Q16



RGBlink®

User Manual

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Thank you for choosing our product!

This User Manual is designed to show you how to use this video processor quickly and make use of all the features. Please read all directions and instructions carefully before using this product.

Declarations

FCC/Warranty

Federal Communications Commission (FCC) Statement

This equipment has been tested and found to comply with the limits for a class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area may cause harmful interference, in which case the user will be responsible for correcting any interference.

Guarantee and Compensation

RGBlink provides a guarantee relating to perfect manufacturing as part of the legally stipulated terms of guarantee. On receipt, the purchaser must immediately inspect all delivered goods for damage incurred during transport, as well as for material and manufacturing faults. RGBlink must be informed immediately in writing of any complains.

The period of guarantee begins on the date of transfer of risks, in the case of special systems and software on the date of commissioning, at latest 30 days after the transfer of risks. In the event of justified notice of compliant, RGBlink can repair the fault or provide a replacement at its own discretion within an appropriate period. If this measure proves to be impossible or unsuccessful, the purchaser can demand a reduction in the purchase price or cancellation of the contract. All other claims, in particular those relating to compensation for direct or indirect damage, and also damage attributed to the operation of software as well as to other service provided by RGBlink, being a component of the system or independent service, will be deemed invalid provided the damage is not proven to be attributed to the absence of properties guaranteed in writing or due to the intent or gross negligence or part of RGBlink.

If the purchaser or a third party carries out modifications or repairs on goods delivered by RGBlink, or if the goods are handled incorrectly, in particular if the systems are commissioned operated incorrectly or if, after the transfer of risks, the goods are subject to influences not agreed upon in the contract, all guarantee claims of the purchaser will be rendered invalid. Not included in the guarantee coverage are system failures which are attributed to programs or special electronic circuitry provided by the purchaser, e.g. interfaces. Normal wear as well as normal maintenance are not subject to the guarantee provided by RGBlink either.

The environmental conditions as well as the servicing and maintenance regulations specified in this manual must be complied with by the customer.

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Operators Safety Summary

The general safety information in this summary is for operating personnel.

Do Not Remove Covers or Panels

There are no user-serviceable parts within the unit. Removal of the top cover will expose dangerous voltages. To avoid personal injury, do not remove the top cover. Do not operate the unit without the cover installed.

Power Source

This product is intended to operate from a power source that will not apply more than 230 volts rms between the supply conductors or between both supply conductor and ground. A protective ground connection by way of grounding conductor in the power cord is essential for safe operation.

Grounding the Product

This product is grounded through the grounding conductor of the power cord. To avoid electrical shock, plug the power cord into a properly wired receptacle before connecting to the product input or output terminals. A protective-ground connection by way of the grounding conductor in the power cord is essential for safe operation.

Use the Proper Power Cord

Use only the power cord and connector specified for your product. Use only a power cord that is in good condition. Refer cord and connector changes to qualified service personnel.

Use the Proper Fuse

To avoid fire hazard, use only the fuse having identical type, voltage rating, and current rating characteristics. Refer fuse replacement to qualified service personnel.

Do Not Operate in Explosive Atmospheres

To avoid explosion, do not operate this product in an explosive atmosphere.

Installation Safety Summary

Safety Precautions

For all product installation procedures, please observe the following important safety and handling rules to avoid damage to yourself and the equipment.

To protect users from electric shock, ensure that the chassis connects to earth via the ground wire provided in the AC power Cord.

The AC Socket-outlet should be installed near the equipment and be easily accessible.

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Unpacking and Inspection

Before opening product shipping box, inspect it for damage. If you find any damage, notify the shipping carrier immediately for all claims adjustments. As you open the box, compare its contents against the packing slip. If you find any shortages, contact your sales representative.

Once you have removed all the components from their packaging and checked that all the listed components are present, visually inspect the system to ensure there was no damage during shipping. If there is damage, notify the shipping carrier immediately for all claims adjustments.

Site Preparation

The environment in which you install your product should be clean, properly lit, free from static, and have adequate power, ventilation, and space for all components.

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Chapter 1 Your Product

1.1 In the Box

AC Power Cord



DVI Cable



HDMI Cable



Network Cable



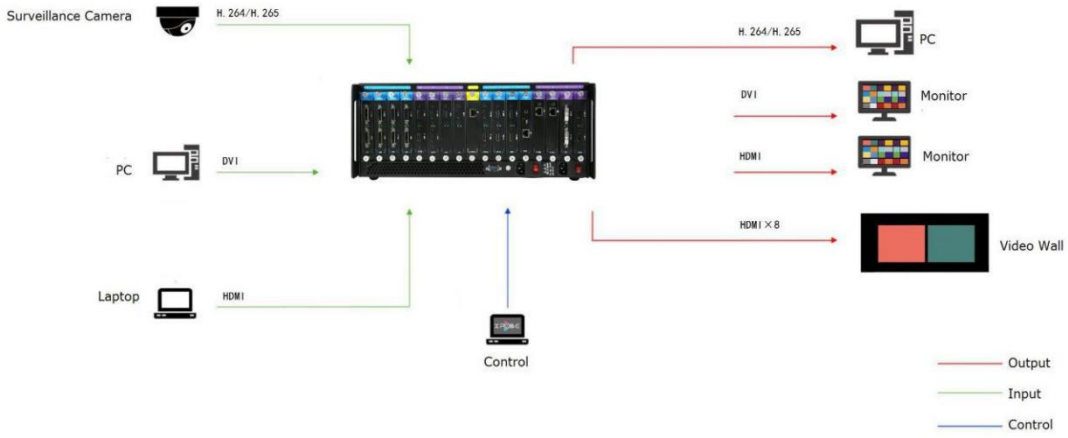
Anti-Static Bag

Note: AC Power Cable supplied as standard according to destination market.

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1.2 Product Overview

Q16 adopt modular design, supporting 24 layers on each output. Each layer supports for scaling, moving, crossing and overlying. It supports for 16 In 16 Out. Up to 128 IP inputs via H.265 decoding , resolution up to 1080P. It also support preview inputs, realtime streaming back, background picture import and OSD.



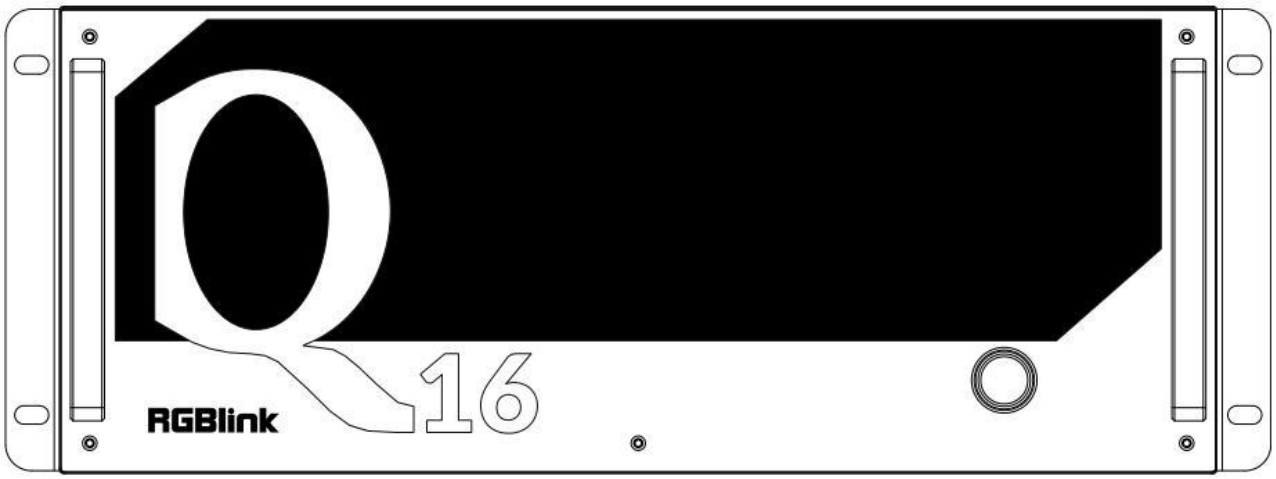
Q16 SYSTEM CONNECTION DIAGRAM

1.2.1 Key Features

- **Single port support up to 24 layers**
- **Each layer support for scaling, moving, crossing and overlying**
- **Support for 16 In 16 Out**
- **Up to 16 IP inputs via H.265 decoding , resolution up to 1080P**
- **Preview inputs**
- **Real-time streaming back**
- **Background picture import**
- **OSD**

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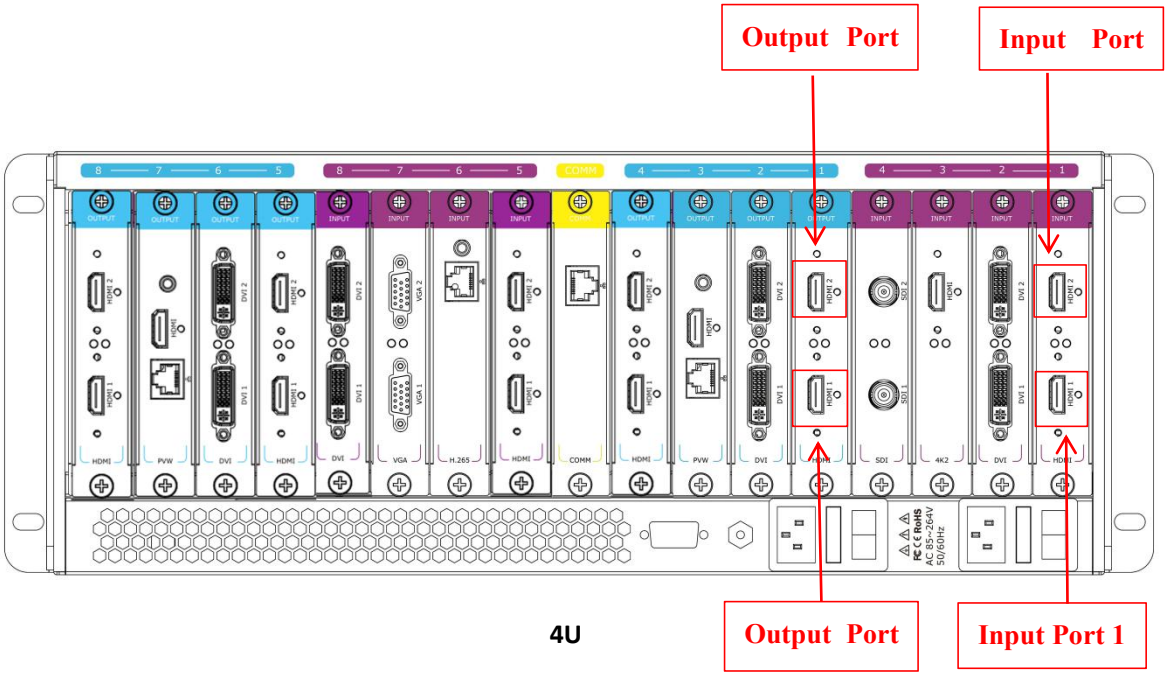
1.2.2 Front Panel



	Power Switch

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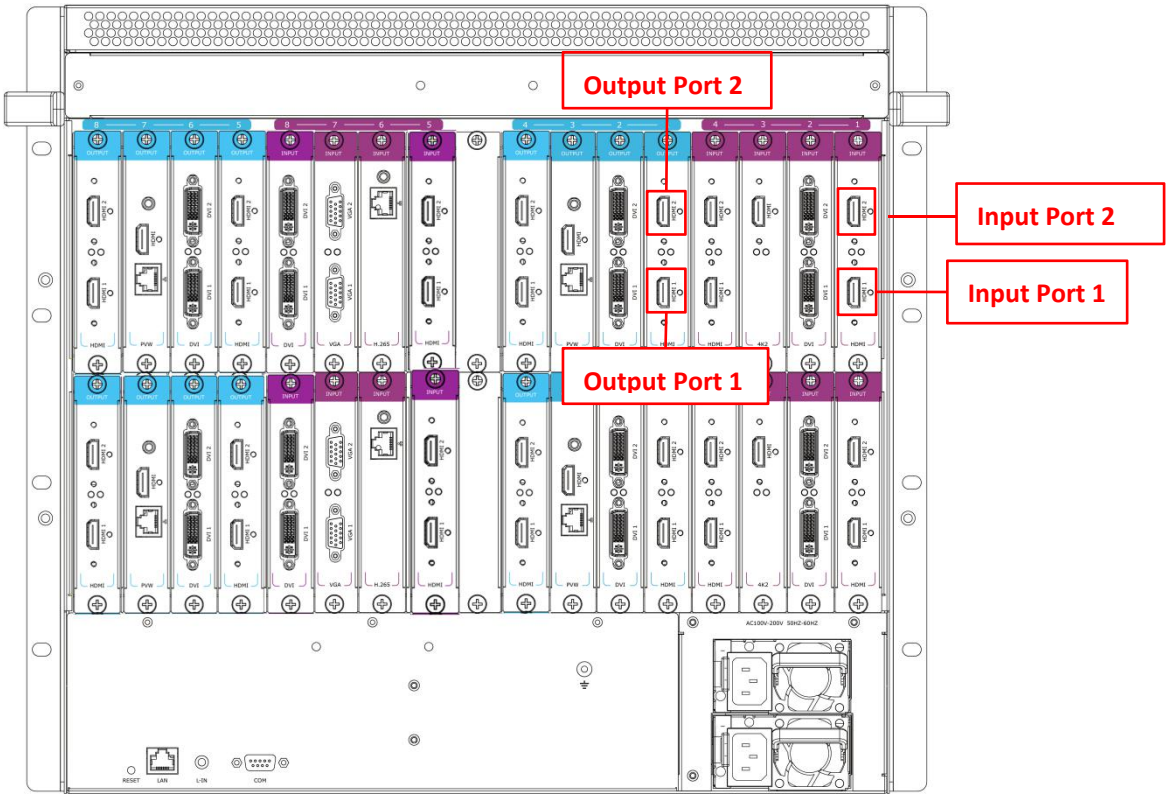
1.2.3 Rear Panel



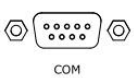
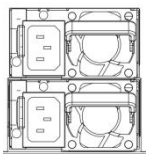
Purple Input Port 1-8	Input slots 1-8,supporting DVI,HDMI, H.265 modules The model index is counting from right to left,the port index is from bottom to top,as shown in the picture.		
Blue Output Port 1-16	Output Slots 1-8,supporting DVI,HDMI modules The model index is counting from right to left,the port index is from bottom to top,as shown in the picture.		
Yellow COMM	Communication board with LAN port, to connect router or computer to realize software control		RS232 serial port for Open API command
	Dual power switch		Ground wire screw

Note: purple tip indicates input, blue tip indicates output, yellow tip indicates communication.

