Colorlight

VX20

LED Video Controller

User Manual V1.0

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SAFETY INFORMATION

To avoid personal injury and equipment damage, please read and comply with the following instructions.

Power supply safety

- Do not put heavy objects on the power cord or the device.
- Power supply for the device must be grounded.
- The device contains live parts. To avoid electric shock, do not disassemble the device without permission.
- To avoid electric shock, do not disassemble the device while it is power-on.
- Turn off the main power supply of the device when it is used in a humid environment or when it has not been used for a long time.
- Disconnect the power supply when the device is not in use.

Operation Safety

- To prevent device damage, serious personal injury, or even death caused by the device falling, place the device on a stable and level surface.
- To avoid electric shock, do not operate the device with wet hands.
- Do not place or use the device near flammable materials or in an environment with explosive gas or heat sources.
- Do not spill any corrosive chemicals or liquids on or near the device.
- If the device has not been powered on for a long period of time, it must be checked and tested before use.
- Power off the device before cleaning and use dry cloth for the cleaning.
- Keep the heat dissipation hole unblocked and maintain a well-ventilated operation environment so as to ensure the heat generated during operation can dissipate promptly, thus avoiding device damage caused by poor heat dissipation.
- It is suggested to use proper packing or maintain the original packing during transportation to avoid device damage due to strong hit by external forces.
- Be careful to prevent the device from falling while in motion to avoid personal injury or device damage.

Grounding instructions

- This product must be grounded. When equipment fails, the protective grounding contact in the power socket should be reliably connected to the protective grounding terminal in the equipment. This product is equipped with a power cord with a grounding plug. The plug must be plugged into an outlet that is properly installed and grounded in accordance with all local codes and ordinances.
- Improper connection of equipment grounding is able to result in a risk of electric shock. Check with a qualified electrician if you are in doubt as to whether the product is properly grounded. Do not modify the plug included with the product. If the plug is not suitable for the socket, please have a qualified electrician install a suitable socket.

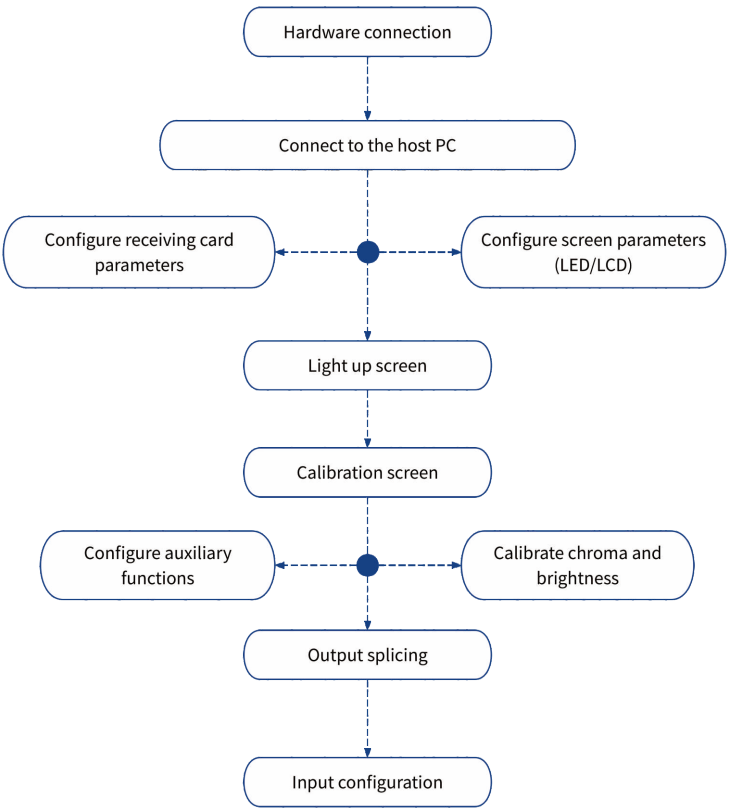
FCC statement

- This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Environmental protection

- Do not dispose of the device and its accessories as regular household wastes. Retire the device as industrial waste. Incineration is strictly prohibited.

CONFIGURATION PROCESS



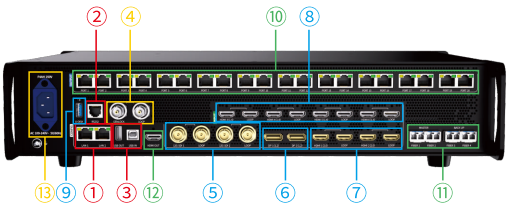
01 APPEARANCE

1.1 Front panel

No.	Name	Description
1	Touch screen	Displays device status and provides menus for parameters settings and device control.
2	Knob	• Press this knob to access sub-menu or confirm selection. • Rotate this knob to select menu items or tune parameters.
3	ESC	Press this button to exit the current touch screen interface and return to the previous interface.
4	Function buttons	• **Main/PIP 1/PIP 2**: Press these layer buttons to view status of the corresponding layers; supports switching between layers for corresponding signal image. • **BKG**: Press this button to switch to the background image. • **SIZE**: Button for setting the size and position of the layers. • **Full Screen**: Press this button to scale the top layer to full screen. • **HDMI 1 / HDMI 2/ DP 1/ DP 2 / SDI 1 / SDI 2 / HDMI 3 / HDMI 4 / HDMI 5 / HDMI 6 / Mosaic**: Press these video source buttons to switch between signals for a selected layer. • **0~9**: Press these number buttons to enter corresponding numbers. • **←**: Deletion button/Backspace button. • **.** : Press this button to enter a space character. • **Status**: Press this button to view device's status. • **Preset**: Press this button to select a preset. • **Bright**: Press this button to adjust the output brightness. • **Freeze**: Press this button to pause the incoming video signal and hold the final frame indefinitely. • **FN**: Function for this button can be defined by users. • **Cut**: Press this button to output the current PVW image to the screen. • **Take**: Press this button to output the current PVW image to the screen with a set effect.
5	Power button	Press this button to power on/off the device.

* The illustration is for reference only. Please refer to the actual product.

1.2 Rear Panel



No.	Name	Description
Control		
1	LAN 1/2	● RJ45 Gigabit Ethernet ports; both can be connected to a host PC for device control. ● Supports bridge function (connects to another VX20 to realize a virtual LAN).
2	RS232	RJ11(6P6C) port for connection to a central control.
3	USB IN	USB 2.0 (type B); connects to the PC for parameter debugging or for cascading input.
	USB OUT	USB 2.0 (type A) for cascading output.
Genlock		
4	GENLOCK	● 1× BNC male connector for sync signal input. ● Supports Black Burst, Bi-level, and Tri-level; supported frame rate: 23.98Hz~60Hz
	GENLOCK LOOP	1× BNC male connector for looping out the GENLOCK sync signal.
Input		
5	2×12G SDI	● Compatible with 6G-SDI, 3G-SDI (LEVEL A/B) and HD-SDI. ● Supports SMPTE-2082-1 (12G), ST-2081-1 (6G), ST-424 (3G) and ST-292 (HD) video source. ● Supports up to 4096×2160@60Hz video input per port.

No.	Name	Description
5	2×12G SDI	● Not support custom EDID. ● Supports 10-bit video source. ● Supports 23.98Hz~60Hz video source. ● Supports YCbCr422 color format. ● Supports interlace processing (12G SDI 1 only).
	2×12G-SDI _LOOP	2× 12G-SDI loop out ports
6	2×DP1.2	● Compatible with DP 1.1. ● The maximum pixel clock rate is 600MHz; supports up to 4096×2160@60Hz or 8192×1080@60Hz video source. ● Supports setting custom resolution via the EDID: - Max. width: 4096 (4096×2160@60Hz) - Max. height: 4096 (2160×4096@60Hz) ● For video input: - Max. width: 8192 - Max. height: 8192 ● Supports 8/10/12-bit video source. ● Supports 23.98Hz~240Hz video source. ● Supports HDR10 and HLG. ● Supports RGB, YCbCr444, and YCbCr422 color formats. ● Supports HDCP 2.2 and HDCP 1.4. ● Supports embedded audio input. ● Not support interlaced signal input.
7	2×HDMI2.0	● Compatible with HDMI 1.4 and HDMI 1.3. ● Max. pixel clock rate: 600MHz; supports up to 4096×2160@60Hz or 8192×1080@60Hz video source. ● Supports setting custom resolution via the EDID: - Max. width: 4096 (4096×2160@60Hz) - Max. height: 4096 (2160×4096@60Hz) ● For video input: - Max. width: 8192 - Max. height: 8192 ● Supports 8/10/12-bit video source. ● Supports 23.98Hz~240Hz. ● Supports HDR10 and HLG. ● Supports RGB, YCbCr444, and YCbCr422 color formats. ● Supports HDCP 2.2 and HDCP 1.4. ● Not support interlaced signal input.

