

Q16pro Gen2 1U



User Manual

RGBlink[®]



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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.

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 device 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.

Unpacking and Inspection

Before opening device 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 device should be clean, properly lit, free from static, and have adequate power, ventilation, and space for all components.

Chapter 1 Your Product

1.1 In the Box

**1x AC Power
Cord**



2 x HDMI Cable



**1 x Network
Cable**



**1 x DB9-RJ11
Cable**



**1 x Anti-static
Bag**



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

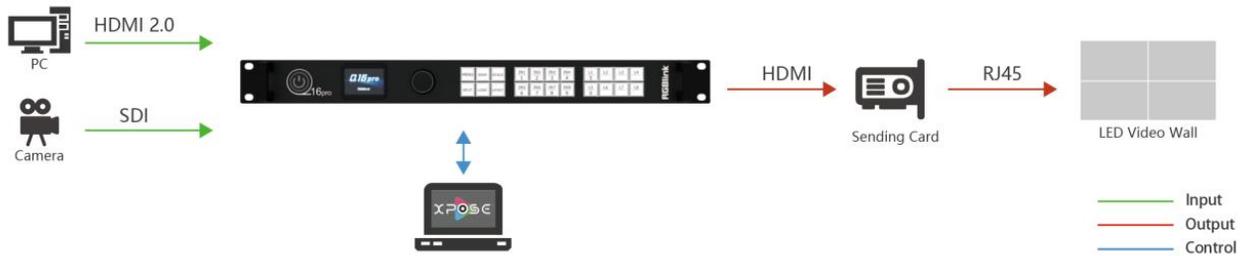
1.2 Product Overview

Q16pro Gen2 1U adopts **modular design**, which supports up to **8 inputs**, including quad HDMI 1.3, quad DVI, quad SD/HD/3G SDI, dual HDMI 2.0 & dual DP 1.2, dual HDMI 1.3 & dual DVI, single H.264/265 for 2K and 4K signals; **4 outputs**, with dual HDMI 2.0, dual DP 1.2, quad HDMI 1.3, quad DVI, quad SDI signals optional.

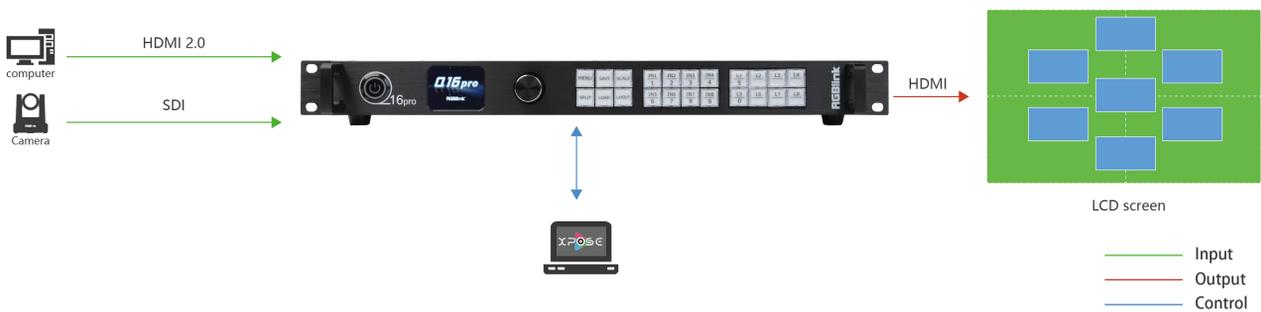
The **standard unit** comes with 4 HDMI 1.3 outputs and builds with local front control panel and remote control interfaces with RS 232 and Ethernet ports.

Q16pro Gen2 1U is available to be **remote controlled** by XPOSE or 3rd party APP / controller by open API. Q16pro Gen2 1U combines rugged design, class-leading video processing and image quality, ultra-low latency, versatile 4K connectivity, livestreaming capabilities, and unmatched ease of use to meet the requirement of the modern commercial display systems application, including live corporate meetings, hybrid events, worship productions, or large-scale LED video wall installations.

Its 8 layers with **roaming capacity** and **layer can cross over each output without layer counting up**.

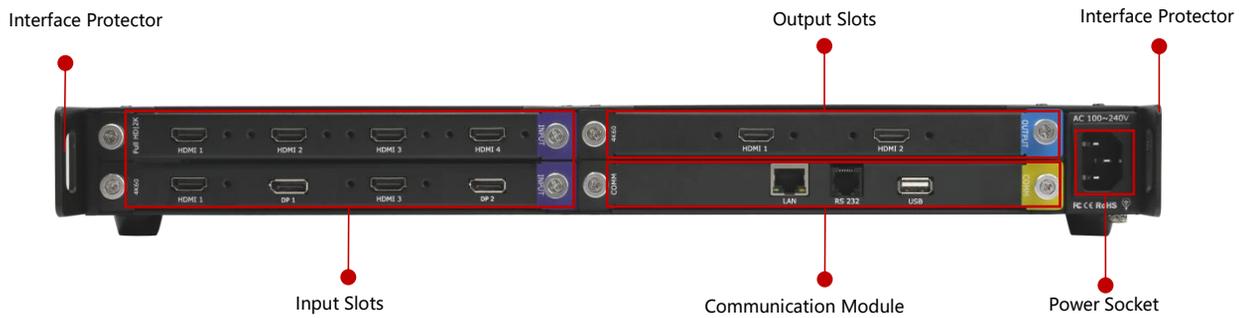


Q16pro Gen2 1U_Application Diagram 1



Q16pro Gen2 1U_Application Diagram 2

1.2.1 Rear Panel



Name	Description
Input Slots	<ul style="list-style-type: none"> Support quad HDMI 1.3, quad DVI, quad 3G SDI, dual HDMI 1.3 & dual DVI, dual HDMI 2.0 & dual DP 1.2, single IP and other optional input modules  purple tip indicates input
Output Slots	<ul style="list-style-type: none"> Support quad HDMI 1.3, quad DVI, quad SDI, dual HDMI 2.0, dual DP 1.2 and other optional output modules  blue tip indicates output
Communication Module	<ul style="list-style-type: none"> 1xLAN、1xRS 232、1xUSB  yellow tip indicates communication
Power Module	1xIEC power socket
Interface Protector	Used to pull out device, fix cables and protect interfaces from collision

1.2.2 Front Panel

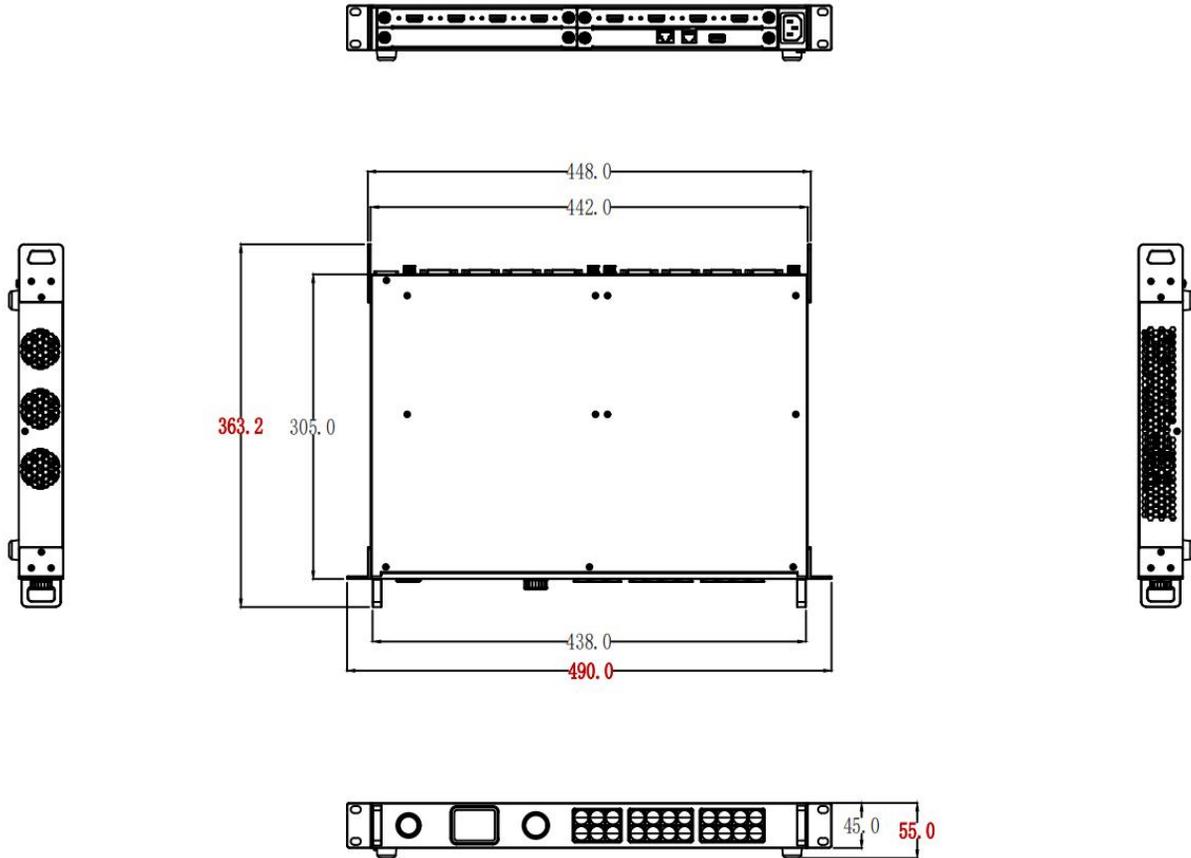


Name	Description
Power Button	<ul style="list-style-type: none"> Press the button to power on or power off the device. Button light turns red when powered on.
LCD Panel	Display current status of the device, and provide interactive choices in conjunction with buttons on the front panel.
Knob	<ul style="list-style-type: none"> Rotate the knob to select a item. Press the knob to confirm the operation.
Buttons	<ul style="list-style-type: none"> MENU: 1) Enter main menu; 2) Back to the previous menu. SAVE: Push SAVE+Digital Button to save scenes to SCENE1-16. SCALE: Adjust width、 height、 H position and V position of layers. SPLIT: Select layout for Split Mode. LOAD: Push LOAD+Digital Button to load scenes from SCENE 1-16. LAYOUT: Select layout for Presentation Mode. IN1-IN8: 1) Input signal selection buttons; 2) 1, 2, 3, 4, 6, 7, 8, 9 digital button. L1-L8: 1) Layer selection buttons; 2) L1 and L5 can also be used as 5, 0 digital button respectively.
Handles	For carrying device.
Rack Mount Ears	Use with the load-bearing screws to fix device on the rack.

