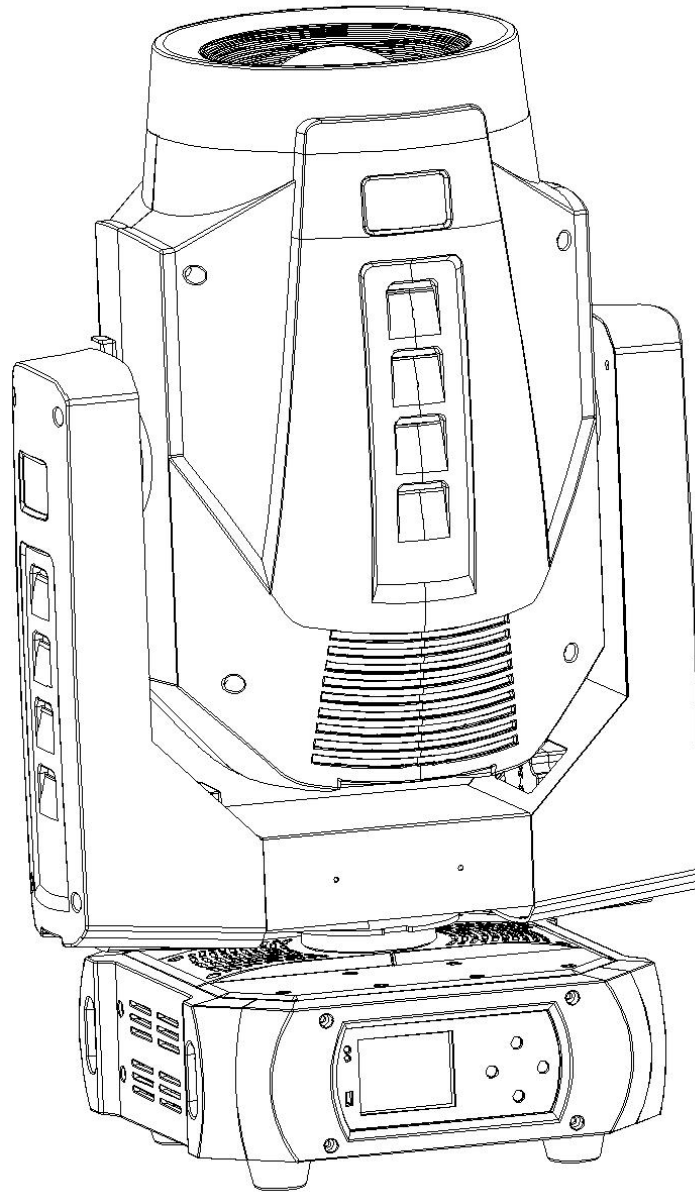


# USER MANUAL



**420 LED 3 IN 1 CMY**

## Foreword

Thanks for choosing 420 LED BSW 3IN1 CMY light, it is our newest the latest independent research and development of a high-grade quality. Compared with other same power lights, it's more light weight and convenient, and with perfect combination of international advanced electronic control technology and excellent human chemical. 420 led BSW 3in1 CMY is in full compliance with the CE standard supports the international DMX512 signal control mode.

420 led BSW 3in1cmy adopts top-level LED module with strong light effect, XY axis fast and smooth movement, precise positioning, pure and uniform beam color.

420 led BSW 3in1 CMY has super high altitude and super long range, and it is fitted with a static gobo wheel (5 gobos + 3 open), rotating gobo wheel(7 gobos +1 open),a frost lens, a color wheel with 5 colors with open, 8 facet prism and T-shape prism stack could combine 3 kinds prism effect. And with rich CMY independent linear color mixing effect.

This model is widely used in TV stations, weddings, discos, dance halls, night clubs,performances and other professional places.

## Product Catalog

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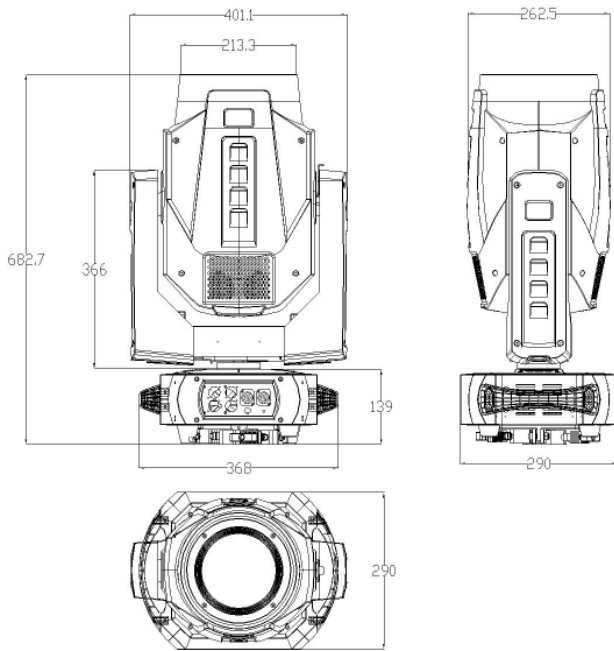
Please carefully read the instructions, this guide consists of important information about installation, use and maintenance