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9U

Purple Input 1-32	Input slots 1-16,supporting DVI,HDMI, H.265 modules The model index is counting from right to left,the port index is from bottom to top,as shown in the picture.		
Blue Output 1-32	Output Slots 1-16,supporting DVI,HDMI modules The model index is counting from right to left,the port index is from bottom to top,as shown in the picture.		
Yellow COMM	Communication board with LAN and RS232 port,to connect router or computer to realize software control.		
	LAN port, connect router or computer to realize software control		RS232 serial port for Open API command
	Dual power switch		To avoid electrical shock, grounding the product before connecting to inputs and outputs

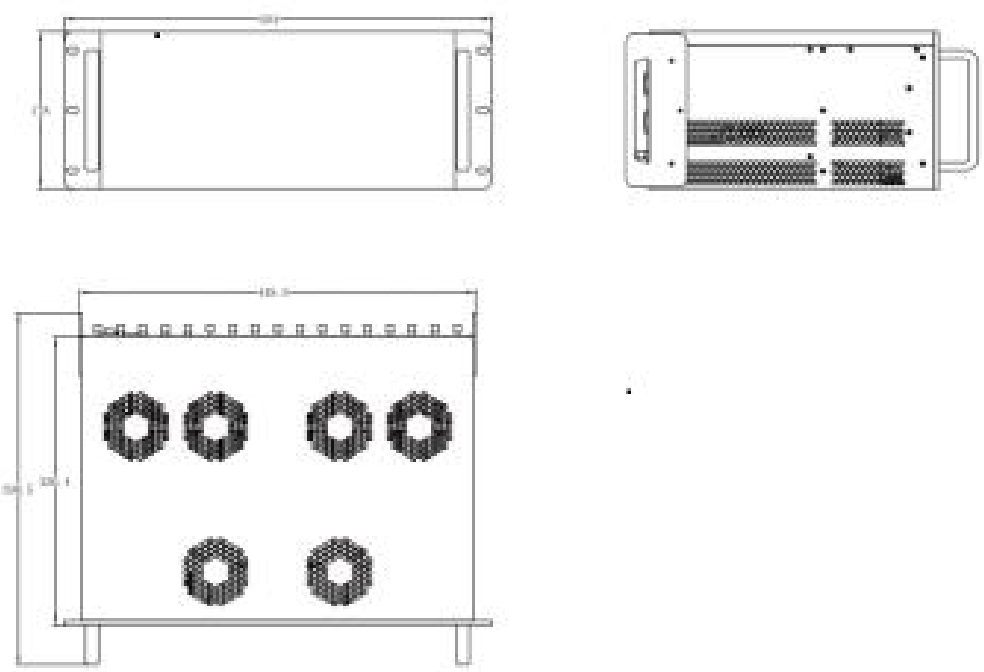
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1.2.4 Dimension

Q16-4U

Following is the dimension of Q16-4U for your reference:

484mm×398.5mm×178mm

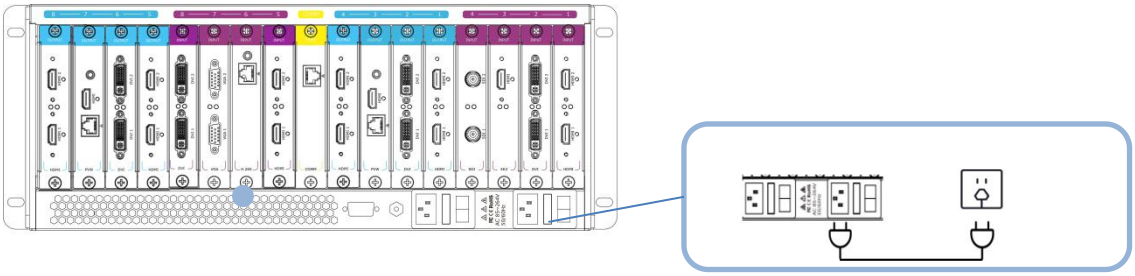


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Chapter 2 Install Your Product

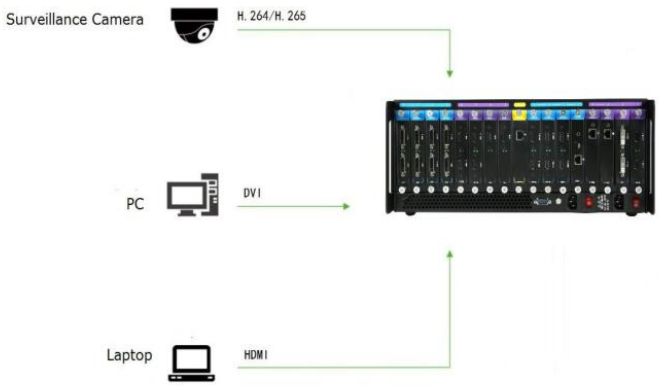
2.1 Plug in Power

Take Q16-4U as example



Connect Q16-4U with standard AC Power Cord.

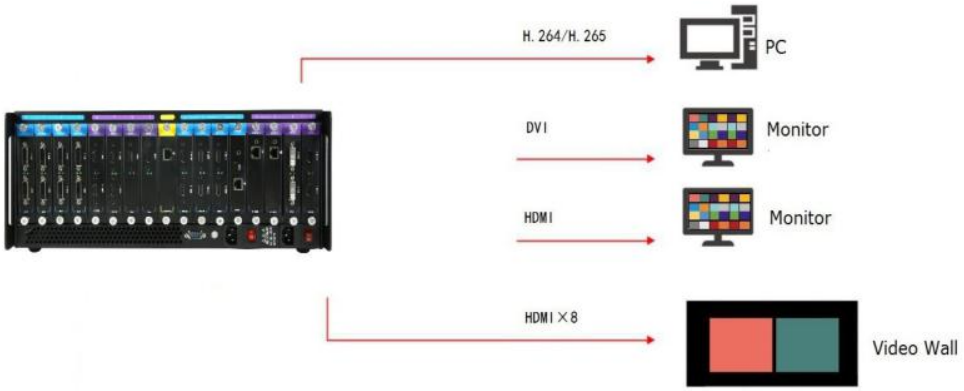
2.2 Connect Input Signal Source



Q16 series supports HDMI、DVI、H.265 and other optional input modules.
Connect Q16 with IP Camera, PC,laptop and other device as shown in the figure above.

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2.3 Connect Output Signal Source



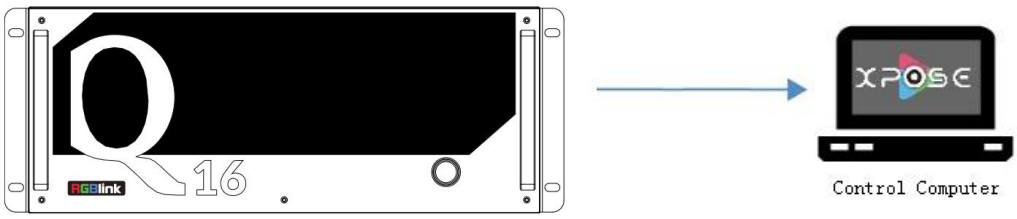
Q16 supports DVI、HDMI and other optional output modules.

Connect Q16 with monitors, PC and other device as shown in the figure above.

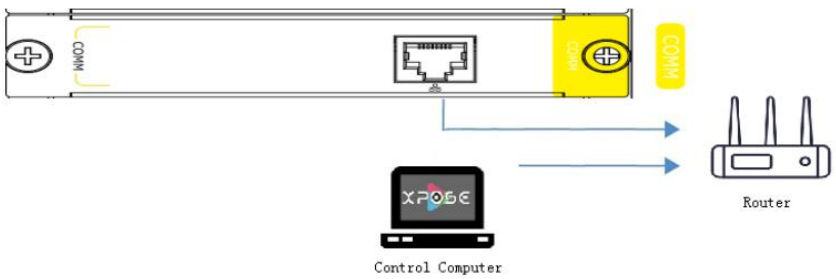
2.4 Connect Control Computer

Q16 is operated by XPOSE,so it is necessary to connect device with control computer.

Method 1： Direct Connection: Connect Q16 with computer via network cable as shown in the figure below.It is suitable for single user to control the device.



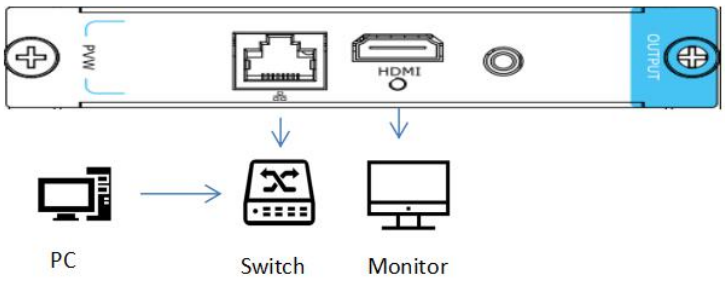
Method 2： Router Connection: Connect control computer and Q16 with Router as shown in the figure below.It supports simultaneous online operation by multiple users.



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2.5 Connect PVW Module

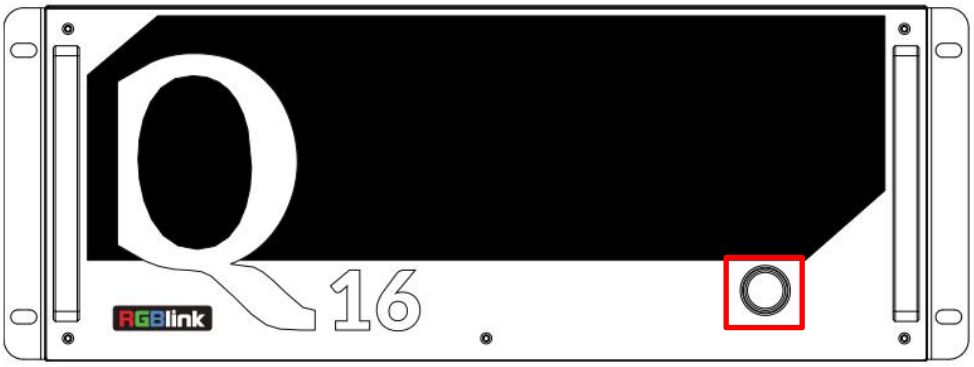
Q16 supports preview input source via control computer or output image via monitor.



LAN:preview input and output

HDMI monitor:preview input source

2.6 Turn on Your Q16



After connection,slightly press the power button in the front panel to turn on Q16.

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Chapter 3 Use Your Product

3.1 XPOSE 2.0 Installation

Note： The following XPOSE operation takes Q16-4 as an example, and other U models operate the same except for the difference of interface.

Environment Requirements:

Window

Processor: 1 GHz or above 32 bit or 64 bit processor

Memory: 4 GB or more

Graphics: Support Direct X9 128M or above (open AERO effect)

Hard disk space: Above 16G (primary partitions, NTFS format)

Monitor：Resolution must be 1920×1080 pixel or above(it can not display normally if the resolution is lower than 1920×1080)

Operating system: Windows 7 or above (full version, not Ghost version or compact version)

CPU:i5 and above

Mac

Monitor:Resolution must be 1680×1050 pixel or above(t can not display normally if the resolution is lower than 1680×1050)

CPU:i5 and above

1. Double click 

,it will pop-up the installer language box, select the language, for example, select “English”, and click “OK” to confirm.



