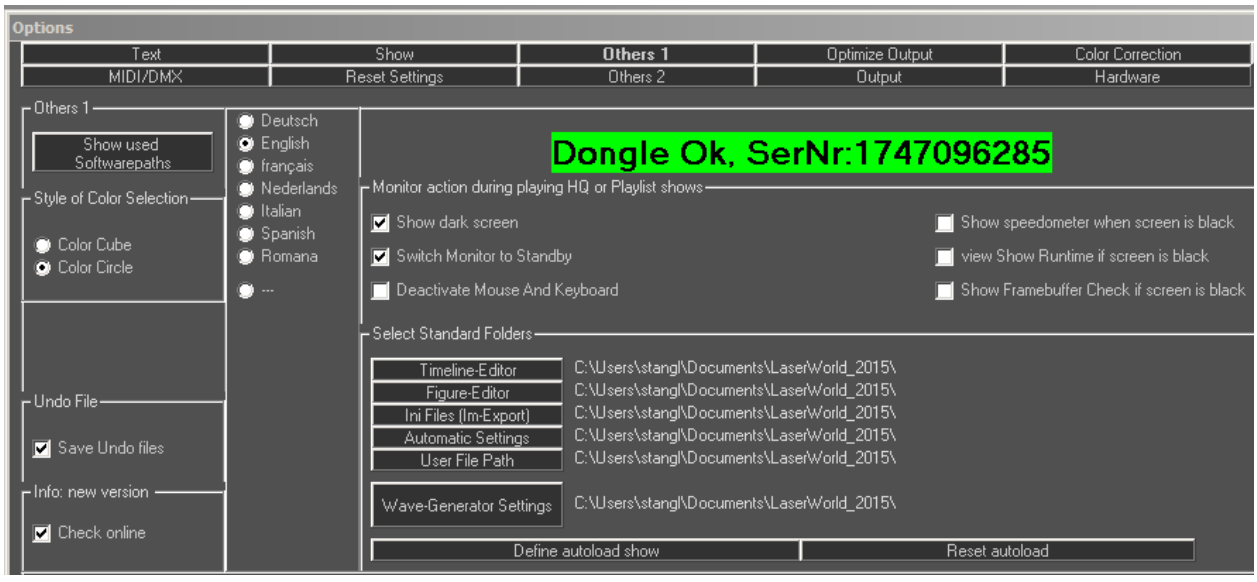


Fig. 92: Options Window, Tab "Others 1"

8.6.1. Show used Softwarepaths

This button opens a dialog box showing the file paths used for storing files and settings by Laserworld Showeditor.

8.6.2. Style of Color Selection

Set the style of the color selection, which is displayed in the upper right corner of the Figure Editor Window: Color circle is selected as standard – this option provides a basic selection of colors. The full color spectrum can be chosen from with the Color Cube. (See chapter 6.8 and following for further details)

8.6.3. Save Undo Files

Undo Files are saved periodically as standard. To increase performance, especially on editing larger figures, this option Auto-Save can be switched off here. Remember: Recovery after a program crash cannot be done any more, if this option is deactivated.

8.6.4. Info: new version

As standard, Laserworld Showeditor checks online on the Showeditor servers if there are any new program versions available. A popup shows on program start if a newer version is detected.
Unchecking this option makes Laserworld Showeditor not look up for new versions any more.
Make sure to stay up to date manually!

8.6.5. Select Language

These radio buttons allow for custom selection of the desired frontend / interface language of Laserworld Showeditor. There are many different translations available, more will follow.
Laserworld Showeditor was developed in German language first, so English and German are the most advanced language packs for the software at the moment.

8.6.6. Monitor action during playing HQ or Playlist shows

These options control the screen display behaviour during show play.

8.6.6.1. Show Dark Screen

This option controls if the main screen shall be switched to black when a show is played HQ or from Playlist.

8.6.6.2. Switch Monitor Standby

The Standby option controls if all screens shall be switched to black when a show is played HQ or from Playlist. This option is recommended for multi-screen control setups. On mouse movement, the screens come on again, so it is recommended to not touch the mouse during show play, except the following option is chosen as well.

8.6.6.3. Deactivate Mouse and Keyboard

Deactivating Mouse and Keyboard during show play prevents the Standby to end due to unwanted mouse movement, however it does not allow to stop or pause the running show – it must run to it's end.

8.6.6.4. Show Speedometer when screen is black

The Speedometer displays information about the number of output actual frames in black-screen mode (e.g. if a show was started via "Play HQ"). This feature helps in determining output quality issues.
The displayed number is the frame actualization rate, which means the frequency the memory of the DAC is updated. The actual behaviour of the DAC can, obviously, not be displayed. (See Fig. 93)

8.6.6.5. View Show Runtime if screen is black

This option shows the actual run time of the show, so the remaining time of the show can be seen, during show play. (See Fig. 93)

8.6.6.6. Show Framebuffer check if screen is black

Shows the framebuffer during show play, which allows for discovering performance leaks. (See Fig. 93)

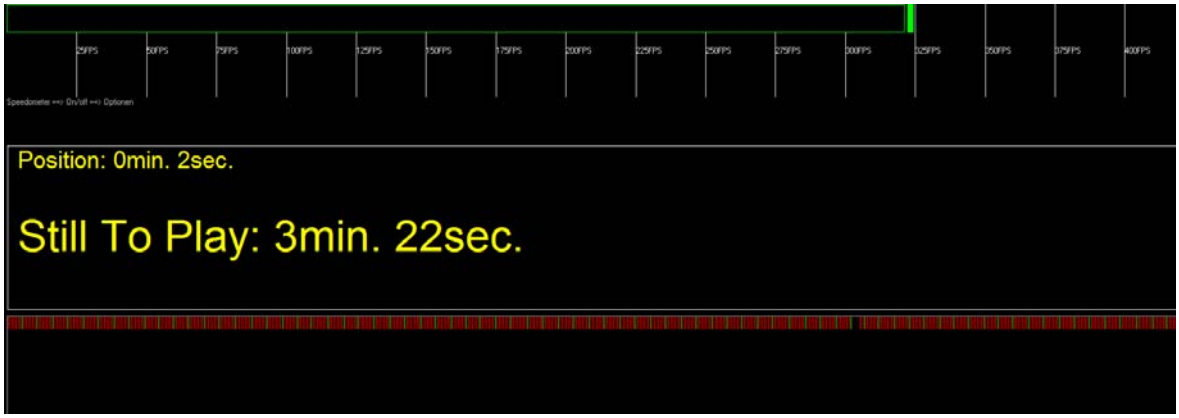


Fig. 93: Black Screen with show info during show play with Frame Buffer, View Show Runtime and Speedometer switched on

8.6.7. Select Standard Folders

The standard folders for storing files and settings are specified here. Program dialogs use these paths as default settings.

8.7. Tab "Others 2"

8.7.1. Show animated frames in Figure Editor

This option displays the preview of animated figures within the drawing area of the Figure Editor if a frame rate is specified and the animation play is activated.

8.7.2. Progress bar always on top

Specifies if a progress bar shall stay on top during any processing (e.g. *.ild import etc.). If unchecked, the progress bar can be overlaid by other windows during the processing.

8.7.3. Quick-start on use of Play button in Timeline Editor

This option controls if a quick start of the show at the very selected is possible position within the Timeline Editor by using the Play button.

8.7.4. Load default Live Show

This option controls whether the default Live Show shall be loaded on program startup. Standard setting is "yes".

8.7.5. Resolution Wave Form Display

See Chapter 6.18.8 (wave Generator) for details.

8.7.6. ILDA Color Byte Order

The setting of this option is NOT stored to the *.ini file, however it may be of help when importing certain *.ild frame types: As there are two different interpretations of the ILDA file format standard, the order of the color channels can be specified in two ways: RGB or BGR. The color order of Red and Blue is inverted.
So changing this option to a different ILDA standard interpretation, allows for Import and proper interpretation of ILDA frames with differently specified color order. As the color order is changed to the "correct" one on saving of the imported frames to a *.heb file, the settings do not need to be preserved on closing of the program (and would in contrast lead to irritations if being preserved).

8.7.7. Define Autoload Show

The show to be loaded automatically on program startup can be specified here.

8.7.8. Reset Autoload

Resets the auto load of a show to the standard setting.

8.8. Tab "Optimize Output"

The settings in this tab influence on the output performance and –quality. Carefully read the descriptions, as wrong settings can destroy the scanners of the laser system.
Output Optimization is essential for graphics and projection shows, but is recommended for any kind of show.
As every scanner system has different behaviour (depending on the quality of the motors, the size and the weight of the mirrors as well as the driver electronics), so is the modulation behaviour of the laser sources. Thus it is difficult to provide "standard" settings. However, the output should be acceptable with standard settings for most laser projectors.

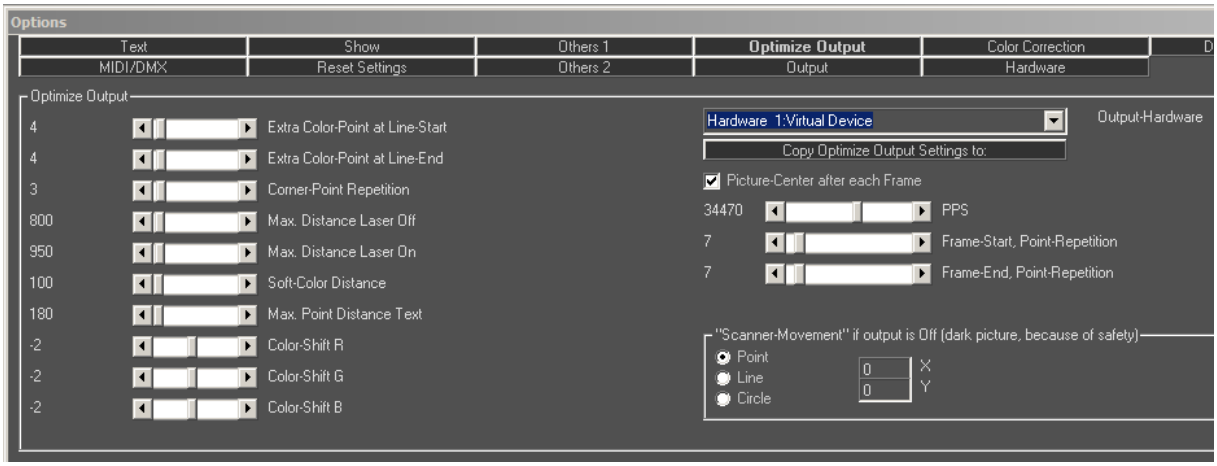


Fig. 94: Options Window, Tab "Optimize Output"

These parameters apply to any output optimization changes:

- The optimization of the laser output is in real-time, meaning the changes are directly put out to the laser system (if connected) and can be seen live..
- Each hardware output channel must be optimized individually.
- Color correction options may also be affected by optimization measures. These can be found in the tab "Color Correction"

A tutorial on how to configure scanners to optimal output performance can be found on: http://www.showeditor.com/tune-scanners

Information**:** The test pictures (with file extension *.bin) are nearly NOT optimized. The pictures from the folder "HE-s_Testbilder" are optimized, as they are "normal" Showeditor figures.

Remember that Laserworld (Switzerland) AG is not responsible, nor liable for the correct control of the laser projector. Please refer to the disclaimer for further details.

8.8.1. Extra Color Point at Line Start

This specifies the number of additional points that are added at the beginning of a line on a color change (NEW color). It applies to the transition blanked→Laser On setting, as well as on a change between colors.

8.8.2. Extra Color Point at Line End

This specifies the number of additional points that are added at the end of a line, before another line piece / object is drawn with a different color. It applies to the transition blanked→Laser On setting, as well as on a change between colors.

8.8.3. Corner Point Repetition

This setting specifies how often a point is repeated, if its property is defined as corner point. More repetitions will result in sharper, but also brighter edges. Corner points are usually defined automatically on the creation of figures.

Polygons, rectangles, line start and line end are corner points. Circles have NO corner points, as well as waves have none.
Depending on the setup, this setting applies to freehand drawings, too. The properties of points can be changed manually using the "wrench tool" (see chapter 6.3.6.).

The value set as corner point repetition specifies the MINIMUM NUMBER OF REPETITIONS of corner points. If a corner point has already been repeated several times by the color correction, the Corner Point Repetition only adds the difference.

8.8.4. Max. Distance Laser OFF

The Max. Distance Laser Off setting specifies the maximum length of the path the Galvo moves with laser output off (blanked). Galvos are not able to move freely in blanked mode over longer distances without this interpolation, therefore this setting is important. Typical values are between 500 and 2000. Depending on the point properties, the settings here may not have any effect under certain circumstances.
If the distance of points of a blanked path is longer than the specified value, the line is automatically split and additional blanked points are inserted.

8.8.5. Max. Distance Laser ON

The Max. Distance Laser ON setting specifies the maximum length of the path the Galvo moves with laser output. The behaviour and application is the same as for "Max. Distance Laser OFF".

8.8.6. Soft Color Distance

If "Soft Color" is activated in the Effects Dialog, the value specified for Soft Color Distance defines the distance between the points for color transitions.
The colors between two colored points get a smooth transition from one color to the other one. Shorter distances make the color transition look nicer and smoother. In most cases a value of 500 is a good choice. If Soft Color is selected, no extra color points are set on line start and line end. Slower Galvos may require a higher value, so do laser systems with laser sources that have slow color modulation.

8.8.7. Max. Point Distance Text

The settings for Max. Point Distance Text have the same behaviour as the ones for "Max. Distance Laser ON/OFF" except that they apply for letter / text projections only.

8.8.8. Color Shift R / G / B

The three scrollbars "Color Shift" control if the laser sources shall be switched on slightly before or after the actual point is drawn. The reason is that the laser sources usually respond faster than the Galvos do (only in very rare cases the laser sources have a slower modulation). This difference in response speed can be corrected by setting the appropriate values.
With using this optimization, the settings for "Frame Start, Point Repetition" and "Frame End, Point Repetition" are changed as well. This is required, as the software needs enough extra points for shifting the colors accordingly.

Further details on color shift optimization can be found at:

http://www.showeditor.com/color-shift

8.8.9. Output Hardware

As any output optimization setting applies per hardware, the desired output channel must be specified. This is done with the Hardware Output dropdown menu.
Any settings refer to the hardware NUMBER, which can be selected here – not to the physical DAC (which can be the same, but doesn't need to be).
This means that changing the physical interface (DAC) for Hardware 1, the optimization parameters are preserved and are used with the newly applied DAC.

8.8.10. Scrollbar PPS

The PPS scrollbar specifies the actual output scan speed for the selected hardware device. The "PPS" is an acronym for Points Per Second ad specifies the output rate of the scanners. This setting must be adjusted to match the scanner system of the laser projector.

For determining the correct PPS rate for the very scanner system, please refer to our tutorial: http://www.showeditor.com/tune-scanners

8.8.11. Picture Center after each Frame

If this option is selected, the Galvo mirrors always move from the picture center to the first point of the figure and from the last point back to the center. This setting is required for some Galvo. It is better to select the option if its requirement is unclear. "Wide Move Scanners" work with this option unchecked.
Basic Galvo systems require this option checked. The movement to the centre adds about 20 additional points, but it makes sure that longer movement paths are displayed correctly.

8.8.12. Frame-Start, Point-Repetition

The additional blanked points that are additionally placed at the initial projection point of the figure are specified here. The number automatically increases, if the value for the Color Correction is negative. The value can not be smaller than the number of color shift points. Usually this value has no significant effect on modern show laser light systems, so the smallest possible value can be chosen.

8.8.13. Frame-End, Point-Repetition

The additional blanked points that are additionally placed at the last projection point of the figure are specified here. The number automatically increases, if the value for the Color Correction is positive. The value can not be smaller than the number of color shift points. Usually this value has no significant effect on modern show laser light systems, so the smallest possible value can be chosen.

8.8.14. Scanner movement, if output is off

These settings specify the scanner behaviour under two different circumstances:

1. Scanner Safety is in use
   If the laser projector is equipped with a scanner safety, delays if the laser output can happen after blacked out sequences. Different types of safeties are available. If a type is in use that monitors the scanner movement only, it can happen that the safety jumps in even if there is just a small break in the

show and, depending on the laser model, a mechanical shutter snaps into the beam path. This behaviour is safety related, but in most cases unwanted during a show, as there is quite some delay for the lasers to come on again after such an interruption.

2. Suppression of Stand-by beams during a show
   Depending on the laser system and it's configuration a very dim laser "blind beam" can be visible if the scanners are not moving. By using the Scanner Movement feature it is possible to "suppress" the blind beam output, as the scanner movement makes it invisible.

To avoid these behaviors, it is possible to have the scanners make a circle or line movement if they experience a stand-by time during the show. With specifying the X and Y offset, the position of the "blanked movement" can be defined. "R" can be used for setting the radius for a circle, X2 and Y2 are used for specifying a line size. Allowed values are in the range of +- 32767 (only positive values for circles)

8.9. Tab "Output"

The options provided on the "Output" Tab allow for adapting the output to the actual projection surface. Geometric corrections as well as projection view are set per Hardware channel, so the correct Output Hardware the settings shall apply to must be selected first.
To reset a single value to default, click on the label next to it (the caption).

