SimPleX

Manunal

As of November 2014

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Foreword

You have decided to buy a SimPleX show laser system.
We want to thank you for showing trust in us.

The SimPleX is characterised by simple operation and comfortable application.

This manual should help to simplify working with this system. It also allows unpractised persons to understand all functions easier.

Before you put the system into operation for the first time, please read the topics “laser safety” and “starting”.

Our laser system are equipped with high sensitive electronics and mechanics. Please pay attention during transport to the security of your device. Strong shocks can cause significant damage to the system. Furthermore, the lasersystem must be regulary maintained to guarantee an error-free operation.

CAUTION!
Should an error occur due to improper handling or maintenance, there is no warranty.

We wish you much pleasure with your new laser system.

Yours LPS-Lasersysteme

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1. Starting

1.1 Areas of use

This device is designed for professional use, for example on stages, in discotheques, theatres etc.

This laser must only be used for shows. The operation of a class 4 show laser is only allowed if it is controlled by a skilled and well-trained operator.

Teenagers older than 16 years can only be employed in laser areas if necessary for completing their job training and if their protection is guaranteed by a skilled person.

This device is designed for mobile use and for permanent installations.

Laser effects are not designed for permanent operation. Regular operation breaks will ensure that the device will work for a long time without defects.

1.2 Electric Connection

This product is approved to be operated only with an alternate current of 100 - 240 V. Notice the manufacture settings!

1.3 Installation

It is required to mount the device only with the mounting bail or an fixed base. In order to guarantee sufficient ventilation, leave 50 cm free space minimum around the device.

Make sure that the area below the installation place is blocked when rigging, derigging or servicing the fixture.

1.4 Operation

For a safe operation, the laser products must be equipped with all protective measures required for their classification and use.

Operate the device only when familiar with its functions. Do not permit operation by persons not qualified for operating the device. Most damages are the result of unprofessional operation!

Please consider that unauthorized modifications on the device are forbidden due to safety reasons! Beachten Sie bitte, dass eigenmächtige Veränderungen an dem Gerät aus Sicherheits- gründen verboten sind.

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If the device is operated in any way different to the one described in this manual, the product may suffer damages and the guarantee becomes void. Furthermore, any other operation may lead to dangers like short circuit, burns, electric shock, etc.

1.5 Unpack and Connect

Check the content of the package of its completeness.

The following parts are included:

- Laser system
- Manual
- Power plug (1 piece)
- Key for laser system
- Emergency strapping plug

Please read the chapter „Laser Safety“ precisely and conscientiously before you connect the system.

The system is working from 100 to 240 VAC. Make sure that the current entry is provided.

Connecting the system is rather simple:

Connect the D/A converter and laser system with the data cable
Plug in the power supply of the laser system and the D/A converter (power plug).
Make sure that the show laser system is mounted stable an cannot fall down.

Important note

By reasons of the laser- and operating safety, the current supply of the system has to be lockable by an Emergency-OFF-Button. To operate without an Emergency-OFF-Button IS NOT ALLOWED. There are already prepared connections for the Emergency-OFF-Button inside the switch box of LPS-Lasersysteme.

Please note in the attachment the circuit diagram for the voltage supply in combination with the Emergency-OFF-Button.

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2. Laser Safety

2.1 Legal notes

Despite all fascination of the “Magic Light”, it may not be forgotten that a laser involves certain dangers. On these pages you will find out how it is possible, in spite of many regulations, to produce a fascinating laser show without dangers for you and your guests.

2.1.1 Laser Classification

The government recommended safety practices for a given laser system which depend on its classification. The following highlights the criteria that are used to classify lasers, as well as the key safety considerations when operating a system with the indicated classification. The reader is directed to the "Code of Federal Regulations" for a comprehensive discussion of these safety topics.

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Classification Criteria:

Class 1	all wavelengthes	safe for the human eye
Class 1M	302,5 nm – 400 nm	safe for the human eye if no optical instruments are used; not safe if optical instruments are used
Class 2	400 nm – 700 nm, up to 0,25 s	safe for the human eye because of aversion response and eyelid closure reflex; not safe if optical instruments are used
Class 2M	400 nm – 700 nm, 0,25 s	eyelid closure reflex; depending on whether it is a divergent or flared beam, it might be unsafe with optical instruments
Class 3R	400 nm – 700 nm, 0,25 s 302,5 nm – 400 nm 700 nm – 10 nm, 100 s	exceeds the maximum tolerable radiation; radiation is max. five times higher than the limit for accessible radiation of Class 1 (respectively Class 2); dangerous for the human eye
Class 3B	all wavelengths laser facilities of power up to 0,5 W	dangerous for the human eye and in certain cases for the skin
Class 4	all wavelengths laser facilities of power more than 0,5 W	very dangerous for the human eye and dangerous for the skin; additionally there is the danger of combustion

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For the class 4 lasers (more than 0.5 W) which we mostly use, following points are to be considered and avoided:

1. **Danger to the eye**
   A human's most sensitive organ is the eye. A laser beam is coherent light with very high energy. A laser beam keeps its intensity even on a large distance. If a laser beam hits a human eye, it could lead to irreparable damages, the retina could be destroyed.
   Therefore the following has to be considered:
   Never look into a laser beam directly, and do not place any objects in the beam, because even diffusely reflected beams will cause eye damage. Never point the laser beam at a person's eyes.

2. **Danger of skin damages**
   If a laser beam hits the human skin, it will cause painful burns due to its high energy density. The beam also burns holes into textiles. Therefore never put your hands in the laser beam and do not intercept the beam with any other part of your body.

