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LASER LINK

Manual

Introduction

Dear customer,

thank you for choosing the Laserlink lasercontroller, which links lighting operators with showlasers in real time.

The Laserlink is the 2nd Generation of the former successful Lightline DMX-Box.

Main feature is to operate a lasersystem easy as a lighting fixture from any lighting console.

For that DMX, ARTNET[1] and RDM can be used.

Hence, the laserlink has up to 2 individual ILDA outputs being able to supply 2 independent scanning systems with 16-bit XY-Scanning and 16-bit RGBO data as a standalone unit or can be mounted directly into a lasersystem.

For automatic effects like rotations, all systems are synchronized by DMX protocol.

Another main feature is the possibility of using Syncronorm Depence2 WYSIWYG visualization. It is fully integrated into the software without need of hardware.

As the standalone unit it is very small size and is very easy to integrate into your stage setup as there is a mount for TV-Bolt or clamp and safety eye bolt.

Please, read the following safety notes carefully, especially before you connect the device to a laser projector rated more than class 1.

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[1] Art-Net™ is Designed by and Copyright Artistic Licence Holdings Ltd.

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Safety Notes

- Each person which is responsible for the installation, the use or service of this unit must be:
  - qualified
  - together with a laser: must have a "Laserschutzbeauftragtenschein" or must be a certified laser-safety officer.
  - must follow the instructions in this manual.

WARNING!

Be careful when using the device. You risk an electrical shock from high voltage, if you touch the wires!

Install and use according to the valid laser safety rules of your country.

- The device has left our company in manufacturer proofed state. To maintain this status and to ensure a permanent safe operation, it is absolutely necessary to follow the safety instructions and warnings in this manual.

IMPORTANT!

Errors caused by not following these instructions are not covered by the warranty. The manufacturer will not accept liability for any resulting defects or problems.

- Keep the unit away from radiators or other heat sources!
- If the unit has been exposed to tremendous temperature changes (e.g. after transportation), do not turn it on immediately. The resulting condensation could damage the unit. Don`t switch unit on until the device reaches room temperature.
- This device belongs to protection class I. Therefore, it is imperative that the green/yellow wire is connected to the earth contact of the plug. The electrical connection must be made by a qualified person.
- Make sure that the cable has never been squeezed or damaged by sharp objects. Check the device and the cables regularly.
- If the cable is damaged, it must be replaced immediately by the manufacturer, its service agent or a qualified person in order to avoid danger.
- Ensure that wires never come in contact with other wires! Handle the power cord and all connections with caution!
- Make sure that the line voltage is not higher than the voltage specified in this manual.
- Disconnect the unit from the AC mains when it is not in use or when cleaning it.
- Disconnect connections only by pulling the cable plug.

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Optical safety in use together with a connected lasersystem

RISK OF EYE INJURIES! RISK TO HEALTH!

- Never stare into direct or scattered beam! Never point laser beams into the audience or towards people. Do not point laser beams to animals.
- Do not stare at laser light reflected from any surface.
- Do not use laser in the presence of inflammable, explosives, or volatile solvents such as alcohol or gasoline.
- Direct eye contact with the output beam will cause serious injury and possible blindness.
- Defects caused by modifications of the device by unqualified handling or an unqualified person are not covered by the warranty.
- Keep the product away from children and unskilled people.
- There are no wear parts in the device. Maintenance and service must be performed only by an authorized service partner.
- Disconnect the unit from the AC mains when not in use or when cleaning it.
- Laser beams might be also powerful enough to burn skin or clothing. Laser beams can ignite volatile substances such as alcohol and can damage light-sensitive elements in video cameras, and video beamer.

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Packaging List:

The Laserlink comes in following OEM configuration:

1 pieces of Laserlink
1 pieces of Neutrik Powercon True1 cable

Optional:
- Safety eye bolt, Safety 50cm
- Manfrotto clamp
- TV-bolt
- DMX Adapters
- Cat cable
- ILDA-Cable

Installation of the system:
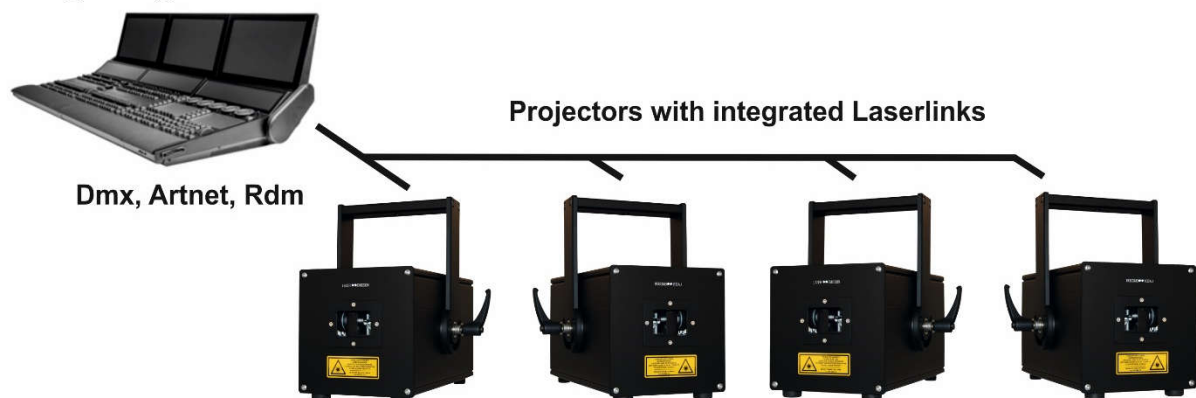
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Laserlink PINOUT

Output connectors D-SUB 25 pol ILDA-Standard

It is recommended to use a standard 25 pol DSUB extension cable

Signal name:	Pin	Notes:
X +	1	0 to +10V
Y +	2	0V to 10V
Blanking +	3	Not connected
Interlock A	4	Connected Pin 17
R +	5	Red, 0V to + 5V
G +	6	Green, 0V to +5V
B +	7	Blue (typically 476nm), 0V to +5V
Deep Blue+	8	Not connected
ORANGE+	9	Orange, 0V to +5V
Cyan+	10	Not connected
Z +	11	Not connected
Not connected	12	Not connected
Shutter	13	Shutter 0V off 5V on
X -	14	Connected to Ground pin 25
Y -	15	Connected to Ground pin 25
Blanking -	16	Not connected
Interlock B	17	Connected Pin 4
R -	18	Connected to Ground pin 25
G -	19	Connected to Ground pin 25
B -	20	Connected to Ground pin 25
Deep blue -	21	Not connected
Yellow -	22	Connected to Ground pin 25
Cyan -	23	Not connected
Z -	24	Not connected
Ground	25	GND

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DMX 512-Connection:

The laserlink is equipped with 5-pin XLR sockets for DMX in and DMX out.

The sockets are wired in parallel.

PINOUT DMX 5 pole Connector

Pin	Description
1	GND
2	Signal –
3	Signal +
4	not connected
5	not connected

Female   Male
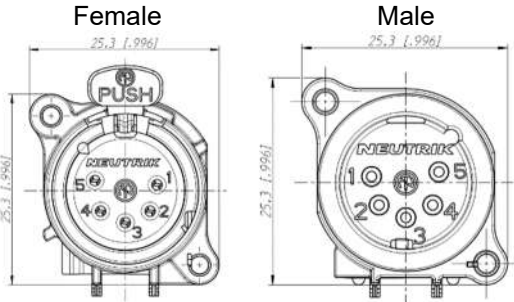
For more than one Laserlink module you can daisychain:

Connect the DMX-Out from console to the DMX-IN of the first fixture. Then Connect DMX-Out to DMX-IN of the second fixture and so on.

Attention: In some cases, the DMX-line has to be terminated with a 120OHM resistor at the last fixture between Signal + and Signal –.

Note: The Laserlink is no Artnet Node. It's not possible to go via Artnet to Laserlink No. 1 and from there further on with DMX.

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Ethernet RJ45 connection

The Laserlink can be connected via Ethernet/Artnet to the NET socket. The Art-Net protocol is based on UDP. Artnet has the advantage that you can send a larger number of channels than DMX 512.

For ARTNET communication you have to set an IP Address for identification and the Universe for the DMX512 frame and channels.

