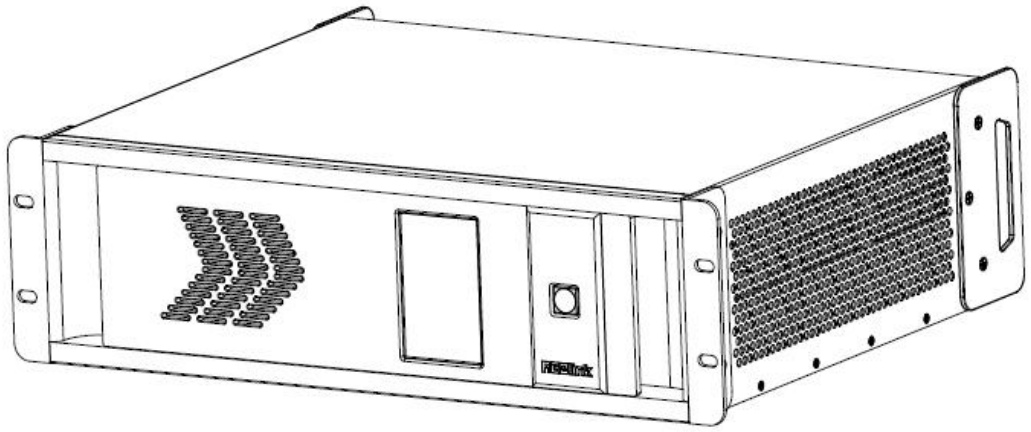
X3p



USER MANUAL

RGBlink®

Article No: RGB-RD-UM- X3p E000
Revision No: V1.0

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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 X3p 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 X3p 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 X3p should be clean, properly lit, free from static, and have adequate power, ventilation, and space for all components.

Chapter 1 Your Product

1.1 In the Box

AC Power Cord

USB Cable

Network Cable

DVI Cable

SDI Cable

DB9-RJ11 Cable

Antistatic Bag

Note:

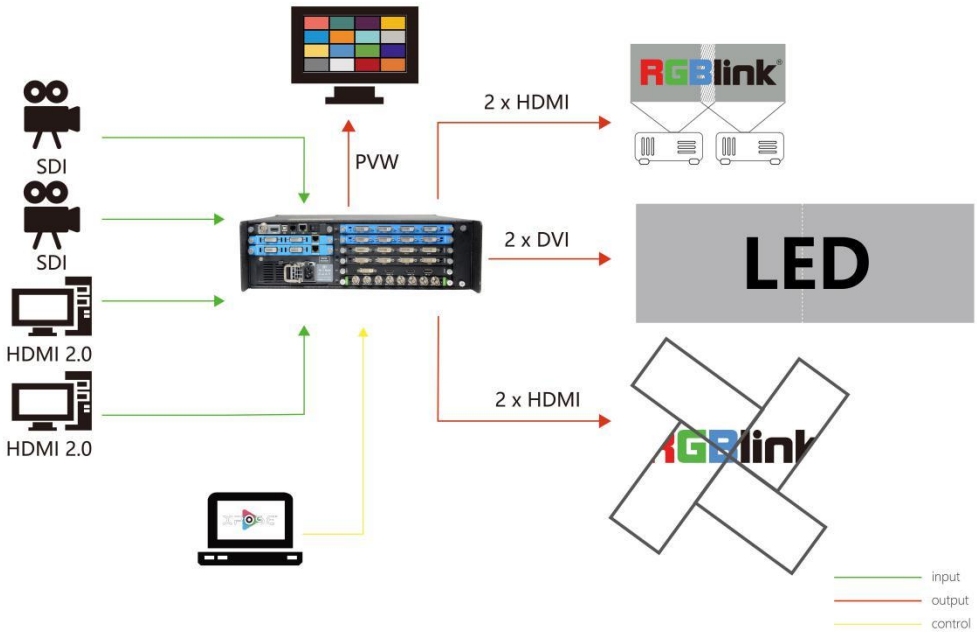
AC Power Cable supplied as standard according to destination market.

1.2 Product Overview

X3p is an HDCP-compliant, scalable, expandable videowall processor configurable to support a variety of input, output and windowing capabilities. It features high performance video scaling capable of producing very high quality images.

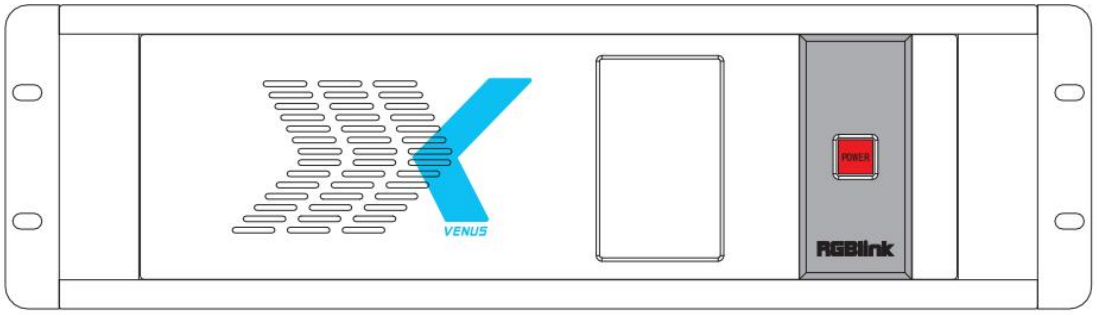
X3p offers six card cages that support various combinations of input and output cards for DVI, VGA, HDMI, CVBS, SDI and USB (for media files play) or video sources. Hundreds of additional video or graphic sources can be input to the X3p using the RGBlink AVDXP Matrix and Router. Multiple X3p can be cascaded to create very large display arrays.

A dedicated, high-speed video/graphic bus maintains real-time performance even under heavy loading of inputs. Compared with other videowall processors, X3p extends two main important performance for presentation application. One is seamless switching between the inputs, the other comes with local control panel option. These advantages make the X3p ideal for all types of surveillance, presentation, and visualization applications, whether traffic, security, military or process control.



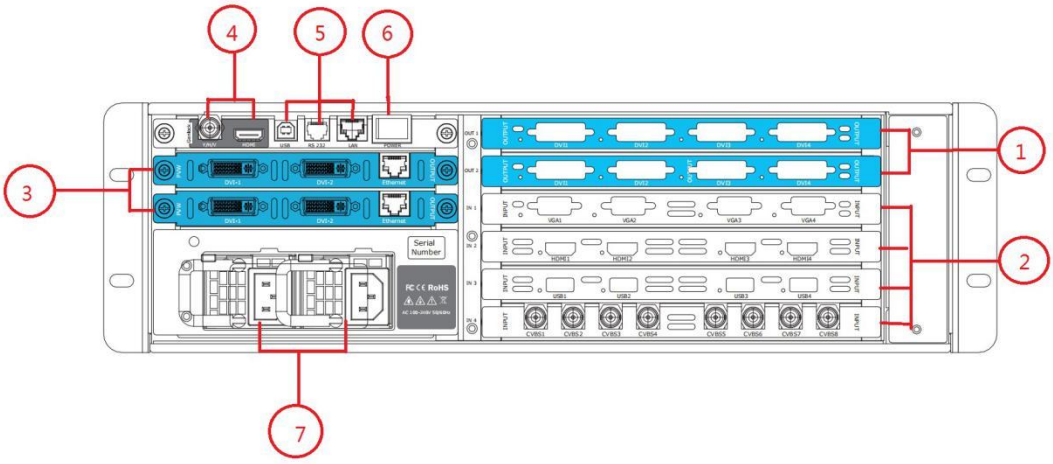
X3p Application Diagram

1.2.1 Front Panel



1	**OLED Panel** Show the input shot and output slot information, device status, COM. Version, IP address and serial address.
2	**POWER** Power button, long push the button, the device can be boot up. Under normal running state, push the button once, the info shown on OLED can be refreshed once ; long push the button, the OLED will pop up a confirm box, release the power button, push the power again before the confirm box disappears, and the power can be turned off.

1.2.2 Rear Panel



Chassis Module Structure			
1	2 output module slots	4	Genlock interface
2	4 input module slots	5	Communication ports
3	2 dedicated slots for PVW modules	6	Power Switch
7	Power modules		

Input Interface

1	4 input slots,supports input modules including DVI, VGA, HDMI, USB, CVBS, 4K@60HZ module and 12G-SDI. For details, please refer to Specification at the end of this document.

Output Interface

2	2 output module shots, support DVI,SDI and HDMI 2.0 signals. For details, please refer to Specification at the end of this document.

PVW（Preview Output)

3	2 slots for 2 PVW modules to preview 16 inputs. For details, please refer to Specification at the end of this document.

Genlock Interface

4	Includes 1 Genlock input and1HDMI output. Genlock Input Input signal from the controller or signal generator and other device. HDMI Input Connect to the display device, video processor or matrix.

Communication Interface

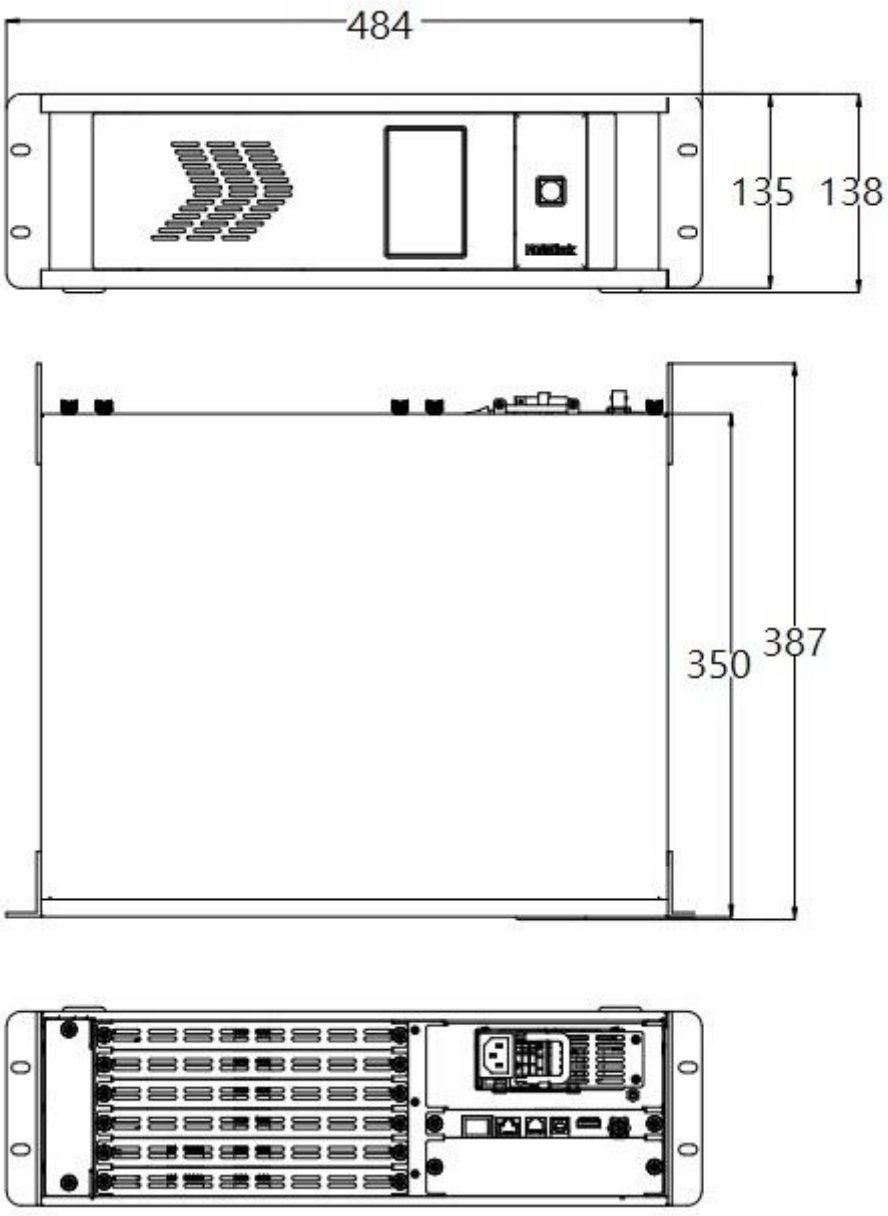
5	Serial USB In
	Serial RS232 In
	LAN

Power Connection

6	Power Switch
7	AC:100-240V Power: Max 65W Power Supply Interface:IEC-3

1.2.3 Dimension

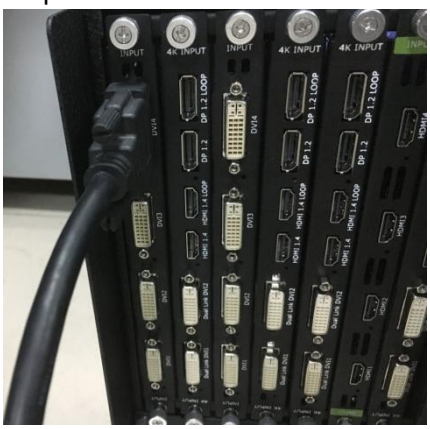
Following is the dimension of X3p for your reference:



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.



2.2 Plug in Main Power

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

2.3 Turn on Your Product

Turn on the power switch on the real 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.

2.4 Connect X3p and Computer

Use network cable to connect the X3p and computer as the following picture show:

Set the IP address of the computer and make sure the computer and the device are in same network range. IP address of the device is available on the OLED screen after it is powered on. For example if the IP of the device is 192.168.110.1, just make sure the IP of the computer is in 192.168.xxx.x, but not exact the same as the device.

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

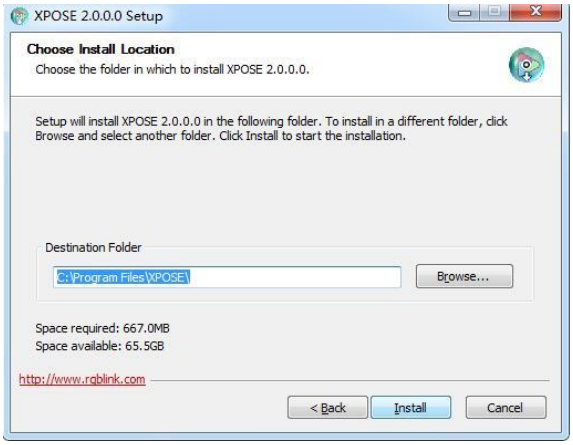
Monitor: Resolution must be 1680x1050 pixel or above (it can not display normally if the resolution is lower than 1680x1050)

CPU:i5 and above

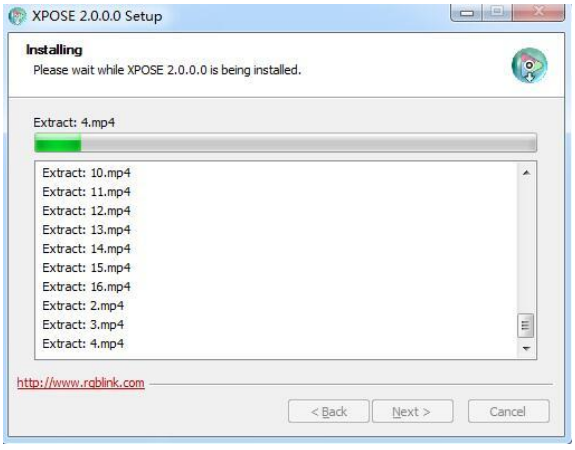
Double click ,it will pop-up the installer language box, select the language, for example, select “English”, and click “OK” to confirm.

