X7



User Manual

RGBlink®

Article No: RGB-RD-UM- X7 E004
Revision No: V1.4

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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 X7 processor 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 X7 processor 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 X7 should be clean, properly lit, free from static, and have adequate power, ventilation, and space for all components.

Chapter 1 Your Product

1.1Packing Configuration

AC Power Cord



USB Cable



Network Cable



HDMI to DVI Cable



DVI Cable



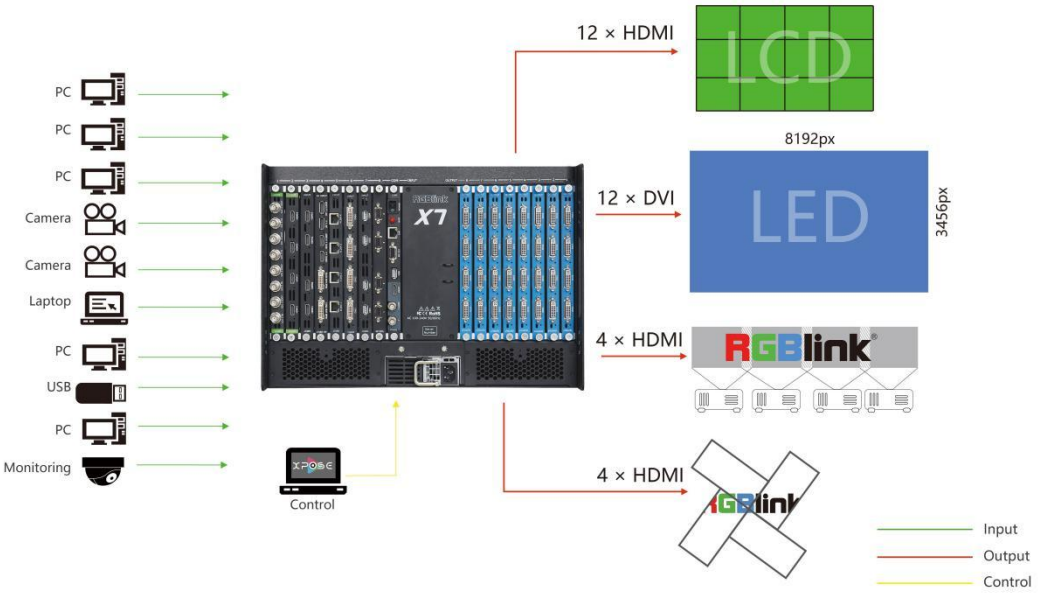
Note:

AC Power Cable supplied as standard according to destination market.

Upgrade tool package and user manual are stored in the USB disk, please keep it.

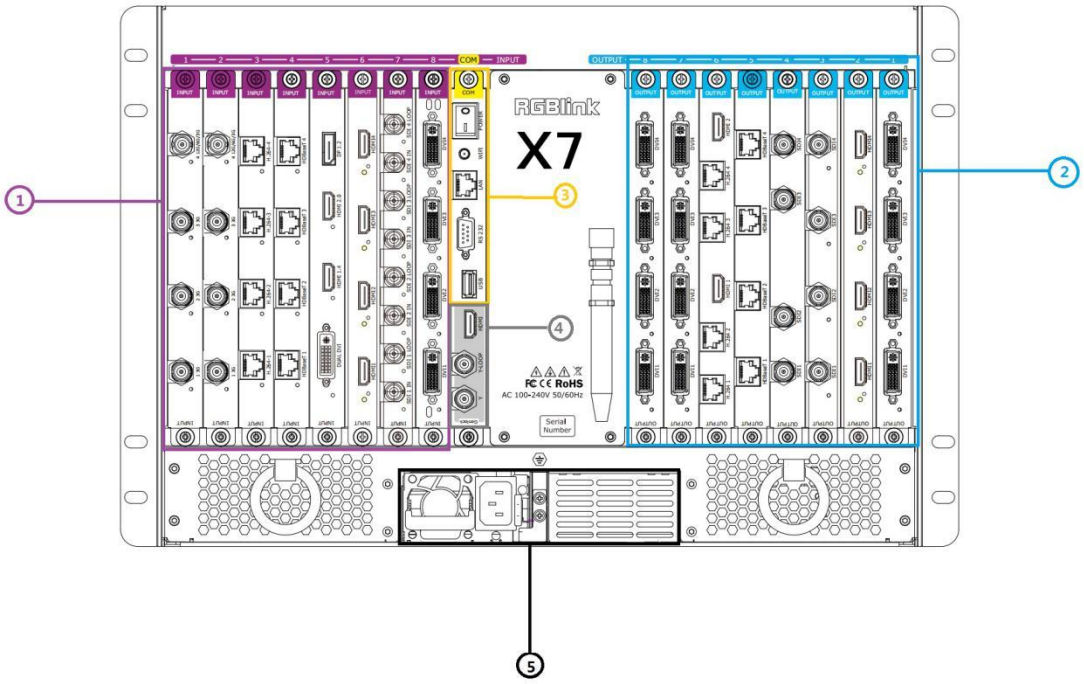
1.2 Product Overview

X7 is an HDCP compliant, scalable and extendable routing and video wall processor configurable to support a variety of inputs and outputs and windowing capabilities. It features RGBlink 3rd generation high performance video scaling technology for excellent image reproduction. The most outstanding feature of it is its throughly modular design, the card frame style, SmartSlot system allowing installation of up to 32 inputs and 32 outputs. Signals supported include SDI, HDMI and DVI, as well as DisplayPort, VGA, and USB direct input. Any input can be scaled, positioned, routed, transcoded to any output or be assembled as layers across outputs. Output capacity is a massive
64 mega pixels. Built for intensive switching and routing applications, the modular design extends to all aspects of the X7 for reliable and durable service.



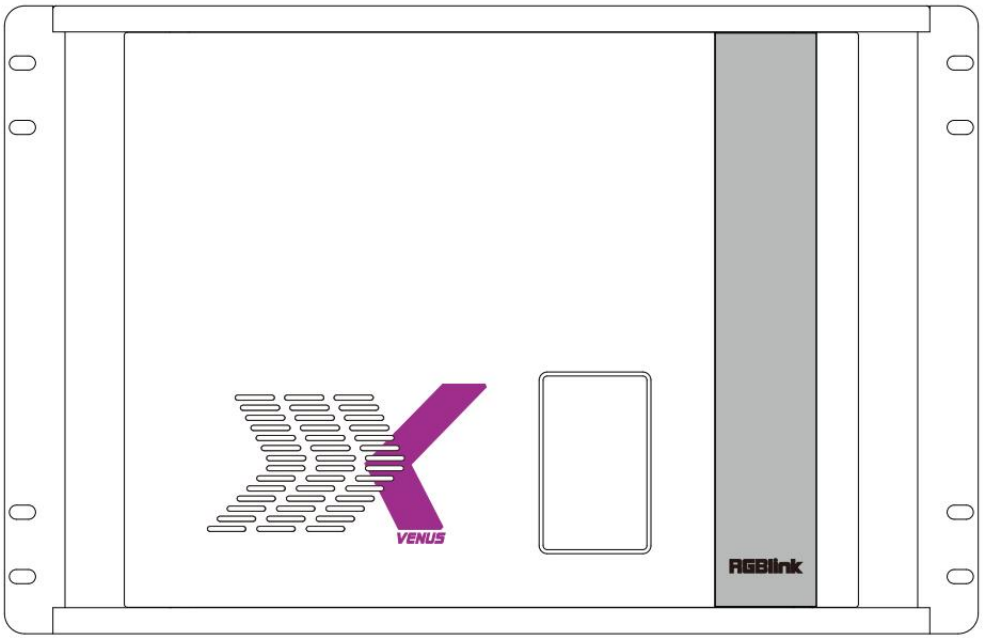
X7 Application Diagram

1.2.1 Rear Panel



Chassis Module Structure	
1	8 input module slots for modules of 4K digital, HDMI 1.3, DVI, 3G SDI,H.264 etc for details please find the Order Codes in Chapter 4
2	8 input module slots for modules of HDMI 2.0, HDMI 1.3, DVI, HDBaseT etc, for details please find the Order Codes in Chapter 4
3	Communication ports including LAN, RS232 , USB ports and WiFi
4	Genlock inputs (for Digital and Analogue signals)
5	2 slots for power supply modules

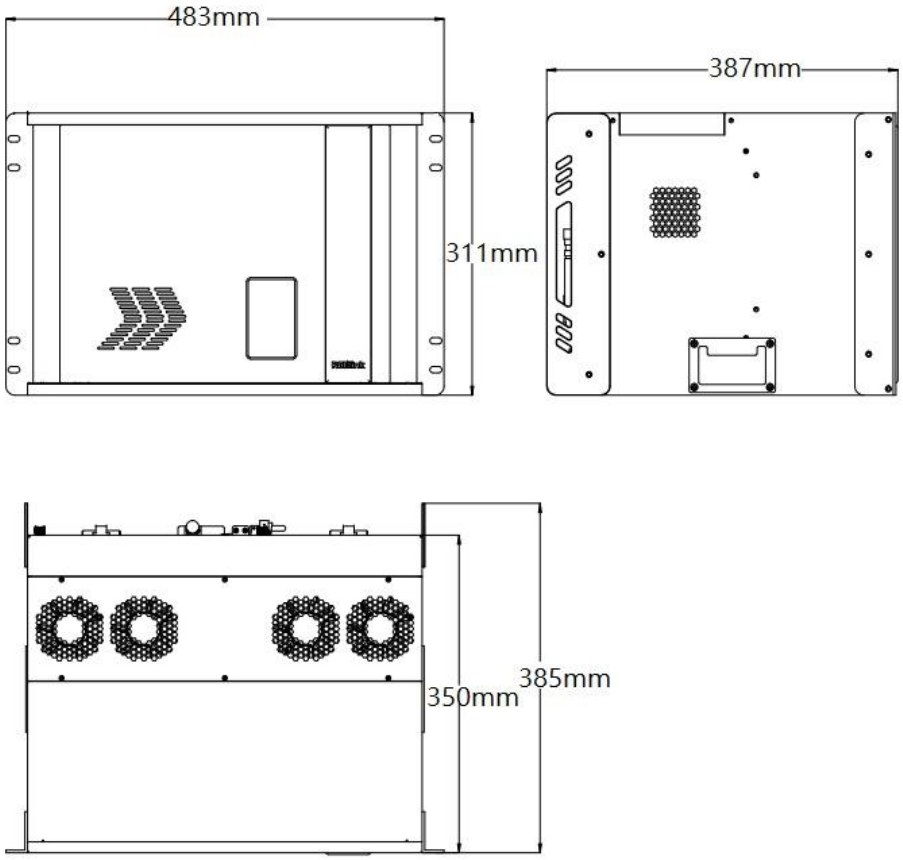
1.2.2 Front Panel



1	**OLED Panel** Show the info of input and output modules , device status, COM. Version, IP address and serial address.

1.2.3 Dimension

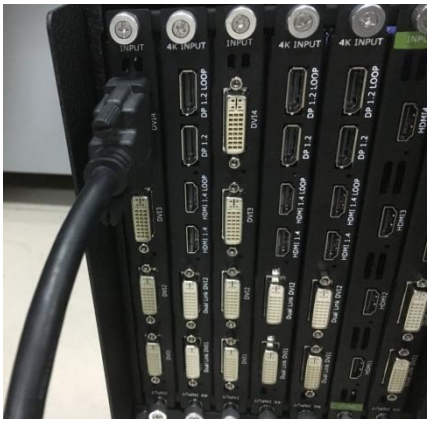
Following is the dimension of X7 for your reference:



Chapter 2 Install Your Product

2.1 Plug in Signals

Connect signals to the product (ensure all the device are all power off first).Tighten connector screws/locks where provided.



Please use cable that can support HDMI 2.0 or DP 1.2 to ensure 4K@60Hz input and output when 4K signal is used.

Connect RS232 port of device and computer with DB9-RJ11 serial cable or connect LAN port of device and computer with network cable or connect both device and computer to the same router, make sure their IP address is not completely same.

2.2 Plug in Main Power

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

If the devices is restarted, make sure the indicator light upon the PSU module is totally out before plugging in the power.

2.3 Turn on Your Product

Turn on the power switch on the rear panel.

OLED display will show as below,completing initialization before loading the latest settings and input/output configuration.

The system begins to work,and the OLED module shows the input slot and output slot information, device status, COM. Versions. IP address and serial number.



Chapter 3 Use Your Product

3.1 Install XPOSE 2.0

Environment Requirements:

Window

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

Memory: 4 GB or more

Graphics: Support DirectX 9 128M or above (open AERO effect)

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

Monitor: Resolution must be 1920x1080 pixel or above (it can not display normally if the resolution is lower than 1920x1080)

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

CPU:i5 and above

Mac

Monitor: Resolution must be 1680x1050 pixel or above (it can not display normally if the resolution is lower than 1680x1050)

CPU:i5 and above



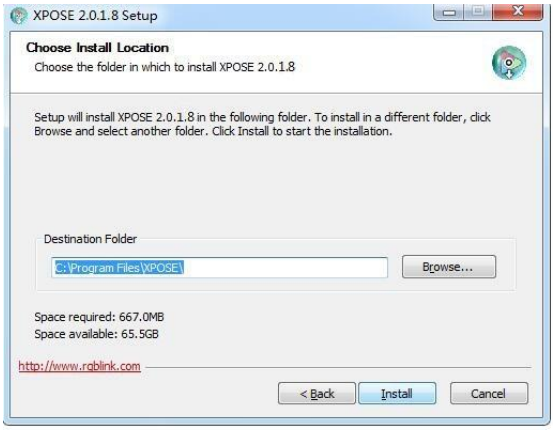
Double click ,it will pop-up the installer language box, select the language, for example, select “English”, and click “OK” to confirm.



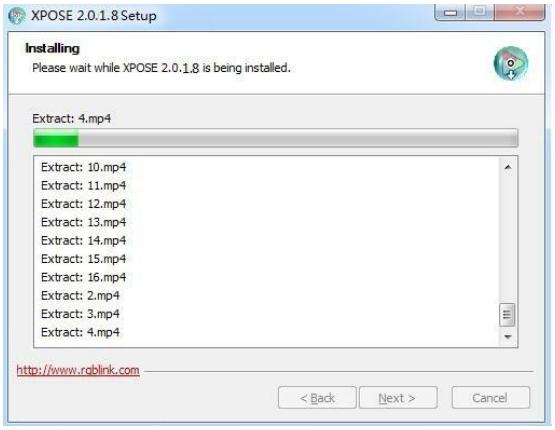
Click “Next” to install:



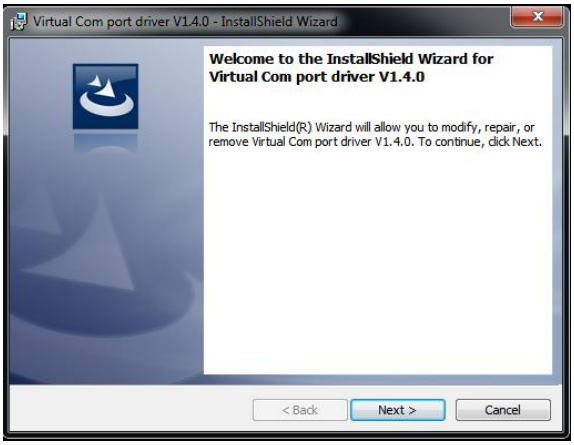
Click “Browse...” to select the XPOSE software install location:



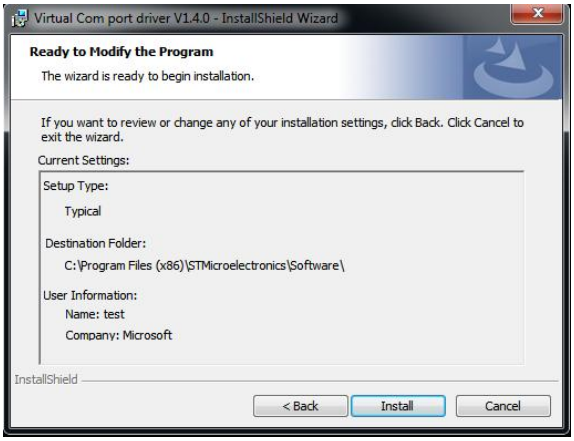
Click “Install”:



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



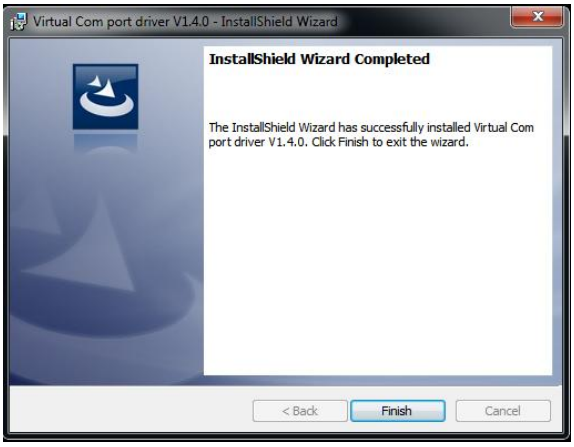
If user install the XPOSE software for the first time, click “Next



Then click “Install", as shown in the figure below:



Click “Finish” and complete the installation, as shown in the figure below:



Click “Finish” and is ready to run the XPOSE :

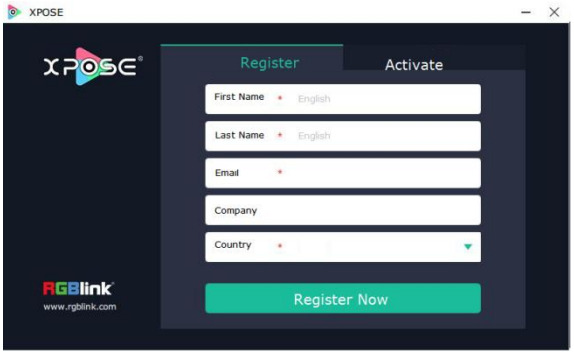


3.2 XPOSE Controls X7

3.2.1 Login in XPOSE

Double click this icon 

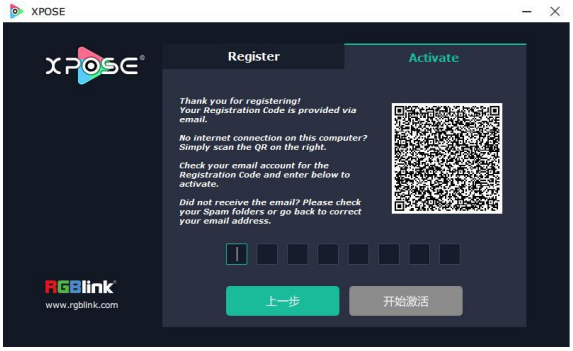
,and enter the log on interface as follow



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

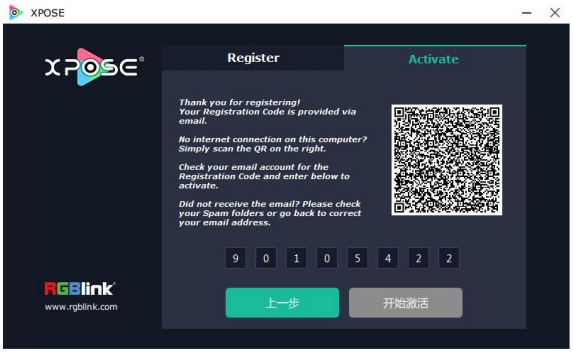
Please note that the email shall be invalid and complete otherwise Registration&Activation code cannot be received.