The pinout of the Ethernet RJ45 connector is:

Pin	Description
J1	TD+
J2	TD-
J3	RX+
J4	not connected
J5	not connected
J6	RX-
J7	not connected
J8	not connected
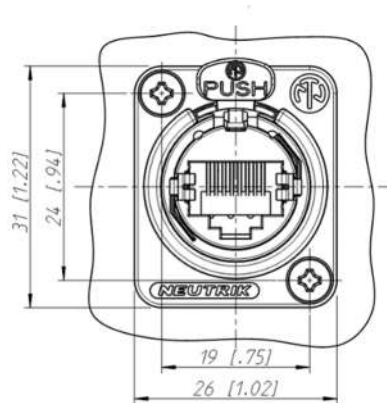
Connection to Mains

The Laserlink has an autoranging powersupply that goes from 100 to 240VAC and 50/60Hz.

Plug Marking	Connection	EU	US
L	Live	brown	black
N	Neutral	blue	white
Earth	Earth	Yellow/green	green

Note: For proper connection consult a qualified electrician.

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DMX Sheet for Fixture:

The Laserlink has one basic DMX-sheet which can be easily copied 4 times to get full access and output of the Laserlink device:

Channel	Laserlink	Description	Default
1	Safetychannel	Safetychannel	0%
2	Servicechannel Output 1	Blanking options	
3	Shutter/Strobe	Shutter/ Strobe	100%
4	Dimmer	16 Bit	0%
5	Dimmer Fine		
6	Red	0-255	100%
7	Green	0-255	100%
8	Blue	0-255	100%
9	Orange	0-255	100%
10	Pan	PAN 16 bit	50%
11	Pan Fine		
12	Tilt	TILT 16 bit	50%
13	Tilt Fine		
14	Gobo	Maximum 255	
15	RotZ	Rotation Z 16-bit	50%
16	RotZ-Fine		
17	Color 1 Colorsegments	255 Colorgobos 0-255	0
18	Color 1 Colorspeed	Colorspeed 0-255	0
19	Color 2 Colorsegments	255 Colorgobos 0-255	0
20	Color 2 Colorspeed	Colorspeed 0-255	0
21	Color X-Fade7mix	Fade Colorprogram 1 into Colorprogram 2	0
22	Zoom	ZOOM 16 Bit	50%
23	Zoom Fine		
24	Rot X	Rotation X 16 Bit	50%
25	Rot X Fine		
26	Rot Y	Rotation Y 16 Bit	50%
27	Rot Y Fine		
28	Modifier 1	Animationseffects like Prism, Sparkle etc.	0
29	Modifier speed 1	Effect Speed	0
30	Modifier 2	Visible, Oscillate etc.	0
31	Modifier Speed 2	Effect Speed	0
32	Delay/Point Repeat	Scanrate	0

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Patching:

If we assume the DMX start address is 1 then you will get following outputs:

Basic fixture 1: DMX 1-32 ILDA Channel 1 Object 1

Basic fixture 2: DMX 33-64 ILDA Channel 1 Object 2

The second object will be turned on when the Gobo channel is > 0 that means if Gobo channel > 0 the second object output is sending to the scanner even if the dimmer channel is 0.

Basic fixture 3: DMX 65-96 ILDA Channel 2 Object 1

Basic fixture 4: DMX 97-128 ILDA Channel 2 Object 2

The second object will be turned on when the Gobo channel is > 0 that means if Gobo channel > 0 the second object output is sending to the scanner even if the dimmer channel is 0.

First startup:

Connect all cables as in the diagram installation of the system with Lasers turned OFF.

When you connect the power plug the system boots up.

Please, enter the DMX start address or Art-Net settings.

Be sure that the lighting console has the right fixture and fixture patch:

To get something out of the box you do following in your lighting console:

With a function ready patched fixture:

- Set the Dimmer channel less 10%
- Shutter Channel 100%
- Set Pan/Tilt to 50%
- Set Zoom to 50%
- Set RGBO channels to 100%
- Choose GOBO > 0
- Enable the Safety channel

A laser output should be achieved.

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Adjustable values and value ranges.

In the adjustment settings the values correspond the DMX values.

So a 8-bit DMX value can have the value range from 0..255

A 16-bit value has a range from 0..65535 or -32768..32767 respectively.

Usually, the scanner output is centered around coordinate XY=0,0. Therefore, the values reach from -32768 to 32767. Hence the DMX values have an offset.
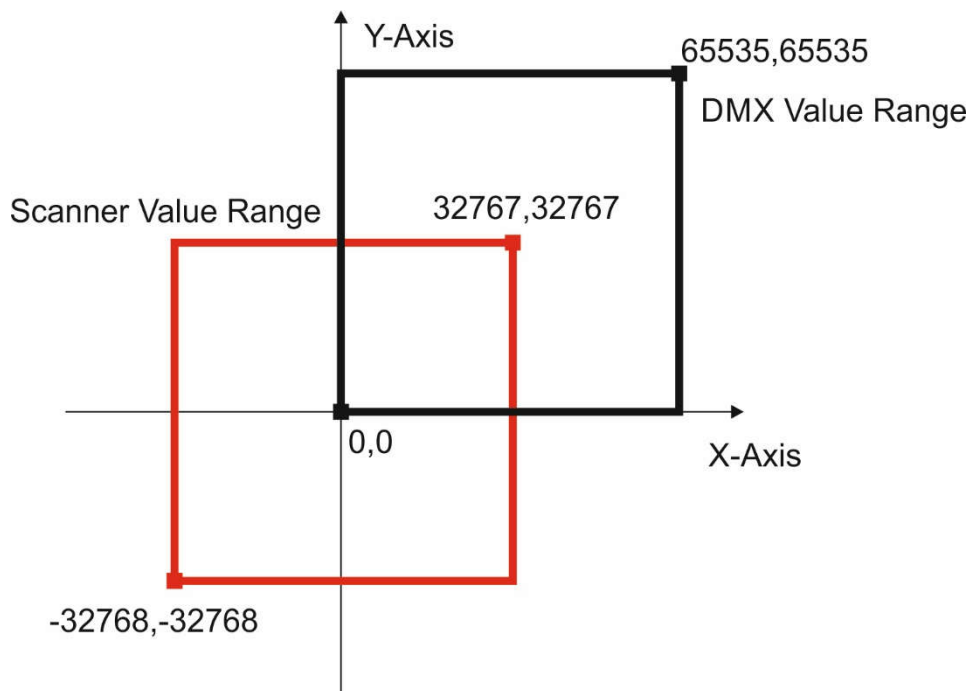
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Main Screen

In the main screen you can see the submenus, the Laserlink IP-Address and the MAC address.
Every Laserlink has a unique MAC address.

On the upper right you see the DMX address.

If there is no DMX signal connected or a DMX fault the DMX Address turns red.
In the bottom you see the Software version.

Then the following six submenus are accessible:

- Control Setup
- Scanner Setup
- System Setup
- Testpicture
- Color Calib.
- Load/Save Conf.

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CONTROL SETUP

If you press the Button Control Setup in Main menu you will access the Setup for the communication settings. There you can choose between DMX, ARTNET and Static Data. With the checkbox RDM you can enable the RDM Mode which is either used in DMX or ARTNET mode. In this menu the Safety Channel can be disabled.

By choosing the Edit buttons, the settings for DMX, ARTNET and Static Data can be changed.

The DMX address can be entered directly by the Edit button or changed with the up and down buttons.