1.2.3 Dimension

Following is the dimension of Q16pro Gen2 1U for your reference:

Dimension: 490mm x 363.2mm x 55mm



unit: mm

Chapter 2 Install Your Product

2.1 Plug in Signals

Connect signals to the input connector of device (ensure all devices are powered off first). Tighten connector screws/locks where provided.

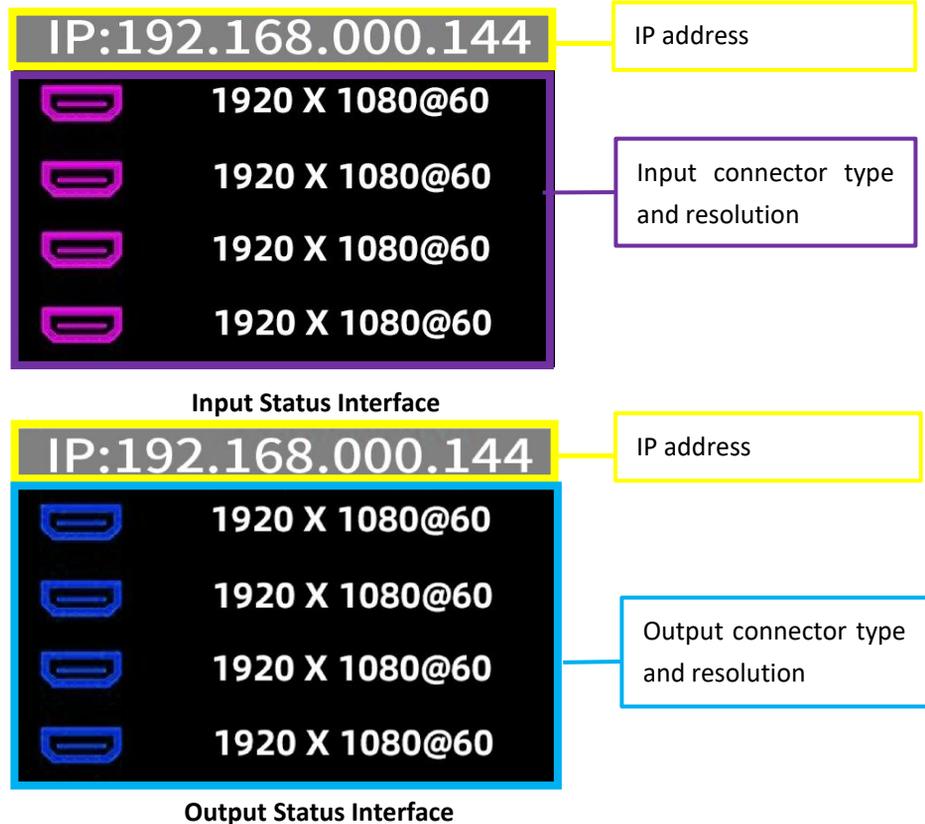
2.2 Plug in Main Power

Connect IEC cable to device and plug into wall socket. Turn on power at wall socket.

2.3 Turn on Your Product

After the device is boot up, the screen shows as below, meanwhile the screen will show its input and output state and IP address.

Users can check input and output status by rotating the black knob, as shown in the figure below.

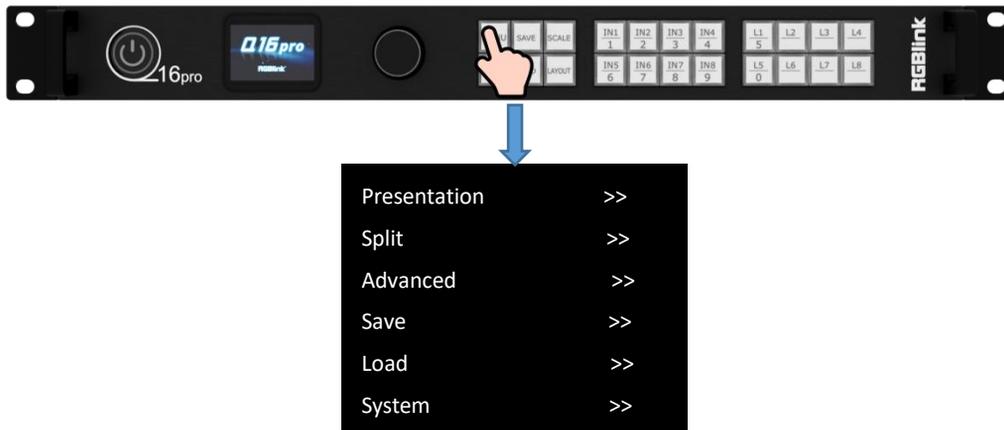


Note: 1. IP address defaults to 192.168.0.100;
2.  purple icon indicates input,  blue icon indicates output. Pictures above take HDMI input and output status as the example.

Chapter 3 Use Your Product

3.1 Use the Menu Button

Push **【MENU】** button to enter main menu.



Turn the knob to select corresponding menu item; push the knob to enter sub-menu; push **【MENU】** button to return back to the previous menu.

- 1) The **symbol** >> indicates that the next item is available, shown as Figure 1;
- 2) The **symbol** -> indicates that the item is editable, shown as Figure 2;
- 3) Push the knob to edit the item. The **symbol** * indicates the selected item is under editing state, ready to be set or checked, shown as Figure 3.



Figure 1

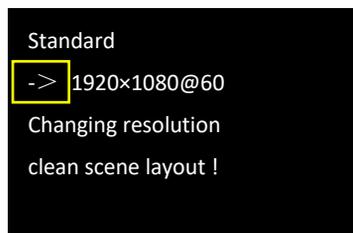


Figure 2

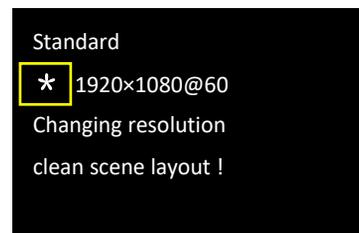


Figure 3

3.2 Menu Structure

The MENU structure includes **Presentation**, **Split**, **Advanced**, **Scene Save**, **Scene Load** and **System**, shown in the figure below.

Presentation	Split	Advanced	Save	Load	System
Output Resolution >>	Output Resolution >>	4K Input Mode >>			SN 1024
Image Layout >>	Split Layout >>	EDID >>			Black Out OFF
					Software Version >>
					Network Setting >>
					Fan Speed >>
					Language 语音 ENG
					Factory Reset

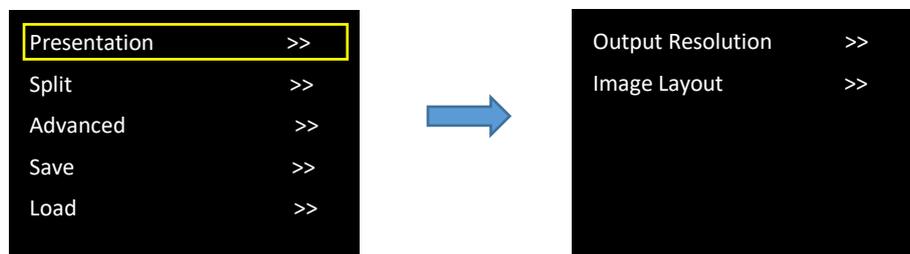
3.3 Use the Menu

Use the menu system for convenient and intuitive operation. The **LCD panel** shows the menu items. The screen will show the default state when the menu is not in use, or the operation has timed out.

Using the MENU button and rotary knob in the front panel, the screen will show the corresponding menus according to user selections.

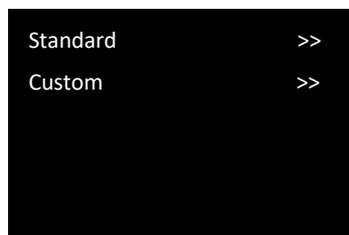
3.3.1 Presentation

After the device is boot up, push MENU to enter main menu interface. Then rotate the knob and select <Presentation>.

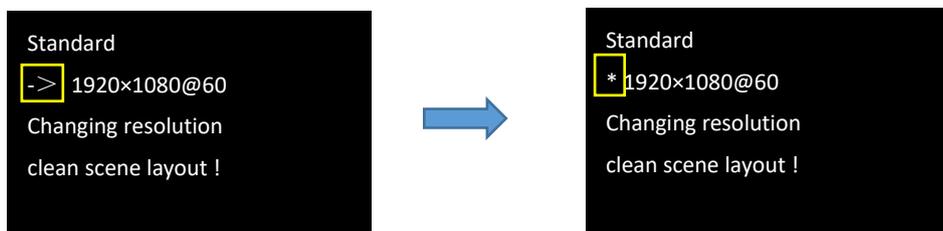


Output Resolution

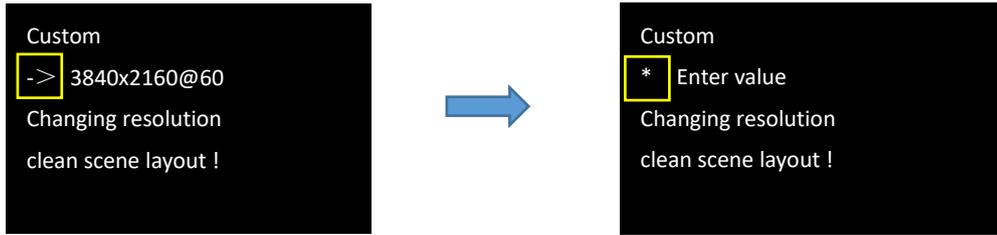
In Output Resolution interface, users can choose Standard resolution or Custom resolution.



Standard: Push the knob to edit resolution. Wait the **symbol** -> in front of the resolution changes into **symbol** *, and then users can rotate the knob to choose standard resolution.



Custom: Push the knob to edit resolution. Wait the **symbol** -> in front of the resolution changes into **symbol** *.



The 0~9 numeric keys will light up at the same time. Use the numeric keys to input the width, height and frame rate.