Click **Activate** and scan the QR code

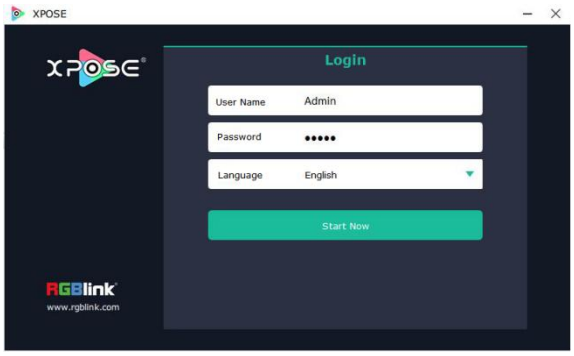


an email from **RGBlink Registrations** will be sent to the **Register** email address.

Type in the activate code and confirm



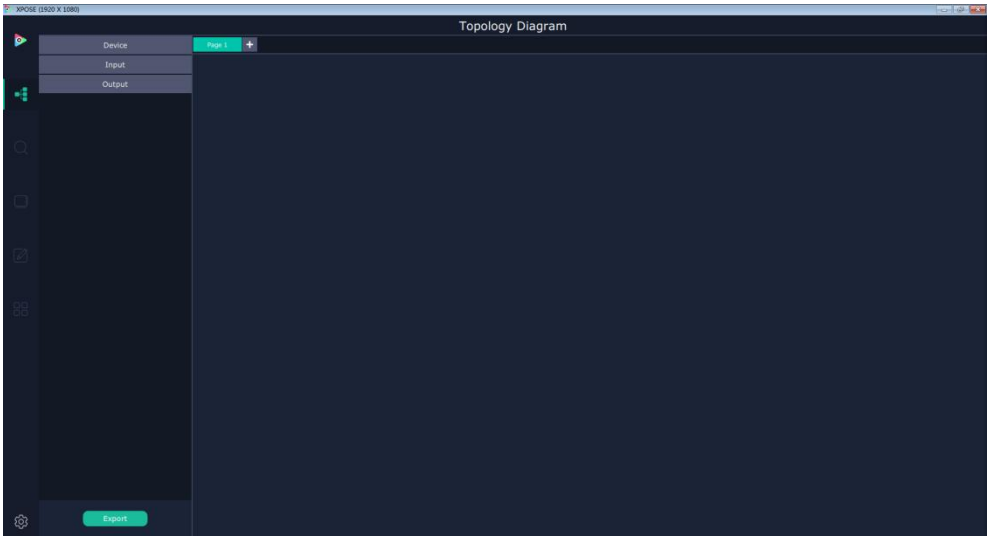
then enter the login interface.



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

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

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



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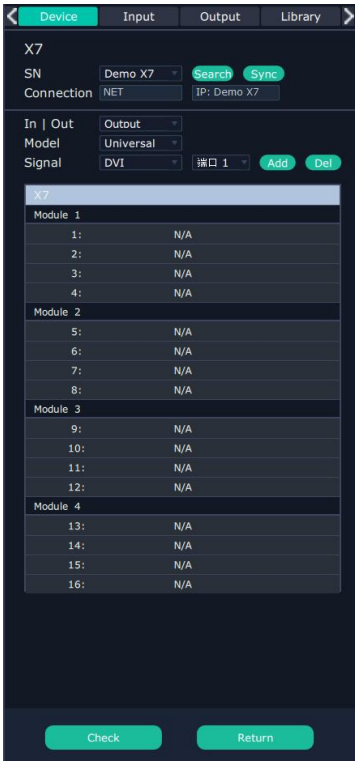
3.2.2 Topology Diagram

XPOSE 2.0 offers the feature of making topology diagram which require users to import the actual input and output connection into XPOSE. XPOSE will check the topology according to the actual input and output modules combination.

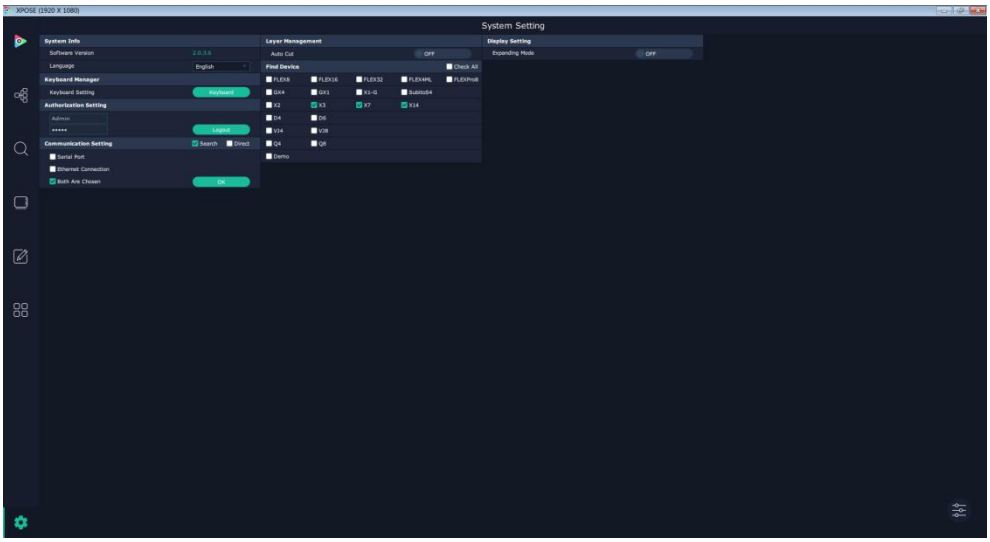
1. Drag device, input source device and output device from the list on the left based on the field application. For example, drag a X7 from Device, Laptop from Input and LCD from Output list as follows:



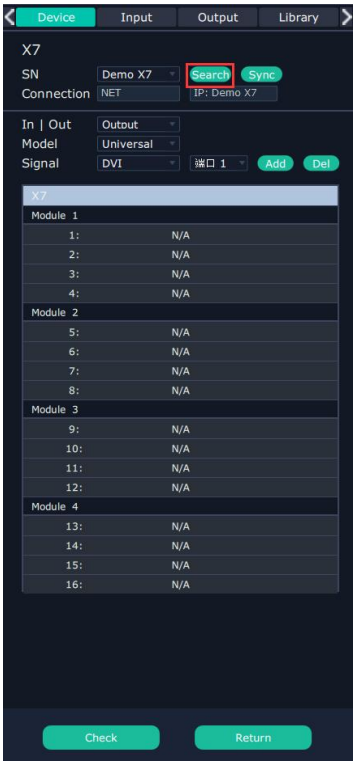
2. Click the icon  at the right bottom corner and open the setting interface as following:

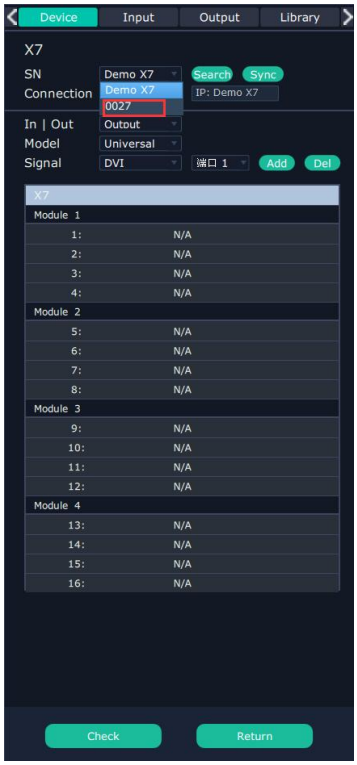


3. Click the icon  in the left bottom corner to open up Syestem Setting interface. Tick the devices that need to be controlled.

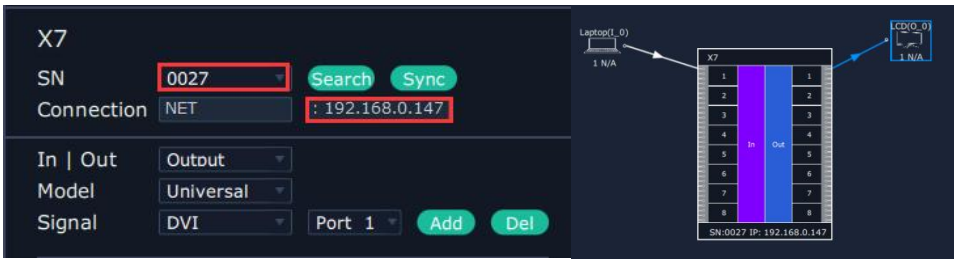


4. Go back to the Topolgy and click “Search” beind SN, after Sync, there are serial numbers devices available linked in the same network.

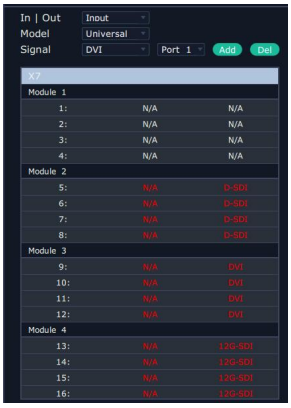


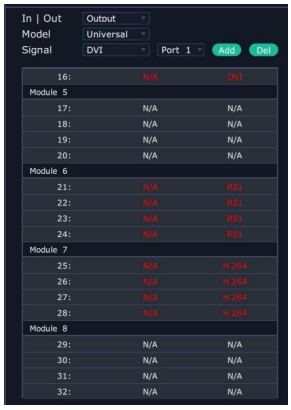


After the the device is chosen, its SN and IP is shown in the interface.



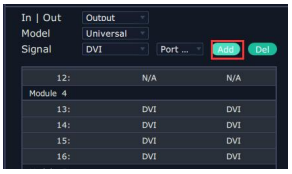
After Sync, XPOSE will show the actual input and output modules installed in the list below.





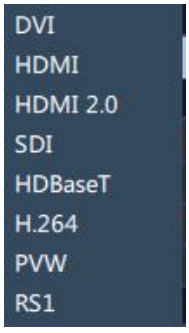
5. Configure the filed application to add signal type. On the above IN /OUT list, the second column is signal type and the third column is actual port types installed. Choose the signal type according to port. For example, output module 4 is a DVI module, all ports are DVI. Add DVI signal to this module.





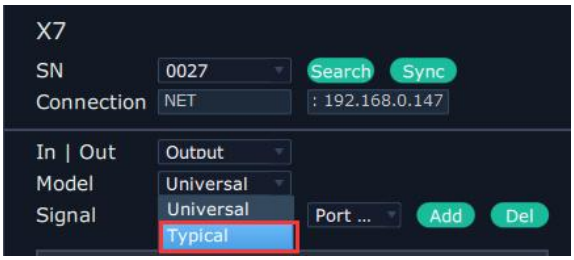
If 4 signal type on the one module is the same as the actual modules installed, choose Model Univeral, in drop down list there are singal type according to the all modules this device supported.

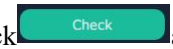




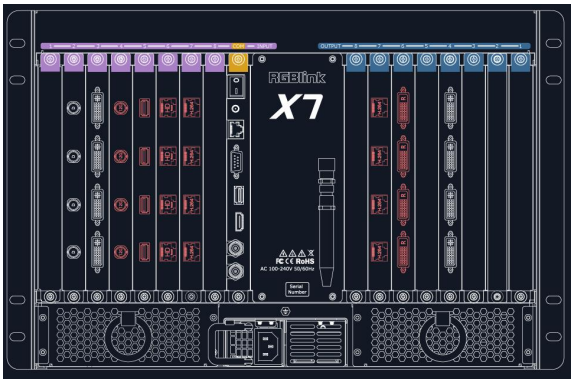
Input module Output module

If each signal is different choose Model as Typical, user can add signal port by port.



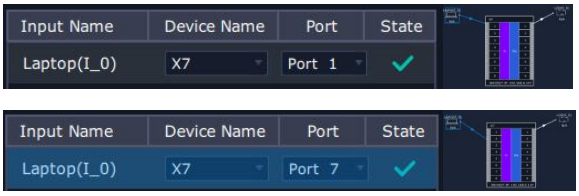
Click Check 

at the bottom, the interface will jump to the back panel picture showing the current input and output modules installed on the chosen device. If the signal type matches the modules , it is indicated in white, otherwise in red.

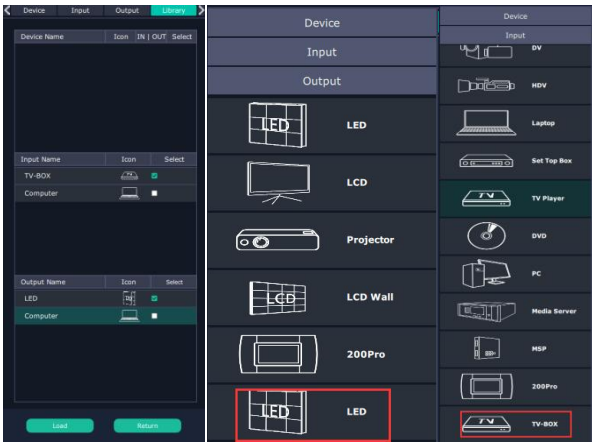


6. 

Input and output allows users to change the port index for input source and output display. For example, change the input source coming from laptop form Port 1 to Port 7.



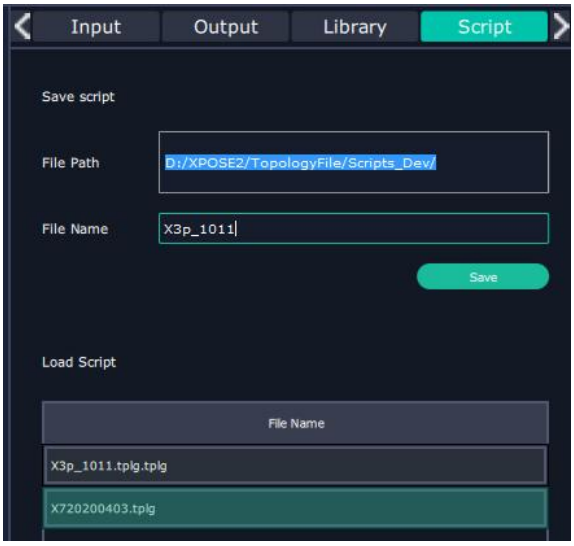
7. If there are not enough devices in the device list on the left column, users can select and load more devices to the list from the **Library**.



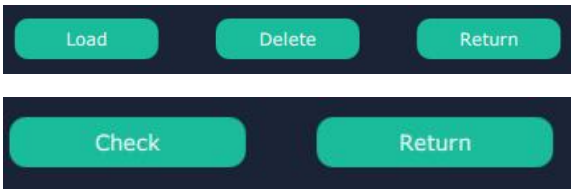
8. Topology could be save as script to local hard drive.