Click “Next” to install:

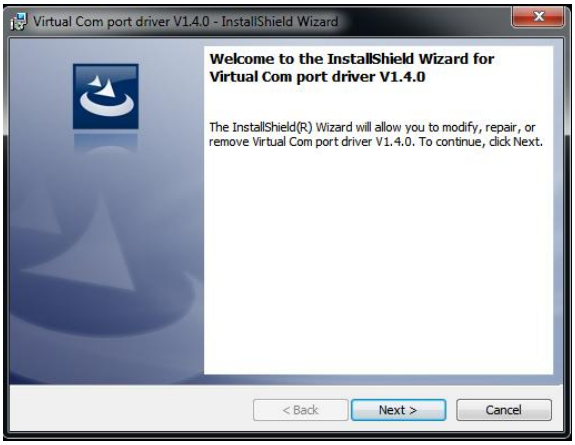
Click “Browse...” to select the XPOSE software install location:



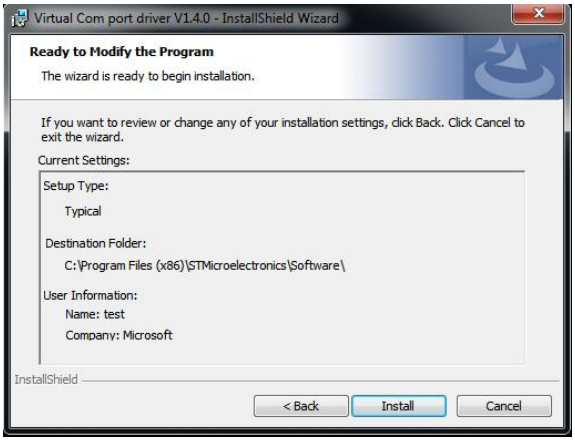
Click “Install”:



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

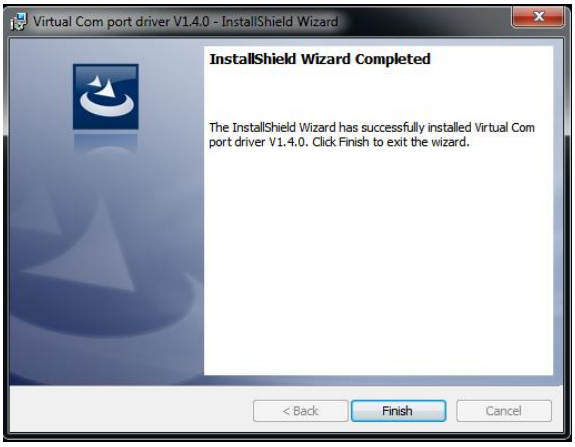


If user install the XPOSE software for the first time, click “Next



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

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



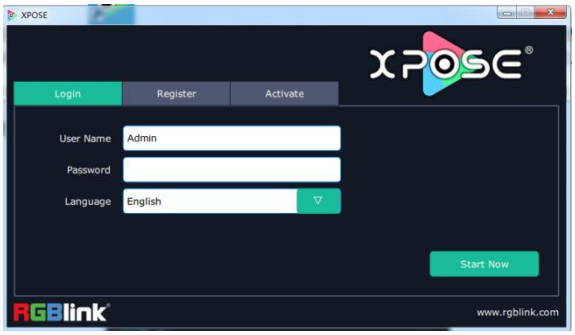
Click “Finish” and is ready to run the XPOSE :

3.2 XPOSE Controls X3p

3.2.1 Login in XPOSE

Double click this icon

,and enter the log on interface as follow



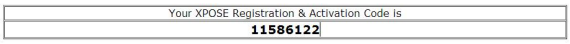
The initial language of XPOSE2.0 is self adjusted based on the operation system language of the computer. **Click Register** and fill in the blank with first name, last name, email, company and country and then click **Register Now.**

Registration complete.

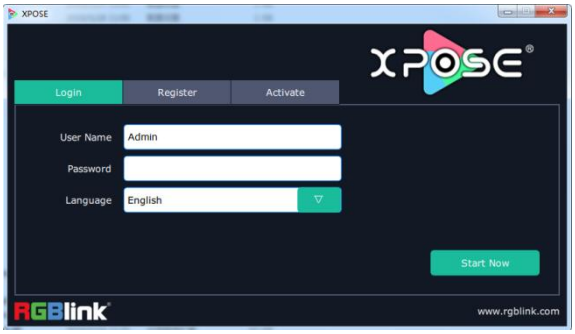
Please note that the email shall be invalid and complete otherwise registration cannot be completed.

Click **Activate** and scan the QR code

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



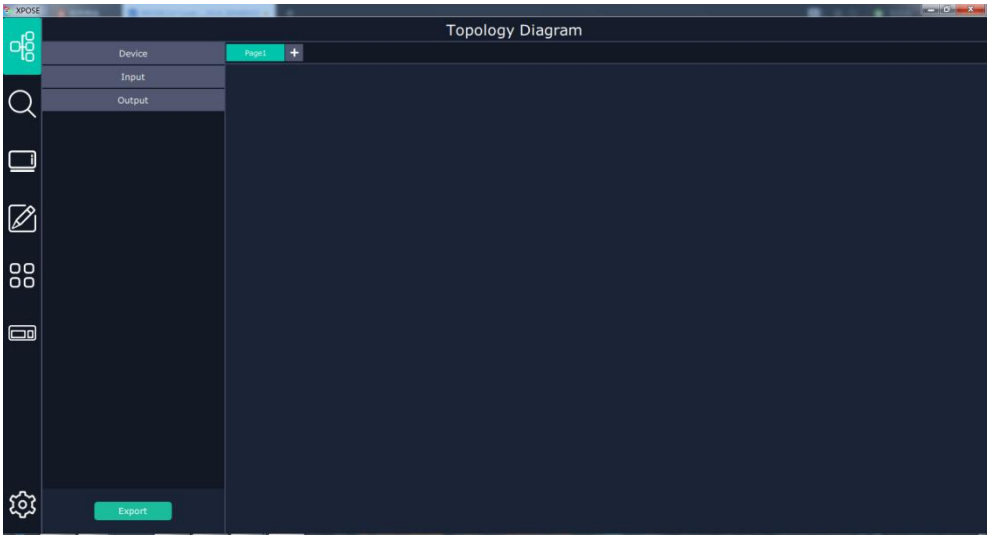
Type in the activate code and confirm, it will automatically skip to **Login**



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

Note: 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.

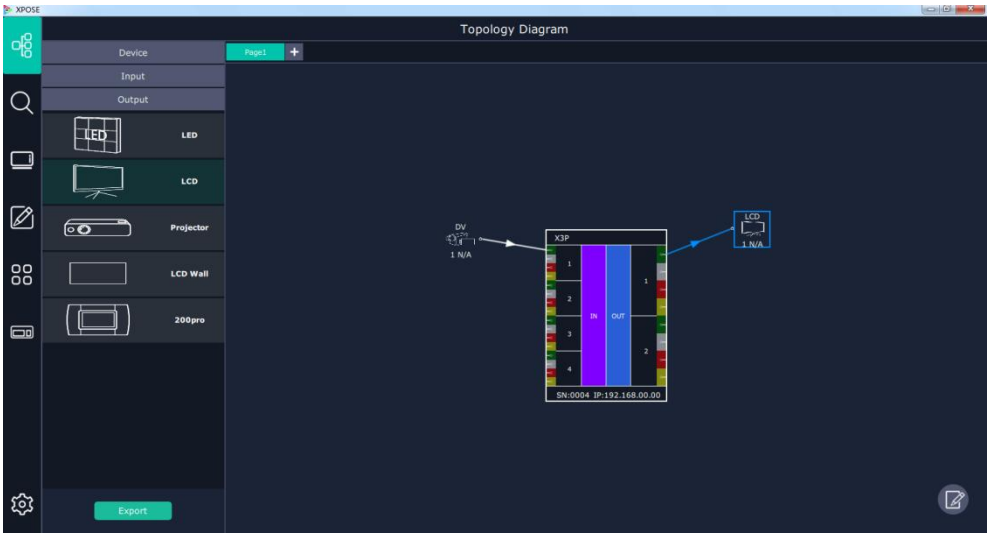


In the following text, we are going to show how to use XPOSE 2.0 to control X3p.

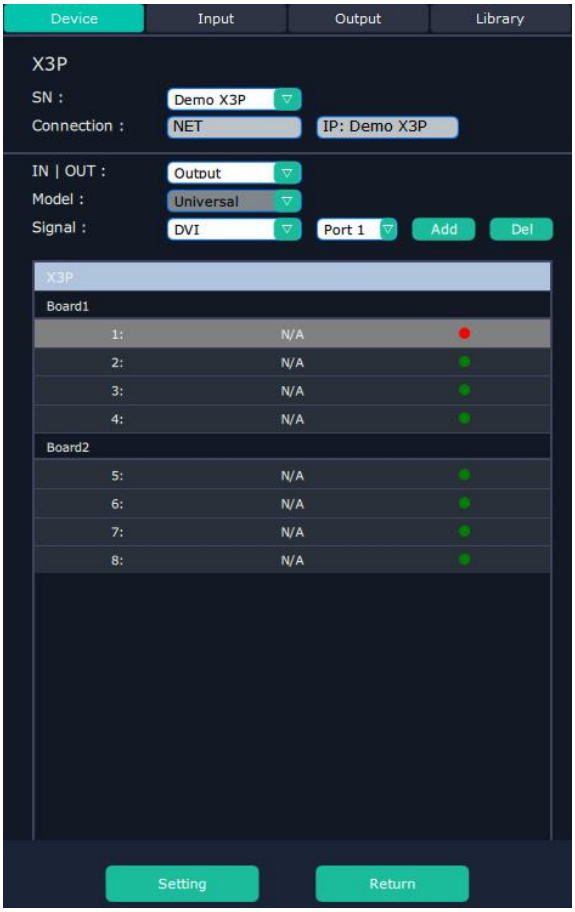
3.2.2 Topology Diagram

XPOSE 2.0 offers the feature of making topology diagram which can assist users to import the actual input and output connection into XPOSE control.

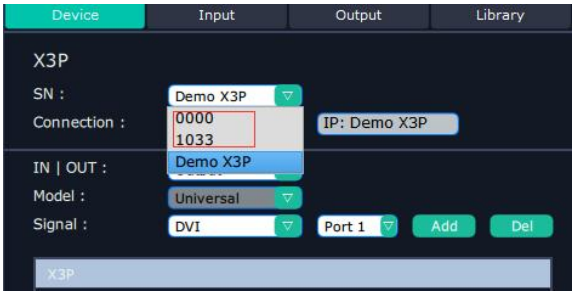
1. Drag device, input source device and output device from the list on the left based on the field application. For example, drag X3p from Device, DV from Input and LCD from Output list as follows:



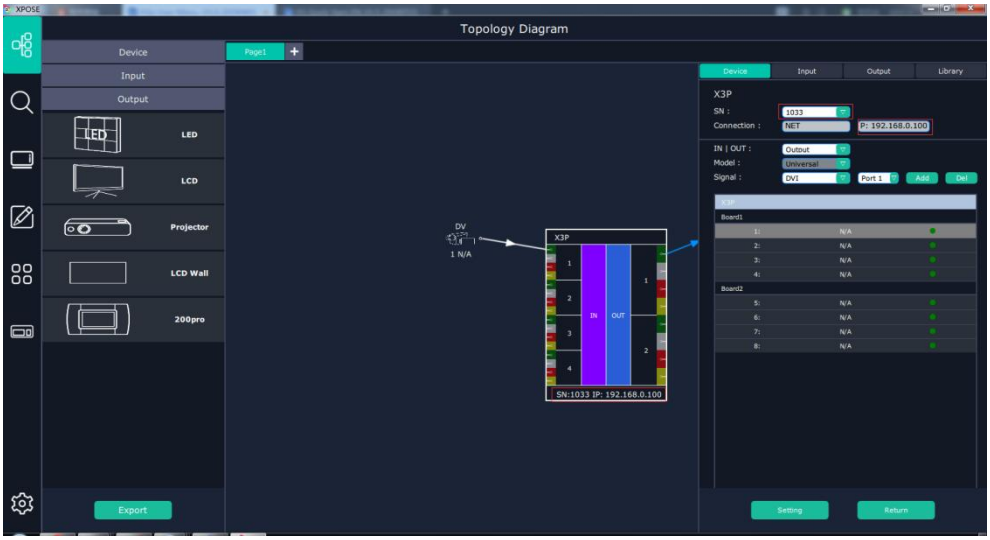
2. Click the icon at the right bottom corner and open the setting interface as following:



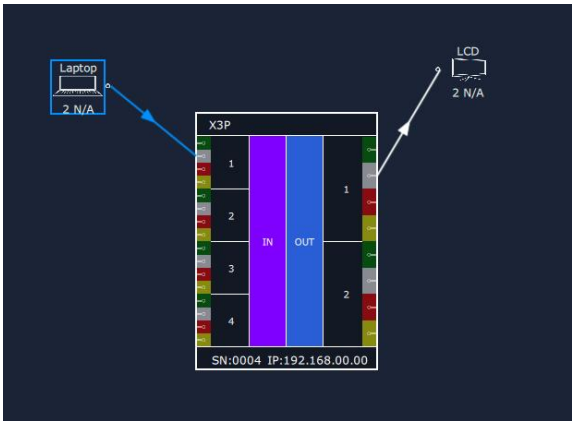
2.1. After X3p is dragged into the topology diagram interface, users can find how many X3 devices currently linked in the same network from the drop-down arrow after SN.



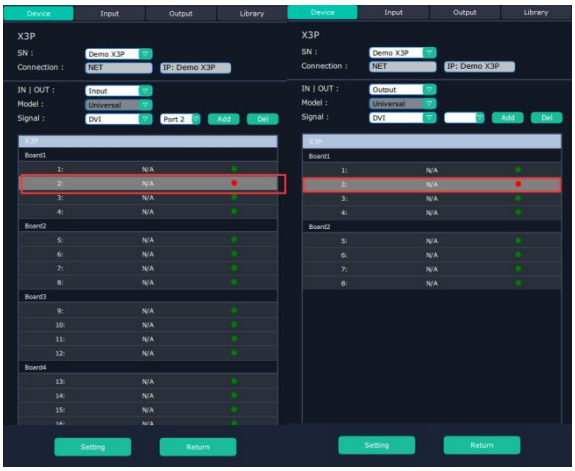
After one of the device is chosen, the device on the topology diagram shows the SN and IP address of the chosen one.



2.2 In and Out port will show according to the topology diagram. For example topology diagram as follow:

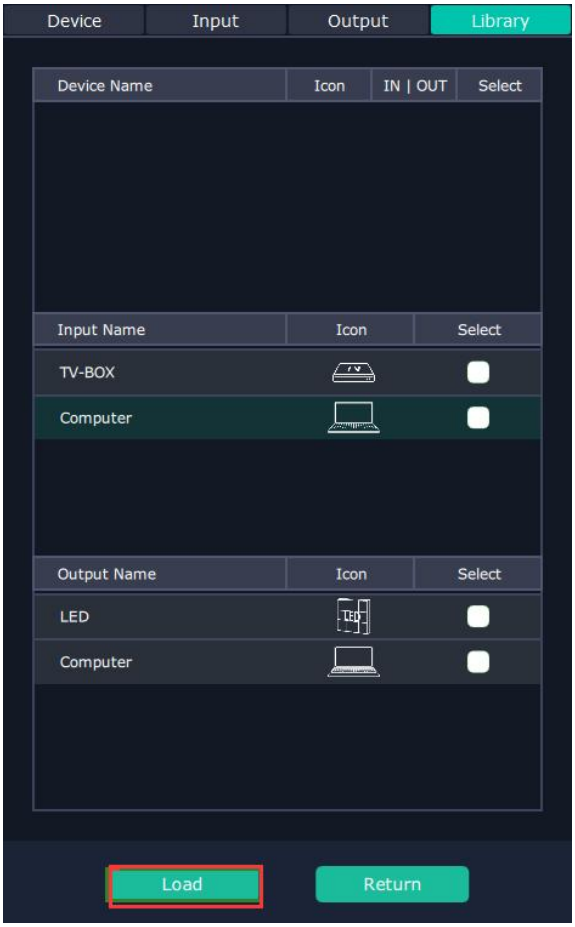


The chosen port of board of In and Out indicated by red dot as below:



3. Users can check the state in **Input** and **Output**

4. 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**.



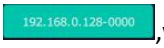
3.2.3 Input and Output Settings

Connect the Device

After Topology Diagram is finished, users can move to next step, the exact setting on each input and output board.

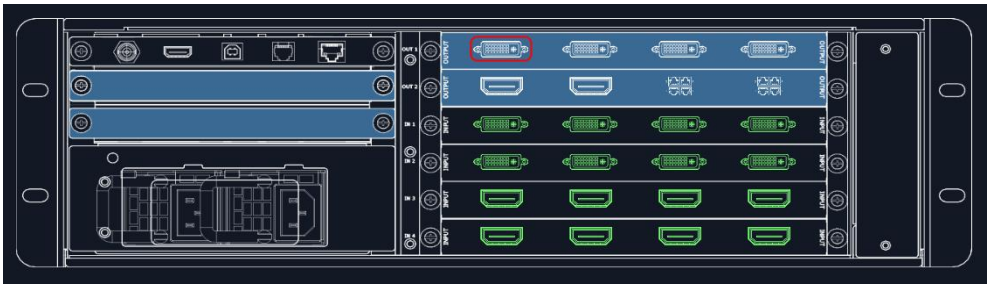
Click icon and enter the operation interface.

First, choose the device from All Devices for example X3p SN:0000

Then click icon behind X3p in **Chosen Device**,IP and SN of this device is shown on the left top corner of the interface  ,which indicates that the device is connected to the computer and it can be operated by XPOSE 2.0 from now on.

