IC2

User Manual

RGBlink®

Content

Thank you for choosing our product!

This User Manual is designed to show you how to use this product 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 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.

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.

Chapter 1 Your Product

1.1 In the Box

| Power Adapter	USB Cable	Certification
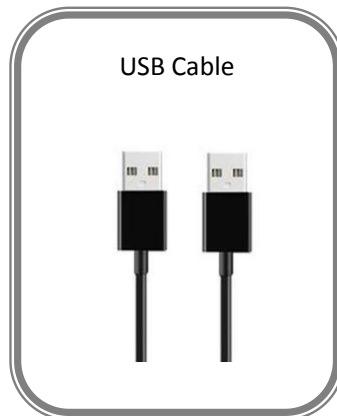
Note: Power Adapter is supplied according to destination market.

1.2 Product Overview

Meeting the growing requirements for distributed management, control and display of compute and other video systems, IC2 is so much more than KVM.IC2 provides secure IP based and advanced RGBlink video technologies for demanding environments where high performance and quality are essential.

Designed for multi-point applications, RGBlink IC2 are universal transmitter receivers that can be employed in a wide range of combinations in support of a diverse and dynamic range of applications.Each device as receiver/RX can support display of multiple video sources in flexible layouts with features including zoom and overlay. Videos sources up to 1080p60 are delivered with low latency and high quality. Switching between sources is seamless and glitch free.

USB mouse, keyboards and serial control devices may be used allowing remote control of connected computers from any designated point of control.
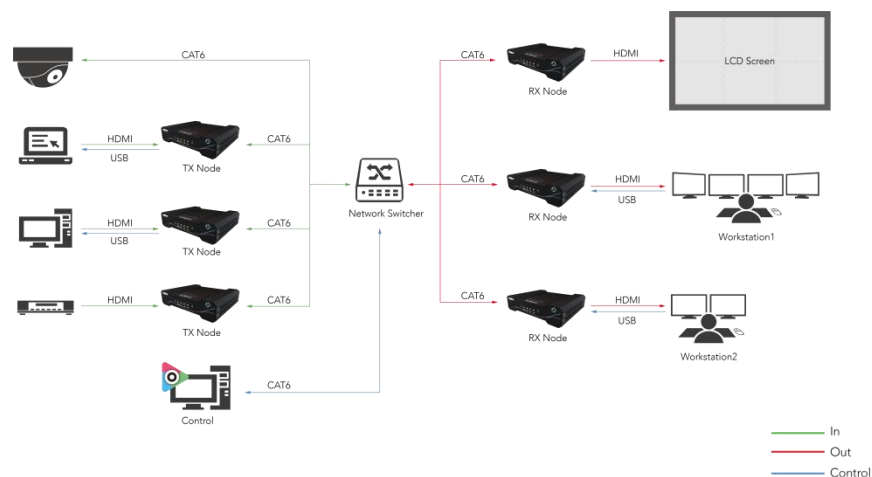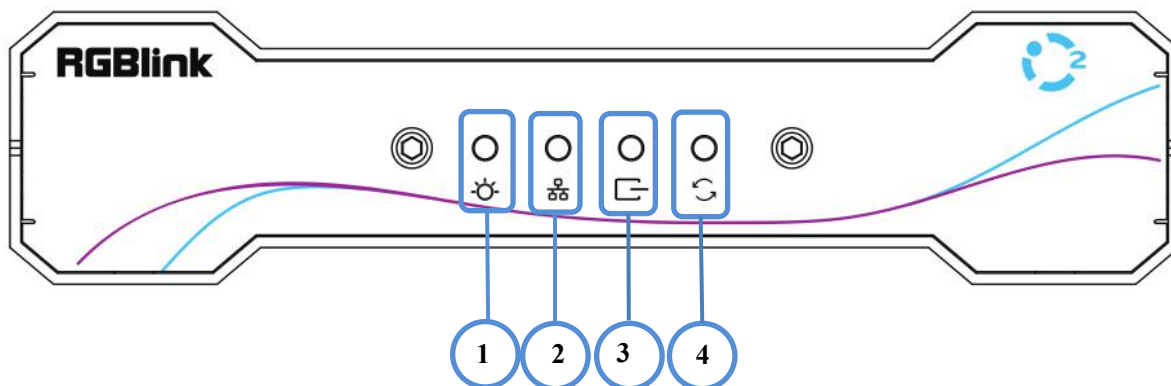

IC2   SYSTEM DIAGRAM

Key Features

- Resolutions up to 1920 × 1080@60Hz

- Support embedded audio

- Single interface supports up to 4 layers

- Support multi-layers splicing, scaling, overlay and roaming

- Switch TX/RX via DIP

- Indicator lights

- Support USB keyboard and mouse (KVM)

- Static and dynamic OSD overlay

1.2.1 Front Panel

| NO.	Item	Description
1	Power light	Power on
2	Connection light	Successful network connection
3	Signal light	Successful signal connection
4	Abnormal light	Device hardware runs abnormally

1.2.2 Rear Panel
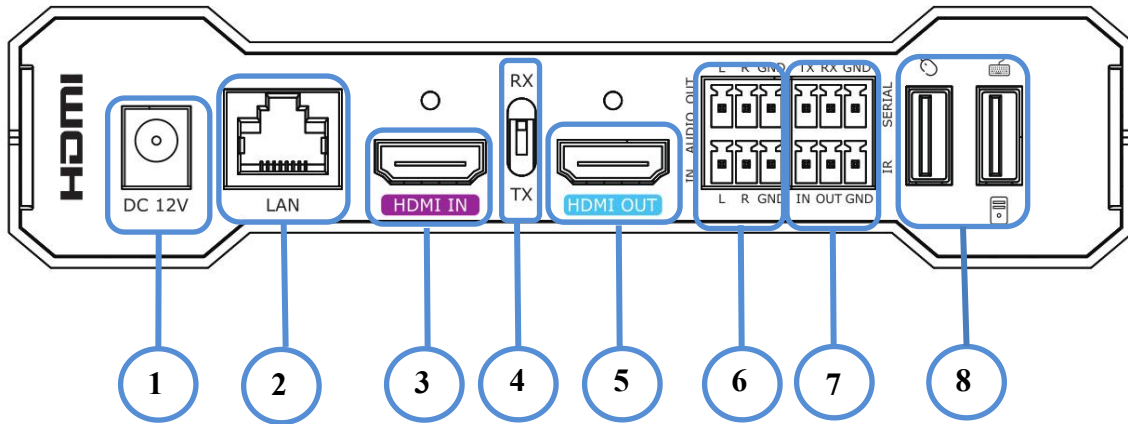
NO.	Connectors	Description
1	Power	Connect to 12V power supply
2	LAN	1×RJ45,connect to Gigabit Switch; Support PoE power supply
3	HDMI IN	1×HDMI-A As RX.it is useless; As TX,connect to media player or camera.
4	Switch	Switch between Receiver(RX) and Transmitter(TX)
5	HDMI OUT	1×HDMI-A As RX,connect to display; As TX,the signal of HDMI IN is the source of that of HDMI OUT
6	Audio	1×Analog Audio Input/Output
7	RS232	Connect to camera,projector and other devices needed controlling
8	USB	2×USB-A As RX,connect to keyboard and mouse; As TX,connect USB port on the right to the computer,which can be controlled by the terminal.

1.2.3 Dimension

Following is the dimension of IC2 for your reference:
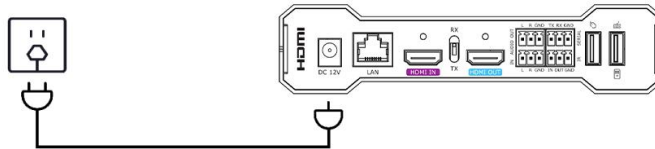
Dimension of IC2 :160mm×128mm×37.1mm
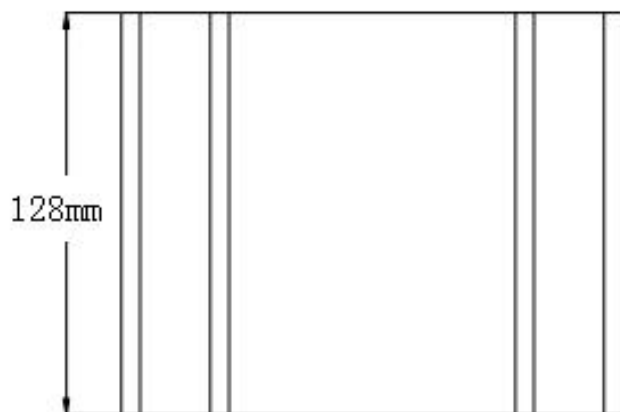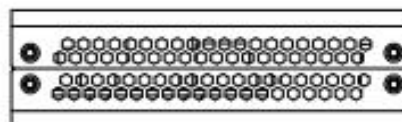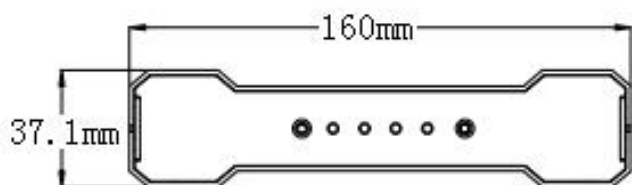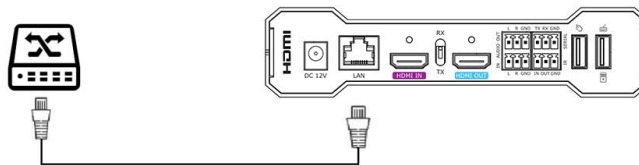
Chapter 2 Install Your Product