File path is fixed XPOSE2/TopologyFile/Scripts_Dev/

File name can be custom.



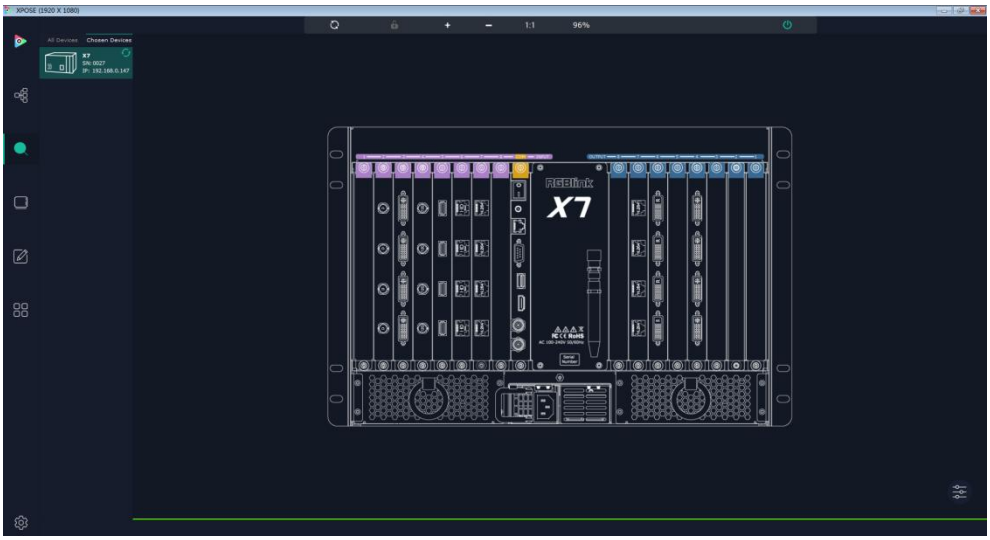
Load the script and check the topology, XPOSE will jump to next step Input and Output Setting.



3.2.3 Input and Output Settings

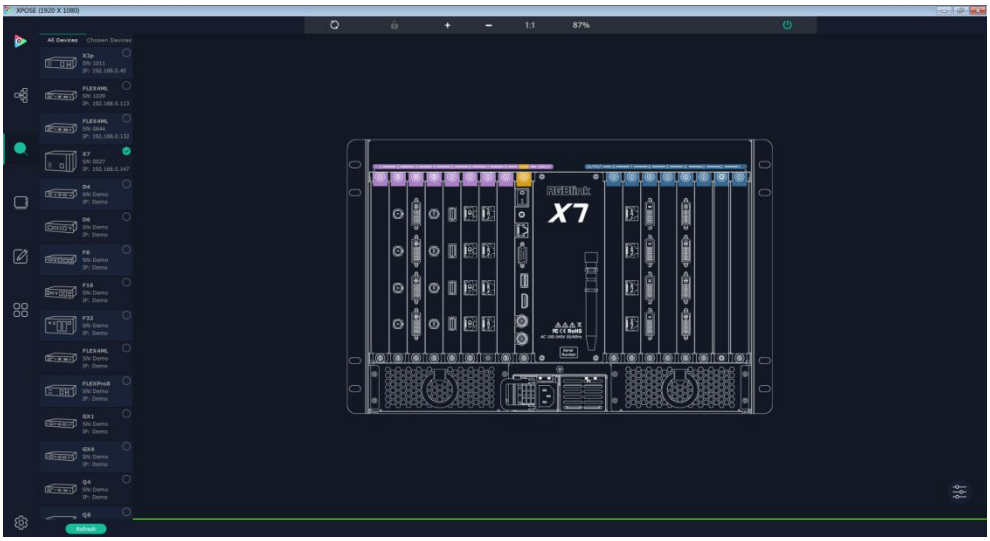
Connect the Device

After Topology Diagram is Checked to match the actual modules installed, XPOSE will enter the interface below and allow users move to next step-the exact setting on each input and output module.

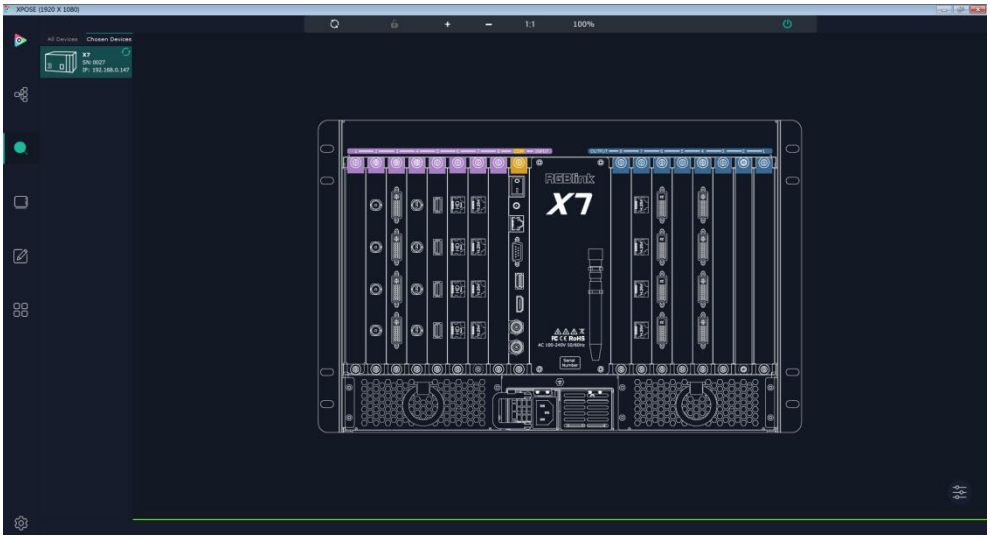


Users can also click icon  and click refresh 

to check all available devices in the network.



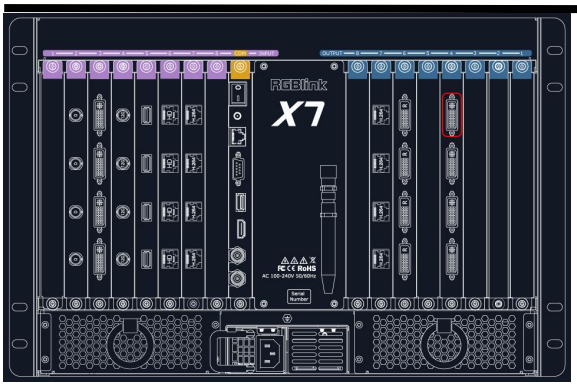
Clcik  to choose the device and in Chosen Device click the device to obtain the control of this device.



 purple tip indicates input modules, blue output modules.

Output Setting

Click any output port , the module where the port locates is selected. Users can do settings to the modules now. A red rectangle  flashes around the port when it is chosen.



Different output modules port could have different output setting items subject to their features but geneally there on Out end, there are such output settings items as: Resolution Setting, Test Pattern, DE Setting,OSD Setting. Some special modules such as H.264, PVW could have H.264 setting.

Here are figure listing the modules and its. output setting items supported.

	DVI	HDMI 1.3	HDBaseT	Rotation(RS1)	SDI	H.264	HDMI 2.0
Resolution Setting	√	√	√		√		√
Test Pattern	√	√	√	√	√		√
DE Setting	√	√		√			
OSD	√	√	√		√		
H.264 Setting						√	

Resolution Setting



Output Switch: Slide to On or OFF

Format Range: select ALL or Module. All means this setting is applied to all output ports, Module means this setting is only valid on this module.

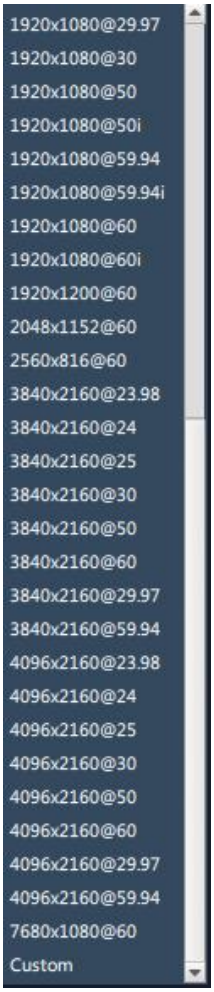
Format Type:Standard /Customize

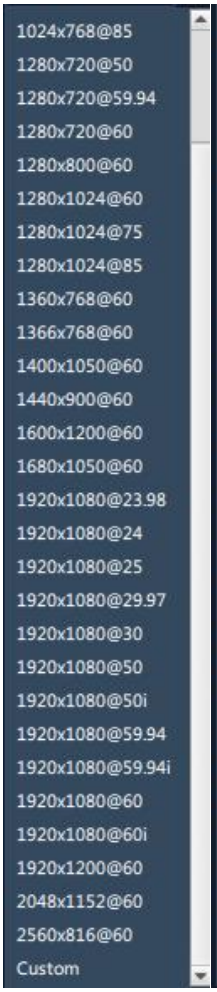
Choose Customize, width, Height, Refresh Rate have to be put in by users manually.

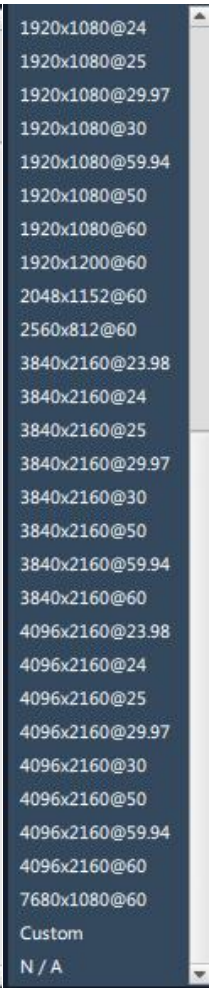
Format: when format type is Standard, there are standard format list to choose.

Format for ALL and Format for modules is subject to the device. Format list of X7 is as figure below .

ALL 2K module 4K module







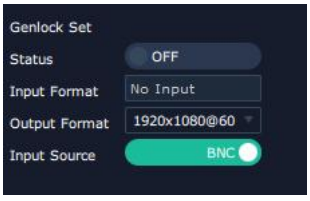
Genlock Set

Status: On or OFF

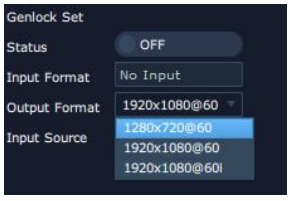
Input Format:there is Genlock signal is input, the format will be shown.

Output format:customize or subject to input source HDMI or BNC.

If input source is HDMI output source usually only 1920×1080@60, if the input source is BNC, there is a list for output format .

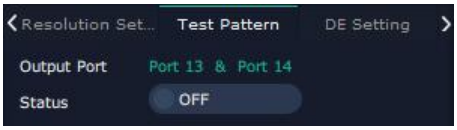




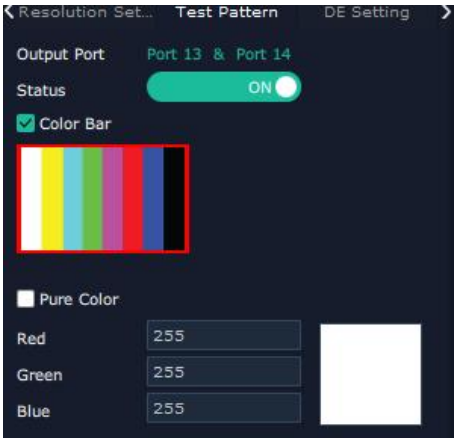


Test Pattern

slide ON/OFF the Status. After slide ON the test pattern, users can choose Color Bar or Pure Color as test Pattern.



OFF



ON

DE Setting

Output Port：choose current port or Port All
HDMI Output Type: DVI or HDMI
Color Range: Image or Video
Bits：8 bits for DV, 8bits/10bits/12bits for HDMI
Brightness：0-128
DE Switch：ON or OFF
Switch ON DE to set X,Y,Width,Height,Line Polarity
X：horizontal position
Y：vertical position
Width：horizontal size
Height：vertical size
Line Polarity: Pos or Neg (Positive or Negative)
Scene Polarity: Pos or Neg(Positive or Negative)



OSD Setting

Output port: the current port

Status: ON or OFF

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 is available

Font Type： Normal,Italic,Bold,Bold Italic

Font size：0-300 pixels

Pixel alignment： Left, Right, Center to Horizontal,Vertical Center Right, Align Bottom Right, Align left bottom, Vertical center left, Vertical center, Horizontal center bottom

Font Transparent,

Background Transparent

Scroll Speed：0-16

Scroll Direction： Scroll Off, Scroll Left, Scroll Right

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



Input Setting

Click any input port in purple area, the board where the port locates is selected. Users can do settings to the board now. A red rectangle flashes around the chosen port when it is clicked. Different input modules port could have different input setting items subject to their features but generally on In end, there are such input settings items as: Property Setting, DSK Setting, EDID Setting, Logo Setting, Source Merge. Some special modules such as H.264, 12G SDI, 4K@60 digitial modules could have H.264 setting, 12G SDI setting, 4K setting.
Here are figure listing the modules and its. output setting items supported.

	DVI	HDMI	4K@60HZ	12G SDI	3G SDI	USB	H.264	HDBaseT
Property	√	√	√	Mode	√	√		Reserved
DSK Setting	√	√			√			
EDID	√	√	√					
Logo	√	√			√			
Source Merge	√	√			√			
4KSetting			√					
USB Setting						√		
H.264 Setting							√	

Property Setting
Input Port：Current port
Scale
X/Y：Vertical and horizontal position
Width/Height：Vertical and horizontal size
Crop：
Left:crop left
Top:crop top
Width:horizontal size after crop
Height:vertical size after crop
Display mode：Live or Freeze
Picture Adjustment
Mirror：ON or OFF
Alpha：transparency adjustment, range from 0~128.
Mini Delay mode:On or Off. Select this mode on the output and input pixel ratio is 1:1.Under this mode, the image is under the best state.
Saturation：slide to adjust

Hue：slide to adjust

Color Temperature

Red：Slide to adjust

Green：Slide to adjust

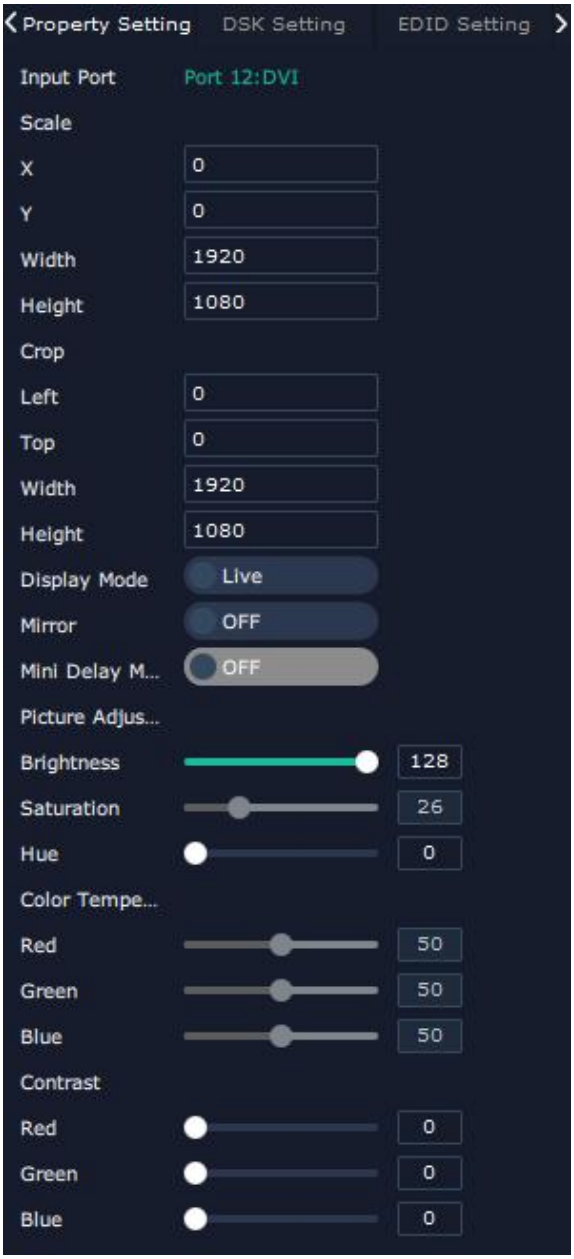
Blue：Slide to adjust

Contrast

Red：Slide to adjust

Green：Slide to adjust

Blue：Slide to adjust



DSK Setting

Input Port:Current Port

Preset：Customize,White on Black 1,White on Black 2,
Black on White 1,Black on White 2,Green on Black 1,
Green on Black 2,Green on White 1,Green on White 2,
Red on Black 1,Red on Black 2,Red on White 1,
Red on White 2

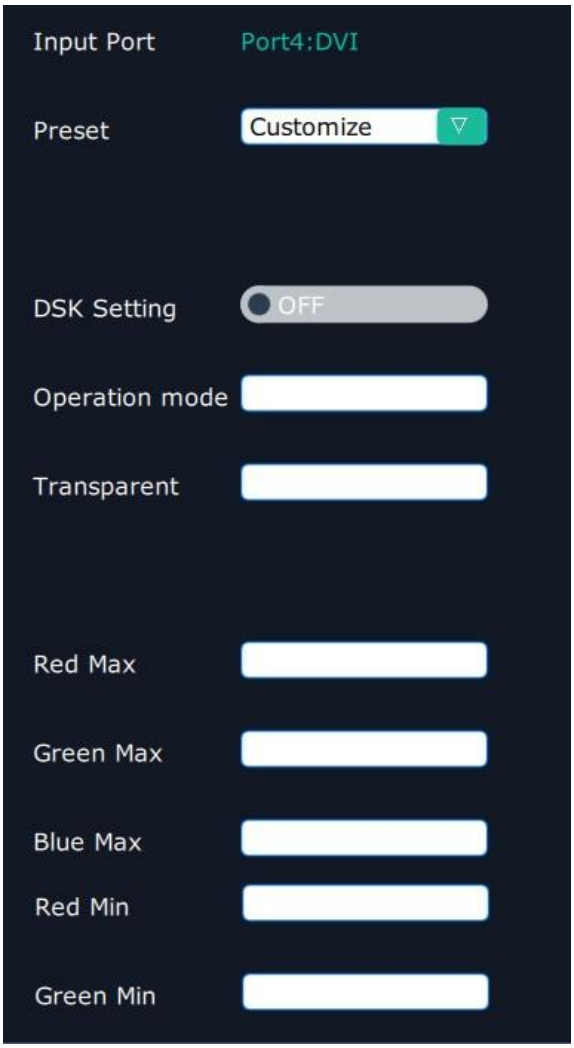
DSK Setting switch：On or Off

Operation Mode：0 or 1,automatically show
according to user's Preset choice

Transparent：0-255,automatically show
according to user's Preset choice

Red,Green,Blue Max：0-255,automatically
show according to user's Preset choice

Red, Green Min：0-255,automatically show
according to user's Preset choice



EDID Setting

Input Port: Current Port and type

Customized EDID

EDID Template : RGB-DVI and RGB-HDMI to choose

White Height Frequency: automatically show current port.