## 1. Safety Instructions

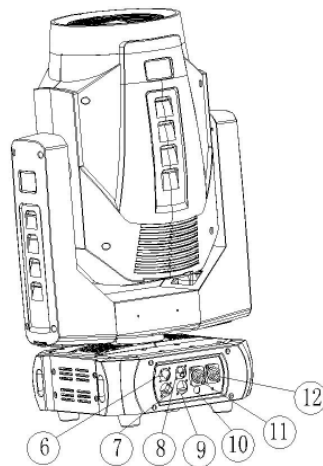
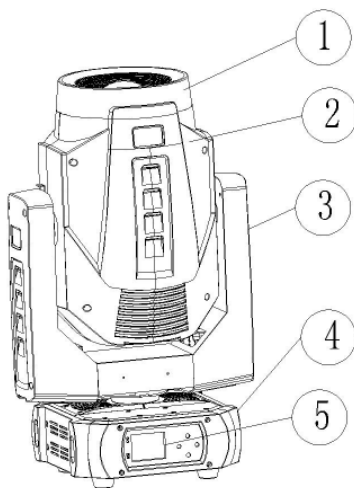
- ◇ Before using this product, please observe carefully the product is not unwrap or damage during transportation. As a result of damage during transporting, please do not use the lights, and contact with the dealer or manufacturer.
- ◇ Before running products, to ensure that the voltage and Hertz in accordance with the requirements of lights.
- ◇ It's very important, connecting ground wire to avoid the electric shock.
- ◇ This product is for dry indoor environment.
- ◇ This product must be installed on the sufficient space, adjacent to interface the shortest distance of 50 cm, to ensure that the lights will not crash each other.
- ◇ Before moving or repairing the product, please unplug the power.
- ◇ When it working, ensure that no inflammable and explosive near objects.
- ◇ When installing this product, please use the safety rope. When handling this product, lift the armrest base, rather than the lamp body.
- ◇ This product is suitable for a maximum temperature of 40 degrees Celsius, when the surrounding environment is higher than 40 degrees Celsius, please do not use this product.
- ◇ Do not touch. When working, the product running very fast, to prevent bruising.
- ◇ Problems happens when operating performances, should immediately stop using the lights. Do not carry out maintenance, repair damage caused or likely to cause other problems. Please contact the company's maintenance repair. During the repair process, use the same type of accessories.
- ◇ Please read the instructions carefully, especially regarding the installation, using, maintenance parts. Important that the lighting in the transport process, must be packed anti-shock protection carton or flight case.

## 2. Technical Parameters

- ◇ DMX Channel: 20/25CHs
- ◇ Control model: DMX512, RDM etc
- ◇ LED LCD touch screen + press button control, Chinese/English mode
- ◇ top-level LED module 360w led light source
- ◇ Luminous flux 19500lm
- ◇ Super fast and ultra silence 3-phase step motors
- ◇ Color temperature is 9000K, life span is 20000Hs
- ◇ 7 colors +open, semi color effect
- ◇ 5 fixed gobo+ 3 open
- ◇ 7 rotating gobo + white
- ◇ prism: rotating 8-facet prism + Linear prism could rotate reversible, prisms can combine multilayer beam effect.
- ◇ Optical lens: High precision glued optical lens
- ◇ Soft light effect: the angle of the spot that can adjust the soft light
- ◇ Focus: Linear Focus
- ◇ Dimmer: 0-100% linear dimmer.
- ◇ Beam angle: 3-50°
- ◇ Strobe: electronic strobe (0.5-20FPS)
- ◇ 14pcs super silence motors, pan & tilt 2pcs 3-phase step motors,16bit.
- ◇ Housing: High temperature resistant alloy plastic + plastic handle
- ◇ Max frost angel is: 60°
- ◇ Rated power: 450 W
- ◇ IP rate: IP20
- ◇ Weight: 26.9KG
- ◇ Size: 401\*290\*682.7mm



### 3. Lighting Components



1. Lens front cover
2. Lamp body cover
3. Light arm
4. Bottom case cover
5. LCD Display
6. 5 pin XLR DMX input
7. 5 pin XLR DMX output
8. 3 pin XLR DMX input
9. 3 pin XLR DMX input
10. Insurance
11. Power in
12. Power out

## 4. Packing And Shipping

### 4.1 Packing Material and Accessories

420W LED is packaged by carton or standard 2-in-1 flight case (Other options are the 1-in-1 flight case and 4-in-1 flight case).