3. **Danger due to perilous High Voltage**
   Laser systems use fatally high voltages. When operating your laser system, always observe the warning notes on the laser and the instructions concerning laser safety in the manual of your laser. Make sure that no unauthorized persons have access to your laser system.

4. **Danger of fire damages**
   If a laser beam hits easily inflammable material, for instance paper, this will ignite and may suddenly cause a fire. Therefore you should always make sure that there is no inflammable material in the path of the beam before turning the laser on. Moreover, check regularly your air cooling system on the laser. Ecpecially the filters and fans should be checked in their functions, so that defects due to over temperatures could be exclude.

The use of a laser can only be regarded as harmless if the main beam is sufficiently weakened, expanded, divided or moved very fast.
In this case it will meet the eye only briefly and the values for the maximum permissible irradiation are not exceeded (this depends on the wavelength, irradiation time and the repetition frequency on pulse rates).

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The legal instructions for using a laser product vary from country to country. The user must always inform himself on the legal instructions valid in his country and apply them to his situation.

In Germany, the following instructions are binding:

DIN EN 60825-1 "Safety requirements for laser systems; Part 1: “Equipment classification, requirements and user policies“ www.din.de

E DIN 56912 "Safety requirements for Lightshow lasers and laser lightshow systems" www.din.de

or DIN-Pocketbook 342 "event technology" http://www.dthg.de

Trade Association Ordinance laser radiation BGV B2:
http://publikationen.dguv.de/dguv/pdf/10002/b2.pdf or
http://www2.fz-juelich.de/gs/datapool/page/324/bgvb2a102007.pdf

Leaflet "laser equipment in nightclubs and st show events"
http://www.boku.ac.at/fileadmin/_/an-gesund/AUVA_lasersicherheit.pdf

Leaflet "Disco-Laser": http://www.salc.ch/pdf/unfallverh%FCtungsvorschrifen-laser.pdf

DIN EN 12254, "Screens for laser working places – Safety requirements and testing” www.din.de

Equipment Safety Law (GSG)
http://bundesrecht.juris.de/bundesrecht/techarbmg/gesamt.pdf

Criminal Code § 223 ff: http://bundesrecht.juris.de/bundesrecht/stgb or
http://bundesrecht.juris.de/bundesrecht/stgb/gesamt.pdf

Further useful links:

University Essen
Selbstbau-Laser: http://pluslucis.univie.ac.at/FBA/FBA95/Matischek/laser3.pdf

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2.2 Dangers caused by Laser Radiation

The first starting of a show laser of the classes 3 and 4 (for more information see page 6) must be announced to the responsible authority for the industrial safety and to the responsible professional association, because of the regulations for the prevention of accidents (BGV B2).

The service personnel and persons, who are in the area of the show laser, must be instructed. The instruction includes the acquisition of knowledge regarding danger of laser radiation, other possibilities of endangerment, protection regulations, behaviour in the area of the show laser, safety precautions as well as the knowledge of the operating procedure with the use of a show laser system.

For these regulations LPS-Lasersysteme will give a special one-day briefing on its premises to the service personnel. Everyone who operates this system, has to participate in such a course.

This course contains the following topics:

- reflecting power of laser beams
- damage of the skin
- inflammability
- classification of laser systems of LPS-Lasersysteme
- warning devices and safety precautions
- special safety references for the usage site of the laser
- limit values for harmless laser radiation
- laser safety regulations
- tasks and duties of the laser protection representative
- special regulations for show lasers used on stages
- safety device of the show laser area
- demarcations of the spectator range
- geometrical borders
- amenability
- adjustment of the laser system
- protection devices of stages

The company, which operates with laser classes 3 or 4, has to nominate in writing at least one permanent employed person as laser protection representative. Furthermore the company has to notify the laser protection representative to the responsible professional association.

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Eye damage caused by unskilled operation of laser products can be considered as physical injury and can be persecuted by law.

Please note that the organizer is responsible for keeping all specified protective measures.
If a laser gets out of control, the performance has to be cancelled immediately.

If the organizer does not fulfill his safety duties, he is reliable by civil law for any damages occurred, like:

- Paying the injured person‘s treatment expenses.
- Paying damages for pain and suffering to the injured persons.
- If financial loss was caused by the operator of the laser product, compensation payment might be claimed.

Please note:
LPS-Lasersysteme cannot be made liable for damages caused by incorrect installations and unskilled operation!

Protective measures for a safe operation

For producing and operating laser radiation the following regulation is binding:
DIN EN 60825-1 "Sicherheit von Laser-Einrichtungen", E DIN 56912
"Showlaser und Showlaseranlagen", die berufsgenossenschaftliche Vorschrift
Laserstrahlung BGV B2, Merkblatt "Lasergeräte in Diskotheken und bei
Show-Veranstaltungen", Merkblatt "Disco-Laser", all governmental regulation and all enerally binding rules of technology.

The following are excerpts from the regulation mentioned above. This information is based on regulations given on the date of printing. When operating a laser product in public or industrial areas, a set of safety instructions has to be followed that this manual can only give in part. The operator must therefore inform himself about the latest safety instructions and follow them.

2.3 Safety Shutdown

Show lasers must provide a safety shutdown enabling to interrupt the laser radiation directly at any time.

2.4 Mechanical Construction

The show laser must be protected against re-adjustment, rotation and tilting.
The show laser must be installed in a way that the beam cannot be emitted in an unwanted way. If there are optical efficient components (e.g. mirrow), they must be firmly fixed at the wall etc. All load-bearing elements must also be firmly fixed.