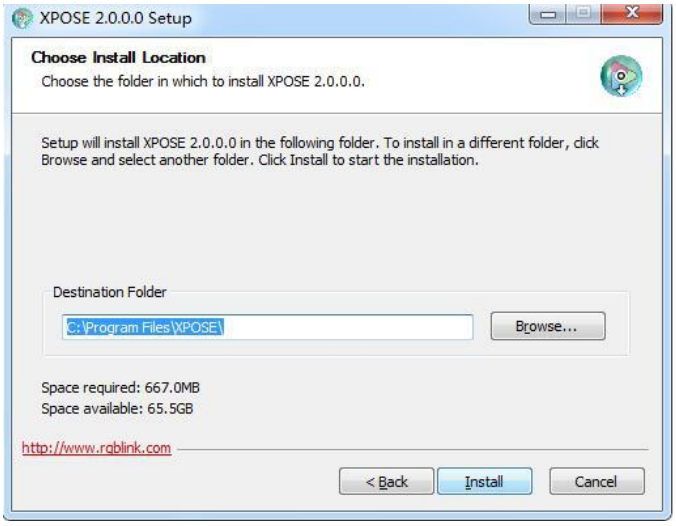
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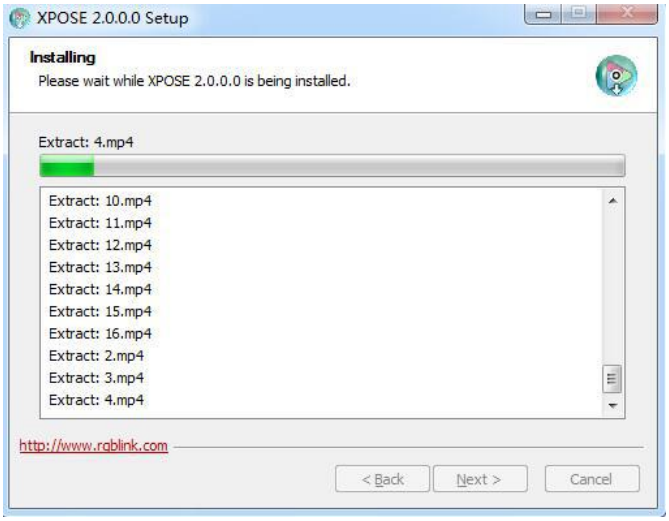
2. Click “Next” to install



3. Click “Browse...” to select the XPOSE software install location

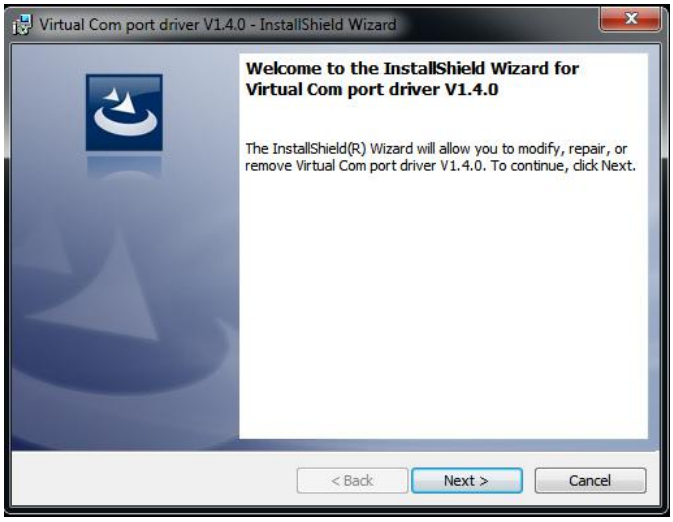
Click “Install”



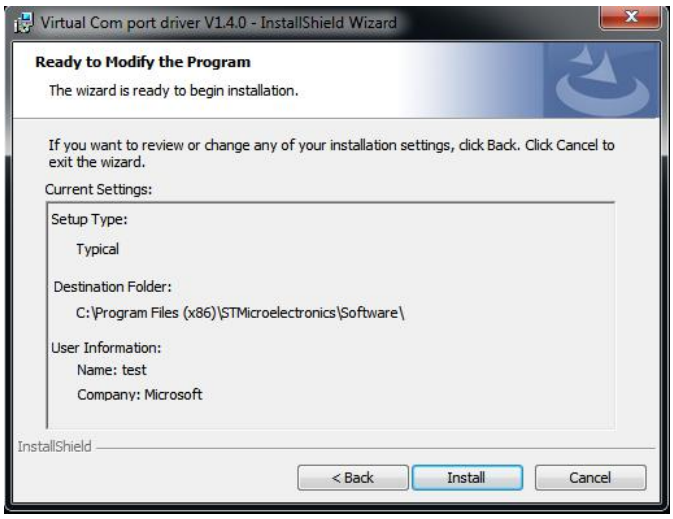


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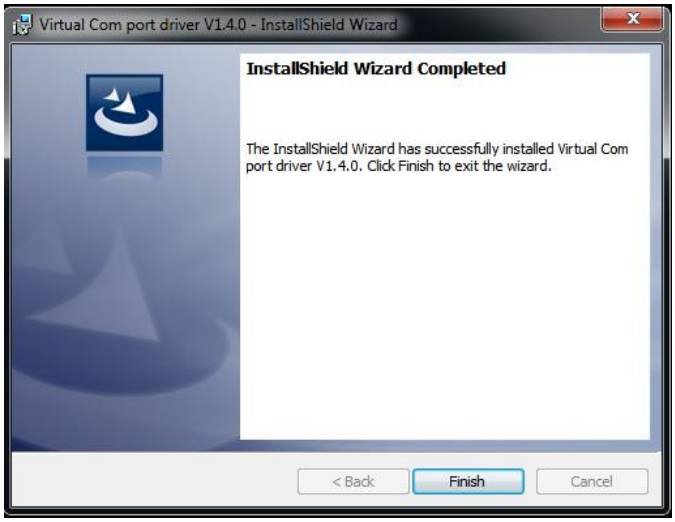
4. During installation, it will pop up the window of Install Shield Wizard for Virtual Com port.
If user install the XPOSE software for the first time, click “Next”



5. Then click “Install", as shown in the figure



6. Click “Finish” and complete the installation, as shown in the figure



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7. Click “Finish” and is ready to run the XPOSE software



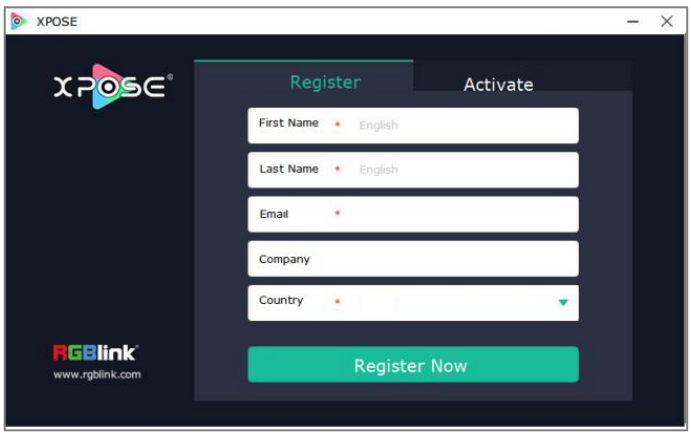
3.2 XPOSE Operation

3.2.1 Login in XPOSE

Double click this icon 

,and enter the log on interface as follow

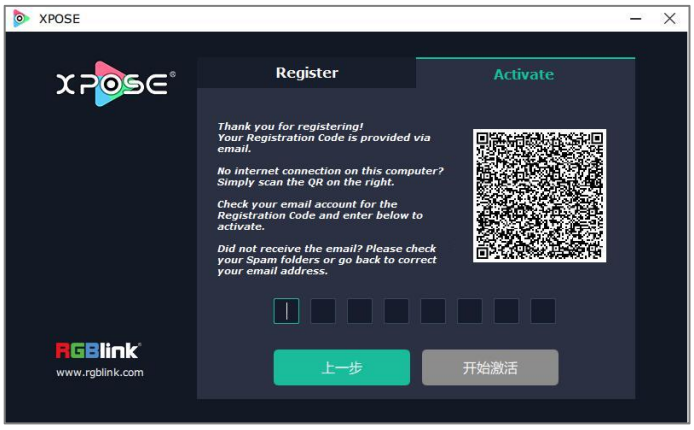
The initial language of XPOSE 2.0 is self adjusted based on the operation system language of the computer. Click Register and fill in the blank with first name, last name, email, company and country and then click Register Now.



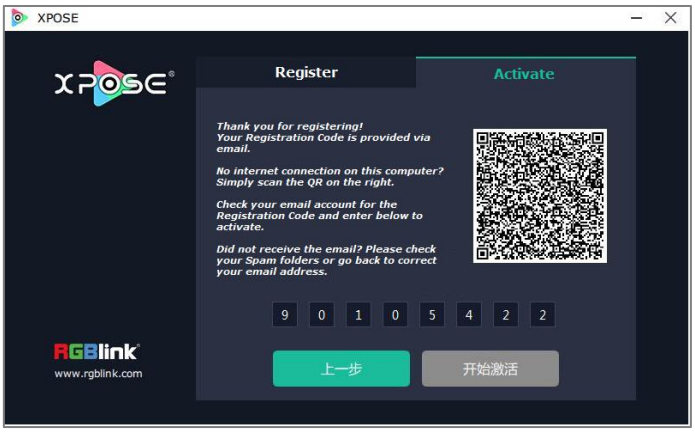
Please note that the email shall be invalid and complete otherwise Registration&Activation code cannot be received.

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Click **Activate** and scan the QR code
an email from **RGBlink Registrations** will be sent to the **Register** email address.
Type in the activate code and confirm.

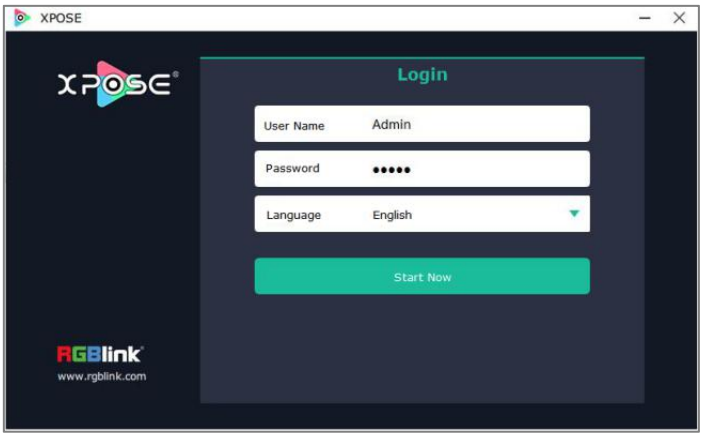


Type in the activate code and **confirm**.

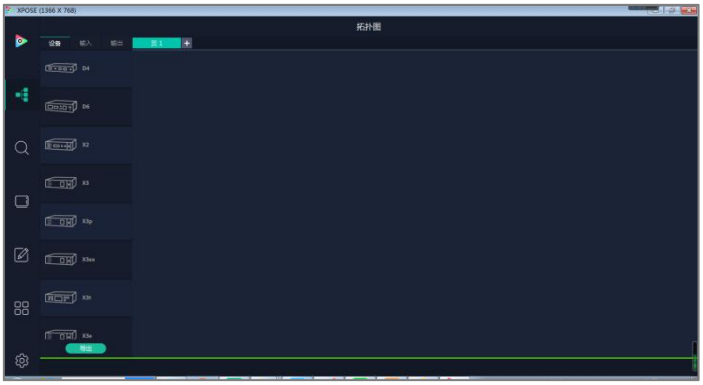


Keep the user name as “Admin” and password blank and then click **Start Now.**

If exact Name and Password are needed, users can set up them in Authorization Setting under System Setting.



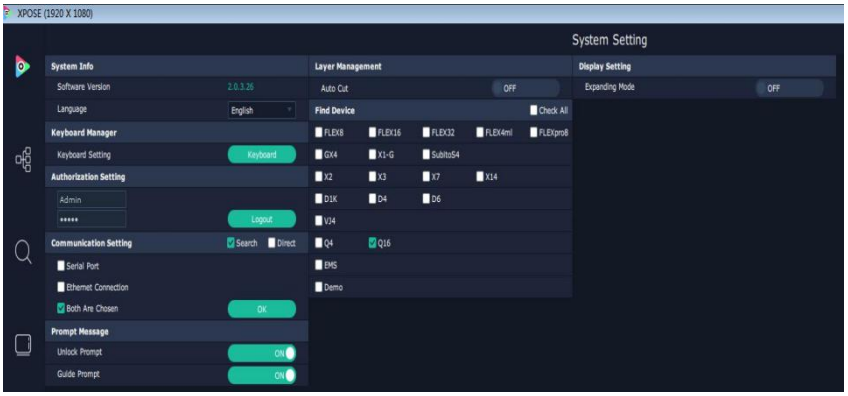
After login, users can find the management including:Topology Diagram,Search,Display System,Layer Management, Preset Management, Keyboard Settings. The details of each hierarchy will be described hereafter.



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3.2.2 System Setting

New version of XPOSE 2.0 is blank default in Find Device. Users are supposed to choose the device needed in System Setting.



Find Device: Click icon  and enter the interface, choose the device Q16 in Find Device. Before system setting, make sure physical connection of Q16 and XPOSE 2.0 is done, either by connecting Q16 to the PC which run XPOSE 2.0 or connect Q16 to router which offer same network as the PC in

System Info: show the current software version

Language: Chinese, English and Russian

Communication Setting: Search or Direct, Search default. Serial port, Ethernet Communication, Both are Choose. Both are Chosen default.

Layer Management: Auto Cut On or Off

Prompt Message: Warning or Notice will show in yellow when Unlock Prompt and Guide Prompt are on.