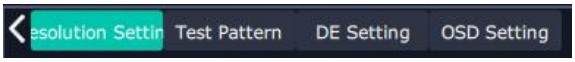
Output Setting

1. Click any output port in blue 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.

2.1 After 2K DVI or HDMI board is selected, users can do the following settings in the edit section after clicking icon



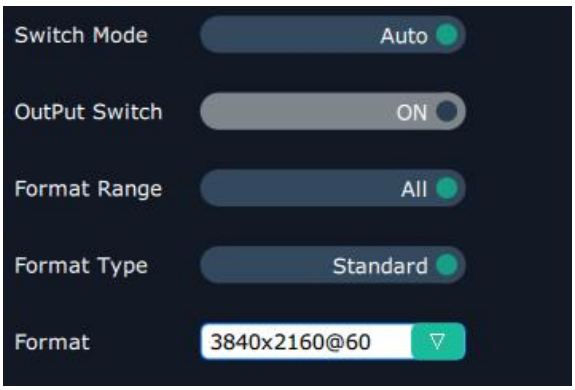
2.1.1 **Resolution Setting**

Switch Mode: Slide to Manual or Auto, If Manual is selected, users can slide ON or OFF to Output Switch

Output Switch: Slide to On or OFF after Manual Switch Mode is selected

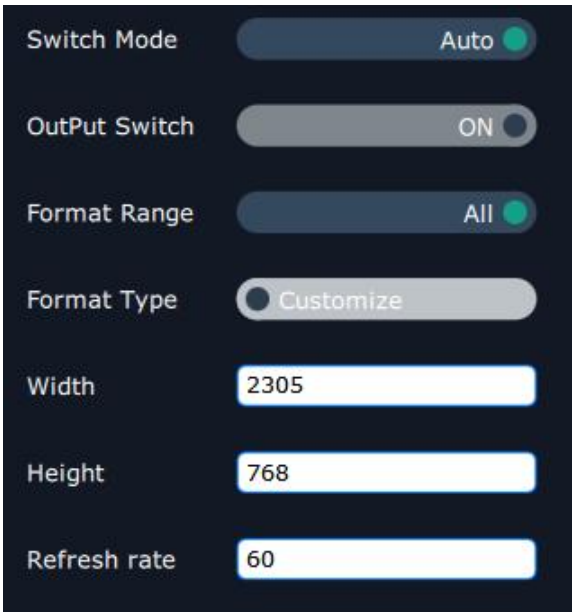
Format Range: select ALL or Module；

When ALL is selected, 26 Standard resolution types available, from 1920x1080@60 to 7680x1080@60



Format Type: Standard or Customize

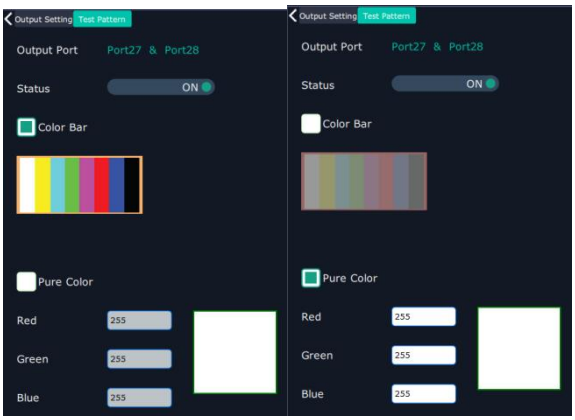
Choose Customize, width, Height, Refresh Rate have to be put in by users manually.



2.1.2 **Test Pattern**

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

Color Bar Pure Color



2.1.3 **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

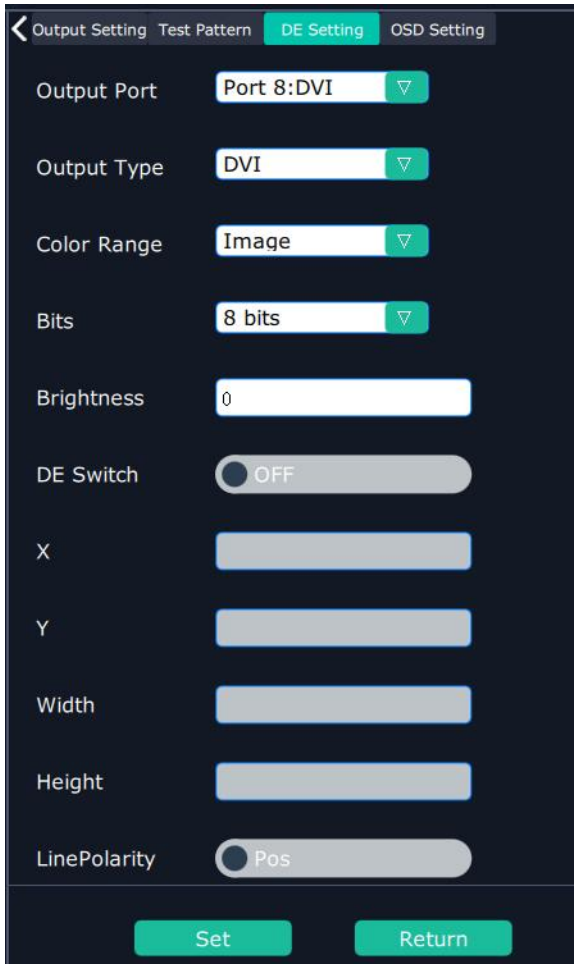
X：horizontal position

Y：vertical position

Width：horizontal size

Height：vertical size

Line Polarity：POS or Neg (Positive or Negative)



2.1.4 **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,

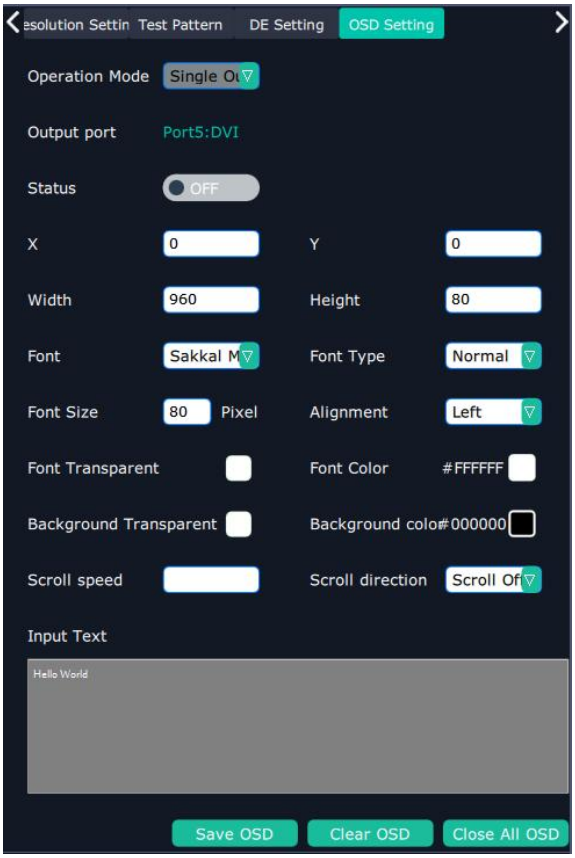
Background Transparent

Scroll Speed：0-16

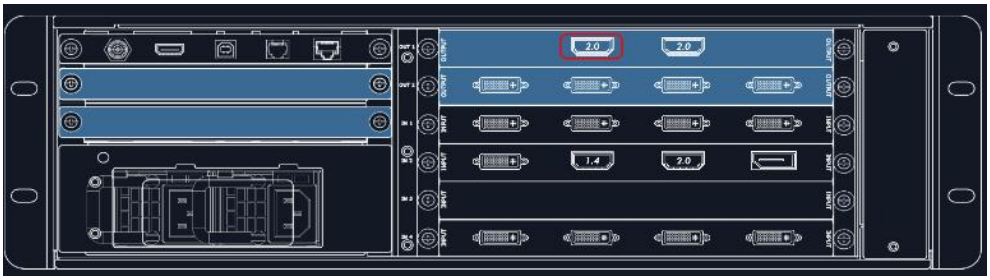
Scroll Direction： Scroll Off, Scroll Left, Scroll Right

Input Text:The exact content of the text.

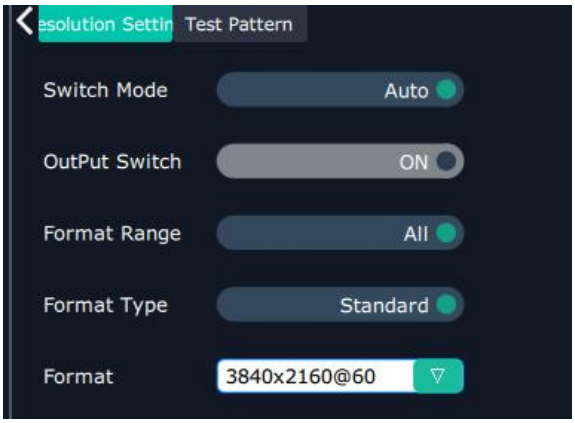
After setting, users choose Save OSD,Clear OSD(if the setting is not desired) or Close All OSD



2.2 When 4K (HDMI 2.0) Output board is selected.

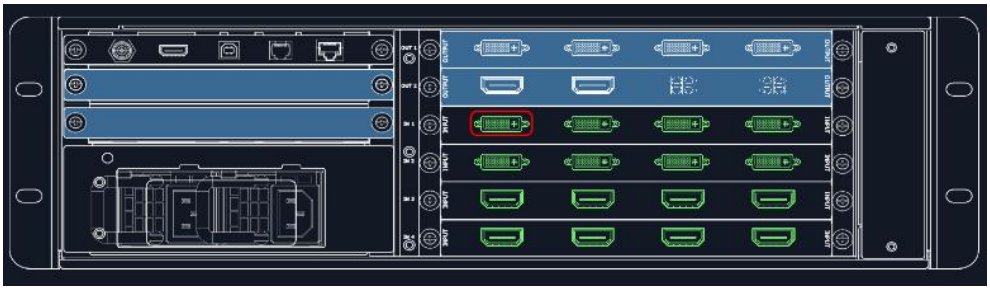


Resolution setting and Test Pattern are available.



Input Setting

1. 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.



2.1 When DVI input module is chosen, Property, DSK Setting,EDID Setting,LOGO,Source Merge could be done.

2.1.1 **Property**

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 the input signal is directly sent to output display, without refresh rate delay.

Saturation：slide to adjust

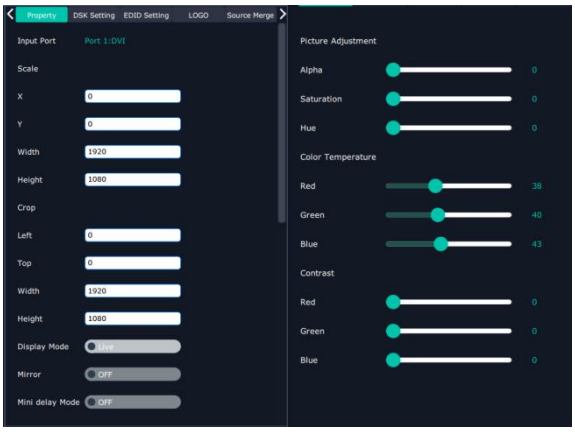
Hue：slide to adjust

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

2.1.2 **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

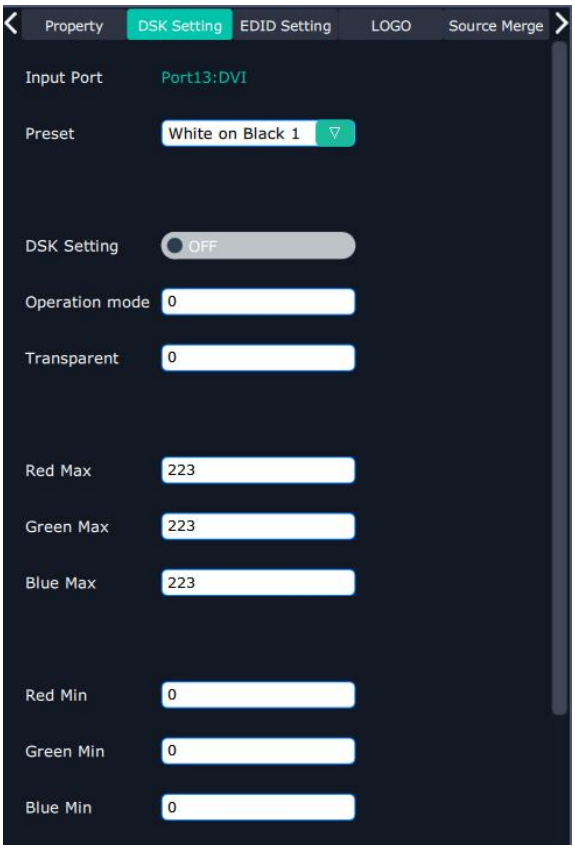
DSK Setting switch：On or Off

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,Blue Min：0-255,automatically show according to user’s Preset choice



2.1.3 **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

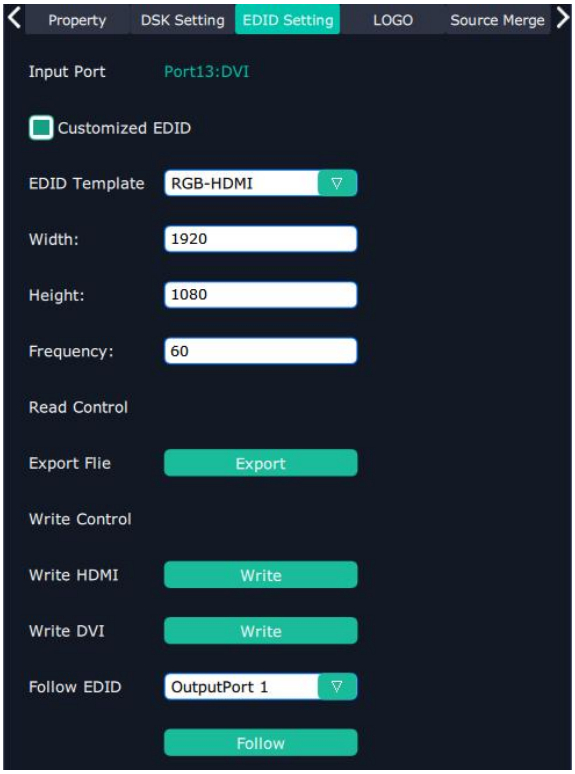
Export File: Export to local computer and store to XPOSE 2.0 File.

Write Control

Write HDMI

Write DVI

Follow EDID :Output 1



2.1.4 **Logo**

Input Port：Current Port

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

Logo Catpure

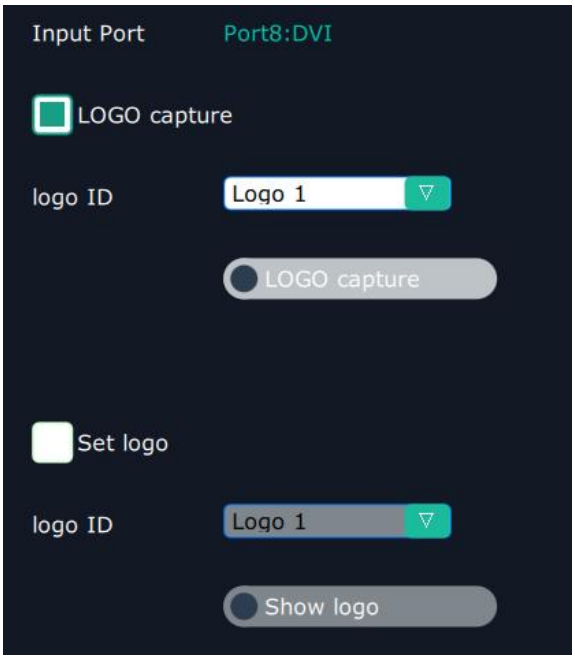
Logo ID：select from Logo1-Logo10

Slide to enable Logo capture

Set Logo

Logo ID: select from Logo1-Logo 10

Slide to enable Show Logo



2.1.5 **Source Merge**

Source merge is used to merge input sources on the same input module, and combine the inputs to display in the same layer, with different layout.

Input Port:Currently chosen port

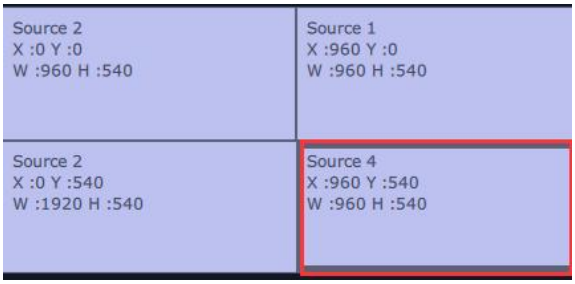
Resolution： resolution of current input source

Channels:Choose one channel to be the “base” for the merged signal.