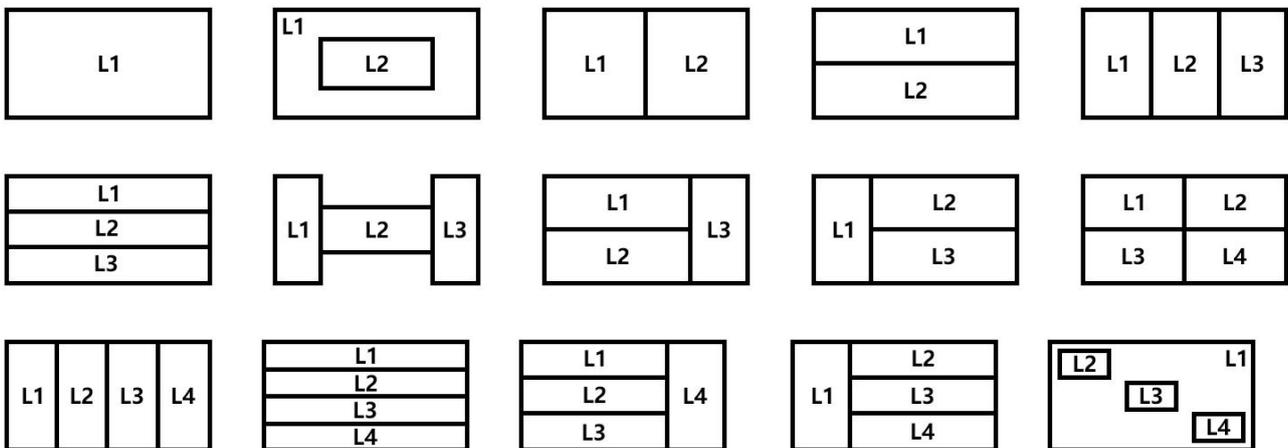
After entering the width, press the knob to confirm and then enter the height; if height parameter is set, press the knob to enter the frame rate, as shown in the figures below.



After the width, height and frame rate are all set, push knob to confirm.

Image Layout

Select the image layout for presentation mode. There are 15 layout patterns built-in as follows:

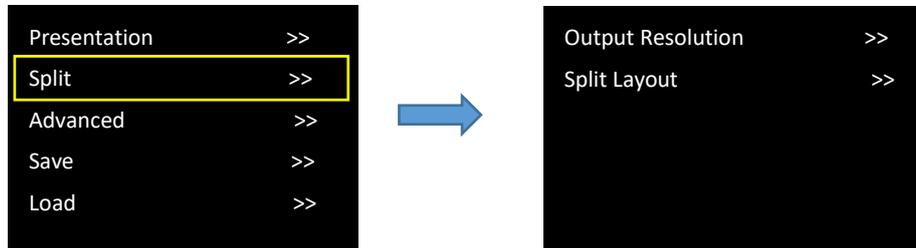


Push the knob to select layout, and the LCD Panel will automatically return to the previous menu interface. Users can use the L1-L8 buttons on the front panel to select the layer, and then select the input signal by using IN1- IN8 buttons.

Note: ONLY the first four layouts are available for 4K input module. Please reselect if the wrong layout is chosen.

3.3.2 Split

After the device is boot up, push MENU to enter main menu interface. Then rotate the knob and select <Split>.



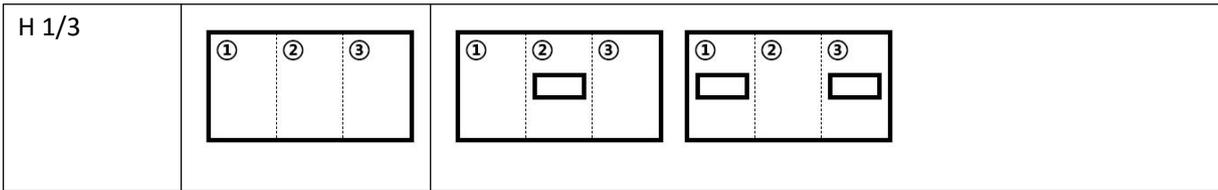
Output Resolution

The same operation as shown in Presentation.

Split Layout

There are 6 split modes available and each basic split mode comes with useful multi-picture layout.

Split Mode	Background	Multi-Picture Layout
H 1/2		
V 1/2		
Cross		
H 1/4		
V 1/4		



Choose the split mode from 6 types shown above by rotating the knob. Push the knob to select the multi-picture layout under this split mode and then set parameters.

The LCD screen displays as follows:

H Total	3840
V Total	1080
Width 1	1920
Save	

Set H total, V total, width1 of screen according to actual need.

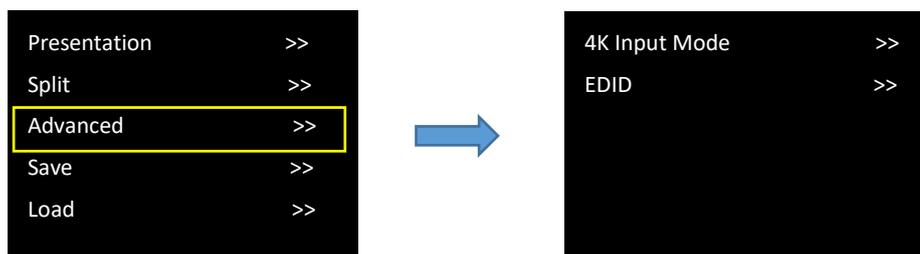
For example: Set H total as 3840, V total as 1080, Height 1 is 1080, same with V total. Set Width 1 as 1920 and Width 2 will be 1920 (H total <3840> - Width 1 <1920> = Width 2 <1920>).

Use the numeric keys to enter parameters, then rotate the knob to "Save" and push the knob to save above settings.

Note: ONLY H 1/2 layout and V 1/2 layout are available for 4K input module. Please reselect if the wrong layout is chosen.

3.3.3 Advanced

After the device is boot up, push MENU to enter main menu interface. Then rotate the knob and select <Advanced>.



4K Input Mode

Source 1	3 HDMI 2.0
Source 2	8 DP
Save	

Source 1/Source 2: with HDMI 2.0, DP 1.2 input source available. The number indicates the position of this interface on the input module.

Rotate the knob to "Save" and push the knob to save above settings.

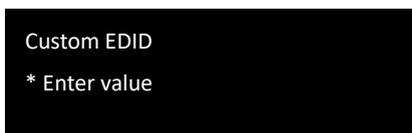
EDID



Input port: 1~8 input port

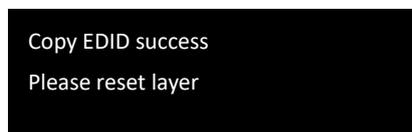
Source: CUSTOM or RESET optional

Choose **CUSTOM** to custom EDID and the LCD panel displays the interface below.



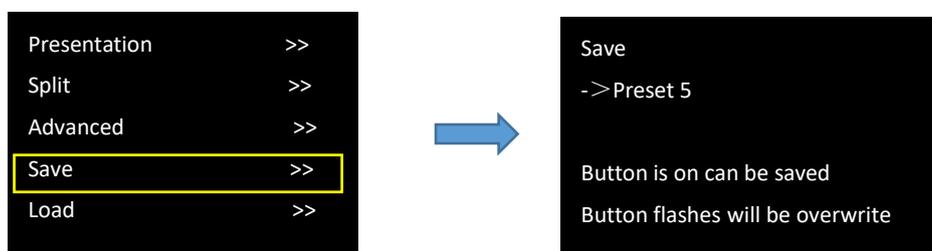
The 0~9 numeric keys will light up at the same time. Use the numeric keys to enter the width, height and frame rate one by one and then push the knob to confirm.

Choose **RESET** to reset EDID and the LCD panel displays the interface below after successful setting.



3.3.4 Save Preset

After the device is boot up, push MENU to enter main menu interface. Then rotate the knob and select <Save>.

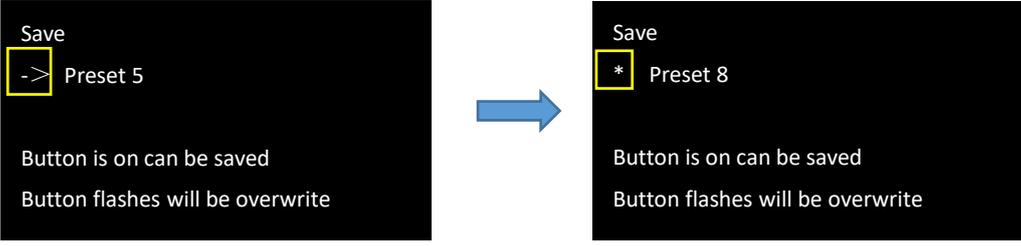


RGBlink provides **16 positions** for saving or recording parameters.

Enter Save interface, the **SAVE** button light is on, which indicates the SAVE function is enabled.

Digital buttons 0-9 will be always on or flashing. **An always-on button** indicates that no preset has not been saved at this position; **A flashing button** indicates that certain preset has been saved at this position already.

Push the knob and wait the **symbol ->** in front of the Preset changes into **symbol ***. Users can turn the rotary knob to select Preset1-Preset16 or use the number button 1, 2, 3, 4, 5, 6, 7, 8, 9, 0 to select Preset1-Preset10. Select the position that will save, push the knob to confirm.



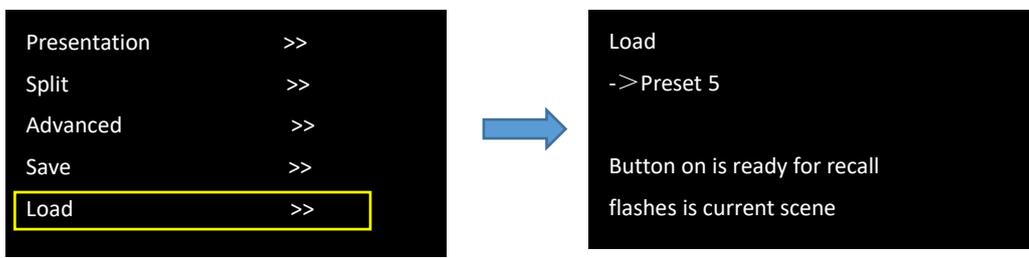
Saving preset in the button with flashing light will **overwrite** the saved parameters before.
 For example: If button 8 is flashing, pushing button 8 will **overwrite** the preset saved in Preset 8, and the LCD screen will display as follows.

Preset 8 exists
 Preset reset or not ?
 Yes <SEL>, No <MENU>

Push knob to confirm or MENU to cancel the operation.