2.1 Plug in Power

There are two ways of power supply:

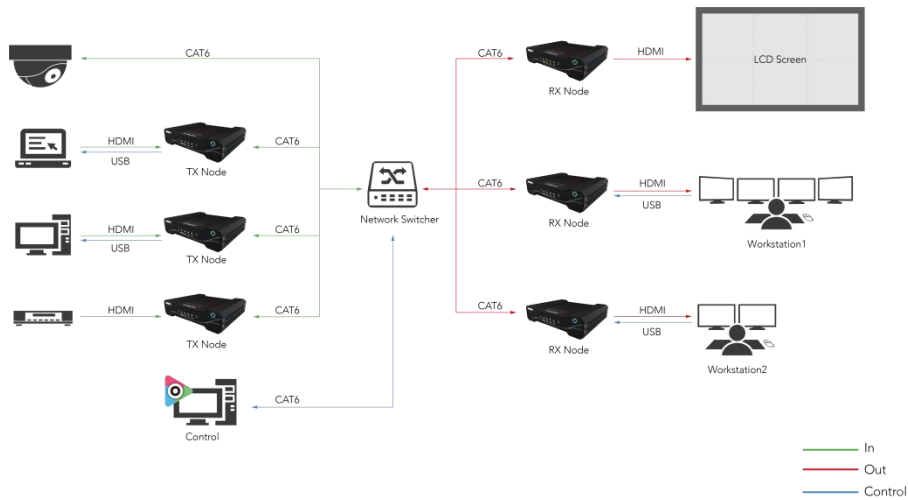1. Connect 12V power adapter and power cable to the wall socket,as shown in the picture below;

2. Connect IC2 to PoE Switcher via CAT6 cable,as shown in the picture below;

2.2 Connection

Connection mode as shown in the picture below:

1. As TX,connect HDMI input source to IC2 TX HDMI IN port.
2. As RX,connect monitor to IC2 RX HDMI OUT port.
3. Workstation:connect mouse and keyboard to RX USB port.
4. Connect all the IC2 device to the same Gigabit Switch via CAT6 cable.
5. Connect control computer to Gigabit Switch via CAT6 cable.

Note: Only the USB port with the host icon can achieve KVM control;The Gigabit Switch is essential and make sure that all the IC2 and control computer shall in the same network segment.

2.3 Rack Installation

Diagrams of Rack Installation are as follow:

Front View

Rear View

Chapter 3 Use Your Product

3.1 Software 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

Installation:

1. Double click ,it will pop-up the installer language box, select the language, for example, select"English", and click "OK" to confirm.
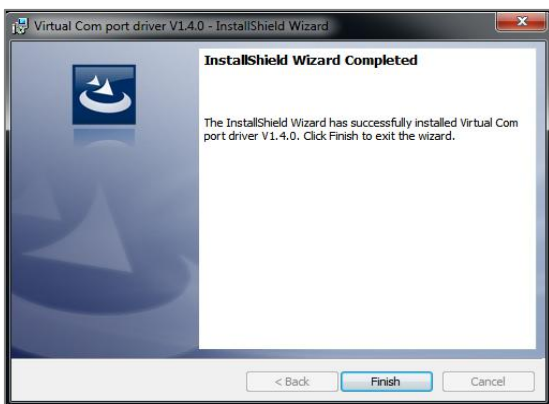
2. Click "Next"to install

3. Click "Browse…"to select the XPOSE software install location and click"Install"
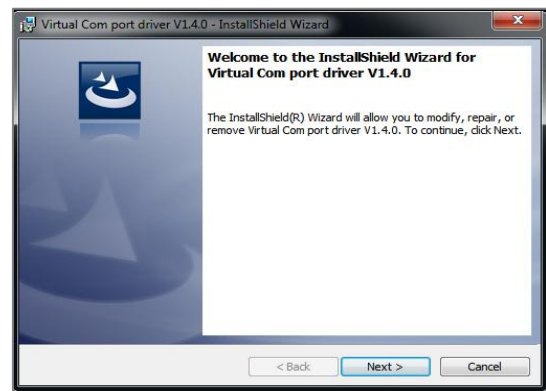
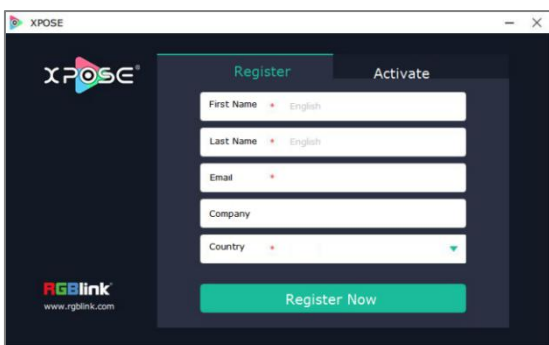4. During installation, it will pop up the window of Install Shield Wizard for Virtual Com port,click"Next"

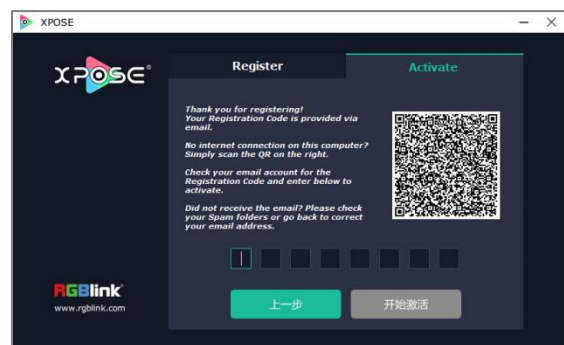5. Click "Finish" and complete the installation, as shown in the figure above

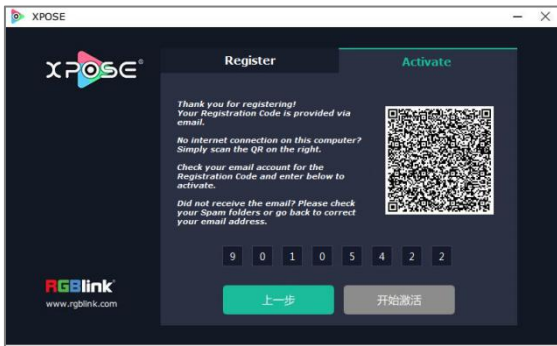6. Click "Finish"and is ready to run the XPOSE software
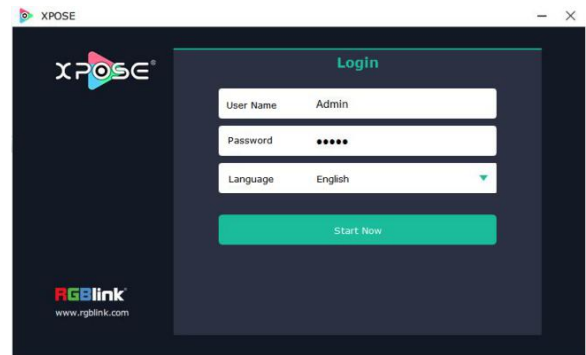
Registration:

1. Double click this icon 🔲 ,and enter the log on interface as follow
Click Register and fill in the blank with first name, last name, email, company and country and then click Register Now.

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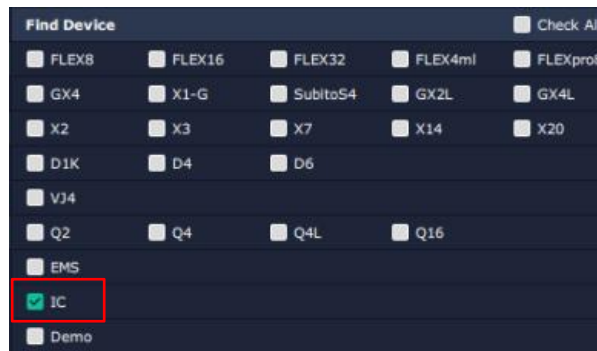
3. Type in the activate code and **confirm**.