Accessories as below.

Item	Quantity	Unit
User Manual	1	Piece
Signal Line	1	Piece
Safety Rope	1	Piece
Bracket+ Clamp	2	Piece
Power Cable	1	Piece

### 4.2 Protection Lock for Transport

For the convenience of transportation, the light has 2 protection locks (Each of it is on the X-axis and Y-axis.). There are 4 locked buttons on the X-axis and 3 locked buttons on the Y-axis to lock the light' s position. The lock position is locked at the center and the light body is in a vertical position with the arm.

### 4.3 Packing

1. Power off to let the lamp cool completely before packaging at least 15 minutes or more
2. Lock the light protection locks when cleaning the surface of the light.
3. Use the packing bag to cover the light, grab the handle on both sides of the equipment and put it upside down and put it into the box gently.
4. Put the light' s accessories into packing box after putting the light into the box.
5. It' s only up to two crates stacked and is prohibited upside down.

## 4.4 Unpacking

1. Open the packing box and packing bag
2. Grab the equipment's handles, lifting and carrying away the light from the packing box or opening the flight case cover placing lift boom close to the light base, then equipping light hook on light base bottom tightening quick Install locks. At last rising away boom to the top of the lamp from flight case, put the flight case away.
3. Unlock the light protection lock before turning on the light

Note: Upon receipt of light, please check if there is damage to the light caused by transport, please do not use the fixture if any damage, and contact us as soon as possible.

## 5. Safety Standard Installation

Users should ensure that light and installation materials are checked for regular safety check. Please do not install it yourself if you do not have the professional work condition and similar experience. Please ask the professionals to operate it. Incorrect installation will cause danger.

The working temperature for the equipment is available between -20 degrees and 40 degrees Celsius. Do not use the equipment outside of this environment. Don't stand under the light when the light is installed, dismantled, moved or serviced. The operator must ensure that the fixtures are securely connected. Installing the light after professionals approving electrical parameters make sure that these installation must be checked at least once per year by experts



## 5.1 Hook Clamp Installation

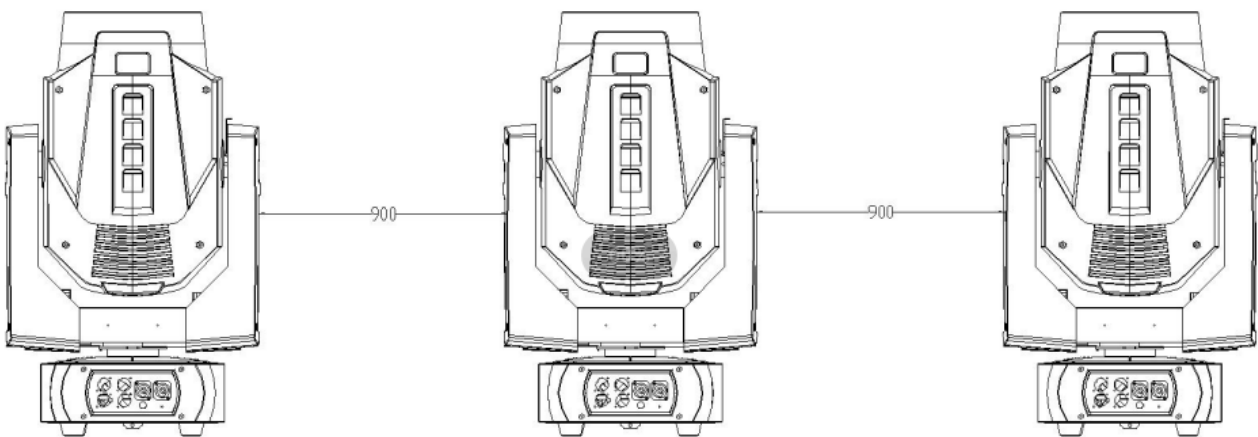
420 L E D can be placed on the stage or on a stand in any direction , quick lock system can quickly and easily remove or install a light hook.