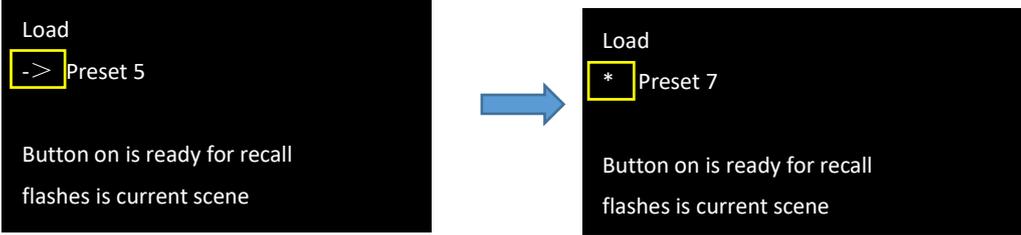
3.3.5 Load Preset

After the device is boot up, push MENU to enter main menu interface. Then rotate the knob and select <Load>.



Enter Load interface, the **LOAD** button light is on, which indicates the LOAD function is enabled.
 Digital buttons 0-9 will be always on or flashing. **An always-on button** indicates that certain preset has been saved at this position; **A flashing button** indicates that certain preset has been saved at this position already, which is ready for recall.

For example: If button 5 is flashing, it means that Preset 5 has been loaded. Now users need to load Preset 7, please do as follows: Push the knob and wait the **symbol ->** in front of the Preset changes into **symbol ***. Then push button 7 to load Preset7. Now the button 7 light starts flashing and button 5 light changes into always-on status.

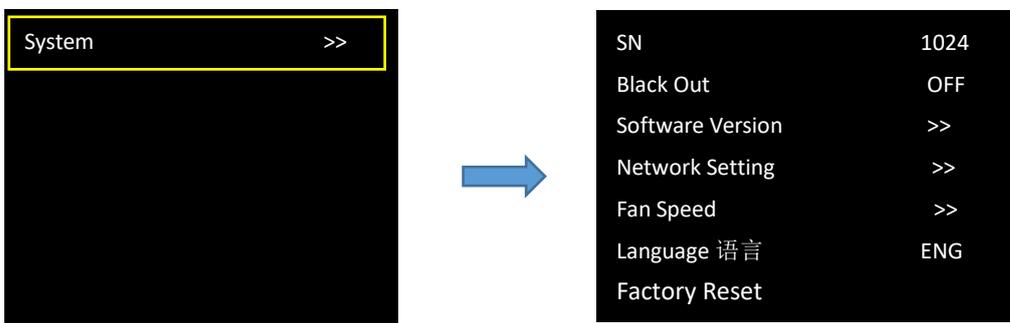


Then view the LCD screen to check if the operation is successful, if the above operation is ok, the screen will display as follows.



3.3.6 System

After the device is boot up, push MENU to enter main menu interface. Then rotate the knob and select <System>.



SN

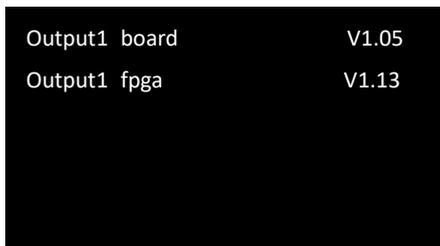
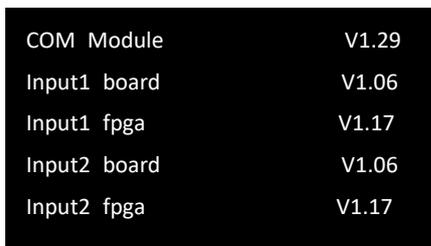
To check serial number of the device.

Black Out

Q2 1U provides black effect processing for output with cut black effect, which can realize one-key-touch to a black screen. Rotate the knob to Black Out to turn on black effect processing.

Software Version

Rotate the knob to Software Version to check communication module version, input module version and output module version.



Network Setting

Rotate the knob to Network Setting.

DHCP	OFF
IP Address	>>
Net Mask	>>
Gateway	>>
MAC Address	

DHCP: ON/OFF

Turn off DHCP to manually set IP Address, Subnet Mask and Gateway. The setting takes effect after the device is rebooted.

Fan Speed

Rotate the knob to Fan Speed so as to adjust fan speed for device dissipation.

Auto Control	OFF
Fan Speed	80%

Users can turn on Auto Control for automatic adjustment of fan speed or turn off Auto Control to adjust speed manually by rotating black knob on the front panel.

Language

Rotate the knob to Language to switch language here. English or Chinese available.

Factory Reset

Rotate the knob to Factory Reset and the LCD panel will show the interface below.

Factory reset or not
Yes<SEL>, No<MENU>

Select "YES" or "NO". Confirm by pushing knob to restore default settings, cancel by pushing MENU button.



Note: Choose factory reset will restore all parameters to the default settings, including but not limited to IP address, EDID, presets, etc. Users need to re-import configuration set before.

3.4 XPOSE 2.0 Installation

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(it 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.

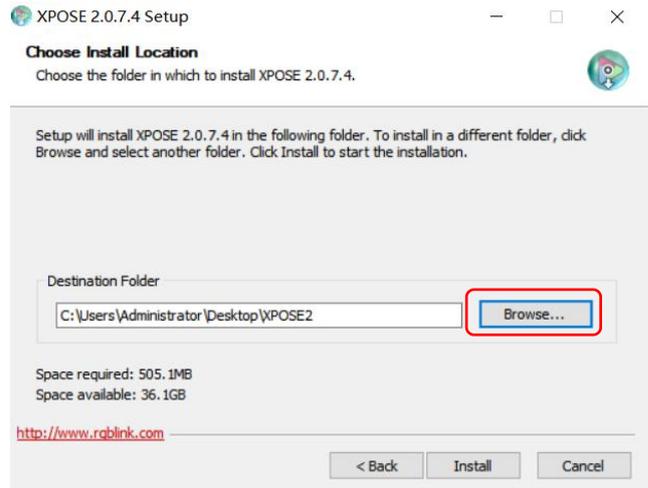


2. Click “Next” to install.

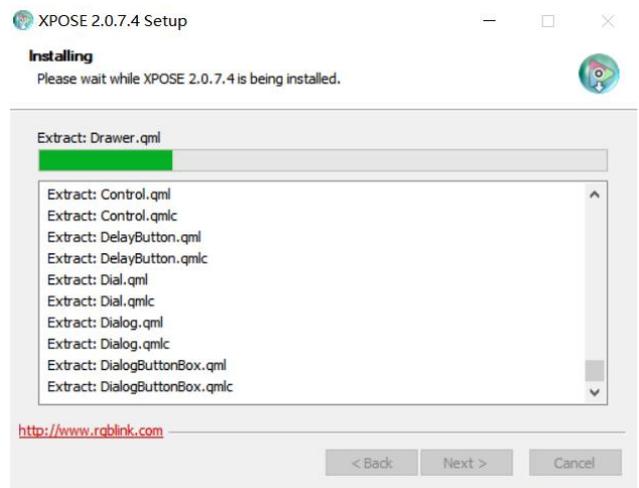


3. Click "Browse..." to select the XPOSE software install location.

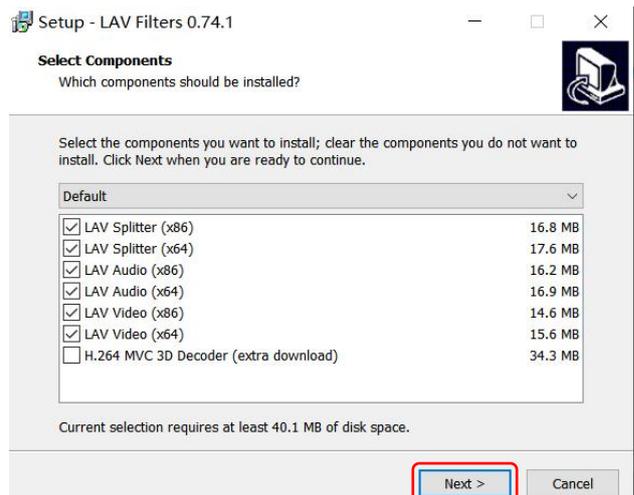
Click "Install".



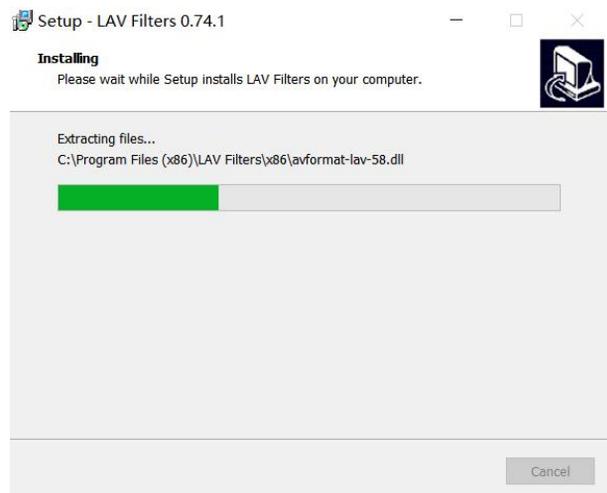
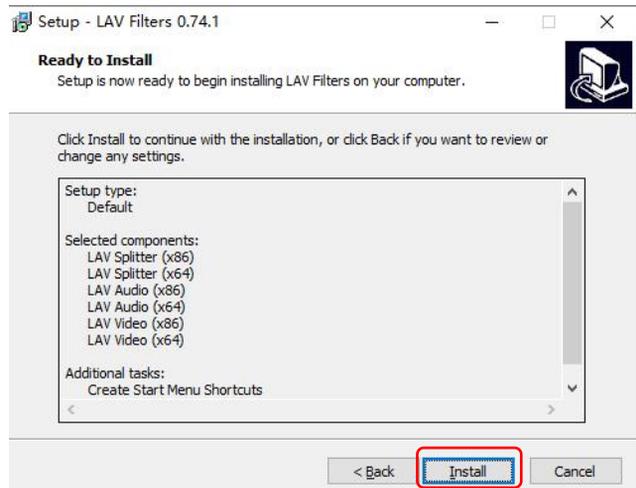
4. During installation, it will pop up the window of Install Shield Wizard for Virtual Com port.