Expanding Mode: If there is expanded display connected, turn on expanding mode, XPOSE interface will show on the display

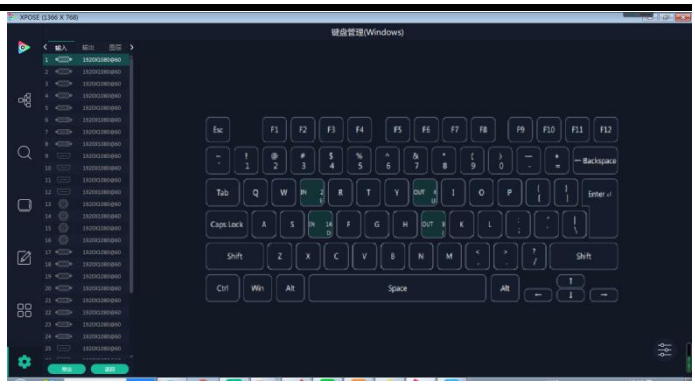
Keyboard Management: click <**keyboard**> it will redirected to keyboard setting window.

Keyboard setting is designed to fit for different operation system such as Windows and Mac. Users can set short cut keys.



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Drag Input, Output, Layer and Preset from the list to the keys you desired as shown in the figure:



Please note the keyboard area where allows to set short cut keys.

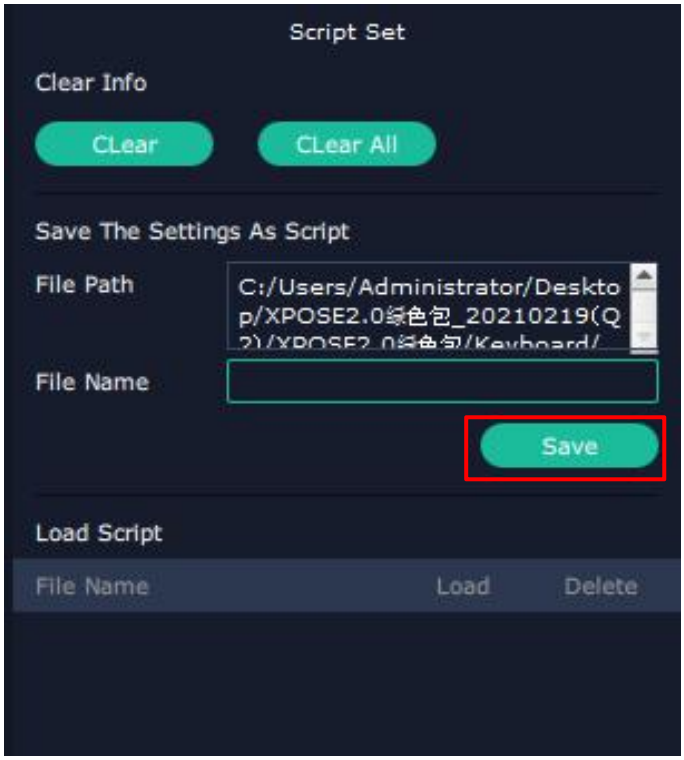


If the setting goes wrong or no need for short cut keys any more, click  to clear some keys or clear all.

Clear: is to clear some keys, the keys need to selected before hand.

Clear all: is to remove all already set short cut keys.

Users can also save the keyboard setting as script.



Scrip Set

File Path: Save the current keyboard Settings in the script to the local path
File Name: script file name
Load Script: Load/Delete

Click Return to back to <system setting>



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Communication Setting： The default is **<search>**, if it is< direct>,users need to type the corresponding IP address

Serial Port： search only those connect via serial port.

Ethernet Connection： search only those connect via ethernet.

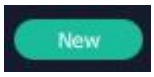
Both Are Chosen：click both, both connections change synchronously.



Prompt Message: open and close unlock prompt and guide prompt.

Authorization Setting

Click  to open up the authorization entry.

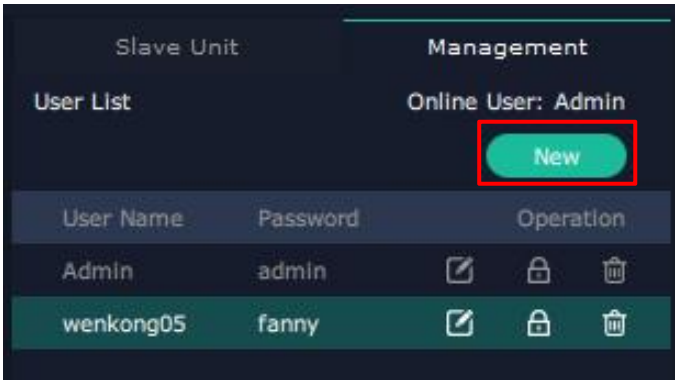


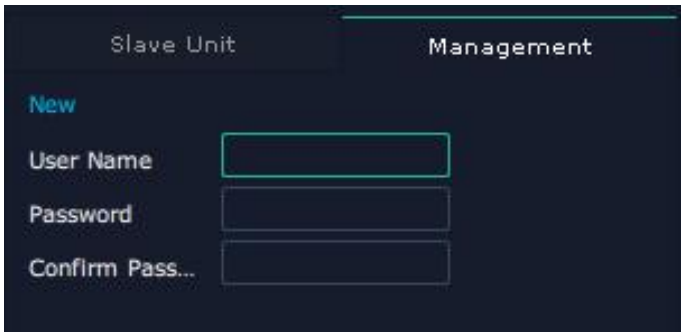
New:Add new USER NAME and PASSWORD

**Edit:** Edit user name and password already built.

**Delete:** Delete user name and password already built.

**Permission:** functions on this XPOSE 2.0 on this computer that the users are allowed to operate.
Click the green block to remove the function not to be permitted.

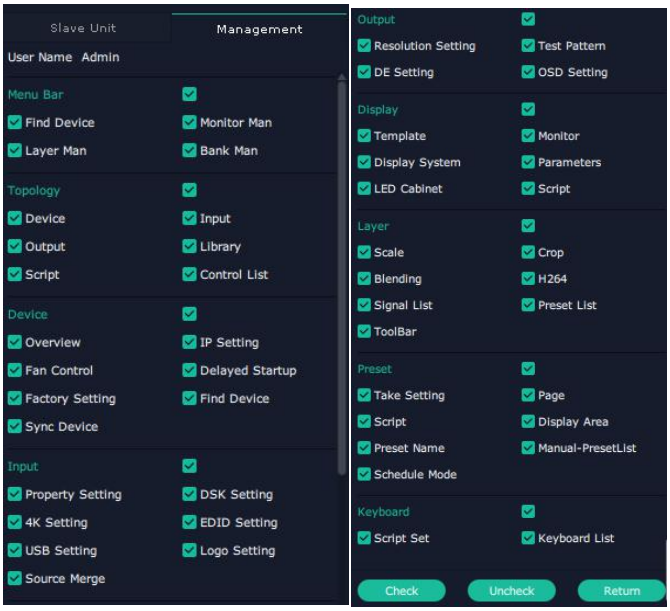




Click "**new**",type in User Name and Password.

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Authorization Set: click on the function that allows other users to take action



Slave Unit:

Click **Slave Unit**



Slave Unit is to control multiple devices simultaneously, which are connected to same network. ("In the same network" means that the the third section in the IP address digits are the same) XPOSE do operation on one device, same operation synchronized to other devices. For example, there is another devices linked to the same network, one with IP IP192.168.0.45



If users need to back up operation from current running device to this device slave unit shall be used. First fill in the quantity of to be linked devices, click **Set Numbers**, **Index**, **Device IP** and **State** will come up. Choose the IP address of the other device from drop down list, e.g IP192.168.0.45 and slide to ON, the red dot behind turns to green indicating that the device has been connected.

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3.2.3 Topology Diagram

XPOSE 2.0 offers the feature of making topology diagram which can assist users to import the actual input and output connection into XPOSE control. Q16 has not been imported to Topology Diagram yet but to unlock following settings dragging any device from the device list to the window can do.

3.2.4 Output|Input|Overview

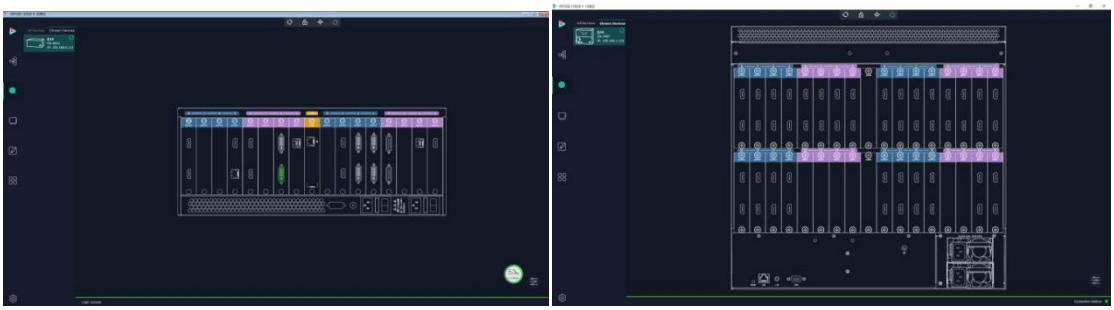
Device Connection

After the device is selected in Find Device under System Setting, the device can be searched on XPOSE 2.0.

Click the  and click  to check all available devices in the network.

Click  to choose the device and in Chosen Device click the device to obtain the control of this device.

Following is 4U and 9U model for your reference,and the operation takes 4U as an example.



4U 9U

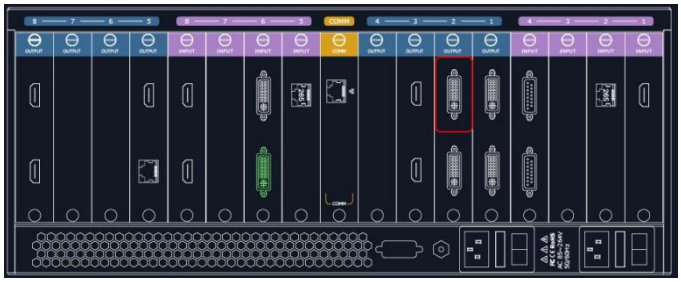
Note:  purple tip indicates input,  blue tip indicates output,  yellow tip indicates communication.

Output Setting

Click any output port, the board where the port locates is selected. Users can do settings to the port now.

A red rectangle flashes around the chosen port when it is clicked.

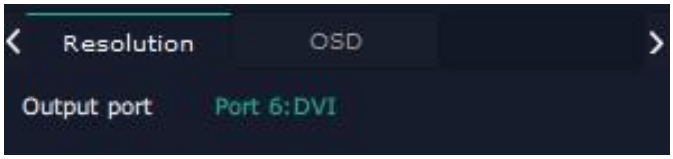
When a DVI or HDMI port is selected, users can do the subtitle setting.



Resolution

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Q16 doesn't support customizing output resolution.



OSD:



Operation Mode:

Single Output: means the OSD setting only take effect on the current output port.

Multiple Output: means the OSD setting take effect on the whole Display Area where current output port is.

Position:

Vertical Distance: the vertical distance between OSD and the top border of display.

Font Style:

Font: basically the fonts here are those in your computer.

Size:0~300 Pixels

Color:click the square behind to choose color

Background:

Transparent:0~255

Color:click the square behind to choose color

Scrolling:

Speed:Static, Slower, Slow, Fast,Faster

Direction:Left Scroll On Top, Left Scroll On Bottom,Roll Up

Input Text: OSD text.

Input Setting

Click any input port in purple area, the board where the port locates is selected. Users can do settings to the board now. A red rectangle flashes around the chosen port when it is clicked.

Different input modules port could have different input setting on Q16 subject to their features but generally there are such input settings as: Property Setting, EDID Setting.

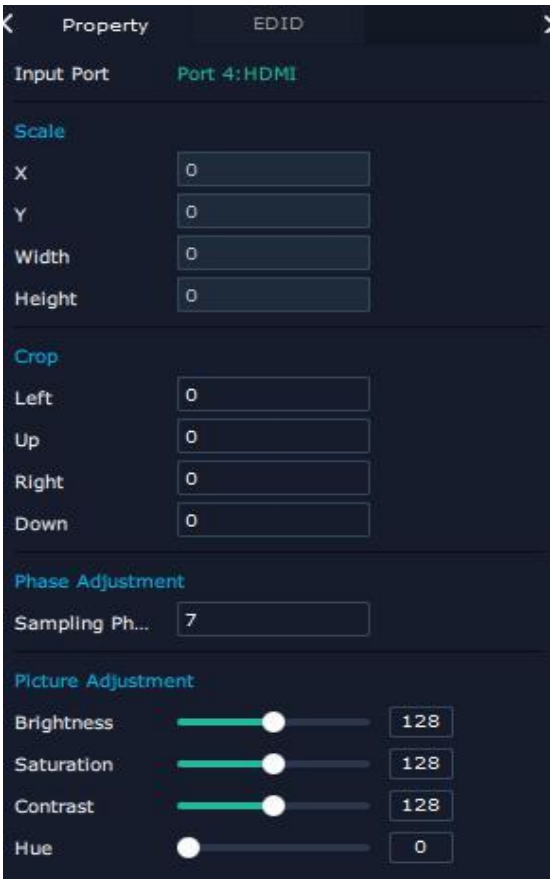
Here are figure listing the of input ports and their output setting supported.