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2.5 Audience Area

In the audience area, the maximum permissible values for radiation and radiation intensity must never be exceeded.

People must never be exposed to laser radiation that exceeds the highest allowed level.

The operator has to make sure by technical or organizational measures that laser radiation as well as reflected laser radiation does never exceed the allowed level.

2.6 Show laser area

The initial installation is performed by LPS-Lasersysteme.
Nevertheless, the following steps have to be carried out by the laser protection representative every time before starting:

Before using the laser system, the device must be examined by a visual inspection if safety-relevant modifications have been made.

This contains the following topics:

Is the laser system in the same position it was installed in?
Are there no inflammable articles, like decoration, in the path of the beam?
Is the housing of the system closed?
Are all plugs plugged in, particularly all energized plugs, and have they no safety deficiencies as for example defect of the casing or isolation?

If one of the problems mentioned above did occur, the laser system must be immediately repaired. Please contact LPS-Lasersysteme (phone: +49 7473 271177).

When operating show lasers, there is a hazard zone, the so-called laser saftey area, in which the laser radiation duration and power might be higher than the highest allowed level. This area must never be entered by unauthorized persons.

The laser saftey area must only be entered by trained and authorized persons. Suitable protective measures must be carried out.

If it is unavoidable to enter the show laser area, it has to be guaranteed that the laser saftey area can only be entered from instructed and authorized persons. In this case suitable preventive measures must be observed. If it is necessary for the stage scene that persons stay in the show laser area, suitable preventive measures are to be observed to avoid endangerments, e. g. and by marked positions.

The geometric borders of the laser saftey area must be calculated or measured before starting the operation.

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Uncontrolled reflected radiation of laser products must be avoided, specular or reflective objects or areas must be kept out of the laser beam, they must be removed or covered.

In order to protect from dangerous reflections, tools, accessory and adjustment devices being used in the laser area should not have specular surfaces and people in the laser area should not wear specular objects.

The laser saftey area must be safely shielded from the audience area, e. g. by a higher stage area (minimum height: 0.8 metres) or grids. The safety distance between the laser saftey area and the audience area must be 1 metre to the sides. The distance from the lowest point of audience area to the top must be 2.70 metres at least.

If walls are used for shielding laser areas, walls made of brick, limestone or concrete are considered as suitable. Other shieldings may also be used if they comply with the
requirement of E DIN EN 12 254.

2.6.1 Announcement of the Laser Show

Each laser show must be announced to the responsible professional association and to the trade supervisory board and must be permitted by them.

If a laser show is performed outdoor, it must be also announced to the air traffic control or to the public order office.

2.7 Control Units

The control units of a show laser must be outside the laser saftey area and the complete laser saftey area must be visible from this point. The laser product may only be accessible by authorized persons. The show laser must never be operated unsupervised. During a show, the laser product must never be repaired or adjusted in a way that the laser beam is corrected.
Outside the area where the laser show takes place, the beam must be interrupted close to the laser or it must be shut off. After moderations that might affect the safety of the show laser system (like changing the path of the beams) it is necessary to have the system checked by experts again.
The system must be protected against unauthorized starting or operating. If the system is not in operation, it must be ensured that the key of the system is taken off and kept safely.
Before the audience arrives, it is absolutely essential to check if every single beam still meets its reflection mirrors (beam trajectory according to the expert). An adjustment might be required.

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2.8 Operating Stuff

Only qualified persons are entitled to run the laser show. These persons must control the laser beam during the show and immediately switch off the device or interrupt the laser beam in case of failure of the device or insecure operational conditions (Push the Emergency-OFF-Button!).

The operator has to make sure that employed persons, who are operating laser products of the classification 2 to 4 or who move in laser areas of the classification 3B or 4, are qualified. The service personnel must be aware of the fact that the laser system can be a dangerous instrument, when it is incorrectly or carelessly handled. It might cause irreparable damage, particularly to the eyes. Therefore the laser system must always be operated with extreme caution and consistent compliance with the safety regulations.

For show lasers, the operator has to instruct the employed persons on how to keep the accessible radiation as low as possible. The employed persons have to follow these instructions.

At least once a year, the operator has to make sure that the employed persons are informed about the dangers of laser radiation, the safety installations and the required protective measures, if laser products of the classification 2 to 4 are operated.

The operator must not employ teenagers in laser areas where laser products of the classification 3B or 4 are operated. Teenagers older than 16 years may only be employed in laser areas if it is essential for completing their job training and if their protection is guaranteed by an expert.

The operator has to make sure that only employed persons who are absolutely necessary can enter the laser area.

2.9 Medical Treatment of Eye Damage

If laser radiation has caused eye injuries, the operator has to make sure that the employed person will immediately be treated by an eye specialist.

2.10 Misapplication/Behaviour in Case of Failure

This laser product must NEVER be operated by private persons as they cannot shield and control laser safety areas and as children might play with the laser product.

This laser must NEVER be operated, if it is not equipped with all protective measures for a safe operation.

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CAUTION!

If you use controls or adjustments or if you perform procedures other than those specified here, this might result in hazardous radiation exposure!

If the laser beam in the scanner way does not move after switching on the device, this device must immediately be taken out of operation. Please let the device be checked by a technician of LPS-Lasersysteme.

Laser products of the classification 2 to 4 must be installed in a way to prevent unintended radiation. Unintended radiation is, when laser radiation emits from the laser product without using the normal control elements, e. g. due to damaged isolation or interferences or if it is possible to operate control elements without intention.

