LASER SHOW SYSTEM

PROFESSIONAL ANIMATION SERIES

FOS 10W RGB

USER GUIDE

SAFETY NOTES

ANIMATION LASER SHOW SYSTEM SAFETY NOTES

Thank you very much for choosing our product, for your safety, please read the laser safety instruction and this manual carefully before your operation.

This manual includes installation and user information.

Please install and operate the laser according to the requirements of this manual and safety guidelines.

DO NOT OVER DRIVE THE SCANNERS. WHEN USING MAX SPEED KEEP THE ANGLE SMALL. FOR MAX ANGLE DO NOT EXCEED 40000PPS ON THE ILDA SOFTWARE SETTING.

Class 3B and 4 Laser Lighting Effect User Safety Guide
Important Warnings

Class 4 Lasers have the potential to harm eyesight if viewed directly in the face, and in many instances this may be the case even if viewed over longer distances of several tens of metres. Therefore before using the laser product you should familiarise yourself with its operation, and also the safety aspects that need to be considered.

Laser lighting effects are quite safe to watch if installed and used correctly, and being aware   of a few basic factors will help you to achieve this. This guide has been prepared to help provide a basic backgrounder to the key safety aspects, and is based on current UK health and safety guidance on the use of lasers for public displays.

Installation and Operation Notes

1. The laser should only be installed and operated by those that are aware of how to operate laser, and what the various controls perform.

2. The laser should be mounted in a suitable and secure position in the venue, so that once in position it is unlikely to be affected by unintended movement.

3. Prior to installation and operation of the laser, the paths of the beams and effects should be   considered, particularly with respect to how they will touch the audience. If direct audience scanning is desired then the laser energy in the effects needs to be considered to decide if the effects are safe for direct viewing.

Introduction

Laser lighting products are used to create some of the most vivid and striking visual effects, and are often noted for how they seem to produce solid shapes that cut through the air, and pick up highly defined swirling smoke patterns. The light that is used to create these stunning effects is different from normal light and therefore several precautions need to taken when using lasers to ensure that the lighting effects are safe and enjoyable to view. The optical power output from the kind of lasers used for lighting displays can be harmful if not properly setup or is misused. But when used following the recommended health and safety guidelines, laser lighting effects no more harmful than looking at any conventional lighting effect.

Although this guide covers the main points to consider when using laser effects, users are advised to familiarise themselves with other guidance, particularly that issued by the Health and Safety Executive, HS(G)95 The Radiation Safety Of Lasers Used For Display Purposes.

A laser product that emits more than 5mW of light and less than 500mW can be classified as a Class 3B laser product

A laser product that emits more than 500mW of light and can be classified as a Class 4 laser product

Class 3B and 4 are safe if used responsibly, and in accordance with the relevant the guidance issued by the Health and Safety Executive.

Class 4 laser devices may cause fires and burn the skin if exposed directly.

In the simplest terms, generally keeping the beams and effects above the audience will not present a hazard to those viewing the show or effects. When you start to aim the laser effects down into the audience area is when it becomes harder to tell if the effects could cause harm. With a Class 3B and 4 laser lighting effect, the problem can arise if the beams or effects actually hit someone's face. If in doubt, keep the effects above the audience.

Class 3B and 4 laser devices can be harmful to eyesight if viewed directly. i.e. that is, the beam or effect strikes the face of a person directly. The actual injury that a Class 3B and 4 laser can cause depends upon a number of factors, including how long the laser beam enters the eye for, the intensity of light, and what part of the eye it actually gets focused onto. The most susceptible part of the eye to receive damage from a laser is the internal back wall of the eyeball, known as the retina. It is this part of the eye that receives the light signals that are sent to brain. All light entering the eye gets focused onto the retina.

There are no specific "laser laws" or any "laser licences" that anybody needs in order to own or operate a laser for lightshow use. However, there is specific guidance issued by the Health and Safety Executive in the form of a document called HS(G)95 The Radiation Safety of Lasers Used for Display Purposes. HS(G)95 outlines a number of detailed points to consider when using lasers for lightshow purposes.