Click  to open <**Property**>and<**EDID**>

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Property Setting

When HDMI 1.3 or DVI port is selected



Input Port: chosen port

Scale:

X/Y：Vertical and horizontal position

Width/Height：Vertical and horizontal size

Crop：

Left:crop left

Top:crop top

Width:horizontal size after crop

Height:vertical size after crop

Phase Adjustment:

Sampling Phase:0~31

Picture Adjustment:

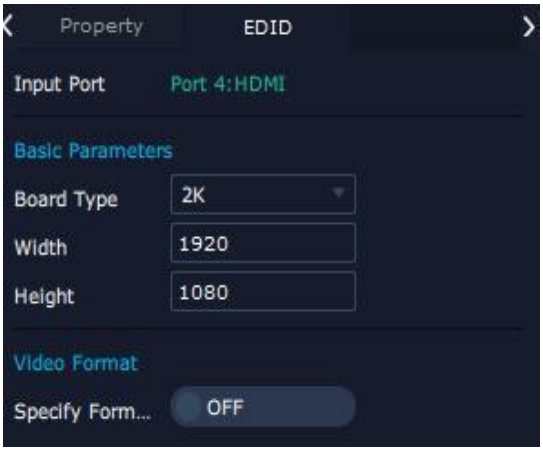
Brightness:0~255

Saturation:0~255

Contrast：0~255

Hue：0~255

EDID



Input Port: chosen port

Basic Parameters:

Board Type:4K or 2K

Width:default 1920 for 2K, 3840 for 4K

Height:default 1080 for 2K, 2160 for 4K

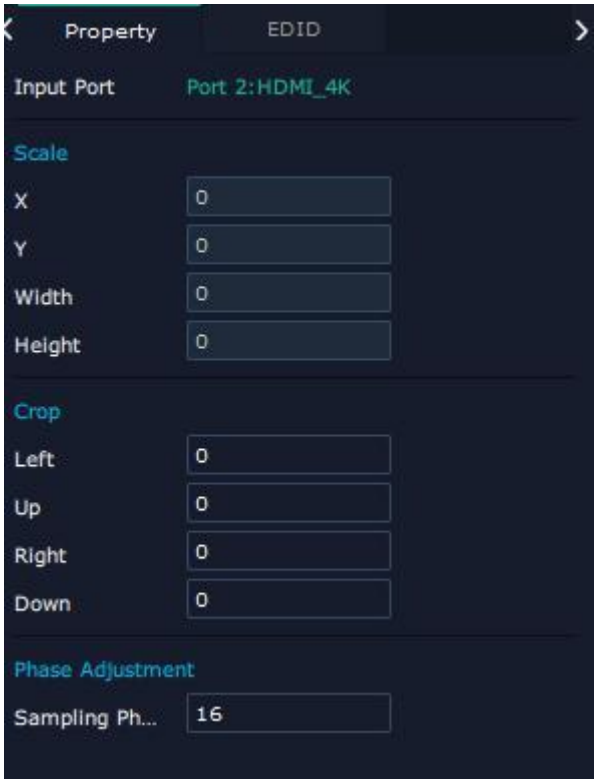
Video Format:

Specify Format: turn on and there is a resolution list to choose.

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Property Setting

When HDMI 1.4 port is selected



Input Port: chosen port

Scale:

X/Y： Vertical and horizontal position

Width/Height： Vertical and horizontal size

Crop：

Left:crop left

Top:crop top

Width:horizontal size after crop

Height:vertical size after crop

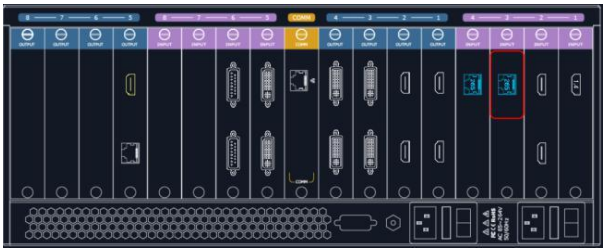
Phase Adjustment:

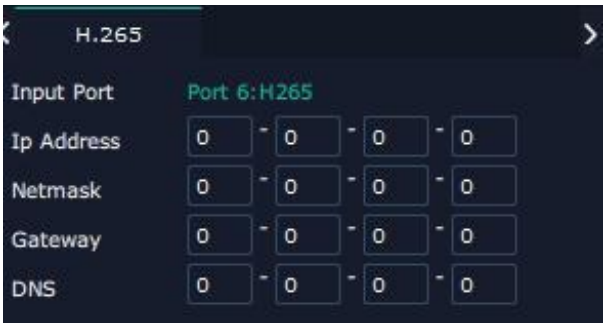
Sampling Phase:0~31

H.265 Setting

When there is H.265 input module installed on Q16, through the module, Q16 is able to search and take the video signal from webcam in the same local network.

To make sure H.265 module take effect, **IP setting** is required. IP of H.265 should **in the same network section**, for example:network IP is 168.192.0.1, IP of H.264 shall be 168.192.0.X (X≠1)





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Device Overview

Click Return 

, there are overview, IP, Fan Control, Factory Setting.



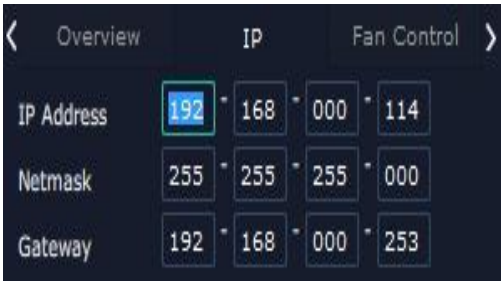
Overview:

Device Info： users can check version and MAC information

Input & Output Module Info : users can check current output module name and MCU version

IP: Show IP Address, Netmask, Gateway

IP default:192.168.1.200



Fan Control: Auto adjustment is not supporte.Fan Speed: 0-99



Factory Setting



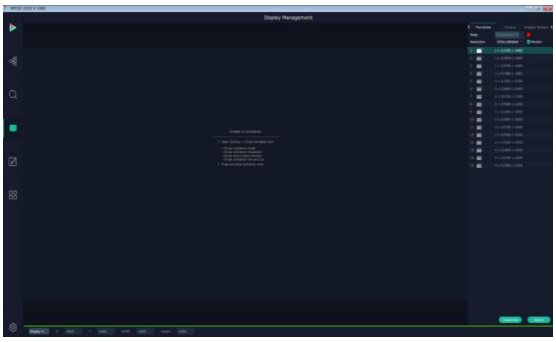
Note: IP default:192.168.0.100. After IP address is changed,re-plug the power and restart.

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3.2.5 Display Management

Display System is for users to set layout of outputs.


Click this icon first and then click enter the interface.



Container

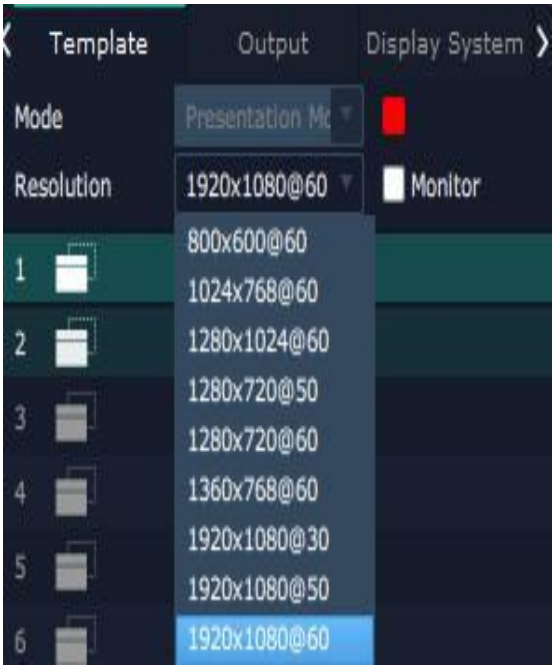
Container here means the Display Area, for example it could be a formed LED screen or an array of LCDs.



Template

There are **16** types of basic “Display Area” which is used to contain output interface,and could be regarded as layout of output.

Drag a template to create a container, in other word a display area.



Mode

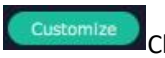
XPOSE 2.0 allows multiple modes running on one same interface, to differentiate each mode, different color is given to each mode based on different devices. At present, Q16 support only Presentation Mode

Resolution

Users can choose output resolution as shown in the figure.

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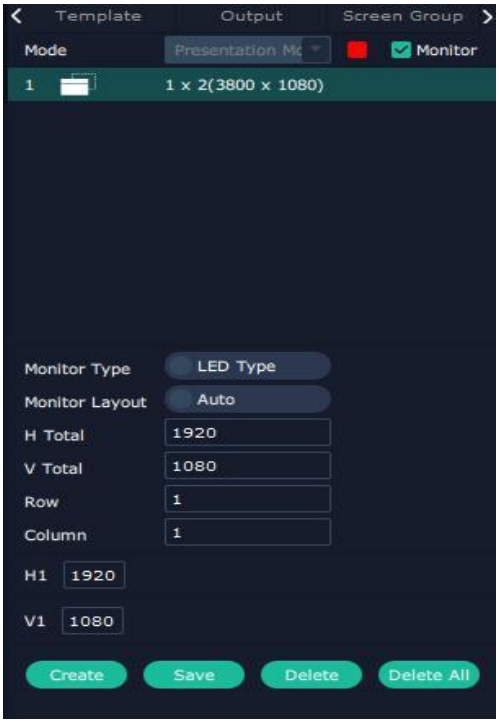
Customize Container



Click this icon at the bottom of template list.

Monitor Type:LED or LCD

Monitor Layout:Auto or Manual



1. Choose Led and Auto

Fill in H Total/V Total and Row/Column, then click 

,a customized container is created.

If this container need to be saved, click 

.

2. Choose LCD and Auto

There are Top Border, Bottom Border, Left Border, Right Border available to adjust the customized container.



3. Choose Manual

There will be a simulated display area showing up at the bottom of the column. After fill in the H,V total and Row Column, drag the available monitor to the display area.



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Output

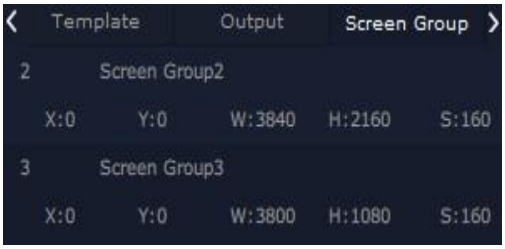
Show all the output ports on the device. Once the monitor is dragged into container meaning this output is used and the output port gets dark.



Screen Group

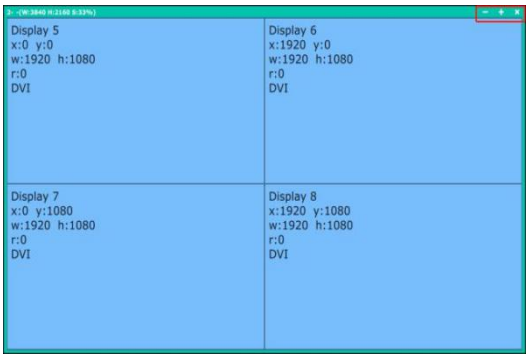
Q16 support to manage 4 screen groups at most on XPOSE.

It allows users to edit the name of the screen group that has been created just click the .



Adjust Screen Group window on XPOSE interface

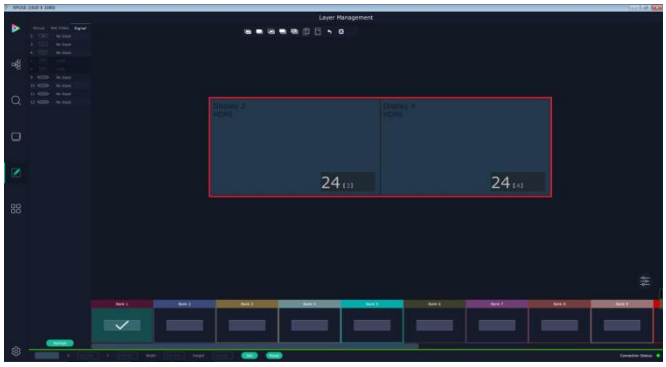
Drag the boarder of the display area to move its place in the interface. Click  icon to shrink,Click  to enlarge the proportion of display area on interface. Long pressing  the to cancel the screen group..



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3.2.6 Layer Management

Layer Management is designed to manage the layer of each monitor.Click this icon  to enter the interface:



Group

When enter Layer Management interface, the window is blank. The screen group created in Display System shall be dragged from the Group.

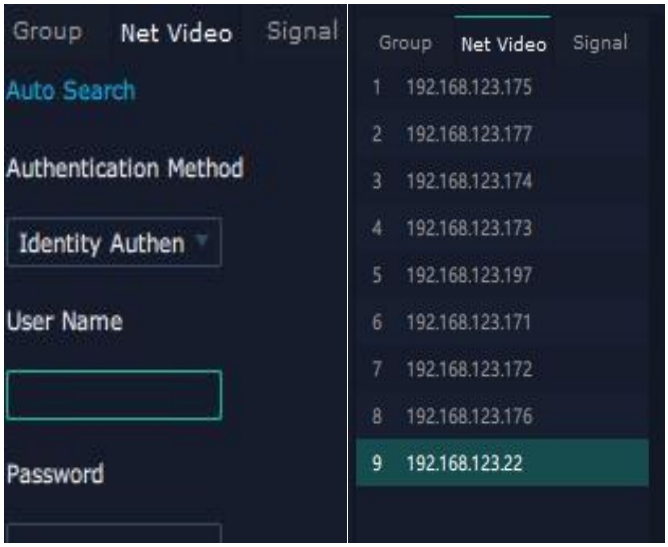


Signal

Signal list, showing all input signals and resolutions currently. Drag the signal to the display.