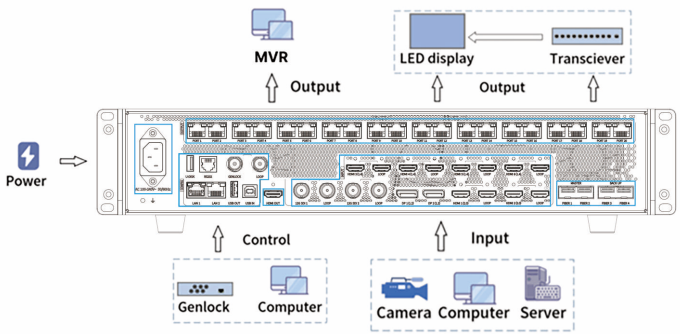
No.	Name	Description
7	2×HDMI2.0_LOOP	2× HDMI 2.0 loop out ports
8	4×HDMI1.4	● Max. pixel clock frequency: 330MHz ● Max. resolution: 4096×1080@60Hz or 4096×2160@30Hz ● Min. resolution: 800×600@60Hz ● Supports setting custom resolution via the EDID: - Max. width: 4096 (4096×1080@60Hz) - Max. height: 4096 (1080×4096@60Hz) ● Supports 8bit video source. ● Supports inputs at 23.98Hz~120Hz. ● Supports RGB, YCbCr444, and YCbCr422. ● Supports HDCP 1.4. ● Supports audio input (HDMI3 only). ● Not support HDR. ● Not support interlaced signal input.
	4×HDMI1.4_LOOP	4× HDMI 1.4 loop out ports
9	U-DISK	USB driver connector; supports import and configuration of receiving card parameters.
Output		
10	PORT 1-20	● Total load capacity: 13.1 million pixels - Max. width: 16,384 pixels; Max. height: 8192 pixels - 8-bit@60Hz: 13.1 million pixels; 10-bit@60Hz: 9.8 million pixels - 8-bit@120Hz: 6.55 million pixels; 10-bit@120Hz: 4.9 million pixels - 8-bit@240Hz: 3.27 million pixels; 10-bit@240Hz: 2.45 million pixels ● Load capacity per port: 650,000 pixels - 8-bit@60Hz: 650,000 pixels; 10-bit@60Hz: 490,000 pixels - 8-bit@120Hz: 320,000 pixels; 10-bit@120Hz: 240,000 pixels - 8-bit@240Hz: 160,000 pixels; 10-bit@240Hz: 120,000 pixels ● Communication distance: the recommended maximum cable (CAT5e) run length is 100 meters. ● Supports Ethernet ports loop redundancy.
11	Fiber 1-4	● 4× 10G fiber ports (optional 10G SFP+Optical module, the transmission distance depends on the specification of the optical module) ● Fiber1/Fiber2 - When used with a fiber optic transceiver, the fiber ports serve as the output ports automatically.

No.	Name	Description
11	Fiber 1-4	- When Fiber 1 and any one of the Ethernet port 1~10 are connected at a time, Fiber 1 takes precedence for output; when Fiber 2 and any one of the Ethernet port 11~20 are connected at a time, Fiber 2 takes precedence for output. - When no fiber port is connected while any of the 20 Ethernet ports is connected, the Ethernet port works. ● Fiber3/Fiber4 In Copy mode by default and can be set to Backup mode; respectively copies or backs up the data transmitted via Fiber 1 and Fiber 2.
12	HDMI OUT	● 1× HDMI 2.0 port ● Connects to a monitor for viewing the image of PVW, PGM, and all input signals.
Power		
13	AC100-240V	Port for power input; 100-240V; 50/60Hz.

* The illustration is for reference only. Please refer to the actual product.

02 DEVICE CONNECTION

Before using, respectively connect the input, output, and control ports of VX20 to the corresponding ports of the hardware to be connected. The power supply connection should be done last.



Video processor mode:

- Ethernet port output: Connect the Ethernet ports to the LED display using network cables.
- Fiber port output: Connect the fiber ports to a fiber optic transceiver first, and then connect the fiber optic transceiver to the LED display.
- HDMI OUT output: Connect to a monitor for viewing the image of PVW, PGM, and all input signals.

Bypass mode:

- The device works independently, providing pixel-to-pixel output without any processing to the video source. In this mode, the input is added to and displayed on the main layer, and layers PIP1 and PIP2 are unavailable.

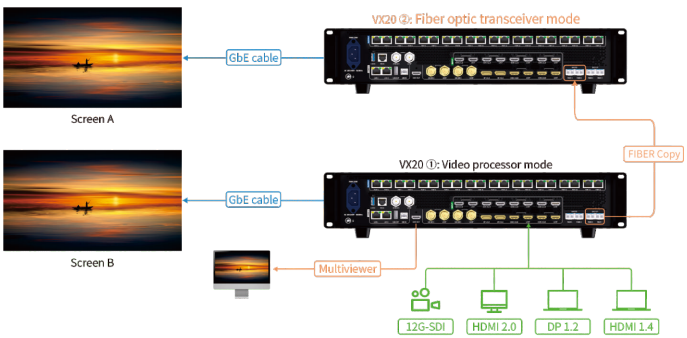
Fiber optic transceiver mode:

- Long-distance transmission

* For long-distance transmission, Fiber1/2 or Fiber3/4 is used for connection, and Fiber3/4 works as Fiber1/2's redundant port.

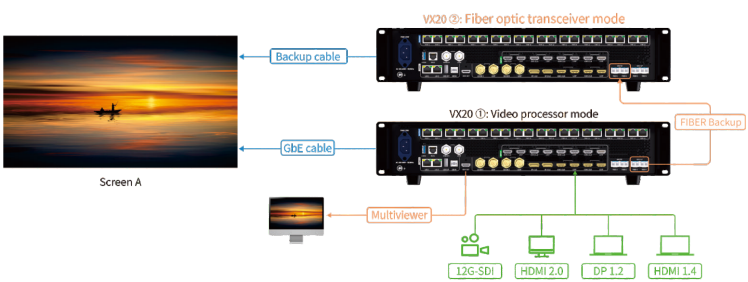
Copy mode:

- Fiber3/4 serves for output only. When the device is in the copy mode, these two ports support copying and transmitting data from the 20× Ethernet ports. The connection is shown as below:



Backup mode:

- Fiber3/4 serves for output only. When the device is in the backup mode, these two ports support backing up and transmitting data from the 20× Ethernet ports. The connection is shown as below:



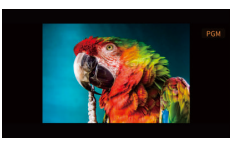
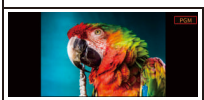
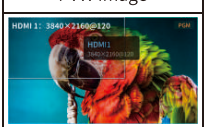
* The illustration is for reference only. Please refer to the actual product.

03 HOMEPAGE

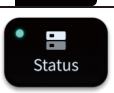
3.1 Video Processor / Bypass Mode

Touch screen - Homepage

Area	Description
Video Processor	Indicates the current device mode, updating in real time based on the selected mode: **Video Processo**r (default), **Bypass**, or **Fiber Optic Transceiver**.
	You can switch between the locked/unlocked status of the touch screen by tapping this icon or using the knob to select this icon.
192.168.1.10	IP address of the device, which will update in real time. ● In static IP mode, the IP address will always be shown. ● In DHCP mode, corresponding IP address will be shown when the device is connected to network. ● "No Service" indicates the device is not connected to network at the time.