Note: The light is fitted with folding hook, please pull up the folding hook and ensure they're all in the same direction if use.

## 5.2 Fixing Equipment

1. Please confirm the rigging equipment is not damaged and can bear at least 10 times of light's weight before installing. Also check the building can be bore at least 10 times of total weights of light, fixture, and cable accessories.
2. Insert the locked hook fastener into base mounting holes horizontally, grab the handle clockwise 90 degrees fasteners, in the same way to install a second fastener, make sure the fastener is fastened under the light base
3. If truss can be lifted the equipment can be directly clamped from flight case and locked fixture base. Then hung on the light and fixed it. Before rising the light to right height, connect the power line and signal line.

Note: Add a safety rope attached the light's base insurance shelf, do not connect the light's handle.



Note: Lights be placed vertically upward, the shortest distance between working lights must be more than or equal 900mm, lighting installation layout as following

### 5.3 Data cable

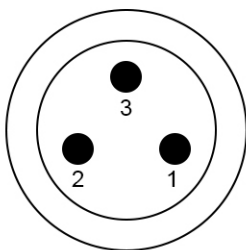
Data cable is DMX512 signal

Caution: Signal line connections is X-type connector

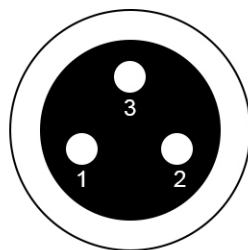
X-type connector-----If the external flexible cable or cord of this light is damaged, please replace the professional cable or cord from the manufacture or its agent.

Lights' DMX input and output connects to a 3&5pin XLR, first pin is grounded, then negative signal is second pin, third pin connects to the positive polarity signal, the fourth and fifth is empty.

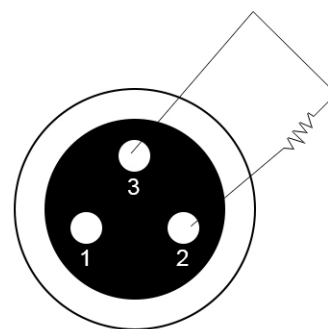
In order to prevent reception reflection and interference control signal, a terminal plug must be installed on the first branch of the connected device last 3-pin output jack



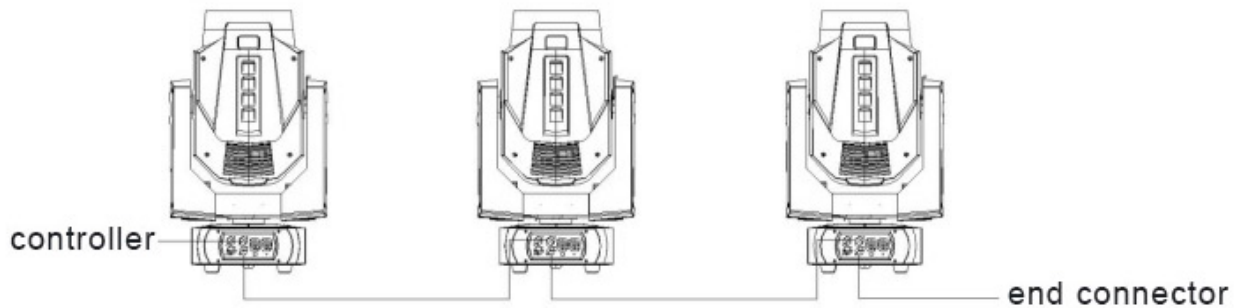
- 3XLR Plug
1. Grounding
  2. Signal-
  3. Signal+



Terminal plug connect with XLR plug second or third by a 0.25w 120ohm resistor, then connect the resistor into last light's DMX output jack



The controller connects to the nearest input XLR 3-pin, then from the output of the device connects to the input of the next device, continuous connection one by one, the final output data cable terminal equipment plug one end into the terminal.



If the signal transmission is long-distance, 512 signal amplifier must be added. DMX512 signal controller connect to the input of the amplifier first, then connect to the fixture from its output, couple with the terminal plug last.

**Note:**

1. Do not use two separate output connections. To connect the branch, a separating consecutive DMX512 signal amplifier must be used to separate.
2. Please use the specialized DMX512 shielded twisted-pair cable. Standard microphone cables can not be reliably controlled long-distance data.