Class 3B and 4 laser products are required to have several specific safety features as part of their design. These features are laid out in the British Standard on Laser Product Safety BS/EN 60825-1 and are a

requirement of the product meeting CE approvals. The important ones are listed below:

1) Laser Safety Warning Labels   2) Emissions Indicator   3) Remote Interlock Connector

Audience Scanning

Audience Scanning is the term commonly used to describe when laser effects are being directly aimed at the viewing audience. This creates a very dramatic looking effect, as people can touch the light, and look down smoky tunnels. But because the laser light can touch or scan past people's faces, it also carries a risk that it could cause damage to people's eyesight, if they are overexposed to the laser light.

The amount of laser light that a person can be exposed to without it causing harm to eyesight   is known as the Maximum Permissible Exposure or MPE. These levels are defined the in the British Laser Safety Standard BS/EN 60826-1. When people are exposed to laser light which is above the MPE, it poses a risk of causing eye damage. This could be of concern when the laser effects are viewed directly in the face or there is a chance that they could be.

Knowing what the MPE and exposure level is for a given laser effect is quite a complex and involved process to establish. For it is dependant on a whole number of conditions and variables that need to be taken into account. The laser safety standard BS/EN 60825-1 contains the data required to calculate the safe levels, but it is not straightforward to interpret. Laser Safety Calculation Software has been developed to help ease the task of establishing laser effects exposure.

The BS/EN60825-1 Laser Safety Standard recommends that all establishments that use, or businesses that work with Class 3B laser products, should appoint a Laser Safety Officer (LSO). The Laser Safety Officer should be aware of the safety issues when using lasers, and   is responsible for overseeing how the laser is used. In smaller businesses, the LSO will probably also be the installer, operator, owner etc.

The worst case effect to look at directly is a static single beam, because all the light energy is concentrated into one point.

General instructions

Unpacking

Thank you for purchasing this product. Please read user guide for safety and operations information before using the product. Keep this manual for future reference. This product can create perfect laser programs and effects since it has passed a series of strictly tests before delivery. Please check the attachments listed on the page after opening the carton. In the event of carton damage or attachment missing in transit, please contact your dealer or our after sales service department.

Attachments

   1. Laser Light: 1PC

   2. Power Cable: 1PC

   3. User Guide: 1PC

Notice

1. Do not exposure the human eye direct to laser beam.

2. Do not turn on and off the unit frequently.

3. Before using this unit make sure the power supply is ground.

4. This unit is intended for indoor use only and should be prevented form water, moisture and shake. The working temperature of this unit is -30～40℃, do not use this continuously over 6 hours, otherwise it shortens the lifetime of the unit.

5. Use cleaning tissue to remove the dust absorbed on the external lenses periodically to optimize light output.

6. Do not remove or break the warranty label, otherwise it void the warranty.

7. Always replace with the exact same type fuse, replacement with anything other than the specified fuse can cause fire or electric shock and damage your unit, and will void your manufactures warranty.

DANGER
LASER RADIATION AVOID EXPOSURE
TO BEAM CLASS 4 LASER PRODUCT
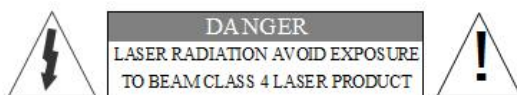
Features

1. Full pure diode laser with more stable performance and longer working life. Diode solid-state (DSS) laser is that when power on, the diode will have laser output directly. It can work properly between -30°C and 40°C.

2. Made of analog laser modulation. Users can dimmer the laser brightness linearly to makes the laser light more colorful.

3. Graphics & Effects: Beam show and animated graphics show patterns.

4. TF Card: 8GB, for storage build in program and downloading program.

5. Safety intelligent: PC control mode will shut off laser automatically without trigger signal. The scanner failure protection will shut off the laser signal and the shutter will block the laser output automatically, so as to avoid the single beam coming out.