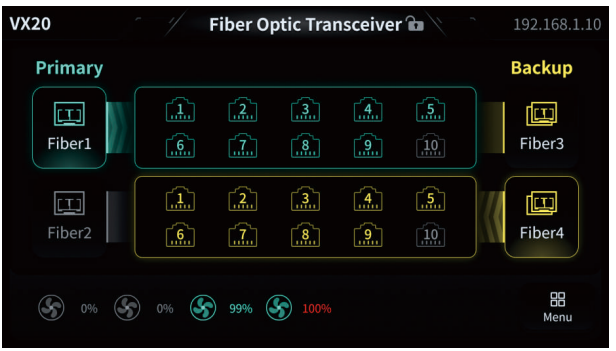
<table>
<tr><th>Area</th><th colspan="2">Description</th></tr>
<tr><td> 
</td><td colspan="2">List of layers. 3 layers are available: Main, PIP1, and PIP2. A highlighted icon indicates the corresponding layer is currently in use, while a grayed-out icon indicates the opposite. Tap a desired layer to access the interface where you can edit the corresponding layer.</td></tr>
<tr><td rowspan="4">  </td><td colspan="2">This area is for PVW/PGM image, layer image, and layer editing. Double tapping the image can view it in full screen of the touch screen.</td></tr>
<tr><td> 
PGM image</td><td>This view will be shown in Normal mode.</td></tr>
<tr><td> 
PVW image</td><td>This view will be shown in Stage mode.</td></tr>
<tr><td> 
Main/PIP1/PIP2 image</td><td>Tap the desired layer on the left side to view or edit the layer.
● The layers are independent of the input signals. When the selected layer has no signal, it can be dragged at will. You can adjust the layer position and size after tapping Size or pressing Size button on the front panel.
● Long press the desired input signal on the right, then drag and drop it to this area for displaying the on the current layer.</td></tr>
</table>

Area	Description	
		• To display a desired signal on the current layer, you can also select a layer first and then tap the desired signal. Alternatively, you can rotate the knob clockwise or anticlockwise to select the signal and then press the knob to confirm the selection. You can also press the target signal button on the front panel. • After adding a signal to the current layer, pressing **ESC** will automatically navigate back to the current layer. • The MOSAIC signal can only be added to one layer at a time. If the MOSAIC signal is already in use, attempting to add it to another layer will fail, prompting you with "The MOSAIC signal has been used. Please select another signal."
	 Interface for editing, where you can adjust the size and position of the layer within	This interface can be accessed by pressing **Size** button or tap **Size** after selecting a layer. If no layer is selected in advance, the interface for editing the **PIP2** layer will open by default. • In this interface, you can scale up/down the layer, or press and drag the layer to change its position.

Area	Description	
		• Rotate the knob to select the X coordinate for the position settings, press the knob to confirm the selection and then rotate it clockwise or anti-clockwise to increase or decrease the value. • After you define the value for the first item (X coordinate) in this interface, press the knob to confirm the value and then switch to the next item (Y coordinate) by rotating and pressing the knob. • Repeat the same actions to define the next item (layer width). • When you finish defining the value of the last item (layer height) in this interface, pressing ESC can confirm the value and the previous item will be selected. • The order of items for settings in this interface is: X coordinate > Y coordinate > layer width > layer height.
	Input signal list. A connected signal will be highlighted in blue while a disconnected signal will be grayed out. In layer editing interface, users can long press a connected signal and drag it to the layer for displaying on the layer.	
	Tap this icon or press **Status** button to view device status.	

Area	Description
	Tap this icon or press **Preset** button to access the interface for preset management.
	Tap this icon to enable/disable **Blackout**.
	Tap this icon or press **Freeze** button to enable/disable **Freeze**.
	Tap this icon or press **Bright** button and then move the pop-up slider to increase/decrease the brightness.
	Tap this icon or press **Size** button to access the interface where you can adjust layer size on the touch screen.
	Tap this icon or use the knob to access the main menu interface.

3.2 Fiber Optic Transceiver Mode



Area	Description
	Indicates the connection status of fiber ports (Fiber1&3) and the 10 Ethernet ports. A port highlighted is online while a grayed-out port is offline.
	Indicates the connection status of the fiber ports (Fiber2&4) and the 10 Ethernet ports. A port highlighted is online while a grayed-out port is offline.
	Indicates the fiber port being used at the moment.
	Indicates fan status. An icon highlighted in green indicates the corresponding fan is working normally, while a grayed-out icon signifies the corresponding fan is not working.
0% 99% 100%	Indicates fan speed.

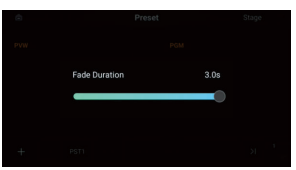
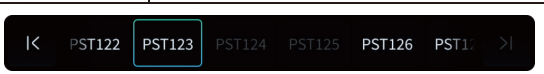
3.3 Multiviewer

You can double tap the PVW/PGM image to access the Multiviewer interface.

Area	Description
	Tap to bring out the menu for switching images.
	Available options for images viewed on the touch screen, including **PGM**, **PVW**, and **Signal**. You can tap anywhere other than the list to exit the selection. When **Signal** is selected, you can press a desired input signal button on the front panel to quickly switch to the selected signal image.
	When **Signal** is selected, you can swipe the touch screen to switch between input signals. A blue strip indicates that the current signal is selected, and an orange strip indicates that the current signal is being modified.

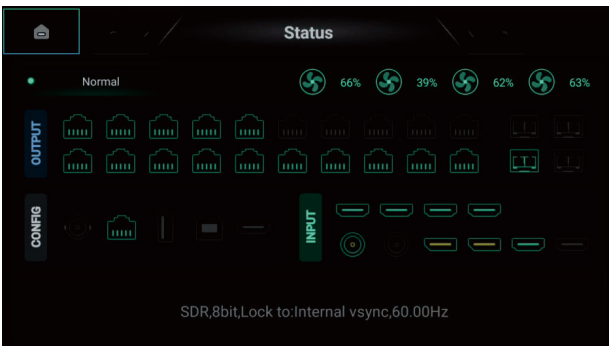
3.4 Presets

Area	Description	
Stage	Two modes are available, including **Normal** (default) and **Stage**.	
	Normal	In **Normal** mode, the PGM image will be displayed.
	Stage	In **Stage** mode, both PVW and PGM images will be displayed.

<table>
<tr><th>Area</th><th>Description</th></tr>
<tr><td></td><td>If you tap a preset in Normal mode, the preset will be displayed on the LED screen.</td></tr>
<tr><td colspan="2">PVW: Previews the preset. You can preview any of the presets by double tapping them.
PGM: Shows the image currently displayed on the screen.</td></tr>
<tr><td></td><td>Tap this icon to change the mode for switching between PVW and PGM images.</td></tr>
<tr><td colspan="2">Copy (default): Tap this icon to copy the PVW view to the PGM view.
Swap: Tap this icon to exchange the PVW and PGM images.
You can also swipe the PVW to the right, or press the Take/Cut button to switch the images.</td></tr>
<tr><td> 
</td><td>Tap this icon to add fading effect for preset transition. The effect duration is adjustable by dragging the slider or rotating the knob.
 
</td></tr>
<tr><td>  </td><td>Tap this icon to add a new preset.</td></tr>
<tr><td colspan="2"> 

Preset list. You can swipe the list to view more presets. A preset in the list can be selected and displayed in PVW or PGM area by double tapping.
If you want to view the last preset on the list, tap the right-most icon ; if you want to view the first preset on the list, tap the left-most icon .
This area shows all presets, including those with or without contents. Presets with content can be selected for application, while the empty presets are grayed out. You can rotate the knob to select presets with content.</td></tr>
<tr><td colspan="2">Delete: If you want to delete a preset, hold the preset for more than 1 second and then tap Delete.</td></tr>
<tr><td> 
</td><td>Indicates the number of currently saved presets and the maximum supported number of presets.</td></tr>
</table>

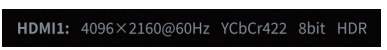
3.5 Status



Area	Description
Normal	Overall status of the device.
Normal	Indicates that the display is normal.
Input Exception & Output Exception	Respectively indicates abnormal input and output.
Input/Output Exception	Indicates abnormal input or output. The status of the input is determined by the existence of layers and the connection status of the signal added to the current layer. The status of the output is determined by whether the port control area has been configured and whether the Ethernet port / fiber port is connected.
	Fan status Icon highlighted in green indicates a normal status of fan. Grayed-out icon indicates the fan is not running.