5. Click "Next".



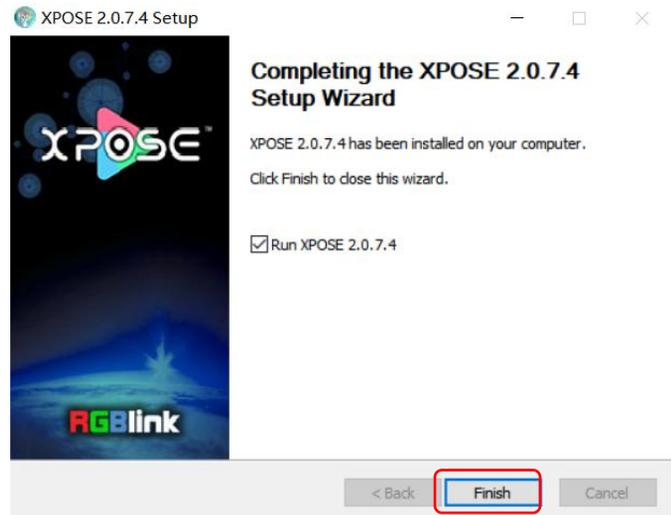
6. Then click "Install", as shown in the figure.



7. Click "Finish" and complete the installation, as shown in the figure below.



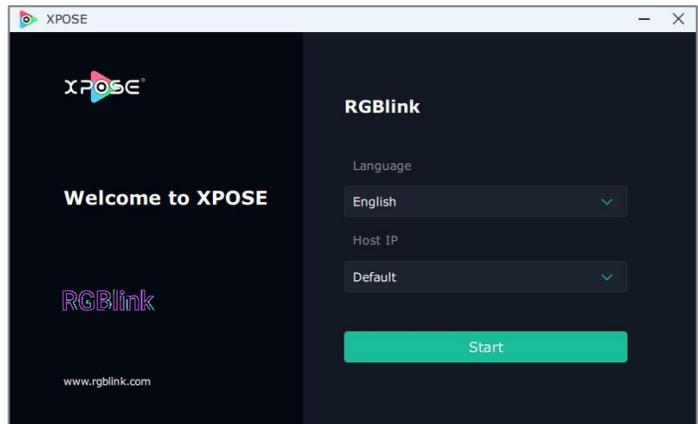
8. Click "Finish" and is ready to run the XPOSE software



3.5 XPOSE Operation

3.5.1 Login in XPOSE

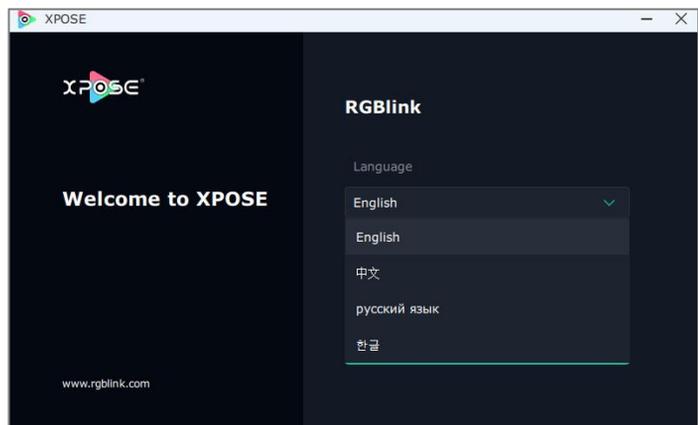
Double click this icon , and enter the log on interface shown in the right:



The initial language of XPOSE 2.0 is self adjusted based on the operation system language of the computer.

If you want to change language, just click **Language** and choose one you need.

Then click **Start** to run XPOSE.



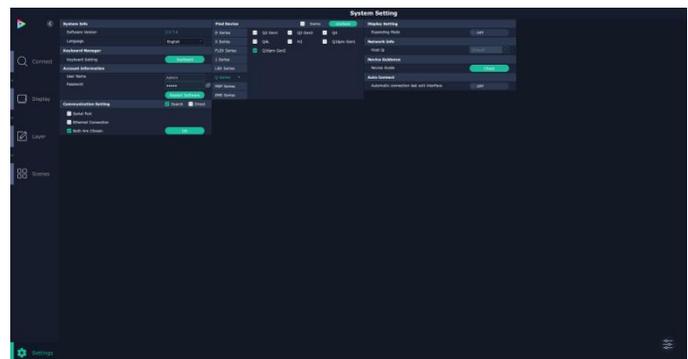
After login,the interface is shown in the right.

Users can find 5 major parts : **System Setting**, **Connect**, **Display**, **Layer**, **Scenes**.

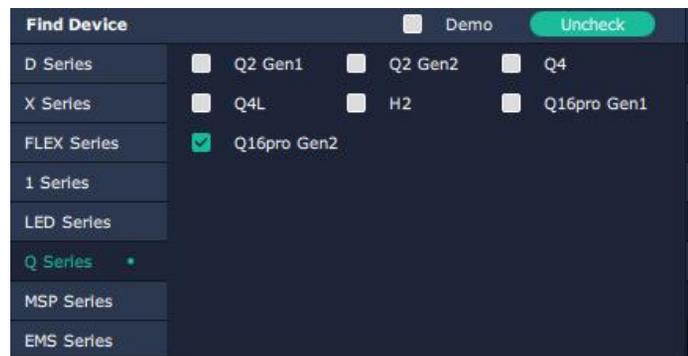


3.5.2 System Setting

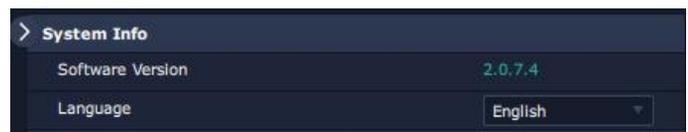
Click  to enter <System Setting>interface.



Find Device: New version of XPOSE 2.0 is blank default in Find Device. Users are supposed to choose correct series and then select the device needed.



System Info: Check current software version and choose system language you need.

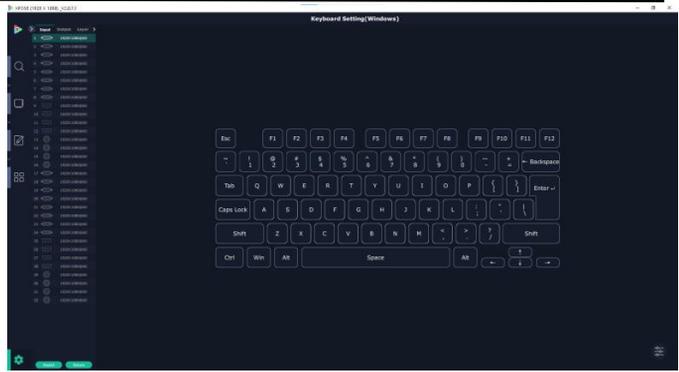


Keyboard Management: click <Keyboard> to enter the interface shown in the right.

Keyboard Setting is designed to fit for different operation system such as Windows and Mac.

Users can **set short cut keys**.

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**.

Script Set

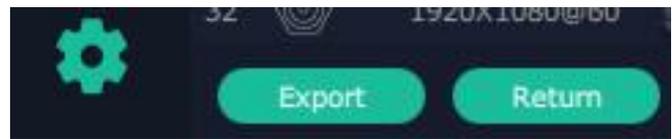
File Path: Save the current Keyboard Settings in the script to the local path

File Name: script file name

Load Script: Load/Delete



Click Return to back to <System Setting>



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.



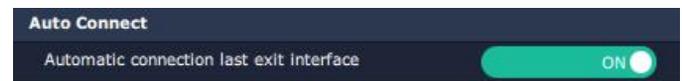
Display Setting: Users can turn on **Expanding Mode** if there is an extension screen.



Novice Guide : check novice guide for quicker operation of XPOSE software.



Auto Connect : turn on auto connection switch and the interface will pop up a prompt to remind the user whether to restore the previous interface.

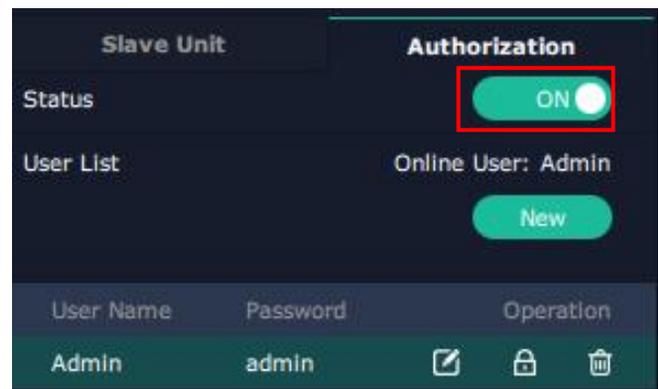


Authorization Setting

Click  to open up the authorization entry.

Authorization Setting is used to add and edit the user name and password for authorized users, as well as the permissions that users can operate.

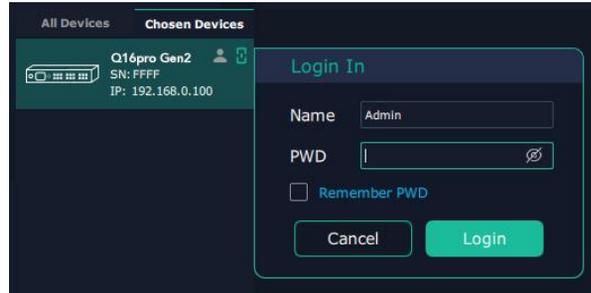
Authorization Status defaults to OFF, please Turn On Status for operation.



For operating device for the first time, or device upgrade, or factory reset, XPOSE defaults to log in as Administrator with name defaults to Admin, and PWD defaults to admin.  is displayed in Chosen Devices.



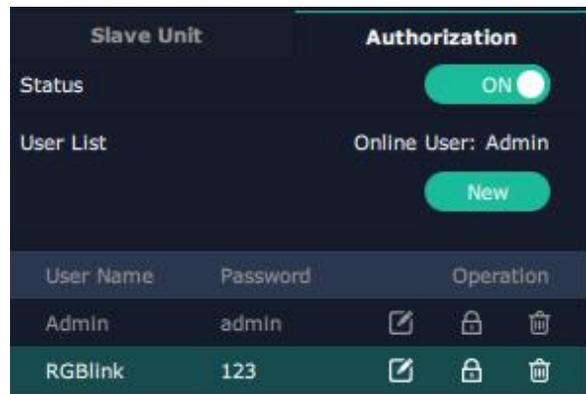
If users have logged in XPOSE before,  is displayed in Chosen Devices. Enter Name and PWD, then click Login.  icon indicates successful operation.