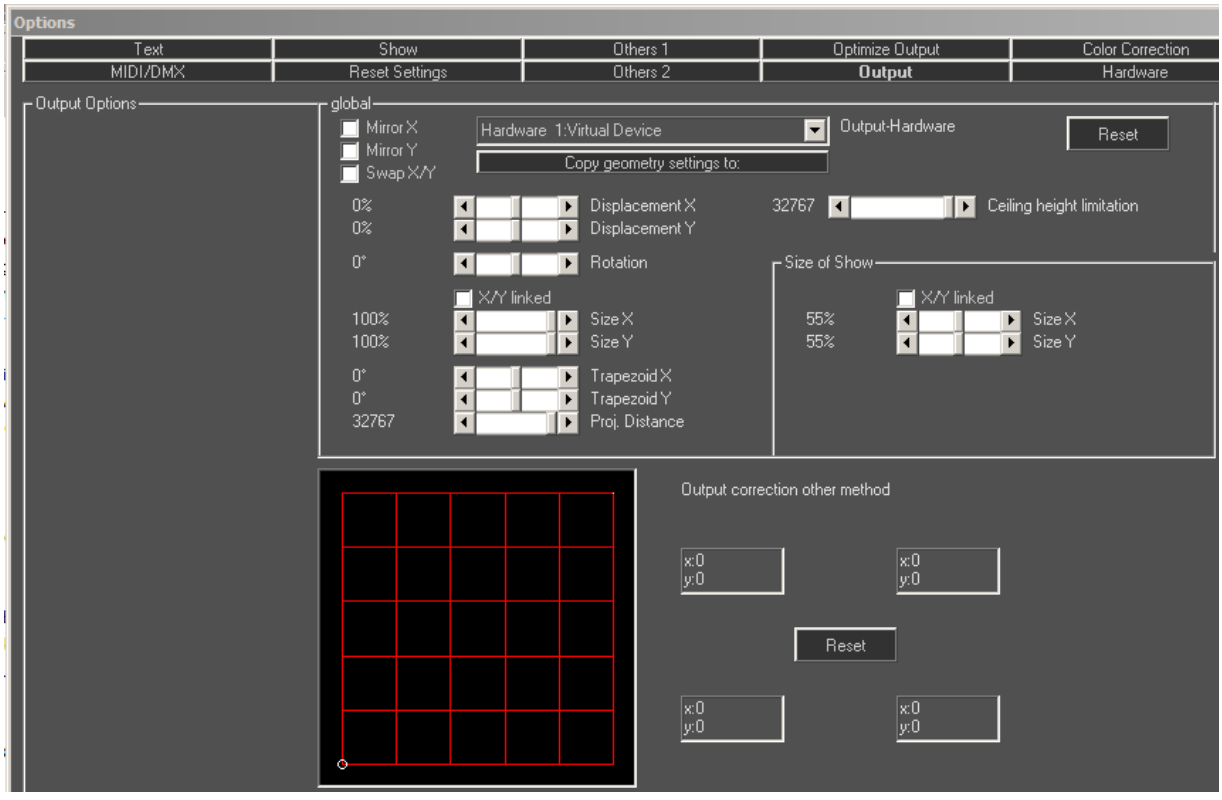


Fig. 95: Options Window, Tab "Output"

8.9.1. Output-Hardware:

As the settings for the geometric corrections are always applied per hardware device, it is essential to first select the hardware device the settings shall be applied to.

8.9.2. Mirror X/Y:

Mirror the output for the x-axis / y-axis.

8.9.3. Swap X/Y:

Swap the output for the x-axis / y-axis (inverts the output).

8.9.4. Displacement X/Y:

These settings specifies the offset of the output for x-axis and y-axis

8.9.5. Rotation:

This option specifies the rotation of the output. The values can be specified in 1 degree steps.

8.9.6. Size X/Y (global):

These setting specify the maximum size of the projection zone. With "X/Y linked" checked, the same value is applied to the other axis if one is changed.

8.9.7. Trapezoid X/Y:

This setting allows for the trapezoid correction of the output. This is especially useful to correct the output for projections from an inclined perspective. This feature is depending on the values set for "Proj. Distance" and is in direct relation to this.

8.9.8. Proj. Distance:

The distance between the laser projector and the projection surface can be specified here. The setting corresponds with the trapezoid correction and specifies the way the correction is made.

8.9.9. Size of Show: Size X/Y

These setting specify the maximum display size of the show. With "X/Y linked" checked, the same value is applied to the other axis if one is changed.

The difference between global size and show size settings:
The global size emulates the maximum scan angle of the scanners would be smaller – no effects or fixed size figures can exceed this, every projection is scaled down.
With the show size setting the projection in general is scaled down, but effects (movement etc.) and fixed sized figures can use the full possible scan angle of the laser system (and thus exceed the specified show size area).

8.9.10. Output correction – alternative method

The alternative method for the geometric correction allows for distorting the projection are with click-dragging the mouse. This method is very quick and especially suitable if settings don't need to be 100% accurate.

8.10. Tab "Color Correction"

The Color Correction is used for specifying the power levels per laser source color channel. This Tab also provides the options to set safety zones (beam attenuation map) and control the color handling behaviour.

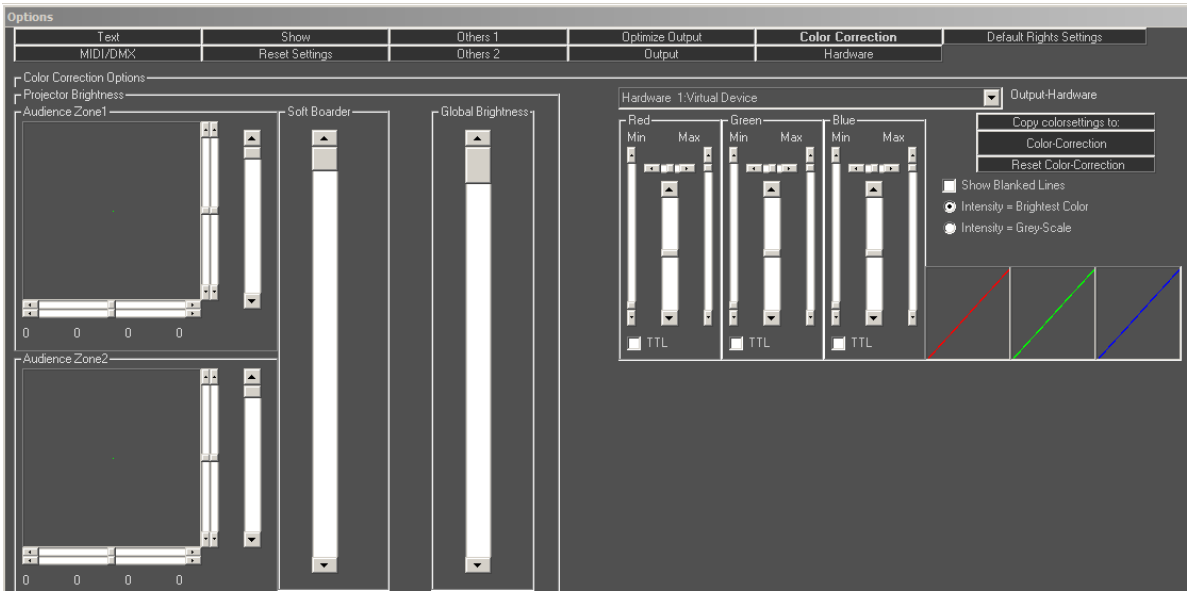


Fig. 96: Options Window, Tab "Color Correction"

8.10.1. Show Blanked Lines

This option is a help for setting up the correct values. If checked, even the invisible movement paths of the beam are made visible. To distinguish them from "normal" lines (un-blanked), they are colored RGB in small bits. (single color lasers show colored-black lines).
Attention! If a figure consists of zero points (actually no figure), a single beam is projected! A warning message is displayed in this case.

8.10.2. Intensity = Brightest Color / Intensity = Grey-Scale

There are two options how the intensity of color output can be calculated, which can be selected here. Changing the standard setting (Brightest Color) only makes sense for applications where the intensity signal of the DAC is used. Grey-Scale leads to overall less bright output color, however this option may be required under certain circumstances.

8.10.3. Button Color-Correction

The click on this button opens the Color Correction dialog shown in Fig.98.

The color correction dialog provides another method for the basic color correction setup. One main feature, however, is the possibility to make the color adjustments when running the laser sources in cw mode (full power).

This dialog was used in former times for the colour correction and today it is not really necessary any more. Nevertheless it can be used to make a pre-setup of the colour correction anymore.
When having made a selection, the info area at the bottom provides further details. Follow the instructions given in the info area.

Select either "Laser CW mode" to compare the laser color balance and brightness of the lasers in full power mode or select "Laser blank mode" to compare color balance and brightness in normal modulation mode. For configuring the white balancing for a laser show, use the "Laser blank mode" in combination with Helix scanning.

In case the laser projector is not equipped with R-G-B laser sources but only with one or two colors, the corresponding checkbox of the very color shall remain unchecked, so the control signal that comes in for the missing color is distributed to the existing color(s).

On clicking "Proceed", the selections made are passed to the general color correction tab and the Color correction dialog closes.

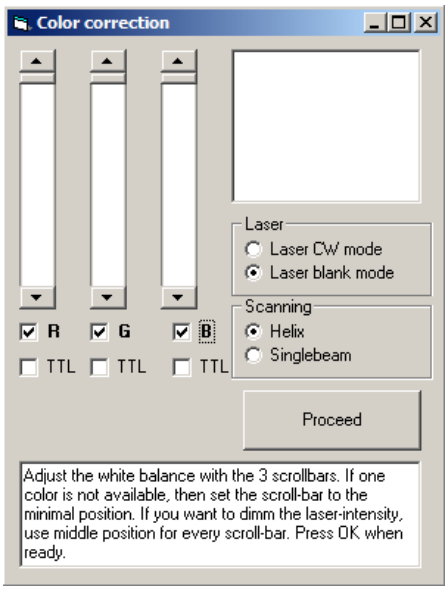


Fig. 97: Dialog Optimize Output / button Color Correction

8.10.4. Extended Color Correction (Min/Max scroll-bars for RGB)

Fig. 98 shows the extended color correction:

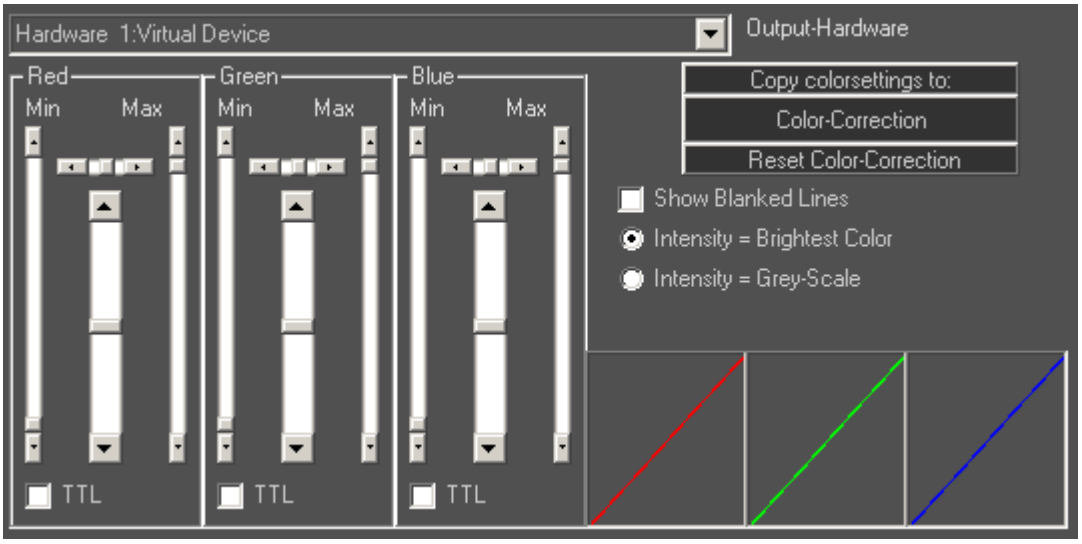


Fig. 98: Options Window, Extended Color Correction

Each color channel can be individually adjusted: The extended color correction allows for configuring a non-linear dimming behaviour per color channel. This feature

can also be used to force the color brightness to a certain smaller range which can increase brightness (but negatively impacts on the fading behaviour).

The **Min** scrollbars specify the minimum modulation voltage for the laser source, meaning the voltage where the laser source starts with it's minimal output power (threshold). Set this scrollbar just slightly below this threshold to be able to blackout the laser source. Properly configuring the threshold helps the laser sources with reacting to control signals more quickly.

The **Max** scrollbars specify the maximum modulation voltage for the laser source. This setting limits the maximum brightness of the color channel.

The **scrollbars in between** work similar to those of the "parametric middle" in a sound mixer. The horizontal scrollbars determine the position of the on and off of an interpolation point. Use these scrollbars in between to set a nonlinear response curve.

TTL lasers: If a laser source can only modulate in **TTL** (on/off), the TTL-box must be checked. This results in all brightness values being put out with full intensity.

8.10.5. Area "Projektor Brightness" – Safety Zones, Beam Attenuation

"Audience Zone": Two Safety Zones can be specified in Laserworld Showeditor: These are areas where the laser output power is reduced. This feature is usually used to reduce the output power in the close audience are to stay within the MPE although the laser itself has more power. Overhead beams usually don't require further power reduction (see your local laser regulations!) so the safety zone is a good way of only reducing a part of the laser output and maintain the ability to shoot aerial effects with full power.
It is suggested to project a grid test pattern when setting up the safety zones to be able to immediately see the results of any adjustments.

"Soft Border": The soft border setting controls the behaviour of border softening / fading for the projections.

"Global Brightness": This allows for setting the global brightness for the laser, affecting all color sources to the same extent. Settings in the Safety Zones always refer to this setting, so if the global brightness is reduced, this also reduces the relative power reduction for the safety zones.

8.11. Tab "Reset Settings"

This tab provides different kind of reset options for restoring the default values:

8.11.1. Button "Reset Settings"

A click on this button resets all software settings to standard values.

8.11.2. Button “Reset only Windows Positions”

This button resets the positions of all Showeditor windows to their standard ones. This is especially useful if the number or the resolution of screens has changed and not every window is in the visible area any more.

8.11.3. Button “Reset Skin colors”

This button is used for resetting the individually colored / skinned Showeditor user interface to the default color scheme.

Fig. 99: Options Window, Tab “Reset Settings”

8.12. General Buttons of the Options Dialog

Fig. 100: General buttons of the Options Window

8.12.1. Buttons “Export/Import Settings”

These buttons allow for export/import of setting. A dialog for specifying the name for the exported settings will open, or respectively for selecting existing settings that shall be imported.

8.12.2. Button “Close Window”

Clicking on “Close Window” closes the options dialog without saving the settings for the next program start. BUT: The settings that were just made are already applied, so those will remain active until program restart.

8.12.3. Button “Save Settings and Close Window”

Clicking this button saves the settings made to the active settings file. On restart of the program, these settings will be used. Use this button after any color corrections have been made to preserve those settings.

8.12.4. Filename path of ini File

The area "Filename of IniFile" shows the actual path to the active *.ini configuration settings file. As it is possible to use many configuration / settings files with Laserworld Showeditor, this helps in identifying the active one.