Area	Description
0% 99% 100%	Fan speed

You can tap an input interface to view its status information, which will be updated on the bottom of the touch screen.



The status bar shows the device's HDR status, output color depth, and sync signal information by default.

HDR: SDR/HDR/HLG.

Output color depth: 8bit/10bit.

Sync source: Auto phase lock/Internal Vsync/Genlock/Input signal.

Except for the SDI interface, you can tap an input interface to configure its EDID or perform **Limited to Full**.

User interface for input signal settings: This interface will pop up when you tap any one of the input signal. It contains options for EDID settings and the option **Limited to Full**. (This interface is not available for an SDI signal.)

EDID: Including several predefined options and an option (**Custom**) for custom settings. For custom settings, you can define the width, height, and frame rate of the EDID.

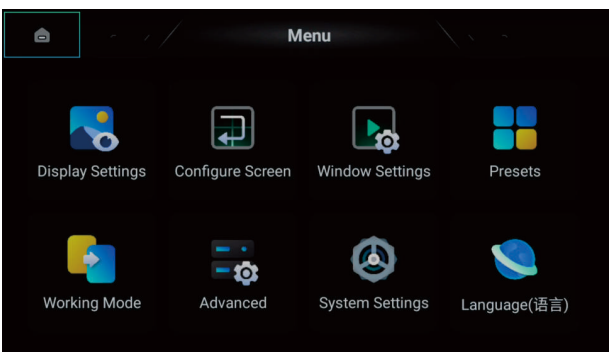
Limited to Full: You can switch on/off the toggle to enable/disable **Limited to Full**.

3.6 Menu Interactions

If you want to access the main menu interface, tap **Menu** or use the knob to select **Menu**.

Options provided in the top-level menu include: **Display Settings**, **Configure Screen**, **Window Settings**, **Presets**, **Working Mode**, **Advanced, System Settings**, and **Language (语言)**.

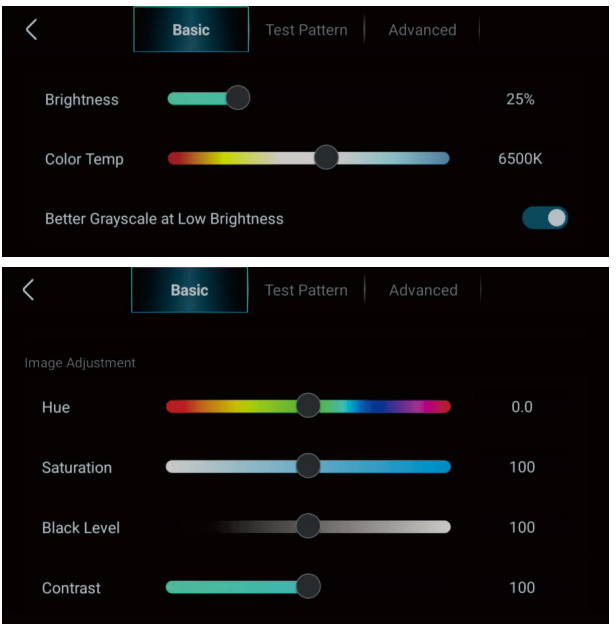
You can use the knob to select the desired item on the menu, or directly tap the item to access the corresponding interface.



* In Fiber optic transceiver mode, only **Working Mode**, **Network Settings**, and **Language (语言)** are available.

* In Bypass mode, some functions are not available, including presets, canvas settings, layer 1 and layer 2 settings, and layer scaling.

3.6.1 Display Settings



Basic: This interface is for adjusting the brightness, color temperature, hue, saturation, black level, and contrast ratio of the output image, and supports enabling/disabling **Better Grayscale at Low Brightness**.

- Brightness: Press the knob to enable editing the item. You can rotate the knob, tap and drag the slider, or type the desired value into the input box to adjust the brightness. The brightness value is within the range of 0 to 100%. By default, 0 is the minimum value (display black), and 100% is the maximum.

- Color Temp: Press the knob to enable editing the item. You can rotate the knob, tap and drag the slider, or type the desired value into the input box to adjust the color temperature. The color temperature is within the range of 2000K to 10000K (default: 6500K). 2000K (warm tone) is the minimum value of the color temperature, and 10000K (cool tone) is the maximum.

Better Grayscale at Low Brightness: This function is not enabled by default. With this function enabled, the grayscale details in low gray level will be enriched.

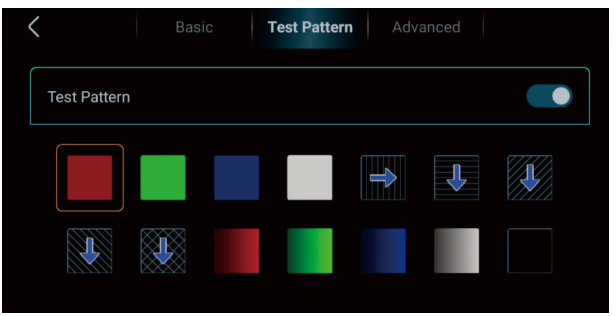
Image Adjustment:

Hue: -30 to 30 (default: 0)

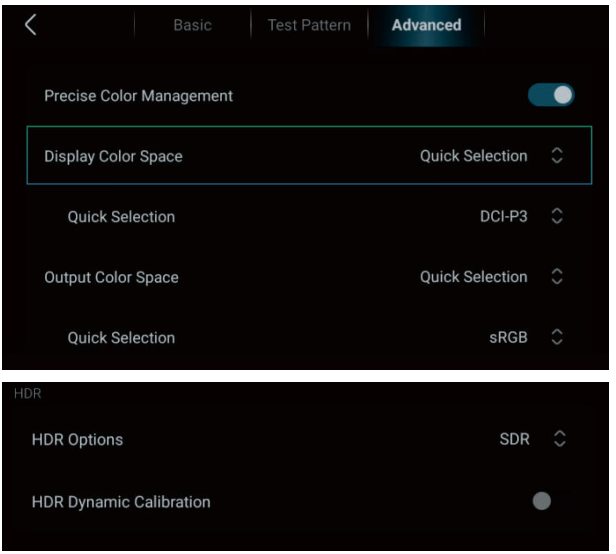
Saturation: 0 to 200 (default: 100)

Black Level: 0 to 200 (default: 0)

Contrast: 0 to 200 (default: 100)



Test Pattern: You can switch on **Test Pattern** and then select any of the provided patterns to test the display.



Advanced: In this interface you can perform **Precise Color Management**, and carry out HDR and RGB settings.

Precise Color Management: Offers sub-menus (Status, Display Color Space, Output Color Space)

1) Status: 2 checkboxes for enabling and disabling the function. When the function is disabled, the display color space and output color space are grayed out.

2) **Display Color Space**: Sub-menu, offering 3 options (**Unknown**, **Quick Selection**, and **Measurements**).

3) **Output Color Space**: Sub-menu, offering 3 options (**Unknown**, **Quick Selection**, and **Measurements**)

3.6.2 Configure Screen

When the display is assembled by cabinets of the same batch, you can configure the display in a quick way. In this interface, you can perform quick screen configuration,

cabinet parameters import, sending cabinet parameters, saving cabinet parameters, and so on.

3.6.2.1 Quick Configuration

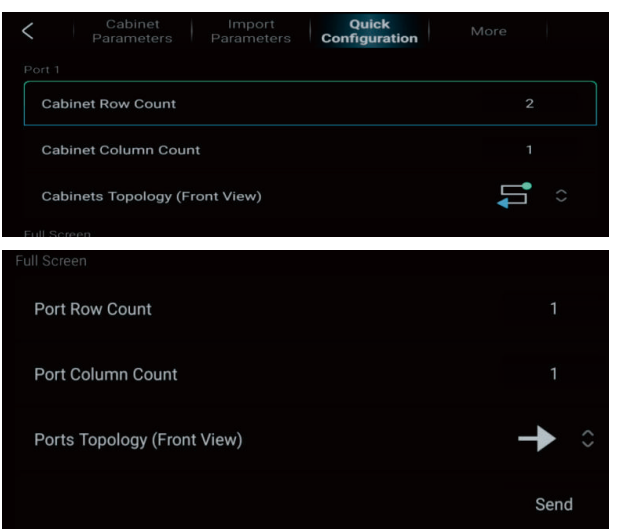
Quick Configuration: Supports setting the cabinet row count, cabinet column count, number of cabinets loaded by Ethernet ports, cabinets topology (front view), and full screen settings.