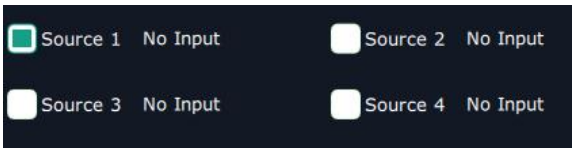
Layers： up to 4 layers (choose layers first, layers depending on how many pictures needed to show on one display)

Merge patterns (choose merge patterns after layer number decided)

Click the layer to select it



then select from source 1 to 4 to change the content of this layer.



Adjust the layer by Scale if needed.

2.2 When HDMI port is select, users can do setting of Property and EDID

2.3When SDI port is select, users can do setting of Property , DSK, LOGO and Source Merge.

2.4When USB port is selected, Property and USB setting could be done.

2.4.1**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

2.5 Select H.264 input port.

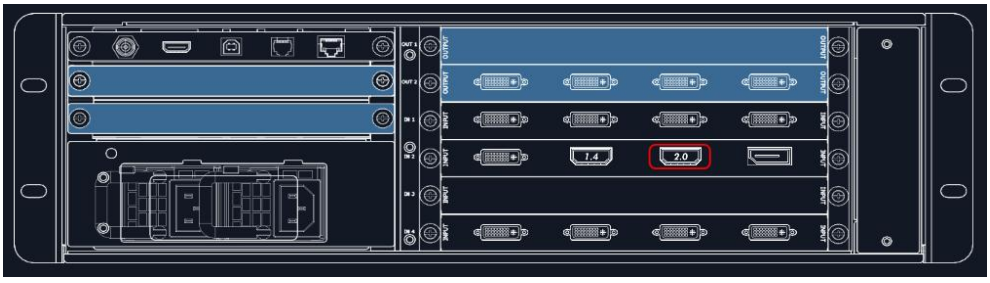
Property could be set：

Input Port：Current port and type

Scale：set position（X,Y）,and size（Width,Height）

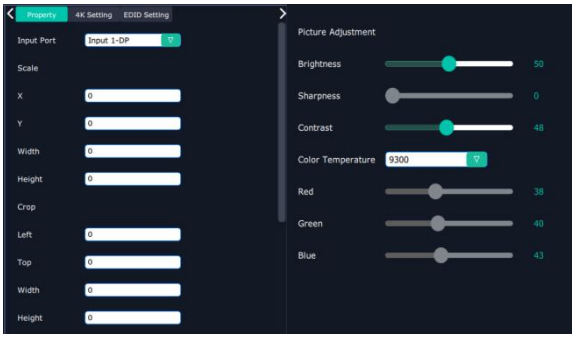
Crop：set starting position（X,Y）,and size（Width,Height）

2.6 Select any port on 4K@60 board.



There comes Property,4K Setting ,EDID Setting

2.6.1 **Property**

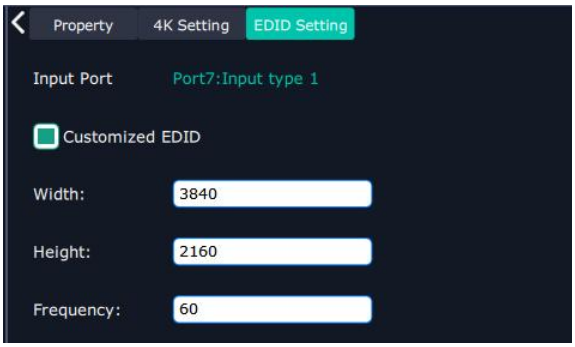


2.6.2 **EDID Setting**

Input Port Current Port and Type

Customized EDID

Width, Height, Frequency:current



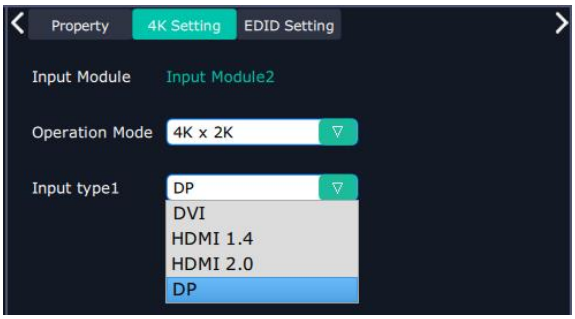
2.6.3 **4K Setting**

Input Module: current module position

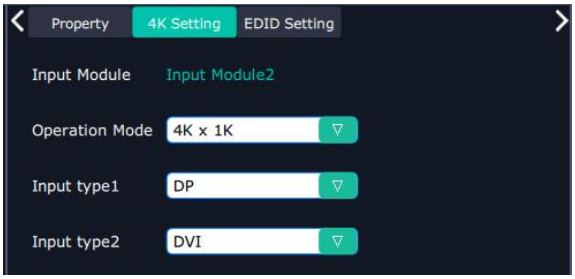
Operation mode: 4K x 2K, 4K x 1K, 2K x 1K, PIP

4K x 2K

Input type 1: select from DVI, HDMI 1.4, HDMI 2.0 and DP

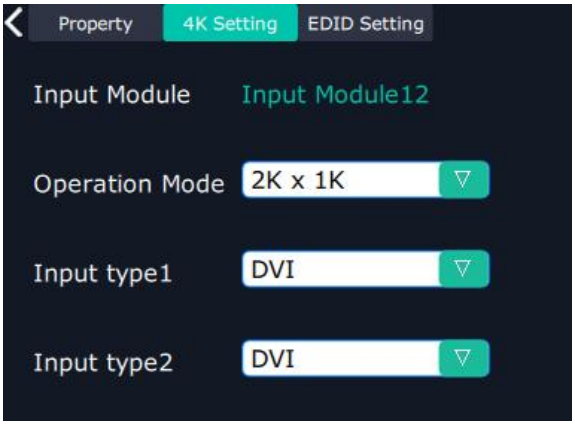


4K x 1K



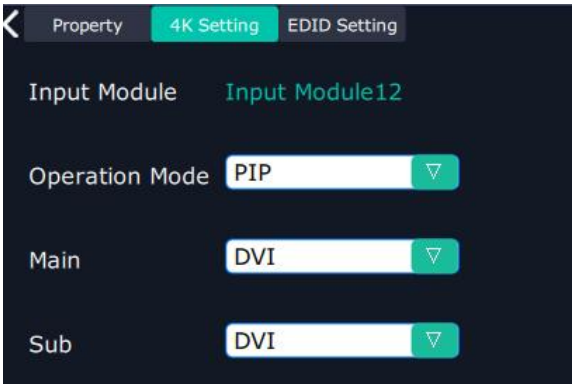
Input type 1 & Input type 2: select from DVI, HDMI 1.4, HDMI 2.0 and DP

2K x 1K



Input type 1&Input type 2: select from DVI, HDMI 1.4, HDMI 2.0 and DP

PIP

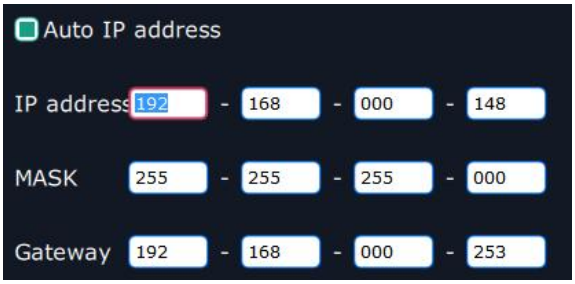


Select Main and Subsidiary picture from DVI, HDMI 1.4, HDMI 2.0 and DP

Device Overview

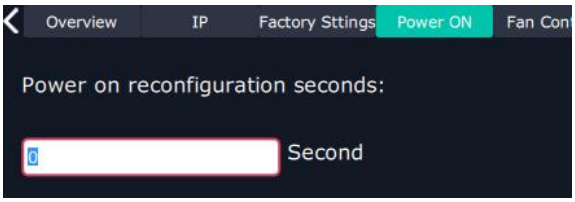
Click Return Return, there are overview, IP setting,Factory Setting,Power ON,Fan Control Overview show Device Info, board info in each slot.

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



Factory setting： Remove Logo and/or Remove EDID

Power on：0-255S

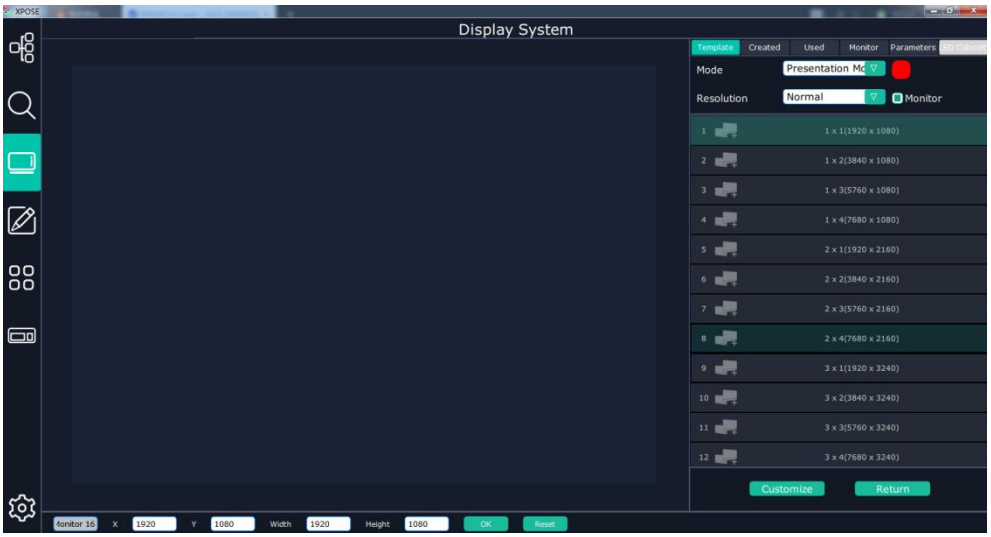


Fan Control：Auto adjustment,Fan speed 0-99

3.2.4 Display System

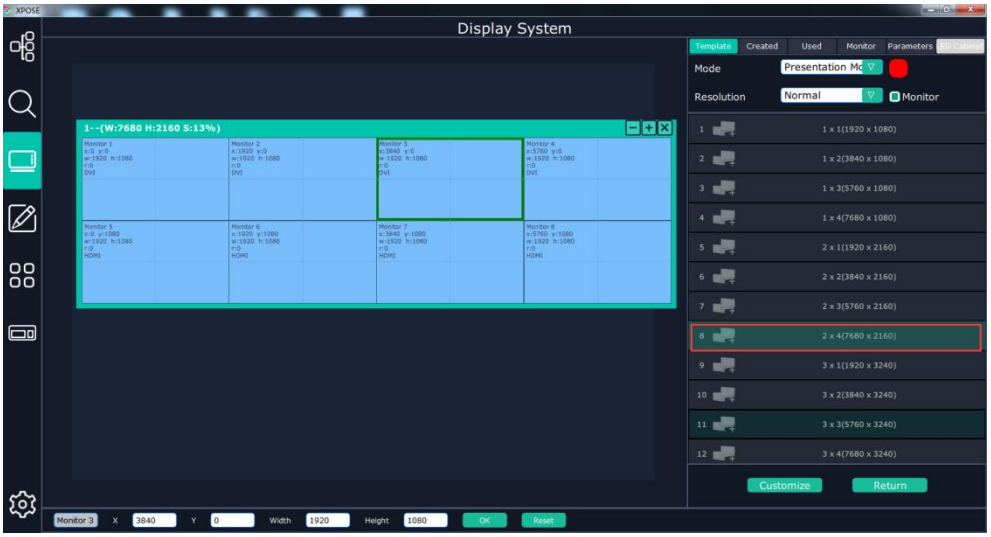
Display System is for users to set layout of outputs.

Click this icon first and then click enter the interface as follow:



Template：

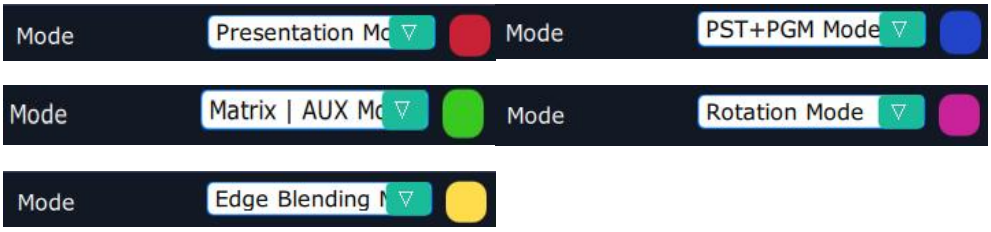
There are 16 types of basic “Display Area” which is used to contain output interface,and could be regarded as layout of output. Drag a layout for example 2x4 (4680x2160) from the template list to the middle interface.



Mode：

At present, there are Presentation Mode, PST+PGM Mode,Matrix|Aux,Rotation Mode and Edge Blending . Rotation and Edge blending is valid only when ARO rotation module is installed to the device.

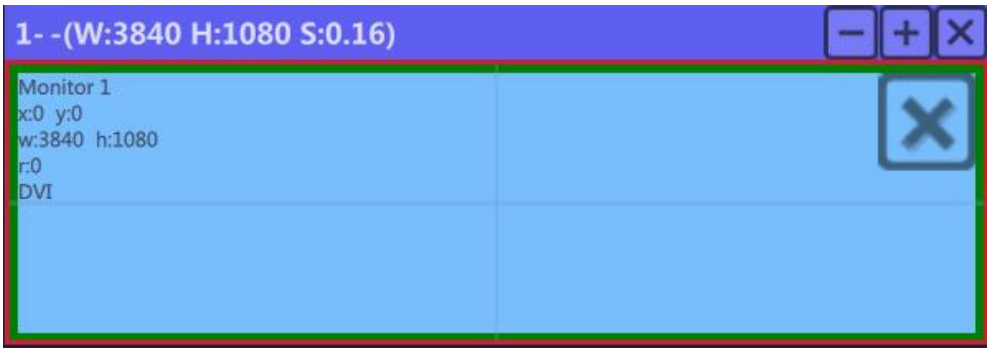
XPOSE 2.0 allows multiple modes running on one same interface, to differentiate each mode, different color is given to each mode.



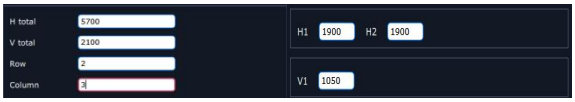
Click this icon to cancel the monitor in Display Area

Long pressing this icon to cancel the Display Area

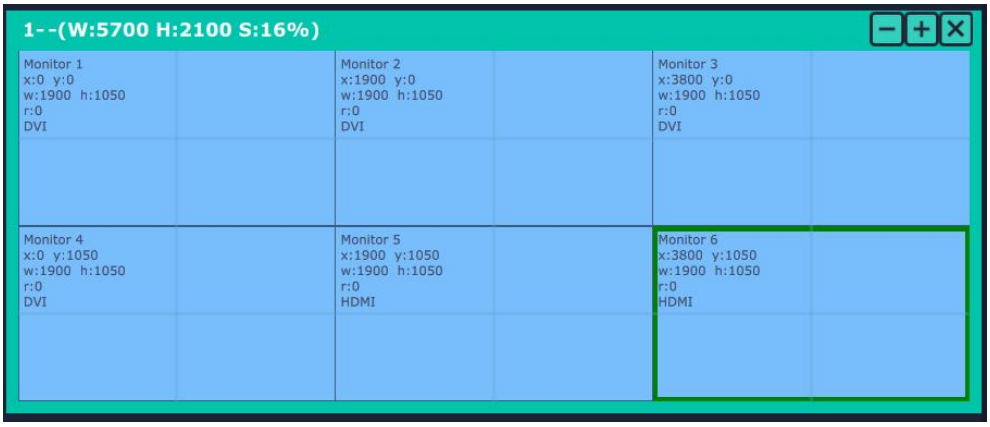
Use the bar under the interface and type in the parameter to set resolution and position of monitor



Created: Click Customize below template, user can type in the H total (width), V Total (height) ,Row and Column, according to actual display in field.It will automatically calculate the width and height of each monitor based on the parameter above, eg. Create a container 5700x2100.

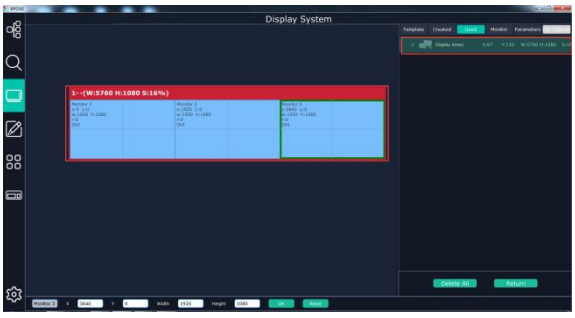


type in as left above, it will automatically work out H1 , H2 and V1 as the right above and click . A container 5700x2100 is created.