Net Video

If there is H.265 input module installed on Q16 and connecting to local network where there are webcam source availalbe. Click “Search”, there is Authenticafication Method required. Choose Anonymous Access, the webcams without user name and passoword could be found. Choose Indentity Authentification User Name and Password are required, for example fill in the User Name and Password with “admin”, those webcams with same user name and password can be found and listed.



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If Auto Search cannot find the desired webcam,users can manually add the webcam by filling in
Name(usually IP address)
Transport Mode (RTP/UTP by default)
Main Media Stream URL
Main Width
Main Height
Sub Media Stream URL
Sub Width
Sub Height



Save to Bank Automatically

Choose bank first and then drag the signal to display. Chose another bank, previous bank can be automaticall saved.

Layer Numbers

Numbers in the corner is to show how many layers at present allowed to put in the output.



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Layer Adjustment

There are two ways to adjust layer.

1.Use the bar under the interface

Choose one layer and the bar shows its signal source, type in position and size.click Set to confirm.



2.Layer Scale

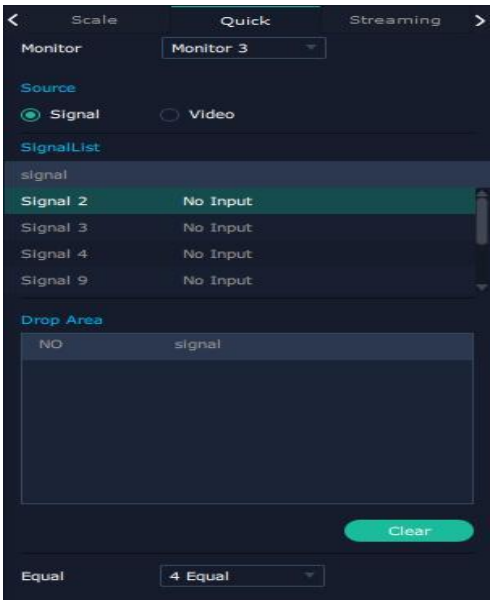
Choose one layer needed to be adjusted,and type in its position and size.



 this icon means data related, when width is changed, height will be changed as same proportion.

 this icon means data not related, width and height need to be filled respectively.

Quick



For quick layer layout

Monitor：Choose the monitor to do quick layout. Choose single current monitor or choose ALL.

Choose All, the quick layout setting will take effect on the whole screen group.

Source：Choose Signal or Video

Signal is from those HDMI, DVI, VGA input module

Video is from webcam source.

Drop Area

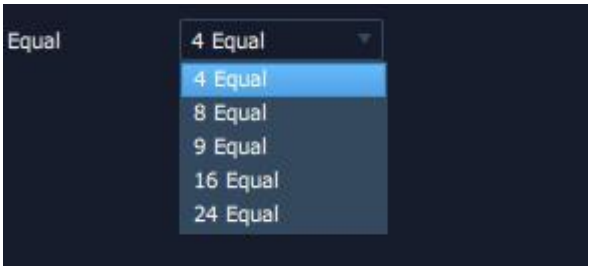
drag signal or video from above signal list or video list to drop area. Those signal or video will be equally placed on the monitor in order.

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Equal

4 Equal,8 Equal,9 Equal,16 Equal,24 Equal.

Equal here means Equal sized layer



I.e.: Monitor-ALL,Source-Signal,Drop Area- 2,3,4,9, Equal-8,as following:



Streaming

Works when there is H.264 streaming module installed on Q16.

Module Index: H264

Image Quality: Smooth Hi-Q,Normal, we suggest Smooth

Layer Preview: preview the layer when signal is drag into monitor.

Input Preview:preview input in the signal list

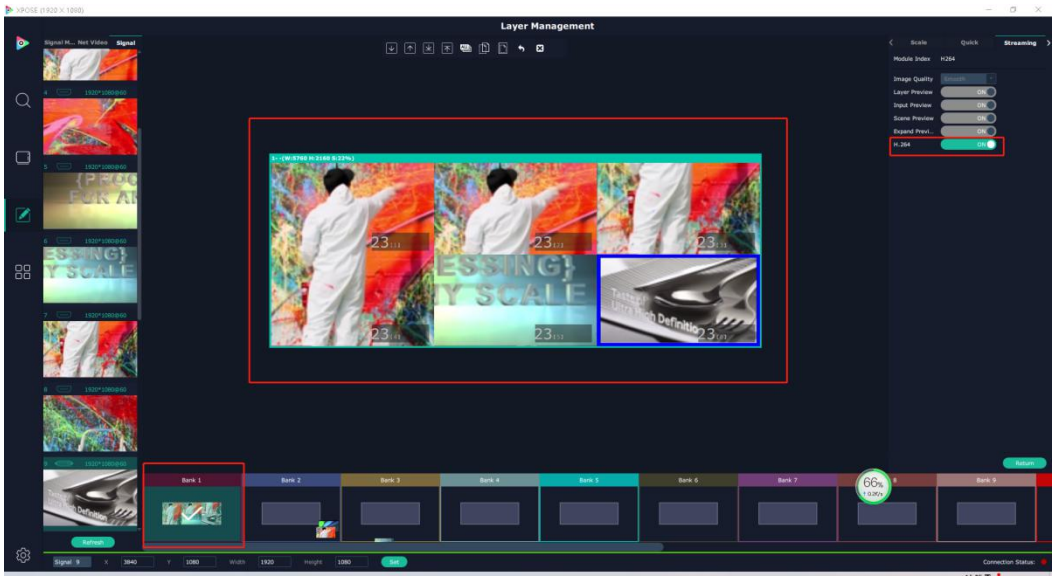
Scene Preview:preview each scene in the BANK

Expand Preview: preview 16 input on expanded display

H.264:the master switch of all preview, **turn on** after desired preview is on (Refer to the picture below).



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Background

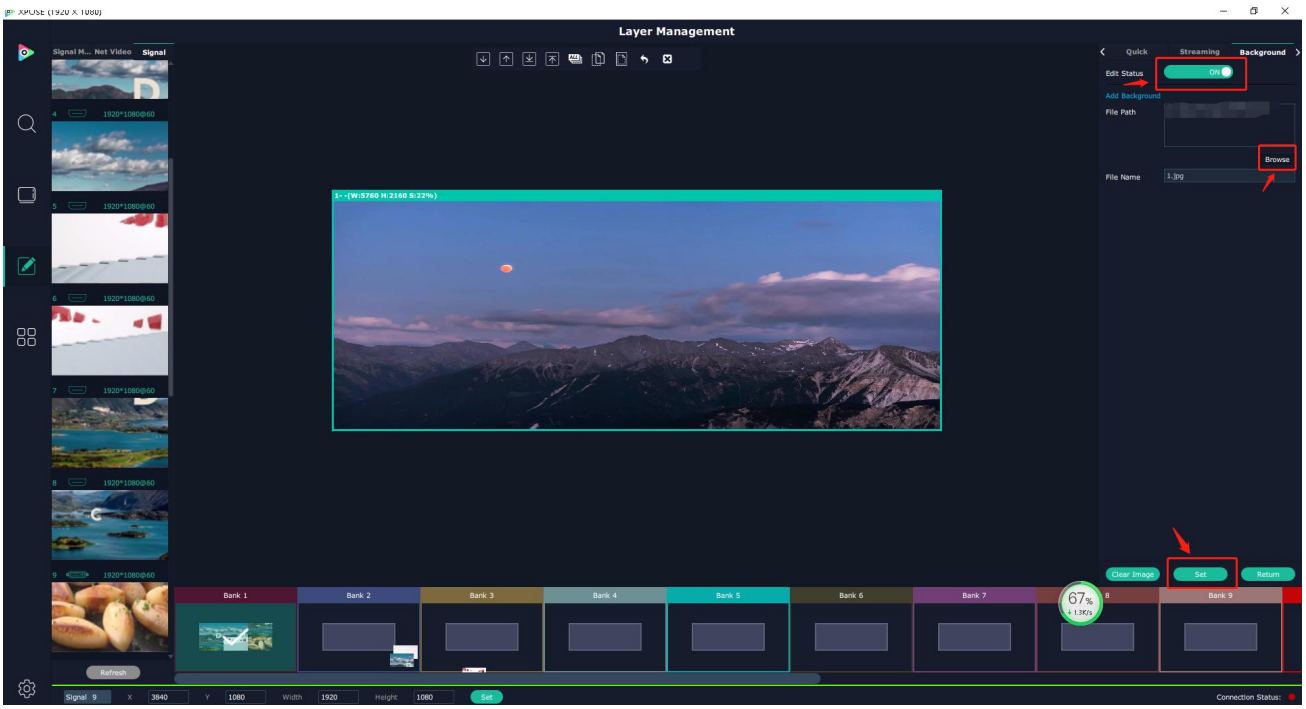
Edit Status

Turn it **on**, and ADD Background picture can be done.

Click **Browse** to open up local file and upload a picture as background. Background does not occupy layer.

Background can be adjusted in scene group window.

After Background adjustment is done, click **Set**.

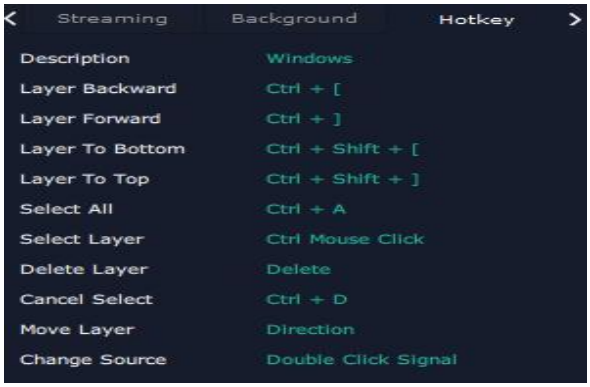


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Hotkey

short cut keys on keyboard to do layer management.

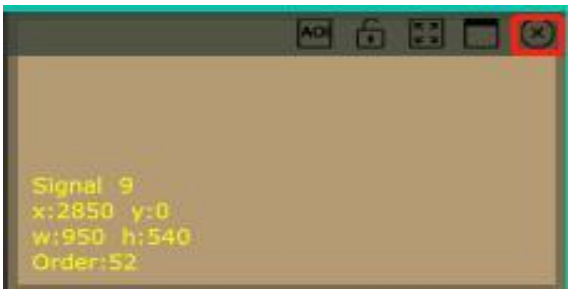


Layer Movement

Place the cursor on the layer, it turns to a palm icon  , press the left of mouse, the icon turns to a fist  , moving the mouse can drag the layer.

Layer Remove

Click the cross on the top right of the layer to remove the layer if needed.



Layer Max

Click this icon , to cover up all monitors in the same sceen group with the one signal.

Layer Copy

Press Ctrl and mouse left at the same time, move the mouse the layer selected can be copied and place in any monitor in the same Display Area but it doesn't work when cross over display area.

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Other Operation on Layer


Use the tools bar on top of window to do such operations.

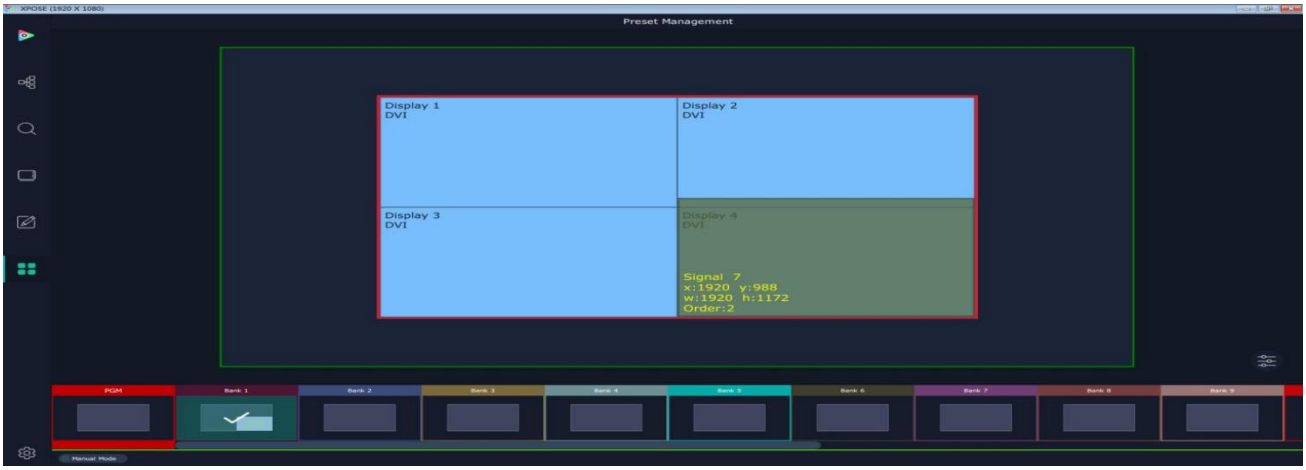
	Layer Backward		Layer to Top		Paste Selected
	Layer Forward		Select All		Cancel Selected
	Layer to Bottom		Copy Selected		Delete Selected

3.2.7 Preset Management


Preset Management is designed to switch bank (scene setting done in last step).