- Cabinet Row Count: Maximum count=Maximum cabinet count supported by each Ethernet port×total Ethernet port count. This value decreases as the cabinet column count increases.

- Cabinet Column Count: Maximum count=Maximum cabinet count supported by each Ethernet port×total Ethernet port count. This value decreases as the cabinet row count increases.

- Cabinets Topology: Supports changing topology of the receiving cards.

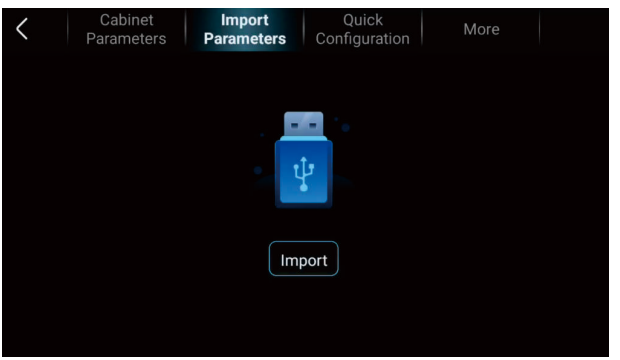
- Full Screen: Supports setting the Ethernet ports row/column count, and the ports topology (front view).



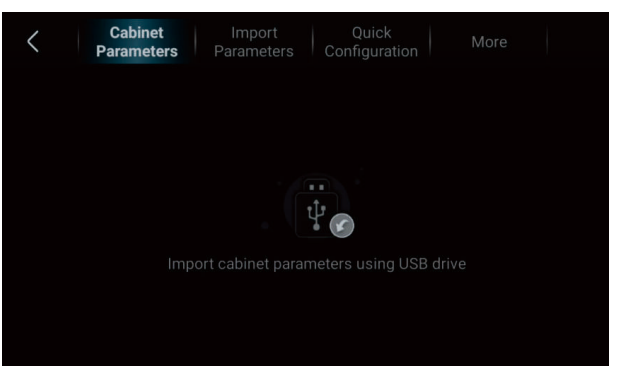
3.6.2.2 Configure Cabinet Parameters

After powering on the LED display, if one of the cabinets or the whole LED display cannot be lit up, you can import cabinet parameters and send the parameters to update the configuration files of the LED cabinets.

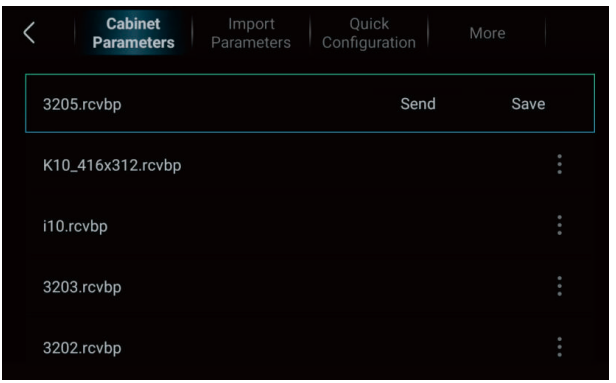
- Import Cabinet Parameters: Plug a USB drive containing parameter files to the device. The device will automatically recognize the .rcvbp parameter file for import. Please ensure the file is stored in the folder named "rcvbp" in the USB drive.



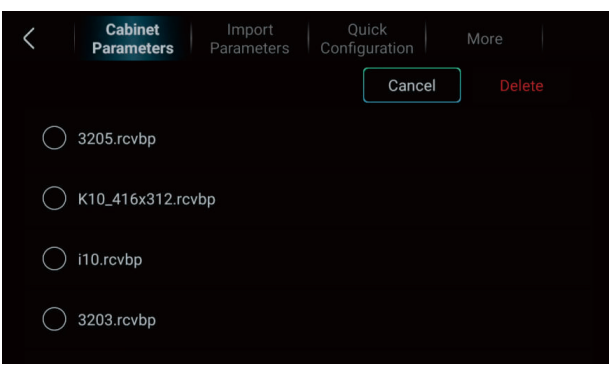
- Send Cabinet Parameters: When cabinet parameters exist, you can select the desired parameters and then press the knob to send the selected parameters. The parameters that have been sent can be saved. When there is no cabinet parameters, you should import cabinet parameters first.



- Save Cabinet Parameters: Tap this button to quickly save the parameters to the receiving cards.

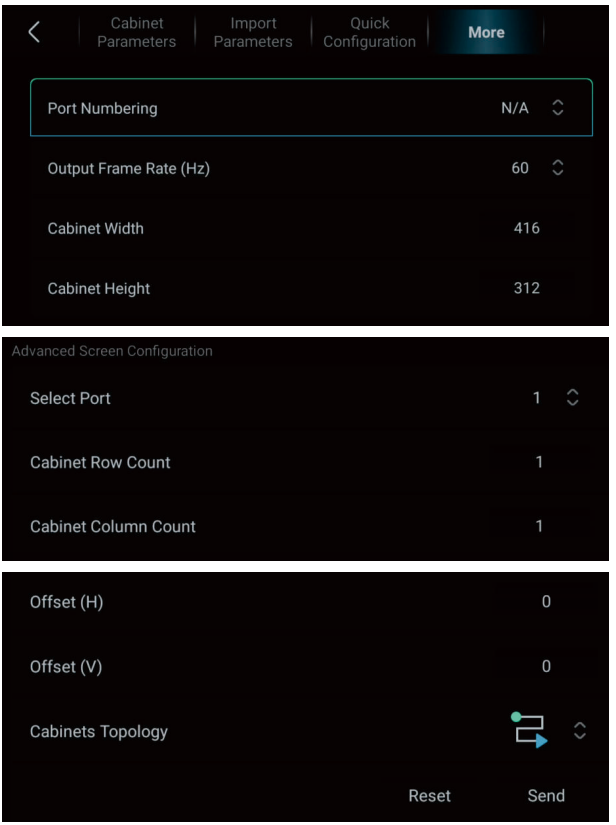


- Delete Cabinet Parameters: Tap and hold the desired parameters to bring up a menu offering deleting action.



3.6.2.3 More Settings

Supports advanced screen configuration, numbering receiving cards, and setting output frame rate.



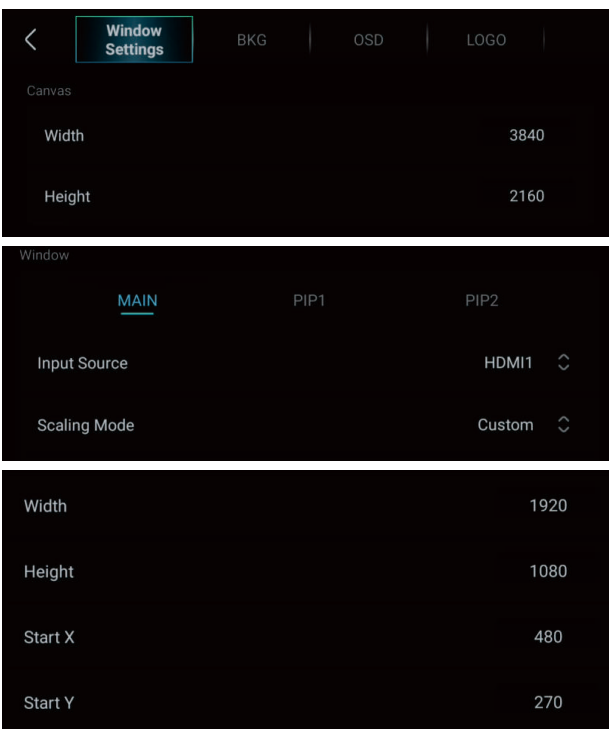
- Advanced Screen Configuration: Select the target port first, then set the row and column count of the cabinets loaded by the port and set the horizontal and vertical offsets of the first cabinet. The offset (represented in pixel) equals to the spacing between the upper-left corner of the first cabinet loaded by the port and the upper-left corner the display.