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In the Art-Net setup, the ARTNET Universe, the ARTNET Net address and the ARTNET - Sub Net can be changed.
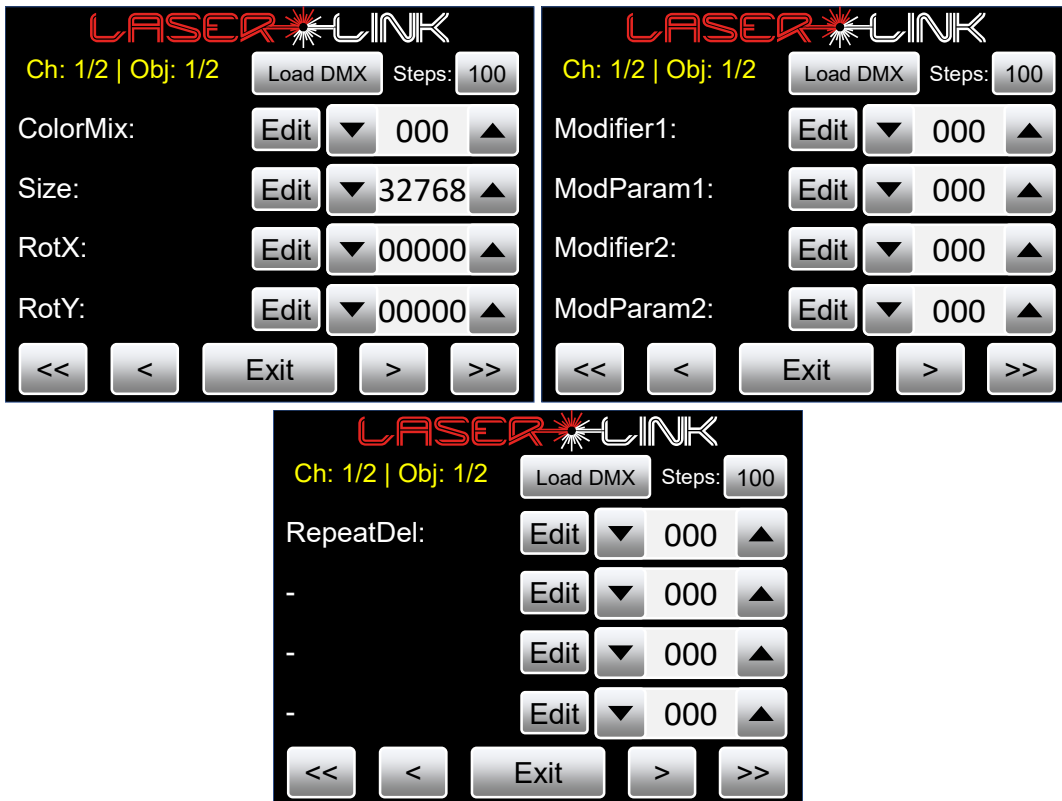

The IP-Address of the Laserlink is derived from the Artnet specification and unique MAC address.

In the Static Data Setup pre-defined values can be stored that can be made active during boot. This enables a fully standalone functionality. The Load DMX button reads the actual data (DMX or Art-Net).
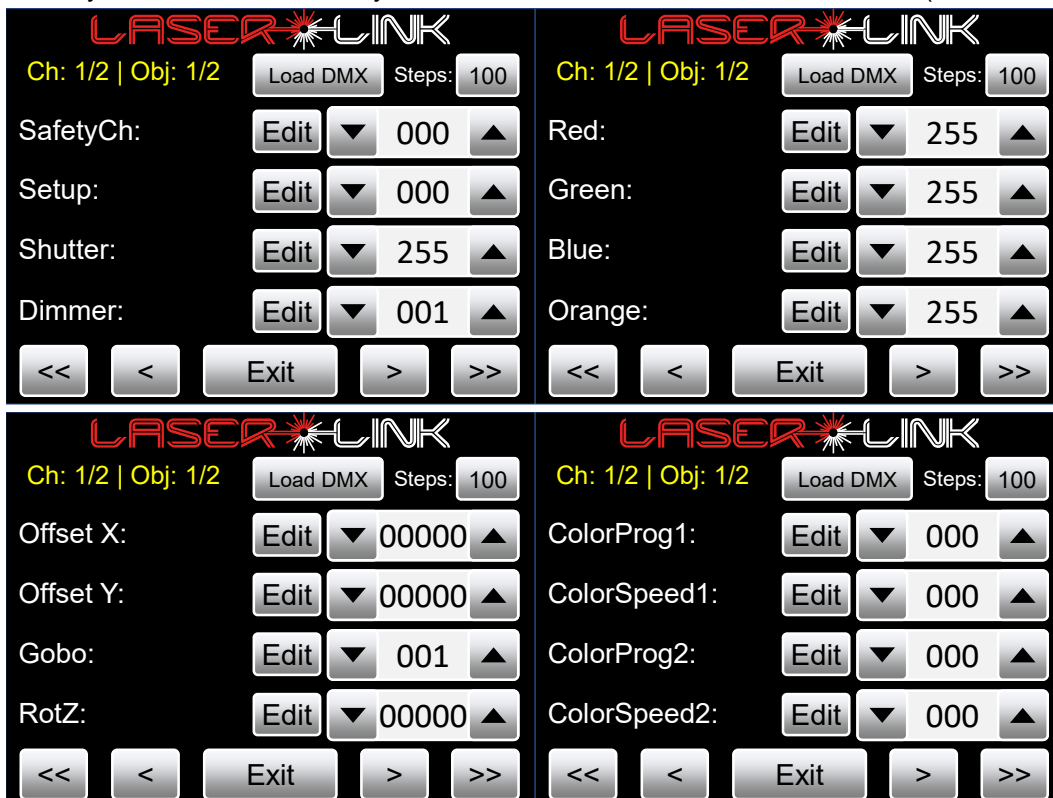
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Scanner Setup

Scanner settings can be changed in Mainmenu Scanner Setup.

There you can see in the top Channel 1 /2. This represents output 1 Channel 2/2 represents output 2. With the button Steps you can choose between 1, 10, 100 or 1000. This represents the value which increase and decreases the values in the spin-boxes.

For example, if Step is set to 1 and Min Obj Size is 15 and you tab the decrease button 14 will be set.

The Scan Frequency is adjusted to fixed steps of 1000.
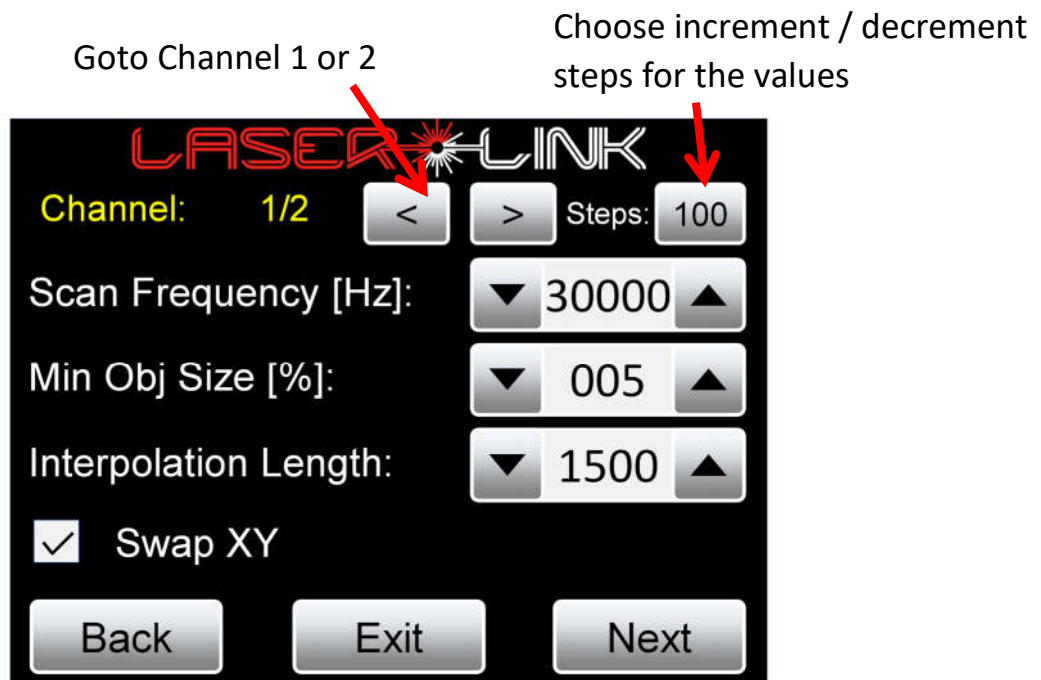
Then you can edit following parameters for each output:

Scan frequency:

Scan Frequency [Hz] can be selected between 10000 (slow scan speed) and 30000 (fast scan speed) points per second.

Min Obj. [%]

The Min Obj. Size[%] is the minimum Size of the Gobo. Here it's set to 15%. This is to prevent a single beam from a Gobo with Zoom 0%. The laser output is faded out additionally for the last 1/3 percent range of the Minimum Object Size.

Interpolation Length:

The Laserlink interpolates points into the Gobo output in order to make the output smoother.
The interpolation length is the maximum length between 2 Picture points before extra points will added.
Smaller value here means increasing the number of output points.

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With next you will access the Repeats Menu

Here you can adjust following parameters:

PreBlank On Repeats
It's the time delay in repeats before the scanner reaches a blanked point and blanks because of his mass inertia.

PreBlank Off Repeats
It's the time delay before the blanking will be turned off.

PostBlank On Repeats
These are the numbers of repeats before the Picture will be shown.

PostBlank Off Repeats
These are the repeats which needed to delay the projection in order to put on the beam on again.