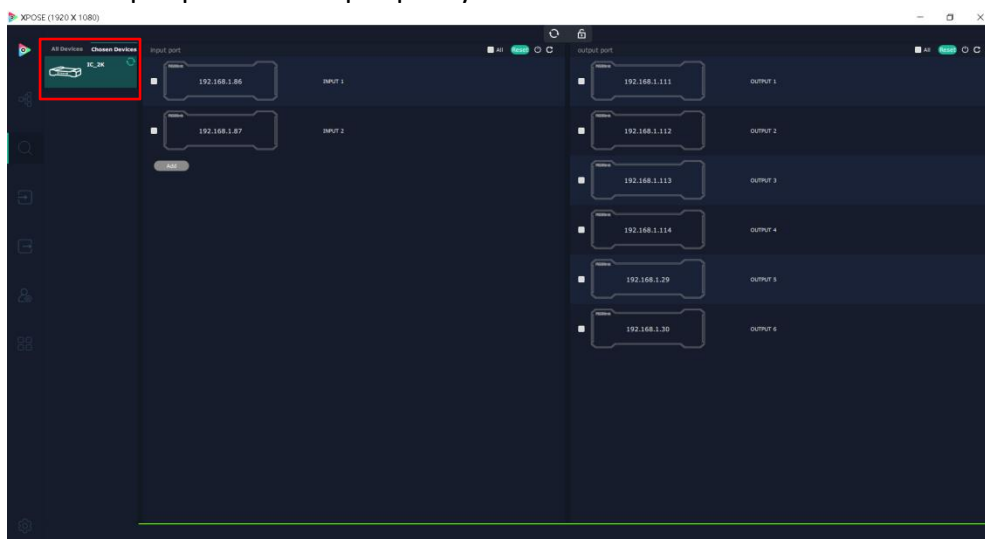4. Keep the user name as "Admin" and password blank and then click **Start Now.**

3.2 Software Operation

3.2.1 Search Device

1. Click the icon ⚙ to enter System Settings interface,and select "IC" in the list of **Find Device.**
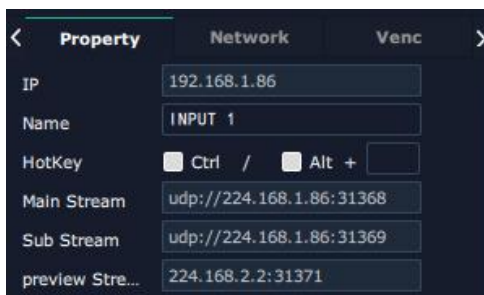

2. Click the icon 🔍 to enter the interface,select "IC" in the list of **All Devices** and **Chosen Devices**,and select input port and output port you need.

3.2.2 Input Port

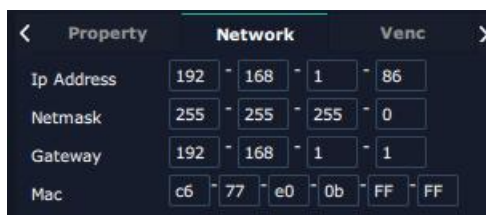1. Property

Click input port to check property,including IP,Name,Main Stream,Sub Stream and Preview Stream

2. Network

Edit IP Address,Netmask and Gateway for input port.

3. Venc

Edit Main Stream,Sub1 Stream,Sub2 Stream and other parameters.

Venc Style: The higher the resolutions,the higher the frame rate,the clearer the video is.The Venc Style should not exceed the input resolution,and they will be the same by default.
Venc Type: H.264/H.265,H.264 by default
Frame: The high the frame rate,the smoother the video,A default frame rate of 60 can significantly improve the sense of interaction and realism.The frame rate is up to 60.
Quality: select the image quality as low,medium or high.

4. Audio
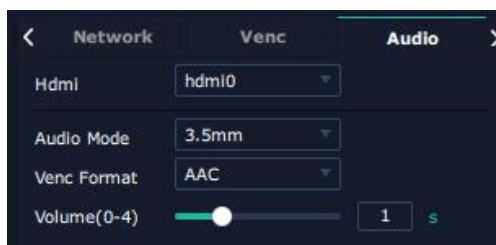
Audio Mode:3.5mm/HDMI
Venc Format:AAC/G611A
Volume:0-4

5. Advanced
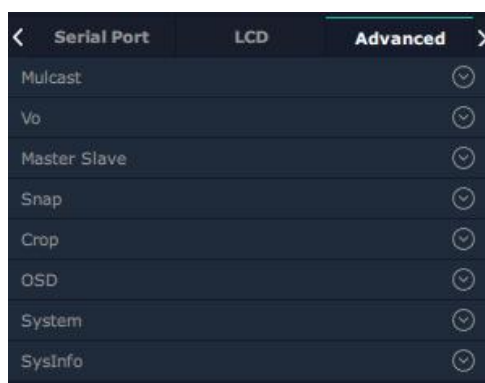
Mulcast

Basically, the multicast address and port are set as the default address and port.

Vo

Out Same In/Hardware Loop:ON/OFF

Brightness/Contract/Hue/Saturation:50 as default

Snap
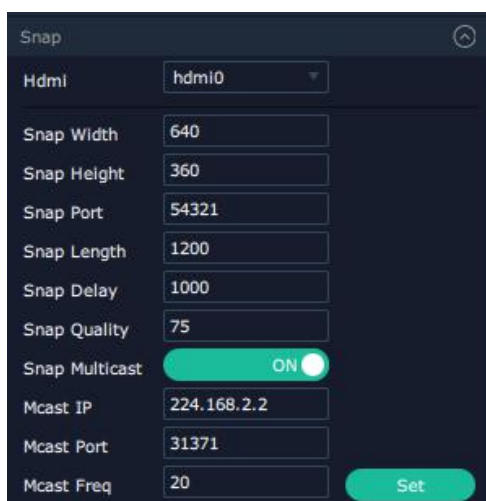
Set snap parameters

Crop
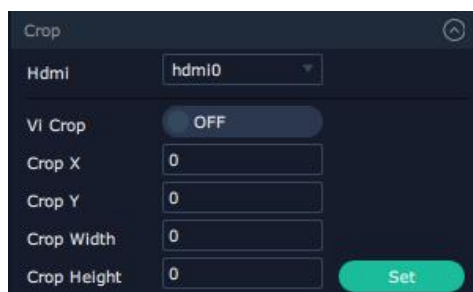
Vi Crop:ON/OFF

Crop X/Y: the starting crop horizontal and vertical position

Crop Width:256<Crop Width<Width Total-Crop X;

Crop Height:128<Crop Height<Height Total-Crop Height;

Venc Style≤Crop Resolutions≤Input Resolutions

OSD

OSD:ON/OFF

OSD Content: The content is limited in length,usually no more than 20 words.

Front Size/Color/OSD X/Y:adjustable as shown in the picture

SysInfo

You can check the Product Name/MainBoard/System/Switch to Output

3.2.3 Output Port

1. Network

Edit IP Address,Netmask and Gateway for output port.

2. Audio
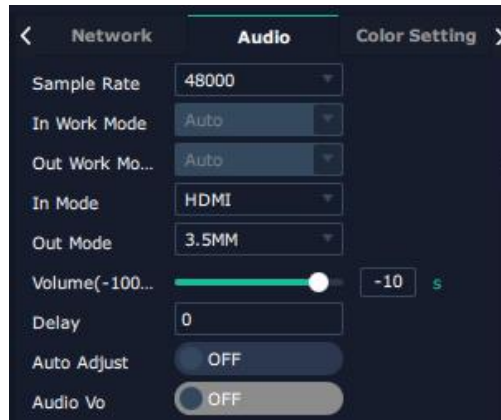
Sample Rate: refers to the sampling numbers to audio in 1 second.The higher the sampling frequency, the more real and natural the sound will be restored. The product supports 48000.
In Mode:HDMI/3.5MM;
Out Mode:HDMI/3.5MM;
Volume: -10 as default
Auto Adjust/Audio Vo : ON/OFF

3. Color Setting
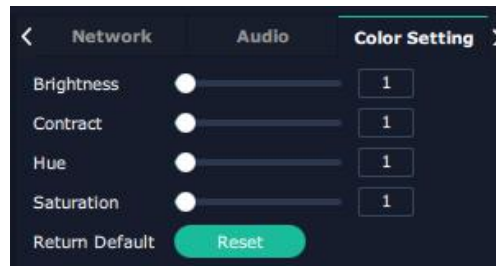
Brightness/Contrast/Hue/Saturation:adjustable;
Return Default:Click Reset to restore default value as 50

4. Advanced
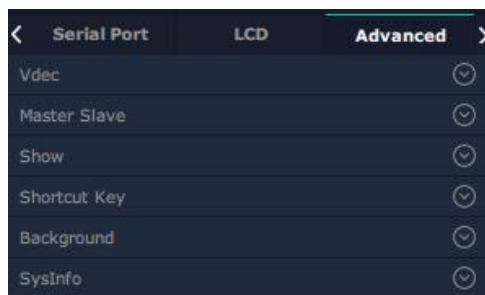
Vdec

Max Resolution:support up to 1920*1080;

Vdec Num: The number of decoding channels is related to the maximum decoding resolution. When the maximum decoding resolution is 1080p, the corresponding number of decoding channels is 16;

Vdec Mode: stream/frame,stream as default;

Output Resolution:up to 1920*1080;

Output Mode:HDMI/DVI/AUTO,HDMI as default;

ForceOut:ON/OFF

Master Slave
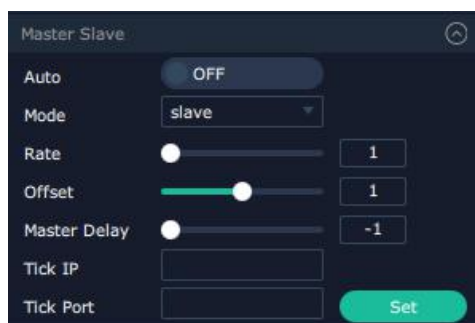
Set Master slave to achieve layer overlay,roaming,scaling and other functions.