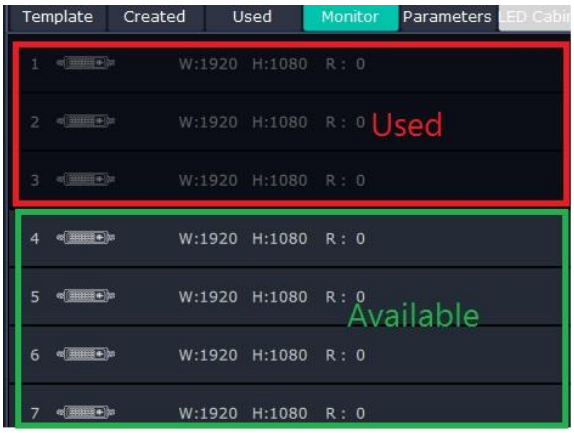
Used:

Show the already used “Display Area”, all the used “Display Area” can be kept unless users “**Delete All**”



Monitor

Show all the output ports (monitors) of this device. If the monitor is in dark (black), it indicates that this monitor is used, otherwise it is in grey.



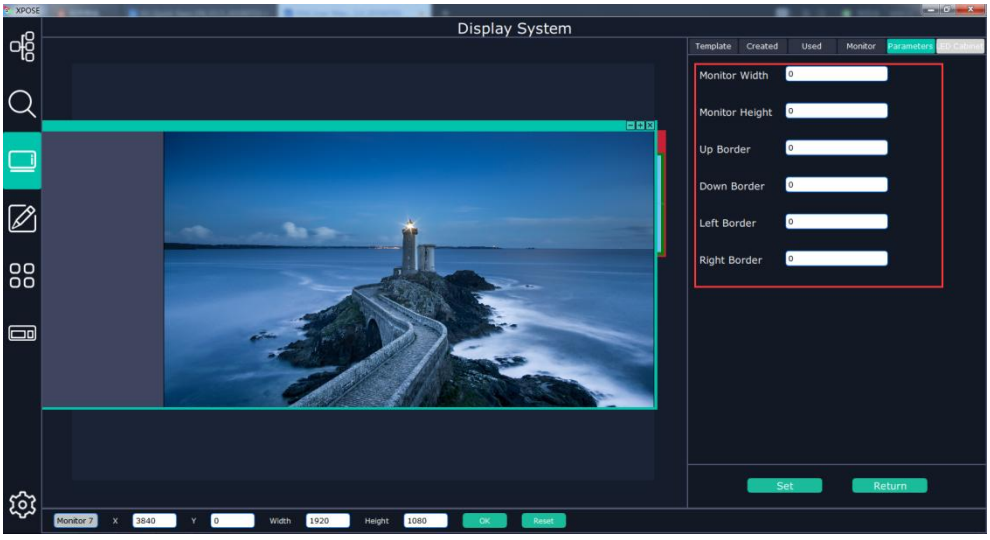
Parameters

It is designed to adjust the size and position of monitor. Under the mode of Presentation, PST|PGM, Matrix|Aux, Parameter works the same as the bar under interface.

Parameter under under the mode of Presentation, PST|PGM, Matrix|Aux mode

But under Rotation and Edge Blending mode, they are different.

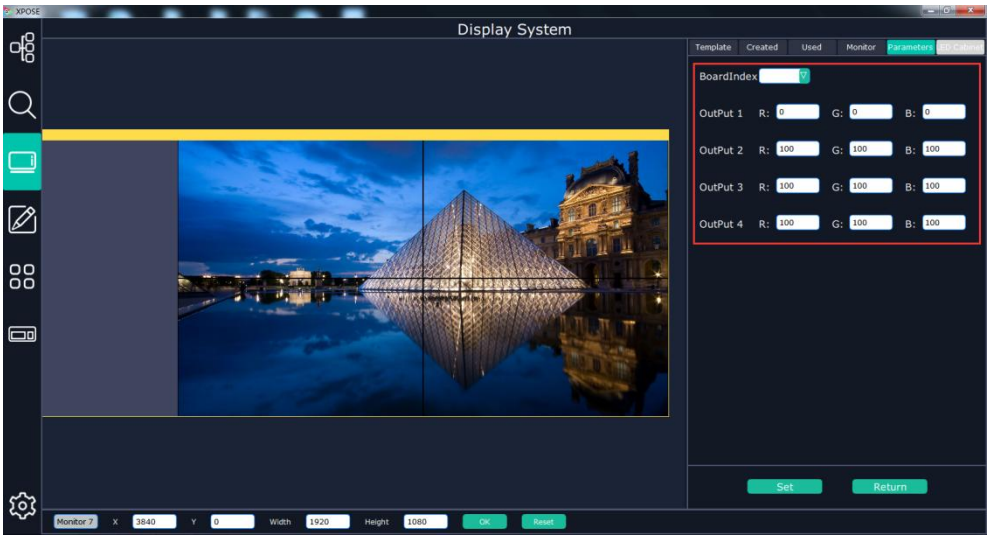
Parameter under Rotation Mode and its monitor



Parameter of Monitor Width, Height, Up Down Left Right Border are to set the overall monitor

Display Area, not not single monitor, but the bar under is for single monitor.

Parameter under Edge Blending Mode



Parameter here is to set the RGB value of each output port of Rotation board but bar is still the bar is still for single monitor.

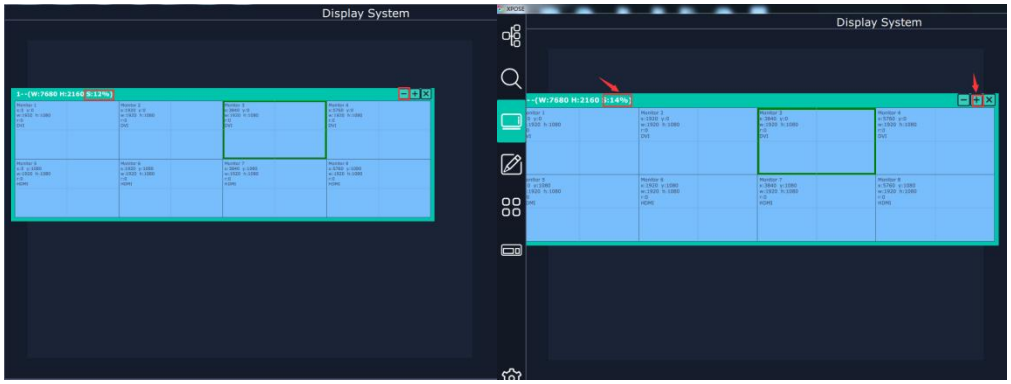
Note: Edge Blending Mode and Rotation Mode only work under the circumstance that ARO Rotation module is installed to X3p device.

Parameter here is to set the RGB value of each output port of Rotation board but bar is still the bar is still for single monitor.

Adjust Display Area

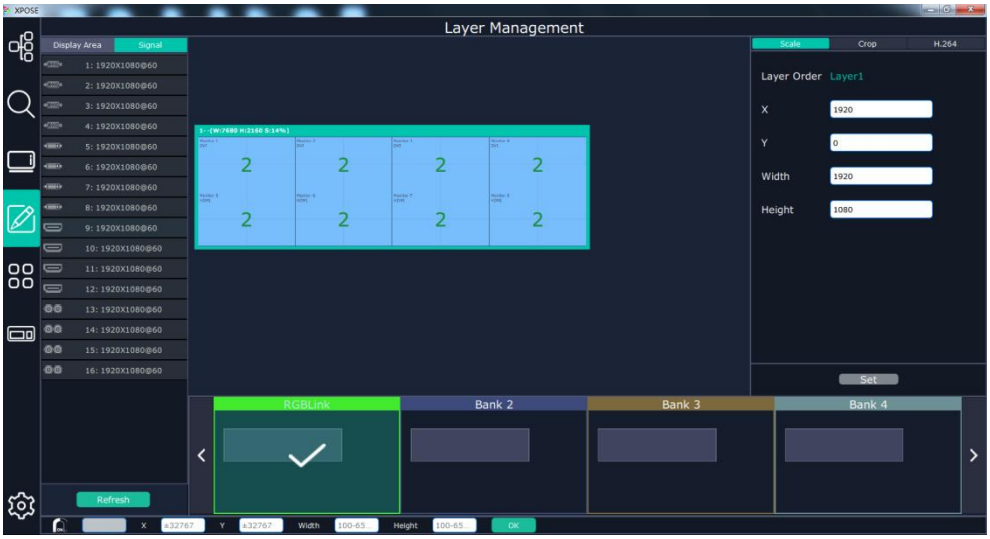
Drag the boarder of the display area to move its place in the interface.

Click icon to shrink,Click to enlarge the proportion of display area on interface.



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 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 Signal

To show the signal list of 16 inputs. Drag source from signal list to monitor

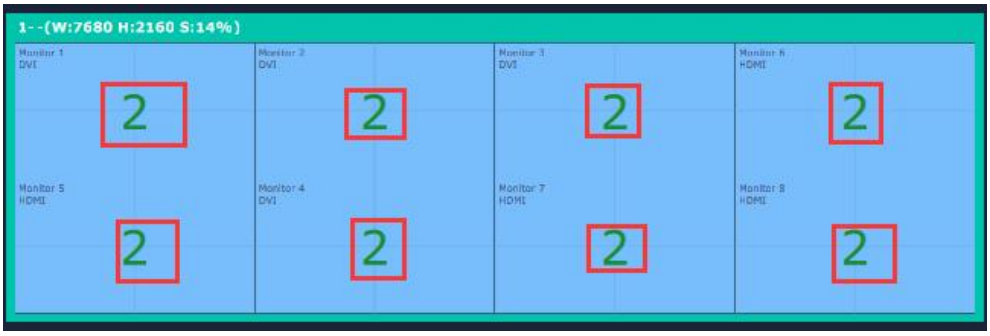
Click pencil icon after the signal to change the signal name if needed.

Numbers on Monitor

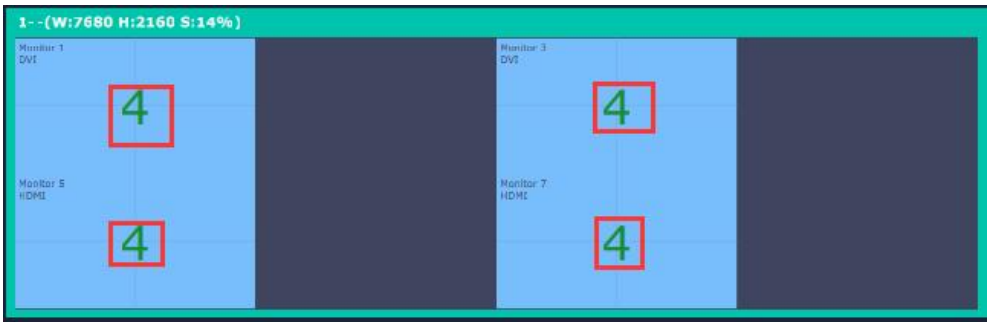
Numbers on monitor is to show how many layers at present allowed to put in the monitor .

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.

Please see the following example to understand the layers number on each monitor.



This is standard 8 monitor layout, each monitor allows 2 layers.



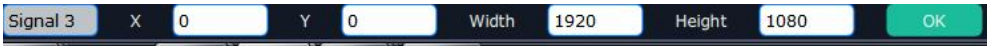
When neighboring monitor is canceled, the remaining monitor allows 4 layers each.

Layer Adjustment

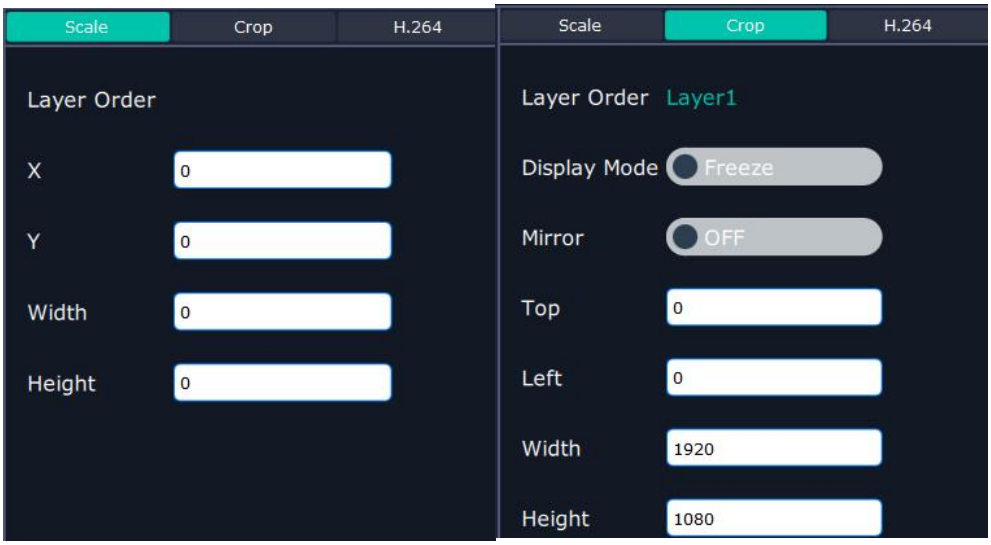
Under the Presentation Mode, there are two ways to adjust layer.

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 or Crop



Layer Movement

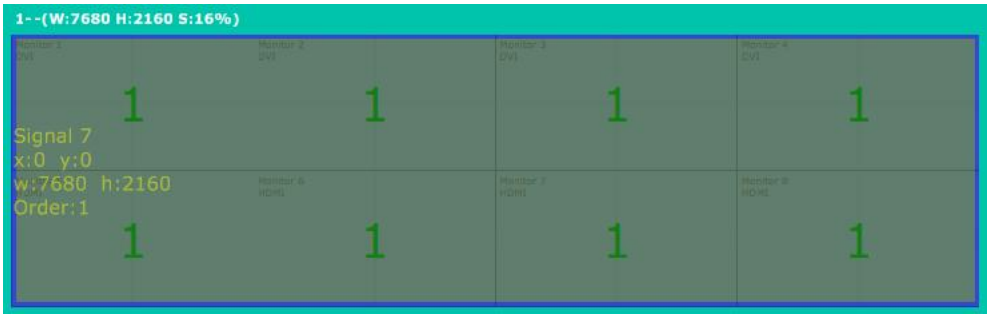
Place the cursor on the layer, it turns to a palm icon , press the left of mouse, the icon turns to a fist , moving the mouse can drag the layer.

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:

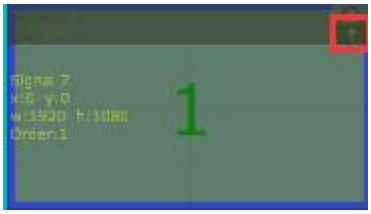


Layer Copy

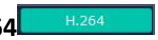
Press Ctrl and mouse left at the same time, move the mouse the layer selected can be copied and place in any monitor in the same Display Area but it doesn't work when cross over display area.

Layer Lock

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



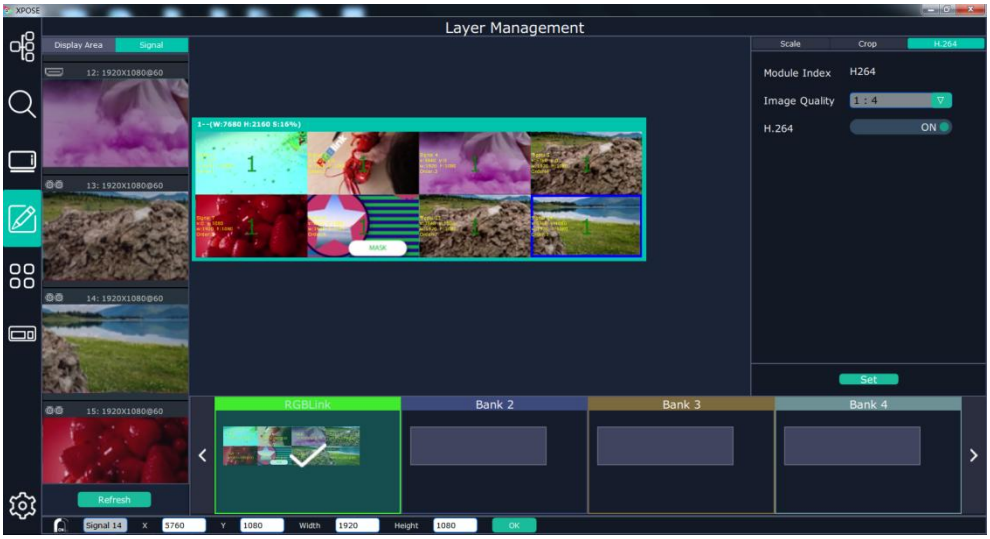
When the layer is locked, any movement or removal to the layer is invalid

H.264 

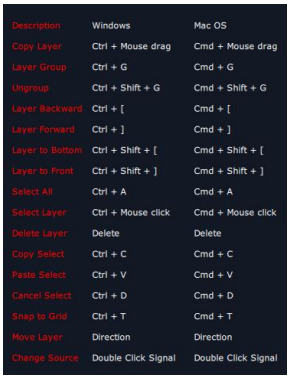
Slide H.264 to ON

Module Index: H.264

Image Quality: to choose from 1:1,1:2,1:3,1:4,1:5,1:6, the higher the ratio is the better the preview image is but if band width of network is not good enouh, high ratio image quality may cause problem. We usually suggest user to choose 1:4 as the attached picture.