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3. Technical Specification

Operating voltage	100 V – 240 VAC
Voltage line frequency	50 Hz / 60 Hz
Operating current	SimPleX 850 RGB: 0.4 A SimPleX 1300 RGB: 0.5 A SimPleX 1800 RGB: 0.7 A
Power consumption	SimPleX 850 RGB: 90 W SimPleX 1300 RGB: 150 W SimPleX 1800 RGB: 161 W
Cooling requirements	air-cooled
Degree of protection	IP 20
Protection class	1, protection ground
Operating temperature	10° - 35° C
Warm-up time	< 15 minutes

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Total laser power	SimPleX 850 RGB: 850mW SimPleX 1300 RGB: 1.3W SimPleX 1800 RGB: 1.8W
Modulation	analogue modulation up to 50 kHz
Wavlength	SimPleX 850 RGB: 200mW red@638nm LD, 150mW DPSS green@532nm, 500mW blue@445nm LD SimPleX 1300 RGB: 200mW red@638nm LD, 300mW DPSS green@532nm, 800mW blue@445nm LD SimPleX 1800 RGB: 500mW red@638nm LD, 300mW DPSS green@532nm, 1W blue@445nm LD
Scanner	SimPleX 850 RGB: 20 kpps scanner SimPleX 1300 RGB: 30 kpps scanner SimPleX 1800 RGB: 30 kpps scanner
Deflection angle	maximal 60°
Dimension and weight	SimPleX 850 RGB: 320 x 260 x 160 mm, 4,1 kg

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	SimPleX 1300 RGB: 460 x 320 x 160 mm, 8,15 kg SimPleX 1800 RGB: 460 x 320 x 160 mm, 8,5 kg

Technical changes and design changes without notice and errors excepted.

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4. Overview

The overview will help you to find a better handle to the functions of the systems

4.1 Case front view

1	**Laser output window**
2	**Power LED**
3	**Music LED**
4	**Microphone**

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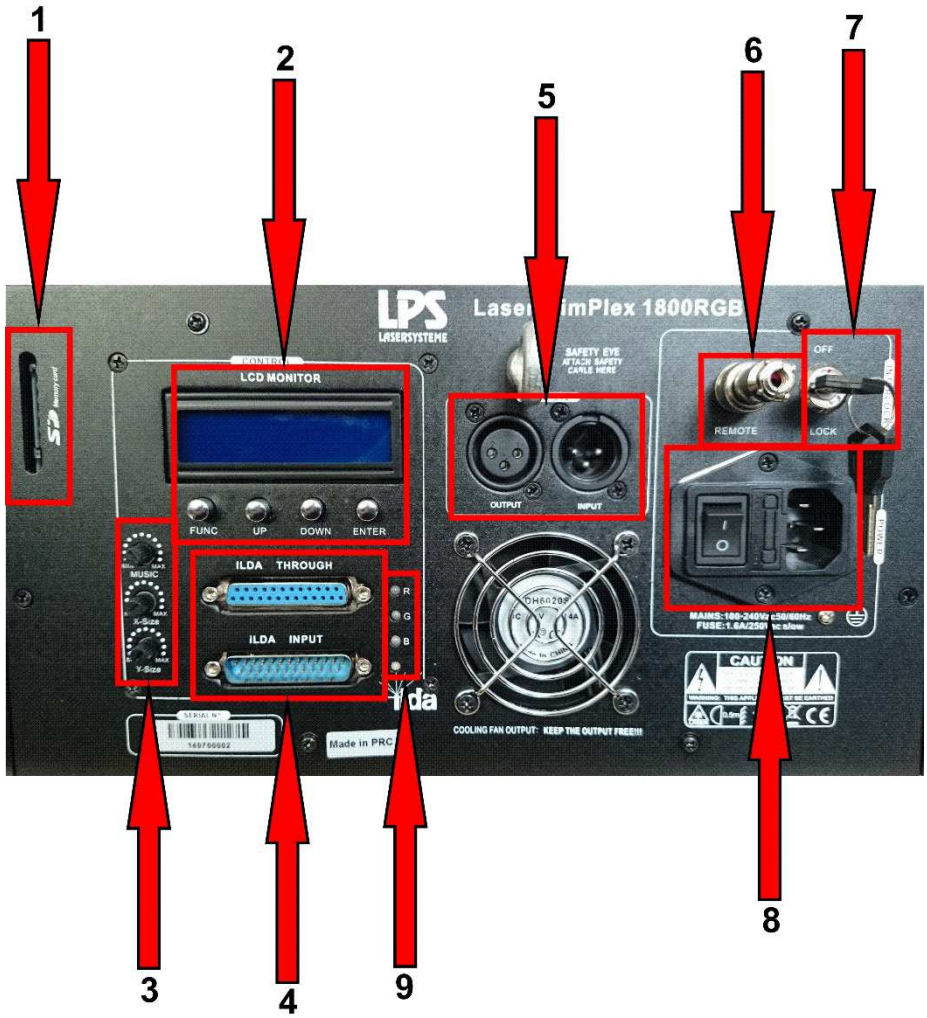
4.2 Case back view



1	SD Card Slot
2	Display Section
3	Adjustment potentiometer (X/Y size / threshold music)
4	ILDA Connections
5	DMX Connections
6	Emergency Off Connection
7	Key-Switch Interlock
8	IEC connector and ON / OFF Switch
9	Status LED´s

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5. Device Operation

Make sure that the device is connected with the mains and correct voltage is given. The permissible voltage range for laser systems of the type SimPlex is 100 - 240VAC at 50 - 60 Hz mains frequency. In addition, the key switch should be in the On mode (green dot) and the remote connection is bridged through an emergency - off switch. For some functions, the SD card which is also delivered must be disconnected.