- Port Numbering: Disabled by default. When enabled, the function enables locating cabinet by highlighting the frame of the target cabinet on the screen based on the numbers labeled to the ports and cabinets.

- Output Frame Rate: Available options include: 30, 50, 60, 120, and 240. By default, it is 60. This selection only affects the calculation of the load capacity when configuring the receiving cards' topology and it is not the final output frame rate of the device.

3.6.3 Window Settings

Window Settings: Setting canvas, layers (Main, PIP1, and PIP2), BKG, and Logo.

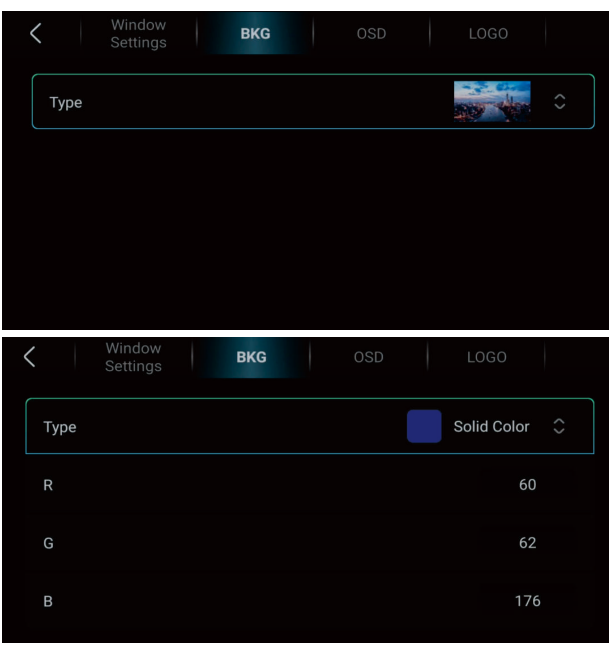


- Canvas: Adjustable width and height.

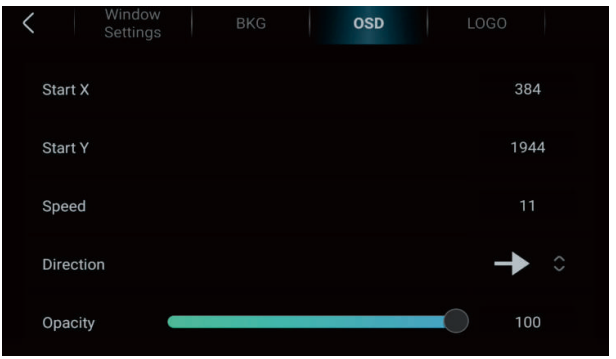
- Main/PIP1/PIP2: Changeable input source, adjustable scaling mode, horizontal width, vertical height, starting coordinates, input cropping, and opacity.

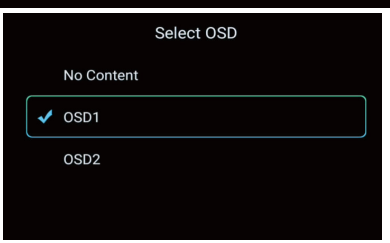
* 3 layer modes are available: **Full Screen**, **Pixel-to-Pixel**, and **Custom**. Only in Custom mode can you set the horizontal width and vertical height.

BKG: To display a background, you can tap the spin buttons on the row of **Type** to access the **Choose Picture** page. The page contains up to 4 BKGs, either with or without content. If you select a solid-color BKG, a drop-down R/G/B editing box will pop up for color selection.

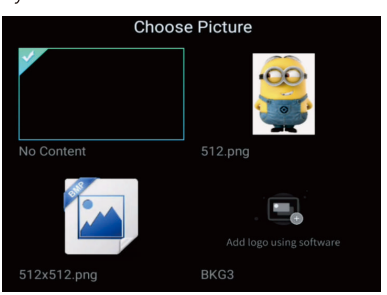


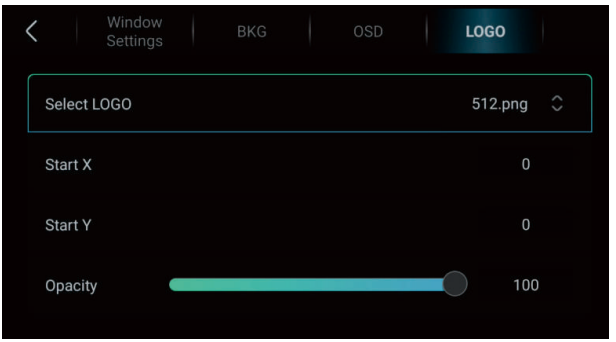
OSD: You can select an existing OSD. After selection, you can modify the selected OSD's starting coordinates, scrolling speed and direction, and opacity, and perform OSD cropping.





LOGO: To select one picture as the logo, you can tap the spin buttons on the row of **Select LOGO** to access the **Choose Picture** page. The page contains up to 10 logos, either with or without content. After selection, you can modify the logo's starting coordinates and opacity.





3.6.4 Presets

VX20 supports 1000 presets. The preset list will be shown on the touch screen, including presets with or without content. You can tap a desired preset to apply it, or tap and hold a preset for a pop-up menu where you can delete the preset. You can also select multiple presets at a time for deletion.

3.6.5 Working Modes

VX20 offers 3 working modes: Video processor mode, Bypass mode, and Fiber optic transceiver mode.

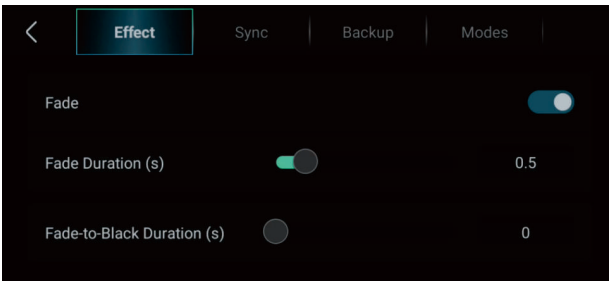
3.6.6 Advanced Functions

The options provided by VX20 for advanced functions include: **Fade**, **Fade-to-Black**, **Sync Source**, **Frame Rate**, **Frequency Multiplication**, **Additional Delay Frame**, **Processor Redundancy**, **Input Source Hot Backup**, **Fiber3/4**, and **Multiviewer**.

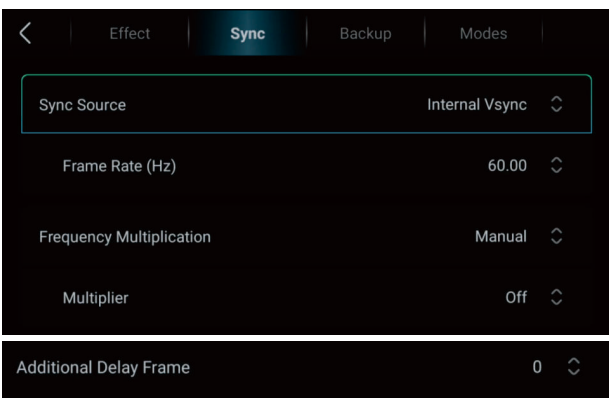
3.6.6.1 Image Effect

Fade: You can switch on or off the toggle to enable or disable the effect. The effect duration is adjustable.

Fade-to-Black: The effect duration is adjustable.



3.6.6.2 Synchronization



Sync Source: Supports using internal input source or external signal (Genlock) as the signal source for synchronization. Options include: **Auto** (default), **Genlock**, **Input**, and **Internal Vsync**.

Frequency Multiplication: You can select auto multiplication or manual multiplication. For manual multiplication, 3 options are available: **Off**, **2×**, and **3×**. The logic for auto multiplication settings is as below:

Frame rate≤30: 2×;

Frame rate＞30: Off

Additional Delay Frame: Supports setting 0 to 2 frames of delay.

3.6.6.3 Backup

Processor Redundancy: The current device can be set as either the primary or the backup device.