Hot Key (Shortcut keys)



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

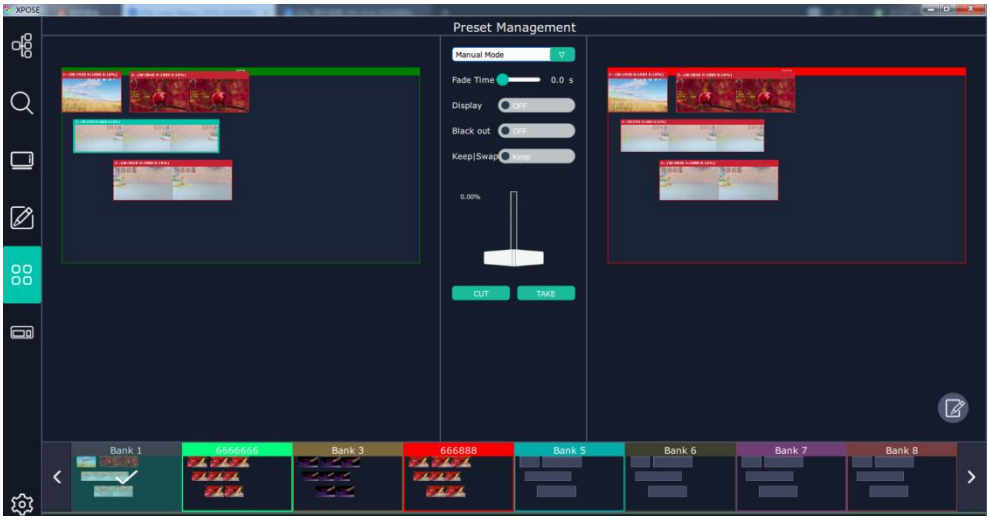
Save to Bank Automatically

When one Bank (where the set is contained) is finished, click next Bank, previous set is saved to bank.

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

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 scene (Bank) from PST (Preset) to PGM (Program) directly without any Fade time.

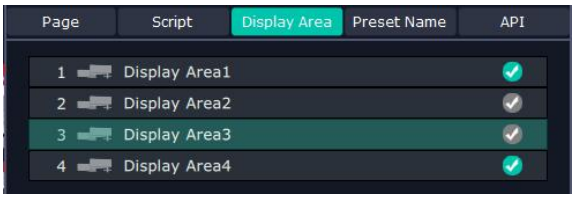
Take:Switch scene (Bank) from PST (Preset) to PGM (Program) directly with set Fade time.

Display

separate display area switching

Slide Disply to ON

, Click and select the Display Area



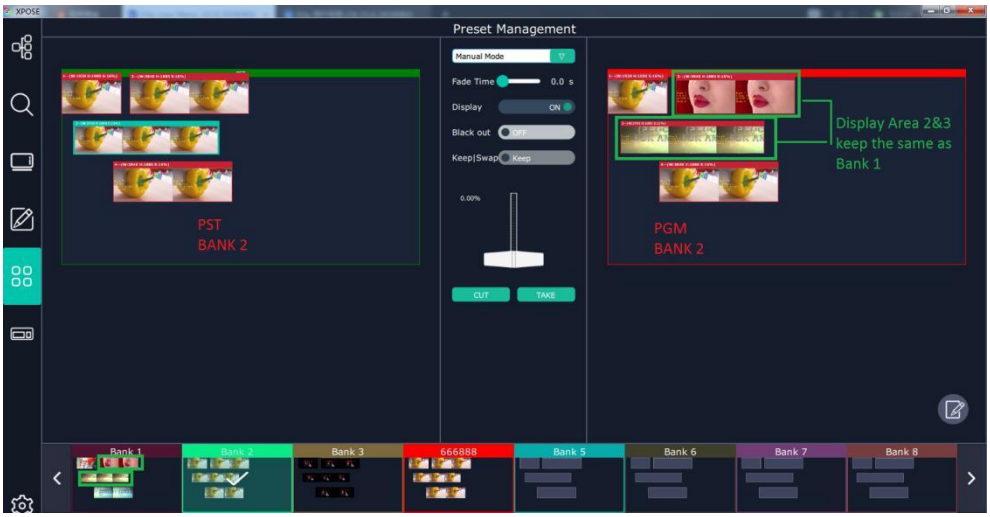
when users need to switch scene from eg. Bank 1 to Bank 2 but want to keep Display Area 2 and 3 the same as Bank 1. Follow the steps below to do the setting.

Step1: click Bank 2 and open Display Area

Step 2: click the icon behind to cancel the display area of 2 and 3 and click

to confirm,

Step 3:TAKE or Cut



Keep|Swap

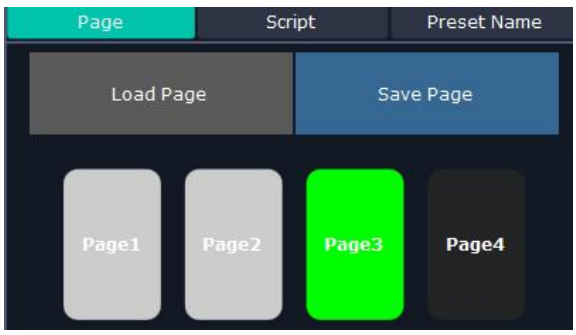
Under the **Keep** status, users need to select a bank and use Cut or Take to switch image from PST to PGM.

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

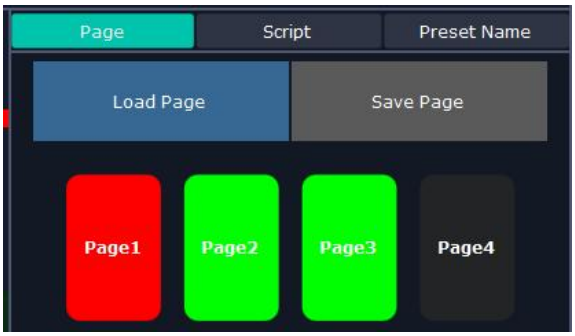
Select a bank,click Page,select Page X,the bank is saved in the page.
The page turns green then become grey, indicating the bank is saved in the page.



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.

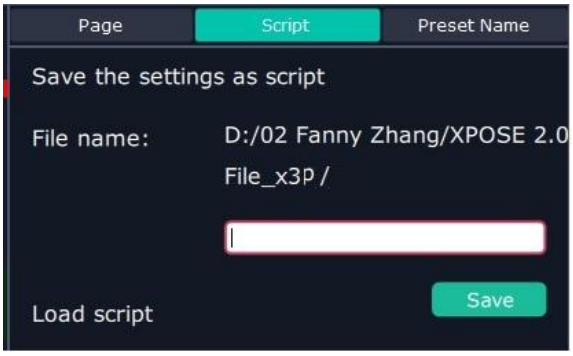


Script Save and Load

Save Script

Click

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

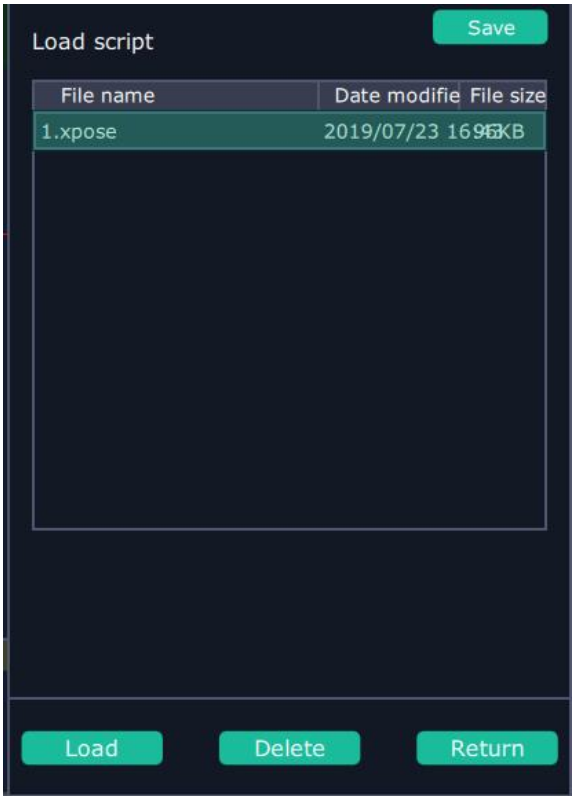


Load and Delete Script

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

Select the file and click Load

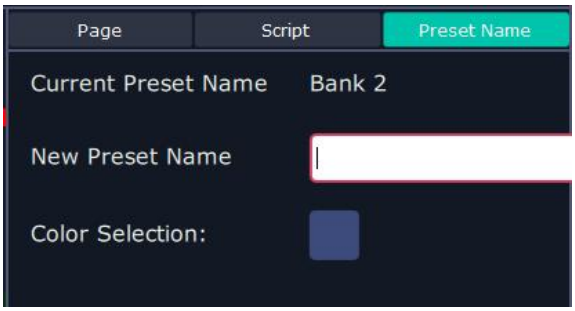
Select the file and click Delete, the chose file can be deleted from list.



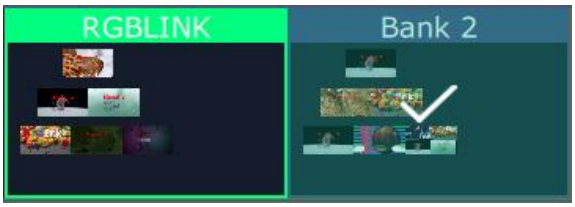
Preset Name

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.

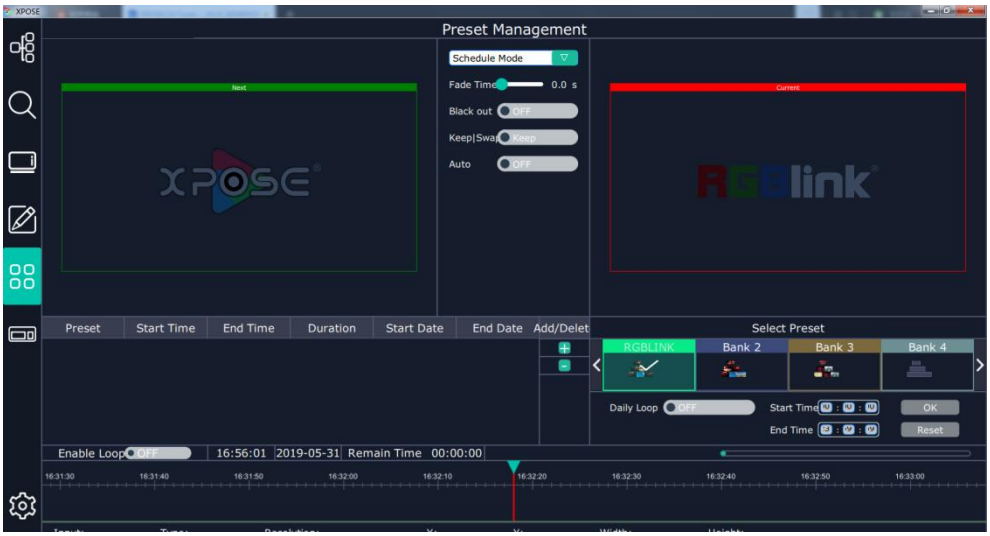


For exmaple change Bank1to RBGLINK, with green boader



Schedule Mode

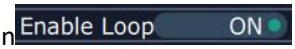
This mode is designed to set auto bank (scene/preset) switch.



Loop

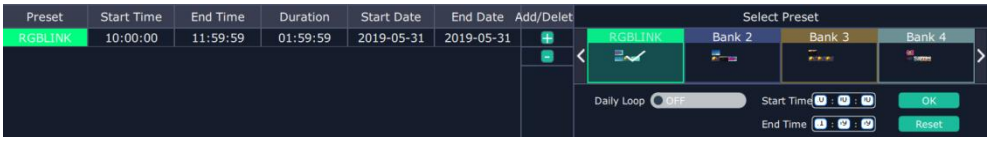
Click under , select a bank and set Start Time and End Time.

Click OK , the bank will be added to the loop list on the left.

Enable Loop to On 

Long pressing to remove the bank from loop list when loop is OFF

(Note, Loop need to be disabled first, if a bank need to be removed from loop list)



3.2.7 Keyboard Setting

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:

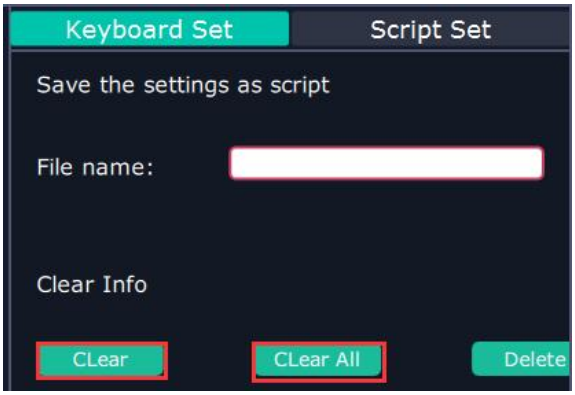
Input, Output, Layer and Preset.

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.

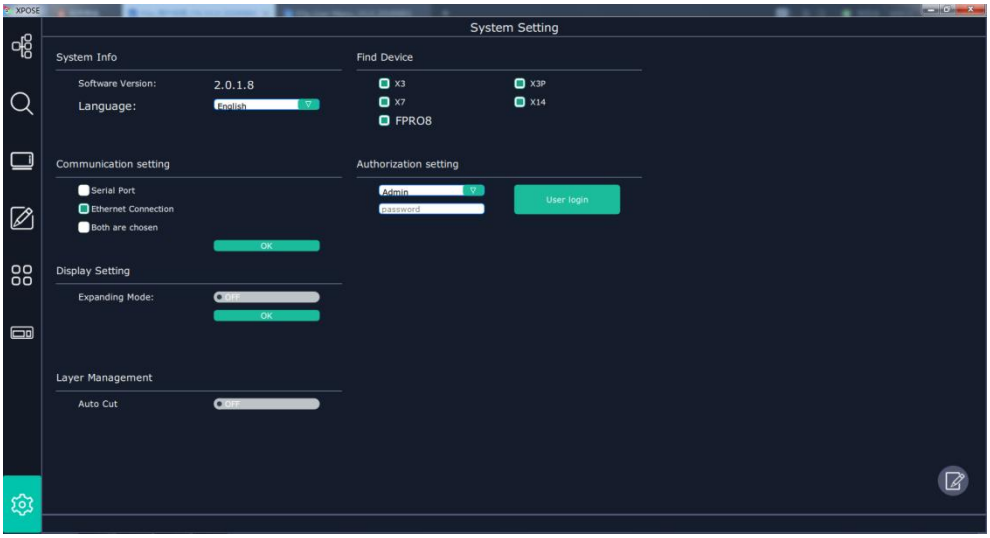
Clear: is to clear some keys, the keys need to selected before hand.

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


Keyboard Set
Script Set
Save the settings as script
File name:
Clear Info
CLear
CLear All
Delete

3.2.8 System Setting

Click this icon and enter the interface



System Info,Software Version and Language options with English and Russia to choose.

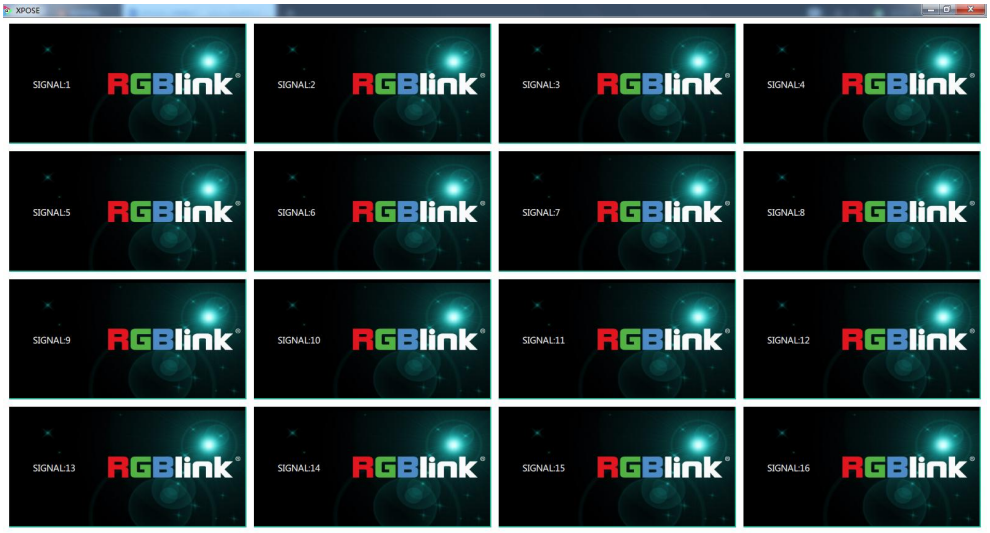
Communication Setting,this is to decide how XPOSE to communicate with the device

By serial port,ethernet connection,or both are choosen

Find Device： choose the devices that users need to be connected

Authorization setting： type in the password and to set up subordinate user's authorization.