Show
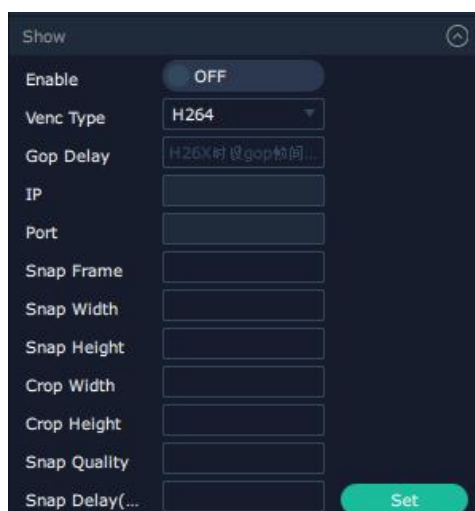
Enable:ON/OFF
Set the snap and crop parameters

Shortcut Key

KVM/Title/LOGO/VO/:ON/OFF
Fix MAC:OFF as default

Background
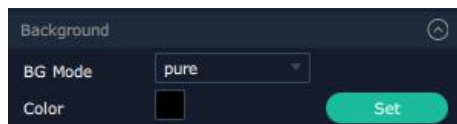
BG Mode:pure/image

SysInfo

Check Product Name,MainBoard,System,Switch to Output

3.2.4 Input Manage

Click the icon to enter <Input Manage> interface,as shown in the figure below,there is a list of <Input Node> in the left side and <Group Signal> in the right side.
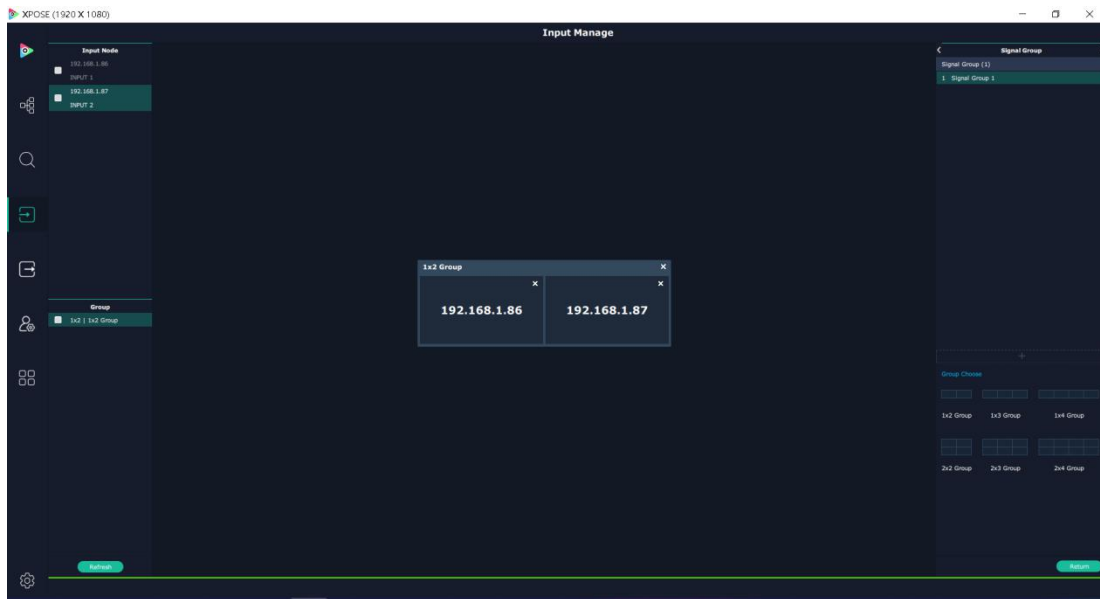
Signal Group

1. In the <Signal Group>menu,click "+" to add a new signal group,click ✎ to edit the group name,click ☒ to delete a signal group.

2. Group Choose:there are 6 kinds of Groups to be selected.You can select different Groups in one Signal Group.

3. Drag and drop the input node in the left side to the Group you have selected in last step.

4. Select Input Nodes and Groups, which have been set in last step, for different Signal Groups.
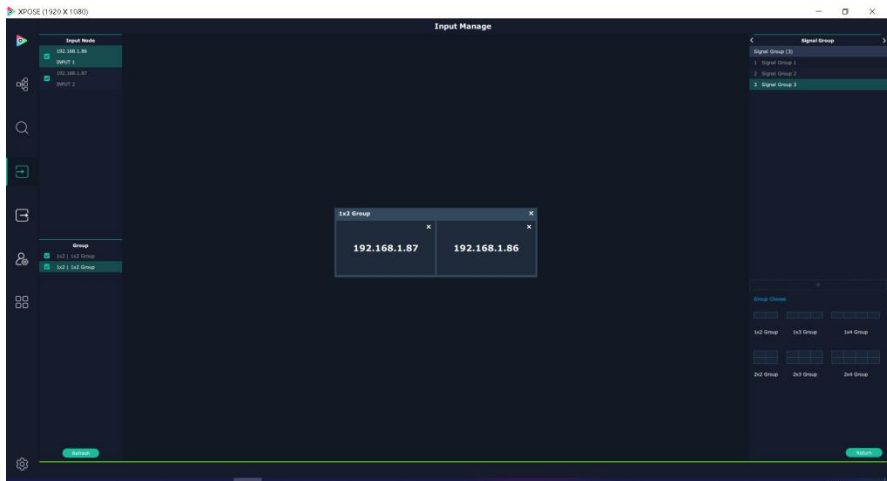
3.2.5 Output Manage

Click the icon ▣ to enter <Output Manage> interface,as shown in the figure below:there is a list of <Output Node> in the left side and <Videowall> and <KVM> in the right side:
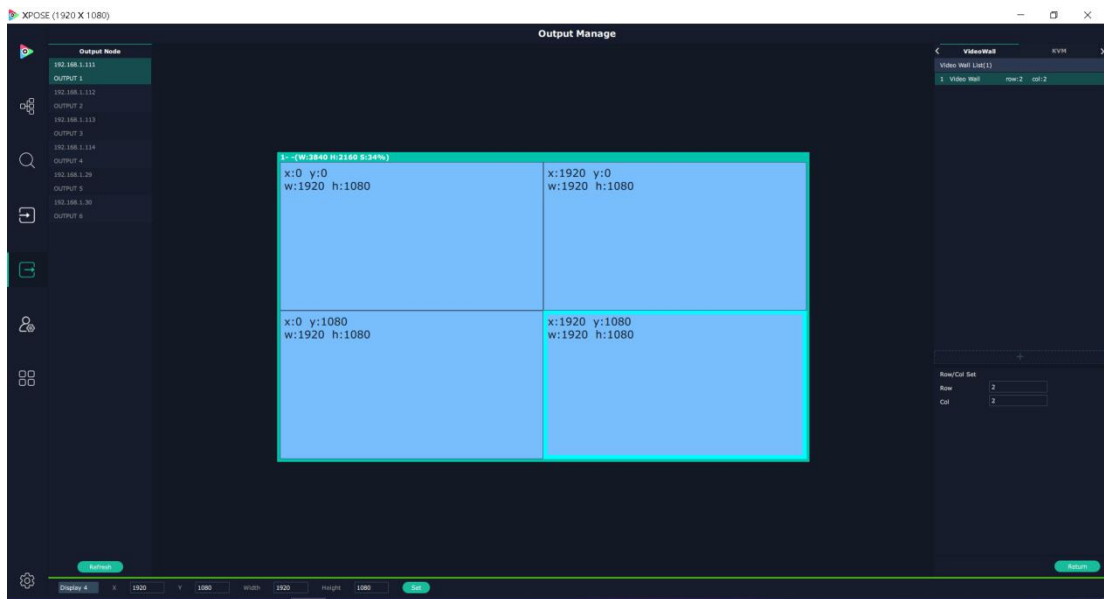
Videowall

1. In the <Videowall> menu,click "+" to add a new Video Wall,click ✐ to edit videowall name,and click ☒ to delete videowall.
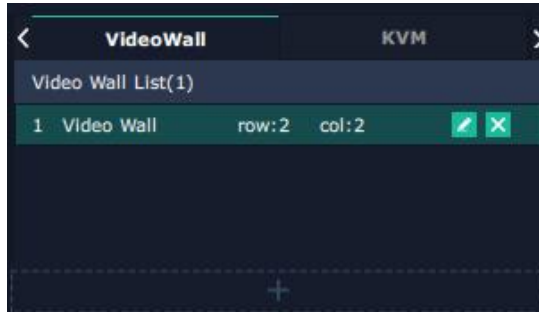
2. In the<Row/Col Set> menu,fill in the number of row and col you want.For example,set row as 2,col as 2,there will be a 2*2 videowall show in the interface.
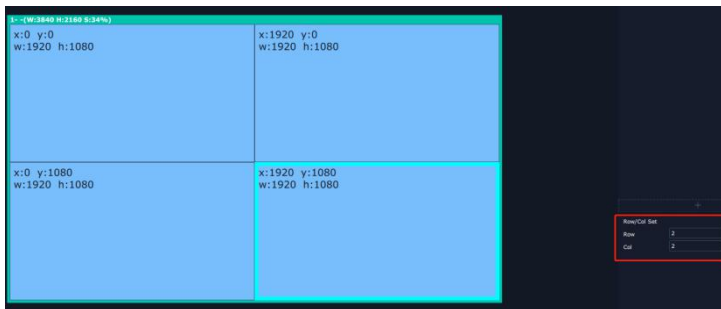
3. Drag and drop the output nodes in the left to the videowall as shown in the figure below,a videowall rectangle will appear in the output nodes you have selected.