Click **New** in Authorization interface to add new USER NAME and set PWD.



Then click **Save** to confirm.



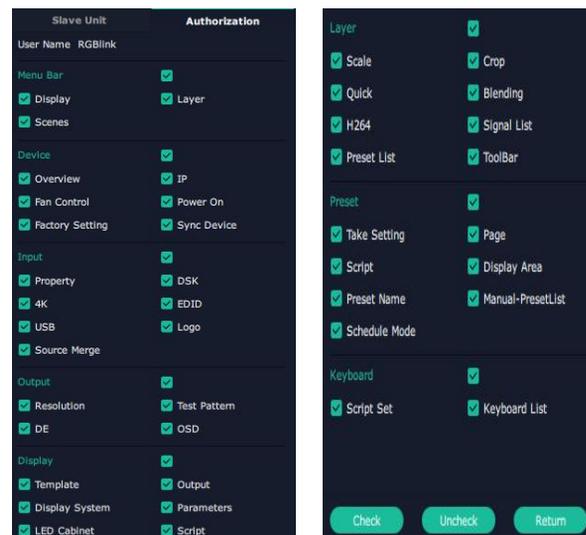
 **Edit:** Edit user name and password already built.



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

 **Authorization Set:** Functions on 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.



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 device linked to the same network, one with IP: 192.168.0.112, SN: 0027; the other with IP: 192.168.0.129, SN: 3344.

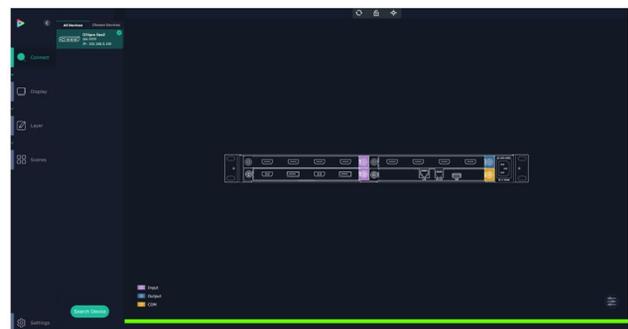
If users want the same operation on 3344 to be backed up to 0027, please do as follows.

1. Set device numbers;
2. Select the IP of the device in the drop-down menu for Device IP;
3. Click **ON**, the two device are connected when the red pot  turns to be a green one ;
4. Click **OFF to disconnect**, it could not control two device at the same time.



3.5.3 Output | Input | Overview

Click  to check rear panel interface as shown in the right figure.



Note:

1.  purple tip indicates input,  blue tip indicates output,  yellow tip indicates communication.
2. Interface Color Description: 1) Green: normal signal; 2) Yellow: abnormal signal; 3) White: no signal. (Due to hardware limitation, **interface of SDI output module** always displays white where there is or isn't a signal.)

Device Connection

1. Click the device needed in the <All Devices> list.
2. Click  in the <Chosen Devices>.



Output Setting

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

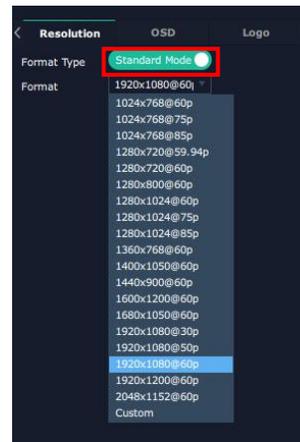


A red rectangle flashes around the chosen port when it is chosen.

Resolution:

Q16pro Gen2 1U supports resolution settings of output modules.

Users can choose Standard Resolution or type in width, Height and Refresh Rate to Custom Resolution, shown in the right figure.



OSD:

Q16pro Gen2 1U output modules which support OSD are shown below: **(Please Turn ON Status before setting)**

- *Quad HDMI 1.3 Output Module
- *Quad SDI Output Module
- *Quad DVI Output Module

Order Codes please refer to [4.2 Module Codes](#).

Output Port: current output port

Status: ON/OFF OSD

X/Y: the starting horizontal and vertical position

Width/Height: the horizontal and vertical size of the text

Font: font of the text, all fonts installed in the computer are available

Font Type: Normal, Italic, Bold, Bold Italic

Font Size: 0-300 pixels

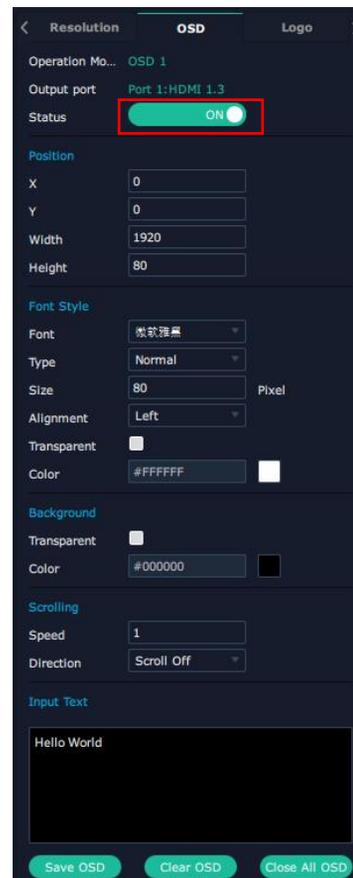
Alignment: set alignment type

Background: choose transparent or set background color

Scroll Speed: 0-16

Scroll Direction: Scroll Off, Scroll Left

Input Text: The exact content of the text



After setting, users choose **Save OSD**, **Clear OSD** (If the setting is not desired) or **Close All OSD**.

After all settings done, click **<Set>** and the OSD will be displayed on the screen.

LOGO: Users need to pre-store the Logo on the SD card for Logo capture.

Output Port: current port

Logo Operation:

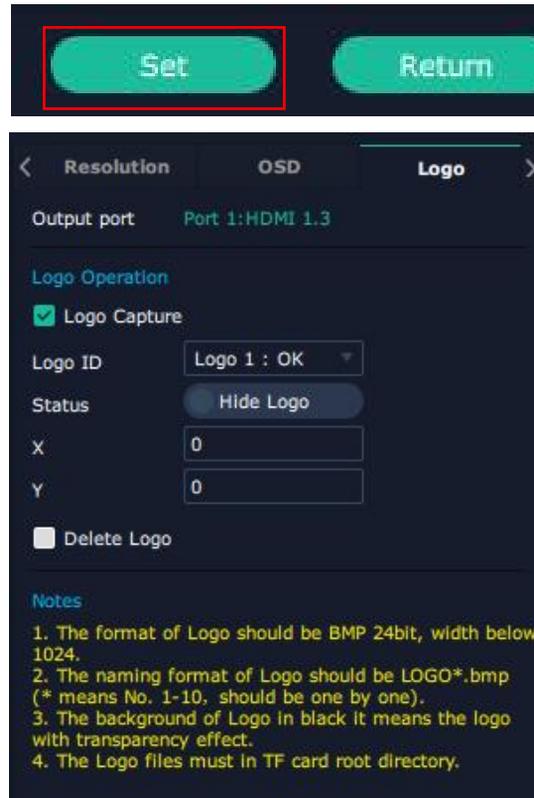
Logo Capture:

Logo ID: Load Logo ID been saved

Status: Hide/Show Logo

X/Y: Horizontal and vertical position of Logo

Delete Logo: Clear logo set already



Input Setting

Click any input 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.

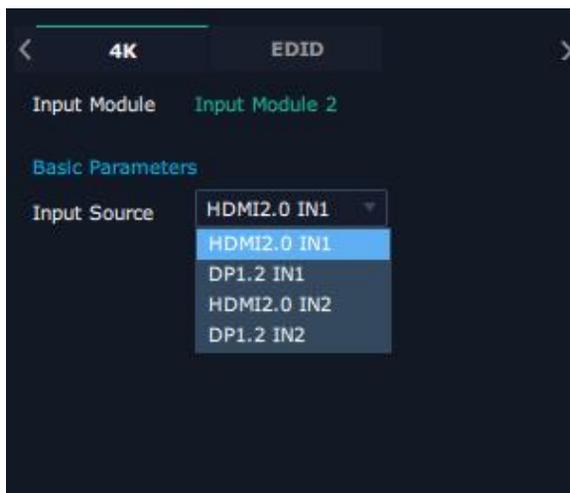
User can set **<EDID>**. If 4K module is installed, the **<4K>** setting interface will appear.

4K

Input Module: Position of current chosen port

Basic Parameters

Input Source: Choose certain port on the 4K module



EDID

Input Port: chosen port

Basic Parameters:

Monitor Name: type the monitor name

Width/Height/Frequency: type in custom parameters to meet your needs.

Input modules which support EDID are as follows:

- Quad HDMI 1.3 Input Module
- Dual HDMI 2.0 & DP 1.2 4K@60 Input Module
- Quad DVI Input Module

Order Codes please refer to [4.2 Module Codes](#).



Overview

Click **Return** Return, there are Overview, IP, Fan Control, Factory Setting.

Device Info: users can check communication module version, current device temperature and MAC information.



Input Module Info: users can check current input module name and MCU version

Index	Module Name	MCU
1	HDMI 2.0	V1.06 +
2	HDMI	V1.06 +

“...” indicates that there are no input modules, as shown in the right figure.

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

Index	Module Name	MCU
1	HDMI	V0.84 +

IP: support auto/manual setting. Show IP Address, Netmask, Gateway

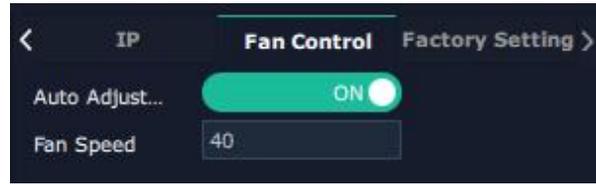


Fan Control: support auto/manual setting.
Fan Speed: 0-100 adjustable

Notice: To avoid insufficient heat dissipation, the recommended manual fan speed is not less than 30%.