Display Setting： Slide Expanding Mode to On, 16 displays can be viewed on XPOSE.



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 are two devices linked to the same network, one with IP IP192.168.0.112 SN 0027, the other 192.168.0.129 SN 3344 as followed:

If users need to back up operation from current running device 3344 to 0027, 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.

Fill in the blank with the IP address of the other device, e.g 0027,IP192.168.0.112 and click **ON**

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

Click **OFF**

, the connection is cut off.

Chapter 4 Order Codes

4.1 Product

310-1003-11-0	X3p (Standard with PVW)

4.2 Options

4.2.1 Input Options

190-0003-01-0	Quad DVI Input Module
190-0003-02-0	Quad 2K HDMI Input Module
190-0003-03-0	Quad VGA Input Module
190-0003-04-0	Quad 3G SDI Input/Loop Module
190-0003-06-0	Quad CVBS Input/Backup Module
190-0003-07-0	Quad USB Input Module
190-0003-11-0	4K@30 Digital Input Module
190-0003-25-0	4K@60Hz Input Module
190-0003-18-0	Quad HDBaseT Input Module
190-0003-17-0	12G-SDI Input Module

4.2.2 Output Options

190-0003-21-0	Quad DVI Output Module
190-0003-24-0	Quad 3G SDI Output Module
190-0003-22-0	Quad 2K HDMI Output Module
190-0003-38-0	Dual 4K HDMI Output Module
190-0003-27-0	H.264 Output Module
190-0003-28-0	ARO Rotation Module

4.2.3 Other

190-0003-33-0	PVW Module
950-0005-00-0	Power Supply 400W

Chapter 5 Support

5.1 Contact Us

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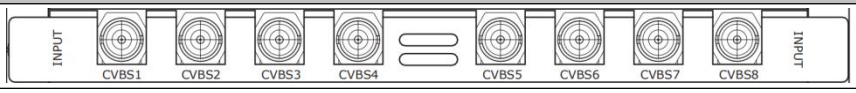
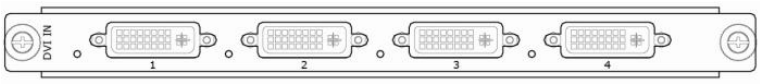
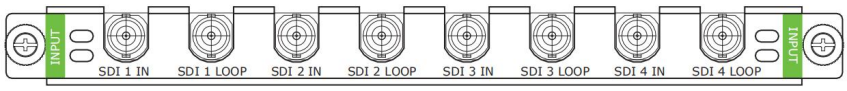
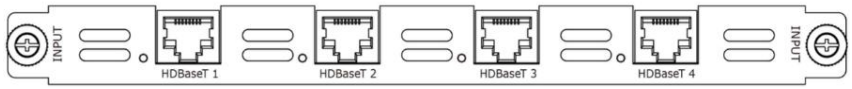
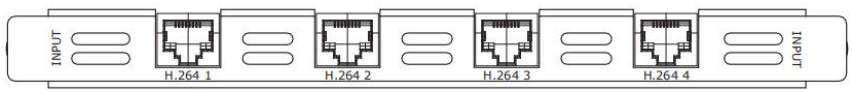
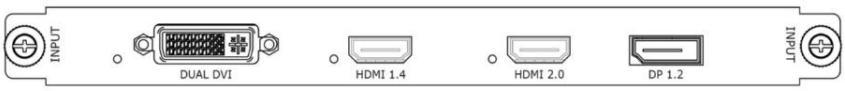
Chapter 6 Appendix

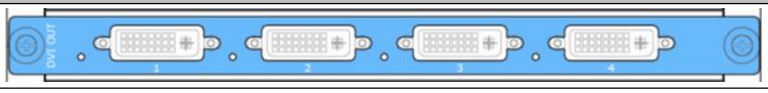
6.1 Specification

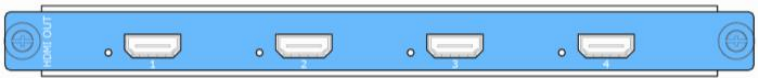
CVBS Input Module	
Interface Appearance	
Board Size	216*200*20（mm）
Number of Connectors	8 (4 Inputs and 4 backup)
Connector	Standard BNC Socket
Supported Standards	PAL I NTSC I SECAM
Signal Level	1Vpp±3db (0.7V Video+0.3v Sync) 75 ohm
Supported Resolution	480i I 576i
VGA Input Module	
Interface Appearance	
Board Size	216(L)×20(W)（mm）
Number of Connectors	4
Connector	Standard DB15 Socket
Supported Standard	VGA-UXGA
Signal Level	R、G、B、Hsync、Vsync:0 to1Vpp±3dB (0.7V Video+0.3v Sync) 75 ohm black level: 300mV Sync-tip: 0V
Supported Resolution	VESA 800x600@60 | 1024x768@60 | 1280x1024@60 | 1366x768@60 | 1440x900@60 | 1600x1200@60 | 1920x1080@60
DVI Input Module	
Interface Appearance	
Board Size	216*200*20（mm）
Number of Connectors	4
Connector	Standard DVI-I socket
Supported Resolution	SMPTE 480i | 576i | 720p@50/59.94/60 | 1080i@50/59.94/60 | 1080p@50/59.94/60 VESA 800x600@60 |1024x768@60 |1280x768@60 | 1280x1024@60 | 1600x1200@60 | 1920x1080@60 | 1920x1200@60 | 2048x1152@60 | 2560x816@60
Signal Level	TMDS pwl, single pixel input,165MHz bandwidth

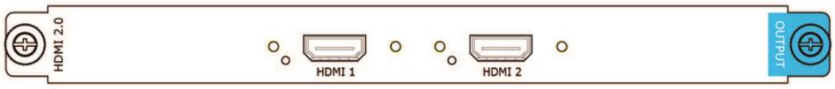
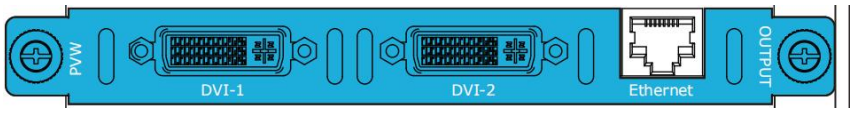
Format Standard	Single Link DVI	
USB Input Module		
Interface Appearance		
Board Size	216(L)×20(W)（mm）	
Number of Connectors	4	
Connector	Standard USB port	
Supported Standard	Support general Image and video formats	
HDMI Input Module		
Interface Appearance		
Board Size	216(L)×20(W)（mm）	
Number of Connectors	4	
Connector	HDMI standard type A interface	
Supported Resolution	SMPTE	480i | 576i | 720p@50/59.94/60 | 1080i@50/59.94/60 | 1080p@50/59.94/60
	VESA	800x600@60 | 1024x768@60 | 1280x768@60 | 1280x1024@60 | 1600x1200@60 | 1920x1080@60 | 1920x1200@60
Embedded Audio Channels	Choose one from the two inputs	
Format Standard	HDMI 1.3	
HDMI Input Module(With Deinterlace Feature)		
Interface Appearance		
Number of Connectors	4	
Connector	HDMI standard type A interface	
Supported Resolution	SMPTE	480i | 576i | 720p@50/59.94/60 | 1080i@50/59.94/60 | 1080p@50/59.94/60
	VESA	800x600@60 | 1024x768@60 | 1280x768@60 | 1280x1024@60 | 1600x1200@60 | 1920x1080@60 | 1920x1200@60
Format Standard	HDMI 1.3	
3G-SDI Input /Loop Module		
Interface Appearance		
Number of Connectors	8 (4 Input, 4 Loop)	

Connector	BNC	
Supported 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 259M-C | DVB-ASI	
12G-SDI Input Module		
Interface Appearance		
Board Size	216(L)×20(W)（mm）	
Number of Connectors	4	
Connector	BNC	
Supported 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 ST 259, DVB-ASI,MADI	
HDBaseT Input Module		
Interface Appearance		
Number of Connectors	4	
Connector	RJ45	
Supported Resolution	SMPTE	720p@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 |
Standard	HDBaseT 1.0	
H.264 Input Module		
Interface Appearance		
Number of Connectors	4	
Connector	RJ45	
Supported	176x144@60 | 240x180@60 | 320x180@60 | 320x240@60 | 320x256@60 |	

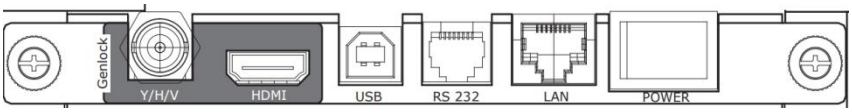
Resolution	352x228@60 | 352x480@60 | 400x224@60 | 400X3p20@60 | 480x270@60 | 480x272@60 | 480X3p20@60 | 480X3p60@60 | 480X3p84@60 | 480x480@60 | 544x480@60 | 608x448@60 | 640X3p60@60 | 640x480@60 | 704x576@60 | 720x404@60 | 720x480@60 | 720x540@60 | 720x576@60 | 850x480@60 |1024x576@60 | 1280x720@60 | 1680x1056@60 | 1920x1080@60	
Standard	H.264/MPEG-4 AVC	
4K@60 Input Module		
Interface Appearance		
Number of Connectors	4	
Connector	DVI-I | HDMI-A |DisplayPort	
Supported Resolution	SMPTE	720p@60 | 1080p@60 |2160p@24/25/30/50/60
	VESA	800x600@60 | 1024x768@60 | 1280x768@60 | 1280x800@60 |1280x1024@60 | 1360x768@60 | 1366x768@60 |1400x900@60 | 1600x1050@60 | 1600x1200@60 |1680x1050@60 | 1920x1080@23.98/24/25/29.97/30/50/59.94/60 | 1920x1200@60 | 2048x1152@60 | 2560x812@60 | 2560x816@60 | 2560x1600@60 | 3840x1080@60| 3840x2160@23.98/24/25/29.97/30/50/60 | 4096x2160@60
Standard	DVI	DUAL
	HDMI	2.0 | 1.4
	DisplayPort	1.2

DVI Output Module		
Interface Appearance		
Board Size	216(L)×20(W)（mm）	
Number of Connectors	4	
Connector	Standard DVI-I Socket	
Signal Level	TMDS pw, 165MHz bandwidth	
Supported Resolution	SMPTE	720p@50/59.94/60| 1080p@50/59.94/60
	VESA	800x600@60 |1024x768@60/75/85 |1280x720@50/59.94/60 |1280x800@60 |1280x960@60 | 1280x1024@60/75/85 | 1400x1050@60 |1600x1200@60 |1920x1080@23.98/24/25/29.97/30/50/59.94/60 |2048x1152@60
SDI Output Module		

Interface Appearance	
Board Size	216(L)×20(W)（mm）
Number of Connectors	4
Connector	BNC interface
Signal level	800mV±10%
Supported Standard	SMPTE 425M - 3G Level A Format
Supported 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
2K HDMI Output Module	
Interface Appearance	
Board Size	216(L)×20(W)（mm）
Number of Connectors	4
Connector	HDMI standard type A interface
Supported 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

HDMI 2.0 Output Module		
Interface Appearance		
Number of Connectors	2xHDMI-A	
Supported Resolutions	SMPTE	720p@60|1080p@60|2160p@60
	VESA	1280x720@60 | 1360x768@60 | 1366x768@60 |1600x900@60 | 1920x1080@60 | 2540x1440@60 | 3480x2048@60 |3840x2160@60
Supported Standard	HDMI 2.0	
PVW Module (Standard with 2)		
Interface Appearance		
Number of Connectors	2 x DVI-I | 1 x RJ45	
Supported Resolution	DVI	
	1920x1080@60	

	H.264
	176 x 144 | 240 x 180 | 320 x 180|320 x 240 | 320 x 256 | 352 x 228 | 352 x 480 | 400x224| 400 x 320 | 480 x 270 | 480 x 272 | 480 x 320 | 480 x 360 |480 x 480 | 544 x 480 | 608 x 448 | 640 x 360 | 640 x 480 |704 x 576|720 x 404@60 | 720 x 480 | 720 x 540| 720 x 576 | 850 x480 | 1024 x 576 |1280 x 720 | 1680 x 1056 |1920 x 1080
Supported Standard	DVI Single Link H.264 MPEG-4/AVC

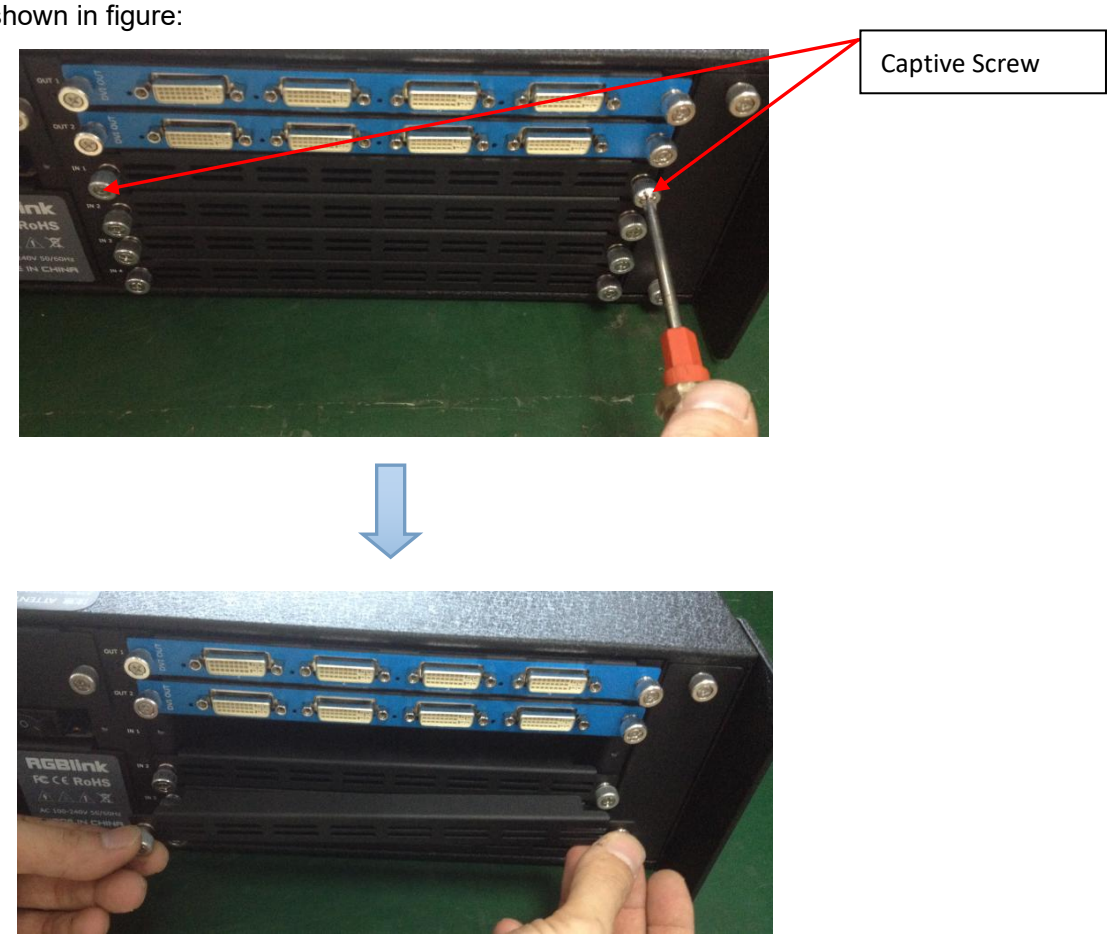
Communication	
Interface Appearance	
Board Size	165(L)×19(W)（mm）
Genlock	
Number of Connectors	2
Connector	BNC (Genlock Y/H/V) HDMI (Genlock Loop)
Control	
Number of Connectors	3
Connector	USB-B | RJ11 | RJ45
Function	
Switch	Support any two inputs fade in fade out
Extras	
Power Supply	100-240V IEC-3
Working Environment	0°C~45°C
Stored Environment	10% to 90%
Product Warranty	3 years parts and labor warranty