KVM

1. In the menu of <KVM>,click "+" to add a new KVM,click ✐ to edit KVM name,and click ☒ to delete a KVM.
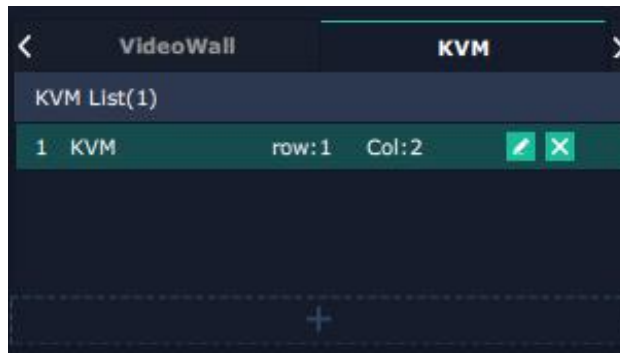
2. There are 8 kinds of KVM Sets to be selected as shown in the figure:
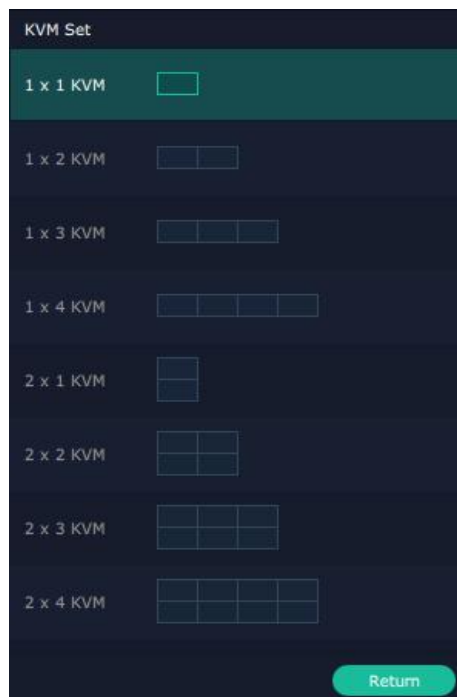
3. Drag and drop the output nodes in the left side to the KVM as shown in the figure below,please note that the same output node cannot exist in both videowall and KVM at the same time.

3.2.6 User Manage

Click the icon to enter<User Manage>interface as shown in the figure:
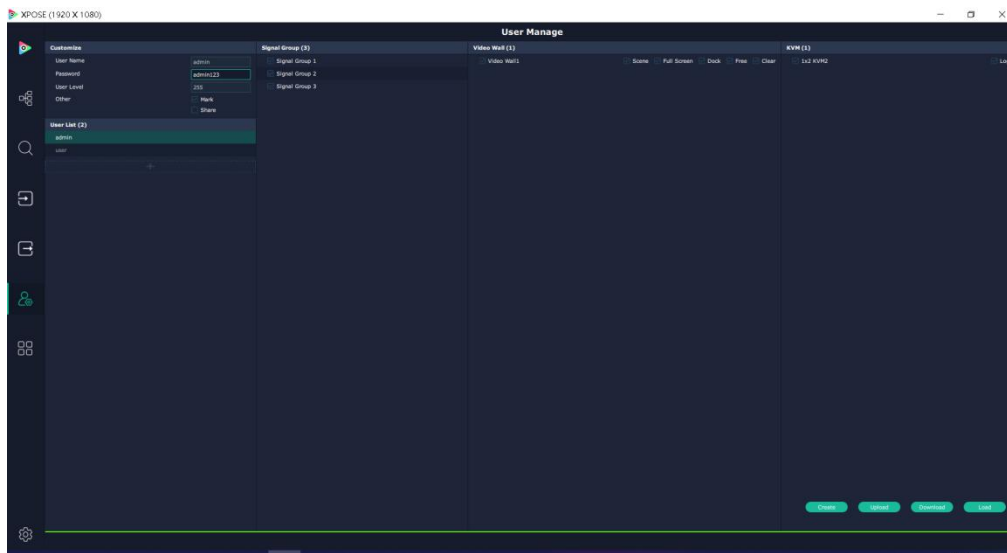
1. In the<Customize>menu,edit User Name,Password and User Level;
   In the <User List>menu,click "+" to add a new user.

2. Authorization Setting

Admin enjoys all the permissions of Signal Group,Video Wall and KVM.

Other users can be assign permissions according to their needs

Video Wall:Scene,Full Screen,Dock,Free,Clear.

KVM:Login

3. After all the settings,click<Create>and <Upload> to upload all the settings to the device.
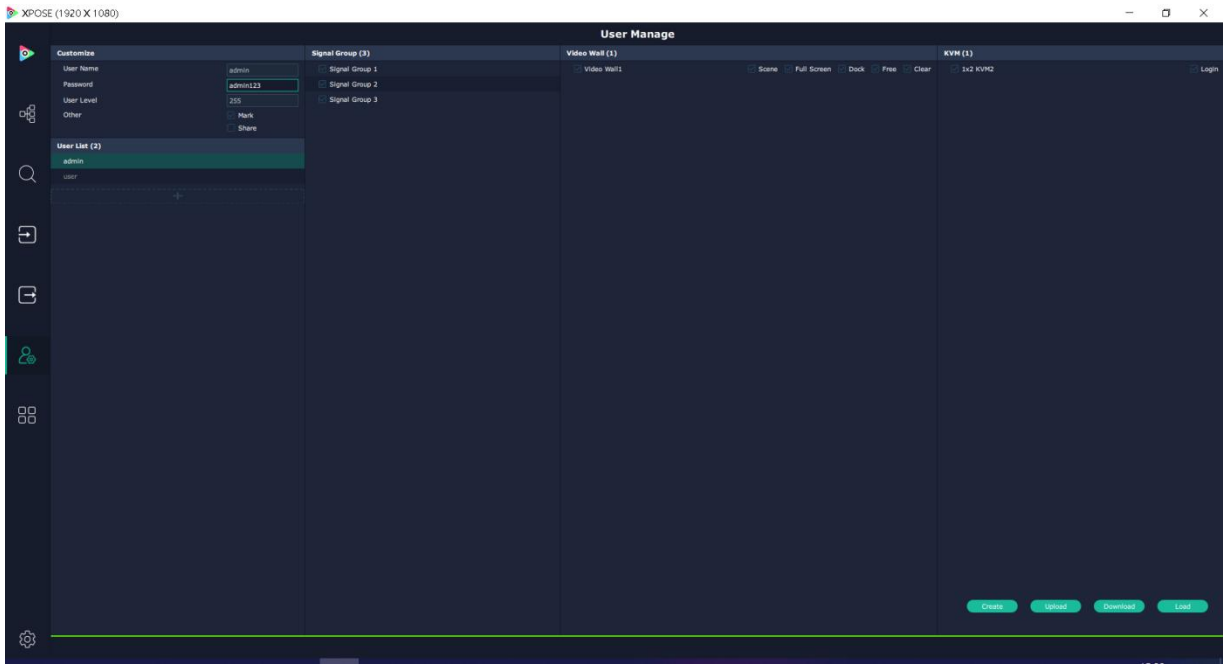
3.2.7 Videowall Manage
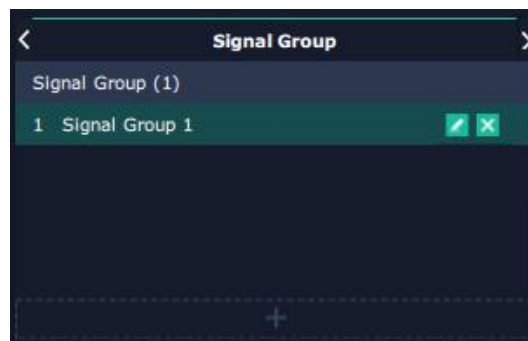
Click the iconto enter<Videowall Manage>interface as shown in the figure below,there is a list of <Signal Group> in the left side,<Videowall> and <Scene List> in the right side.
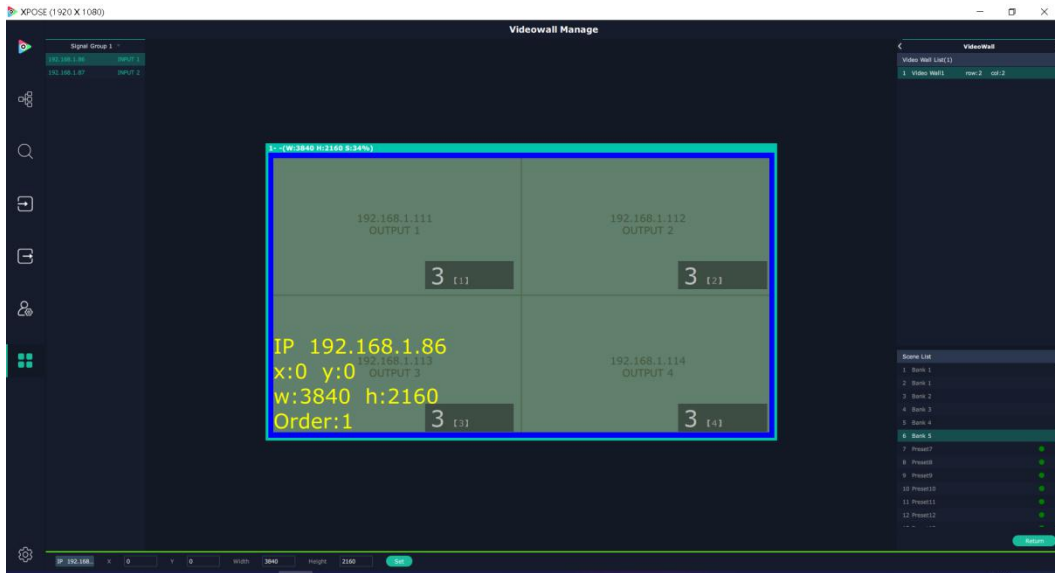
1. In the <Video Wall>menu,click the Video Wall you want to set.
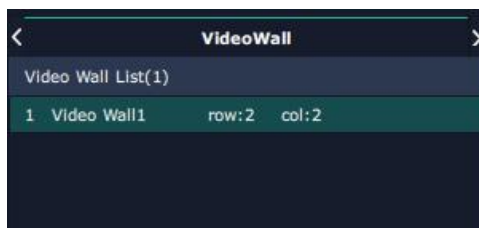
2. Each videowall can support 16 scenes.
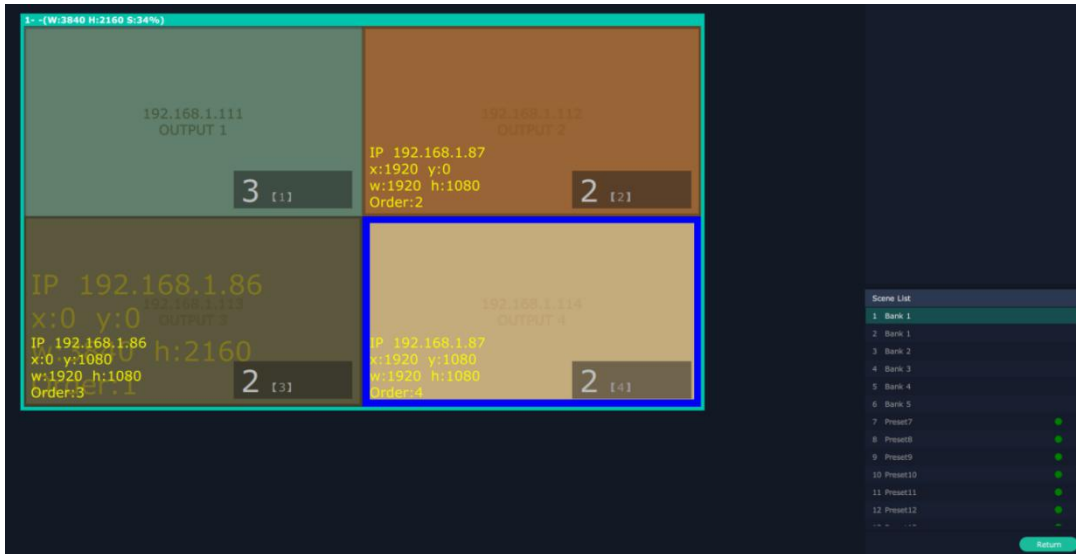
3.3 Computer Operation