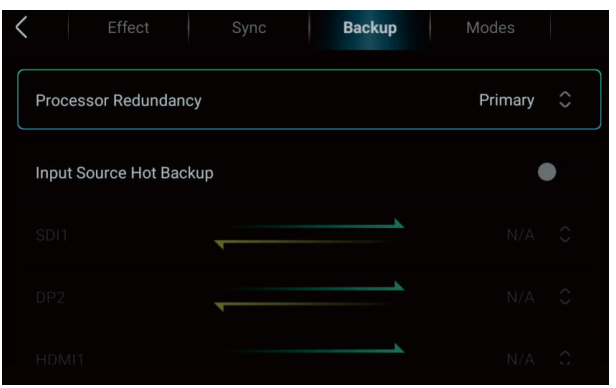
Input Source Hot Backup: Hot backup is only available for input signals of the same type. When hot backup for HDMI1 is enabled, the device will automatically switch signal following the principles below (take HDMI signal as an example):

1) When HDMI1 loses signal and HDMI2 has signal, switch to HDMI2;

2) When HDMI1 resumes and HDMI2 still has signal, remain HDMI2, otherwise, switch back to HDMI1;

3) When HDMI1 has signal and HDMI2 loses signal, switch back to HDMI1 automatically if users switch to HDMI2 manually;

4) When both HDMI1 and HDMI2 do not have signal, the switching will not take effect.

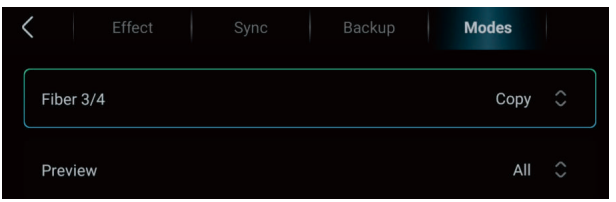


3.6.6.4 Mode

Fiber3/4: Fiber 3 and Fiber 4 are used for output only, and support Backup mode (default) and Copy mode.

- Copy mode: Copies and transmits data from the 20× Ethernet ports.
- Backup mode: Backs up and transmits data from the 20× Ethernet ports.

Multiviewer: Offers four views for previewing and monitoring, including **All** (default), **PVW**, **PGM**, and **Input**. The **Input** view supports viewing 11 input signals including the Mosaic signal.



3.6.7 System Settings

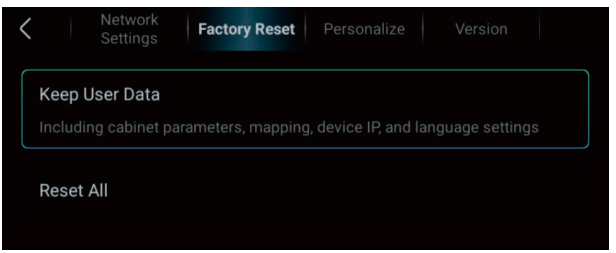
In **System Settings**, you can find **Network Settings**, **Factory Reset**, **Personalize**, and **Version**.

Network Settings: Supports 2 modes: **Static IP(Manual)** and **DHCP(Auto)**.

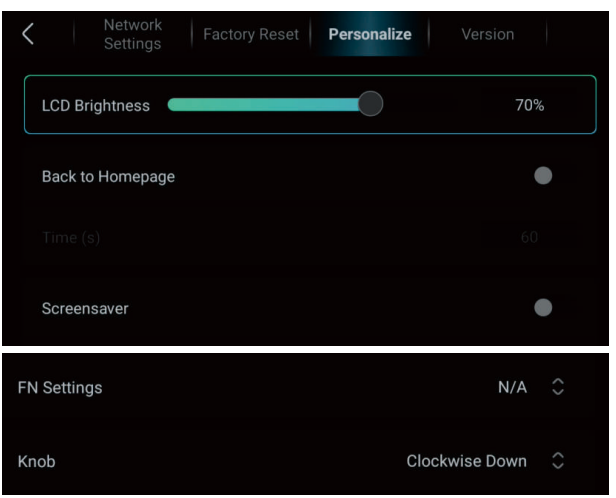
- Static IP(Manual): In this mode, you can define the IP address, subnet mask, and gateway of the device using the knob or by tapping the corresponding items for editing. You can press the knob to switch between fields and items. After completing all fields, pressing the **ESC** key on the front panel can save the settings.

- DHCP(Auto): In this mode, the IP of the device will be automatically assigned by the LAN via DHCP.

Factory Reset: You can reset the device to its factory settings. You can select **Keep User Data** to retain the user data after factory reset, or **Reset all** to remove all data from the device.



Personalize: Supports setting the LCD brightness, the period of time after which the interface will automatically return back to the home page, and the period of time after which the device will show a screensaver. Besides, you can also customize the FN key for quick operation, and define the action for the knob. You can also update the device's logo as needed.



(1) **LCD Brightness**: The supported range is between 0% to 100% while 0 leaves the LCD with 0.5% brightness. 70% is the default brightness. The adjustment step size is 1%.

(2) **Back to Homepage**: The time range for this item is 30 to 3600 seconds, and the default time is 60 seconds. You can switch on/off the toggle to enable/disable this setting.

(3) **Screensaver**: The time range for this item is 30 to 3600 seconds, and the default time is 60 seconds. You can switch on/off the toggle to enable/disable this setting.

(4) **FN Settings**: Supports designating functions to the FN key on the front panel for quick operation. Available options include: **Blackout**, **Sync Source**, **Multiviewer**, and **Audio Settings**. By default, no function is designated (**N/A**).

(5) **Knob**: Supports customizing the action of the knob. Available options include: **Clockwise Down** (default) and **Anticlockwise Down**.

(6) Update logo: In **Personalize** page, you can tap **Personalize** 5 times successively to access the page for changing the device logo. You should plug in a USB drive containing the update file in advance. The file name should be "VX20LOGO.zip".

Version: Displays the version information of the device.

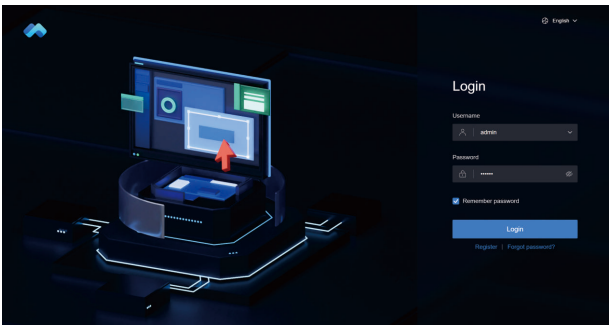
3.6.8 Language

In **Language（语言）**, you can switch the device language between English and Chinese.

04 WEB APPLICATON

4.1 Login Page

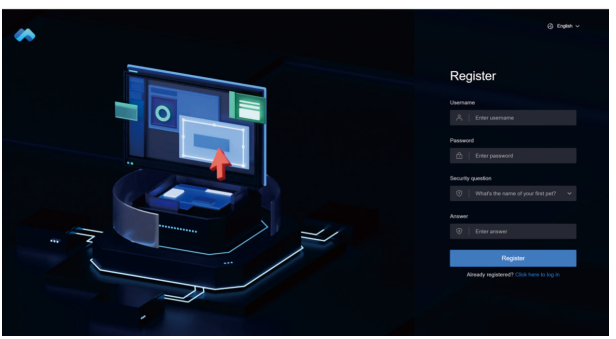
4.1.1 Create Account



- To create an account, click **Register**.

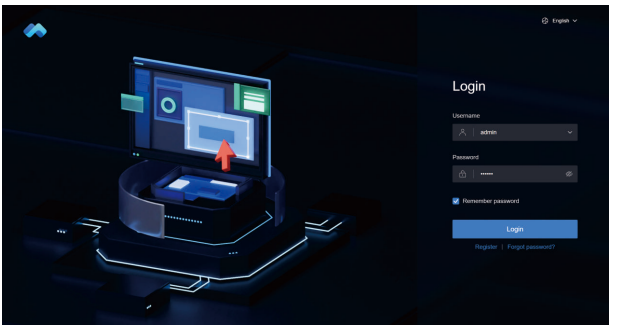
- In the registration page that appears, enter your username, password, security question, and answer.

- If the account was created successfully, you will be directed to the login page; if not, an error message will appear.



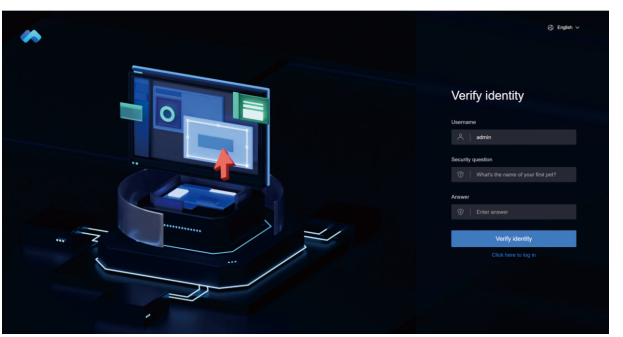
4.1.2 Login

- In the login page, enter your username and password to access the main interface.