Read Control

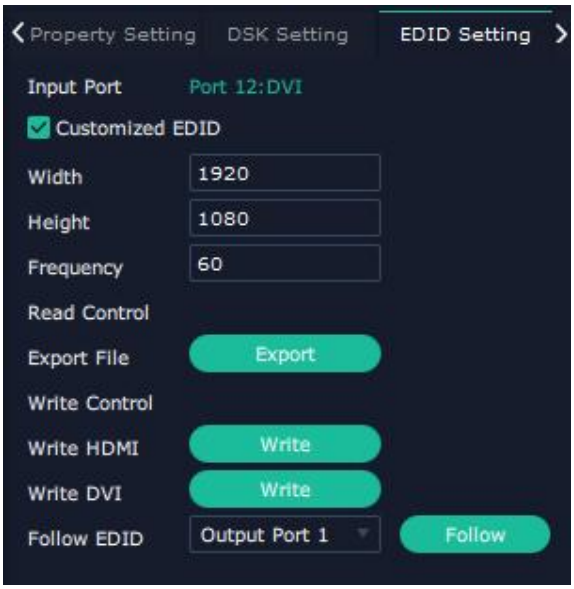
Export File: Export to local computer and store to XPOSE 2.0 File.

Write Control

Write HDMI

Write DVI

Follow EDID :Output 1



Logo

Input Port： Current Port

Select **Logo capture** or **Set Logo**

Logo Catpure

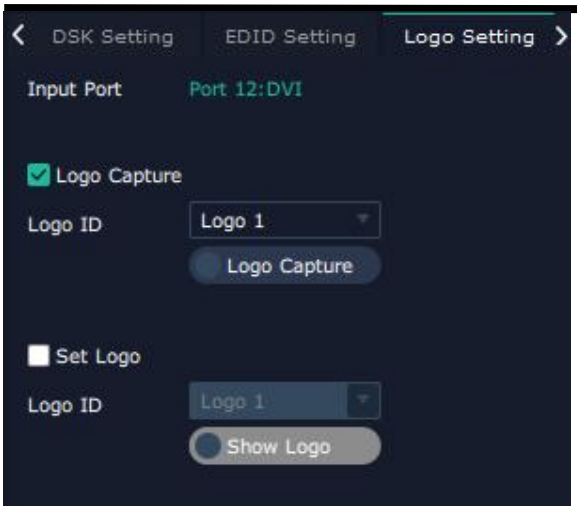
Logo ID： select from Logo1-Logo10

Slide to enable Logo capture

Set Logo

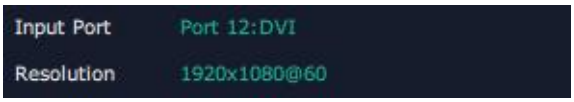
Logo ID: select from Logo1-Logo 10

Slide to enable Show Logo



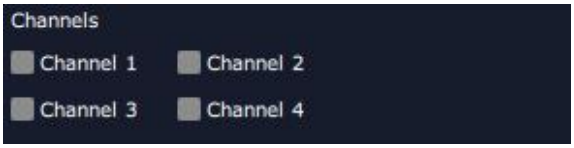
Source Merge

Souce merge is used to merge input source from same one input module to make one layer able to diplay up to 4 pictures.

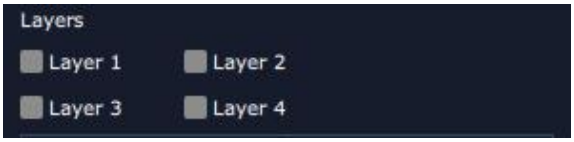


Input Port:Current input port

Resolution： resolution of current input source



1. Select the channel which is going to bear the merged source layer.



2. Select how many layers (4 at most) to be merged



3. Select which merge patterns to use



4.slecet each layer and switch source from 1 to 4 or do Scale or Crop on the selected layer.

USB Setting

Input Port Current USB port

Select **Video** or **Image**

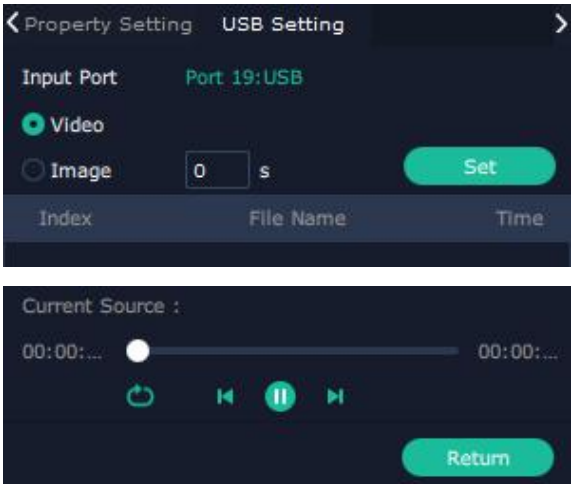
Choose Video, will list down the media files in video format by index.

Set play loop by ,switch to previous , next and stop playing

Choose Image, will list down the media files in graphic format by index.

Set playing time from 0 to 255S.

Note: the time setting is only enable when User select Image.



4K Setting

Input Module: current module position

Operation mode: 4K×2K, 4K×1K, 2K×1K, PIP

Input Type: DVI, HDMI, DP



4K×2K

Splice Height 1: no more than 2160

4K×1K



Splice Width 1& Splice Width 2: no more than 10000

2K x 1K



Input type 1&Input type 2: select from DVI, HDMI and DP

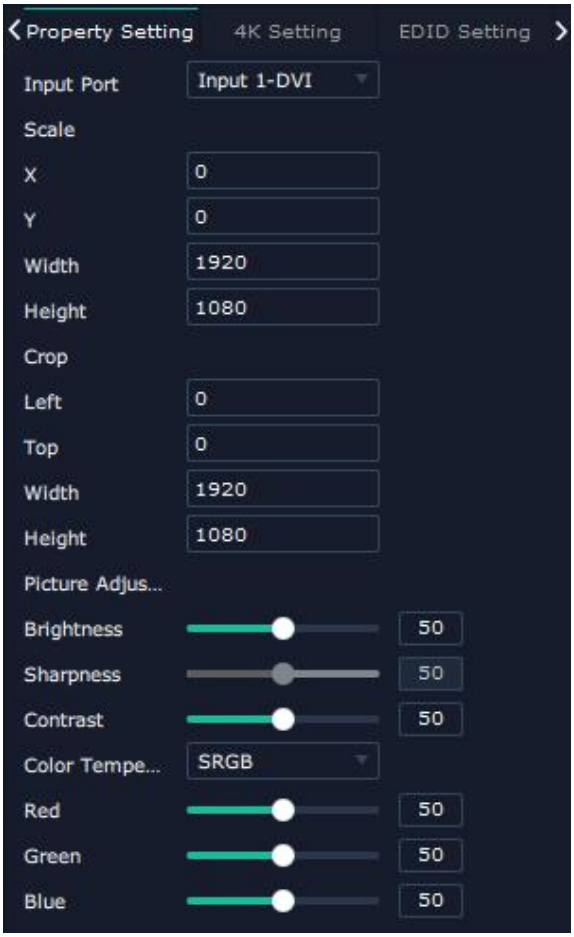
PIP



Select Main and Subsidiary picture from DVI,HDMI,DP .

Property and EDID of 4K module is different from 2K module.

Property setting of 4K module



EDID setting of 4K module



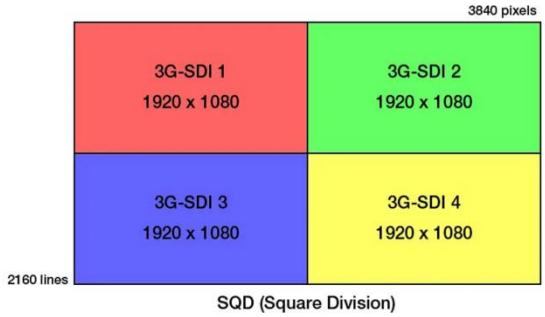
Property of 12G SDI

12G SDI is selected, two mode SQD and 2SI of 12G SDI is available.

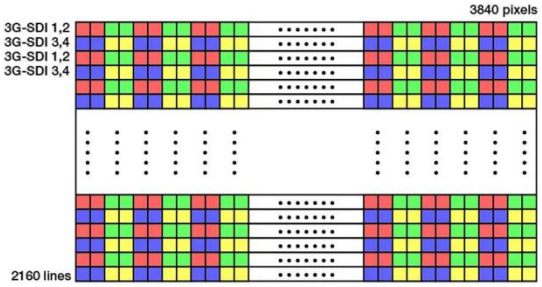


SQD:Square Division, a 12G-SDI method, by dividing a full 4K/UHD image into four 3G SDI images.
2SI-Two Sample Interleave: sending two consecutive pixels to one of the four sub-image at a

time.

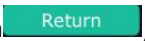


SQD (Square Division)



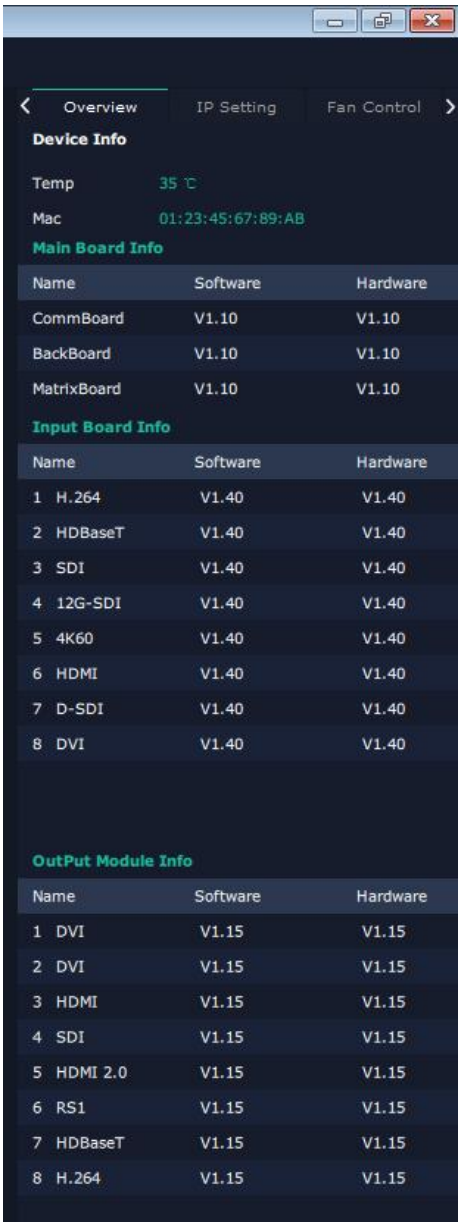
2SI (2-Sample Interleave)

Device Overview

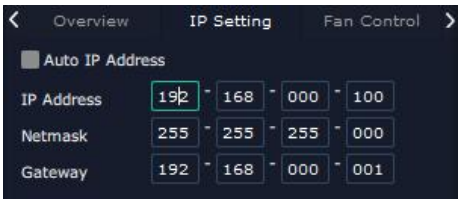
Click Return 

, there are overview, IP setting,,Fan Control,Power ON,Factory Setting,

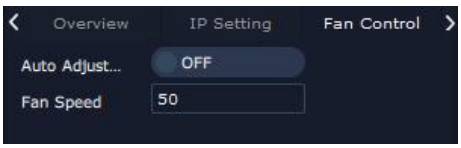
Overview: show Device Info, board info in each slot.



IP Setting：select Auto IP address or manually type in the IP address, MASK and Gateway

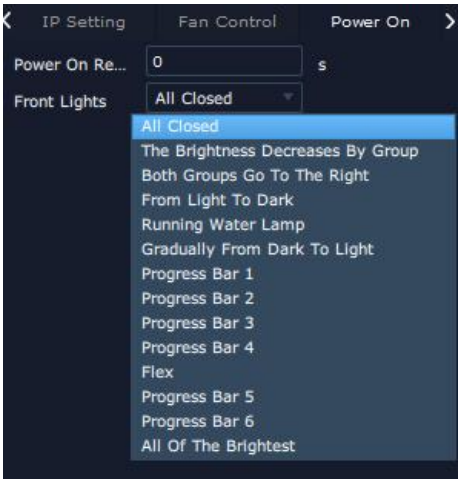


Fan Control： Auto adjustment,Fan speed 0-99

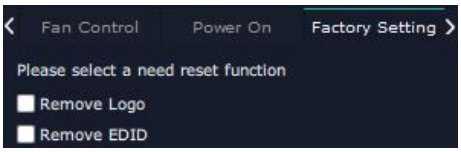


Power on Reserve：0-255S

Front lights:light effect



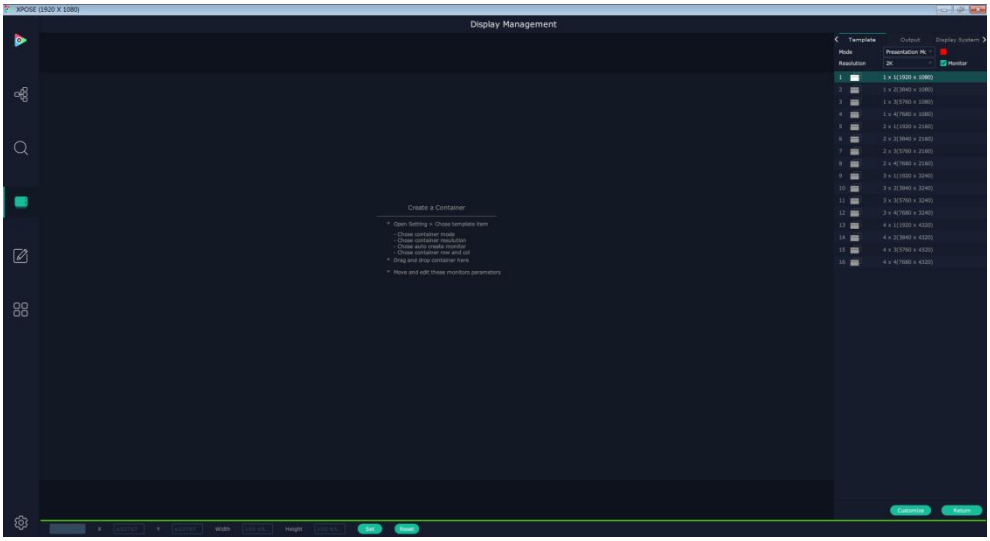
Factory setting：Remove Logo and/or Remove EDID



3.2.4 Display Management

Display System is for users to set layout of outputs.