6. Applicable for all kinds of large-scale outdoor performances, outdoor lighting projects.

Technical Specification

1. Voltage: AC90~250V/AC, 50HZ/60HZ

2. Rated Power: 180W

3. Waterproof Level: IP51

4. Work Environment: outdoor and indoor, -30 °C ~40 °C

5. Scanner: 40K High-speed optical scanner, ±25° big angle scanning

6. Laser: RGB analog modulate, 30KHZ frequency

   Red laser, 3000mW, wavelength 638nm

   Green laser, 3000mW, wavelength 520nm

   Blue laser, 4000mW, wavelength 450nm

7. Beam Diameter<5mm, Divergence<1.2mrad

8. Working Modes: ILDA mode (PC Control), DMX512 (11CH/31CH/61CH), PRG, ILD, Sound Active Auto, Landmark, Master/Slave

9. Play Program Format: .ild laser show document

10. Safety Configure: Security protection, Laser key switch, laser remote interlock, SFS Control(scanner fail safety control ON/OFF), flying rings bolt

11. Interface: 3 pins XLR jack for DMX, DB25 and RJ45 interface for PC control

12. Machine dimension: 350(L)*240(W)*195(H)mm

13. Machine Weight: 13Kg

Machine Pictures

The following pictures are for your reference only, the specific kind prevail.
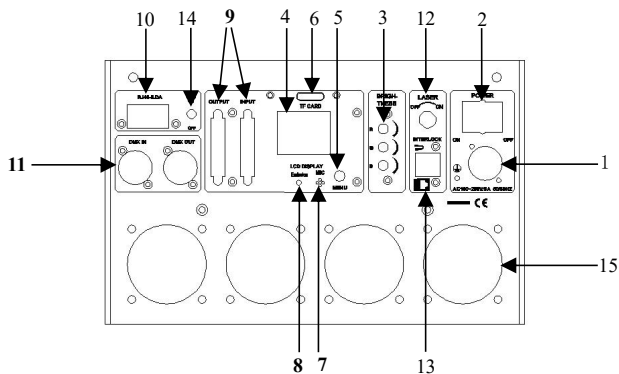
Front Panel Picture
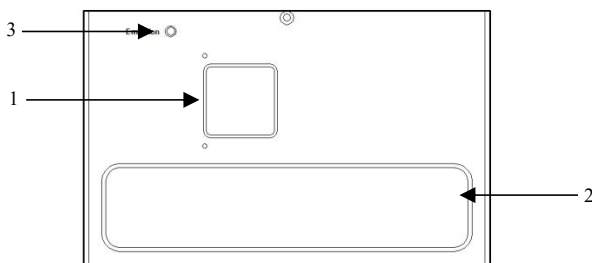
1. Laser aperture

2. Fan air outlet

3. Emission: Laser ON/OFF indicator. White indicator light, laser output is allowed when turned on, please operate carefully; laser output is not allowed when turned off.

Rear Panel Picture

1．**POWERCON Input Socket**: AC100~250V,50/60HZ

2．**POWER Switch**

3．**BRIGHTNESS:** RGB brightness adjusting knob，0~100% adjustment

4．**LCD DISPLAY:** LCD display, displaying current operation information

5. **MENU:** Menu reuse keys, rotation to make choices, click action to enter or return, long time press action to return to the main interface.

6. **TF CARD:** TF memory card, store laser program, and store the largess program to make laser software and other data. **Warning! Do not insert or pull out the TF card when laser power is on.**

7．**MIC:** Sound-control microphone with SOUND mode recognition sound rhythm signal

8．Emission: Signal indicator light, signal flashing in DMX mode, other conditions for power indication

9 ． ILDA In and Out Interface with DB25: Use laser software control(such as QuickShow from Pangolin).When connect to hardware of laser software, it turn to ILDA mode automatically.

10. ILDA In and Out RJ45 Interface：Use laser software control (such as QuickShow from Pangolin). Simple ILDA interface, using RJ45 network port as input and output port, only 8 pin signal, cannot automatically identify the ILDA mode, need to open (RJ45-ILDA：ON/OFF) in menu settings to connect the IDLA signal.