6.2 Install Options

X series (X2/X3/X3p/X7) supports replaceable input and output optional modules, user can install or replace the optional module according to actual need. Take X3 for example, the specific installation steps are as follows:

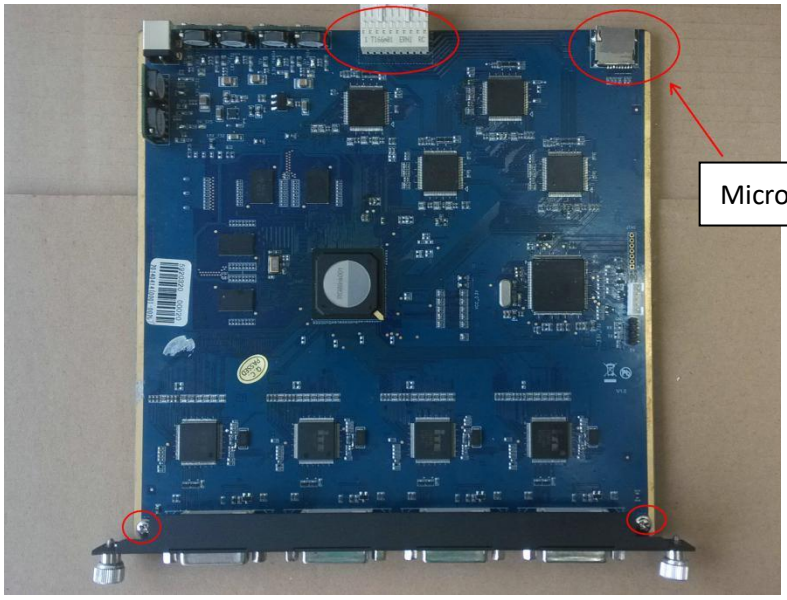
Install the Optional Module

1. Unscrew the 2 captive screws in input modules block, and pull out the input module block, as shown in figure:



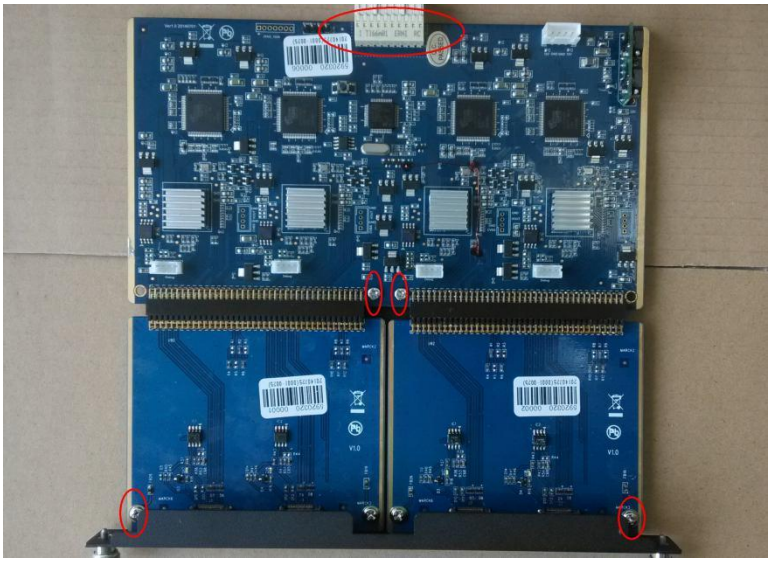
2. Install the input module:

For the whole PCB input module with DVI or HDMI interface, fix the input module on the plate with 2 M3*4 flat screws, also need to install the 2G Micro SD card.



DVI input module:

① For the joined PCB input module with CVBS, HDMI, VGA, USB or SDI interface, fix the input module on the plate with 2 M3*4 flat screws and 2 M3*4 round head screws.



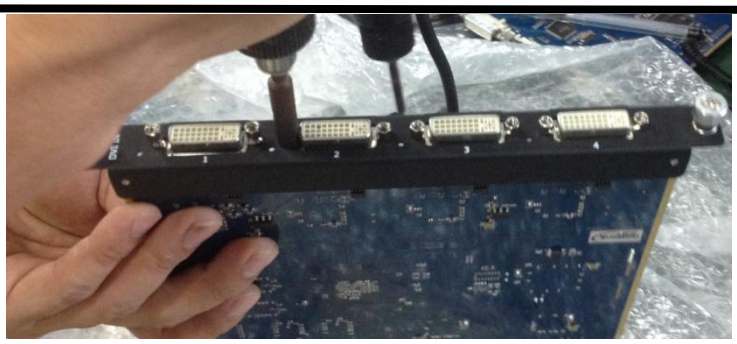
HDMI input module:

VGA input module:

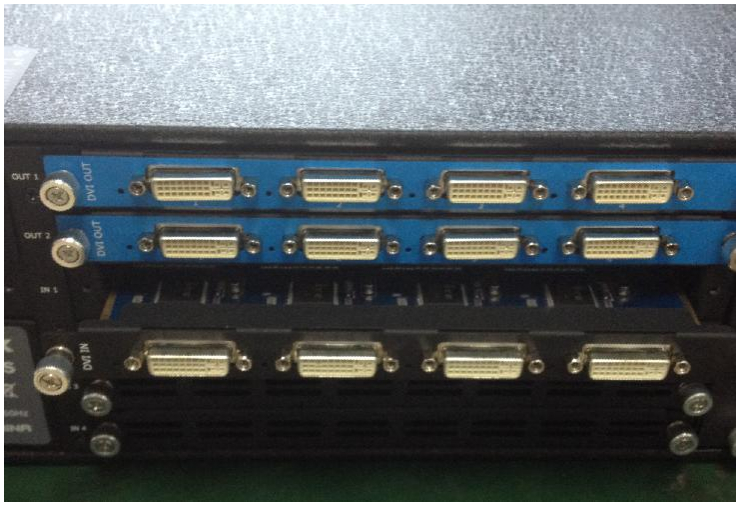
CVBS input module:

USB input module:

3. Fix the input module block with fixed screws, as shown in figure:



4. Push the input modules into the device along the slide rail, and screw the captive screws, as shown in figure:



Note: The install steps of output module installation and input/output module replacement are the same as above.

6.3 Clean Cooling Fan

High temperature generated by device running can affect the device working. Too much dust on the cooling fan can reduce cooling and cause malfunction to the device, therefore we suggest cleaning the cooling fan modules regularly, at least once a half year.

Step 1: Loosen the screw (the red arrow pointed in the picture)and pull out the fan module

Step2: Clean dust on the front and back of the fan module by brush.

Step 3: Loosen the locking screw to separate the dust screen and fan. Clean the screen and fan by brush.

Step 4: Reverse steps above.

Put the dust screen back to the fan and tighten the screw.

Push the fan module back to the device and tighten the screw.

6.4 Terms & Definitions

The following terms and definitions are used throughout this guide.

- **“ASCII”:** American Standard for Information Interchange. The standard code consisting of 7-bit coded characters (8 bits including parity check) used to exchange information between data processing systems, data communication systems, and associated equipment. The ASCII set contains control characters and graphic characters.
- **“Aspect ratio”:** The relationship of the horizontal dimension to the vertical dimension of an image. In viewing screens, standard TV is 4:3, or 1.33:1; HDTV is 16:9, or 1.78:1. Sometimes the “:1” is implicit, making TV = 1.33 and HDTV = 1.78.
- **“AV”:** Audio visual, or audio video.
- A **“Background”** is an unscaled source, typically originating from a computer. A background source appears at the system’s lowest priority — visually in back of all other sources.
- **“Baudrate”:** Named of J.M.E. Baudot, the inventor of the Baudot telegraph code. The number of the electrical oscillations per second, called baud rate. Related to, but not the same as, transfer rate in bits per second (bps).
- **“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. One signal is normally used to set up an entire video system or facility. Sometimes it is called House sync.
- **“BNC”:** Bayonet Neill-Concelman. A cable connector used extensively in television and named for its inventors. A cylindrical bayonet connector that operates with a twist-locking motion. To make the connection, align the two curved grooves in the collar of the male connector with the two projections on the outside of the female collar, push, and twist. This allows the connector to lock into place without tools.
- **“Brightness”:** Usually refers to the amount or intensity of video light produced on a screen without regard to color. Sometimes called “black level.
- “**CAT 5**”**:** Category 5. Describes the network cabling standard that consists of four unshielded twisted pairs of copper wire terminated by RJ-45 connectors. CAT 5 cabling supports data rates up to 100 Mbps. CAT 5 is based on the EIA/TIA 568 Commercial Building Telecommunications Wiring Standard.
- **“Color bars”:** A standard test pattern of several basic colors (white, yellow, cyan, green, magenta, red, blue, and black) as a reference for system alignment and testing. In NTSC video, the most commonly used color bars are the SMPTE standard color bars. In PAL video, the most commonly used color bars are eight full field bars. In the computer, the most commonly used color bars are two rows of reversed color bars.
- **“Color burst”:** In color TV systems, a burst of subcarrier frequency located on the back porch of the composite video signal. This serves as a color synchronizing signal to establish a frequency and phase reference for the chroma signal. Color burst is 3.58 MHz for NTSC and 4.43 MHz for PAL.

- **“Color temperature”:** The color quality, expressed in degrees Kelvin(K), of a light source. The higher the color temperature, the bluer the light. The lower the temperature, the redder the light. Benchmark color temperature for the A/V industry include 5000°K, 6500°K, and 9000°K.
- **“Contrast ratio”:** The radio of the high light output level divided by the low light output level. In theory, the contrast radio of the television system should be at least 100:1, if not 300:1. In reality, there are several limitations. In the CRT, light from adjacent elements contaminate the area of each element. Room ambient light will contaminate the light emitted from the CRT. Well-controlled viewing conditions should yield a practical contrast ratio of 30:1 to 50:1.
- **“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.
- **“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 optimal video format for the display based on the provided EDID data, ensuring proper video image quality. This communication takes place over the DDC – Display Data Channel.
- **“Ethernet”:** A Local Area Network (LAN) standard officially known as IEEE 802.3. Ethernet and other LAN technologies are used for interconnecting computers, printers, workstations, terminals, servers, etc. within the same building or campus. Ethernet operates over twisted pair and over coaxial cable at speeds starting at 10Mbps. For LAN interconnectivity, Ethernet is physical link and data link protocol reflecting the two lowest layers of the OSI Reference Model.
- **“Frame”:** In interlaced video, a frame is one complete picture. A video frame is made up of two fields, or two sets of interlaced lines. In a film, a frame is one still picture of a series that makes up a motion picture.
- **“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.
- **“HDMI” - High – Definition Multimedia Interface:** An interface used primarily in consumer electronics for the transmission of uncompressed high definition video, up to 8 channels of audio, and control signals, over a single cable. HDMI is the de facto standard for HDTV displays, Blu-ray Disc players, and other HDTV electronics. Introduced in 2003, the HDMI specification has gone through several revisions.
- **“HDSDI”:** The high-definition version of SDI specified in SMPTE-292M. This signal standard transmits audio and video with 10 bit depth and 4:2:2 color quantization over a single coaxial cable with a data rate of 1.485 Gbit/second. Multiple video resolutions exists including progressive 1280x720 and interlaced 1920x1080 resolution. Up to 32 audio signals are carried in the ancillary data.
- **“JPEG” (Joint photographic Expects Group):** Commonly used method of lossy compression for photographic images using a discreet cosine transfer function. The

degree of compression can be adjusted, allowing a selectable tradeoff between storage size and image quality. JPEG typically achieves 10:1 compression with little perceptible loss in image quality. Produces blocking artifacts.

- **“MPEG”:** Motion Picture Expect Group. A standard committee under the auspices of the International Standards Organization working on algorithm standards that allow digital compression, storage and transmission of moving image information such as motion video, CD-quality audio, and control data at CD-ROM bandwidth. The MPEG algorithm provides inter-frame compression of video images and can have an effective compression rate of 100:1 to 200:1.
- **“NTSC”:** The color video standard used in North America and some other parts of the world created by the National Television Standards Committee in the 1950s. A color signal must be compatible with black-and-white TV sets. NTSC utilizes an interlaced video signals, 525 lines of resolution with a refresh rate of 60 fields per second (60 Hz). Each frame is comprised of two fields of 262.5 lines each, running at an effective rate of 30 frames per second.
- **“Operator”:** Refers to the person who uses the system.
- **“PAL”:** Phase Alternate Line. A television standard in which the phase of the color carrier is alternated from line to line. It takes four full pictures (8 fields) for the color-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, in many transmission forms, is widely used in Western Europe, Australia, Africa, the Middle East, and Micronesia. PAL uses 625-line, 50-filed (25 fps) composite color transmission system.
- **“PIP”:** Picture-in-Picture. A small picture within a larger picture created by scaling down one of the images to make it smaller. Each picture requires a separate video source such as a camera, VCR, or computer. 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.
- **“Polarity”:** The positive and negative orientation of a signal. Polarity usually refers to the direction or a level with respect to a reference (e.g. positive sync polarity means that sync occurs when the signal is going in the positive direction).
- **“RJ-45”:** Registered Jack-45. A connector similar to a telephone connector that holds up to eight wires, used for connecting Ethernet devices.
- “**RS-232”:** An Electronic Industries Association (EIA) serial digital interface standard specifying the characteristics of the communication path between two devices using either DB-9 or DB-25 connectors. This standard is used for relatively short-range communication and does not specify balanced control lines. RS-232 is a serial control standard with a set number of conductors, data rate, word length, and type of connector to be used. The standard specifies component connection standards with regard to the computer interface. It is also called RS-232-C, which is the third version of the RS-232 standard, and is functionally identical to the CCITT V.24 standard.
- **“Saturation”:** Chroma, chroma gain. The intensity of the color, or the extent to which

a given color in any image is free from white. The less white in a color, the truer the color or the greater its saturation. On a display device, the color control adjusts the saturation. Not to be confused with the brightness, saturation is the amount of pigment in a color, and not the intensity. Low saturation is like adding white to the color. For example, a low-saturated red looks pink.

- **“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.
- **“SDI”:** Serial Digital Interface. The standard based on a 270 Mbps transfer rate. This is a 10-bit, scrambled, polarity independent interface with common scrambling for both component ITU-R 601 and composite digital video and four channels of (embedded) digital audio.
- **“Seamless Switching”:** A feature found on many video switchers. This feature causes the switcher to wait until the vertical interval to switch. This avoid a glitch (temporary scrambling) which normally is seen when switching between sources.
- **“SMPTE”:** Society of Motion Picture 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.
- **“S-Video”:** A composite video signal separated into the luma (“Y” is for luma, or black and white information; brightness) and the chroma (“C” is an abbreviation for chroma, or color information).
- **“Sync”:** Synchronization. In video, sync is a means of controlling the timing of an event with respect to other events. This is accomplished with timing pulses to insure that each step in a process occurs at the correct time. For example, horizontal sync determines exactly when to begin each horizontal scan line. Vertical sync determines when the image is to be refreshed to start a new field or frame. There are many other types of sync in video system.(Also known as “sync signal” or “sync pulse.”)
- **“TCP/IP”:** Transmission Control Protocol/Internet Protocol. The communication protocol of the Internet. Computers and devices with direct access to the Internet are provided with a copy of the TCP/IP program to allow them to send and receive information in an understandable form.
- **“USB”:** Universal Serial Bus. USB was developed by seven PC and telecom industry leaders (Compaq, DEC, IBM, Intel, Microsoft, NEC, and Northern Telecom). The goal was easy plug-and-play expansion outside the box, requiring no additional circuit cards. Up to 127 external computer devices may be added through a USB hub, which may be conveniently located in a keyboard or monitor. USB devices can be attached or detached without removing computer power. The number of devices being designed for USB continues to grow, from keyboards, mice, and printers to scanners, digital cameras, and ZIP drives.
- **“VESA”:** Video Electronics Standards Association. A nonprofit number organization dedicated to facilitating and promoting personal computer graphics through improved standards for the benefit of the end-user. www.vesa.org

- **“VGA”:** Video Graphics Array. Introduced by IBM in 1987, VGA is an analog signal with TTL level separate horizontal and vertical sync. The video outputs to a 15-pin HD connector and has a horizontal scan frequency of 31.5 kHz and vertical frequency of 70 Hz (Mode 1, 2) and 60 Hz (Mode 3). The signal is non-interlaced in modes 1, 2, and 3 and interlaced when using the 8514/A card (35.5 kHz, 86 Hz) in mode 4. It has a pixel by line resolution of 640×480 with a color palette of 16 bits and 256,000 colors.
- **“YCrCb”:** Used to describe the color space for interlaced component video.
- **“YPbPr”: Used to describe the color space for progressive-scan (non-interlaced) component**

6.5 Revision History

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

Format	Time	ECO#	Description	Principal
V1.0	2019-08-08	0000#	Release	Fanny