Click this icon first enter the interface as follow:



Container



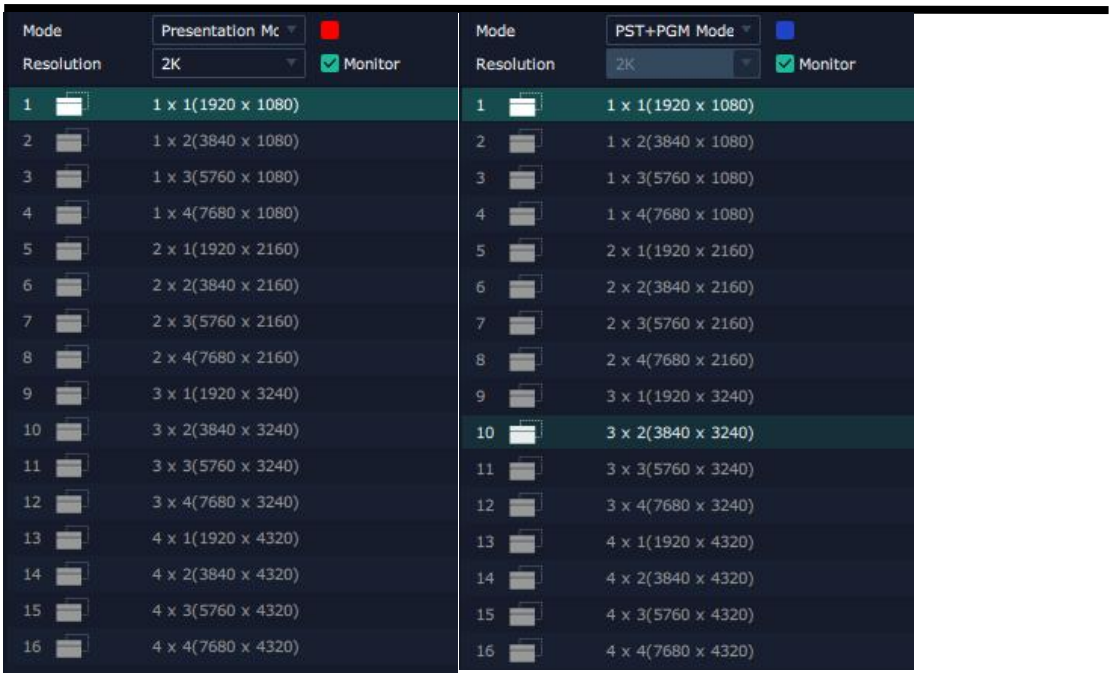
Container here means the Display Area, for example it could be a formed LED screen or an array of LCDs

Template

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

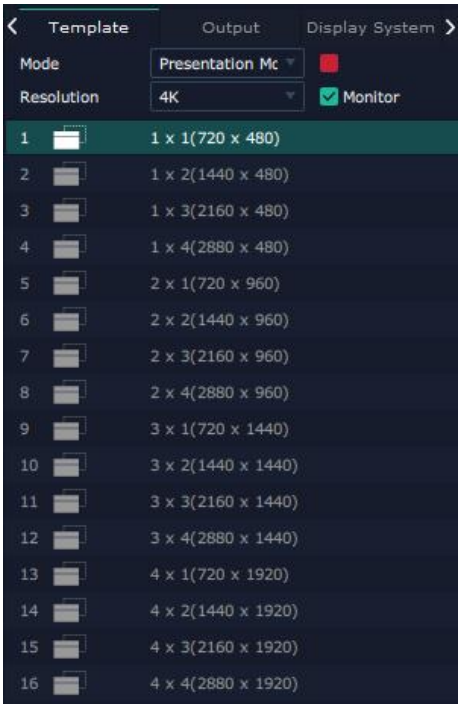
Mode

At present, there are Presentation Mode, PST+PGM Mode,Rotation Mode and Edge Blending . Rotation and Edge blending is valid only when ARO rotation module is installed to the device. Each mode is marked in different color and provided with fitted templates.

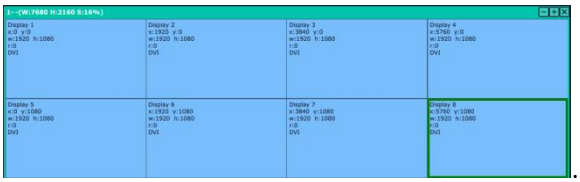


Resolution

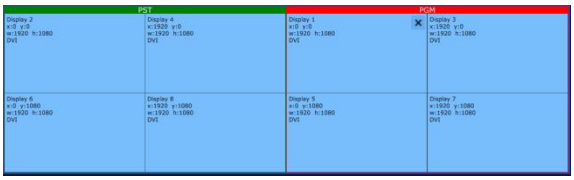
2K or 4K, except Presentation Mode, it is default 2K. Under Presentation, if the output is 4K monitor, Monitor behind shall be ticked and Resolution could be 4K, the template is as followed:



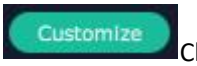
Container(dragged from Template) under Presentation Mode

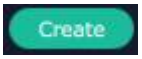
.

Container(dragged from Template) under PST|PGM Mode



Customize Container

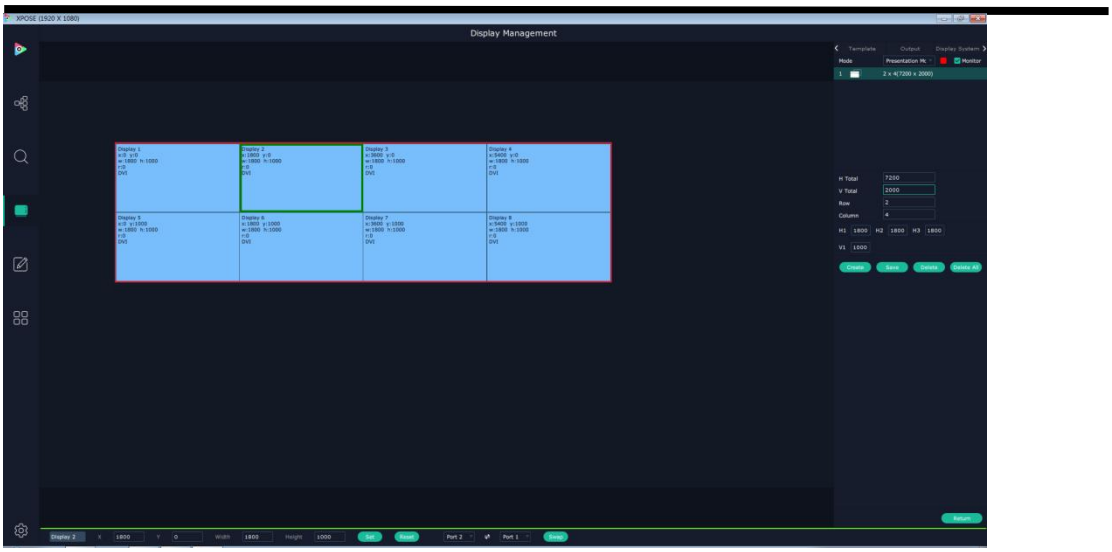


Click this icon at the bottom of template list. Fill in the H Total, V Total, Row and Column, then click 

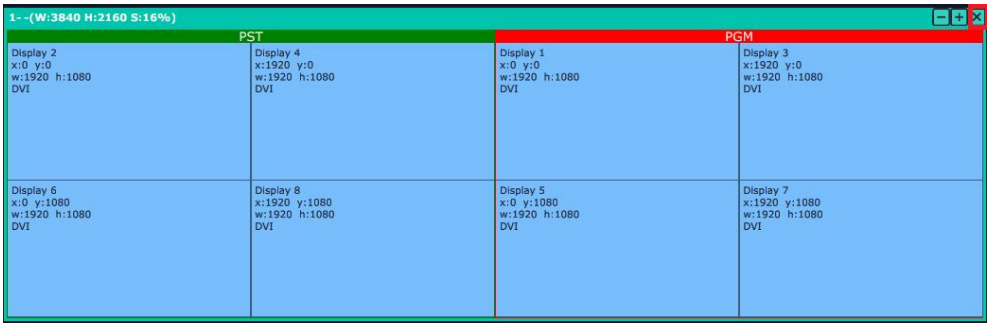
a customized containers is created. If this container need to be saved, click SAVE 



For example create a , 2×4 ,7200×2000 container as follows



Long pressing this icon  on container to cancel the Container/Display Area



Adjust Display Area

Place the mouse in the Container, roll the mouse can zoom in or out the Container in the XPOSE window. Clicking icon  and  can do the same work.

Drag the border of the display area to move its place in the interface.

Output

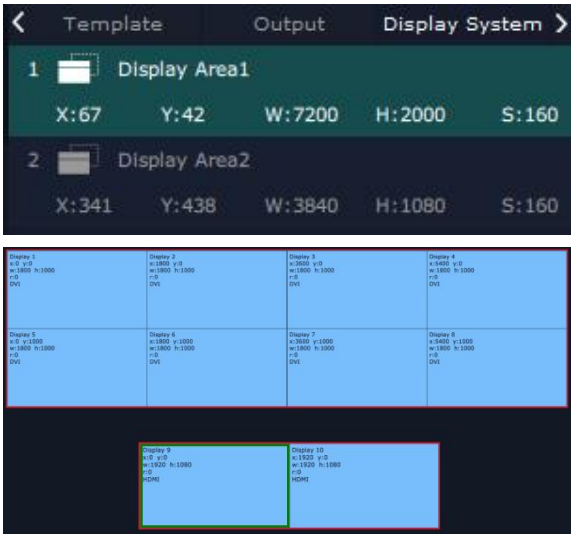
Show all the output ports on the device. Once the monitor is dragged into container meaning this output is used and the output port get dark.



Click this icon on Display to cancel the display in Display Area

Pressing CTRL+ALT can lead to close of all displays on the XPOSE window.

Display System

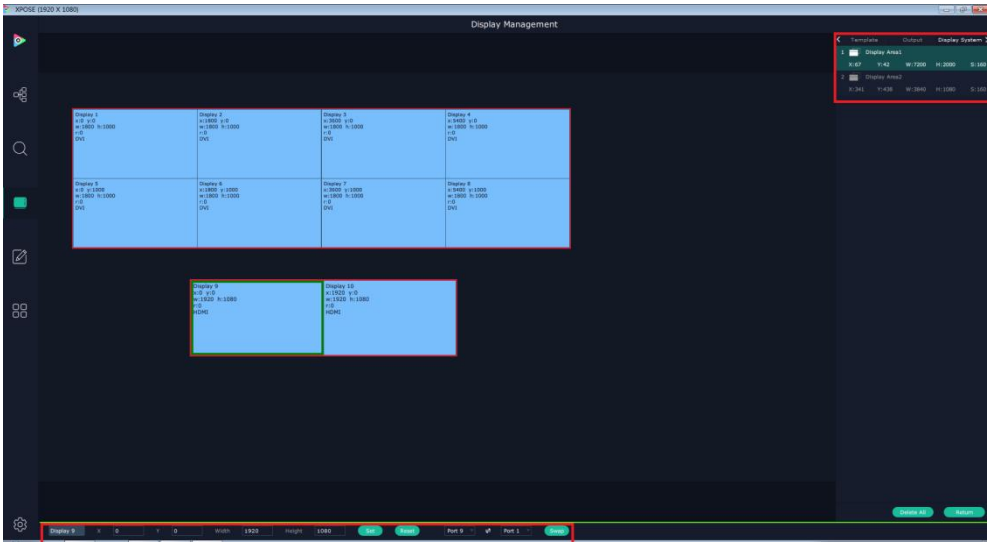


Show all Containers/Display Area that have been created.

Click tick icon behind to give alias to the each Display Area if necessary.



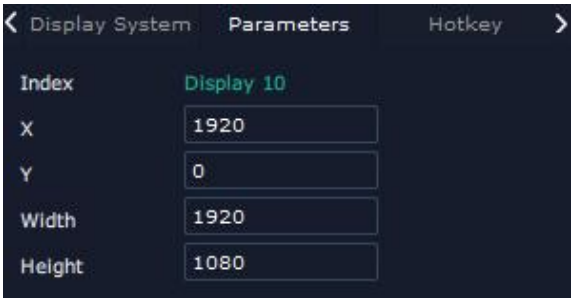
Parameters



Parameter is designed to set size (Width, Height)and position (X,Y) of each display.

There are two ways to adjust the display, by Parameter or by the bar below the window.

Parameter



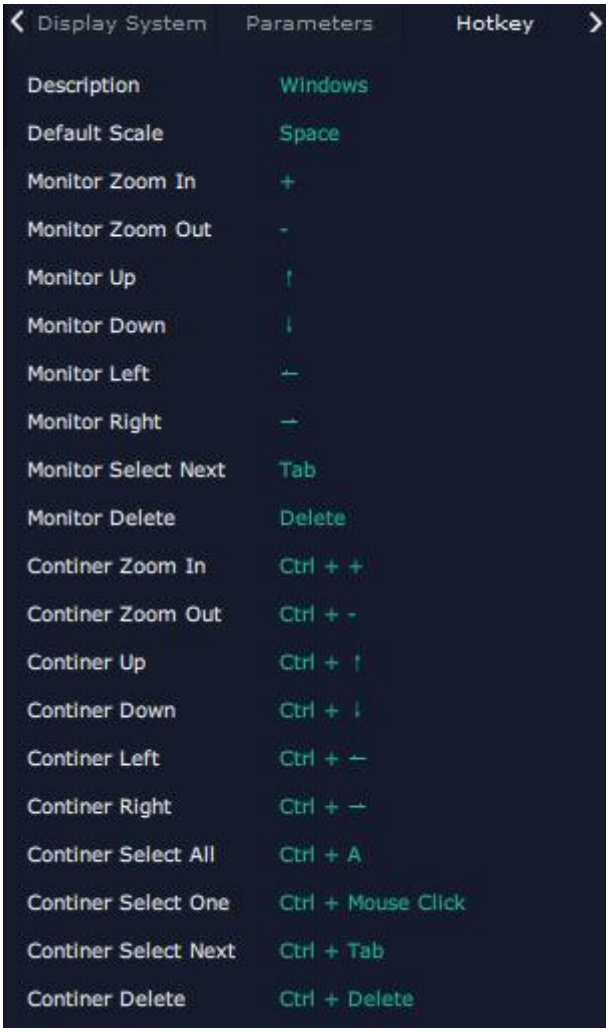
Bar under XPOSE window



SWAP

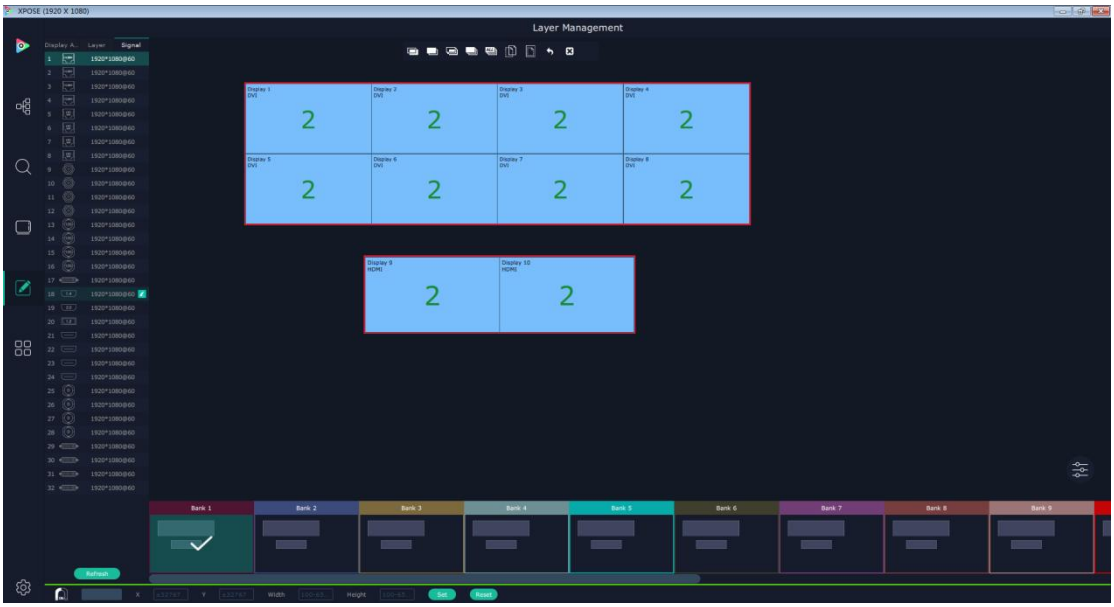
Swap two output ports if needed.

Hotkey



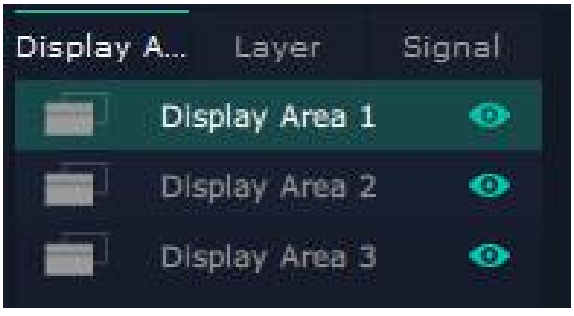
3.2.5 Layer Management

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



Display Area

Here is to show all the Display Area set in previous step System Management. Click to cancel or use the corresponding Display Area.



Signal



To show the signal list of all inputs. Drag source from signal list to each display or Container.