To the operation of the system in the ILDA mode is a valid ILDA output device are connected with the ILDA input with the system. Once this is plugged into the system, the system will automatically switch in the ILDA mode.

For the configuration of the laser system, a display, four including buttons, as well as three potentiometers are available.

5.1 Display section and projector settings

After turning on the laser system, the text "SD MEDIA LASER" appears as well as the version of the micro-controller of instance on the display. After a few seconds, the device can be configured using the four buttons now.
The basic functions of the buttons are explained below:

FUNC: Runs through the various menu items
ENTER: confirms input / opens the selected menu item
UP / DOWN: changes the parameter / range points within a menu item

Menu items:

1.
- SHOW1 car / AUTO SHOW2: autoplay on internal animations
- MUSIC SHOW1 / MUSIC SHOW2: Sound-to-laser with internal animations
No SD-card is required for these modes.

2. SD SHOW
Using the UP and DOWN arrow keys, select a category of animations saved on the SD card.
There are animations available, where IB selects individual animations, and ILD packages previously compiled in PRG ILD and PRG.

3. DMX
Confirm this menu item with ENTER to operate the laser system in DMX mode. By using the UP and DOWN arrow keys, you can set the DMX address. You should press ENTER to confirm.

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4. SIGNAL SLAVE

Multiple devices of the type SimPlex 1300RGB / 1800RGB SimPlex can be connected with a DMX cable to each other. The first device in the chain is the master device. All these devices can confirm this menu point devices as slave used. Now, to the master, all slaves work synchronically. This function is used only for internal animations, so AUTO SHOW1, AUTO SHOW2, MUSIC SHOW1 and MUSIC SHOW2.

5. SETTING
Colour
- Multicolour – for RGB devices
- Dual colour - for RG devices
- Single colour - for monochrome devices

Mirror
- reflects the X - or Y-axis. SX is the X-axis, SY is the Y-axis, the following Y stands for inverted, N stands for not inverted. The different States of inversion can be selected with the UP and DOWN buttons and be confirmed by pressing ENTER. Default is SY: N, SX: Y (Front projection)

Music
- At these devices without function

5.2 Adjustment potentiometer

Reasons of simplified access to basic parameters, the show laser system of the type SimPlex 1300RGB and SimPlex 1800RGB have three potentiometers. Its function is as follows:

-Music: Here the threshold of sound intensity for the music based operating conditions can be adjusted. These modes are MUSIC SHOW1 and various MUSIC SHOW2 Functions in DMX mode.
- X size: adjusts the output size in the X-axis.
- Y size: adjusts the output size in the y axis.

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5.3 Status LED´s

Back:
The R, G and B-LED indicates that the respective laser is active at the moment.
The lower LED indicates the unit is ready for operation.

Front:
The power LED indicates the unit is ready for operation.
The Music LED indicates if the set noise to the sound-control threshold is exceeded.

6. DMX Mode

6.1 Basics of DMX control

DMX-512 allows the use of up to 512 channels. Different devices, such as Moving Heads, dimmer packs, etc. require many different channels. These channels are usually grouped together by their function. All the DMX receiver need a certain number of channels for these various functions.
The basic address sets the start address for this device in the whole range of 512 channels.
The individual channel number by each function will be added to this start address (-1).
By laser systems of the type SimPlex, it is allowed to use the address of 500 as a last start address (13 channels). Devices that are set to the same start address, will react to the changes in a value of the DMX controller. SimPlex allows the positioning of a group of 13 channels within the 500 channels.
Example: start address = 48. control functions are placed on individual channels 1-13, means physical channels of 48-60. Your SimPlex 13 DMX channels needed to operate in DMX mode.

DMX Channel assignment	
Channel 1	Operating mode
Channel 2	Animation selection or category selection (depending on the mode)
Channel 3	Strobe or animation selection (depending on the mode)
Channel 4	X Position
Channel 5	Y Position
Channel 6	Zoom
Channel 7	X Rotation
Channel 8	Y Rotation
Channel 9	Z Rotation
Channel 10	Clipping-Effekt (Builds the animation step by step apart)
Channel 11	Ripple effect

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	(Put the animation in a wave motion along the y axis)
Channel 12	Color change (Change the color or colors of the animation)
Channel 13	Point and blanking effect (Reinforced single points of animation or represents the animation bar-like, or dotted

Operating modes in DMX mode:

In DMX mode, it is possible to the laser system to set a mode of operation. This setting is made via channel 1.