9. Timeline Editor

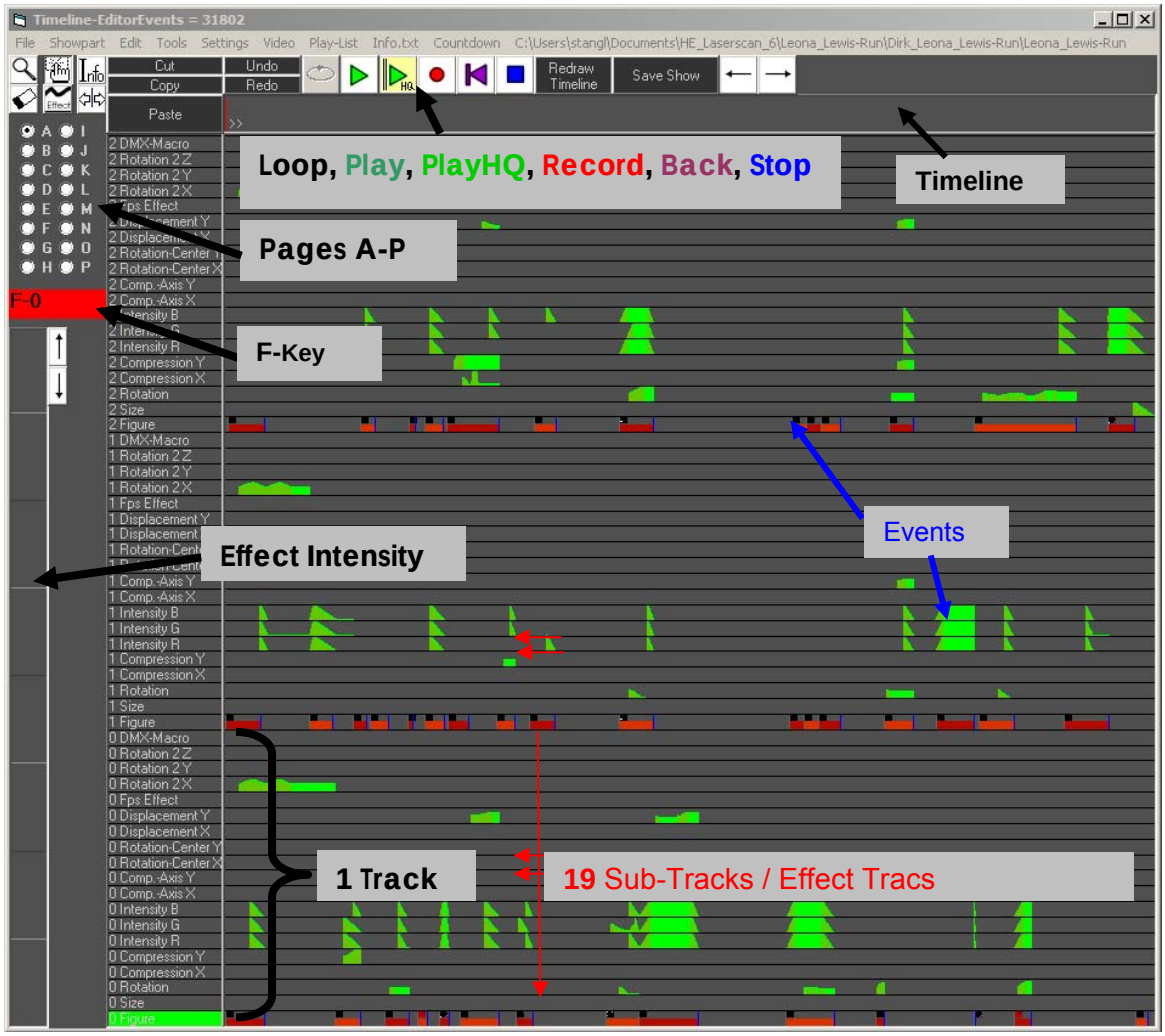


Fig. 101: The Timeline Editor

The Timeline Editor is the main window for programming a music synchronous laser show. It also provides features for playing back existing shows. The window consists of several tracks, each with 19 subtracks. The main subtrack is the figure track, as it specifies the very figure. All other subtracks apply effects to this figure track.
In total there are 16 track pages (A – P) each providing 3 laser tracks.

Recording of a laser show:
With a click on "Record" the timeline editor starts playing back the selected music file (See 3.2) and listens to any input coming from the keyboard or any other compatible controller. On pressing keys in the record mode, the respective events are applied at the very position in the timeline. Make sure to always have selected the correct subtrack for recording.

During playing or recording a show, each event is forwarded to the corresponding program window as well, so e.g. changes to the figures are pushed to the figure editor and changes to effects are pushed to the Effects Window. This behaviour allows for modular effect processing.

The **Timeline** shows the progress of the show. If a *.wav file is used as music track, the volume level is displayed there.

To record events in the Timeline Editor, the respective subtrack must be marked (click on its caption). Marked tracks get a green background color.

9.1. Buttons and Tools

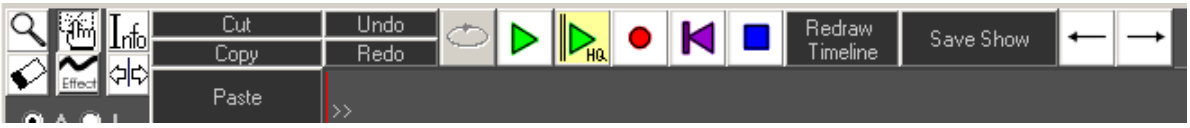


Fig. 102: Timeline Editor: Buttons and Tools

9.1.1. Magnifying Glass

The magnifying glass is used for zooming parts of the Timeline. The magnifying glass works in the same way as the one in the Figure Editor (See 6.3.8).
The zooming can be done in several steps after each other.
Reset the zoom with a click on the tool with the left mouse button or by clicking the button "**Redraw Timeline**" with the **right** mouse button.

9.1.2. Hand

The hand has similar functions as the one in the Figure Editor for marking or moving events (See 6.3.1).
Only **events of ONE subtrack** can be marked. The subtrack that is in the centre of the selection rectangle is activated.

Movements are done by click-dragging with the **right** mouse button. The marked events are moved. If no event is marked, the one under the curser is considered as marked. By holding the **"Ctrl"-key** during the intended movement, a **copy** of the original event is made and moved to the new position. It is possible to also move events to other subtracks as long as the new subtrack is of the same nature than the original one. Marked events have a differently colored background and can thus be identified.

9.1.3. Eraser Tool

The eraser works like the one in the Figure Editor (See 6.3.5).

9.1.4. Effect Tool

The Effect-Tool is used for creating effect events or for editing them. A click on the respective button activates the tool. With the tool opened, an area for inserting a new event can be selected, or one subtrack can be selected for editing with left mouse click (only works with effects subtracks, not with the figure track). The marked region is shown with a light yellow background. On releasing the mouse button, the effects window opens (Fig. 103).
Even though this tool works well, it is recommended to "live" record the effects.

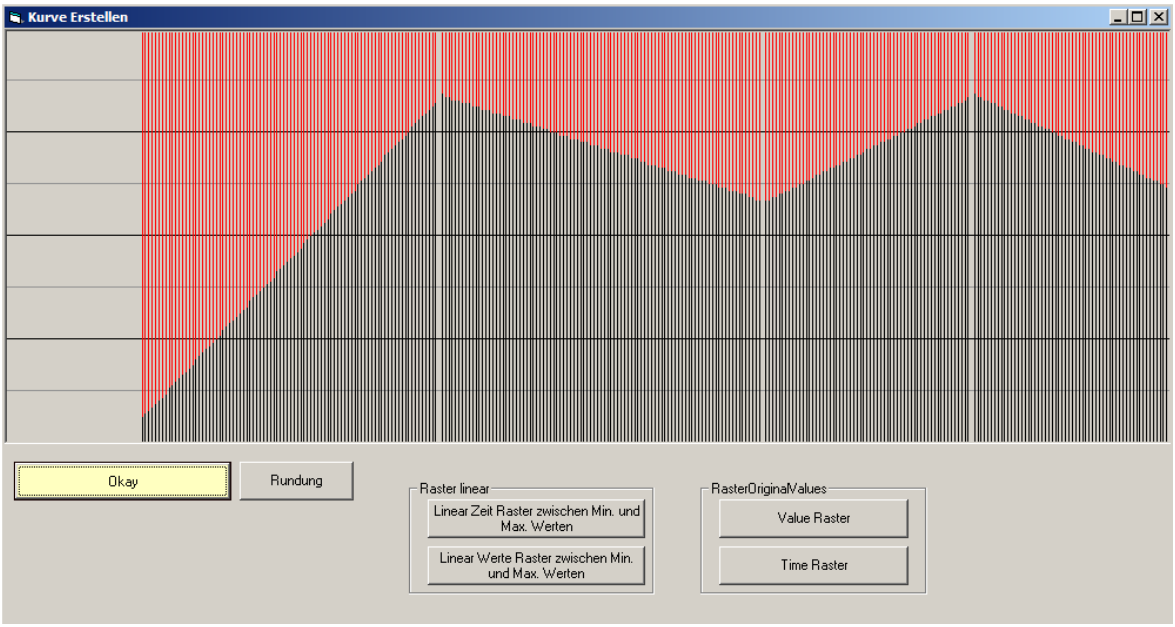


Fig. 103: Timeline Editor: Window of the Effect Tool

9.1.4.1. Create/Edit Effects

With left or right mouse click and drag, events can be created in the window.
When using the right mouse button, the effects curve is aligned to the grid (horizontal lines, raster 1/8). Depending on the effect that is edited, the behaviour of the grid can also be different: The horizontal lines specify certain values of the effect. E.g. when using a rotation effect, the distance between the horizontal lines refers to a 45° rotation step. When using a displacement effect, the line distance corresponds with 25% of the maximum possible distance.

9.1.4.2. Smooth

With clicking the "Smooth" button, the effects curve is smoothened by an automatic calculation of average values between two steps. The more often the button is clicked, the more often the smoothening effect is applied. Remember that the start value of the selected area is also affected by the smoothening. Its new value may be the average of 0 and the actual value and may be too small.

9.1.4.3. Linear Time Raster between Min and Max Values

This curve modification identifies the highest and lowest effect values and generates a linear path with using constant time intervals. The time intervals can be adjusted with a right mouse click on the button.

9.1.4.4. Linear Value Raster between Min and Max Values

This curve modification identifies the highest and lowest values. Then the function generates a linear curve of interpolation points between these values, using fixed steps of the effects values. The time intervals are automatically determined based on the occurrence of a whole value step. Smoother effect curves can be created this way, but it also leads to more effects events (which may negatively impact rendering performance in some rare cases).

9.1.4.5. Time Raster

This curve modification fills breaks in the effect path. It generates equal time intervals between the effects. This feature can be used for reducing the effect calls and thus improve performance. The time intervals can be set with a right mouse click on the button.

9.1.4.6. Value Raster

This curve modification fills breaks in the effect path. It identifies effect value changes and levels the effect curve based on this. Overall this leads to smoother effect curves at good performance.

9.1.4.7. Apply

Clicking on Apply closes the window and writes the edited effect curve to the previously specified / selected area on the very subtrack.
Click "Undo" if the applied settings shall be dropped and the previous settings shall be restored.

9.1.5. Info Button

This button opens a small area to show the active figure and its name (Fig. 104), when clicking on its position in the respective subtrack. In case of multi frame figures with the first frames being dark, it is useful to open the simulation window as well.

The info function can be used by click-dragging the mouse in the subtrack. When using the right mouse button for this, the events of ALL figure tracks, which are active at the very time, have their info displayed in the Info Area as well as output to the laser (if connected). The laser output is automatically activated and deactivated again afterwards. As very much information has to be handled, it is recommended to move the mouse slowly!

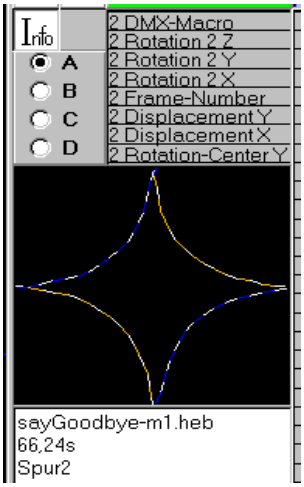


Fig. 104: Timeline Editor: Info Area

9.1.6. Buttons Cut, Copy and Paste

These buttons are self-explaining (See 6.3.2).

9.1.7. Buttons Undo/Redo

A click on UNDO cancels the most recent changes. The state after the last use of editing features or recording is restored. The undo keeps up to 10 levels back. REDO does the opposite of UNDO.
If the storing of the undo files takes too much time, which can happen when working with very complex and long shows, the storing of undo files can be switched off in "Options → Others".

9.1.8. Show Control Buttons

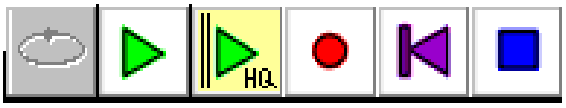


Fig. 105: Timeline Editor: Show Control buttons

The Show Control Buttons handle the playing, recording stopping etc. of the laser show.
The green arrows are the Play buttons (Play and PlayHQ), the red, full circle is to start recording, the violet arrow (Jump to start) sets the timeline position to the start of the show and the blue square is used to stop the playing or recording. The start position for playing or recording can be specified with a click on the desired position on the tracks or on the timeline. If the playing or recording is stopped and restarted again, the restart begins at this position until another position is selected or the violet arrow is clicked. The start position is changed, when events are marked or deleted. Furthermore a loop timeframe can be specified.

9.1.8.1. Button Play

This button is intended to be used during the editing of a show. A click on this button starts the replay of the show, but the quality can be poorer than with using the Play HQ button. Depending on the setup in the Timeline menu "Settings -> Start/Stop Laser output automatically" the laser output are switched on automatically.
The same is applies for the DMX-output. When using the normal Play button for playing a show not from the very beginning, some effects paths may not be applied correctly.
The advantage of the use of the Play button over the Play HQ button is that the Play button also allows for starting the playback at any time in the timeline, which makes it very suitable for show editing.

9.1.8.2. Button Play HQ

The Play HQ button is used to start the playing of a show in high quality. "Start" means that after a click on the button and after a certain, adjustable time, the monitor is blacked out, the outputs to the windows are stopped and the show is displayed on the laser projector(s). The start delay can be adjusted with a right mouse click on the button. The show starts at its very beginning and all effects

settings are set to the specified values. It is highly suggested to use the Play HQ button for real laser show displays.
The Playlist uses the Play HQ features as well.

9.1.8.3. Button Record

A click on this button starts the recording of events to the selected subtrack. Depending on the setup in the Timeline menu "Settings -> Start/Stop Laser output automatically" the laser is switched on automatically. The same applies for the DMX-output. It is possible to repeatedly click on record. On each click the recording starts at the selected start position.
It is possible to record on several tracks at the same time. To select several subtracks at once (must be of the same kind), hold the "Ctrl"-key when selecting the subtracks with the mouse.

9.1.8.4. Button Jump to Start

A click on this button stops the replay or recording and the timeline position is set to the very beginning of the show. Depending on the setup in the Timeline menu "Settings -> Start/Stop Laser output automatically" the laser is switched off automatically. The same applies for the DMX-output.

9.1.8.5. Button Stop

A click on this button stops the replay or recording. Depending on the setup in the Timeline menu "Settings -> Start/Stop Laser output automatically" the laser is switched off automatically. The same is valid for the DMX-output.

9.1.8.6. Button Loop

If a part of the Timeline is marked for play/record by click-drag with left mouse click, the loop button becomes activated. When clicking on the Loop button, the specified area of the timeline will be repeated infinitely.

9.1.9. Further Show Editor Elements

9.1.9.1. Track-Page Selection

"A", "B", "C" … up to "P" …these are the available track pages. Each track page has 3 tracks with each having 19 subtracks for the figures and effects. The assignment of laser output hardware to these tracks can be done at *Options -> Tab Hardware* (See Chapter 8.2). To open another track page, just click on the respective radio button.

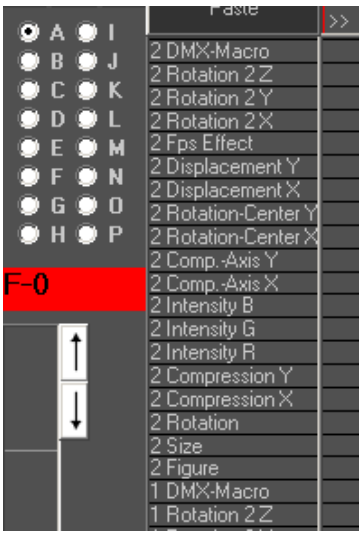


Fig. 106: Timeline Editor: Track-Pages selection, Tracks and Sub-tracks, Effect Intensity Input (yellow) during recording.

9.1.9.2. Figure and Effect Subtracks

Each figures subtrack has corresponding effect subtracks. The effect intensities set in these subtracks only apply to the figure assigned to the corresponding

figure subtrack. Each subtrack is the "container" for the respective effect intensity or figure. To record events on a subtrack, the very subtrack must be activated with a click on its caption. A green background marks the active subtrack. If several subtracks shall be recorded at the same time (e.g. all three intensities for RGB), hold the "Ctrl"-key and click-select the desired subtracks.

According to the kind of the subtrack (figure or effect) the events are recorded with using the prior assigned keys (figures) or the mouse and the Effect Intensity Input.
The functions of the 19 subtracks are:

- **Figure:** Start/Stop of figure-calls, recorded with assigned keys or by drag and drop
- **Size:** The size of the figure (Intensity input range: 0-120%)
- **Rotation:** The rotation of the figure (Intensity input range: +/- 180°)
- **Compression x:** The compression on the x-axis (Intensity input range: 0-100%)
- **Compression y:** The compression on the y-axis (Intensity input range: 0-100%)
- **Intensity R:** Intensity red color (Intensity input range: 0-100%)
- **Intensity G:** Intensity green color (Intensity input range: 0-100%)
- **Intensity B:** Intensity blue color (Intensity input range: 0-100%)
- **Comp.-Axis x:** compression along x-axis (Intensity input range: +/- 50%)
- **Comp.-Axis y:** compression along y-axis (Intensity input range: +/- 50%)
- **Rotation Centre X:** Movement of rotation-centre along x-axis (Input intensity range: +/- 50%)
- **Rotation Centre Y:** Movement of rotation-centre along y-axis (Input intensity range: +/- 50%)
- **Displacement X:** Displacement along x-axis (Intensity input range: +/- 50%)
- **Displacement Y:** Displacement along y-axis (Intensity input range: +/- 50%)
- **Frame Number:** Selection of frames of multi-frame figures (Input-intensity-range: 0-100%)
- **Rotation 2X:** Rotation around x-axis (Intensity input range: +/- 180°)
- **Rotation 2Y:** Rotation around y-axis (Intensity input range: +/- 180°)
- **Rotation 2Z:** Rotation around z-axis (Intensity input range: +/- 180°)
- **DMX-Macro:** On/Off of DMX-Macros

9.1.9.3. Effect Intensity Input

To record effects on the timeline, select the desired effects subtrack first. After hitting the record button it is possible to draw the effect intensity in the area on the very left of the Timeline Editor – see Fig. 107. It is possible to use the right mouse button to record the effect intensity as well: With this method, the effect levels are aligned to the horizontal grid.