1------- 8

RJ45 Definition

RJ45 Pin	1	2	3	4	5	6	7	8
ILDA signal	X+	X-	Y+	Y-	R	G	B	GND

DB25-RJ45 Interconnection Definition									
ILDA Signal	X+	Y+	R	G	B	X-	Y-	GND	INTERLOCK Identify
DB25 Pin	1	2	5	6	7	14	15	25	4 & 17 Pin
RJ45 Pin	1	3	5	6	7	2	4	8	

11．DMX IN/OUT: Connect the input and output of DMX signal with 3 pins XLR jack

3pin-XLR, 1-pin: GND, 2-pin: DMX-, 3-pin: DMX+

12．Key Lock: ON and OFF laser. When at the ON position, laser ON, at the OFF position, laser OFF.

13．Remote Interlock: Laser remote control interface to control laser ON and OFF. Connection to laser ON, Disconnection to laser OFF. Cooperating with key lock, when all ON then have laser output. When emergency, can shut off the laser quickly.

14. SFS: SFS control, scanner fail safety control ON/OFF. If turned OFF, a single point of laser will appear if the scanner fails. If turned ON, if there is a single point, automatically turn off the laser

15. FAN: Radiator fan *4PCS

Manu Setting

Manu	Sub item	Default setting	Remarks
DMX Address	001--511	001	DMX mode and set the address
Show Mode	ILD	Auto	Only Play the ild file program
	PRG		Play the PRG list file program
	Landmark		Play building landmark program
	Auto		Auto play mode
	Sound		Sound active play mode
	TEST		Test mode

Program (Auto/Sound)	Progr	Progr	Built-in geometric graphic programs
	Progr1		Reserve it for user programming and storage
	Progr2		Reserve it for user programming and storage
	Progr3		Reserve it for user programming and storage
Program (ILD/PRG)	Progr	Progr	Built-in all animated programs(Progr1/2/3)
	Progr1		Built-in animal animated programs
	Progr2		Built-in human and other animated programs
	Progr3		Built-in abstract line pattern animated programs
	Load-Pro		Reserve to download the animated programs
PRG/ILD File	File name or Built-in	Buil-in	Folder(animated programs) selection from TF card and Built-in animation in PRG/ILD mode
Size X	-100--+100	+80	Pattern X/Y size and phasic setting only built-in mode(ILD/PRG/Auto/Sound……) valid
Size Y	-100--+100	+80	
Speed	8--40	30	Scanner speed setting, only valid for built-In mode
DMX State	Show	Show	DMX status setting, no DMX signal to show (built-in programs) or black
	Black		
Slave Mode	Slave	Slave	Master/Slave mode setting
	Master		
X Phasic	Positive	Positive	X Phasic setting of all mode valid
	Reverse		
Y Phasic	Positive	Positive	Y Phasic setting of all mode valid
	Reverse		
Color Mode	RGB	RGB	Color setting of built-in mode
	White		
SFS Protect	ON	OFF	Prohibit the laser single-point output
	OFF		Allow the laser single-point output
Sound Sense	0--100	80	Sound sensitivity setting
Password Set	0--100	ON	Time lock, used to set how long to closing
RJ45-ILDA	ON	OFF	RJ45-ILDA signal on/off settings. ON is RJ45-ILDA mode. OFF is built-in mode
	OFF		
	OFF		
	ILD File		Load animation to menu Program>> Load-Pro