## 6. AC Power

### 6.1 Fuse Size

Power: 100-240v~

Fuse: 8A 5 \* 20 main fuse

## 6.2 Power Connection

If the external flexible cable or cord of this light is damaged, the line is up to the manufacturer or its service agent or a similar qualified person to replace, in order to avoid danger. Connect the power supply personnel must have the appropriate qualifications before proceeding, you must make sure you are using the power supply voltage matches the voltage identified and have overload or leakage protection. Directly connect the device to the power supply, do not connect to the silicon box dimming system, otherwise damage to the equipment.

## 7. Light Source

### 7.1 Light Source Description

420LED 3 in 1 CMY LED module, this LED module provides a very stable color temperature of 9000K, color rendering index greater than 85, and average life of more than 20,000 hours (depending on the lighting environment)

note:

1. Please do not install other similar light bulbs, otherwise it will cause safety hazards or damage the equipment.
2. To reduce the risk of damage to the luminaire, replace the lamp before it exceeds the life of the lamp.
3. It is forbidden to use scratched and damaged LED light source

## 8. Dynamic Effects

### 8.1 Gobo Wheel

A metal Gobo Wheel consisting of 5 fixed gobos + 3 white open, customers can change their own customized simple gobo as needed.

A dynamic rotating Gobo Wheel consisting of 7 glass gobos + white

Fixed Gobo Wheel

## Fixed Gobo Wheel



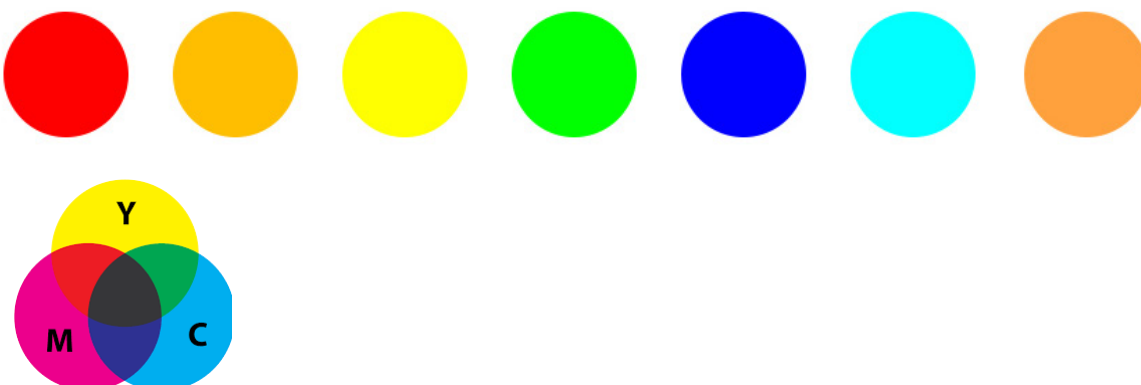
## Rotating Gobo Wheel



## 8.2 Color Wheel & CMY

The color wheel is composed of 7 fixed colors of high standard. Users can easily choose the color they like and create a perfect lighting effect. At the same time, it can be used with the gobo wheel. The effect is better, and the colorful gobo can be changed at will. (You can change your own custom color plates at any time according to customer needs). The CMY is composed of three sets of pure C, M, and Y pieces. It can control C, M, and Y separately, and the CMY piece can be freely combined with the five solid colors on the color wheel. It can be freely switched and linearly adjusted color.

## Rotating Gobo Wheel



### 8.3 Optical lens focusing

Synchronous work with two high-precision screw motors is used to adjust the optical lens to complete the gobo definition.

### 8.4 Prism

The prism wheel is equipped with an 8-facet prism and a linear prism, which can be rotated clockwise and counterclockwise, and the speed can be adjusted. With the color and gobo, various brilliant lighting effects can be created. The prism wheel passes two high-precision ultra-fast the eight-head screw motor adjusts the size of the prism spot to create a dynamic effect of the prism.

### 8.5 Dimmer & Strobe

0-100% electronic dimming, instant switching, stroboscopic speed can be adjusted freely, up to 20 times / sec, with special function of random strobe.

### 8.6 Frost

The frost consists of an frost piece, which is done according to the actual control to achieve the soft light effect you want.

### 8.7 Pan & Tilt

Pan 540 degrees, Tilt 270 degrees, with 16BIT precise positioning function. Pan & Tilt speed can be adjusted.