To start point repeats
After the output of the last picture point of a Gobo the scanner moves again to the start point of the Gobo as fast as possible. Because of the mass inertia of the scanning mirror that takes some time.

To be sure that the scanner is again at the start point some start point repeats can be added.

Swap XY
Here you can swap the X with Y axis of the output. The picture will be turned 90 degrees.

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With next you will reach the new window for Visualisation Parameters.

LaserComProtocol

With this checkbox you can enable and disable the Ethernet Communication with Visualizers like Reallizer and Depence2 from Syncronorm.

More Visualizers will follow in the future.

LaserDeviceID

Here you can give the Laseroutput a device ID which is necessary for Visualization.

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System Setup

Here in this menu you can reach following settings:

- Network settings
- Calib. Touchscreen
- Factory Settings
- Error Log

With next you will reach following menu where you can choose between

Update System and Reboot System.

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Network Settings

In the first menu of the system setup you can change the IP Address.

Also HTTP and FTP connections needed for Gobo Upload and Software Update can be enabled and disabled.

If the system should broadcast visualization Data for the Visualizer conn. checkbox needs to be enabled.
It's recommended to disable if you do not use a visualizer to reduce data in the networks.

With next you can reach the Setup to change the IP addresses, the Netmask address and Gateway address.
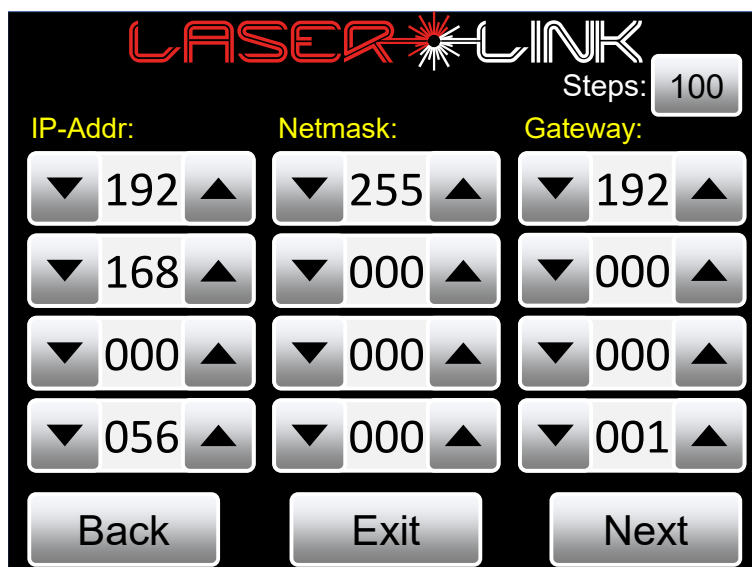
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Touchscreen Calibration

The system is pre-configured and calibrated. In case of new calibration of the touchscreen is needed, 3 points need to be pressed after each other.
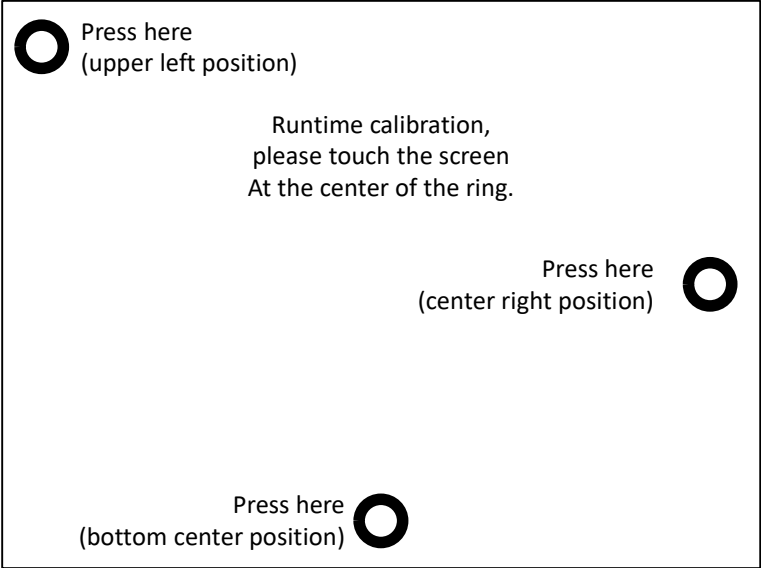
To store the touchscreen calibration values, hit button OK to complete calibration.

If within 5 seconds the button is not pressed, the old configuration data becomes valid.
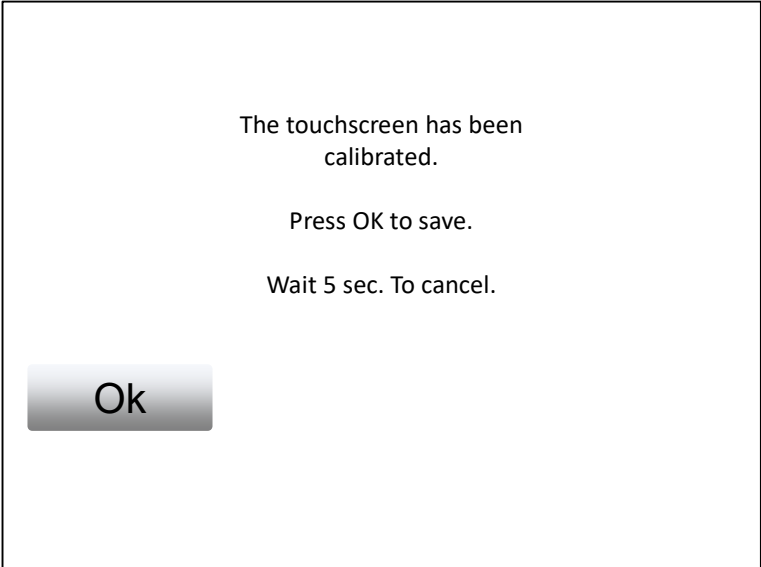
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Factory Settings

Internal configuration data can be reset to default state.

Default state means that all values are initialized to default value.

Press YES for reset, NO for discard.

A new configuration can be saved in the Load/Save Configuration dialog.
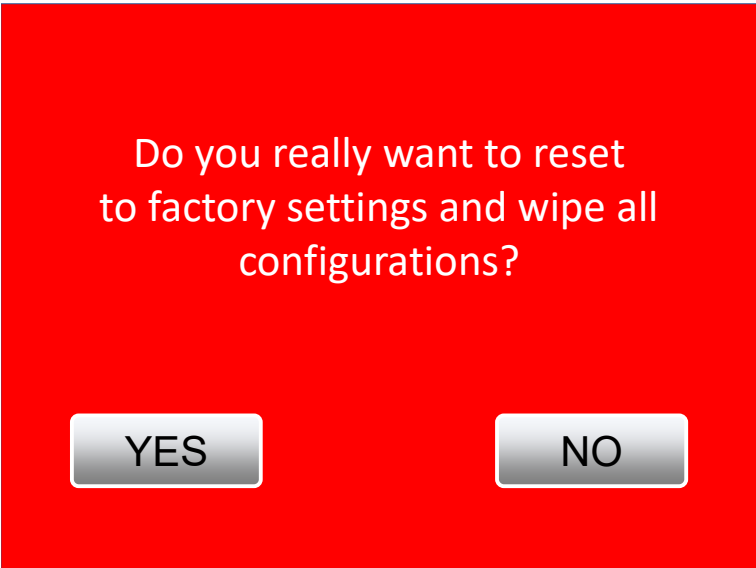
Error Log

The errorlog shows fault status to solve technical issues.

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Update System

For the system update you will have to connect to ethernet.

Make sure that the devices are not disconnected and deenergized during update!!!

Press YES to update
Press NO for skipping update
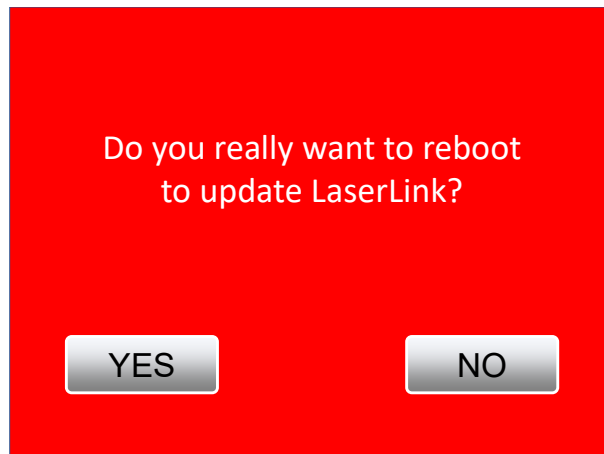
Reboot System

With reboot Laserlink the Laserlink can be restarted.