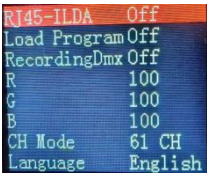| Load Program	DMX Pr1	OFF	Load Program(in TF card) to menu Program>> Progr1/ Progr2/ Progr3 in Auto/Sound mode
	DMX Pr2		
	DMX Pr3		
Recording DMX	OFF	OFF	
	Progr1		Recording DMX Program to menu Program>> Progr1/ Progr2/ Progr3 in Auto/Sound mode
	Progr2		
	Progr3		
R	0--100	100	Red Dimmer, only built-In mode valid
G	0--100	100	Green Dimmer, only built-In mode valid
B	0--100	100	Blue Dimmer, only built-In mode valid
CH Mode	11CH	31CH	Normal mode
	31CH		Professional mode
	61CH		Double patterns mode
Language	English	English	
	中文		

| Main Interface | Menu Interface 1 | Menu Interface 2 | Menu Interface 3 |

Information of Main Interface: Name of Software System, Playback Mode, DMX Address, Play ILDA file (displayed in PRG/ILD mode). In ILD mode, it plays a single ILD program file, and users need to enter the main interface to select the ILD files from the current folder by using the knob. The selected file name will be displayed at the bottom part of the main interface.

DMX Mode: DMX512 mode. In the CH Mode menu, there are options for regular mode with 11 Channels for dynamic programs, professional mode with 31 Channels, and dual-pattern professional mode with 61 Channels.

Show Mode: Built-in program mode, including DMX/ Auto/ Sound/ ILD Loop Play/ PRG Animation Play /Landmark /TEST. The ILDA mode (controlled by computer laser software) is a non-built-in program mode.

Auto: Automatic mode. Play automatic programs: Progr, Progr1, Progr2 and Progr3, which is running automatically.

Sound: Sound control mode. Play the automatic programs: Progr, Progr1, Progr2 and Progr3, triggered by sound control.

ILD: Loop playback mode. Play ILD files, including loop playing built-in animations: Progr, Progr1, Progr2 Progr3 and Loaded-Pro, single ILD files from the selected folder on the TF card (file extension is ILD).

PRG: Animation playback mode, Play PRG lists. Play built-in animations: Progr, Progr1, Progr2 Progr3 and Loaded-Pro, selected PRG playlist files from the folder on the TF card (files extension is PRG).

Landmark: Outdoor landmark mode. Play built-in outdoor beam programs, designed specifically for outdoor usage.

PRG/ILD File: PRG/ILD animation folder selection. Return to the main interface (long press the knob) to select ILD file.

Speed: Scanner speed setting, 8KPPS-40KPPS. It is recommended to set it between 20-30KPPS, depending on the scanner speed performance. If the speed is too low, the pattern will flicker severely; if it is too high, the pattern will be distorted. When at a high speed, if with large-angle pattern, the motor will load heavily and prone to damage easily. When controlled by computer laser software (ILDA mode), pay attention to the scanning speed setting in the software, do not exceed the maximum limit that the scanner can handle, otherwise, the pattern will be severely deformed, the scanner will frequently enter a protective state, and it may get damaged. When scanning at a large angle, the scanning speed should be set lower; the larger the scanning angle, the heavier the motor load.

DMX State: No signal state.

1) SHOW: If no DMX signal is received, it will run the built-in mode. When there is no DMX control, set it to SHOW.

2) BLACK: If no DMX signal is received, then the light is turned off. It is recommended to set it to BLACK when device is controlled by DMX.

Slave Mode: Master-Slave setting. If master-slave synchronization is required, set only one machine as Master and the rest as Slave mode to achieve the master-slave synchronization effect. In DMX mode, all machines should be set to Slave mode; otherwise, the Master machine will severely affect the DMX signal.

Password Set: Time lock password. It is used for setting the machine to shut down after a certain period of operation. ON (factory default): No password protection is set, and the light is always allowed to be on; OFF: When the operating time ends, the light will be turned off, and only entering the password can allow the light to work normally. The working time can be set from 001 - 999 hours. Only the manufacturer has the authority to set the time lock.

RJ45-ILDA: RJ45-ILDA signal switch setting. The DB25-ILDA signal can be automatically identified, but the RJ45-ILDA, due to the limited number of pin signals, cannot be automatically identified and needs to be set manually. ON: ILDA mode, both RJ45-ILDA and DB25-ILDA interfaces are valid; if there is no

ILDA signal, the light will be off. OFF: RJ45-ILDA is off, and will run the built-in mode.