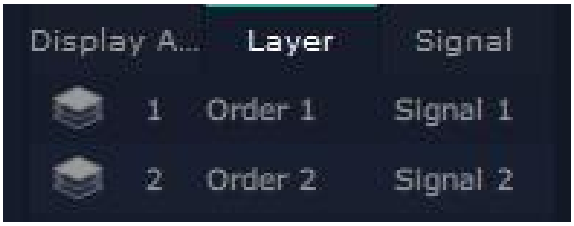
Click this icon and alias of signal could be put in if necessary.



Click this icon to confirm the alias setting.

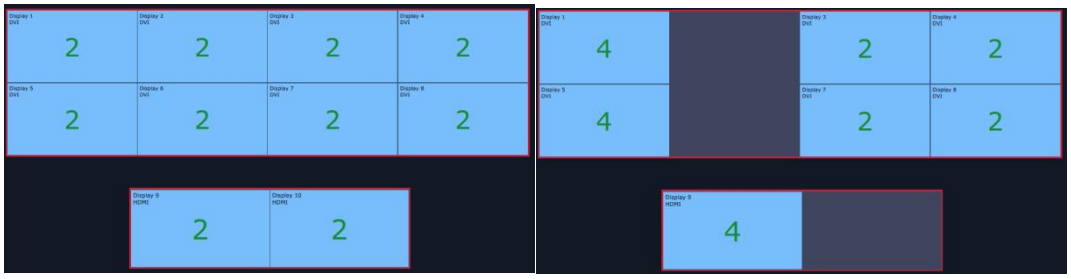
Layer

After signal is dragged into display, show Layer index Versus Signal index



Numbers on Monitor

Numbers on monitor is to show how many layers at present allowed to put in the monitor .
(each neighboring monitor (1 and 2, 3 and 4) allows to put 4 layers, if there is no neighboring monitor in the display area, the single monitor can contain 4 layers. For example in one display area, there are monitor 1 and monitor 3, monitor 1 can contain 4 layer and so does monitor 3)



X7 layer numbers

Layer Adjustment

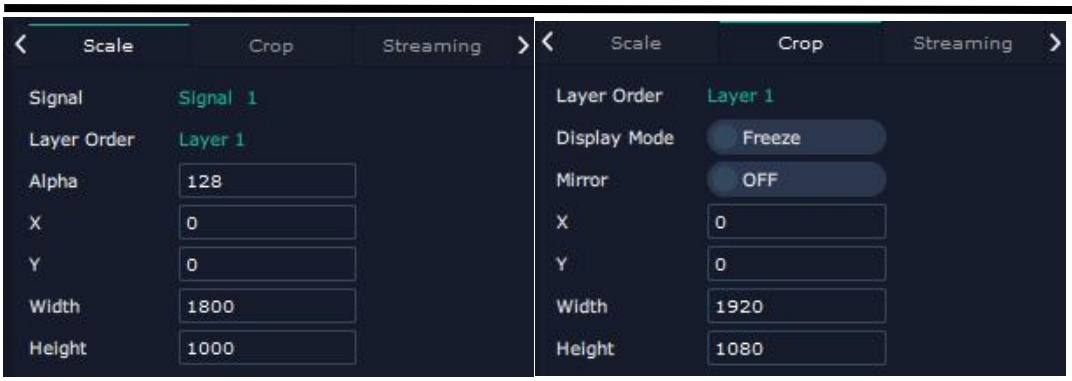
there are two ways to adjust layer.

1. Use the bar under the interface

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



2. Layer Scale and Crop

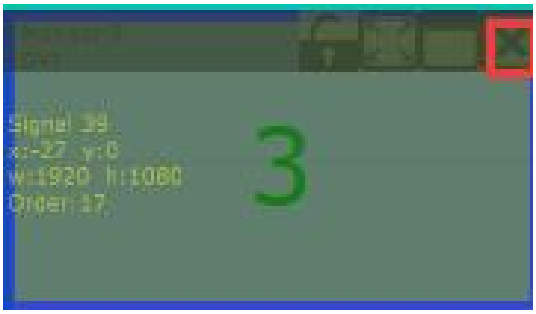


Layer Movement

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

Layer Remove

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



Layer Max

Click this icon , to cover up all monitors in the same Display Area with the one signal, as the following:



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.

Layer Lock

Click the lock icon on the right middle of the later boarder.



When the layer is locked, any movement or removal to the layer is invalid

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

Save to Bank Automatically

When layer setting of one BANK is done, click next or other BANK, this BANK can be saved automatically.



Streaming



Module Index:show the module where steaming coming from

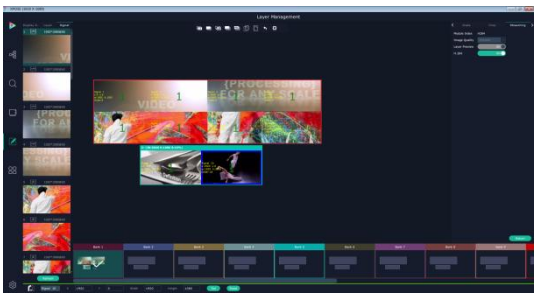
Image Quality: to choose from Hi-Q, Normal, Smooth

the better the preview input image but if band width of network is not good enough, high ratio

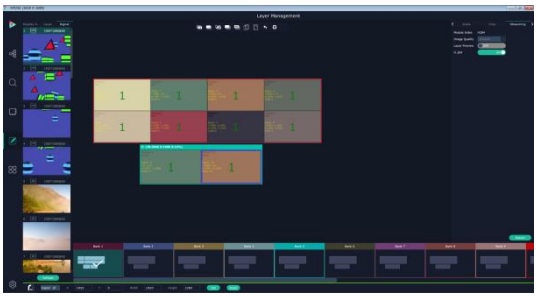
image quality may cause problem. We usually suggest user to choose smooth.

Layer Preview and H.264.

Turn on Layer Preview first and then turn on H.264, all input source and layers in the display areas can be previewed.



If turn on H.264 only, only input signal can be previewed.



HotKeys

Hot keys, provided to do quick layer setting such as Copy Layer, Layer move

Description	Windows	Mac OS
Copy Layer	Ctrl + Mouse drag	Cmd + Mouse drag
Layer Group	Ctrl + G	Cmd + G
Ungroup	Ctrl + Shift + G	Cmd + Shift + G
Layer Backward	Ctrl + [	Cmd + [
Layer Forward	Ctrl +]	Cmd +]
Layer to Bottom	Ctrl + Shift + [	Cmd + Shift + [
Layer to Front	Ctrl + Shift +]	Cmd + Shift +]
Select All	Ctrl + A	Cmd + A
Select Layer	Ctrl + Mouse click	Cmd + Mouse click
Delete Layer	Delete	Delete
Copy Select	Ctrl + C	Cmd + C
Paste Select	Ctrl + V	Cmd + V
Cancel Select	Ctrl + D	Cmd + D
Snap to Grid	Ctrl + T	Cmd + T
Move Layer	Direction	Direction
Change Source	Double Click Signal	Double Click Signal

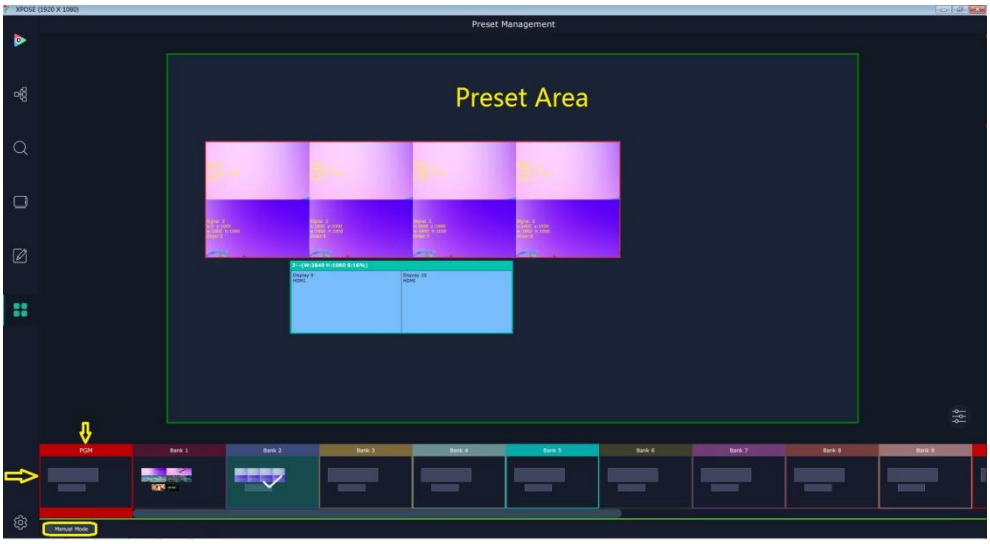
3.2.6 Preset Management



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

Preset Management Mode： 1 Manual Mode,2 Schedule Mode

Manual Mode



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

Preset is showing the BANK selected. PGM is in first box in the bottom left.

Take Setting

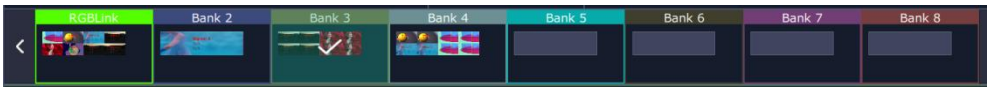


Click this icon after selecting a BANK.

Fade Time 0.0-10.0S

Black out, slide to ON or OFF

The tick on the bank indicates that the bank is selected.



Cut|Take

Cut, switch from PST to PGM without any effect.

Take, switch from PST to PGM with chosen effect in set Fade Time.

Display

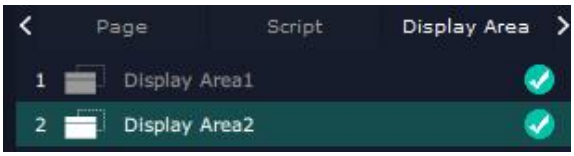
separate Display Area/Container switching. It must work with Display Area list.

Slide Display to ON 

, click  to see more settings and select the Display Area.

Display Area

is to let users to choose which display areas to display on the PGM and allow users to set transition effect for each display area so that they can switch from PST to PGM in desired effect.



Display Area list on X7.

X7support no transition effects.

when users need to switch scene from eg. Bank 1 to Bank 4 but want to keep Display Area 2 the same as Bank 1. Follow the steps below to do the setting.

Step1: click Bank 2 and open Display Area

Step 2: click the icon behind to cancel the display area of 2 and click 

to confirm,

Step 3:TAKE or Cut



Display Are 1 of Bank 4 is switched to PGM but Display Area 2 keep the same as Bank 1.

Keep|Swap

Only when separate **Display** switching is OFF can **Keep|Swap** work.

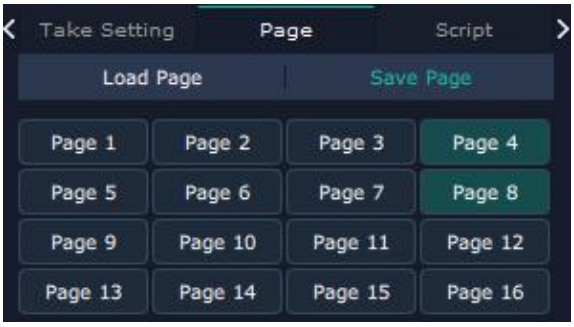
Under the **Keep** status, users need to select a bank and use Cut or Take to switch image from PST to PGM.

Under **Swap** status, users select a bank, then use Take or Cut to swap this bank and the bank before this one.

Bank Save and Load

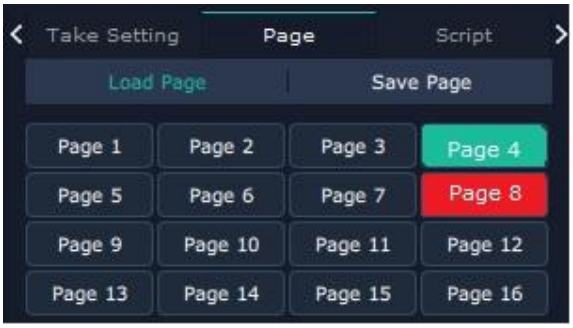
Save Bank to Page

Select a bank,click Page,select Page X,the bank is saved in the page.
The page turns green then become green, indicating the bank is saved in the page.



Load bank from Page

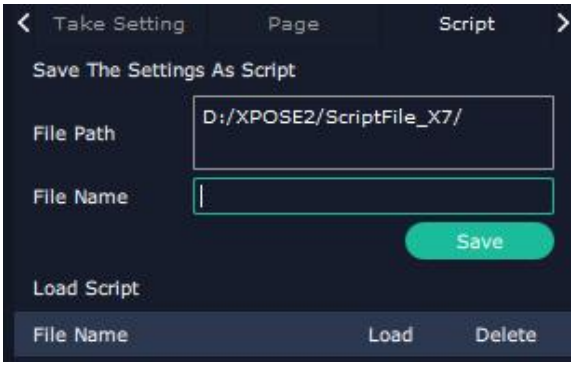
Click Load Page, pages with bank saved are green, select one from them and the selected one becomes red. The bank is loaded from page to PST.



Script Save and Load

Save Script

Fill in the blank with the name of setting and Save



Load and Delete Script

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

Select the file and click Load

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

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.

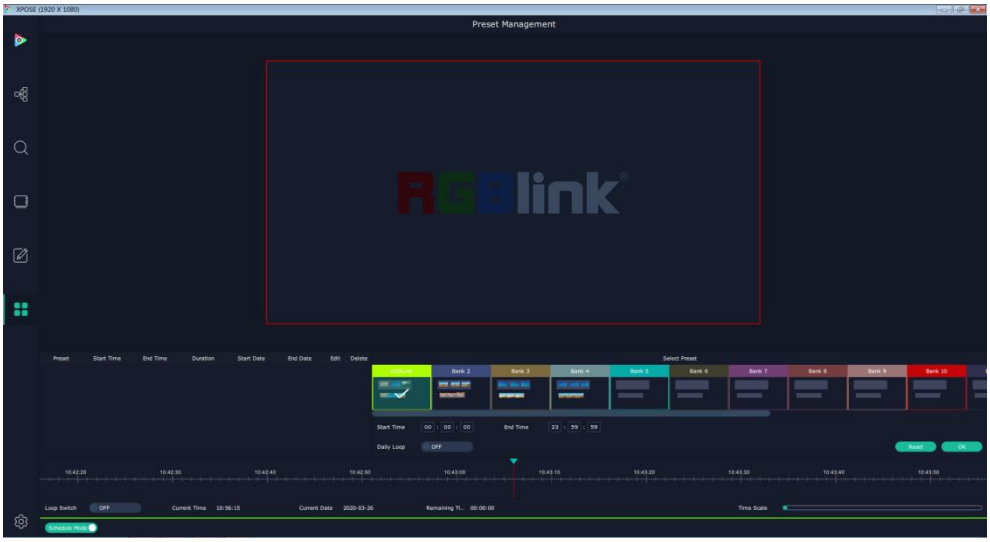


For exmaple change Bank1to RBGLINK, with pointed boader

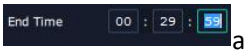
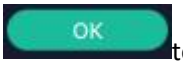


Schedule Mode

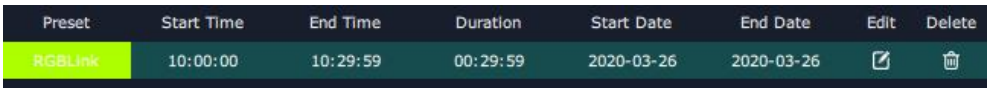
This mode is designed to set auto bank (scene/preset) switch.



Select the bank that need to be looped.

Set **Start Time**  and **End Time**  and press **OK**  to confirm.

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



Preset	Start Time	End Time	Duration	Start Date	End Date	Edit	Delete
RGBLink	10:00:00	10:29:59	00:29:59	2020-03-26	2020-03-26		

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

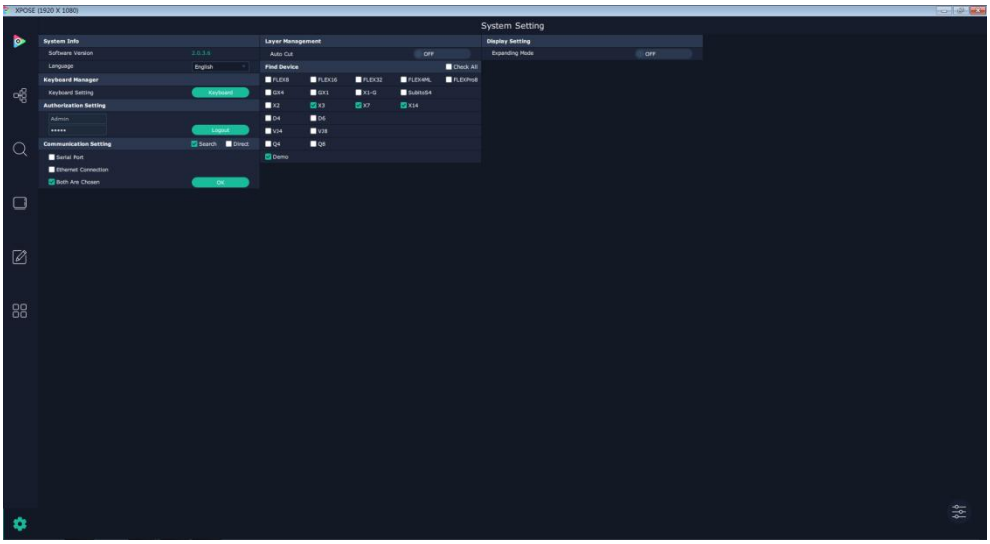
 Click this icon to delete this preset if it is not needed.