IC2 supports keyboard and mouse operation for mode conversion:
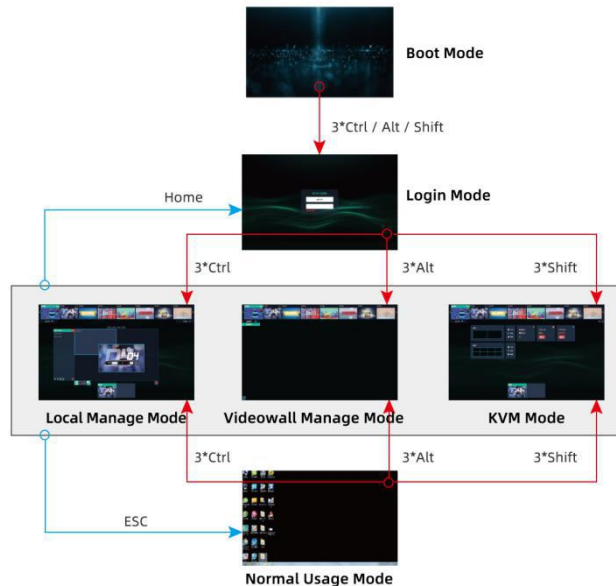
1. Press "Ctrl"/"Alt"/"Shift" three times to enter Login Mode.

2. Fill in the name and password:

● Press "Ctrl" three times to enter Local Manage Mode.

● Press "Alt" three times to enter Videowall Manage Mode.

● Press "Shift" three times to enter KVM mode.

3. Press "HOME" to exist current account and return to Login interface.

4. Press "ESC" to exist computer control.

3.3.1 Login Mode
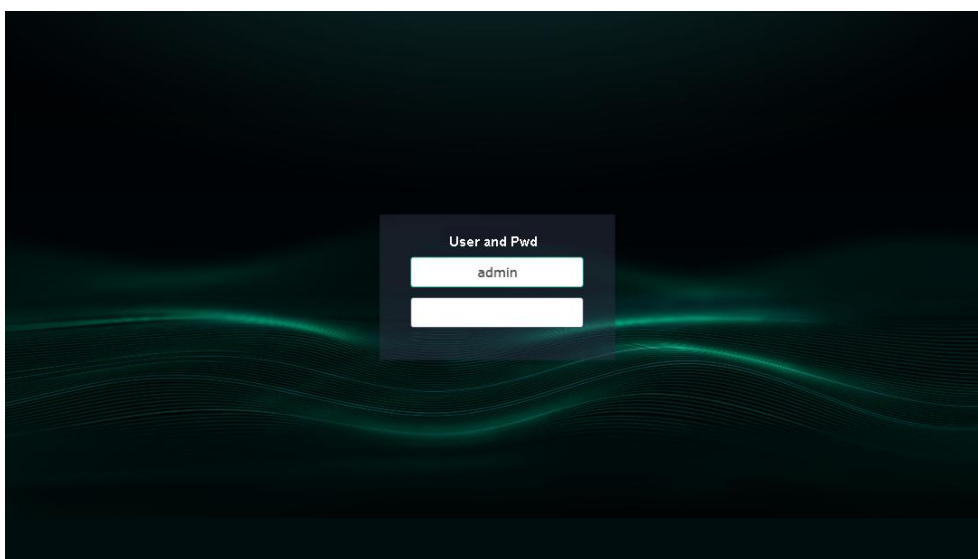
① Fill in the name and password via TAB key to switch.

② Press "Enter" to confirm(Incorrect user name or password will be indicated in red)

③ The background image can be configured with designer,and can be selected in either all-screen mode or single-screen mode.

3.3.2 Local Manage Mode

1. No signal
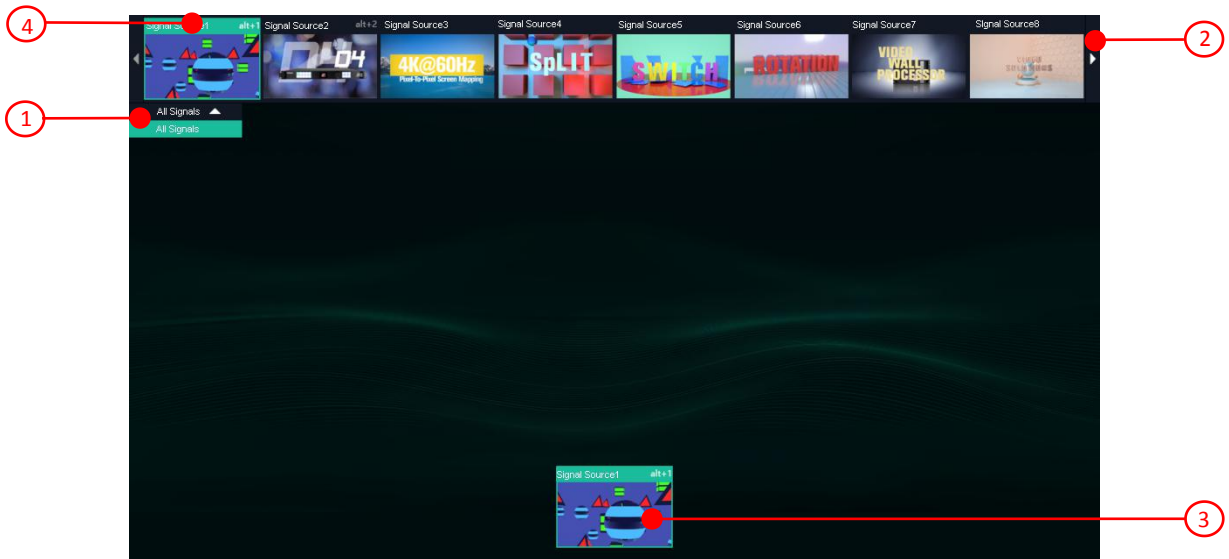
① Single click to select Signal Group

② Single click to select signal source paging(8/page)

Switch signal source: ③ Double click to switch signal source(Return to Usage Mode after switching)

④ Drag and drop the signal to the screen(or other screen)

⑤ Press hotkey to return to the screen your mouse control.

Note:A signal can only exist on one screen,but you can change its position by switching.