Recording DMX: Record DMX programs. Provide users with recording DMX programmed shows, when finished, it can run as an automatic program without the DMX controller. Recording steps are as follows:

1) When recording a DMX program, need to use the DMX console to edit the programs firstly.

2) Select the program list to be recorded on the machine (Recording DMX >> DMX Program 1/2/3), and you will be prompted to "Press the button to start." If there is no DMX signal connected, it will prompt "Please input DMX."

3) Run the program on the DMX console.

4) Record the required program. Press the button to start recording, and you will be prompted to "Press the button to end"; press the button again to finish the recording. Long press the button to return to the main interface.

Load Program: Including loading programs 1/2/3 and loading animation programs.

1) Load DMX programs. When recording a DMX program, please insert a TF card into the machine firstly. After recording is finished, the program data file (file name PROGR1/2/3.YUQ) will be saved to the TF card, then insert the card into other machines to load programs. Avoid repeating the Recording DMX operation. Go to the LOAD FLASH menu, and select the program list to import (Load Program >> DMX Progr1/2/3).

2) Load animation programs. Users can also load animation programs themselves. First, need to edit a single program file in ILD format; then create a LOAD.PRG file according to the requirements of the playlist file PRG; in the same folder as ILD and PRG, run the ILD APP (stored in the root directory of the TF card, copied to the PRG folder) to get the loaded animation program file LOAD.ZYQ. Loading path: Load Program >> ILD File. Playback path for loaded animation programs: Program >> Load-Pro.

Color Mode: Pattern color mode. RGB: Full color; White: Single color.

R/G/B Output: R/G/B dimming setting, 0-100% brightness output.

Attention

1. The system just support short file name, file name (include folder name), most 8-bit file name and 3 extension name, file name and extension name formed by letter, number and under line. File name can't over 8 and no Chinese words, otherwise the system can't identify it.

2. CF card can't mix other file, most support 20 folders, every folder can save maximum 255 files and 10 PRG files.

3. Program table: user can use notepad to edit program list, the extension name is .PRG. Program table formed by play file name, play speed, play times. Edit item, for example: one program formed by File1.ild, File2.ild, File3.ild. File1.ild play speed is 30K, replay 20 times; file2.ild play speed is 25K, play

10 times; file3.ild play speed is 30K, play 15 times. Then prg1.prg contents as below:

<div align="center">
File1.ild,30,20

File2.ild,25,10

File3.ild,30,15
</div>

When create one folder, need create the same PRG file under the folder, and put all the files need to play in the folder into the PRG file. For example, under aurora folder, create aurora.prg file. After adding ILDA file, need add the file to prg file, so that we can find the file quickly and play the file as per the speed you set.

DMX Operation

The system has three kinds of channel versions for users to choose.

1. **Normal Mode 11 Channel Versions**

Channel	Function	Value	Description
CH1	RGB Dimmer	000-255	RGB dimmer from 0% to 100%
CH2	Red Dimmer	000-255	Red dimmer from 0% to 100%
CH3	Green Dimmer	000-255	Green dimmer from 0% to 100%
CH4	Blue Dimmer	000-255	Blue dimmer from 0% to 100%
CH5	Program Library	000-019	Program library 1: geometric program(mainly circles)
		020-039	Program library 2: geometric program(mainly lines)
		040-059	Program library 3: geometric program(mainly polygon)
		060-079	Program library 4: geometric program(mainly curve line)
		080-099	Program library 5: building landmarks program
		100-119	Animated programs 1: animal programs
		120-139	Animated programs 2: human programs
		140-159	Animated programs 3: other programs
		160-179	Animated programs 4: abstract line pattern programs
		180-189	Animated programs 5: text class of static effects
		190-199	Animated programs 6: corresponding to the menu: program>> Load-Pro's program. if no program is closed
		200-255	Animated programs 7: TF card folder animation, every 5 values assigned to a folder (PRG), 200-204, 205-209, 210-214, 215-219, 220-224, 225-229, 230-234, 235-239, 240-244, 245-249, 250-254, 255. 245-255 have no program. If no program is closed.