## 9. Display Setting

### 9.1 Display Introduction

### 9.2/Menu Operation:

FUNC ( Confirm ) 、UP ( Last One ) 、 DOWN ( Next One ) 、ESC ( Return )			
— 、 Main Menu :			
1 、 DEX address : 01-512			
2 、 Channel mode : 1 、 25    2 、 20			
3 、 Reset Operation	1 、 Motor off 、	Yes/No	
	2 、 Pan/Tilt		
	3 、 Color		
	4 、 Gobo		
	5 、 Dimmer		
	6 、 Zoom/ Prism		
4 、 Operation ( BMX )	1 、 BMX		
	2 、 Auto 1		
	3 、 Auto 2		
	3 、 Auto 3		
	4 、 User program		
	5 、 Sound mode		
5 、 Manual control	1 、 pan		0-255
	2 、 Tilt		0-255
	3 、 Color		0-255
	4 、 Static Gobo		0-255
	5 、 Rotating Gobo		0-255
	6 、 、 Rotating gobo rotation		0-255
	7 、 Prism		0-255
	8 、 Frost		0-255
	9 、 Zoom		0-255
	10 、 Focus		0-255
	11 、 Shutter		0-255
	12 、 Dimmer		0-255
	13 、 Prism/1 Rotating		0-255

		1、pan	0-255	
		2、Tilt	0-255	
		3、Color	0-255	
		4、Static Gobo	0-255	
6、Operation Set	1、Tilt Set	1、Direction	Yes/No	
		2、Start		0-255
		3、End		255-0
	2、Pan Set	1、Direction	Yes/No	
		2、Start		0-255
		3、End		255-0
	3、Dimming curve	1、straight line		
		2、Square		
		3、Prescribe		
		4、S curve		
		5、logarithm		
	4、Master-slave mode :	Slave		
		Master		
	5、Sound Mode Set	1、Sound Mode	Dimmer	
			Color	
			Gobo	
		2、Other channels	DMX	
			Auto	
			Manual	
			Sensitivity	0-255
			Response threshold	0-255
		3、CMY Macro		0-255
		4、Automatic return	Never	
30 seconds				
2 Minutes				
Never				



	6、Mixed scene	1、Play scene		1-9
		2、First round		A-H
		3、Second round		A-H
		4、Third round		A-H
		5、Fourth round		A-H
		6、Fifth round		A-H
		7、Sixth round		A-H
		8、Seventh round		A-H
		9、Eighth round		A-H
	7、Scene editing	1、Scene number		A-H
		2、Step number		0-29
3、Step editing		Time		0-255
		Channel		1-25
		Value		0-255
4、copy				
5、Paste				
6、Recording				
8、Cutting	1、Pan/Tilt	Yes/No		
	2、Color	Yes/No		
	3、Gobo	Yes/No		
	Prism/Fire Wheel	Yes/No		
9、P/T Control Mode：	Speed/Time			
10、Synchronous random frequency conversion	Yes/No			
11、Color linear switching	Yes/No			
7、Display Set	12、Disable smooth dimming	Yes/No		
	1、Sleep	30 seconds		
		2 minutes		
		10 minutes		
		Not sleeping		
	2、brightness	1—10		
	3、Reverse display	Yes/No		
	4、Indicator light	Auto/ Normally open		

8、 advanced settings	1、Fine Adjustment ( Code 576 )	1、Pan		0...500...-500	
		2、Tilt		0...500...-500	
		3、Color		0...500...-500	
		4、CMY1		0...500...-500	
		5、CMY2		0...500...-500	
		6、CMY3		0...500...-500	
		7、Static Gobo		0...500...-500	
		8、Focus	!	0...500...-500	
		9、Prism arm 1		0...500...-500	
		10、Prism 1 Rotating		0...500...-500	
		11、Prism arm 2		0...500...-500	
		12、Prism 2 Rotating		0...500...-500	
		13、Rotating Gobo Wheel		0...500...-500	
		14、Rotating Gobo		0...500...-500	
		15、Frost		0...500...-500	
		16、Zoom		0...500...-500	
		Lock the menu	Yes/No		
		2、Factory setting ( Code )			
		3、Fine- tuning backup and recovery	1、Recover		
			2、Backup		
	3、Fine adjustment value is cleared				
	4、View backup data				
	5、View local data				
	4、No DMX	1、execute	Centered		
			maintain		
			Auto ( Test )		
			Auto ( Gobo )		
			Auto ( Color )		
			Sound control		
		User program			
		2、Mode :	Anti-boot		
		Any time			
	3、Automatic host		Yes/No		
	Return				