During reboot the adjusted Parameter Set from start configuration in Load/Save Conf. Menu will be used.

Press YES to reboot.
Press NO to skip.

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Testpicture

In the Menu Testpicture you have following options:

- Enable Test pattern Channel 1
- Enable Color Test pattern for Color calibration Channel 1
- Enable Safety Test pattern for Channel 1

- Global Brightness Channel 1 can be set to directly to 0, 10 and 100% and can be adjusted in 1% steps with up and down buttons.

- Enable Test pattern Channel 2
- Enable Color Test pattern for Color calibration Channel 2
- Enable Safety Test pattern for Channel 2

- Global Brightness Channel 2 can be set to directly to 0, 10 and 100% and can be adjusted in 1% steps with up and down buttons.
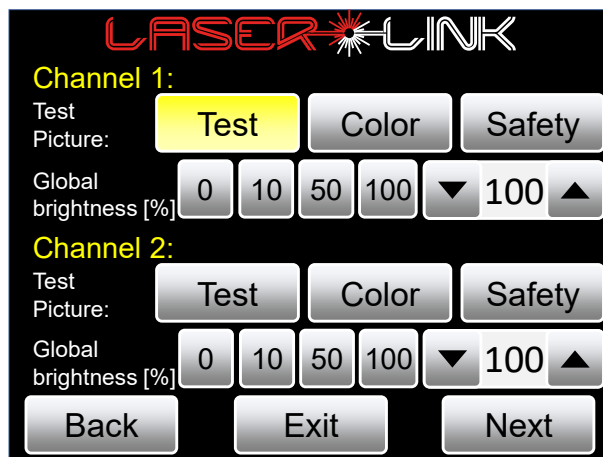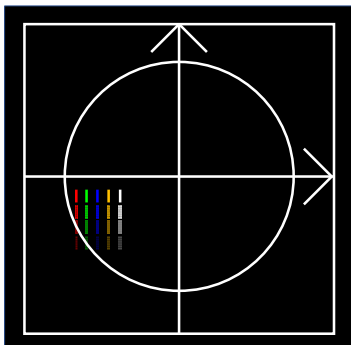
Testpicture	ColorPic	Safety Zones
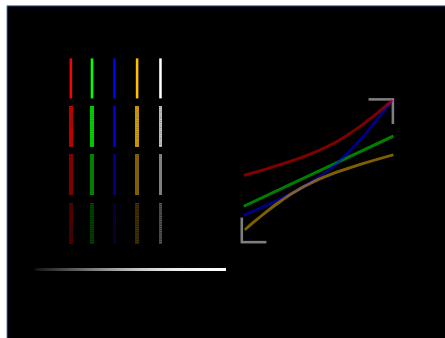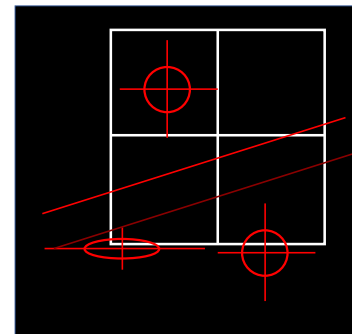
The Testpicture shows the frame of the laser output. The color test picture shows the color calibration of the Laserlink in real time. The Safety zones Testpicture shows the outline of the testpicture as well as the clipping ellipses and audience horizon.

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With Next you will reach following menu Offset / Size:

Here following parameters can be adjusted:

- Offset X: horizontal offset of the test pattern
- Offset Y: vertical offset of the test pattern
- Output Size X: horizontal size of the test pattern
- Output Size Y: vertical size of the test pattern

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With next you will reach the Geometric correction menu:

Corner Upper Left

Enable Geometric Correction

Change Channel 1 & 2

Step width: 1, 100, 1000

X/Y Values for the selected Point

Reset all values
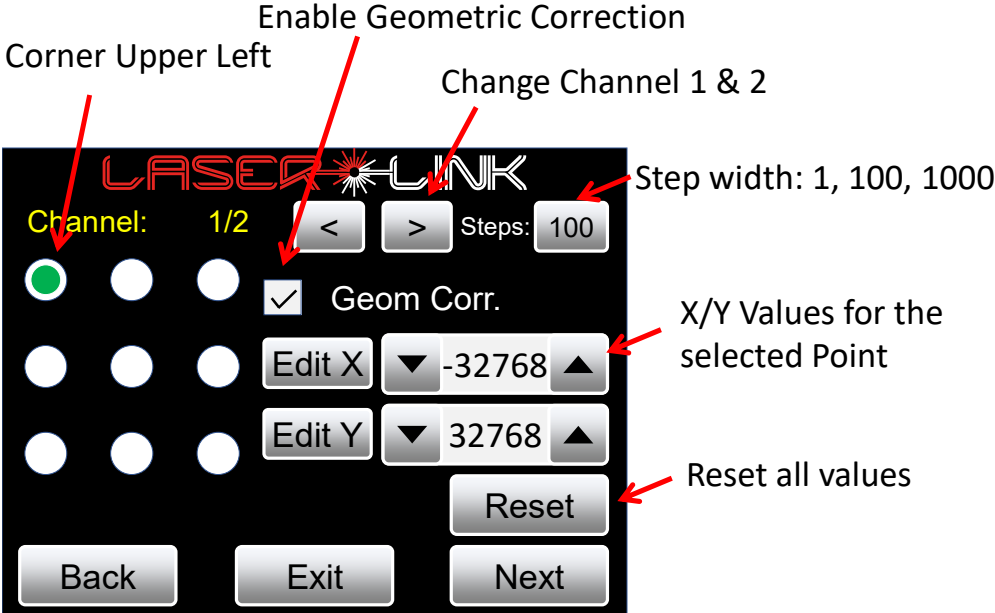
With geometric correction enabled it is possible to distort the test pattern in 9 points.
In order to edit a point activate it by click and edit X and Y values.

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With next you reach the Clipping mask menu.

Here parts of the test picture can be clipped. That means outside this area the laser will have no output.
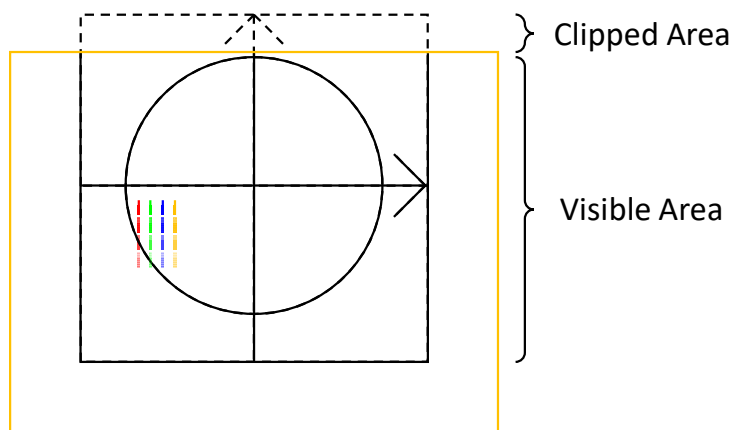
The difference using Size or Clipping

If you use size in order to make your show safe and for example you adjust the test pattern to aspect ratio 2:1. A circle becomes an ellipse.

If you use clipping instead the test pattern will be cropped without changing the aspect ratio. You may only have to adjust the incoming DMX values that the laser will be displayed at the edges.

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With Next you will reach following menu Audience Horizon:

The audience horizon can be used to define areas of the test picture to be faded out in brightness to prevent high power audience scanning as safety feature. The horizon can be defined at any angle, position and fade length. In addition, a minimum brightness value is possible.