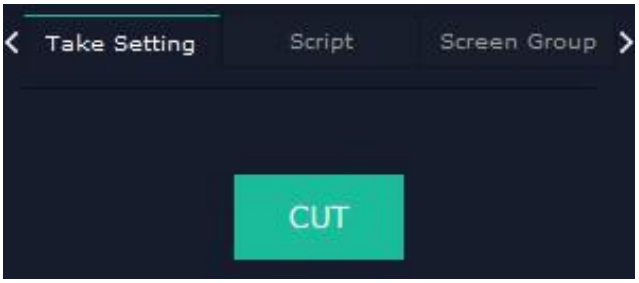
Preset Management Mode:

1. Manual Mode 2. Schedule Mode



Manual Mode

Switch Manual Mode or Schedule Module by the bar in the left bottom corner of the window.

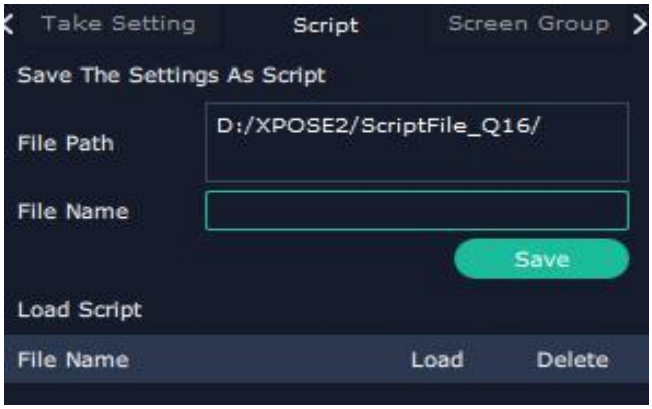


Cut

Cut, switch from PST to PGM immediately

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Save Script and Load



Save Script:

Click 

,fill in the blank with the name of setting and Save

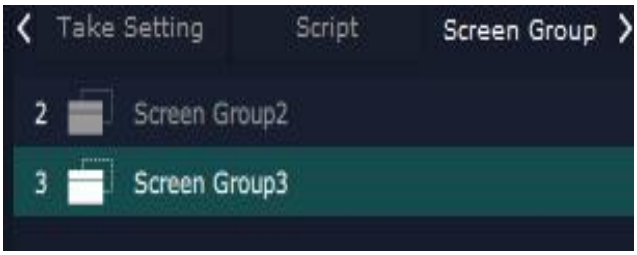
Load and Delete Script:

After the script is saved, the bank name will appear in the load list.

Select the file and click Load:

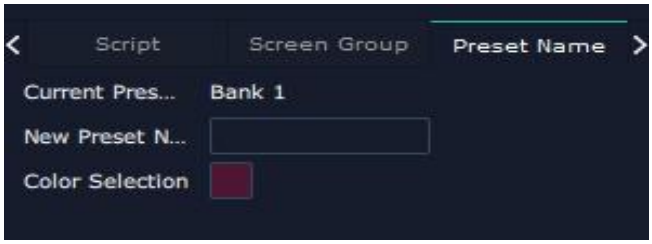
Select the file and click Delete, the chose file can be deleted from list.

Screen Group



Choose the Screen Group for Preset Management.

Preset Name



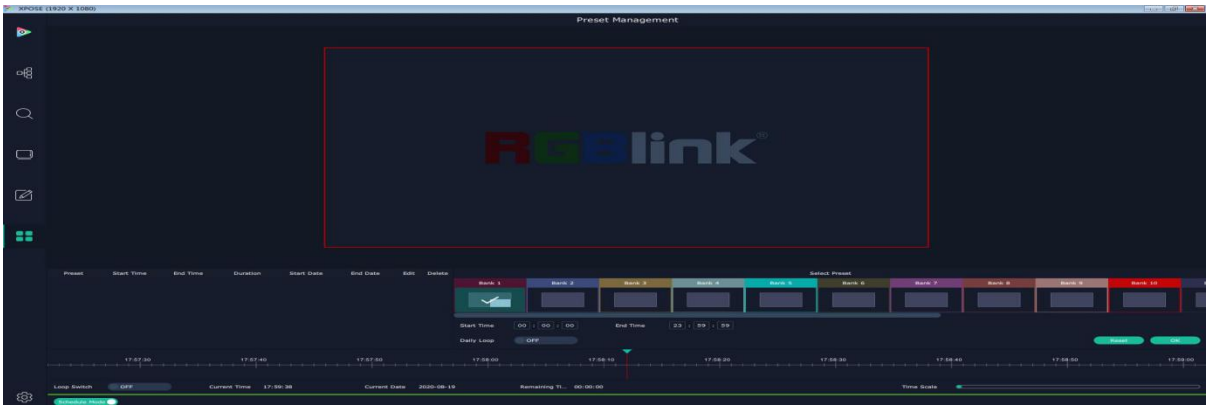
Select a bank and click Preset Name,fill in the blank after New Preset Name to rename a Preset (Bank)

Click the color block after Color Selection and choose a new color for the boarder of chosen bank.

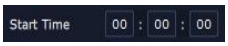
Schedule Mode

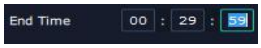
This mode is designed to set auto bank (scene/preset) switch.

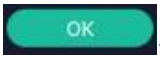
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Select the bank that need to be looped.

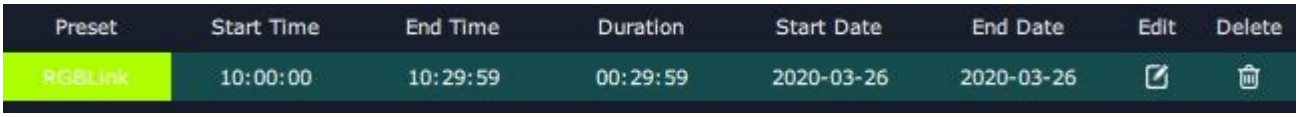
Set **Start Time** 

and **End Time** 

and press **OK** 

to confirm.

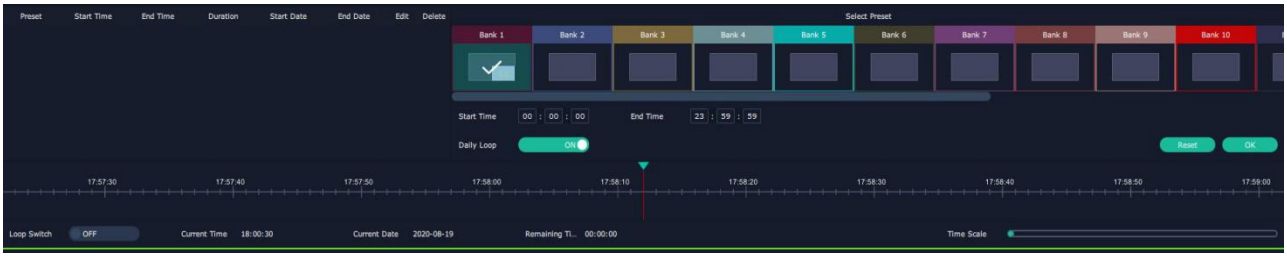
The Preset can be added into the loop list after confirm.



 click this icon to edit Start Time and End Time if needed.

 Click this icon to delete this preset if it is not needed.

Turn on Daily Loop and Loop Switch



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Chapter 4 Order Code

4.1 Product Code

711-0016-00-0	**Q16-4U**
711-0032-00-0	**Q16-9U**

4.2 Module Code

791-0016-01-0	**Single HDMI 1.4 Input Module**
791-0016-02-0	**Dual HDMI1.3 Input Module**
791-0016-04-0	**Dual VGA Input Module**
791-0016-05-0	**Dual DVI Input Module**
791-0016-07-0	**IP Streaming Input Module**
791-0016-21-0	**DVI Output Module**
791-0016-22-0	**HDMI 1.3 Output Module**
791-0016-24-0	**H.265 Streaming Preview Module**

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Chapter 5 Support

5.1 Contact us

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Chapter 6 Appendix

6.1 Specification

Connectors	Input	*support up to 16 inputs*		
		Select from	DVI Module	2×DVI-D (Compatible with HDMI)
			VGA Module	2×DB15
			HDMI 1.3 Module	2×HDMI-A
			HDMI 1.4 Module	1×HDMI-A
			H.265 Streaming Module	1×RJ45
	Output	*support up to 16 outputs*		
		Select from	DVI Module	2×DVI-I
			HDMI1.3 Module	2×HDMI-A
	PVW		H.265	1×HDMI-A | 1×RJ 45
	Communication		LAN	1×RJ45
Performance	Input Resolutions	DVI		
		SMPTE	720p@59.94/60 | 1080i@50/59.94/60 | 1080p@50/59.94/60	
		VESA	1024×768@60 | 1280×1024@60 | 1600×1200@60 | 1920×1080@60	
		VGA		
		VESA	800×600@60 | 1024×768@60 | 1280×1024@60 | 1280×720@60 | 1440×900@60	
		HDMI		
		SMPTE	720p@59.94/60 | 1080i@50/59.94/60 | 1080p@50/59.94/60 | 2160p@30	
		VESA	1024×768@60 | 1280×1024@60 | 1440×900@60 | 1920×1080@60 | 3840×2160@30	
		H.264/H.265		
			176×144 | 240×180 | 320×180 | 320×240 | 320×256 | 352×228 | 352×480 | 400×224 | 400×320 | 480×270 |480×272 | 480×320 | 480×360 | 480×480 | 544×480 | 608×448 | 640 × 360 | 640×480 | 704×576 | 720×404 | 720×480 | 720×540 | 720×576 | 850×480 | 1024×576 | 1280×720 | 1680×1056 | 1920×1080	
	Output Resolutions	DVI | HDMI		
		SMPTE	720p@50/60 | 1080p@25/30/50/60	
		VESA	800×600@60 |1024×768@60 | 1280×1024@60 | 1400×1050@60 | 1360×768@60 | 1920×1080@60	
	Supported Standard	H.265	ITU-T H.265/ ISO/IEC 23008-2	
		HDMI	1.4	
		DVI	1.0	
Power	Input Voltage	100V-240V 50/60-Hz auto adjusting		
	Max Power	250W		
Enviroment	Temperature	-30℃~50℃		
	Humidity	10%~85%		
Physical	Weight	Net	12.1kg	
		Packaged	15.1kg	
	Dimension	Net	484mm×398.5mm×178mm	
		Packaged	645mm×525mm×295mm	

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6.2 Terms & Definitions

●**RCA:** Connector used primarily in consumer AV equipment for both audio and video. The RCA connector was developed by the Radio Corporation of America.

●**BNC:** Stands for Bayonet Neill-Concelman. A cable connector used extensively in television (named for its inventors). A cylindrical bayonet connector that operates with a twist-locking motion .

●**CVBS:** CVBS or Composite video, is an analog video signal without audio. Most commonly CVBS is used for transmission of standard definition signals. In consumer applications the connector is typically RCA type, while in professional applications the connector is BNC type.

●**YPbPr:** Used to describe the colour space for progressive-scan. Otherwise known as component video.

●**VGA:** Video Graphics Array. VGA is an analog signal typically used on earlier computers. The signal is non-interlaced in modes 1, 2, and 3 and interlaced when using in mode.

●**DVI:** Digital Visual Interface. The digital video connectivity standard that was developed by DDWG (Digital Display Work Group). This connection standard offers two different connectors: one with 24 pins that handles digital video signals only, and one with 29 pins that handles both digital and analog video.

●**SDI:** Serial Digital Interface. Standard definition video is carried on this 270 Mbps data transfer rate. Video pixels are characterized with a 10-bit depth and 4:2:2 color quantization. Ancillary data is included on this interface and typically includes audio or other metadata. Up to sixteen audio channels can be transmitted. Audio is organised into blocks of 4 stereo pairs. Connector is BNC.

●**HD-SDI:** High-definition serial digital interface (HD-SDI), is standardized in SMPTE 292M this provides a nominal data rate of 1.485 Gbit/s.

●**3G-SDI:** Standardized in SMPTE 424M, consists of a single 2.970 Gbit/s serial link that allows replacing dual link HD-SDI.

●**6G-SDI:** Standardized in SMPTE ST-2081 released in 2015, 6Gbit/s bitrate and able to support 2160p@30.

●**12G-SDI:** Standardized in SMPTE ST-2082 released in 2015, 12Gbit/s bitrate and able to support 2160p@60.

●**U-SDI:** Technology for transmitting large-volume 8K signals over a single cable. a signal interface called the ultra high definition signal/data interface (U-SDI) for transmitting 4K and 8K signals using a single optical cable. The interface was standardized as the SMPTE ST 2036-4.

●**HDMI:** High Definition Multimedia Interface: An interface used for the transmission of uncompressed high definition video, up to 8 channels of audio, and control signals, over a single cable.
●**HDMI 1.3:** Released on June 22 2006, and increased the maximum TMDS clock to 340 MHz (10.2 Gbit/s). Support

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resolution 1920 × 1080 at 120 Hz or 2560 × 1440 at 60 Hz). It added support for 10 bpc, 12 bpc, and 16 bpc color depth (30, 36, and 48 bit/px), called deep color.