9.1.9.4. Display of the Waveform

If the sound file is in the *.wav file format, the waveform of the sound file is displayed in the timeline bar. In case of wrong waveform recognition double click on the timeline bar to re-initialize the waveform display.

Fig. 107: Timeline Editor, live record effects intensity

9.2. Menu: File

9.2.1. Open Show

This menu item is used for opening an existing show. Select the appropriate show and click Open. Additional possibilities to load shows either is the use of the playlist or a double click on the show file (extension *.shw) in the Windows Explorer.

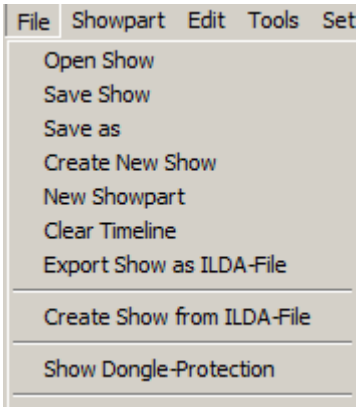


Fig. 108: Timeline Editor: Menu File

9.2.2. Save Show

This menu item is used for saving the active show.

9.2.3. Save as

This menu item is used for saving the active show with a new name. It is possible to use the same show folder for different shows, if they all only use figures that reside in this very folder. It is possible that these different shows in one folder use different music files too.

9.2.4. Create New Show

Clicking on this menu item opens the dialog for creating a new timeline laser show: The sound file for the new show must be selected first. It is recommended to create a new show folder that should hold the music file, prior to this step. File types *.mp3 and *.wav are supported.). All show files and figures must be stored in the same folder to be accessible for show programming.

After having selected the music file and specified the name for the show, the Figure Editor automatically opens the show folder and loads all available figures and frames to the Figure Table.
The creation of the show can begin.

If the show shall be programmed with using a *.wav-file, but the show shall run with an *.mp3-file later (due to file size), put both files into the show folder (they must have the same name, just a different file extension). After having finished the programming, delete the *.wav-file. On reload of the show a message pops up, stating that the music file is missing. Go to *Options -> Tab Show* and select the *.mp3-file.

9.2.5. New Showpart

It is possible to create showparts that are all saved to the same show folder. Each showpart is treated as "figure" and also appears in the Figure Table. They can be assigned to a key, like a normal figure, and be used within a live show or in a timeline laser show.
There are some limitations:

- A showpart shall not contain calls of other showparts (no cascading of showparts).
- If several showparts are running at the same time, the last called event has priority.
- It can happen that one showpart stops the playing of another one under certain circumstances.
- Showparts are no real figures or animations, but they are small shows that call figures and apply effects to those.
- It is suggested to arrange each showpart in a way that after the sequence has been run the called figures are terminated.
- Showparts can be used in the Live Window, too. That way it is possible to call figures and effects for several tracks with only one key.

The creation of a showpart works similar to the creation of a complete laser show (Timeline Show). The showpart, however, is meant for not being a whole show but e.g. the refrain of the song, that shall be repeated one or several times later on.

To create a showpart, click on New Showpart, select the music file (mandatory, even if the showpart is played without music later e.g. in the Live Window) and record the events for the showpart like for a normal laser show. All effects and figure tracks can be used.

When having finished the creation of the showpart, click on *Menu -> Showpart -> Create Showpart from Sequence*. By doing so, the created showpart is saved to the Figure Table as figure. The Timeline Editor then returns to the actual show. The showpart is then available in the Figure Table as a new "figure" with yellow design.

To edit the icon, right-mouse-click on it, select "Edit Showpart Icon" and specify the thumbnail.

The showpart itself can also be edited with a right mouse click on the icon. The program opens the Timeline Editor and automatically loads the showpart for editing.

After editing the showpart, the changes have to be applied through *Menu -> Showpart -> Apply*. Store the showpart "figure" with a click on "Store" in the Figure Editor. The active show is buffered in the computer's RAM. Therefore so not switch off the computer, or the edited data can get lost.

9.2.6. Clear Timeline

Clicking this menu item completely empties the active show timeline by deleting all events.

9.2.7. Export Show as ILDA-File

It is possible to export complete timeline shows as ILDA files (if the appropriate rights are granted). This menu item allows for export of Laserworld Showeditor laser show files to the standard ILDA format. Shows in ILDA format can be shared between different laser show control systems, as most software in the market is capable of importing ILDA files – however many of them don't support ILDA export. Laserworld Showeditor explicitly allows ILDA exports.

It is important to mind these points:

- The show is exported including optimizations, color correction and geometrical corrections. For exporting a show as ILDA-file, all options should be reset to standard or set to maximum values (e.g. output-size).
- If the show is programmed for more than one output channel, one ILDA file is generated per channel (a number is added to the ILDA-file name to identify the output channels).
- The ILDA file contains 2-dimensional coordinates.
- The ILDA file can contain a color table.
- The ILDA file should be created as RGB-file. The software does not create ILDA files with Pangolin colors!
- If the ILDA file is exported without colour-table and without RGB-data, the colors may not be displayed correctly on the target system.

After the click on the menu item just follow the instructions.

It is recommended to set the frame rate to 25-50 frames per second, even if the Galvo systems that are to be used for output are not able to handle this.
It is also suggested to not use any color correction when exporting to ILDA files, as well as not to use any color shift settings for optimization. A good value for scan rate settings for ILDA export is 30 kpps.

9.2.8. Create Show from ILDA-File

This menu item is used for importing ILDA files to the Timeline. On import, the frames-per-second value is calculated from the number of frames of the ILDA file and the length of the song. The ILDA file is imported like the ILDA figure import in the Figure Editor. Further the initial framerate per figure must be set (reasonable proposal is given), the key assignment is done and the *.heb-file for the figure (of the ILDA file) is saved.
A show file is created with only one event on track 0. The show name, as well as various options and settings are asked in dialog boxes.
The whole import requires the ILDA file running at a constant frame rate (fps). It is strongly recommended to only use ILDA files that are created using the standard

RGB configuration. If this is not the case it can help to load the Pangolin Color Palette (See Chapter 6.19.4). After the import successfully finished, the original IDLA file is not needed any more, as it has completely been converted to the *.heb format.

In case the import does not work properly, please refer to the Showeditor Support Forum.

If the ILDA show is a multi-projector show, then the additional files (for the other projectors) must be imported manually. They are stored as figure files within the show folder and assigned to keys, so they can be used in the Timeline.

9.2.9. Show Dongle-Protection

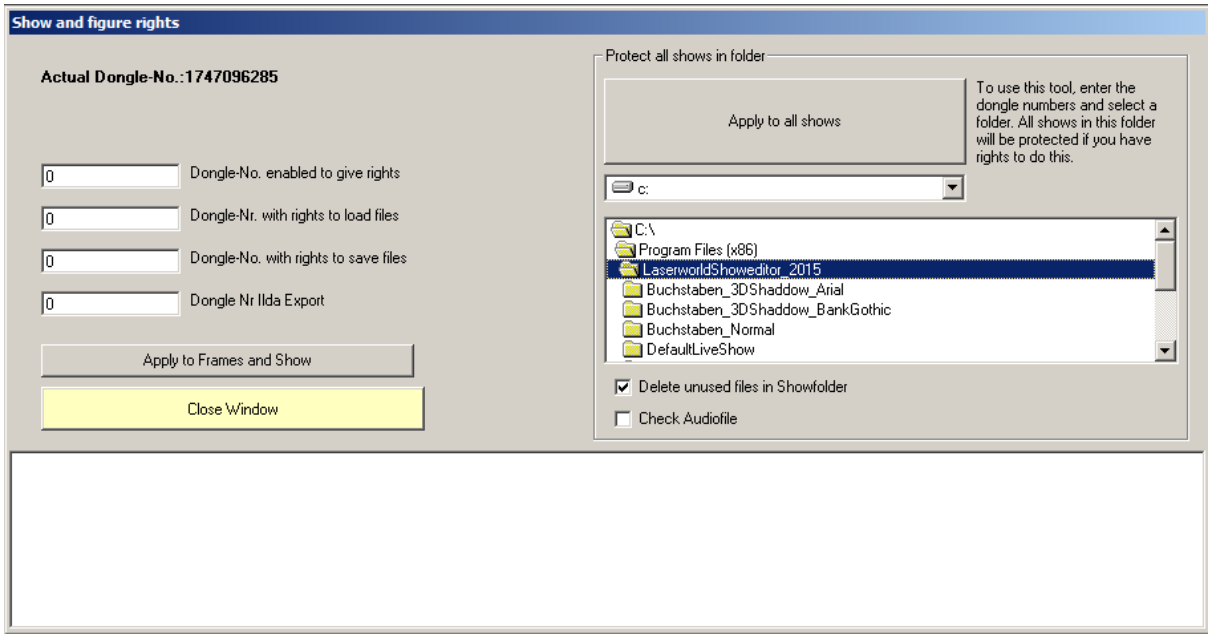


Fig. 109: Timeline Editor: Show Dongle Protection

Laserworld Showeditor allows for protecting shows by only allowing it to be played and/or changed with the use of a certain Showeditor license. This is an important feature as it is possible to sell created shows to customers and it is not possible to share the shows online with other users, as the show is bound to the very Showeditor license.

There are two ways for protecting shows:
a) Only one single show or
b) All shows within a folder.

The left area of the dialog with its button "**Apply to Frames and Show**" is used to protect the actually loaded show. The right area is used to protect all shows, which are stored in the selected folder (and its sub folders). Use the button "**Apply to all Shows**" to protect all shows in the folder (and subfolders). If the option "**Delete unused files in Show folder**" is activated, then all unused figures in the very folders are deleted. Enter Dongle number "0" to use this feature without the protection function.

It is strongly recommended to create a backup copy of the folder before protecting it – just to make sure nothing goes wrong.

The dongle numbers entered in the left area of the dialog box are used for both ways. This is how the permission settings work:

- Only the "**Dongle-No. enabled to give rights**" can change the rights.
- If all numbers are set to 0, no rights are set – the show is open for everybody's use. No protection is applied!
- It is only possible to change the permission settings, if the actually inserted license equals the **Dongle-No. enabled to give rights**. Otherwise no changes to permissions are possible.
- Protection spans all figure-files and all show-files.
- Before setting any protection it is strongly recommended to make a copy of the show(s)!

9.2.10. List of Show Names and Play Lists (loaded at the last sessions)

The 10 last loaded show or play lists are displayed at the bottom of the menu *File* for quick access. A click on the name of a show or Play List directly opens it.

9.3. Menu: Showpart

This menu has already been explained above (See Chapter 9.2.5)

9.4. Menu: Edit

This menu offers some additional features for editing a show.

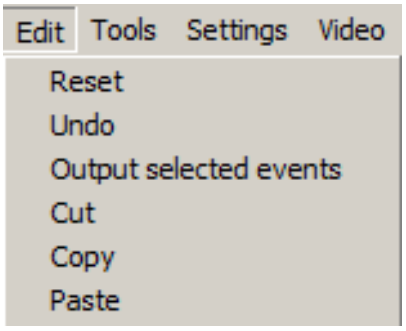


Fig. 110: Timeline Editor: Menu Edit

9.4.1. Reset

This menu item reloads all figures and events.

9.4.2. Undo

This menu item has the same function as the button UNDO. (See Chapter 9.1.7)

9.4.3. Output selected events

This feature activates direct output to the connected projector(s) for active/selected events, if the laser output is set to "On".

9.4.4. Cut/Copy/Paste

This menu item has the same function as the respective buttons. (See Chapter 9.1.6)

9.5. Menu: Tools

9.5.1. Beat Counter

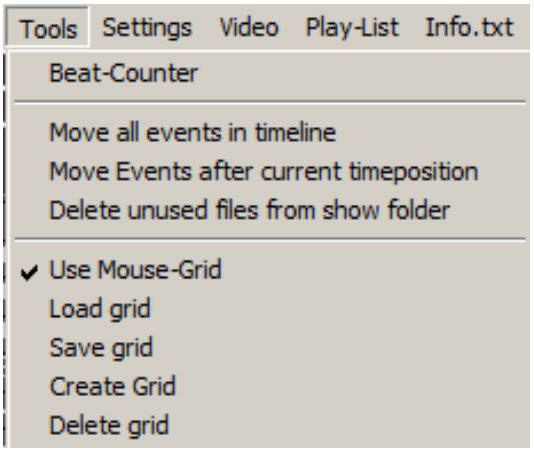


Fig. 111: Timeline Editor: Menu Tools

The Beat Counter (also see Chapter 6.18.7) is a tool for identifying the beats per minute (bpm, the "speed") of the music file. It is very helpful to set the appropriate frame-rate of multi-frame figures. A click on the menu item opens a dialog (self explaining)

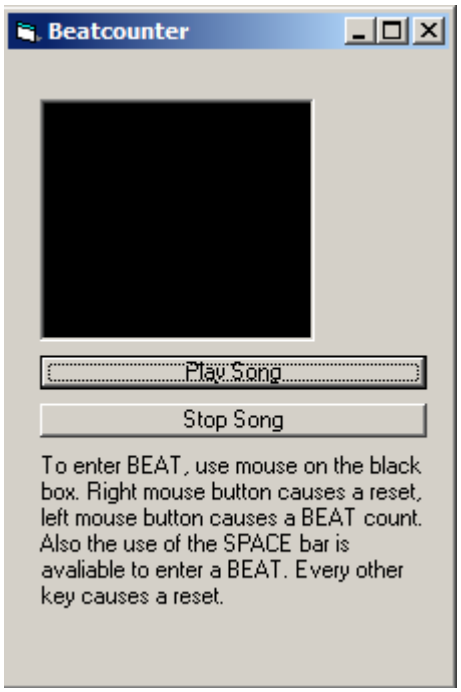


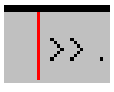
Fig. 112: Timeline Editor: Menu Tools

9.5.2. Move all events in timeline

A click on this menu item opens a dialog that allows for shifting all events in a show on the timeline (in milliseconds). This can be used for e.g. deleting the first part of a show (shorten music file, then move all events by the time the music was shortened) - and the other way round.

9.5.3. Move events after current time position

This menu item acts similar as the previous one, but the time shift is only applied to events that come after the actual timeline position (needs to be selected first with a click to the timeline, it's marked with a red vertical line). Using this tool allows for the easy creation of a gap in the effects sequence for inserting additional effects, and it can also be used for negative time shift, which can result in overlapping effects, so be careful when doing so.



9.5.4. Delete unused files from show folder

This menu item does what it says: It deletes the unused files that reside in the very show folder of the active show. Be careful: It also deletes unused figures, so make sure that everything is backed-up properly.

9.5.5. Use Mouse Grid

As mentioned above, it is possible to insert figures into the timeline tracks by drag and drop. Furthermore it is possible to work on the tracks by copying and moving the events. To ease-up this procedure, it is possible to create a time grid. The option "Use

Mouse Grid" is used for activating the grid. This requires a previously created grid. This has to be done manually, as an automated creation does not make sense.

9.5.6. Create Grid

This menu item is used for creating a time-grid to align events to. A dialog opens, providing all options and instructions on how to set up the grid. Grid lines are entered using the "Space" Key.

9.6. Menu: Settings

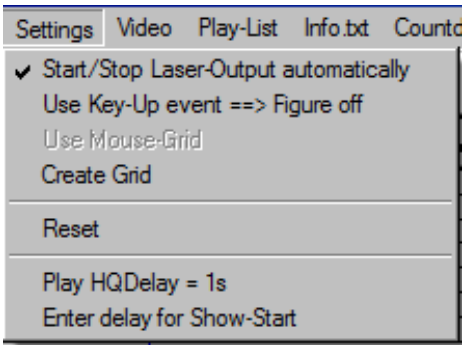


Fig. 113: Timeline Editor: Menu Settings

9.6.1. Start/Stop Laser Output automatically

Toggle this menu item to start and stop the laser output automatically.

9.6.2. Use Key-Up Event ==> Figure off

Check this item if the output display of a figure stops on releasing the assigned key.
Key pressed → figure on; key released → figure off.

If this option is unchecked, only the pressing of a key is recognized. The figure output can then be stopped by pressing the very key again, pressing another key or hitting the "Space"-key (then a blue line is displayed in the timeline at the stop-position

On recording a DMX subtrack, carefully use the Key-up/Figure off option as well as the "Space" Key, as errors may arise from that.

Important: This option influences on the use of the function (F-) keys!