Factory Setting

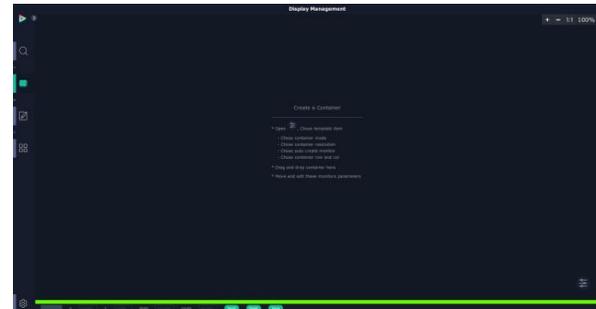
Remove EDID: clear the previous EDID parameter
Save IP: no change of IP after reset



3.5.4 Display Management

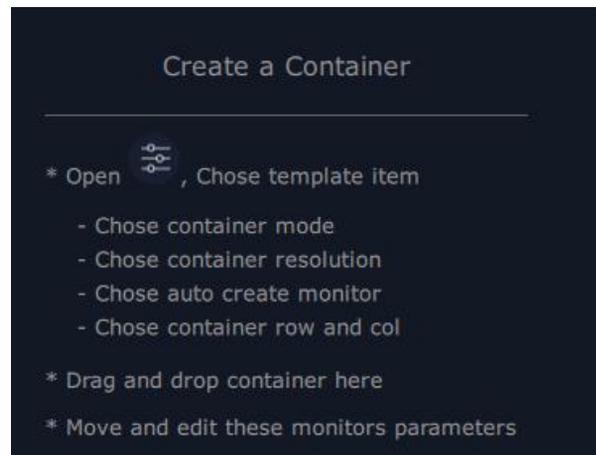
Display System is for users to set layout of outputs.

Click  first and then click  to 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 8 types of basic “Display Area”, which are used to contain output interface, and could be regarded as output layout.

Drag a template to create a container (a display area).

Resolution

Choose monitor and then select output resolution.

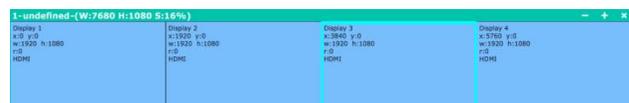
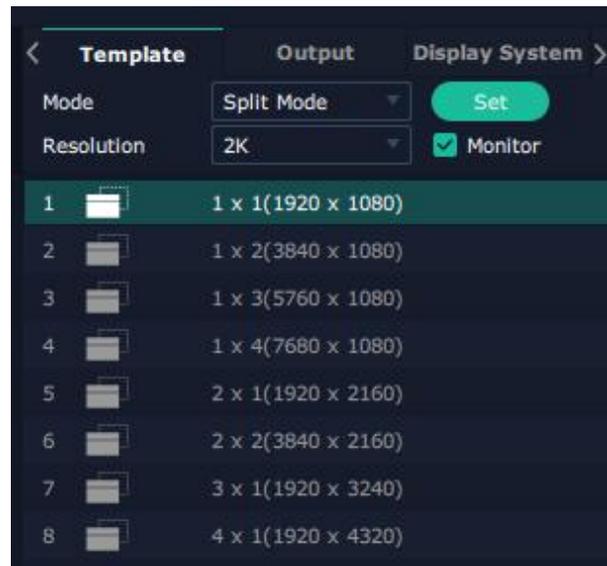
Mode

Each mode is marked in different color and provided with fitted templates. Users can do operations like splice under different modes.

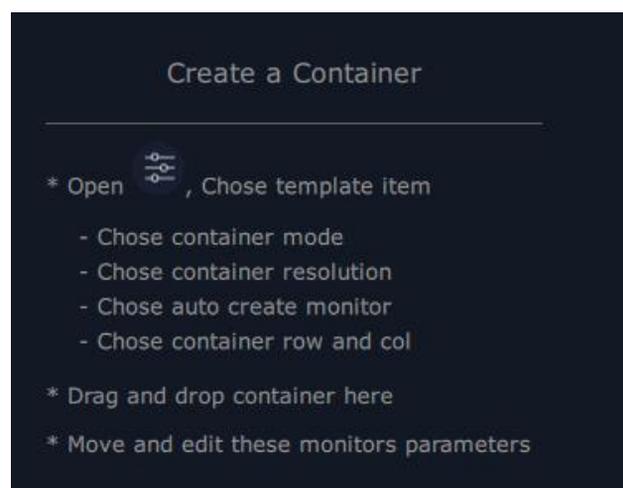
Q16pro Gen2 1U: Split Mode and Presentation Mode (by default) optional.

Presentation Mode: No need of recreating a container after changing resolution.

Split Mode: No container is reserved after change of resolution. Need of recreating a container.

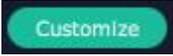


Presentation Mode



Split Mode

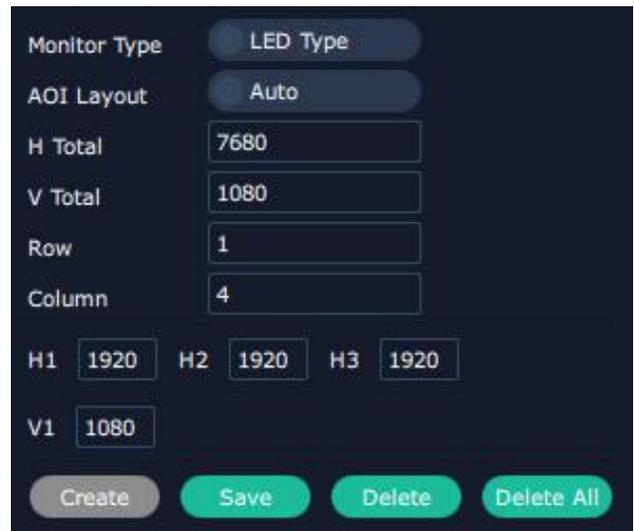
Customize Container

Click **Customize**  at the bottom of template list.

AOI Layout: Auto or Manual

Steps of creating container are as follows:

1. Fill in H Total/V Total and Row/Column, it will calculate H item and V item automatically.
For example, if user needs to create a container with 1 row and 4 columns and each display has a width of 1920 and a height of 1080, the total width will be 7680 and the total height will be 1080;
2. Click **<Create>**, the container will display in the interface;
3. Click **<Save>** to save the container.



Container Adjustment

1. **Move:** Drag the boarder of the display area to move its place in the interface.
2. **Scale:** Click  to shrink, click  to enlarge the proportion of display area on interface.
3. **Cancel:** Long pressing  to cancel the screen group.



Display

Output List:

White one: available

Gray one: unavailable

Operation Steps:

Left-mouse click the output and drag it to the display of the set container.

Replacement:

Drag and drop the output into the corresponding display. The output being replaced will turn from gray to white in the list.



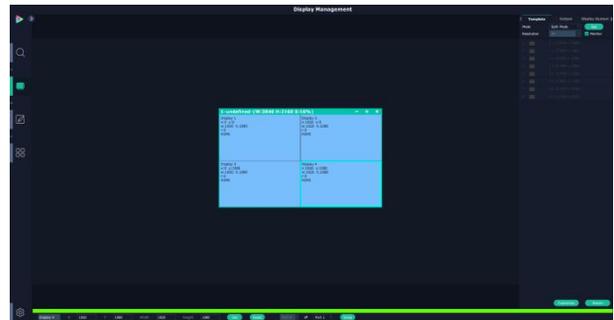
Display System

Q16pro Gen2 1U allows users to edit the name of the Display Area that has been created by clicking .



3.5.5 Layer Management

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



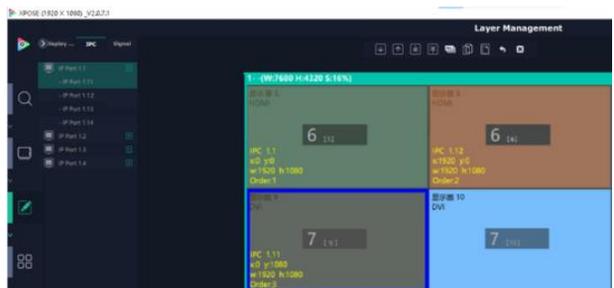
Display Area

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



IPC

IPC is short for IP Camera, that is, the signal of IP camera accessed through IP input module are displayed here.



Signal

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

Click , users can rename the input signal and then

click  to confirm.

Display ...	IPC	Signal
1 	3840*2160@60	
2 	3840*2160@60	
3 	3840*2160@60	
4 	3840*2160@60	
5 	No Input	
6 	No Input	
7 	No Input	
8 	No Input	

Layer

Layer number: The number in the red rectangle on the right figure represents the number of layers that can be placed at the output.

As signal source is dragged to the display, the number in the red rectangle reduces accordingly, and if layers have all been used up, the signal source cannot be dragged to this display anymore.



Note: One signal occupies one layer (4K signal occupies four layers), signal can be dragged into the container repeatedly.

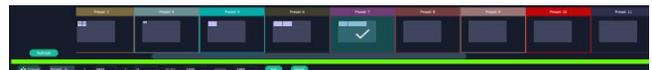
Layer Adjustment:

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 and Crop

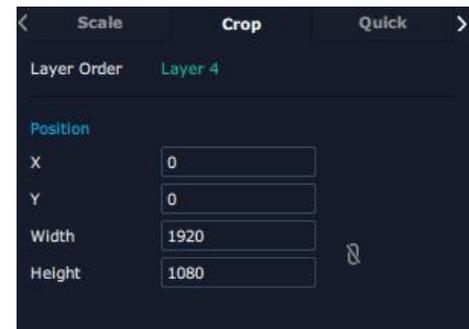
Choose one layer needed to be adjusted, and type in its position and size.



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



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



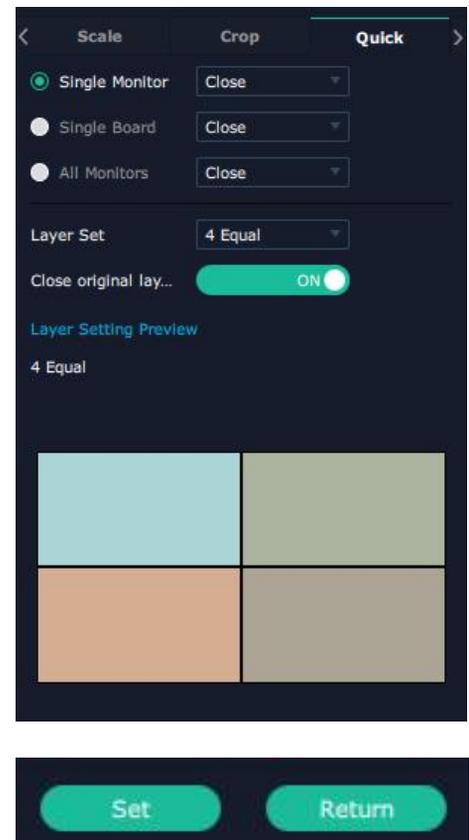
Quick

Quick is to set layer layout quickly.