The picture below shows an example of the audience horizon. The horizon can be defined at any angle which can be used e.g. for circular traverse systems.
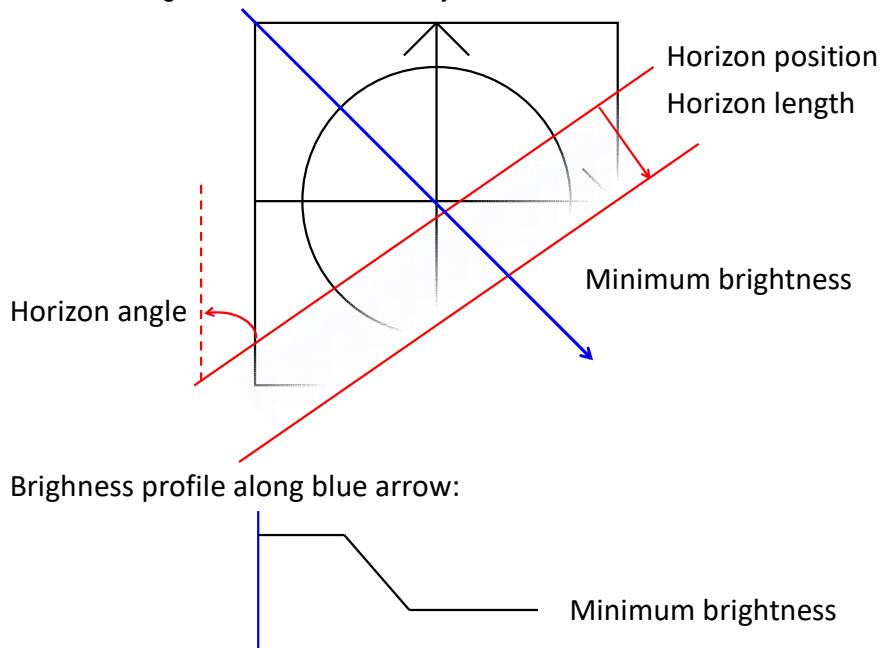
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With Next you will reach following menu Clipping Ellipses:

The clipping ellipses can be used to define max. three areas where no laser output will be visible. This safety feature makes spot clipping possible e.g. for broadcast cameras in the audience. The position and size of the ellipse can be adjusted in 8-bit resolution in XY direction.

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Color calibration

The color calibration of the Laserlink can be done for 4 colors: red, green, blue and orange (4th color channel).

Each color is featuring 16-bit value for the calibration with 3-point spline interpolation:

- Threshold: color threshold, where laser output becomes visible
- Middle X
- Middle Y
- Maximum: color maximum value (limit)

If the color test picture is enabled, the curve is shown for the 4 colors is shown live.

Color 100%

Color 50%

Color 5%

Color 1%

Fade from 1%-100%

3 Point B-Spline Color Adjustment Live view
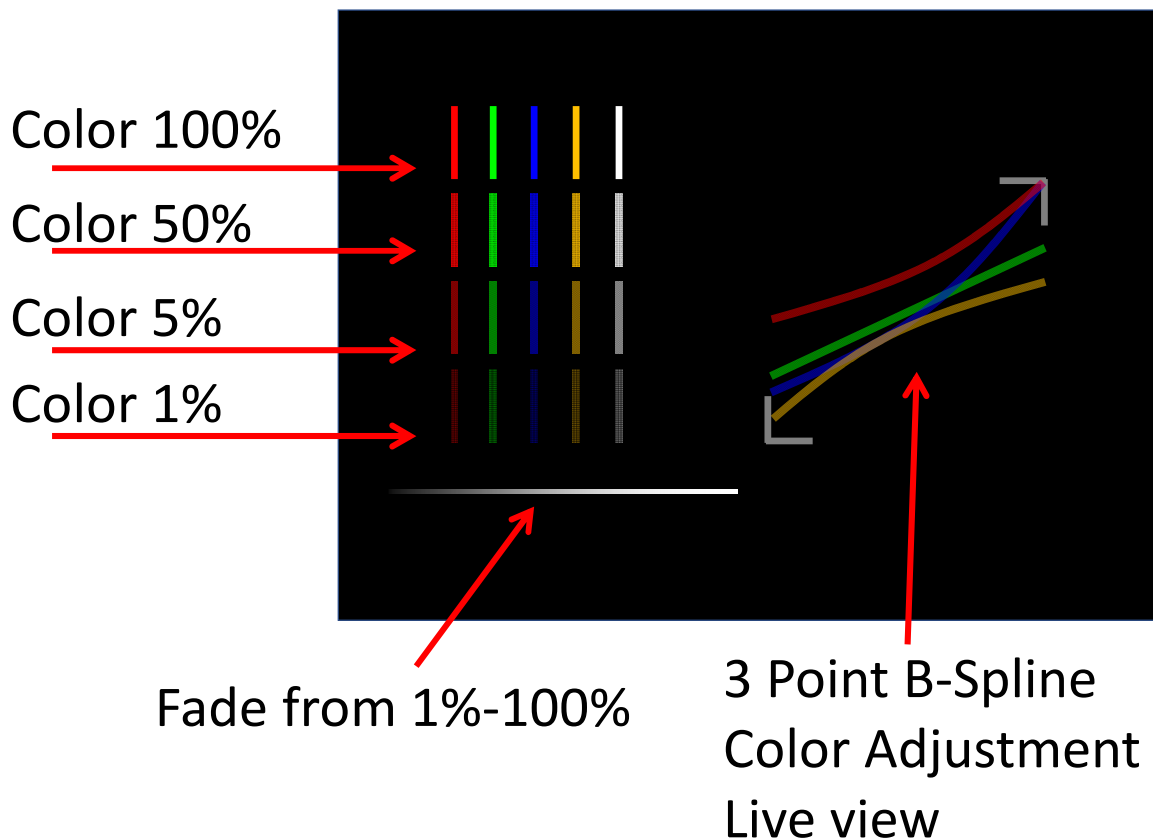
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Settings red channel:

Settings green channel:

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Settings blue channel:

Settings orange channel:

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Load/Save config

In the Menu Load/Save Config you have the ability to load and save 2 individual parameter sets.

After doing the settings you can decide if you want to save the parameter set 1 or parameter set 2

Which parameter set should be loaded during startup can be choosen in the start configuration.

Auto Load DMX Values makes the Static Data values active after boot completes and laser output becomes active.

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RDM operation

The Laserlink supports RDM operation. RDM is Remote Device Management.

While DMX-512 is unidirectional protocol RDM can communicate with the device via the standard DMX cable.

When RDM is enabled the protocol inserts data packets into the DMX-512 stream.

For this the RDM controller can send and receive commands/messages from the Laserlink.

Software like **Super Nova** from **Lumenradio** can be used for configuration.

GrandMA2 Software is faulty. There are no negative values possible.

Here is an overview of the RDM commands:

General RDM Commands:

Parameter ID	Set Command	Get Command
PRODUCT_DETAILED_ID		x
DEVICE_MODEL_DESCRIPTION		x
MANUFACTURER_LABEL		x
LANGUAGE_CAPABILITIES		x
DMX_PERSONALITY_DESCRIPTION		x
DEVICE_LABEL	x	x
LANGUAGE	x	x
DMX_PERSONALITY	x	x
DMX_START_ADDRESS	x	x
IDENTIFY_DEVICE	x	x
MS Artnet Net	x	x
MS Artnet Subnet	x	x
MS Artnet DMX universe	x	x

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RDM Commands Output 1:

Parameter ID	Set Command	Get Command
MS Channel 0:X Offset	x	x
MS Channel 0:Y Offset	x	x
MS Channel 0:X Size	x	x
MS Channel 0:Y Size	x	x
~~MS Channel 0:X Camera~~	~~x~~	~~x~~
~~MS Channel 0:Y Camera~~	~~x~~	~~x~~
MS Channel 0:Clip X min	x	x
MS Channel 0:Clip X max	x	x
MS Channel 0:Clip Y min	x	x
MS Channel 0:Clip Y max	x	x
MS Channel 0:Red threshold	x	x
MS Channel 0:Red mid X	x	x
MS Channel 0:Red mid Y	x	x
MS Channel 0:Red maximum	x	x
MS Channel 0:Green threshold	x	x
MS Channel 0:Green mid X	x	x
MS Channel 0:Green mid Y	x	x
MS Channel 0:Green maximum	x	x
MS Channel 0:Blue threshold	x	x
MS Channel 0:Blue mid X	x	x
MS Channel 0:Blue mid Y	x	x
MS Channel 0:Blue maximum	x	x
MS Channel 0:Orange threshold	x	x
MS Channel 0:Orange mid X	x	x
MS Channel 0:Orange mid Y	x	x
MS Channel 0:Orange maximum	x	x
MS Channel 0:Output Frequency	x	x
MS Channel 0:Testpicture	x	x

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RDM Commands Output 2:

Parameter ID	Set Command	Get Command
MS Channel 1:X Offset	x	x
MS Channel 1:Y Offset	x	x
MS Channel 1:X Size	x	x
MS Channel 1:Y Size	x	x
~~MS Channel 1:X Camera~~	~~x~~	~~x~~
~~MS Channel 1:Y Camera~~	~~x~~	~~x~~
MS Channel 1:Clip X min	x	x
MS Channel 1:Clip X max	x	x
MS Channel 1:Clip Y min	x	x
MS Channel 1:Clip Y max	x	x
MS Channel 1:Red threshold	x	x
MS Channel 1:Red mid X	x	x
MS Channel 1:Red mid Y	x	x
MS Channel 1:Red maximum	x	x
MS Channel 1:Green threshold	x	x
MS Channel 1:Green mid X	x	x
MS Channel 1:Green mid Y	x	x
MS Channel 1:Green maximum	x	x
MS Channel 1:Blue threshold	x	x
MS Channel 1:Blue mid X	x	x
MS Channel 1:Blue mid Y	x	x
MS Channel 1:Blue maximum	x	x
MS Channel 1:Orange threshold	x	x
MS Channel 1:Orange mid X	x	x
MS Channel 1:Orange mid Y	x	x
MS Channel 1:Orange maximum	x	x
MS Channel 1:Output Frequency	x	x
MS Channel 1:Testpicture	x	x

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DMX functionality:

Safety Channel

The safety channel enables or disables the laser output. This is meant as an additional safety fixture which can be disabled in the Laserlink Control Setup. If the Safety channel enabled with DMX value >10. Then also the shutter signal is at the Output Port.

Service coarse 8-bit 0..255

The service channel is used to set some blanking options in binary coding.

If the output of the laser object hits the maximum deflection of the scanner following options are there:

DMX-Value	Function
xxxx.xxx1	Mirrored output along X-axis
xxxx.xx1x	Clipping enabled
xxxx.01xx	Objects moving towards maximum/minimum deflection are faded out entirely
xxxx.10xx	Objects hitting the maximum/minimum deflection are partly faded out (soft-edge), the soft edge length is adjustable in the touch screen setup of section audience horizon

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Shutter/Strobe coarse 8-bit 0 .. 255

DMX value 0..31:   Shutter closed

DMX value 32..63:   Shutter full open

DMX value 64..95:   Shutter slow to fast (on / off)

DMX value 96..127:   Shutter randomized slow to fast

DMX value 128..159:   Shutter slow to fast dimming from off to on

DMX value 160..192:   Shutter slow to fast dimming from on to off

DMX value 192..223:   Shutter slow to fast dimming from off to on and from on to off

DMX value 224..255:   Shutter full open

Dimmer /Dimmer fine coarse 16-bit 0..65535

Dims RGBO values linear 0-100%

DMX value 0:   Dimmer closed

DMX value 65535:   Dimmer full open

RED coarse linear 8-bit 0 .. 255

DMX value 0:   0% output

DMX value 1:   100% output

GREEN coarse linear 8-bit 0 .. 255

DMX value 0:   0% output

DMX value 1:   100% output

BLUE coarse linear 8-bit 0 .. 255

DMX value 0:   0% output

DMX value 1:   100% output

Orange coarse linear 8-bit 0 .. 255

DMX value 0:   0% output

DMX value 1:   100% output

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PAN/ PAN fine coarse 16-bit 0 .. 65535   (- 32768 .. 32767)

Moves the Gobo/Object horizontal from left to right

DMX value 0 (-32768):   Object maximum left position

DMX value 32768 (0):   Object in middle position

DMX value 65535 (32767)   Object maximum right position

TILT/ TILT fine coarse 16-bit 0 .. 65535   (- 32768 .. 32767)

Moves the Gobo/Object vertical from down to up

DMX value 0 (-32768):   Object maximum low position

DMX value 32768 (0):   Object in middle position

DMX value 65535 (32767)   Object maximum high position

Gobo coarse 8-bit 0 .. 255

DMX value 0:   no Gobo output

DMX Value 1..159:   factory Gobos included in the software

DMX Value 160..255:   User logos which can be saved on the SD-CARD via FTP.

The Gobos on black are static. The gobos with white background are animated. For this use modifier speed.

List of included system gobos:

Symbol reference chart, entries 61–120:

61		71		81		91		101	
62		72		82		92		102	
63		73		83		93		103	
64		74		84		94		104	
65		75		85		95		105	
66		76		86		96		106	
67		77		87		97		107	
68		78		88		98		108	
69		79		89		99		109	
70		80		90		100		110	

111			
112			
113			
114			
115			
116			
117			
118			
119			
120			

Symbol reference chart, entries 121–255:

121		131		141		151		160-255 Customized
122		132		142		152		
123		133		143		153		
124		134		144		154		
125		135		145		155		
126		136		146		156		
127		137		147		157		
128		138		148		158		
129		139		149		159		
130		140		150				

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ROT Z/ ROTZ fine coarse 16-bit 0..65535   (- 32.768 .. 32767) **clockwise counterclock**

Rotates the Gobo in Z-Axis: (rearprojection)

DMX value 0..16383:   Gobo rotates anti clockwise in a fixed angle

DMX value 16384..32767:   Gobo rotates anti clockwise from fast to very slow (autorotation)

DMX value 32768 (50%):   Gobo does not rotate

DMX value 32769-49151:   Gobo rotates clockwise from very slow to fast

DMX value 49152-65535   Gobo rotates clockwise in a fixed angle

Color1 Colorsegments coarse 8-bit 0 .. 255

The Laserlink has a color pattern engine included where pre-defined color segments can be chosen and modified in speed / or phase. In addition, two color patterns can be crossfaded.

DMX-Value	Colorprogram
0	White
1	Red
2	Orange
3	Yellow
4	Greenyellow
5	Green
6	Cyan
7	Lightblue
8	Blue
9	Violet
10	Hotpink
11	Magenta
12	DarkMagenta
13	White/Green
14	Green/White
15	Red/Blue
16	Blue/Red
17	Green/Cyan
18	Cyan/Green
19	Red/Orange
20	Orange/Red
21	Red/Yellow
22	Yellow/Red
23	Red/Green
24	Green/Red
25	Cyan/Yellow
26	Yellow/Cyan

27	Green/Hotpink
28	Hotpink/Green
29	WGW
30	GWG
31	RBR
32	BRB
33	MCM
34	CMC
35	WGWG
36	GWGW
37	RBRB
38	BRBR
39	MCMC
40	CMCM
41	GCGC
42	CGCG
43	RORO
44	OROR
45	RYRY
46	YRYR
47	RGBYM
48	WRGBY
49	RGBCMG
50	RGBRGB
51	W->0-100
52	W->100-0
53	Rainbow
54	B->R->B
55	W->G->W
56	B->M->R->M->B
57	W->G->G->W
58	B->R->B->B->R->B->B->R
59	W->G->W->W->G->W->W->G
60	Rainbow2
61	BkW
62	WBkBk
63	BkWWW
64	WWBkBk
65	BkW
66	WWWBk
67	BkBkWBk
68	BkBkWBk_2
69	BkBkWBk_3
70..255	W

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Color1 Colorspeed coarse 8-bit 0 .. 255

Here the color segments in colorprogram 1 have an angle from 0-360 degrees. At values >50% there is autospeed from slow to fast.

DMX value 0 .. 127:   Colorprogram angle

DMX value 128 .. 255:   Colorprogram in automatic move from slow to fast

Color2 Colorsegments coarse 8-bit 0 .. 255

DMX-Value	Colorprogram
0	White
1	Red
2	Orange
3	Yellow
4	Greenyellow
5	Green
6	Cyan
7	Lightblue
8	Blue
9	Violet
10	Hotpink
11	Magenta
12	DarkMagenta
13	White/Green
14	Green/White
15	Red/Blue
16	Blue/Red
17	Green/Cyan
18	Cyan/Green
19	Red/Orange
20	Orange/Red
21	Red/Yellow
22	Yellow/Red
23	Red/Green
24	Green/Red
25	Cyan/Yellow
26	Yellow/Cyan
27	Green/Hotpink
28	Hotpink/Green
29	WGW
30	GWG

31	RBR
32	BRB
33	MCM
34	CMC
35	WGWG
36	GWGW
37	RBRB
38	BRBR
39	MCMC
40	CMCM
41	GCGC
42	CGCG
43	RORO
44	OROR
45	RYRY
46	YRYR
47	RGBYM
48	WRGBY
49	RGBCMG
50	RGBRGB
51	W->0-100
52	W->100-0
53	Rainbow
54	B->R->B
55	W->G->W
56	B->M->R->M->B
57	W->G->G->W
58	B->R->B->B->R->B->B->R
59	W->G->W->W->G->W->W->G
60	Rainbow2
61	BkW
62	WBkBk
63	BkWWW
64	WWBkBk
65	BkW
66	WWWBk
67	BkBkWBk
68	BkBkWBk_2
69	BkBkWBk_3
70..255	W

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Color2 Colorspeed coarse 8-bit 0 .. 255

Here the color segments in colorprogram 2 have an angle from 0-360 degrees. At values >50% there is autospeed from slow to fast.