Turn on Daily Loop and Loop Switch.



3.2.8 System Setting

Click this icon and enter System Setting interface



System Info

Software Version: show the current software version

Language:Chinese, English and Russian

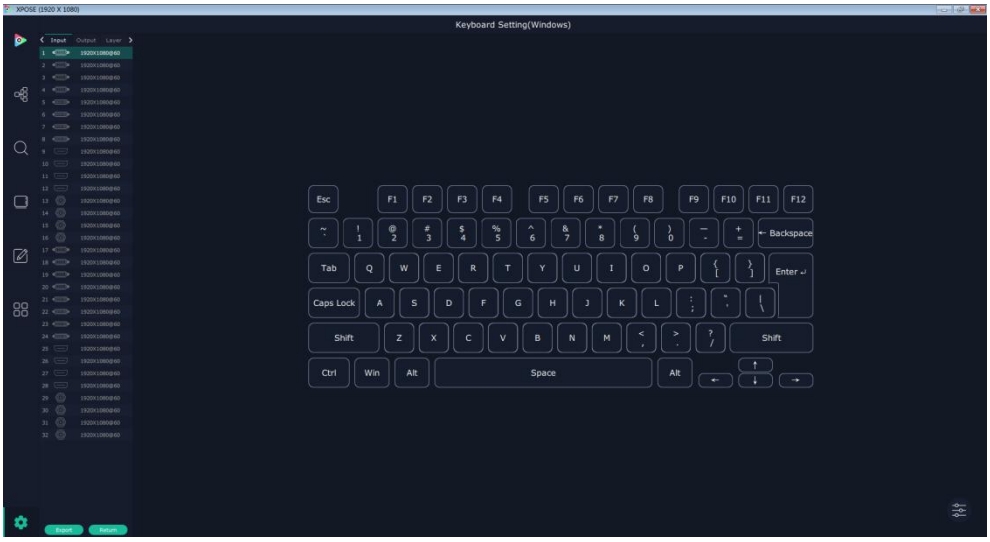
Keyboard Manager

click keyboard 

it will redirected to keyboard setting window.

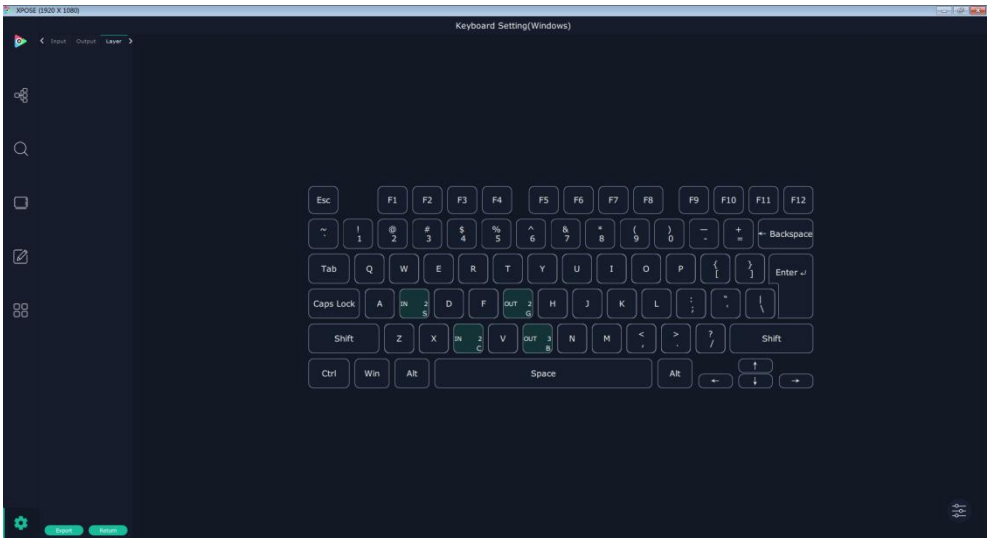
Keyboard setting is designed to fit for different operation systems such as Windows and Mac.

Users can set short cut keys for Input, Output, Layer and Preset.



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

Input, Output, Layer.



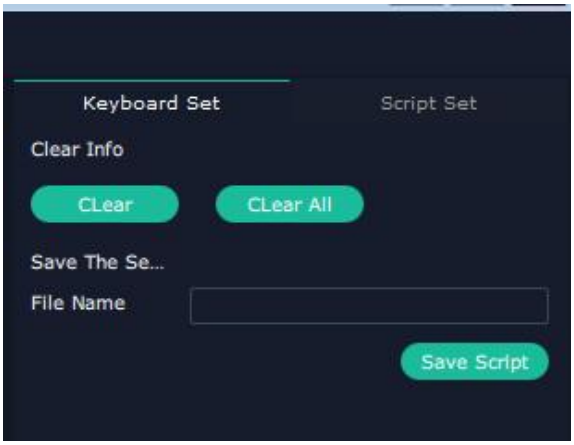
Please note the keyboard area where allows to set short cut keys as follow:



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

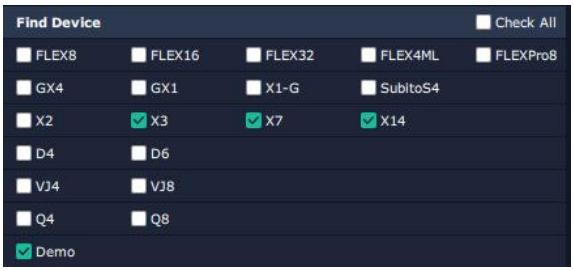
Clear: is to clear some keys, the keys need to selected before hand.

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



Find Device

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



Communication Setting

Search by Serial Port, Ethernet Connection or Both. Default communication by both.



Direct Communication by slecting device and putting its IP Address



Display Setting

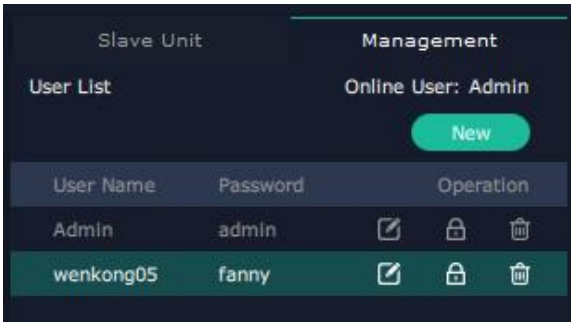
On or Off Expanding Mode to enable or disable the preview 16 input signal source on expanded display.

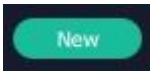
Authorization Setting

Click  to open up the authorization entry.



Click **Management**



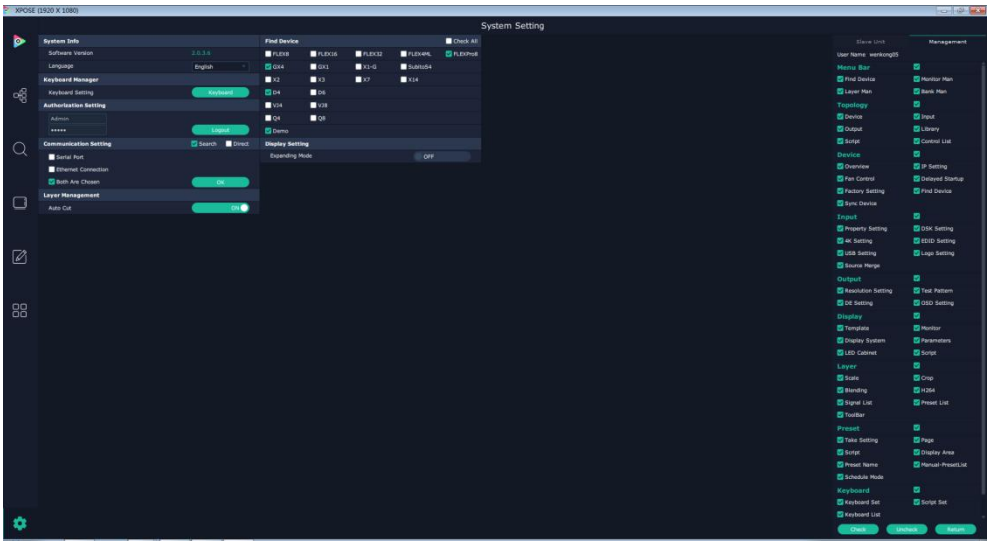


New:Add new USER NAME and PASSWORD


Edit: Edit user name and password already built.


Delete:Delete user name and password already built.


Permission: functions on this XPOSE 2.0 on this computer that the created 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 the the the third section in the IP address digits are the same)

XPOSE do operation on one device, same operation synchronized to other devices. For example, there is another devices linked to the same network, one with IP IP192.168.0.45

If users need to back up operation from current running device to this device slave unit shall be used. First fill in the quantity of to be linked devices, click Set Numbers,

Index, Device IP and State will come up.

Choose the IP address of the other device from drop down list, e.g IP192.168.0.45 and

Slide to ON, the red dot behind turns to green indicating that the device has been connected



Chapter 4 Order Codes

4.1 Product

310-0007-00-0 X7
310-0007-16-0 X7e

4.2 Options

4.2.1 Input Options

190-0003-01-0 Quad DVI Input Module
190-0003-05-0 Quad 2K@60 HDMI Input Module
190-0003-06-0 Quad CVBS (Backup) Input Module
190-0003-11-0 4K@30 Input Module (Choose one of three signals)
190-0003-14-0 Quad 3G SDI Input/Loop Module
190-0003-15-0 4K@60 Input Module (Choose one of four signals)
190-0003-17-0 12G SDI Input Module (single 12G-SDI, dual 6G-SDI, quad 3G-SDI)
190-0003-18-0 Quad HDBaseT Input Module
190-0003-19-0 4K HDR Input Module
190-0003-35-0 Quad 2K@60 HDMI Input Module(De-interlace)

4.2.2 Output Options

190-0003-21-0 Quad DVI Output Module
190-0003-22-0 Quad 2K HDMI Output Module
190-0003-24-0 Quad 3G SDI Output Module
190-0003-27-0 Quad H.264 (RJ45) Streaming Output Module
190-0003-28-0 ARO Rotation Module (independent and arbitrary rotation for DVI)
190-0003-38-0 Dual 4K HDMI 2.0 Output Module
190-0007-21-0 Dual 4K HDMI 2.0 Output Module (Multi-layer)

4.2.3 Other

190-0007-01-0 PVW Module
950-0006-00-0 Power Supply 1200W

Chapter 5 Support

5.1 Contact Us



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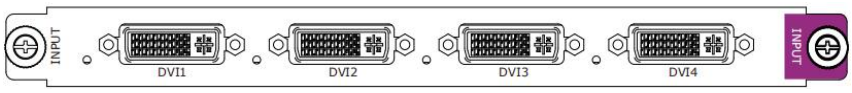
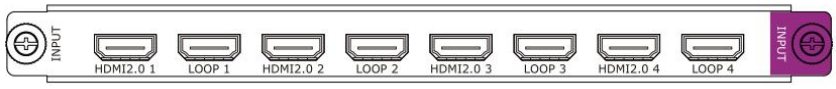
Europe Regional Sales & Support
Eindhoven, Holland

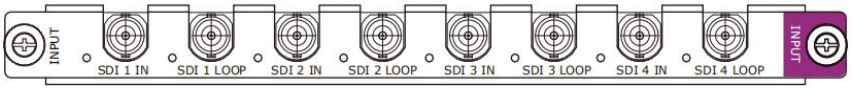
Flight Forum Eindhoven 5657 DW

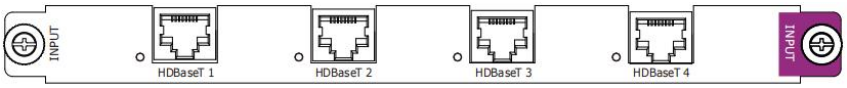
+31 (040) 202 71 83

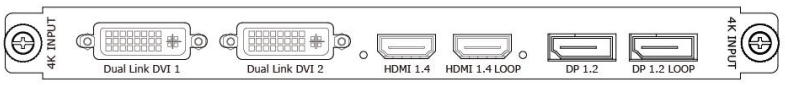
Chapter 6 Appendix

6.1 Specification

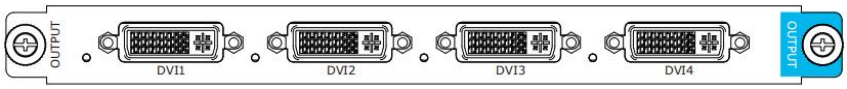
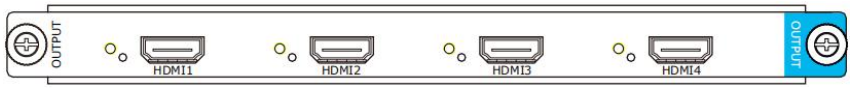
DVI Input Module		
Interface Appearance		
Dimension	216*200*20（mm）	
Number of Connectors	4	
Connector	DVI-I	
Input Resolution	SMPTE	480i | 576i | 720p@50/59.94/60 | 1080i@50/59.94/60| 1080p@50/59.94/60
	VESA	800×600@60 |1024×768@60 |1280×768@60 | 1280×1024@60 | 1600×1200@60 | 1920×1080@60
Format Standard	Single Link DVI	
Color Space	8bit RGB	
Indicator Light	White Light:normal signal connection;Unlit:no signal connection	
HDMI Input Module	**（De-interlace and Sync）**	
Interface Appearance		
Dimension	216*200*20(mm)	
Number of Connectors	4	
Connector	HDMI-A	
Input Resolution	SMPTE	480i | 576i | 720p@50/59.94/60 | 1080i@50/59.94/60| 1080p@50/59.94/60
	VESA	800×600@60 | 1024×768@60 | 1280×768@60 | 1280×1024@60 | 1600×1200@60 | 1920×1080@60
Format Standard	HDMI 1.3	
Color Space	8 bit RGB/YUV 4:2:2/YUV 4:4:4	
Indicator Light	White Light:normal signal connection;Unlit:no signal connection	
HDMI 2.0 HDR Input Module		
Interface Appearance		
Dimension	216*212*20(mm)	
Number of Connectors	8（4 In | 4 Loop）	
Connector	HDMI-A	

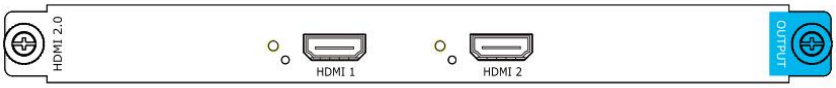
Input Resolution	SMPTE	720P@60 | 1080P@60 |2160@60
	VESA	800×600@60 | 1024×768@60 | 1280×720@60 | 1280×800@60 | 1366×768@60 | 1400×1050@60 | 1600×1200@60 | 1920×1080@60 | 2048×1152@60 | 2560×812@60 | 2560×816@60 | 2560×1600@60 | 3840×1080@60|3840×2160@23.98/24/25/29.97/30/50/60 | 4096×2160@60 | 7680×1080@60
Format Standard	HDMI 2.0	
Color Space	8 bit RGB/YUV 4:2:0/YUV 4:2:2/YUV 4:4:4 10 bit RGB/YUV 4:2:0/YUV 4:2:2/YUV 4:4:4 12 bit RGB/YUV 4:2:0/YUV 4:2:2/YUV 4:4:4	
Indicator Light	White Light:normal signal connection;Unlit:no signal connection	
3G-SDI Input /Loop Module		
Interface Appearance		
Dimension	216*220*20(mm)	
Number of Connectors	8 (4 Input, 4 Loop)	
Connector	BNC	
Input Resolution	SMPTE	480i | 576i | 720p@50/60 | 1080i@59.94/60 | 1080p@23.98/24/25/29.97/30/59/59.94/60 | 1080psf@23.98/24/25/29.97/30
Supported Standard	SMPTE 425M (Level A & B) | SMPTE 424M | SMPTE 292M | SMPTE 274M SMPTE 296M | SMPTE 272M | SMPTE 299M | SMPTE 259M-C | DVB-ASI	
Color Space	10 bit YUV4:2:2	
Indicator Light	White Light:normal signal connection;Unlit:no signal connection	
12G-SDI Input Module		
Interface Appearance		
Dimension	216*220*20(mm)	
Number of Connectors	4 （3G SDI×4 or 12G SDI×1）	
Connector	BNC	
Input Resolution	SMPTE	480i | 576i | 720p@25/30/50/60Hz | 1080i@50/50.94/60 | 1080p@23.98/24/25/29.97/30/50/59.94/60Hz| 2160p@30/50/60
Supported Standard	SMPTE ST 2082-1, SMPTE ST 2081-1, SMPTE ST 424, SMPTE ST 292-1, SMPTE 274M SMPTE 296M | SMPTE 272M | SMPTE 299M | SMPTE ST 259, DVB-ASI,MADI	