●**HDMI 1.4:** Released on June 5, 2009, added support for 4096 × 2160 at 24 Hz, 3840 × 2160 at 24, 25, and 30 Hz, and 1920 × 1080 at 120 Hz. Compared to HDMI 1.3, 3 more features added which are HDMI Ethernet Channel (HEC) , audio return channel (ARC),3D Over HDMI, a new Micro HDMI Connector, an expanded set of color spaces.

●**HDMI 2.0:** Released on September 4, 2013 increases the maximum bandwidth to 18.0 Gbit/s. Other features of HDMI 2.0 include up to 32 audio channels, up to 1536 kHz audio sample frequency, the HE-AAC and DRA audio standards, improved 3D capability, and additional CEC functions.

●**HDMI 2.0a:** Was released on April 8, 2015, and added support for High Dynamic Range (HDR) video with static metadata.

●**HDMI 2.0b:** Was released March, 2016, support for HDR Video transport and extends the static metadata signaling to include Hybrid Log-Gamma (HLG).

●**HDMI 2.1:** Released on November 28, 2017. It adds support for higher resolutions and higher refresh rates, Dynamic HDR including 4K 120 Hz and 8K 120 Hz.

●**DisplayPort:** A VESA standard interface primarily for video, but also for audio, USB and other data. DisplayPort (orDP) is backwards compatible with HDMI, DVI and VGA.

●**DP 1.1:** Was ratified on 2 April 2007, and version 1.1a was ratified on 11 January 2008. DisplayPort 1.1 allow a maximum bandwidth of 10.8 Gbit/s (8.64 Gbit/s data rate) over a standard 4-lane main link, enough to support 1920x1080@60Hz

●**DP 1.2:** Introduced on 7 January 2010, effective bandwidth to 17.28 Gbit/s support increased resolutions, higher refresh rates, and greater color depth, maximum resolution 3840 × 2160@60Hz

●**DP 1.4:** Publish on 1 Mar, 2016.overall transmission bandwidth 32.4 Gbit/s ,DisplayPort 1.4 adds support for Display Stream Compression 1.2 (DSC), DSC is a "visually lossless" encoding technique with up to a 3:1 compression ratio. Using DSC with HBR3 transmission rates, DisplayPort 1.4 can support 8K UHD (7680 × 4320) at 60 Hz or 4K UHD (3840 × 2160) at 120 Hz with 30 bit/px RGB color and HDR. 4K at 60 Hz 30 bit/px RGB/HDR can be achieved without the need for DSC.

●**Multi-mode Fiber:** Fibers that support many propagation paths or transverse modes are called multi-mode fibers, generally have a wider core diameter and are used for short-distance communication links and for applications where high power must be transmitted.

●**Single-mode Fiber:** Fiber that support a single mode are called single-mode fibers. Single-mode fibers are used for most communication links longer than 1,000 meters (3,300 ft).

●**SFP:** Small form-factor pluggable , is a compact, hot-pluggable network interface module used for both telecommunication and data communications applications.

●**Optical Fiber Connector:** Terminates the end of an optical fiber, and enables quicker connection and disconnection than splicing. The connectors mechanically couple and align the cores of fibers so light can pass. 4 most common types

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of optical fiber connectors are SC, FC, LC,ST.

●**SC:** (Subscriber Connector), also known as the square connector was also created by the Japanese company – Nippon Telegraph and Telephone. SC is a push-pull coupling type of connector and has a 2.5mm diameter. Nowadays, it is used mostly in single mode fiber optic patch cords, analog, GBIC, and CATV. SC is one of the most popular options, as its simplicity in design comes along with great durability and affordable prices.

●**LC：** (Lucent Connector) is a small factor connector (uses only a 1.25mm ferrule diameter) that has a snap coupling mechanism. Because of its small dimensions, it is the perfect fit for high-density connections, XFP, SFP, and SFP+ transceivers.

●**FC:** (Ferrule Connector) is a screw type connector with a 2.5mm ferrule. FC is a round shaped threaded fiber optic connector,mostly used on Datacom, telecom, measurement equipment, single-mode laser.

●**ST:** (Straight Tip) was invented by AT&T and uses a bayonet mount along with a long spring-loaded ferrule to support the fiber.

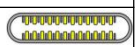
●**USB:** Universal Serial Bus is a standard that was developed in the mid-1990s that defines cables, connectors and communication protocols. This technology is designed to allow a connection, communication and power supply for peripheral devices and computers.

●**USB 1.1:** Full–Bandwidth USB, specification was the first release to be widely adopted by the consumer market. This specification allowed for a maximum bandwidth of 12Mbps.

●**USB 2.0:** or Hi–Speed USB, specification made many improvements over USB 1.1. The main improvement was an increase in bandwidth to a maximum of 480Mbps.

● **USB 3.2:** Super Speed USB with 3 varieties of 3.2 Gen 1(original name USB 3.0), 3.2Gen 2(original name USB 3.1), 3.2 Gen 2x2 (original name USB 3.2) with speed up to 5Gbps,10Gbps,20Gbps respectively.

USB version and connectors figure:

	Type A	Type B	Mini A	Mini B	Micro-A	Micro -B	Type C
USB 2.0							
USB 3.0							
USB 3.1&3.2							

●**NTSC:** The colour video standard used in North America and some other parts of the world created by the National Television Standards Committee in the 1950s. NTSC utilizes an interlaced video signals.

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●**PAL:** Phase Alternate Line. A television standard in which the phase of the colour carrier is alternated from line to line. It takes four full images (8 fields) for the colour-to-horizontalimages (8 fields) for the colour-to-horizontal phase relationship to return to the reference point. This alternation helps cancel out phase errors. For this reason, the hue control is not needed on a PAL TV set. PAL, is widely used in needed on a PAL TV set. PAL, is widely used in Western Europe, Australia, Africa, the Middle East, and Micronesia. PAL uses 625-line, 50-field (25 fps) composite colour transmission system.

●**SMPTE:** Society of Motion image and Television Engineers. A global organization, based in the United States, that sets standards for baseband visual communications. This includes film as well as video and television standards.

●**VESA:** Video Electronics Standards Association. An organization facilitating computer graphics through standards.

●**HDCP:** High-bandwidth Digital Content Protection (HDCP) was developed by Intel Corporation an is in wide use for protection of video during transmission between devices.

●**HDBaseT:** A video standard for the transmission of uncompressed video (HDMI signals) and related features using Cat 5e/Cat6 cabling infrastructure.

●**ST2110:** A SMPTE developed standard, ST2110 describes how to send digital video over and IP networks. Video is transmitted uncompressed with audio and other data in a separate streams.
SMPTE2110 is intended principally for broadcast production and distribution facilities where quality and flexibility are more important.

●**SDVoE:** Software Defined Video over Ethernet (SDVoE) is a method for transmission, distribution and management AV signals using a TCP/IP Ethernet infrastructure for transport with low latency. SDVoE is commonly used in integration applications.

●**Dante AV:** The Dante protocol was developed for and widely adopted in audio systems for the transmission of uncompressed digital audio on IP based networks. The more recent Dante AV specification includes support for digital video.

●**NDI:** Network Device interface (NDI) is a software standard developed by NewTek to enable video-compatible products to communicate, deliver, and receive broadcast quality video in a high quality, low latency manner that is frame-accurate and suitable for switching in a live production environment over TCP (UDP) Ethernet based networks. NDI is commonly found in broadcastapplications.

●**RTMP:** Real-Time Messaging Protocol (RTMP) was initially a proprietary protocol developed by Macromedia (now Adobe) for streaming audio, video and data over the Internet, between a Flash player and a server.

●**RTSP:** The Real Time Streaming Protocol (RTSP) is a network control protocol designed for use in entertainment and communications systems to control streaming media servers. The protocol is used for establishing and controlling media sessions between end points.

●**MPEG:** Moving Picture Experts Group is a working group formed from ISO and IEC developing standards that allow

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audio/video digital compression and Transmission.

●**H.264:** Also known as AVC (Advanced Video Coding) or MPEG-4i is a common video compression standard. H.264 was standardized by the ITU-T Video Coding Experts Group (VCEG) together with the ISO/IEC JTC1 Moving Picture Experts Group (MPEG).

●**H.265:** Also known as **HEVC** (High Efficiency Video Coding)H.265 is the successor to the widely used H.264/AVC digital video coding standard. Developed under the auspices of ITU, resolutions up to 8192x4320 may be compressed.

●**API:** An Application Programming Interface (API) provides a predefined function which allows access capabilities and features or routines via a software or hardware, without accessing source code or understanding the details of inner working mechanism. An API call may execute a function and/or provide data feedback/report.

●**DMX512:** The communication standard developed by USITT for entertainment and digital lighting systems.The wide adoption of the Digital Multiplex (DMX) protocol has seen the protocol used for a wide range of other devices including video controllers. DMX512 is delivered over cable of 2 twisted pairs with 5pin XLR cables for connection.
●**ArtNet:** An ethernet protocol based on TCP/IP protocol stack, mainly used in entertainment/events applications. Built on the DMX512 data format, ArtNet enables multiple “universes” of DMX512 to be transmitted using ethernet networks for transport.

●**MIDI:** MIDI is the abbreviation of Musical Instrument Digital Interface. As the name indicates the protocol was developed for communication between electronical musical instruments and latterly computers. MIDI instructions are triggers or commands sent over twisted pair cables, typically using 5pin DIN connectors.

●**OSC:** The principle of Open Sound Control (OSC) protocol is for networking sound synthesizers, computers, and multimedia devices for musical performance or show control. As with XML and JSON, the OSC protocol allows sharing data. OSC is transported via UDP packets between devices connected on an Ethernet.

●**Brightness:** Usually refers to the amount or intensity of video light produced on a screen without regard to colour. Sometimes called black level.

●**Contrast Ratio:** The ratio of the high light output level divided by the low light output level. In theory, the contrast ratio of the television system should be at least 100:1, if not 300:1. In reality, there are several limitations. Well-controlled viewing conditions should yield a practical contrast ratio of 30:1 to 50:1.

●**Colour Temperature:** The colour quality, expressed in degrees Kelvin (K), of a light source. The higher the colour temperature, the bluer the light. The lower the temperature, the redder the light. Benchmark colour temperature for the A/V industry include 5000°K, 6500°K, and 9000°K.

●**Saturation:** Chroma, Chroma gain. The intensity of the colour, or the extent to which a given colour in any image is free from white. The less white in a colour, the truer the colour or the greater its saturation. Saturation is the amount of pigment in a colour, and not the intensity.

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●**Gamma:** The light output of a CRT is not linear with respect to the voltage input. The difference between what you should have and what is actually output is known as gamma.

●**Frame:** In interlaced video, a frame is one complete image.A video frame is made up of two fields, or two sets of interlaced lines. In a film, a frame is one still image of a series that makes up a motion image.

●**Genlock:** Allows synchronisation of otherwise video devices. A signal generator provides a signal pulses which connected devices can reference. Also see Black Burst and Color Burst.

●**Blackburst:** The video waveform without the video elements.It includes the vertical sync, horizontal sync, and the Chroma burst information. Blackburst is used to synchronize video equipment to align the video output.

●**Colour Burst:** In colour TV systems, a burst of subcarrier frequency located on the back part of the composite video signal. This serves as a colour synchronizing signal to establish a frequency and phase reference for the Chroma signal. Colour burst is 3.58 MHz for NTSC and 4.43 MHz for PAL.

●**Colour Bars:** A standard test pattern of several basic colours (white, yellow, cyan, green, magenta, red, blue, and black) as a reference for system alignment and testing. In NTSC video, the most commonly used colour bars are the SMPTE standard colour bars. In PAL video, the most commonly used colour bars are eight full field bars. On computer monitors the most commonly used colour bars are two rows of reversed colour bars

●**Seamless Switching:** A feature found on many video switchers. This feature causes the switcher to wait until the vertical interval to switch. This avoids a glitch (temporary scrambling) which often is seen when switching between sources.

●**Scaling:** A conversion of a video or computer graphic signal from a starting resolution to a new resolution. Scaling from one resolution to another is typically done to optimize the signal for input to an image processor, transmission path or to improve its quality when presented on a particular display.

●**PIP:** Picture-In-Picture. A small image within a larger image created by scaling down one of image to make it smaller. Other forms of PIP displays include Picture-By-Picture (PBP) and Picture- With-Picture (PWP), which are commonly used with 16:9 aspect display devices. PBP and PWP image formats require a separate scaler for each video window .

●**HDR:** is a high dynamic range (HDR) technique used in imaging and photography to reproduce a greater dynamic range of luminosity than what is possible with standard digital imaging or photographic techniques. The aim is to present a similar range of luminance to that experienced through the human visual system.

●**UHD:** Standing for Ultra High Definition and comprising 4K and 8K television standards with a 16:9 ratio, UHD follows the 2K HDTV standard. A UHD 4K display has a physical resolution of 3840x2160 which is four times the area and twice both the width and height of a HDTV/FullHD (1920x1080) video signal.

●**EDID:** Extended Display Identification Data. EDID is a data structure used to communicate video display information, including native resolution and vertical interval refresh rate requirements, to a source device. The source device will then output the provided EDID data, ensuring proper video image quality.

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6.3 Revision History

The table below lists the changes to the User Manual.

Format	Time	ECO#	Description	Principal
V1.0	2022-03-28	0000#	Release	Aster

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