The use of the F-Keys depends on the setting of "Use Key Up Event => Figure Off". If it is unselected, the respective F-Page is simply chosen by pressing the very key. Unselecting an F-key is done by pressing it again – then the F0 key is automatically selected, meaning "no F-Key".
If the "Use Key Up Event => Figure Off" is selected, the F-Key must be pressed and held as well while pressing the key for calling a figure.

The use of the F10 key may not be available as it's a Windows native key which can not easily be overridden by software.

9.6.3. Play HQ Delay = 1s

This menu item provides the same features as described in 9.1.8.2 .

9.6.4. Enter Delay for Show-Start

This menu item provides the same features as accessible with a right mous click on the "Play HQ" button. See 9.1.8.2 for details.

9.7. Menu: Video

9.7.1. Window On/Off

This menu item opens the video preview window, which only makes sense if a video file is selected as media file for the show.

All video file formats that can be used in the Windows Media Player as standard are supported.

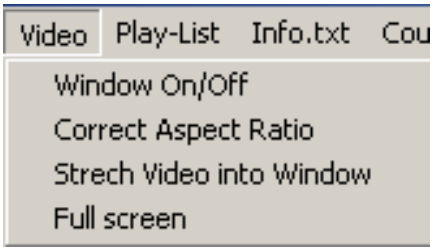


Fig. 114: Timeline Editor: Menu Video

9.7.2. Correct Aspect Ratio

Automatically corrects the aspect ratio of the video file. Using only this feature may lead to the video size exceeding the screen size.

9.7.3. Stretch Video in Window

Stretches the video to make it fit the screen size. Distortions can happen.

9.7.4. Full screen

Shows the video in full screen mode. A mouse click exits full screen mode.

If the laser show is played through PlayHQ, the video window changes to full screen mode. The "main screen" of the PC is switched to black out as usual. But the feature "Monitor Standby" has to be switched off.

9.8. Menu: Play-List

9.8.1. Display

A click on this menu item opens the Play List. See Chapter 10 for further explanations.

9.8.2. Save

Saves the active Play List.

9.8.3. Load

A click on this menu item opens an existing Play List.

9.8.4. Start Play List

Fig. 115: Timeline Editor: Menu Play-List

A click on this menu item starts the playback of the shows of the Play List (See Chapter 10 for details).

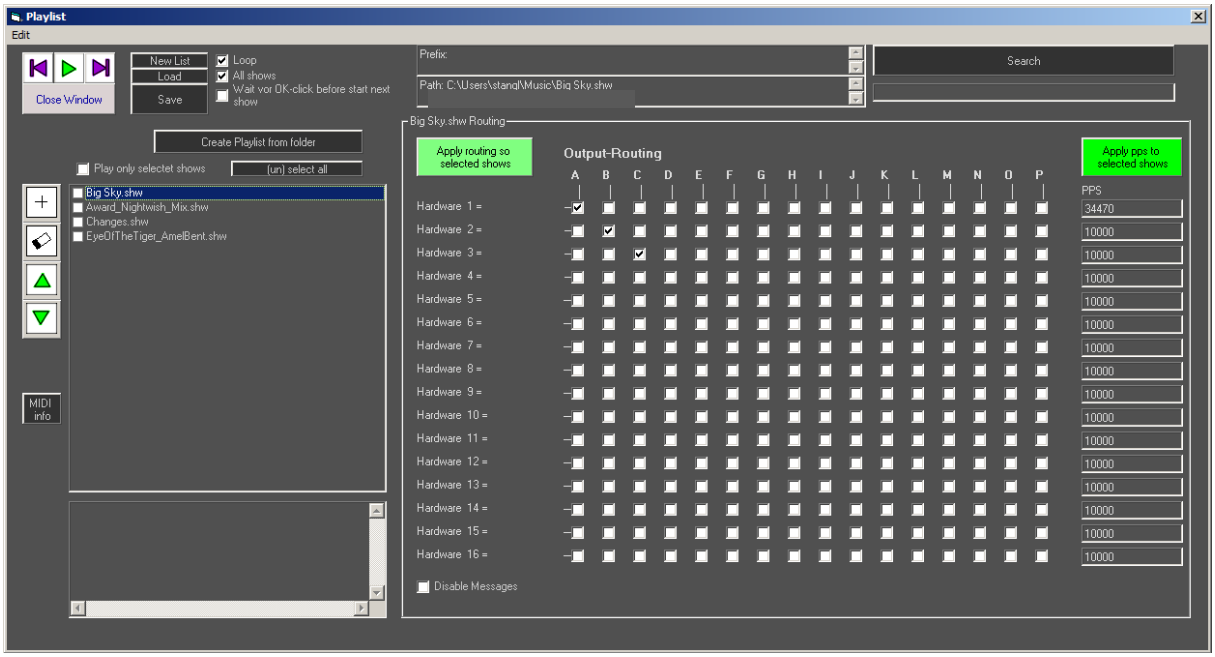


Fig. 116: Timeline Editor: Menu Play-List/Display opens the Play List

9.9. Menu: Info.txt

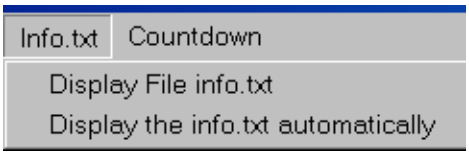


Fig. 117: Timeline Editor: Menu Info.txt

The info.txt-file is created by the show programmer and contains general information about the show, the music file and the show programmer.
This information usually includes the name of the author, the song file, the used or suggested Galvo system (laser projector configuration) and some specials about the show (single beams, safety etc.).
All details provided here are just for information purposes, they do not influence on any program settings!

9.9.1. Display File info.txt

A click on this menu item opens and displays the info.txt dialog.

9.9.2. Display the info.txt automatically

If this option is checked, the info.txt file is automatically loaded and displayed on opening of a show.

9.10. Menu: Countdown

9.10.1. Start

This menu item is used for starting a show by countdown. The countdown is routed depending on the settings in *Options -> Hardware*

When clicking on "Start", a dialog box opens asking for the start time to be set. After a click on OK the countdown starts. The countdown can be interrupted by switching the laser off (*Figure Editor -> Button Laser OFF).*

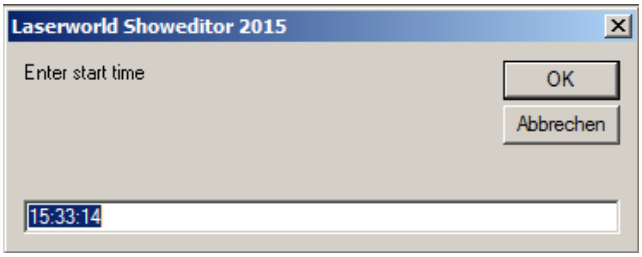


Fig. 118: Timeline Editor: Menu Countdown/Start => Dialog to enter the time to start the show or to cancel the Countdown

9.10.2. Define Figures

This menu item is used to specify the figures that shall be used for displaying the countdown. The figures are inserted via Drag and Drop. They are displayed during the countdown display.
If only these figures shall be displayed during the countdown, uncheck *Options -> Hardware -> Countdown Output*.

With the help of these figures it is possible to write "Next Show"….HH:MM:SS.

The countdown time will be displayed in the selected color. If black is the active color, there of course is no output visible.

The countdown can not be displayed as ticker (scrolling text). The software uses the "normal" standard font (morphing letters, but without morphing). It is suggested to configure the Text display behaviour first.

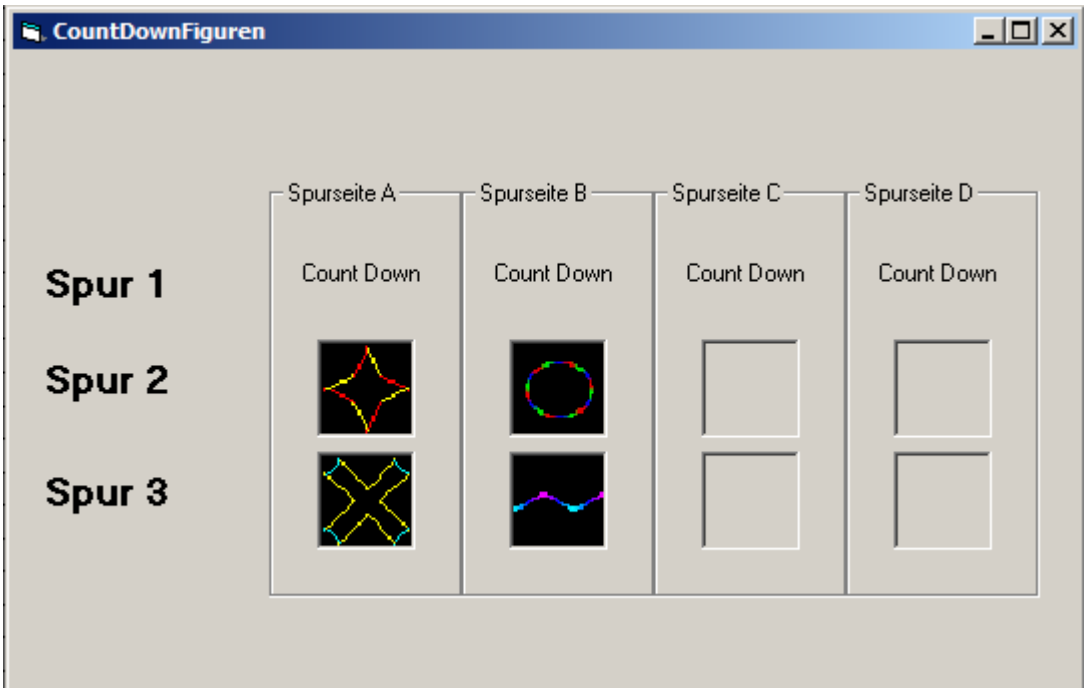


Fig. 119: Countdown figures

9.11. Menu: Showpath

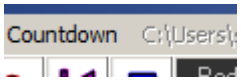


Fig. 120: Menu Showpath

If a show is loaded and active, the file path to the show files is displayed right next to the Countdown menu item.

10. The Playlist

The Play List is the playback feature of Laserworld Showeditor. It allows for playing back existing laser shows. These shows can be loaded to the Play List, arranged in their order and several configurations can be set. It is essential that shows that are referenced in a playlist don't get moved in the file structure, as the Play List references the absolute file paths of the show files.

10.1. Violet Arrows

These two arrows allow for switching to the previous respective the following show in the play list sequence.

10.2. Green Arrow / Blue Square

A click on the button with the green arrow starts the actually selected show. During the show play, the button shows a blue square, which allows for stopping the show play.

10.3. Button Close Window

A click on this button closes the Play List window. On re-opening the Play List, the previously arranged list is reloaded.

10.4. Button +

Shows can be added to the playlist by clicking this button.

10.5. Eraser

A click on this button removes the selected show from the Play List (it does not delete the show, it just removes it from the play list)

10.6. Vertical Green Arrows

The green up / down arrow buttons can be used for arranging the play order of the shows in the Play List.

10.7. The List area

The List area shows all shows in the Play List in the arranged order. The shows can be directly selected. A double click starts the show play of the selected show. After the play of a show that has been started with direct double click, the output is stopped – the consecutive shows are not played. Use the Play button to play the Play List shows in sequence.

10.8. Output Routing and Speed

The output routing and the corresponding scan speed settings allow for individual hardware output routing of the very show signal. (Also see Chapter 2.6)
If the output routing has been changed for the Play List, do NOT save the options, as it will lead to signal routing problems.

10.9. MIDI-Info

A click on this button displays information on the actual status for the remote control of the Play List over MIDI signal.

10.10. Loop

If activated, the playing of the show list repeats from the beginning if has played the last show of the sequence. This runs infinitely until the playback is stopped manually.

10.11. All Shows

If "All Shows" is checked, the playlist plays every show consecutively in their order in the Play List. This option does not apply for shows that have been started by double click.

10.12. Wait for OK-click before start next show

If this option is checked, the start of the playback of the next show must be confirmed. This feature is especially suitable if there shall be explanations between shows and the start of the following show cannot be scheduled.

10.13. New List

Clears the content of the active list and a new one is started.

10.14. Load

Loads an existing Play List.

10.15. Save

Saves the active Play List.

10.16. Create Play List from Folder

This feature allows for easy play list creation directly from the file structure: With selecting a certain folder on the hard disc, all shows in this folder and the subfolders are automatically added to the Play List. Play order can be arranged afterwards, using the green up/down arrows.

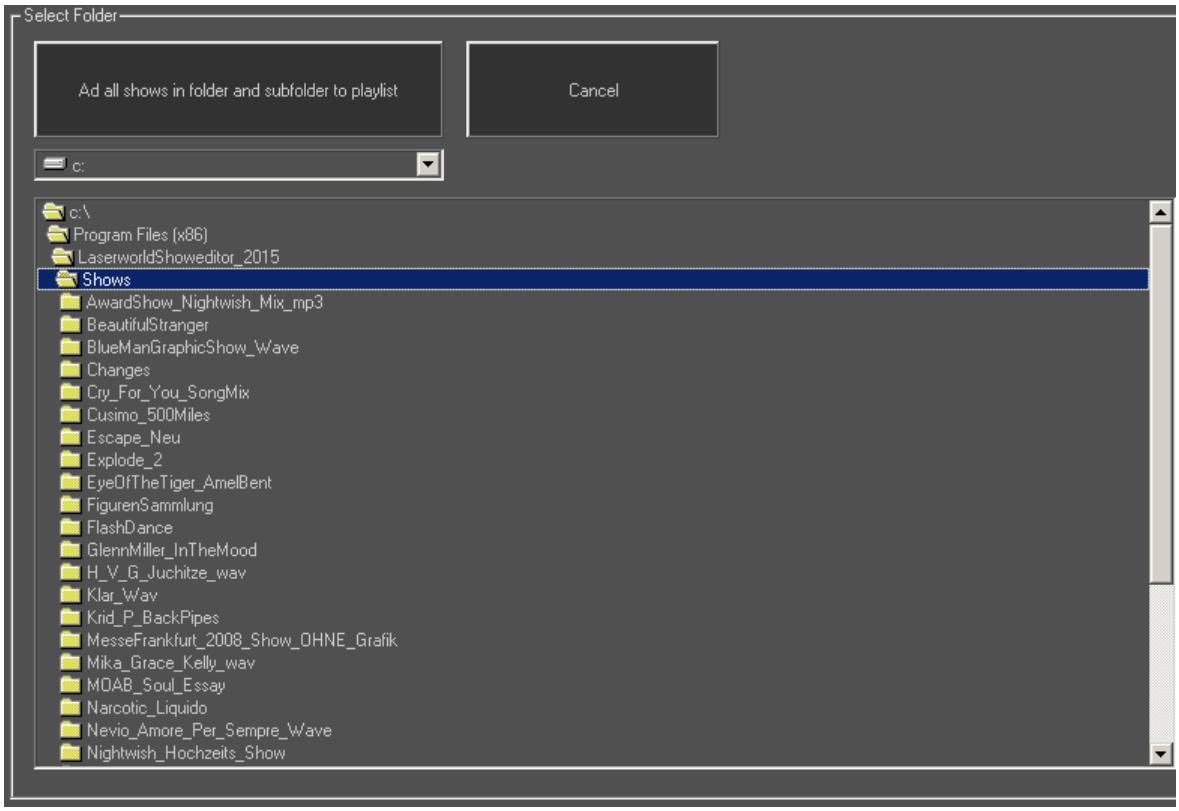


Fig. 121: Play List, Create Play List from folder

11. DMX Editor

The DMX Editor provides control over the DMX output through the hardware interface. Laserworld Showeditor can handle DMX input (for remote control of the software) and output (for controlling DMX fixtures and devices) DMX signals.

The DMX control (for DMX OUT) is done with DMX macros. These macros become assigned to keys on the computer keyboard, so they can easily be called later.