In DMX mode following operating modes are available:

- PRG show about the SD card
- ILD show about the SD card
- CAR SHOW1
- CAR SHOW2
- MUSIC SHOW1
- MUSIC SHOW2
- DMX control

6.2 DMX Channels

Channel	Value	Function
1 Operating mode	0-73	Black Out
	74-110	PRG Show with the SD card (the channels 2 and 3 are active)
	111-147	ILD Show with the SD-Karte (the channels 2 and 3 are active)
	148-165	AUTO SHOW1
	166-184	AUTO SHOW2
	185-202	MUSIC SHOW1
	203-221	MUSIC SHOW2
	222-255	DMX control (all further channels are active)

PRG or ILD mode:

Channel	Value	Function
2	0-225	Category / folder selection
3	0-225	Animation / show selection

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DMX control:

Channel	Value	Function
2 Animation	0-255	Choose from 128 animations (see list of animation)
3 Stroboscope	0-10	Strobe light out
	11-199	Strobe being faster (proportional to the value)
	200-255	Strobe light depending on the sound level
4 X-Position	0-125	X position from left to right manually
	126-185	Movement being faster (proportional to the value, back and forth)
	186-225	Motion with random speed
	226-245	Motion on random position
	246-255	Motion on random position in relation to the sound level
5 Y-Position	0-125	Y position of the top-down manual
	126-185	Movement being faster (proportional to the value, back and forth)
	186-255	Motion with random speed
	226-245	Motion on random position
	246-255	Motion on random position in relation to the sound level
6 Zoom	0-10	Original size
	11-100	Zoom getting bigger (propoertional value)
	101-150	Getting bigger, speed proportional to the value
	151-200	Getting smaller, speed proportional to the value
	201-255	Getting bigger and smaller, speed proportional to the value
7 X-Rotation	0-10	No rotation
	11-110	Rotation around X-axis manual
	111-255	Rotation around X-axis being faster (proportional to the value)
8 Y-Rotation	0-10	No rotation
	11-110	Rotation around Y-axis manual
	111-255	Rotation around Y-axis getting faster (proportional to the value)
9 Z-Rotation	0	No rotation
	1-10	Rotation around Z-axis manual
	11-110	Rotation around Z-axis getting faster (proportional to the value)
	111-255	Rotation around Z-axis getting faster counter clockwise (proportional to the value)
10 Clipping-Effect	0-10	No clipping
	11-74	Clipping based on manually
	75-104	Clipping getting bigger, speed proportional to the value
	105-144	Clipping getting smaller, speed proportional to the value
	145-184	Clipping getting bigger and smaller, speed proportional to the

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		value
	185-224	Clipping getting smaller, speed proportional to the value
	225-255	Clipping on and building up speed propoertional to the value
11 Ripple-Effect	0-9	No ripple effect
	10-199	Ripple effect, speed proportional to the value
	200-255	Ripple effect amplitude proportional to the value
12 Color change	0-16	White
	17-33	Red
	34-50	Green
	51-67	Blue
	68-84	Yellow
	85-101	Magenta
	102-118	Cyan
	119-135	4 colors (white, red, green, blue)
	136-152	4 colors (blue, yellow, magenta, cyan)
	153-169	7 colors (white, red, green, blue, yellow, magenta, cyan)
	170-186	4 colors rotating (white, red, green, blue)
	187-23	4 colors rotating (blue, yellow, magenta, cyan)
	204-220	7 colors rotating (white, red, green, blue, yellow, magenta, cyan)
	221-237	Random colors
	238-255	Color change in relation to the sound level
13 Point / Blanking	0-63	No point or blanking effect
	64-127	Animation with reinforced points
	128-191	Stroke-like animation
	192-255	spotted

6.3 DMX fault protection

SimPlex laser systems automatically detect a valid DMX512 signal. If the signal fails as a result of interruptions of the DMX connection, the output of the show automatically switches to black out, when the system is in DMX mode.
In addition the invalidity of a DMX signal is flashing the word "SIGNAL" in the display indicates. This is the case, or the data lines when there is no DMX connection, are incorrectly set or, in all other cases a signal disability.

XLR pin configuration for DMX:

Pin 1: GND
Pin 2: Data
Pin 3: Data +

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6.4 Activation of the DMX mode

1. Make sure that the laser system is connected to a DMX controller with at least 13 channels.

2. Switch on the laser system.

3. Press the FUNC button, until in the display of the text "MODE: DMX" appears. Confirm it with ENTER.

4. Enter the desired DMX-address via the UP and DOWN buttons and press ENTER it.

7. ILDA Mode

SimPlex laser systems will automatically switch the ILDA mode, when once a valid ILDA signal is connected. The laser system can be controlled by using a laser animation software, for example with the LPS-RealTIME Pro.

7.1 SUB-D Pin Konfiguration

SUB-D Pin Konfiguration	
Pin 1	Signal X+
Pin 2	Signal Y+
Pin 4	ILDA-Interlock A
Pin 5	Signal red+
Pin 6	Signal green+
Pin 7	Signal blue+
Pin 13	Signal Shutter+
Pin 14	Signal X-
Pin 15	Signal Y-
Pin 17	ILDA-Interlock B
Pin 18	Signal red- (GND)
Pin 19	Signal green- (GND)
Pin 20	Signal blue- (GND)
Pin 25	GND

All other pins are not used and connected on ILDA-through.
Please keep in mind that the color in SimPlex asymmetrical signals laser systems.

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8. Autoplay

Four modes of operation are available to the autonomous reproduction of a laser show, without a computer, DMX controller or similar SimPlex laser systems.

8.1 Activation of the auto play modes

1. Switch on the laser system.

2. Press the FUNC button, until in the display of the text "MODE:" and "AUTO SHOW 1/2" or "MUSIC SHOW 1/2" appears.

3. Use the UP and DOWN buttons, select the desired show and confirm this press ENTER.

8.2 AUTO SHOW 1 and 2

As described in section 4.1, select "AUTO SHOW 1" or "car SHOW 2" from. Now, the laser system emits a laser show regardless external input. These laser shows are stored on the internal memory of laser system. Thus, no SD card is required.