	5、Gobo coordination	Yes/No		
	6、Prism coordination	Yes/No		
	7、Advanced function channel	Yes/No		
	8、speed of the fan	full speed /Auto		
	9、Language	1、Chinese		
		2、Eng		
		3、Spanish		
	10、Turn off	No Action		
		Sleep		
	11、Always show Logo	Yes/No		
	12、Turn off the battery			
	13、P/T Correction	Yes/No		
	14、Lamp time clear	Cancel		
		Confirm		
	15、Reset	Cancel		
		Confirm		
	16、Ignore errors	Pan Reset	Yes/No	
		Tilt Reset	Yes/No	
		Lighting board communication	Yes/No	
		Code wheel waveform	Yes/No	
	17、Lightning failure retry	Yes/No		
	18、Clear self programming	Confirm/Cancel		
9 Information	1、DMX Monitor	Channel	01-25	
		Value	0-255	
		Signal check	Accept medium/ no signal	
		period	30	
	2、Condition monitoring	Cpu1 temperature °C		
		Cpu2-0 temperature °C		
		temperature 1 °C		
		temperature 2 °C	invalid	

	3、Lamp usage time	this time ( Minute ) : 0	Total( hour ) : 0	
	4、Error message	Storage	Normal/Error	
		Sensor	Normal/Error	
		Cpu2-0 communication	Normal/Error	
		Bulb filter	Yes/No	
		Cpu1 overheat	Yes/No	
		Cpu2 overheat	Yes/No	
		Hlash	Yes/No	
		RAM	Yes/No	
		License expired	Yes/No	
		Fine Adjustment Backup	Consistent	
		Pan Code wheel waveform	Normal	
		Tilt Code wheel waveform	Normal	
		5、Pan/Tilt Refer Speed	Pan : 01 Second 9833	
	Tilt: 01 Second -27256			
	6、The remaining time ( hour )	unlimited		
		Enter the serial number		
		ID :		
		Security Settings 3.0 ( code )		
	7、Test mode	Test mode ( code 232 )		
		SWD mode		
		Motor off		
		Code wheel	0.....	
		Sensor	0.....	
		Sensor 1	0.....	
		Sensor 2	0.....	
		Sensor 3	0.....	
		Sensor 4	0.....	
		Sensor 5	0.....	
		Sensor 6	0.....	
		Thermistor 0.1K/30632		
		Lighting test ( Press Enter )		

		Sound	0
		Pan Take off	0
		Tilt Take off	0
		Set fan power	0-999
		Local reset	1
		Sub board reset	1
		RDM Test	Turn off/Turn on
		Keyboard form	Four buttons

## 10. Channel description

Mode/Channel		DMX Value	description
25	20		
1	1		Pan
		0-255	Pan Rotation 540°
2	*		Pan Fine
		0-255	Pan Fine 2.11°
3	2		Tilt
		0-255	Tilt Rotating 246°
4	*		Tilt fine
		0-255	Tilt fine 1°
5	3		Pan/Tilt Speed
		0	Maximum speed mode
			speed mode
		1-255	Speed from fast to slow
			Time mode
		1-255	From 0.1 seconds to 25.5 seconds
6	4		Power / special features
			In order to activate the function, at least 4 seconds need to stay in the following DMX values.

		140-149	Pan 、 Tilt Reset
		150-159	Color System Reset
		160-169	Gobo System Reset
		180-189	Focus, Zoom, Prism etc. Reset
		200-209	All Reset
			DMX values enter the following range and activate the function immediately
		220-229	Auto Mode
7	5		Strobe/ Shutter
		0-2	Close
		3-7	Open
		8-97	Strobe from Slow to Fast
		98-101	Open
		102-126	Quickly open slowly close, slow to fast
		127-151	Quickly close slowly open, fast to slow
		152-155	Open
		156-180	Randomly fast open and slow close, from slow to fast
		181-205	Randomly fast close and slow open, from fast to slow
		206-209	Open
		210-249	Randomly Strobe, from slow to fast
		250-255	Open
8	6		Dimming
		0-255	Dimming from 0% to 100%.
9	*		Dimmer Fine
		0-255	Fine adjustment from small to large
10	7		Color Wheel
		0-7	White
		8-15	White+ Red
		16-23	Red
		24-31	Red + Orange
		32-39	Orange
		40-47	Orange + Yellow
		48-55	Yellow
		56-63	Yellow + Green
		64-71	Green