There are two possibilities to control DMX-channels (DMX: digital multiplex):

- EasyDMX – basic fader-based features

- Intelligent DMX (only for users with software license) – for control of more complex fixtures

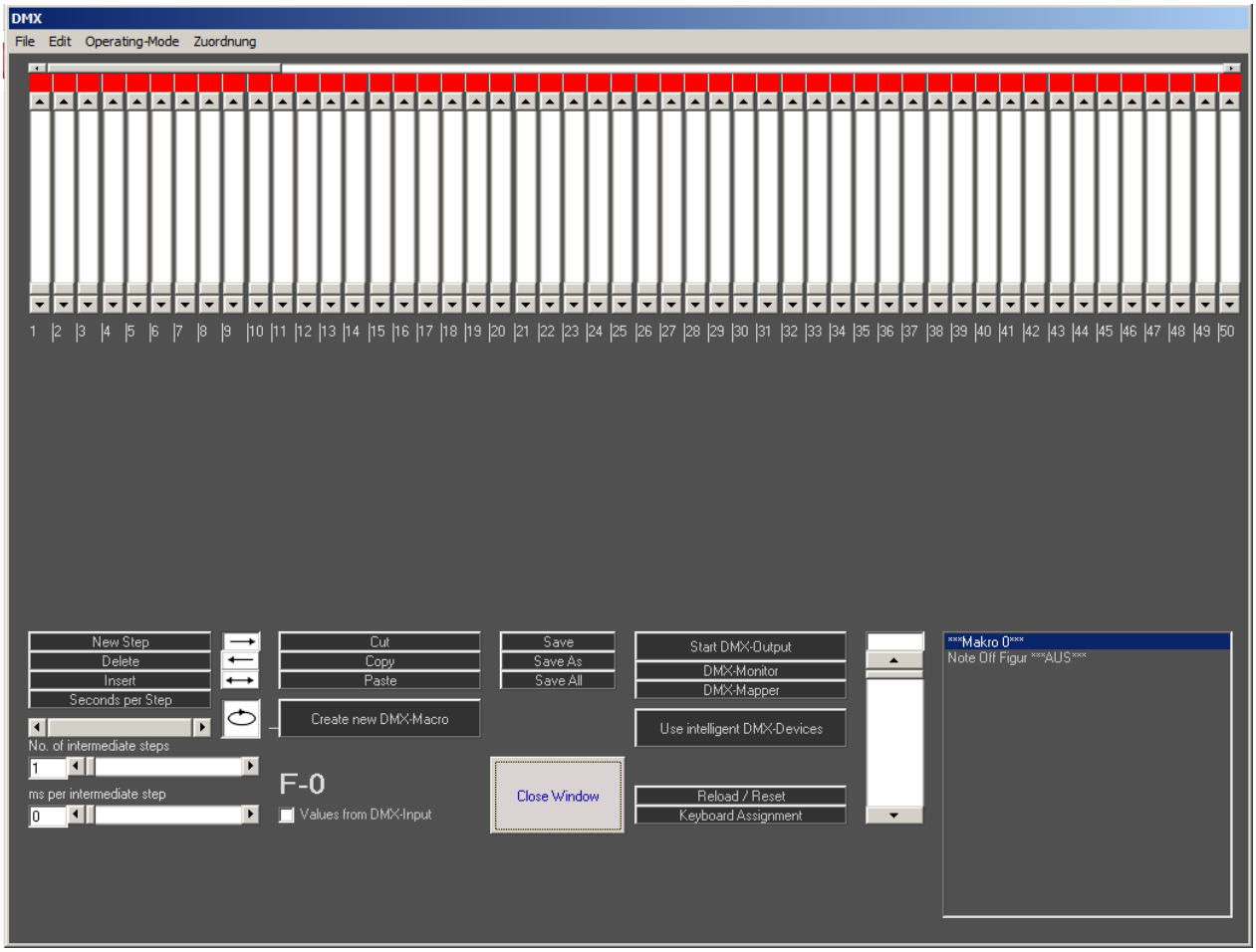


Fig. 122: The DMX-Editor

11.1. EasyDMX – Fader Control

The use of the EasyDMX-Editor (Fig. 122) is similar to the Figure Editor, but for the control of DMX devices "macros" are created (comparable to the figures in the laser shows). Each DMX macro consists of one or more steps ("scenes") and can be assigned to a key (similar to the figures in the Figure Editor). After having creation, assigned and stored the macro, it can be used.

In Fig. 122 there are a lot of vertical scrollbars. Each scrollbar controls one output channel, which can be assigned to one or even more DMX channels (As default each scrollbar is assigned to the respective channel number).

The creation of a DMX-macro works like the creation of a figure. First click on "**Create New DMX Macro**". This creates an empty "Macro 0". Then the scrollbars can be set to the desired positions. To use the scrollbars for channels with higher numbers then 50, use the upper horizontal scrollbar to make them visible. The colored boxes above the scrollbars are all standard colored red after the "Create New DMX Macro" has

been clicked. The red color indicates the controls that have not yet been used for the macro in active edit mode.

All red marked channels do not change the value of the respective DMX channel when calling the macro. If a scrollbar is set to a value, the red box color changes to green and the specified DMX value is put out. The visualization of active and non-active channels through color code is made to avoid any unwanted behaviour of the macros later.
Hit "Save" to save the very macro.

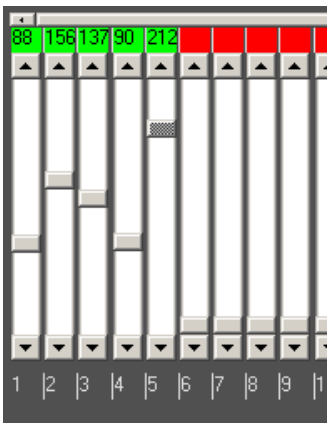


Fig. 123: DMX-Editor: Used and unused channels

11.2. Macro-Steps

11.2.1. Button: New Step

A click on this button adds a new step to the macro after the active one.

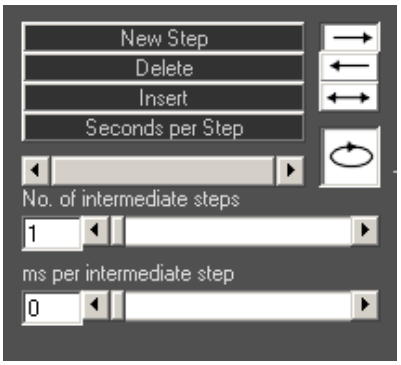


Fig. 124: DMX-Editor: Macro-Steps

11.2.2. Button: Delete

A click on this button deletes the active macro step.

11.2.3. Button: Insert

A click on this button adds a new step before the active one.

11.2.4. Button: Seconds per Step

A click on this button opens a dialog to specify the duration of a DMX macro step in seconds.

11.2.5. Scrollbars No. of intermediate steps/ ms per intermediate step

These scrollbars specify the fading behaviour between macro steps. The nominal values of a new step are set in a delayed way with adding additional intermediate steps (interpolation). Set the number of intermediate steps with the respective scrollbar. 1 means, that the nominal values are taken as they are. Value 2 means one intermediate step and so on.

With the scrollbar "**ms per intermediate step**" the delay for the intermediate steps is set fixed.
A reasonable value is e.g. 30 or more milliseconds for each intermediate step (faster is not recommended, because the laser output quality may become irritated that way).

11.2.6. Buttons for setting the direction

The buttons with arrows specify the playback direction of the Macro sequence – normal order, reverse or alternating. It is important to consider which playback direction is actually set if steps are to be inserted or changed in general, as the playback direction applies for these actions too.

11.3. Edit Steps

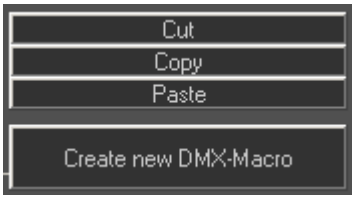


Fig. 125: DMX-Editor: Edit Step

11.3.1. Buttons: Cut/ Copy/ Paste

With these buttons macro steps can be cut, copied and pasted.

11.3.2. Button: Create new DMX-Macro

Use this button to create a new macro.

11.4. File

11.4.1. Buttons: Save/ Save as/ Save all

With these buttons macros can be saved, saved with a different name or all present macros can be saved with one click.

11.4.2. Button: Close Window

A click on this button closes the DMX window.

Fig. 126: DMX-Editor: File

11.5. Additional Elements (Output, Master, Mapper etc.)

11.5.1. DMX Interface

The DMX interface(s) are configured in the Figure Editor *Options -> DMX*. Please see Chapter 8.5 and following.

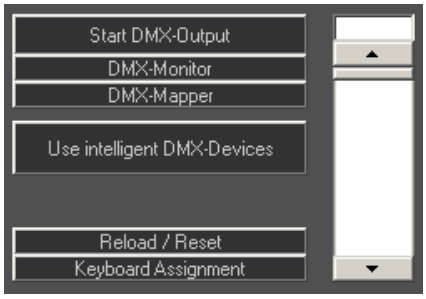


Fig. 127: DMX-Editor: Additional elements (Output, Monitor, Mapper...)

11.5.2. Scrollbar DMX Master

The master scrollbar applies to all DMX channels. It is comparable to the master-volume of an audio-mixer.
If the "Master Sensitivity" has been set to "false", the DMX master fader has no influence on "Intelligent" DMX-devices. See the chapter 11.6 about "Intelligent DMX" for further details.

11.5.3. Button: Start DMX Output

A click on the button "Start DMX Output" enables the DMX output on the hardware device (switches off black-out mode).
On starting the DMX-Output the step timers are activated. The start/stop of the DMX-Output happens automatically on the start/stop of a laser show.

In case there is no DMX-Output, the macro "Note Off Figur ***Aus***" becomes activated automatically.

11.5.4. Button: DMX Monitor

The DMX Monitor opens up in a little window displaying the active values of the 512 output channels. The values automatically update if the DMX output is switched on.

11.5.5. Link DMX Macros to Laser Figures

DMX macros can be linked to laser figures. The linking is done in the Figure Table of the Figure Editor (right click on the laser figure). If the link has been established, a call of the laser figure calls the DMX macro as well. The link refers to the assigned key, so the laser figure and the macro must be assigned to the same key.

11.5.6. Button: DMX Mapper

The DMX macros change the values of the scrollbars. These scrollbars are assigned to DMX output channels – and these channels can be assigned individually. Thus it is possible to e.g. use scrollbar 1 to change DMX Channel 24 etc.. It is possible to assign multiple channels.

A click on the DMX Mapper button opens the dialog area shown in Fig. 128.

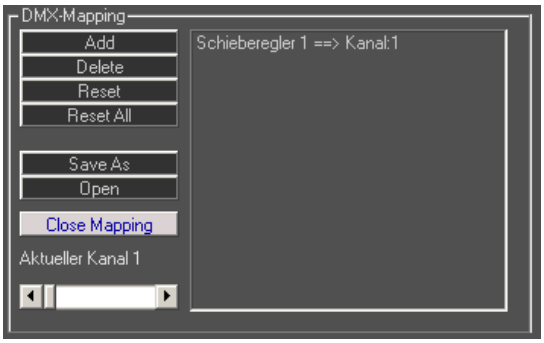


Fig. 128: DMX-Editor: DMX Mapping

The settings are saved to the program folder on leaving the dialog via "**Close Mapping**". Several "mappings" can be used to control the DMX devices by "**Save As**" and "**Open**". The scrollbar that should be edited can be selected with the slider "**Active Channel**" or with a double click on the name of the scrollbar in the list.

This feature helps in making the adaption of DMX macros to different hardware combinations in different venues and with different users possible.

11.5.7. Macro Area

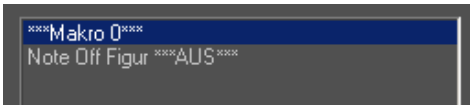


Fig. 129: DMX-Editor: Macro Area

The Macro Area holds all created Macros, similar to the Figure Table in the Figure Editor.
All Macros that are present in the active show folder are displayed there. They can be selected with the mouse either for editing or output.

Key Assignments are not done here, but with using the button "Keyboard Assignment"

11.5.8. DMX Macro "Note off Figur***Aus***"

Note off is equivalent to "Release Key". On DMX-recordings the NOTE OFF function works, too. Thus a macro can be stopped by releasing the respective key (e.g. lamp

on/off), but then the NOTE OFF macro is called, which sets all DMX-channels to 0. This may be an unwanted effect if intelligent lighting is used.

To only set one Channel to 0, e.g. the channel for brightness, it is necessary to write a special macro doing exactly that.

11.6. "Intelligent"-DMX

A click on the button "Use intelligent DMX devices" changes the interface of the DMX-window (Fig.134)

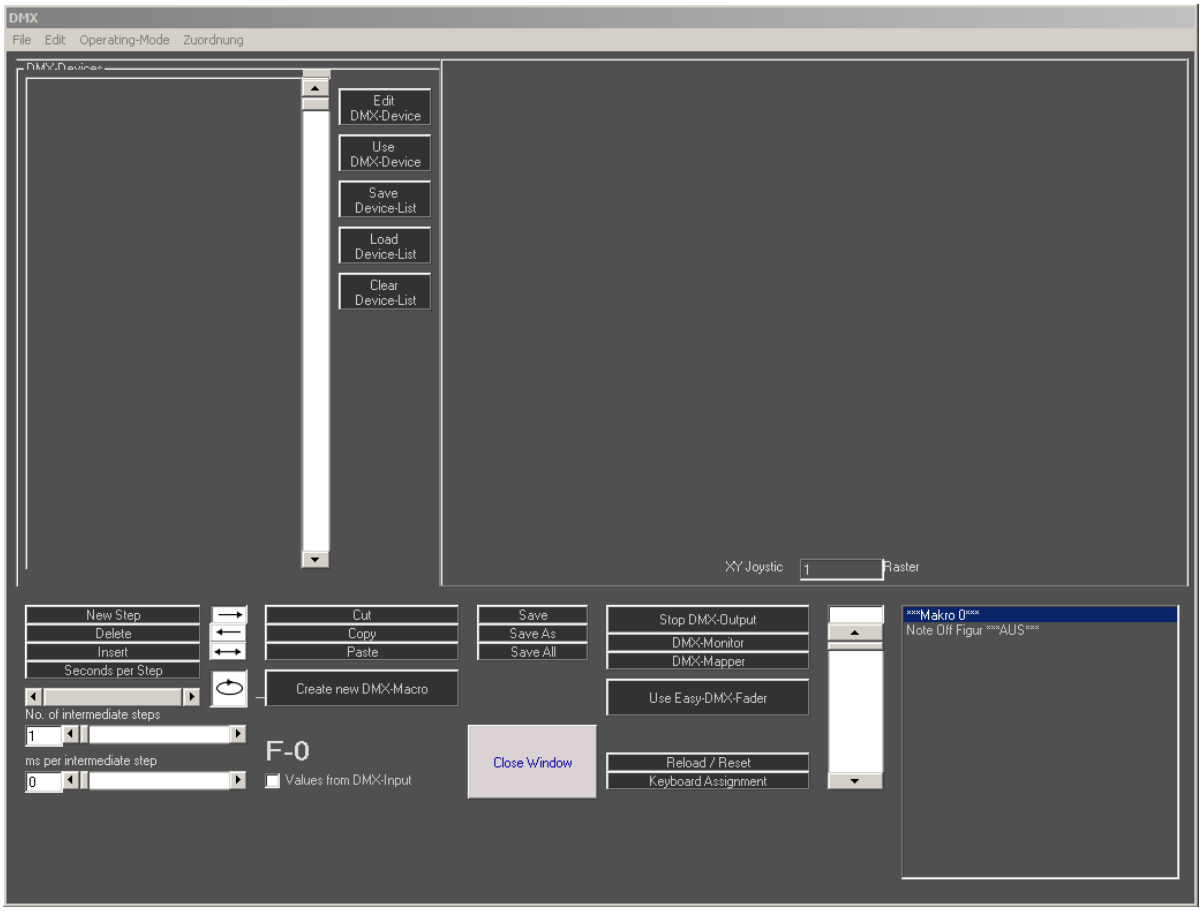


Fig. 130: DMX / Intelligent DMX Window

Before being able to use any intelligent devices, a profile for each intelligent fixture needs to be created.

11.6.1. Button: Edit DMX-Device

Select or edit an intelligent DMX device with this button. A new dialog opens that allows for specifying the configuration for the devices, see Fig. 131.

The example in Fig. 132 shows a very basic and simple profile of an RGB moving head. The start address is set to DMX Channel 1

11.6.2. Label

The label allows for giving names to the very channels. This makes it easier to identify them later.

11.6.3. Dimmable

This column can be set to true or false per channel. It specifies if the very channel shall be considered a dimmer channel, meaning that this very channel can be dimmed using intermediate macro steps. If set to "false", the channels values always immediately change to their nominal values. This e.g. significantly influences on the behavior of Gobo-Wheels in Moving-Heads, Light Scanners and similar devices.

11.6.4. Master sensitive

If this option is selected for a certain channel, this channel reacts to settings of the master dimmer. Usually only the brightness channel(s) is/are assigned a "true" value(s) here. Example: If all channels of a moving head fixture would be assigned "true" for the Master Dimmer, the head would also move to the zero position if the master fader is put to zero – so would all colors and gobos do.

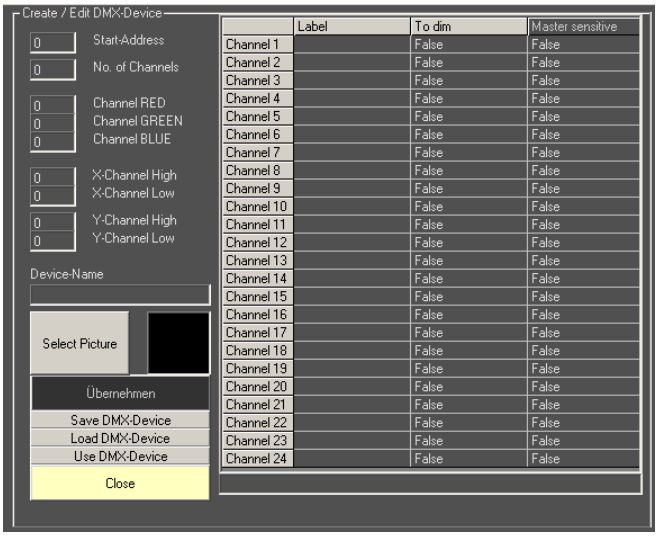


Fig. 131: DMX / Intelligent DMX /Edit DMX-Device

11.6.5. Channel Red/Green/Blue

If channel numbers are entered per color, an RGB color selection field becomes available (Fig. 131). If a non-RGB device is used, enter "0".