CH6	Program Selection	000-255	Select the Program from the program library. Four digits is for one program. When CH5 value is less than 20 and CH6 value is less than 4, all programs are played
CH7	Color Segment	000-000	Built-in color of pattern
		001-255	Change the color segment. The bigger value it is, the less segment it is. In combination with CH8, one color is invalid
CH8	Color Selection	000-007	Built-in color of pattern
		008-015	White
		016-023	Red
		024-031	Green
		032-039	Blue
		040-047	Yellow
		048-055	Cyan
		056-063	Pink
		064-095	Red, Green, Blue, three monochrome automatic change, more big to more fast
		096-127	Cyan, yellow, pink, three monochrome automatic change, speed up
		128-159	White, red, yellow, green, cyan, blue, pink, seven monochrome automatic change, speed up
		160-191	White-pink-blue-cyan-green-yellow-red, seven segment color change, speed up
		192-223	White-pink-blue-cyan-green-yellow-red, seven segment color flow change 1, speed up
		224-255	White-pink-blue-cyan-green-yellow-red, seven segment color flow change 2, speed up
CH9	Pattern Size	000-255	Adjust pattern size, bigger value then smaller size.
CH10	Play speed	000-005	Default automatic speed
		006-255	Select the automatic speed
CH11	Sound Active Trigger	000-127	OFF
		128-255	ON

2. Professional mode 31 channel versions and double patterns mode 61 channel versions

CH2- CH31 are the control channels for Pattern 1/Program 1, and CH32-CH61 are control channels for pattern 2. In 61-channel mode, pattern 2 will be turned off when CH35 and CH36 are both at zero value; animation patterns (CH5<100) will only show the Pattern 1.

Channel		Function	Value	Description
CH1		RGB Dimmer	000-255	RGB dimmer from 0% to 100%
CH2	CH32	Red Dimmer	000-255	Red dimmer from 0% to 100%
CH3	CH33	Green Dimmer	000-255	Green dimmer from 0% to 100%
CH4	CH34	Blue Dimmer	000-255	Blue dimmer from 0% to 100%
CH5	CH35	Pattern/ program Library	000-019	Circle patterns（CH6 - CH120）
			020-039	line segment patterns（CH6 - CH136）
			040-059	Polygon patterns（CH6 - CH244）
			060-079	Curve patterns（CH6 - CH122）
			080-099	Landmark patterns（CH6 - CH108）
			100-119	Animated programs 1: animal programs （CH6 - CH172）
			120-139	Animated programs 2: human programs （CH6 - CH56）
			140-159	Animated programs 3: other programs（CH6 - CH60 ）
			160-179	Animated programs 4: abstract line pattern programs (240)
			180-189	Animated programs 5: text class of static effects（88）
			190-199	Animated programs 6: corresponding to the menu: program>> Load-Pro's program. if no program is closed
			200-255	Animated programs 7: TF card folder animation, every 5 values assigned to a folder (PRG), 200-204, 205-209, 210-214, 215-219, 220-224, 225-229, 230-234, 235-239, 240-244, 245-249, 250-254, 255. 245-255 have no program. If no program is closed.
CH6	CH36	Pattern/ program Selection	000-255	Select the pattern or program from the library. Four digits is for one.
CH7	CH37	Color Segment	000-00	Built-in color of pattern
			001-255	Change the color segment, bigger value, less segment. In combination with CH8, one color is invalid
			000-007	Built-in color of pattern
			008-015	White