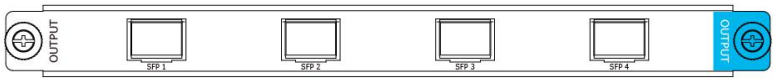
Color Space	10 bit YUV4:2:2
Indicator Light	White Light:normal signal connection;Unlit:no signal connection
HDBaseT Input Module	
Interface Appearance	
Dimension	216*220*20(mm)
Number of Connectors	4
Connector	RJ45
Input Resolution	SMPTE 720p@50/59.94/60 | 1080p@23.98/24/25/29.97/30/50/59.94/60 VESA 800×600@60/75/85 | 1024×768@60/75/85 | 1280×768@60 | 1280×800@60|1280×1024@60/75/85| 1360×768@60 | 1366×768@60 |1400×900@60 | 1600×1050@60 | 1600×1200@60 |1680×1050@60 | 1920×1080@60 | 1920×1200@60 | 2048×1152@60 | 2560×812@60 | 2560×816@60 |
Standard	HDBaseT 1.0
Color Space	8 bit RGB/YUV 4:2:2/YUV 4:4:4 10 bit RGB/YUV 4:2:2/YUV 4:4:4 12 bit RGB/YUV 4:4:4
Indicator Light	White Light:normal signal connection;Unlit:no signal connection
H.264 Input Module	
Interface Appearance	
Dimension	216*220*20(mm)
Number of Connectors	4
Connector	RJ45
Input Resolution	176×144@60 | 240×180@60 | 320×180@60 | 320×240@60 | 320×256@60 | 352×228@60 | 352×480@60 | 400×224@60 | 400×720@60 | 480×270@60 | 480×272@60 | 480×720@60 | 480×760@60 | 480×784@60 | 480×480@60 | 544×480@60 | 608×448@60 | 640×760@60 | 640×480@60 | 704×576@60 | 720×404@60 | 720×480@60 | 720×540@60 | 720×576@60 | 850×480@60 |1024×576@60 | 1280×720@60 | 1680×1056@60 | 1920×1080@60
Standard	H.264/MPEG-4 AVC
Indicator Light	White Light:normal signal connection;Unlit:no signal connection
4K@30 Input Module	

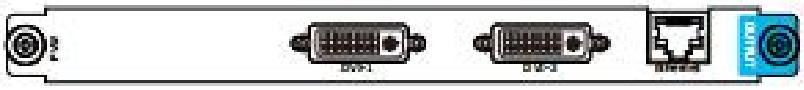
Interface Appearance		
Dimension	216*212*20（mm）	
Number of Connectors	6	
Connector	DVI-I | HDMI-A | DisplayPort	
Input Resolution	SMPTE	480i | 576i | 720p@50/59.94/60 | 1080i@50/50.94/60 | 1080p@ 23.94/24/25/30/50/59.94/60 | 2160p@23.94/24/25/30
	VESA	800×600@60 | 1024×768@60 | 1280×768@60 | 1280×1024@60 | 1600×1200@60 |1920×1080@60 | 1920×1200@60 | 2048×1152@60 | 2560×1440@60 | 2560×1600@60 | 3840×2160@24/24/25/30
Standard	DVI	DUAL
	HDMI	1.4
	DisplayPort	1.1
Color Space	8 bit RGB/YUV 4:2:2/YUV 4:4:4	
Indicator Light	White Light:normal signal connection;Unlit:no signal connection	
4K@60 Input Module		
Interface Appearance		
Dimension	216*212*20(mm)	
Number of Connectors	4	
Connector	DVI-I | HDMI-A |DisplayPort	
Input Resolution	SMPTE	720p@60 | 1080p@60 |2160p@24/25/30/50/60
	VESA	800×600@60 | 1024×768@60 | 1280×768@60 | 1280×800@60 |1280×1024@60 | 1360×768@60 | 1366×768@60 |1400×900@60 | 1600×1050@60 | 1600×1200@60 |1680×1050@60 | 1920×1080@23.98/24/25/29.97/30/50/59.94/60 | 1920×1200@60 |2048×1152@60 | 2560×812@60 | 2560×816@60 | 2560×1600@60 | 3840×1080@60| 3840×2160@23.98/24/25/29.97/30/50/60 | 4096×2160@60
Support Standards	DVI	DUAL
	HDMI	2.0 | 1.4
	DisplayPort	1.2
Color Space	8 bit RGB/YUV 4:2:0/YUV 4:2:2/YUV 4:4:4 10 bit RGB/YUV 4:2:0/YUV 4:2:2/YUV 4:4:4 12 bit RGB/YUV 4:2:0/YUV 4:2:2/YUV 4:4:4	

Indicator Light	White Light:normal signal connection;Unlit:no signal connection

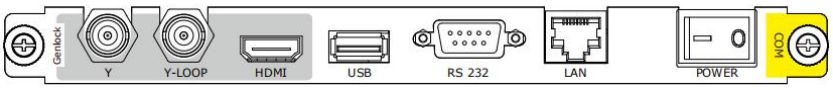
DVI Output Module	
Interface Appearance	
Dimension	216*200*20(mm)
Number of Connectors	4
Connector	DVI-I
Signal Level	TMDS pw, 165MHz bandwidth
Output Resolution	SMPTE 720p@50/59.94/60| 1080p@50/59.94/60 VESA 800×600@60 |1024×768@60/75/85| 1280×720@50/59.94/60 |1280×800@60| 1280×960@60 | 1280×1024@60/75/85 | 1400×1050@60 |1600×1200@60| 1920×1080@23.98/24/25/29.97/30/50/59.94/60| 2048×1152@60
Color Space	8 bit RGB
Indicator Light	White Light:normal signal connection;Unlit:no signal connection
SDI Output Module	
Interface Appearance	
Dimension	216*220*20(mm)
Number of Connectors	4
Connector	BNC
Signal level	800mV±10%
Supported Standard	SMPTE 425M (Level A and Level B), SMPTE 424M, SMPTE 292, SMPTE 259M-C and DVB-ASI
Output Resolution	SMPTE 480i | 576i | 720p/50/59.94/60 | 1080i/50/59.94/60 |1080p/50/59.94/60
Equalization	Belden 1694A 100m HD 1.485G, 300m SD 270Mbps
Color Space	10 bit YUV 4:2:2
Indicator Light	White Light:normal signal connection;Unlit:no signal connection
2K HDMI Output Module	
Interface Appearance	
Dimension	216*220*20(mm)
Number of Connectors	4

Connector	HDMI-A
Output Resolution	SMPTE 480i | 576i | 720p50/59.94/60 | 1080i50/59.94/60 | 1080P50/59.94/60 VESA 800×600@60 | 1024×768@60 | 1280×768@60 | 1280×1024@60 | 1600×1200@60 | 1920×1080@50/60
Format Standard	HDMI 1.3
Color Space	8 bit RGB 10 bit RGB 12 bit RGB
Indicator Light	White Light:normal signal connection;Unlit:no signal connection
HDMI 2.0 Output Module	
Interface Appearance	
Dimension	216*212*20(mm)
Number of Connectors	2
Connector	HDMI-A
Output Resolution	SMPTE 720p@60 | 1080p@60 | 2160p@60 VESA 1280×720@60 | 1360×768@60 | 1366×768@60 | 1600×900@60 |1920×1080@60|2540×1440@60| 3480×2048@60 | 3840×2160@60 | 4096×2160@60
Color Space	8 bit RGB 10 bit RGB 12 bit RGB
Indicator Light	White Light:normal signal connection;Unlit:no signal connection
HDBaseT Output Module	
Interface Appearance	
Dimension	216*212*20(mm)
Number of Connectors	4
Connector	RJ45
Output Resolution	SMPTE 720p@50/59.94/60 | 1080i@50/59.94/60 | 1080p@23.98/24/25/29.97/30/50/59.94/60 VESA 800x600@60/75/85 | 1024x768@60/75/85 | 1280x768@60 | 1280x800@60 |1280x1024@60/75/85 | 1360x768@60 | 1366x768@60 |1400x900@60 | 1600x1050@60 | 1600x1200@60 |1680x1050@60 | 1920x1080@60 | 1920x1200@60 | 2048x1152@60 | 2560x812@60 | 2560x816@60
Supported	HDBaseT 1.0

Standards	
Color Space	8bit RGB
Indicator Light	White Light:normal signal connection;Unlit:no signal connection
Fiber Output Module	
Interface Appearance	
Dimension	216*212*20（mm）
Number of Connectors	4
Connector	LC
Output Resolution	SMPTE 720p@50/59.94/60 | 1080P@23.98/24/25/29.97/30/50/59.94/60 VESA 1024×768@60 | 1280×768@60 | 1280×1024@60 | 1600×1200@60 | 1920×1080@60 | 2048×1152@60 | 2560×816@60
Color Space	8 bit RGB 10 bit RGB 12 bit RGB
Indicator Light	White Light:normal signal connection;Unlit:no signal connection

PVW (Streaming Preview) Module	
Interface Appearance	
Dimension	216*200*20（mm）
Number of Connectors	3
Connector	RJ45|DVI-I
Output resolution	H.264 176×144@60 | 240×180@60 | 320×180@60 | 320×240@60 | 320×256@60 | 352×228@60 | 352×480@60 | 400×224@60 | 400×320@60 | 480×270@60 | 480×272@60 | 480×320@60 | 480×360@60 | 480×384@60 | 480×480@60 | 544×480@60 | 608×448@60 | 640×360@60 | 640×480@60 | 704×576@60 | 720×404@60 | 720×480@60 | 720×540@60 | 720×576@60 | 850×480@60 | 1024×576@60 | 1280×720@60 | 1680×1056@60 | 1920×1080@60 DVI SMPTE 480i | 576i | 720p@50/59.94/60 | 1080i@50/59.94/60 | 1080p@25/29.97/30/50/59.94/60 VESA 1024×768@60/75/85 | 1280×800@60 |

	1280×1024@60/75/85 | 1360×76@x60 | 1920×1080@60	
Supported Standards	DVI	1.0
	H.264	H.264/MPEG-4 AVC
Decode Protocol	Baseline | Main | High Profile L4.2 | MJPEG/JPEG baseline	
Color Space	8bit RGB/YUV 4:4:4	
Indicator Light	White Light:normal signal connection;Unlit:no signal connection	
To run streaming preview via PVW module, CPU of the dominant computer is suggested to be I5 or above. If more than 3 PVW modules is needed, CPU of computer better to be I7 and independent GPU is required as well.		

Communication	
Interface Appearance	
Board Size	165(L)×19(W)（mm）
Genlock	
Number of Connectors	3
Connector	BNC (Genlock Y/H/V) HDMI (Genlock Loop)
Gelnlock can accept Tri Level Sync input and Black burst Input	
Control	
Number of Connectors	3
Connector	USB-A | DB-9 | RJ45
Function	
Switch	Support any two inputs fade in fade out
Extras	
Power Supply	100-240V IEC-3
Max Power	1200W
Working Temperature	0°C~45°C
Stored Humidity	10%~90%
Product Warranty	3 years parts and labor warranty

6.2 Care and Preventive Maintenance

6.2.1 Clean Cooling Fan

The fan is designed to keep the device cool and within temperature range during normal operation. Ensuring that the fan module is clean, dust free is important to maintain product warranty, correct working order and for safety.Clean fan assembly at least every six months, or more regularly depending on the installed environment. We suggest replace the fan every year and remove the dust screen if your device has to keep it ventilated.

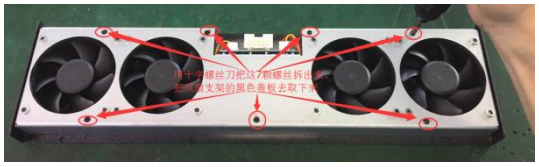
There are two fan modules in X7, one on the top cover and the other on the rear panel.

1.Clean fan on top cover

Step 1：Loosen the screw by hex screwdriver and hold the module with both hands, then pull out carefully



Step 2: Loosen the locking screws to separate black cover panel and fans by cross screwdriver.

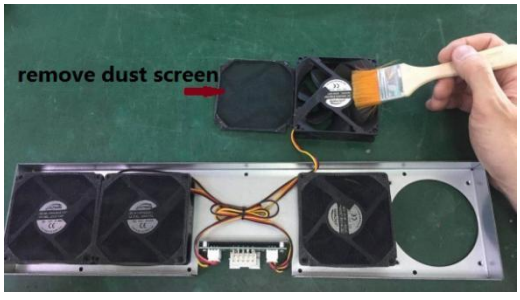


Step 3： Clean dust on the front and back of the fan module by brush.





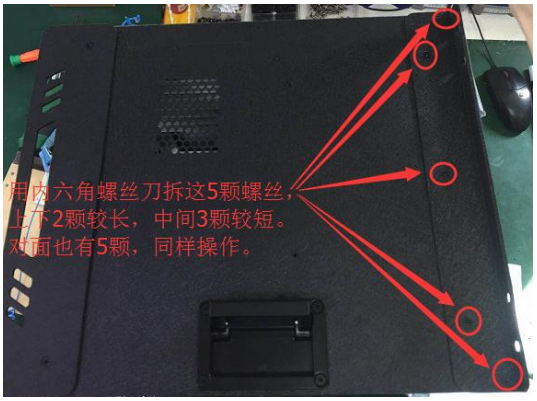
Step 4：Loosen the locking screw to separate the dust screen and fan. Remove the dust screen and clean fan by brush.



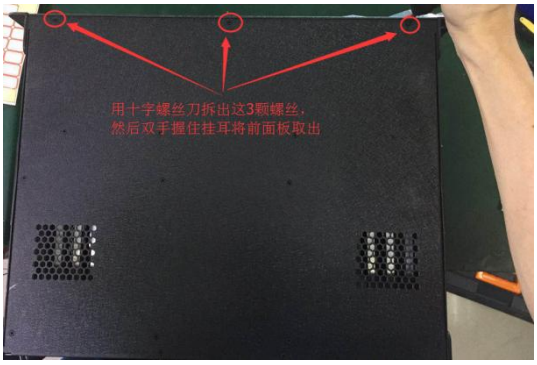
Step 5: Cover the fan with the black panel and lock them by screws.Place the fan module back to the device and tighten the screw.

1. Clean fan on the rear panel

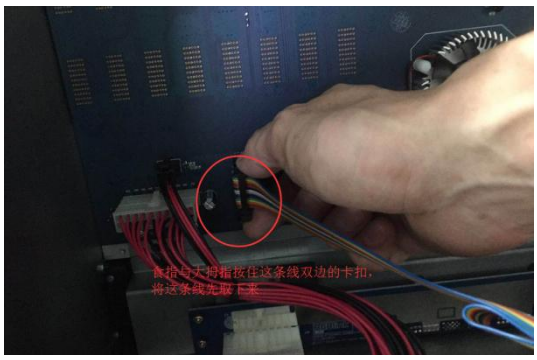
Step 1: Loosen the screws between side panel and wings by hex screwdriver.



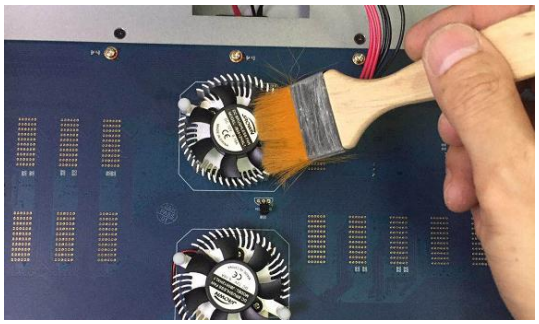
Step 2: Loosen the screws between front panel and base by cross screwdriver.



Step 3: Remove the IDC line connected to the back panel after dismantling the front panel. Press the fastener on both rims by thumb and index finger to take off the line.



Step 4:Clean the the dust on the fan.



Step 5: Reverse the steps above

Insert the IDC line back to the back panel.

Put back the front panel and lock the screws between front panel and base, and then tighten Screws between side panel and wings .

6.3 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.

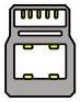
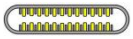
●**USB:** Universal Serial Bus is a standard that was developed in the mid-1990s that defines cables, connectors and communication protocols. This technology is designed to allow a connection, communication and power supply for peripheral devices and computers.

●**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.

6.4 Revision History

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

Format	Time	ECO#	Description	Principal
V1.0	2018-04-29	0000#	Release	Lydia
V1.1	2019-10-24	0001#	Revise (XPOSE 2.0 Control X7) Updated silkscreen of modules	Fanny
V1.2	2020-04-23	0002#	Control by XPOSE 2.0.3.6 Silkscreen updated Order Code updated PVW module added	Fanny
V1.3	2021-07-07	0003#	Appendix updated	Sylvia
V1.4	2023-12-01	0004#	Update order codes	Aster
V1.5	2025-09-09	0005#	Update the included accessories (delete the screw driver and the U disk).	Alyssa

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