		72-79	Green + Dark Blue
		80-87	Dark Blue
		88-95	Dark Blue + Cyan
		96-103	Cyan
		104-111	Cyan+3200K
		112-119	3200K
		120-127	3200K+White
		128-190	Forward rainbow effect, from fast to slow
		191-192	Stop
		193-255	Reverse rainbow effect, from slow to fast
11	8		Cyan
		0-255	Color saturation from small to large
12	9		Magenta
		0-255	Color saturation from small to large
13	10		Yellow
		0-255	Color saturation from small to large
14	11		CMY Mixing dynamic effect
		0-15	Macro function does not work
		16-255	CMY Macro function
15	12		Static Gobo Wheel
		0-15	Gobo 1
		16-25	Gobo 2
		26-35	Gobo 3
		36-45	Gobo 4
		46-55	Gobo 5
		56-65	Gobo 6
		66-75	Gobo 7
		76-92	Gobo 1 shake from slow to fast
		93-109	Gobo 2 shake from slow to fast
		110-126	Gobo 3 shake from slow to fast
		127-143	Gobo 4 shake from slow to fast
		144-160	Gobo 5 shake from slow to fast
		161-177	Gobo 6 shake from slow to fast
		178-199	Gobo 7 shake from slow to fast
		200-201	Big Open

		202-227	Positive gobo flow effect: from fast to slow
		228-229	No Action
		230-255	Reverse gobo flow effect: from slow to fast
16	13		Rotating gobo wheel
		0-5	Open
		6-15	Gobo 1
		16-25	Gobo 2
		26-35	Gobo 3
		36-45	Gobo 4
		46-55	Gobo 5
		56-65	Gobo 6
		66-75	Gobo 7
		76-92	Gobo 1 shake from slow to fast
		93-109	Gobo 2 shake from slow to fast
		110-126	Gobo 3 shake from slow to fast
		127-143	Gobo 4 shake from slow to fast
		144-160	Gobo 5 shake from slow to fast
		161-177	Gobo 6 shake from slow to fast
		178-199	Gobo 7 shake from slow to fast
		200-201	Big Open
		202-227	Positive gobo flow effect: from fast to slow
		228-229	No Action
		230-255	Reverse gobo flow effect: from slow to fast
17	14		Rotating pattern indexing and rotation
		0	No Action
		1-127	360° Rotating gobo index
		128-190	Forward gobo rotation: from fast to slow
		191-192	No Action
		193-255	Reverse gobo rotation: from slow to fast
18	15		Prism
		0-19	No prism effect
		20-75	Prism 1
		76-127	Prism 2
		128-255	Double prism
19	16		Prism 1 indexing and rotation



		0-127	360° Rotating index
		128-190	Forward prism rotation: from fast to slow
		191-192	No Action
		193-255	Reverse prism rotation: from slow to fast
20	17		Prism 2 indexing and rotation
		0-127	360° Rotating index
		128-190	Forward prism rotation: from fast to slow
		191-192	No Action
		193-255	Reverse prism rotation: from slow to fast
21	18		Frost
		0-63	No Frost effect
		64-255	Frost from 0% to 100%
22	19		Zoom
		0-255	Zoom : Beam Angle from small to large
23	*		Fine Zoom
		0-255	Fine : Beam Angle from small to large
24	20		Focus
		0-255	Continuous adjustment from far to near
25	*		Fine focus
		0-255	Fine : from far to near

## 11. Trouble Shooting

Listed below are a few common problems that you may encounter, with solutions.

Unit does not work, No light output and the fan does not work;

1.Check the power connection and main fuse.

2.Be sure the fuse holder is completely and properly seated.

Not responding to DMX Control;

1.Check the DMX connectors/cables to see if they are linked prop- erly.

- 2.If the DMX LED is on and no response to the channel, check the address settings and the DMX controller polarity.
- 3.Try using another DMX controller.
- 4.Check to see if the DMX cables run near or run alongside to high voltage cable. It may cause damage or interference to DMX interface circuit.

One of the channels is not working well;

- 1.The stepper motor might be damaged or the cable connected to the PCB is broken.
- 2.The motor's drive IC on the PCB might be out of condition.

## 12. Cleaning

Regularly clean the outside of the optical lens focusing on the dust. Based on the number of lamps use a clean environment to determine: Are they moist, smoked or is the surrounding environment particularly dirty, which can cause dust deposition lamps.

Please use a glass cleaning solution and a soft cloth to wipe the focusing optical lens. Carefully dry each part. At least 20 days to clean the dust outside a lens, the lens inside 30-60 days to clean up the dust once. Regular inspection lamp fan and bottom case fan, a fan of at least 20\days to clean up dust deposition.

Cleaning must be executed in case of power failure.

### 13. Photometrics Diagram