2. With signal
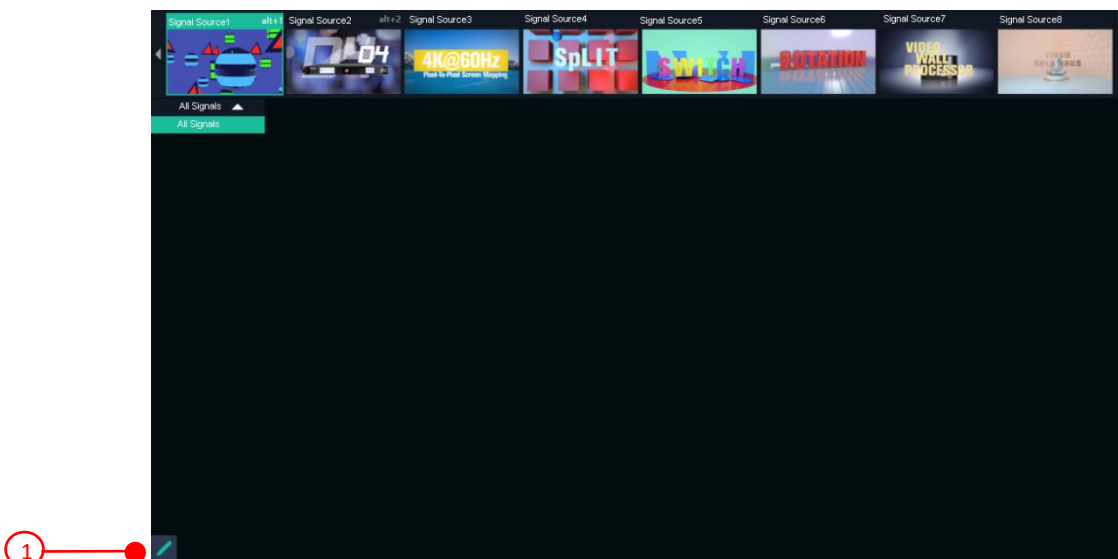
① If there is signal and users enjoy Mark permission,then you can mark on the screen.

3.Marking
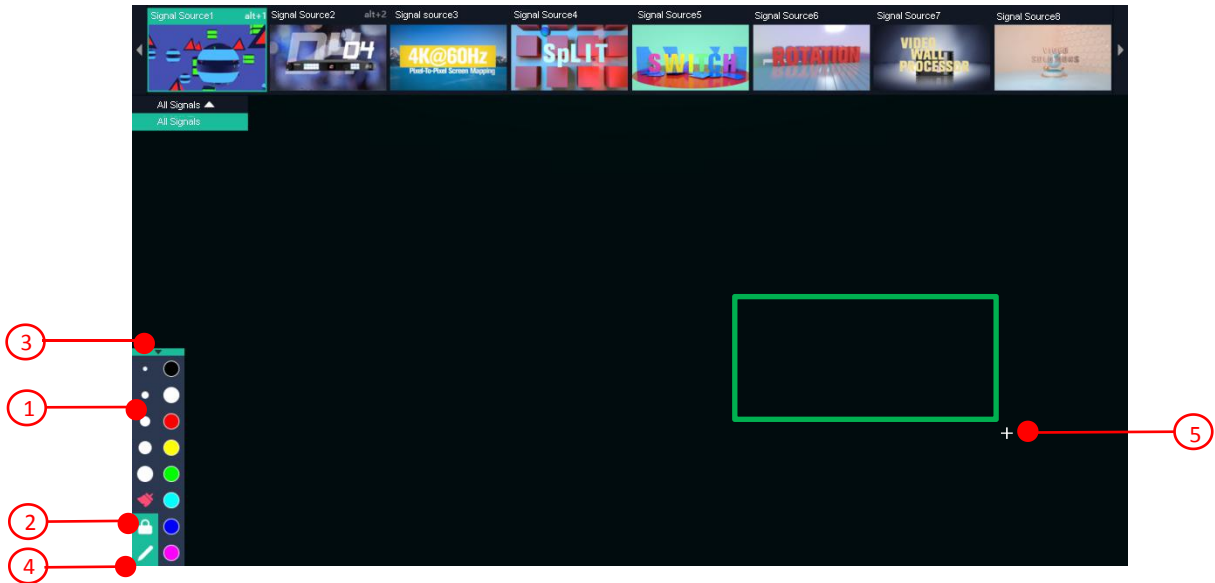
① Select the size and color

② Lock the permission

● Locked: Only users with high permissions can mark

● unlocked: All users with mark permission can operate

③ Keep the taskbar to exit Mark mode

④ Close the taskbar and exit Mark mode

⑤ Press Ctrl to switch mark status

● Free mark status:arrow cursor,real-time mark

● Rectangle mark status:cross cursor,mark takes effect after releasing mouse

⑥ When you press left mouse button to mark,the taskbar on the lower left cornor will be hidden.It will show again after finishing marking

Note:Only input signal can be marked.

3.3.3 Videowall Manage Mode

1. Scene menu closed

① Single click mouse to select videowall

② Single click mouse to select signal group

③ Single click mouse to select signal page(8/page)

④ Drag and drop to switch signals(you can also drag signals to other screen)

⑤ Users can select Docked Mode for Videowall(Docked Mode configured by Designer and users can only preview chosen windows)

⑥ Clear all windows

⑦ Free mode:drag and move windows

⑧ Scene List

⑨ Drag and drop signals to KVM to switch signals(preview chosen KVM screen)

⑩ Press Ctrl to select whether show the position ans size of the chosen window.

Signal source can be from Signal Source List,Videowall and KVM.

2. Scene Menu Opened
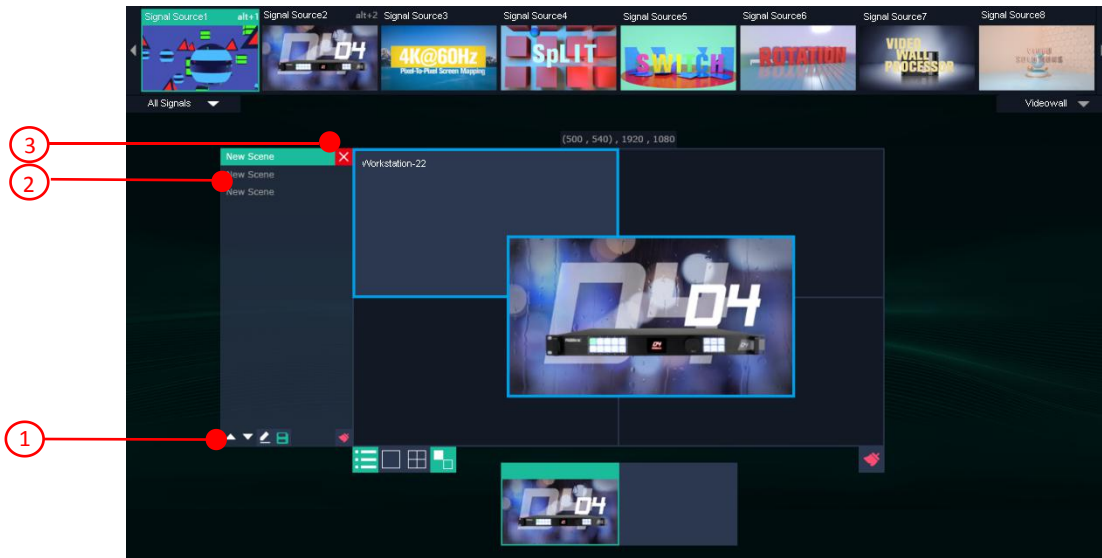
① Page turning/edit name/save/clear

● Choose one scene first and then edit

● Name can only be filled in lowercase English

● Clear saved scene

② Single click to chosen scene(KVM will preview chosen scene,but real-time videowall will not change)

③ Single click to delete chosen scene

④ Double click to switch scene(KVM preview and real-time videowall change simultaneously)

Admin user can view all the scenes created by other users,but other users can only view their own scene

3.3.4 KVM Mode
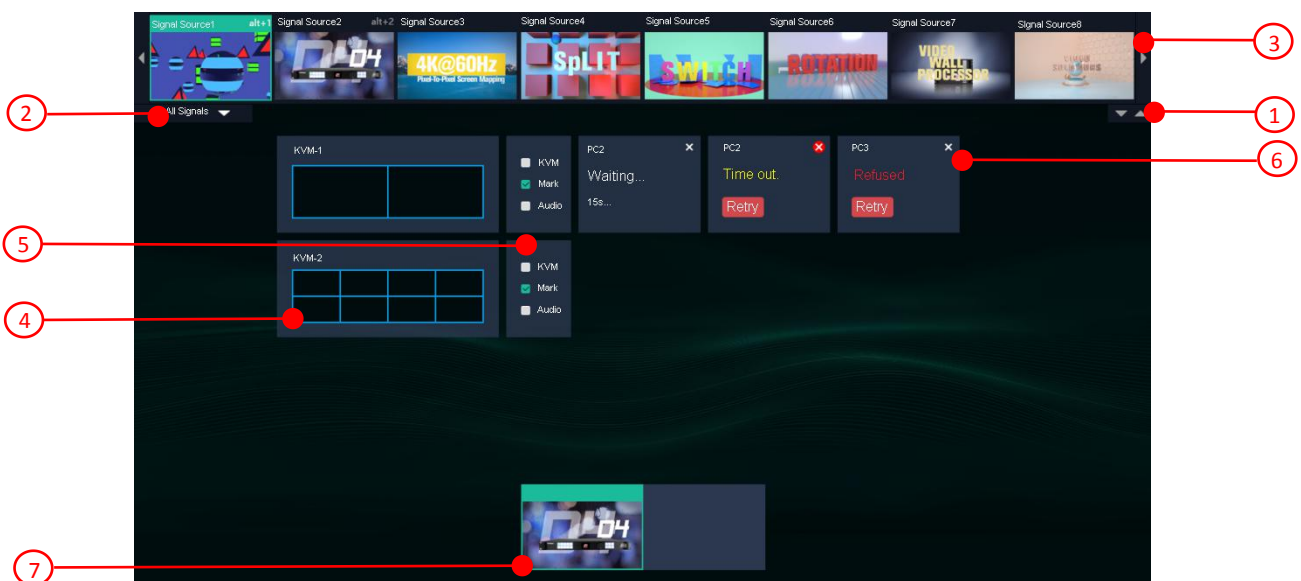
① Single click to select the KVM page(4/page)

② Single click to select Signal Group

③ Single click to select Signal Source page(8/page)