1. **Single Monitor:** choose **one output port** users need to set
2. **Single Board:** choose **one output module** users need to set
3. **All Monitors:** set close or on
4. **Layer Set:** set layer layout

Users can drag and drop the source from the **Signal List**.

After setting, click **<Set>** to confirm and the layout will be shown in the interface as shown in the right figure.



Layer Movement

Moving the mouse to drag the layer.

Layer Remove

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

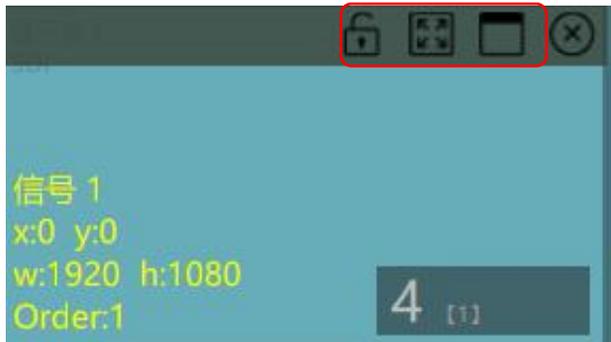


Layer Set

: lock the layer to prevent wrong operations.

: max to cover up the monitor.

: cover up all monitors in the same screen 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.

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

Notice: For modification of monitor where layer has been set, the monitor will display the input signal of the first interface by default.

3.5.6 Preset Management

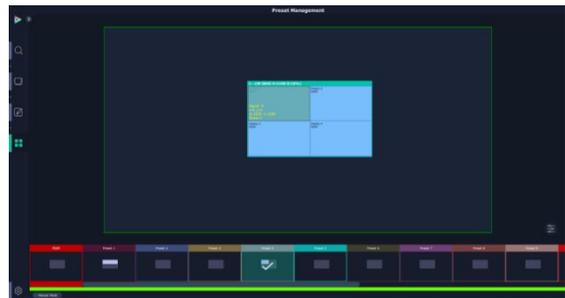
Preset Management is designed to switch bank and save bank.

Preset Management Mode:

1. Manual Mode
2. Schedule Mode

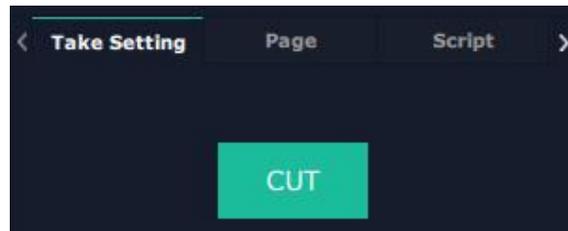
1. Manual Mode

The chosen scene will be displayed in the main interface, and the PGM screen is in the first in the Bank Column.



Cut

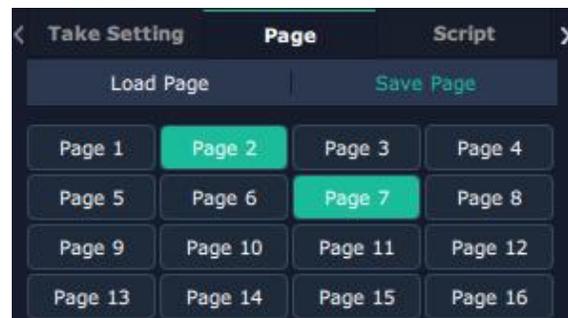
Cut, switch from PVW to PGM immediately.



Page

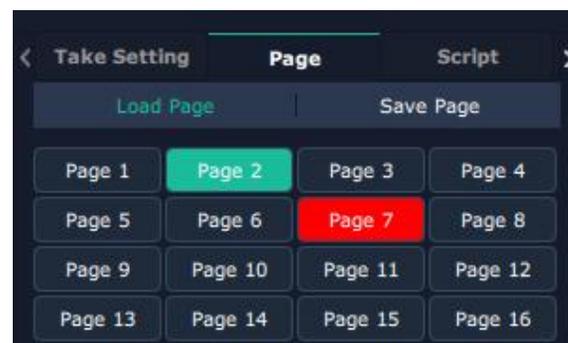
Save Page

Select a Preset, click Save Page, then choose Page X, and the Preset will be saved in this page. Page with saved preset displays in green.



Load Page

Click Load Page, page with saved preset displays in green. Select one preset and then load this preset, the page turns in red.

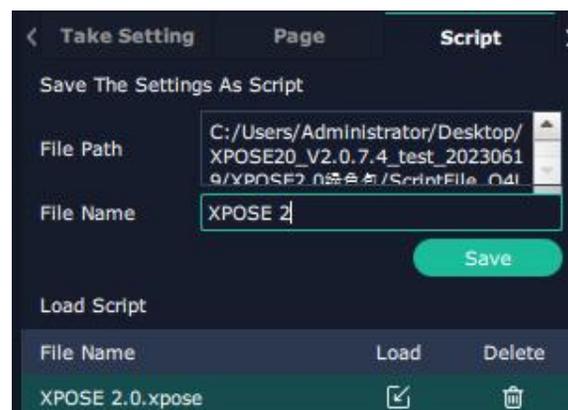


Script

Click <Script>, fill in the file name and click "Save", the file can be seen in the <Load Script>

Click "Load"  to load the file into XPOSE.

Click "Delete"  to delete saved script.



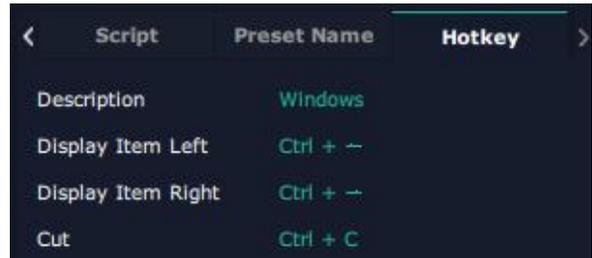
Preset Name

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.



Hotkey

Use hotkey to let the operation in Preset Management more convenient.

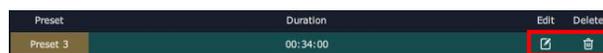
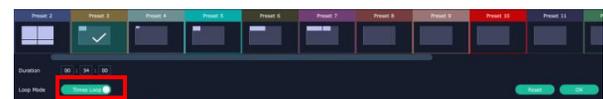
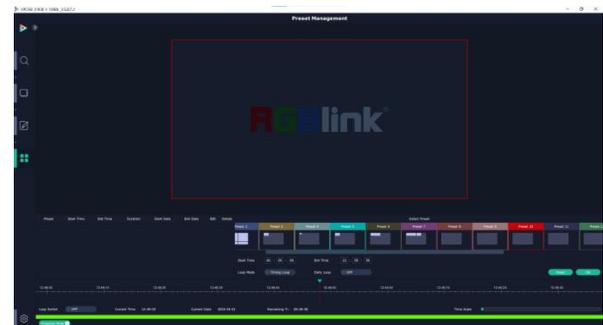


2. Schedule Mode

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

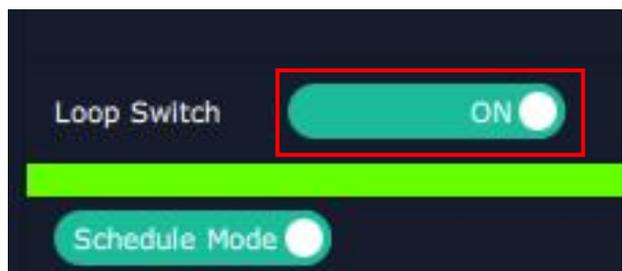
Steps are as follows:

1. Turn on “Schedule Mode”
2. Choose “Times Loop” in Loop Mode
3. Choose the BANK
4. Fill in the “Duration”
5. Click “OK”



Users can click  to edit and  to delete. After

settings done, turn on “Loop Switch” .



Chapter 4 Order Codes

4.1 Product Codes

Order Codes	Description
712-0004-05-0	Q16pro Gen2 1U 2K Standard: 1 x Host (Communication Module Included) 1 x HDMI 1.3 Input Module 1 x HDMI 1.3 Output Module
712-0004-05-1	Q16pro Gen2 1U 1 x Host (Communication Module Included)

4.2 Module Codes

4.2.1 Input Modules

Order Codes	Description
790-1004-01-0	Q16pro Gen2 1U Quad HDMI 1.3 Input Module
790-1004-02-0	Q16pro Gen2 1U Dual HDMI 2.0 & Dual DP 1.2 4K@60 Input Module
790-1004-03-0	Q16pro Gen2 1U Quad DVI Input Module
790-1004-04-0	Q16pro Gen2 1U Quad 3G SDI Input Module
790-1004-05-0	Q16pro Gen2 1U Single IP Input Module
791-0004-01-0	Q16pro Gen2 1U Dual HDMI 1.3 & Dual DVI Input Module

4.2.2 Output Modules

Order Codes	Description
790-1004-21-0	Q16pro Gen2 1U Dual DP 1.2 Output Module
790-1004-22-0	Q16pro Gen2 1U Quad HDMI 1.3 Output Module
790-1004-23-0	Q16pro Gen2 1U Quad DVI Output Module
790-1004-26-0	Q16pro Gen2 1U Dual HDMI 2.0 Output Module
790-1004-29-0	Q16pro Gen2 1U Quad SDI Output Module

Chapter 5 Support

5.1 Contact Us

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Europe Regional Sales & Support

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Chapter 6 Appendix

6.1 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 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 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:

● **NTSC:** The colour video standard used in North America and some other parts of the world create

d by
the
Nation
al
Televi
sion
Stand
ards

	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							

Committee in the 1950s. NTSC utilizes an interlaced video signals.

● **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-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 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 and 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 broadcast applications.

●**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 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 electronic 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.

●**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.

6.2 Revision History

The table below lists the changes to the Video Processor User Manual.

Version	Date	ECO#	Description	Editor
V1.0	2022-12-16	0000#	First release	Aster
V1.1	2023-04-12	0001#	Revise product codes	Aster
V1.2	2023-06-27	0002#	<ol style="list-style-type: none">1. Update button description on front panel2. Update menu structure3. Add XPOSE operation4. Update module specification	Aster
V1.3	2023-08-14	0003#	<ol style="list-style-type: none">1. Add input & output interface description in XPOSE operation2. Add notice of layer management3. Update module specification	Aster

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