DMX value 0 .. 127:   Colorprogram angle

DMX value 128 .. 255:   Colorprogram in automatic move from slow to fast

ColorXFade coarse 8-bit 0 .. 255

Here there is a crossfade from colorprogram 1 in colorprogram 2 from 0 to 100%

DMX value 0 .. 255:   Crossfade from Colorprogram 1 in Colorprogram 2

ZOOM/ ZOOM fine coarse 16-bit 0 .. 65535

Zooms the Gobo. If the zoom is below the minimum object size the Gobo is dimmed out to prevent a single beam.

DMX value 0 .. 65535   Gobosize 0%-100%

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ROT X/ ROTX fine coarse 16-bit 0..65535   (- 32.768 .. 32767)

Rotates the Gobo in X-Axis:

DMX value 0 .. 16383:   Gobo rotates anti clockwise from fast to very slow (autorotation)

DMX value 16384 .. 32767:   Gobo rotates anti clockwise in a fixed angle

DMX value 32768 (50%):   Gobo does not rotate

DMX value 32769 .. 49151:   Gobo rotates clockwise in a fixed angle

DMX value 49152 .. 65535   Gobo rotates clockwise from fast to very slow (autorotation)

ROT Y/ ROTY fine coarse 16-bit 0 .. 65535   (- 32.768 .. 32767)

Rotates the Gobo in Y-Axis:

DMX value 0 .. 16383:   Gobo rotates anti clockwise from fast to very slow (autorotation)

DMX value 16384 .. 32767:   Gobo rotates anti clockwise in a fixed angle

DMX value 32768 (50%):   Gobo does not rotate

DMX value 32769 .. 49151:   Gobo rotates clockwise in a fixed angle

DMX value 49152 .. 65535   Gobo rotates clockwise from fast to very slow (autorotation)

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Modifier 1 Select coarse 8-bit 0 .. 255

Here the Modifier 1 can be selected.

DMX-Value	Modifier
0	Modifier OFF
1	Clip gobo from beginning
2	Clip gobo from end
3	Scan 2x in horizontal direction
4	Scan 3x in horizontal direction
5	Scan 4x in horizontal direction
6	Scan 5x in horizontal direction
7	Scan 10x in horizontal direction
8	Scan 2x in vertical direction
9	Scan 3x in vertical direction
10	Scan 4x in vertical direction
11	Scan 5x in vertical direction
12	Scan 10x in vertical direction
13	Scan 3x on circle
14	Scan 3x on circle
15	Scan 4x on circle
16	Scan 4x on circle
17	Scan 5x on circle
18	Scan 6x on circle
19	Scan 8x on circle
20	Scan 3x on slow speed rotating circle
21	Scan 3x on mid speed rotating circle
22	Scan 3x on fast speed rotating circle
23	Scan 5x on slow speed rotating circle
24	Scan 5x on mid speed rotating circle
25	Scan 5x on fast speed rotating circle
50	Scan 3x along diagonal
51	Scan 5x along diagonal
52	Scan 10x along diagonal
53	Scan 3x along diagonal
54	Scan 5x along diagonal
55	Scan 10x along diagonal
200	Move object along path defined by a gobo with size 0.25
201	Move object along path defined by a gobo with size 0.5
202	Move object along path defined by a gobo with size 0.75
210	Enable clipping ellipse and change X size / Modifier 2 changes Y size
211	Enable clipping ellipse and change X position / Modifier 2 changes Y position the size of the clipping ellipse is fixed to XY 20
212	Enable clipping ellipse and change X position / Modifier 2 changes Y position the size of the clipping ellipse is fixed to XY 40
213	Enable clipping ellipse and change X position / Modifier 2 changes Y position the size of the clipping ellipse is fixed to XY 60
214	Enable clipping ellipse and change X position / Modifier 2 changes Y position the size of the clipping ellipse is fixed to XY 80

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Modifier 1 Speed coarse 8-bit 0 .. 255

With this channel the speed or size of the Modifier1 can be manipulated.

DMX value 0..255:   Speed or Size of Modifier1

In case of modifier 200-202 used, the DMX value represents the gobo to be used for the path.

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Modifier 2 Select coarse 8-bit 0 .. 255

DMX-Value	Modifier
0	Modifier OFF
1	Clip gobo from beginning
2	Clip gobo from end
200	Move object along path speed according Modifier 1
201	Move object along path speed according Modifier 1
202	Move object along path speed according Modifier 1

Modifier 2 Speed coarse 8-bit 0 .. 255

With this channel the speed or size of the Modifier2 can be manipulated.

DMX value 0..255:   Speed or Size of Modifier2

In case of modifier 200-202 used, the DMX value represents the points to skip on the on the gobo path. Large values makes the speed faster that can be compensated by the picture delay DMX channel.

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Delay/Point repeat coarse 8-bit 0 .. 255

With this channel picture repeat and scanrate can be manipulated.

The picture repeat means that the Gobo will be drawn at the same place as long the time which is set in DMX Value 0 .. 248. With this nice 2step effects can be created.

The scanrate is the output Scanning frequency and can be set from 5k to adjusted Maximum in 7 steps.

DMX value 0..247:   Picture Repeat from slow to fast in 0,1s steps

DMX value 248:   Scanrate 5K

DMX value 259:   5k + maximum scanrate/ 7

DMX value 250:   5k + 2*maximum scanrate/ 7

DMX value 251:   5k + 3*maximum scanrate/ 7

DMX value 252:   5k + 4*maximum scanrate /7

DMX value 253:   5k + 5*maximum scanrate /7

DMX value 254:   5k + 6*maximum scanrate /7

DMX value 255:   Maximum adjusted scanrate

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Laserlink Technical Data

Hardware:

- Size: 108x130x70mm
- Weight: 750g
- Power Input: 100-240VAC 50Hz and 60Hz
- Power Consumption: 12W
- Color Touchscreen
- Integrated Touch Pen
- Neutrik PowerCon True1 Input
- Neutrik 5-Pol. DMX-In And -Out
- Neutrik Ethercon
- Mount For TV-Bolt And Clamp
- Safety Eye Bolt
-

Outputs / Interface

- 2 Channels Each 16-Bit Additive Color RGBO
- 2 Channels Each 16-Bit X- And Y- Scanner Output
- 10-30K (More On Request)
- SDXC Card Reader
- DMX, RDM And ARTNET Control
- Shutter Output Signal
- Firmware Update Via Ethernet
- Gobo Upload
- DMX Synchronization
- Depence2 Visualization
- Truly Standalone Operation (No Other Devices Like Computer Or DMX-Device Needed)
- DMX Channels:
  - 1x ILDA Port: 64 DMX Channels
  - 2x ILDA Port: 128 DMX Channels
- Fixtures for Grandma-Series, HOG-Series And
- Various Other Lighting Consoles Available

Features:

- Safety Channel
- Service Channel for Soft-Edge and Clip-Edge Effects
- Various Built in Gobos
- 16-Bit Dimmer
- 16-Bit Pan/Tilt
- 16-Bit Rotations (X, Y, Z)
- 16-Bit Zoom
- Shutter/Strobe
- 2 Independent Colorprograms With Various Patterns
- Color Crossfade
- Real Time Waves
- Various Real Time Modifiers for Transformations And Effects
- Invert X-Scanning, Invert Y-Scanning

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Calibrations:

- Advanced B-Spline Color Adjustments For Thresholds And Maximum Power For
- Optimal White Balance And Fading
- Standard Geometric Correction (3x3)
- Adjustable Interpolation
- XY-Scanner Swap
- Adjustable Minimum Zoom
- Adjustable X/Y Offset
- Adjustable Clipping Mask
- Adjustable Output Offset
- Adjustable Output Size
- Adjustable Frequency

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Document history

Date	Changes
Sept. 2019	Initial version
May 2020	Added new features of clipping ellipses, audience horizon, modifiers and service channel (bit 0)
May 2020	Colorprograms updatet, Modifier2 updatet