④ Drag and drop signal sources to KVM(push at most 4 signals to one KVM)

⑤ Select the permission for KVM

⑥ Click to delete pushing

⑦ Drag and drop signal sources to KVM to switch signals(only preview chosen screen)

There are 4 statuses of pushing:

● **Wait:** waiting for pushed KVM receiving signals

● **Time Out:** KVM does not response in 30 seconds

● **Refuse:**refused by pushed KVM

● **Receive:** received by KVM and close automatically

3.3.5 Normal Usage Mode

1. ESC(with signals)
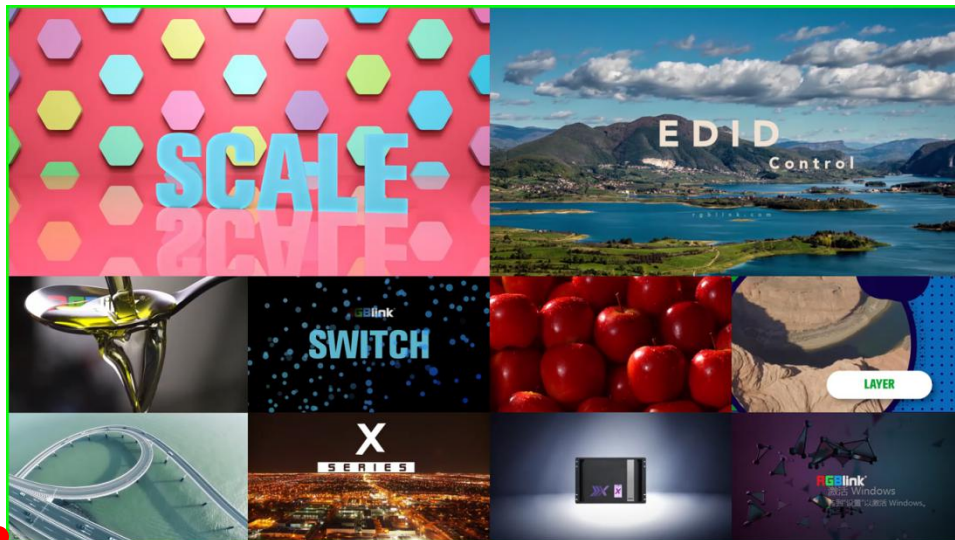
① The border of the screen where your mouse control will show green

2. Be Pushing(with signals)
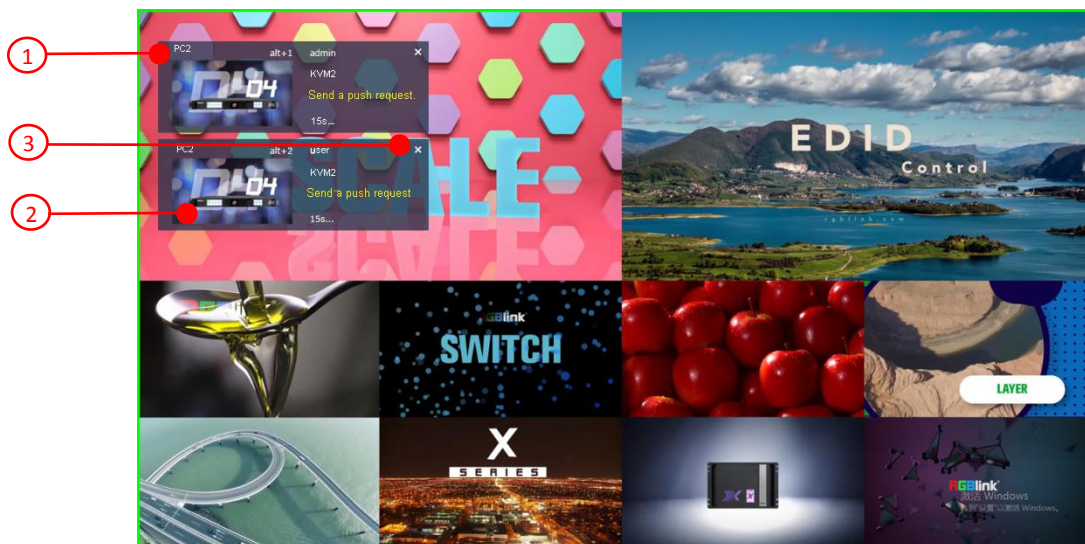
① Pushing List(6 at most, can be from different users)
② Drag and drop signal sources to receive and push(users can also drag and drop signals to other screen)
③ Single click ☒ to delete pushing(Users can only delete the pushing from low-permission users)

2. Be Occupied(with signals)
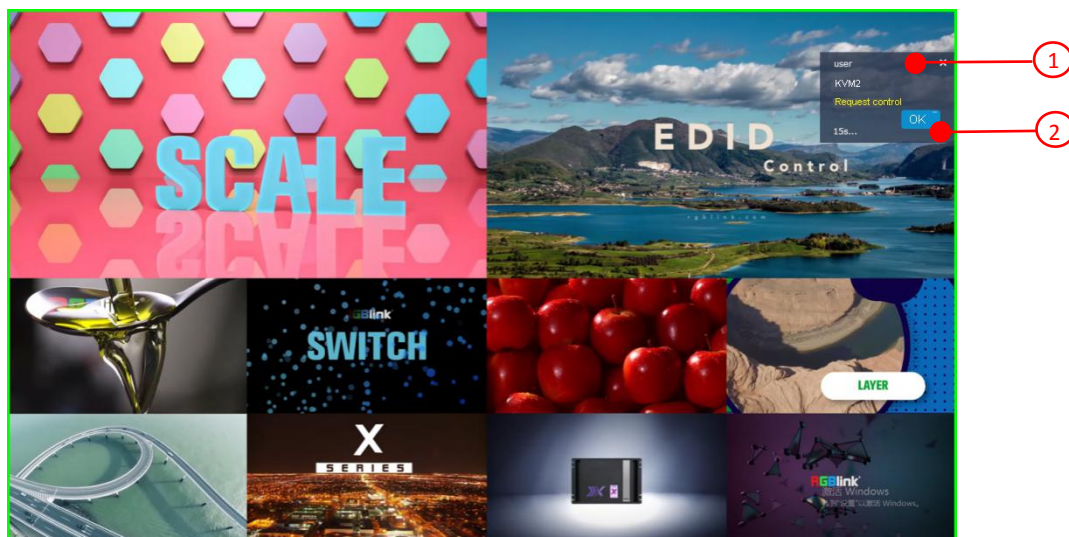
① Message List
② Single click to confirm or delete

Chapter 4 Ordering Codes

4.1 Product Code

660-0002-01-0   IC2

Chapter 5 Appendix

5.1 Specification

Connectors	Input	HDMI	1×HDMI-A
	Output	HDMI	1×HDMI-A
	Communication	USB	2×USB-A
		LAN	1×RJ45
		RS232	1×Phoenix
	Audio	Audio In	1×3 pin Phoenix
		Audio Out	1×3 pin Phoenix
	Power		1×DC Jack
Performance	Input Resolutions	HDMI	
		SMPTE	720p@60
		VESA	1024×768@60 | 1280×1024@60 | 1440×900@60 | 1920×1080@60
	Output Resolutions	HDMI	
		SMPTE	720p@60
		VESA	1024×768@60 | 1280×1024@60 | 1440×900@60 | 1920×1080@60
	Audio Format	AAC/G711A,DTS 5.1/DTS HD/DTS True HD, LPCM2.0/LPCM2.1/LPCM5.1/LPCM 7.1	
	Supported Standard	HDMI 1.3	
Power	Input Voltage	DC 12V	
	Max Power	20W	
Environment	Temperature	0°C ~ 60°C	
	Humidity	0%~65%	
Physical	Weight	0.4kg	
	Dimension	160mm×128mm×37.1mm	

5.2 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 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.
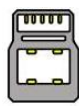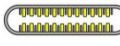
●**USB:** Universal Serial Bus is a standard that was developed in the mid-1990s that defines cables, connectors and communication protocols. This technology is designed to allow a connection, communication and power supply for peripheral devices and computers.

●**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:

	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.

●**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 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 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.

●**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.

5.3 Revision History

The table below lists the changes to the User Manual.

Format	Time	ECO#	Description	Principal
V1.0	2021-06-21	0000#	Release	Sylvia

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Chapter 6 Support

6.1 Contact Us

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