8.3 MUSIC SHOW 1 and 2

Select as described in section 8.1 "MUSIC SHOW 1" or "2 MUSIC SHOW". Now, the laser system emits a laser show, which continues a cue with each crossing the threshold sound level set on the potentiometer of the MUSIC. At rest by more than 3 seconds, the output to black out is turned on. These laser shows are stored on the internal memory of laser system. Thus, no SD card is required.

8.4 Master / Slave-Modus

Several devices from the type SimPleX 1300RGB and SimPlex 1800RGB can be operated in the master / slave mode SimPlex type. This is for the auto play functions of the memory available.

Here, the master system via its DMX-out is connected to the DMX in of the first slave system. So, the chain can be continued. Now, the spending of all slave systems are synchronized to the master system. In places small modifications can occur in the music based shows, like colour differences within the animation.

Configuration of the master system:

The master system can be set to the desired auto play mode as described in section 4.2 or 4.3. Thus, its configuration is complete.

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Configuration of the slave systems:

1. Press the FUNC button, until in the display of the text "MODE: SIGNAL SLAVE" appears.

2. Confirm you slave mode press ENTER.

If there is no valid slave signal, so the connection to the master in any way is disturbed, the word "SIGNAL" in the display flashes.

9. Animation Mode

SimPlex laser systems also in animation mode without computer, DMX controller or similar can be operated in addition to the auto play modes. Only the supplied SD card in the device is to insert. In animation mode, graphical animation chains can be selected and issued by category. As also in the DMX mode, a distinction is made between PRG - and ILD mode. In IB mode, individual animations within a category can be selected while in PRG mode all animations of a category are issued one after the other.

9.1 Activate of the animation mode

1. Make sure that the SD card in the laser system is inserted.

2. Switch on the laser system.

3. Press the FUNC button, until in the display of the text "MODE: SD SHOW" appears. In the lower line "friends: <Kategorie>".

4. Using the UP or DOWN buttons, select the desired category and press ENTER.

5. Choose now via the UP or DOWN button the show format, so ILD show or PRG show. Confirm then ENTER.

6. - When you can have selected in step of 5 ILD now via the UP or DOWN Button select an animation. They will be issued immediately, a confirmation ENTER is not necessary.
   - If you have selected in step 5 PRG output of the animation chain starts automatically.

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9.2 Describe of the SD card with own animations

Basically:

- The SD card must be formatted in the FAT32 file system.
- File and folder names may not be longer than 8 digits.
- Only standard characters (letters and numbers) and underlines are allowed.
- Individual animations must be in the .ild format.
- Animation programs must be in the .prg format.
- Each folder must contain a .prg file with the same name
- The category name matches the folder name.

9.3 Show lists in .prg format

Open the show list to edit (.prg) with the text editor on your computer. Each row corresponds to an animation within the list.

Every show is like this line:
File name, scanning speed, number of repetitions
The individual elements are through "," to separate.

Example:
- The file File1.ild should be played with a scanning speed of 20kpps and 3 times be reviewed.
- The file File2.ild should be played with a scanning speed of 12kpps and 1 times be reviewed.
- The file File3.ild should be played with a scanning speed of 25kpps and 10 times be reviewed.

List code:
File1.ild, 20 3
File2.ild, 12, 1
File3.ild, 25, 10

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10. Safety devices

The SimPlex laser systems have all required safety devices according to DIN EN-60825-1.

10.1 Emergency-Interlock (Remote)

The laser system is via the "remote" Connector (6) to connect with an emergency off switch with opener. The laser output is only possible when the contact between the two pins is given.
The supplied jumper plug can be used only for service purposes.

10.2 Key-Switch-Interlock

With the key switch "LOCK" (7) the laser system will be unlocked. A laser output is possible only in position ON (green dot). The key can be removed only in position OFF (red dot).

10.3 Scanner-Safety

SimPlex laser systems are equipped with a scanner control, which prevents the output of too small animations or even a related beam.

10.4 Mechanical Shutter

SimPlex laser systems are protected by a mechanical shutter to not allowed leakage of a laser beam. The shutter closes approximately 10ms.

11. Maintenance

Dust, nicotine, fog fluid, etc. cause deposits on mirrors, particularly in discotheques. This might evoce a substantial decrease in laser power. Room mirrors as well as the mirrors in the optical bench and its pane are concerned. Even during open air events deposits may emerge.

Therefore a professional and periodic cleaning is essentail!

LPS-Lasersysteme recommends a regular service, which should be implemented at least once a year by a technician.
If you want to clean the mirror more than the prescribed annual period, it should be done only with special introduction! For this purpose LPS-Lasersysteme accepts no liability!

According to the BGV B2 one service by the manufacturer is provided annually!

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Because:

- A complete professional check of the system by an expert can prevent minimum technical errors and / or attrition with large consequences. A small malfunction can be located and repaired in advance.

- Due to inadequate cleaning of the fan and heatsink, overheating and electronic defects can occur. Therefore, regular maintenance is necessary.

- By its completely closed optic area a pollution is hardly iossible but it is still not excluded. Therefore, it should be checked during the regular cleaning of the electronics range whether and how dirty the optic area is.

- For cleaning the electronic area, please remove the front and the back plate of the laser system and remove all dust particles.

- For cleaning the optic and laser area, please remove the cover and the front of the laser system.

- For cleaning only manufacturer's recommended products should be usesd because wrong cleaning agents can damage the components.