11.6.6. X and Y Channels (PAN/TILT)

If values are specified for the X and Y Channel, a joystick for head movement control is available for programming later. The "Low" values refer to the 8-bit resolution channel; the "High" values refer to the 16-bit resolution channels. For non-moving devices enter "0".

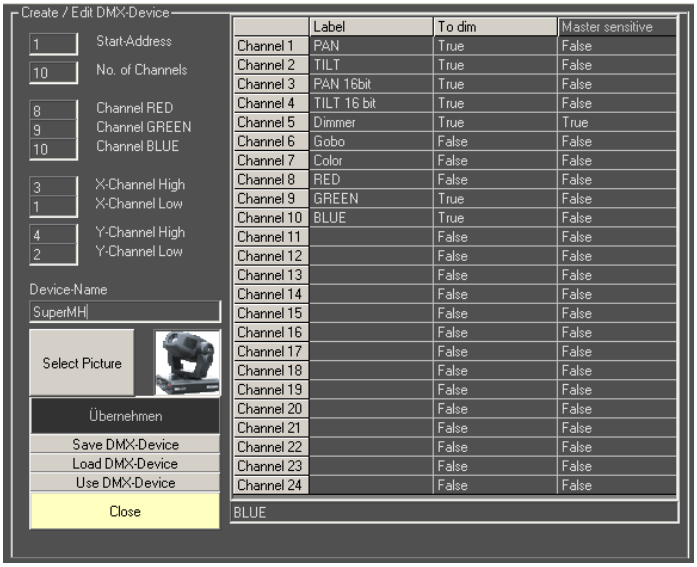


Fig. 132: DMX / Intelligent DMX /Edit DMX-Device. Example

11.6.7. Use of several identical DMX-devices with different addresses

To use several identical DMX units it is necessary to create the profile for one device first. For the other, identical devices it is only necessary to copy the existing profile and simply change the DMX start address (and probably the name as well).
Then save the profiles for the devices, using different filenames.

It is not always necessary to individually save the newly created profiles: If the button "Use DMX Device" is clicked after the profile has been created, the profile is inserted to the device list (without saving). The device list itself can be stored afterwards. It does not require the single profile files.

11.6.8. Button: Save DMX-Device

Save the profile of one DMX device (the one in active edit mode).

11.6.9. Button: Load DMX-Device

Load a *.ger file either edit it and just include it to the device list.

11.6.10. Button: Use DMX-Device

On click on this button, the device profile is immediately inserted to the device list, without saving the individual profile. As it is possible to save a complete device list, this procedure makes the creation of profiles quicker and easier.

Load stored device profiles to the program with this button. A list of devices can be created this way (see example in Fig. 133).

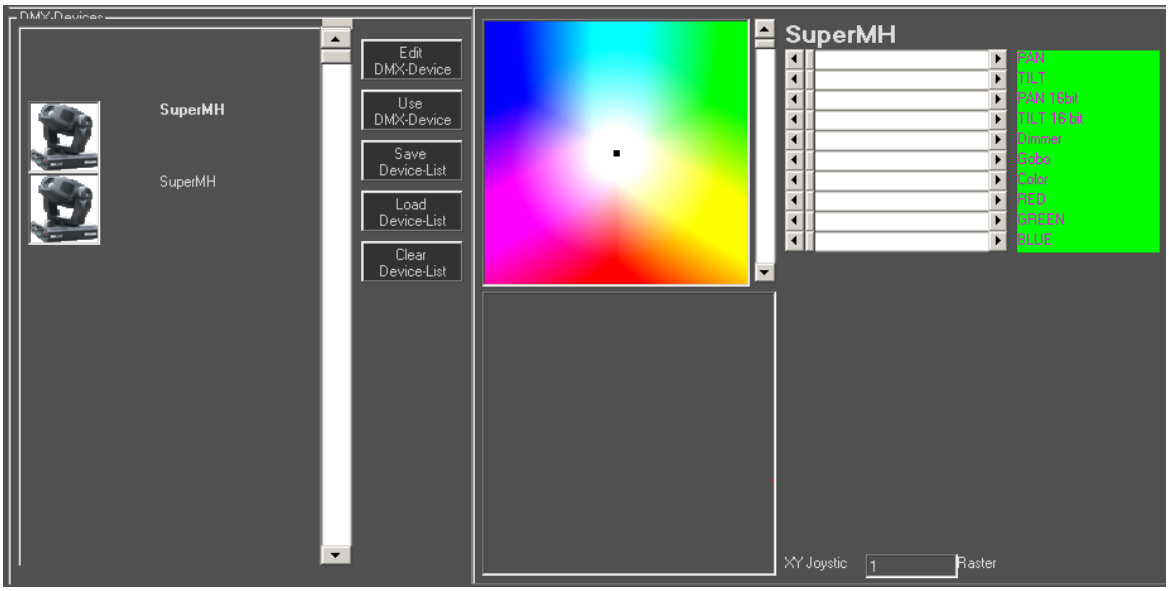


Fig. 133: DMX, Intelligent DMX, DMX device list, color-select area and XY-joystick area

11.6.11. Selection of the DMX devices for creating macros

Select a device from the list by clicking on it, is is the marked as "active" (the device name is displayed in bold letters). The functions of the very device are shown in the right part of the window.

11.6.12. Selection of multiple DMX Devices for creating macros

It is possible to select several devices at the same time for macro editing.
Select the first device and hold the Ctrl-Key while selecting the other ones. The functions of the selected devices are shown on the right side of the window. If RGB values are specified, the color select field is displayed, and if PAN/TILT values are given, a grid area for positioning the fixture is displayed just below the color select field. The grid for the x-y control works slightly different to the one of the Figure Editor. Try different values to see what fits the requirements best. An example: Using a value of 4 divides the area to 4 equal parts. This can be advantageous when using moving-head fixtures, especially if they can rotate their head more than 360°.

If several devices are selected for editing at the same time, the actual values may not be displayed correctly: It's always the values of the device that has been selected as last one that are displayed.
Important: Only select several devices of the same kind at once – using different device types in one grouped selection can lead to unwanted results and effects.

But: It is possible to select several head-moving floodlight fixtures and then change their X and Y position, even if their channel assignment for Pan and Tilt (X and Y) is different.

11.6.13. Button: Save Device List

If a device list is completely configured it can be saved with using this button. If not saved, the device list is lost on program restart.

The device name is preset by the Laserworld Showeditor. It is only possible to store one device list. The device list must not necessarily be loaded for playing shows containing DMX macros.

11.6.14. Button: Load Device List

A click on this button opens a prior stored device list.

11.6.15. Button: Clear Device List

A click on this button clears the contents of the actually loaded device list.

11.6.16. Use of Intelligent DMX-Devices

After the profiles of the desired "intelligent" DMX devices have successfully been created, they can be used for creating macros. Use the macro creation buttons, as described in Chapter 11.3.2 and following, for creating macros with intelligent fixtures.

11.6.17. Intelligent DMX and License

Intelligent DMX is only available in fully licensed Laserworld Showeditor software versions.

11.6.18. Menu of the DMX-Window

The menu of the DMX window only holds items that are directly accessible through buttons as well. Please see the description for the very button for details.

12. Remote Control of the Software via DMX and MIDI

The main show parts of Laserworld Showeditor – Timeline Editor and Live Window - can be completely remote controlled with DMX or MIDI.

12.1. Remote Control with DMX

According to the settings at *Options -> DMX -> incoming DMX* the incoming DMX signals are processed through the DMX Input Mapping. These signals then control the specified window. Mouse and Keyboard control remains active as well.

12.1.1. Timeline Window DMX Control

To use DMX remote control for Laserworld Showeditor it is necessary to configure the settings in *Options -> MIDI-DMX* first. DMX input signal handling can negatively impact on the computer's performance if running together with complex ILDA output, so the settings for the DMX request value should not be set faster as needed.

To control the timeline over DMX the laser output must be switched on in the software and a folder containing the figures must be loaded properly (Figure Table). To call figures over DMX, these have to be assigned to a key and to a DMX value (See "Live Window", chapter "DMX assignment" in Chapter 13.2.6).

If DMX values have been properly assigned to a figure, the DMX value of the active figure is shown in the header of the Figure Table (See Fig. 134). DMX value "0" means black-out, no figure output.

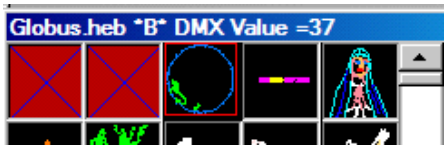


Fig. 134: Display of DMX-value of a figure

It is possible to use the function keys F0 to F12 for DMX figure control as well. They are accessible through DMX channel 19.

The routing of DMX-IN signals to the control channels can be specified in *Options -> DMX -> DMX Input Routing* (See Fig. 136).
This configuration dialog allows for very specific assignment of DMX channels. The channel assignment corresponds with the order of the tracks and subtracks in the Timeline, starting from the lowest track.
Thus the first channel (depending on the DMX-input offset) is the sub-track "0 Figure" (Fig. 135), the second channel is the sub-track "0 size" and so on.

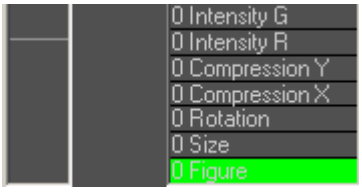


Fig. 135: Figure track number"0" – channel 1 for DMX

There are 19 channels in total per track (DMX-out is not supported in this case).

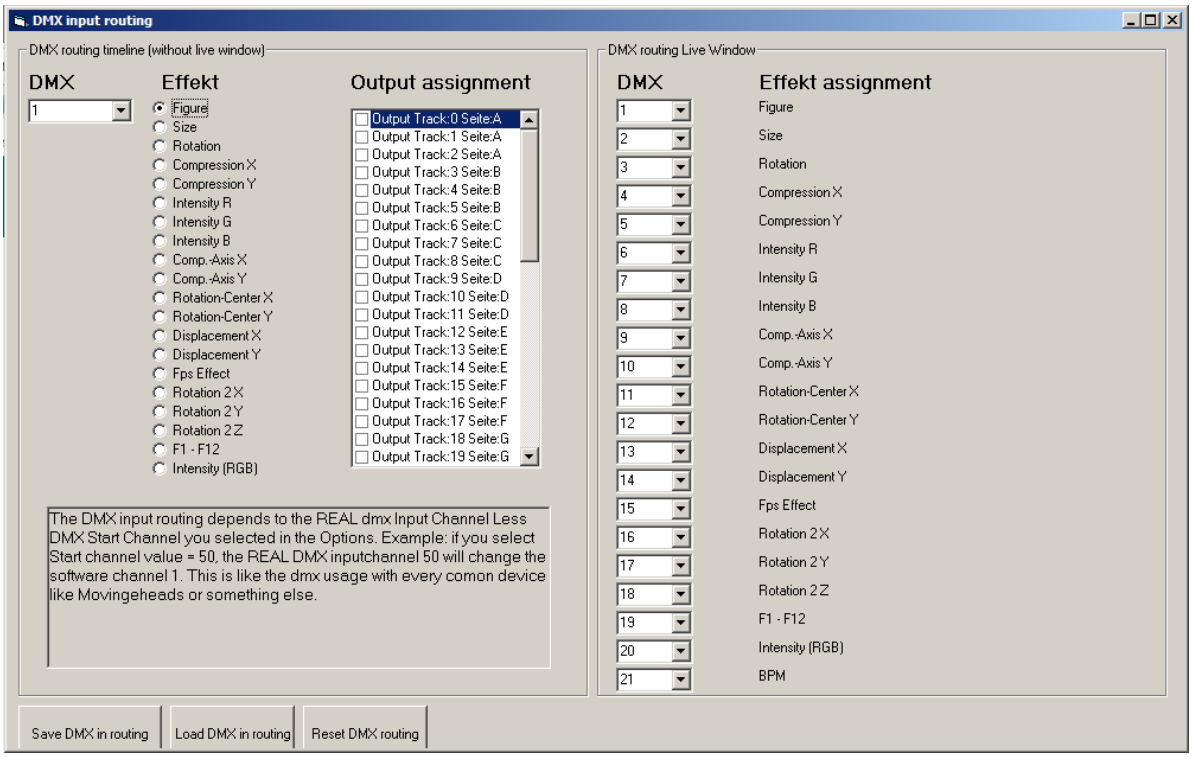


Fig. 136: DMX assignments (Options, Midi-DMX, DMX Input Routing)

12.1.2. Live Window DMX Control

The remote control of the Live Window over DMX is very easy. Like described in the previous chapter for the Timeline control, it is possible to call the figures over DMX if a DMX value has been properly assigned. It is also possible to change the effect settings of the active figure trough DMX.
The Live Window requires 20 DMX channels in total.
The standard assignments can be specified in *Options -> DMX -> DMX Input Routing* (See Fig. 136).

12.2. Control via MIDI

The Showeditor remote control over MIDI works similar to the one over DMX.

12.2.1. Setup of MIDI Input Routing for the Live Window

The general setup of the MIDI input routing can be accessed through in *Options -> DMX -> Setup MIDI input routing.* (See Fig. 137)

Like with the DMX remote control, two important parameters must be set per figure that shall be controlled through MIDI: Each figure must be assigned to a key and it must be linked to a certain MIDI value.

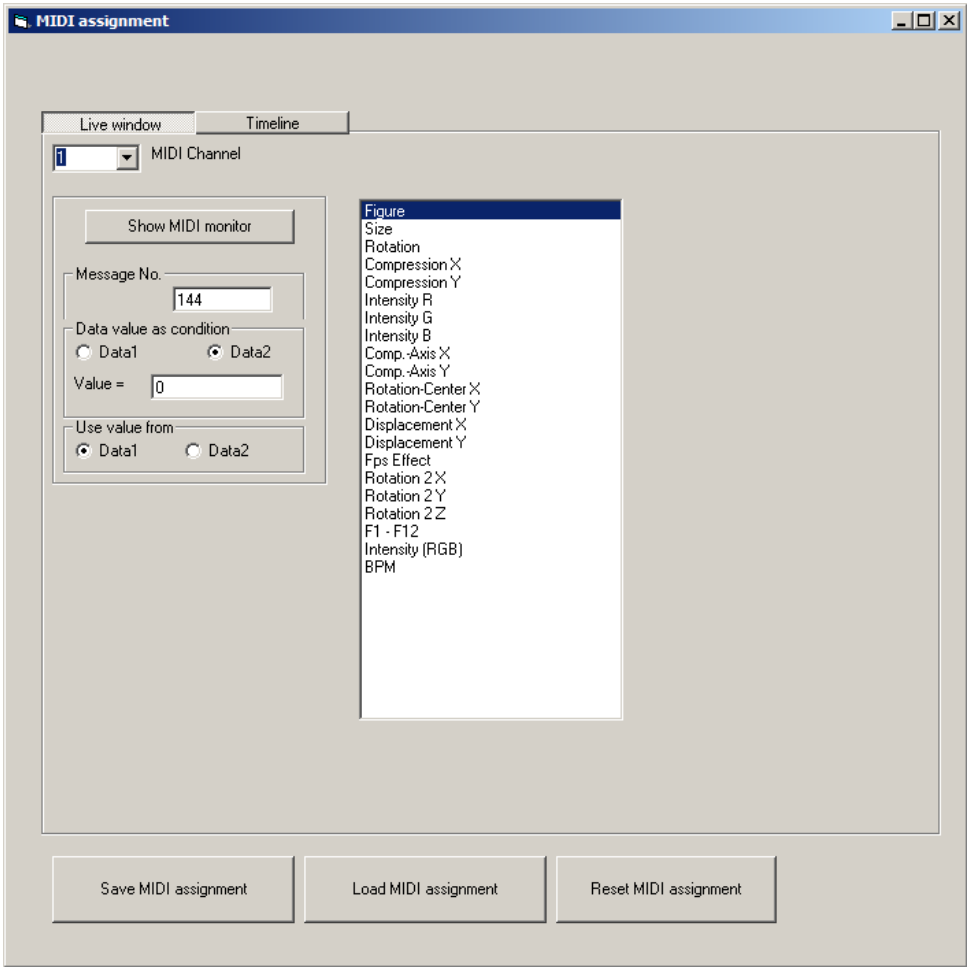


Fig. 137: Live Window: MIDI-Input routing (assignment for Live Window)

The MIDI Input routing specifies, which MIDI values are used to control which feature. Every MIDI transmission contains 4 different data types: MIDI channel, MIDI message No., Data 1 and Data 2. To use a MIDI value for the control of an event (e.g. push a key) the "parameters" must be matched to the incoming MIDI command in order to be recognized properly.