CH8	CH38	Color Selection	016-023	Red
			024-031	Green
			032-039	Blue
			040-047	Yellow
			048-055	Cyan
			056-063	Pink
			064-095	Red, Green, Blue, three monochrome automatic change, speed up
			096-127	Cyan, yellow, pink, three monochrome automatic change, speed up
			128-159	White, red, yellow, green, cyan, blue, pink, seven monochrome automatic change, speed up
			160-191	White-pink-blue-cyan-green-yellow-red, seven segment color change, speed up
			192-223	White-pink-blue-cyan-green-yellow-red, seven segment color flow change 1, speed up
			224-255	White-pink-blue-cyan-green-yellow-red, seven segment color flow change 2, speed up
CH9	CH39	Strobe	000-010	No strobe
			011-255	Auto strobe, strobe speed from low to fast
CH10	CH40	Motion Boundary Setting	000-049	Black in boundary
			050-099	Rebound in boundary
			100-149	Compress in boundary
			150-199	Black in boundary
			200-255	Pass through in boundary
CH11	CH41	Pattern Size	000-255	Adjust size
CH12	CH42	X Position	000-255	Coarse,
CH13	CH43	X Position	000-255	Fine tuning
CH14	CH44	Y Position	000-255	Coarse,
CH15	CH45	Y Position	000-255	Fine tuning
CH16	CH46	Rotation	000-255	0~360° rotation
CH17	CH47	Rotation	000-255	Fine tuning
CH18	CH48	X rolling-over	000-255	Rolling-over from left to right

CH19	CH49	Y rolling-over	000-255	Rolling-over from down to up
CH20	CH50	Drawing	000-255	Drawing from 100% to 0%
CH21	CH51	X Wave	000-009	No wave
			010-069	Small wave, speed up
			070-129	Medium wave, speed up
			130-189	Big wave, speed up
			190-255	Biggest wave, speed up
CH22	CH52	Y Wave	000-009	No wave
			010-069	Small wave, speed up
			070-129	Medium wave, speed up
			130-189	Big wave, speed up
			190-255	Biggest wave, speed up
CH23	CH53	Display Mode /Array Effect	000-063	Light dot display1
			064-127	Light dot display 2
			128-55	Only CH53 has an array effect, and only geometric patterns are valid (CH5<100), multiple channels are required to be combined. For example, FIG.1 is a pattern, and each point of FIG.2 will become FIG.1, then the same multi-pattern array effect appears. FIG.1 should be with patterns in small size, and FIG.2 should choose the pattern with a smaller number of points, and then superimposed on FIG.1 and FIG.2 changes, can make a beautiful array effect.
CH24	CH54	Motion Amplitude	000-255	Amplitude limit of various movements of the pattern is used with the movement channel. Wave, zoom, X/Y rotation are valid. Move, rotation, twist, drawing are invalid. The number more larger, the motion amplitude more smaller
CH25	CH55	Zoom(+/-)	000-000	No change
			001-099	Zoom +, speed up
			100-199	Zoom -, speed up
			200-255	Zoom (+/-) circulate, speed up
			000-000	No moving

CH26	CH56	X Move	001-099	From right to left automatically move, speed up
			100-199	From left to right automatically move, speed up
			200-244	Automatic and irregular jump, speed up
			245-255	sound active and irregular jump, speed up
CH27	CH57	Y Move	000-000	No moving
			001-099	From up to down automatically move, speed up
			100-199	From down to up automatically move, speed up
			200-244	Automatic and irregular jump, speed up
			245-255	sound active and irregular jump, speed up
CH28	CH58	Center rotation	000-000	No change
			001-129	Automatic counterclockwise rotation, speed up
			130-255	Automatic clockwise rotation, speed up
CH29	CH59	X Axes Rotation	000-000	No change
			001-099	Pattern twist, speed up
			100-199	Pattern twists in the opposite direction, speed up
			200-255	Auto rotation, speed up
CH30	CH31	Y Axes Rotation	000-000	No change
			001-099	Pattern twist, speed up
			100-199	Pattern twists in the opposite direction, speed up
			200-255	Auto rotation, speed up
CH31	CH61	Drawing	000-000	No change
			001-099	Auto drawing +, from 0% to 100%, speed up
			100-199	Auto drawing -, from 100% to 0%, speed up
			200-255	Drawing (+/-) circulate, speed up