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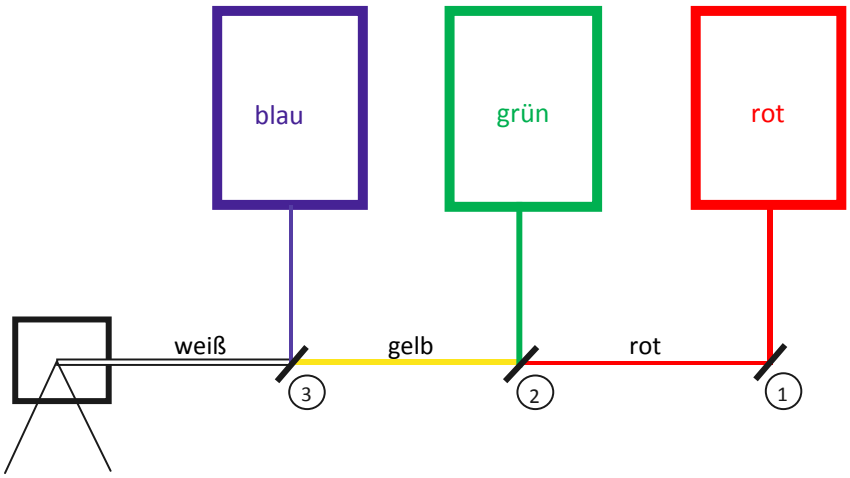
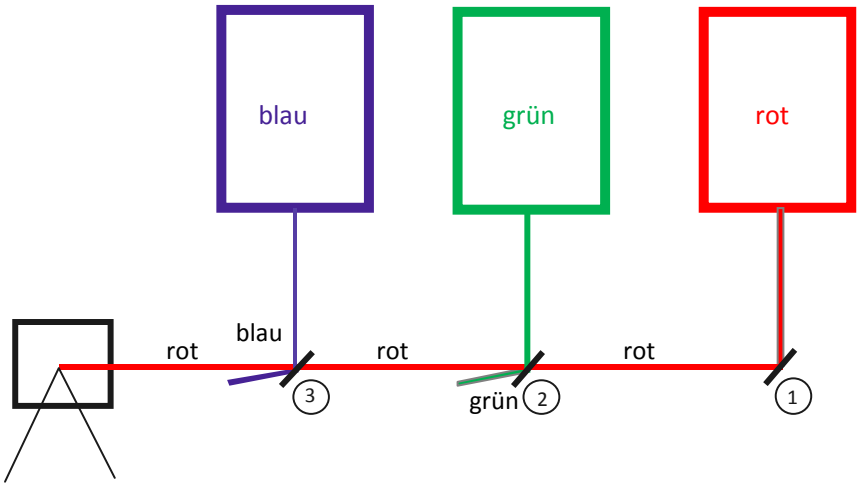
12. Beam Adjustment

It is an ideal beam combination if it looks like the drawing. We explain the beam combination on the following pictures.



At first, put the red laser beam on the mirror of the X Galvo ①. Adjust the beam with the deflection reflector.



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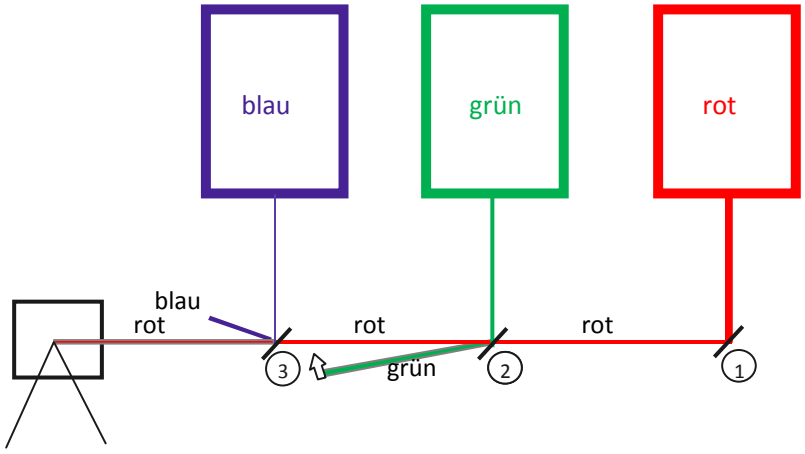
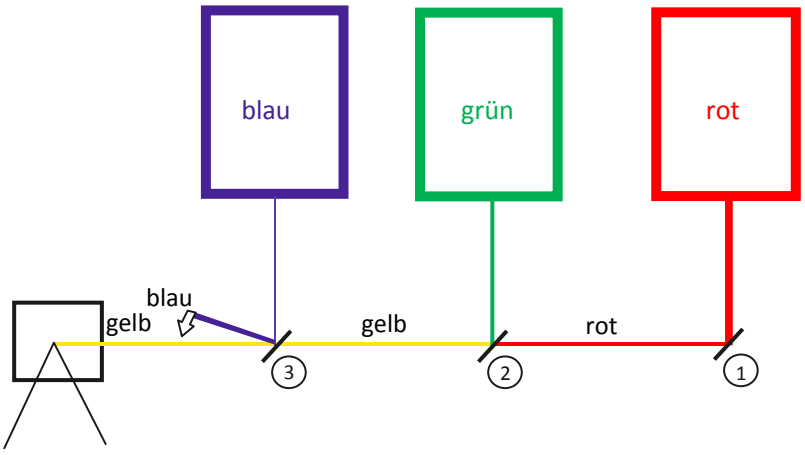
Then adjust the dichro filter ② until the red beam and the green beam are on each other on the projection surface.



Now adjust the dichro filter ③ until the blue and the yellow beam are on each other.



The laser beams should be now on each other inside the laser system, and on the projection screen.

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13. Attachment