12.2.2. Setup of MIDI Input Routing for the Timeline Window

The MIDI configuration of the LIVE and the Timeline Window are done in the same dialog, but the interface needs to be changed with a click on "Timeline".
As the Timeline has different requirements in terms of MIDI control, there is an

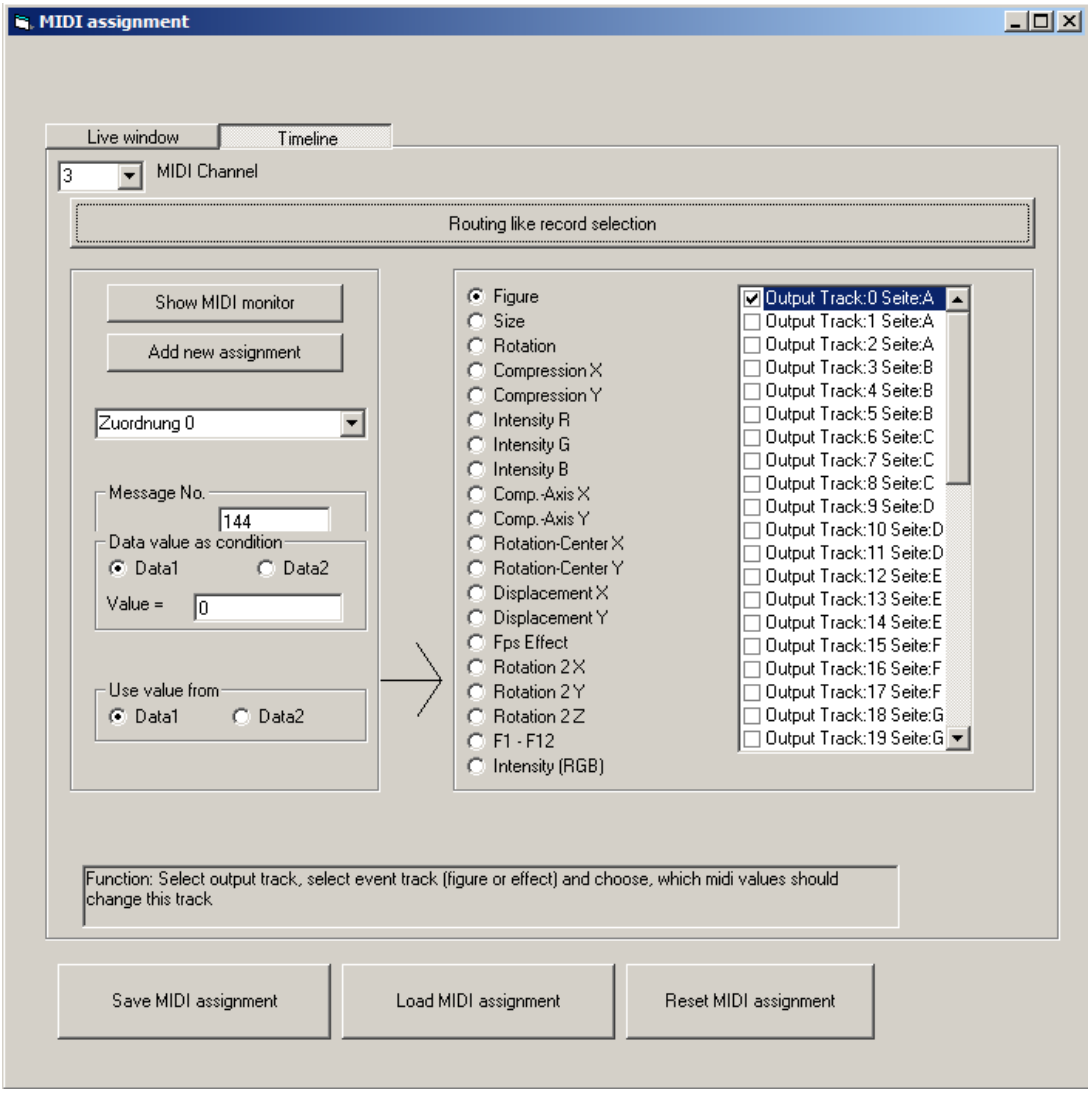


Fig. 138: Live Window: MIDI Input routing (assignment for timeline)

extended configuration screen for it.
The major button toggles "**Routing like record selection**" (Fig. 138). This means: If active, only the green marked track in the Timeline is active for MIDI control.
To program/record a shown over MIDI in this mode: Select a track, click on the record button and the effect values can be adjusted via pitch bend or modulation, the figures can be selected by pushing keys.

With deactivating "Routing like record selection" is is possible to make much more detailed adjustments to the MIDI routing configuration, however this is not requires in most cases.

12.2.3. **MIDI Controller Presets / Profiles**

As every MIDI controller has different features and thus sends it's signals in a different way, it is possible to configure Laserworld Showeditor to being controllable through different controllers. Laserworld Showeditor comes with three standard MIDI Controller Profiles already:

- For M-Audio - Oxygen49 MIDI Keyboard
- For Ableton - AKAI APC mini

These profiles can be found in the Laserworld Showeditor installation folder, subfolder \LiveMidiMapping\

13. The Live Window

The Live Window has been designed for creating laser shows live to the music that is actually played, by a DJ, band or other artist.
The whole live show window also bases on a figure set that is stored in a show folder (see chapter 6.10). All show configuration that is done in the Live Window shall be stored as "Live Show" file (*.live). All depending figures and supporting files must reside in the same folder on the hard disc.

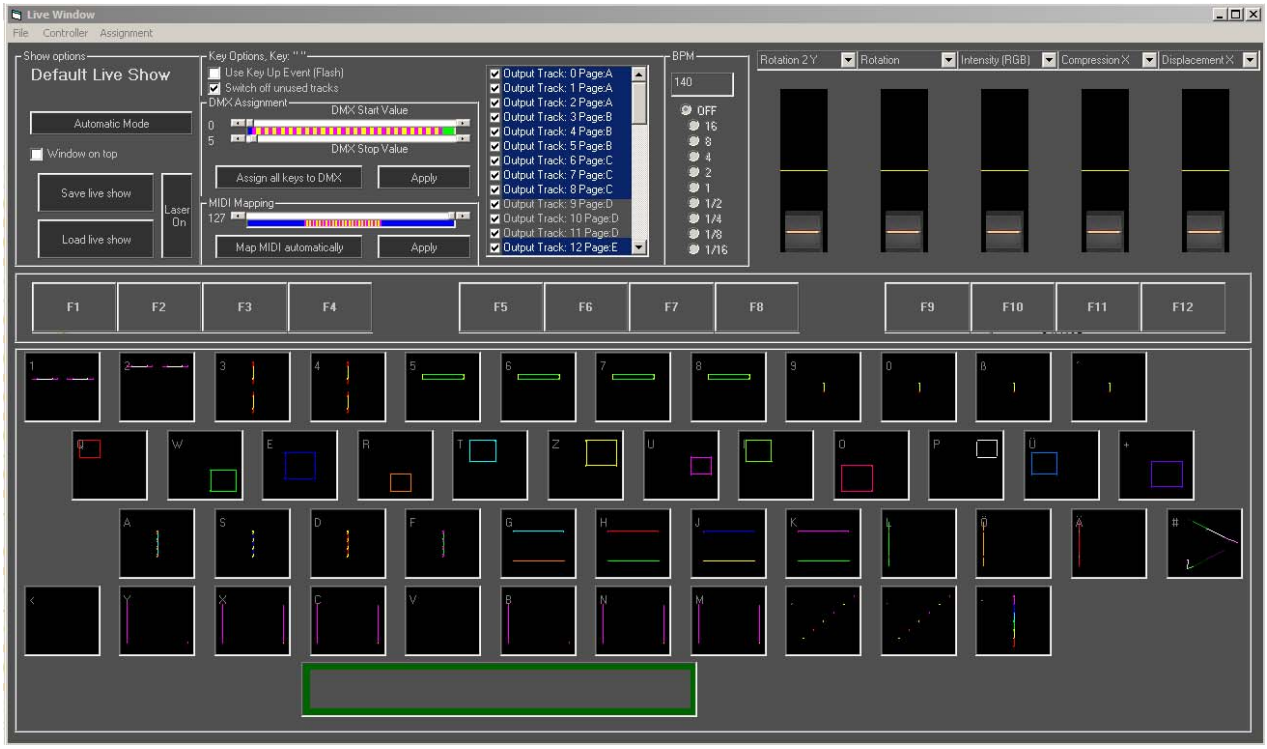
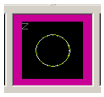


Fig. 139: The Live Window

If the screen resolution is less than 1280x1024 pixels, some scrollbars for the effects control may be not visible.

The live laser show control window provides the possibility to play a laser show live to music etc. by using preset figures, which are assigned to keys and can then either be played with the computer keyboard by pressing the respective key, by clicking the desired buttons with the mouse or by using an external DMX or MIDI controller.

All settings that have been made to a respective key are stored, so become active again on recalling that key.



The active key is highlighted with a **purple** border.

Pressed-and-released keys are highlighted with a **green** border.

The properties of the keys are refreshed on pressing the keys.

Please see the chapter "Figure Editor" (Chapter 6) for details on assigning figures to keys.

A preview of animated figures is displayed when the mouse is moved over the very key.

13.1. Live Show Options

The following features are available:

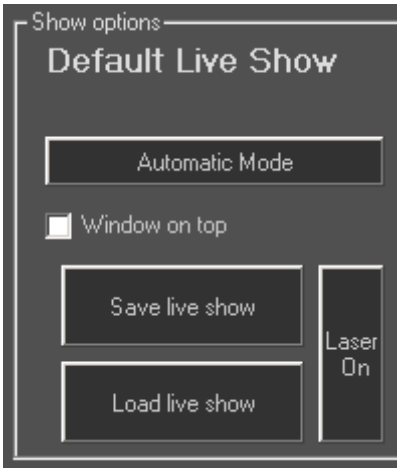


Fig. 140: Live Show options

In the part "Show Options" (Fig. 140) the name of the Live Show is displayed as well as the buttons for saving and loading of live shows. In addition to that, the button for switching on and off the laser output resides here.

The button "Automatic Mode" opens the Automatic Laser Player (see chapter 6.18.6).

Laserworld Showeditor comes standard with a **Default Live Show set**, so it's easy to just load the file and get going: It can be found in the Laserworld Showeditor installation folder, subfolder \DefaultLiveShow\

13.2. Options per Key

The next part of the Live Window shows the options that can be specified per key (Fig. 141). The label of the frame displays the key the options are applied to (Key options, Key: "*Key name*")

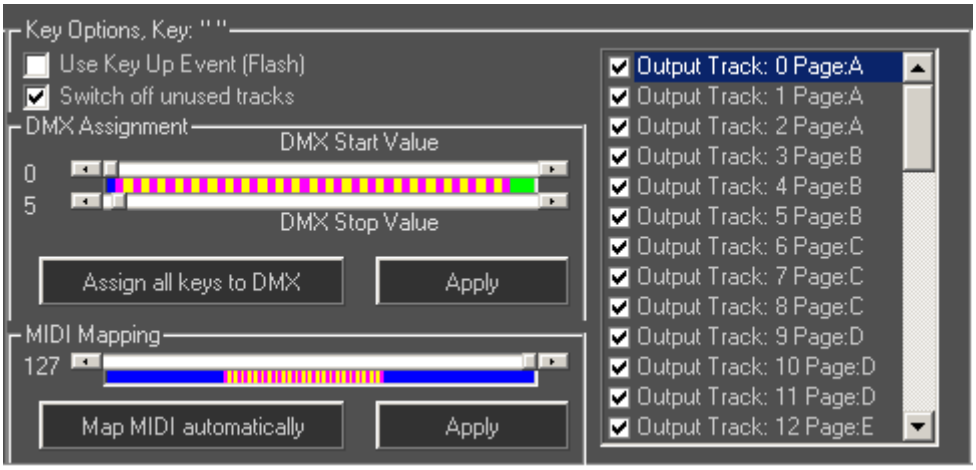


Fig. 141: Key options

13.2.1. Use Key Up Event (Flash)

If this option is checked, the selected figure is only displayed as long as the respective key is pressed. On releasing the key, the figure output switches off. This usually only works on keyboard control. It does not work on DMX or touchscreen control.

13.2.2. Switch off unused tracks

If this option is checked, all figures on other tracks than the active are switched off.

13.2.3. Output Tracks 0 - 47

By checking the output track, the very figure is routed there. (see Figure Editor settings)
Attention! If Showparts are used, the respective main track must be specified. The configuration of the Showpart handles the rest of the show distribution.

13.2.4. Scrollbars DMX Start / Stop Value(s)

With these two scrollbars the DMX value range for DMX control is set. After having set the value range, the **button "Apply"** must be clicked for applying the settings.

13.2.5. Scrollbars MIDI Start / Stop Value(s)

With this scrollbar the MIDI value range for MIDI control is set. After having set the value range, the **button "Apply"** must be clicked for applying the settings.

13.2.6. Buttons "Assign all Keys to DMX" and "Map MIDI automatically"

An automated key assignment for DMX / MIDI can be made with a click on the respective button. This makes sense if many figures are used or just for convenience.

13.2.7. Selection of Effects and intensity

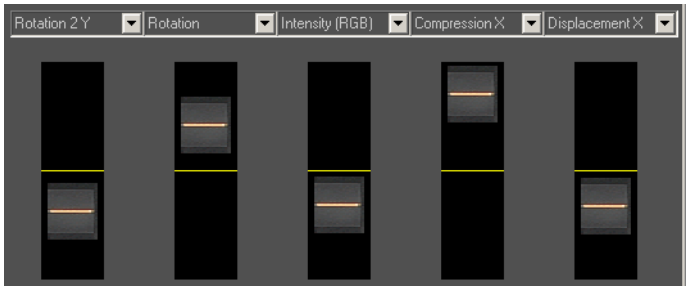


Fig. 142: Effect scrollbars and dropdown lists (above)

The Showeditor Live Window supports many effects that can be controlled over scrollbars/faders. There are five faders available and each one can be assigned effects to, which is done with selecting the respective effects feature from the dropdown list above the fader.
The control of the faders can be done by mouse click, over touchscreen or through DMX or MIDI remote control. MIDI or DMX offer the most versatile use of the effects and faders here, as they allow for additional combinations.

13.2.8. Settings per key, right click menu

A small menu opens on a right click on a key, shown in Fig. 143:

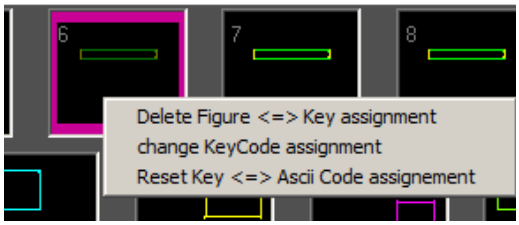


Fig. 143: Live Window: Click with right mouse button on a figure

"**Delete Figure < = > Key Assignment**". Width clicking on this menu item, the respective figure is unassigned from the very key and thus removed from the Live Window (but of course the figure itself is not deleted)

Change KeyCode Assignment is an important feature for all countries with different keyboard layout. In Germany there is a "QWERTZ" keyboard, in other countries the "QWERTY" keyboard is used. "Z" and the "Y" keys are swopped in both types, nevertheless they have the same ASCII-code.

Thus users of the "QWERTY" keyboard layout should reassign the KeyCodes. To do so, select this menu item and then push **every** key of the keyboard. The new KeyCode Assignment is saved within the INI file.
It is strongly recommended to do this **before** creating or loading a Live Show!

Reset Key < = > Ascii Code Assignment allows for reassigning a single key to a new Ascii code, so it is not necessary to reassign the whole keyboard, like explained above, but only to reset the keys that are not assigned correctly.

14. Important Hints

14.1. Further Tutorials on the website, Tutorial videos, Troubleshooting

On http://www.showeditor.com/tutorials there is a section with many tutorial, tips and tricks. In addition to that, there is a FAQ section (http://www.showeditor.com) that provides additional help on many questions.
Tutorial videos are available on the Showeditor website as well, see the Tutorials section.

14.2. Free Laser Shows

Laserworld Showeditor comes with a large number of free laser shows. Some of them are already included with the software on download, but many more can be downloaded from the Showeditor website here: http://www.showeditor.com/free_shows

In addition to the free shows it is possible to purchase more, professionally made laser shows from the Showeditor shop: http://www.showeditor.com/shop

14.3. Shows created with Third Party Software, Compatibility

It is possible to use laser shows that have been programmed in previous versions of Laserworld Showeditor, back to version 2009. In addition to that it's possible to use all shows that have been saved in the ILDA standard file format.
Of course it is essential that the rights for opening the show file are granted.

14.4. Additional Downloads

Laserworld Showeditor uses a good number of different files and configurations for making the software as versatile as possible. We provide a number of presets and configurations in the download section of our website, like preset configurations, MIDI profiles etc.
http://www.showeditor.com/downloads

14.5. Support

Support to the software is provided on the Laserworld Showeditor website under http://www.showeditor.com
Please read the Tutorials and the FAQ sections first, then see the Forum (http://www.showeditor.com/forum) for potential solutions. If not found any, please contribute your question to the forum – Laserworld is monitoring it and usually replies within several hours.

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