4.1.3 Forgot Password

- Click **Forgot password** to open the **Verify identity** page, where your registered account and security question are displayed.
- Enter the correct answer to the security question to proceed to the **New password** page.
- Enter and confirm your new password. Your password will be successfully reset.



4.2 Top Navigation

4.2.1 Full Screen/Exit

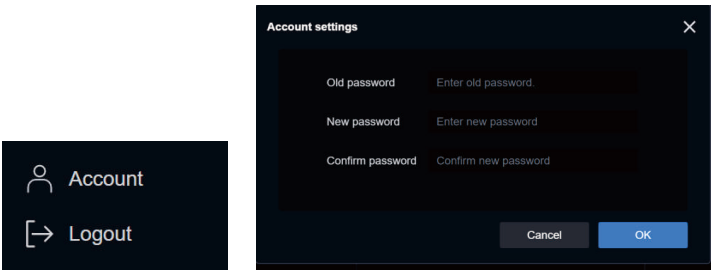
- Click the **Full screen** icon to enter full-screen mode; the icon will change to **Exit**.
- To exit full screen, click the **Exit** icon or press **ESC**.

4.2.2 Account/Logout

- Account settings

Step 1: Click **Account** to verify your account, then you can change your password.

Step 2: After changing your password, click **OK**. You will be directed to the login page to log in again.



- To log out of your current account, click **Logout**.

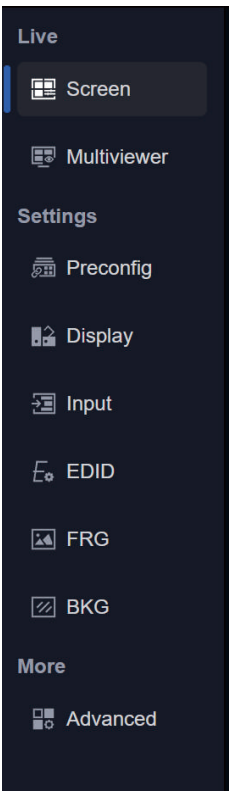
4.2.3 Change Language

- Click the icon to switch between Simplified Chinese (简体中文) and English, or follow the system language settings.

4.2.4 More Functions

- Help: Click **Help** to access the user manual.
- About: Click **About** to display information about the application.

4.3 Left Navigation



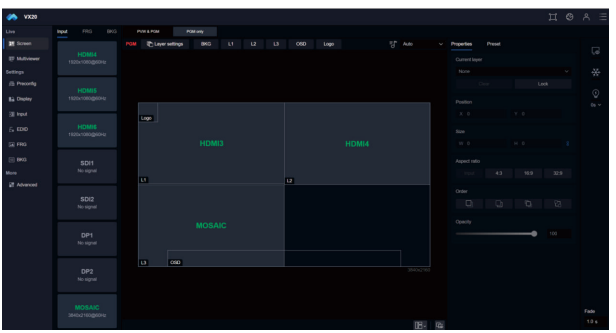
4.4 Screen Management

4.4.1 Device Information

The device information, including its default name VX20, is displayed in the **Screen** interface.

If no device information is displayed, refresh the webpage.

The left navigation bar displays each functional module. Click a module to go to its interface. The list next to the navigation bar shows the device's input ports. The port with an active signal input will be highlighted in green, indicating a connection.



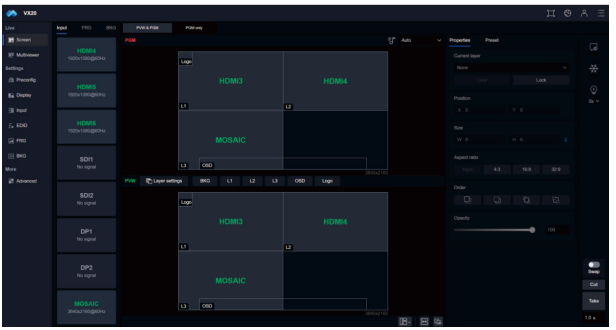
4.4.2 Input Signals

4.4.2.1 Input Port Status

Go to **Screen** > **Input** to view the connection status, signal format, resolution, and frame rate of each input port on the left side. Available input signals include HDMI1(2.0), HDMI2(2.0), HDMI3/4/5/6(1.4), DP1/2(1.2), SDI1/2, and MOSAIC.

4.4.2.2 Dragging Inputs to PVW

Drag the input into the **PVW** area for preview. The VX20 supports up to three input layers, which you can drag into the PVW area, as shown in the figure below.



4.4.2.3 Replacing Inputs

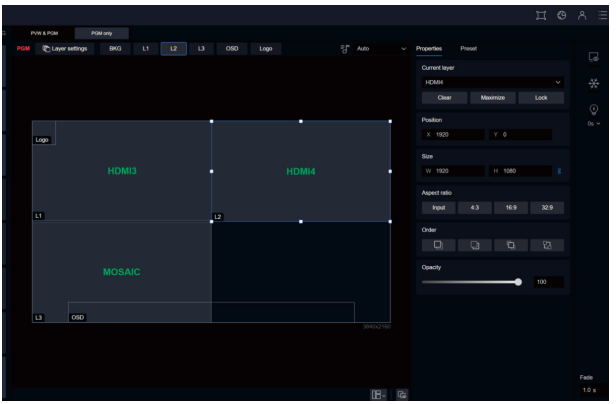
To replace an input, drag a new input over the position of the input you want to replace in the **PVW** area. The current input will be replaced.

4.4.2.4 Layout

The layout function lets you quickly adjust the window size. Click the layout icon to quickly select the layout you want to apply.

4.4.2.5 Locking Layers

In the **PGM** area, click the layer you want to lock to bring up the **Properties** panel.



- Lock: Click **Lock** in the upper right corner to lock the current layer. The layer will be locked, with only the **Unlock** button available in **Properties**.

- Unlock: Click **Unlock** in the upper right corner to unlock the current layer. The status will change to unlocked, restoring all functions in **Properties**.

4.4.2.6 Maximizing Layers

In the **PVW** area, click the layer you want to maximize to bring up the **Properties** panel.

- Maximize: The layer fills the screen or adapts to the layout if applicable.

- Restore: The layer returns to its size prior to maximizing.

4.4.2.7 Clearing Layer

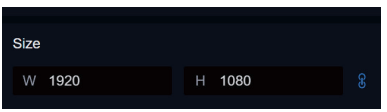
In the **PVW** area, click the layer you want to clear to bring up the **Properties** panel. Click **Clear** to remove all inputs from the current layer, which will display **None** in the upper right corner.

4.4.2.8 Input Offset and Scaling

Scaling: Supports manual scaling, custom scaling, keep aspect ratio, and fixed ratio scaling.

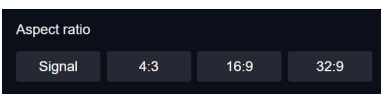
- Manual scaling: Click an input signal to enter the scaling mode. Drag the edges to adjust the input signal size manually, or double-click the layer to fit it to the layout.

- Custom scaling: Enter values in the width (W) and height (H) fields to adjust the input signal size.



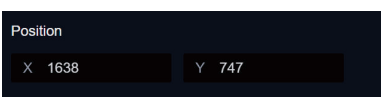
- Keep aspect ratio: Select an input signal, and click the icon to maintain the current aspect ratio while dragging the input signal edges to scale.

- Fixed ratio: Choose from options like **4:3**, **16:9**, or **32:9** to scale the input signal with a fixed aspect ratio.

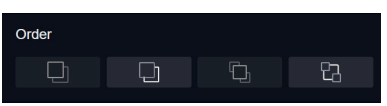


Manual offset: Drag the input signal to move it to any desired position.

Custom offset: Enter the (X, Y) values to specify the coordinates of the window's top left corner, adjusting its position in the **PVW** area.



Order layers: Supports bringing a selected input signal forward or to the top, and sending it backward or to the back.

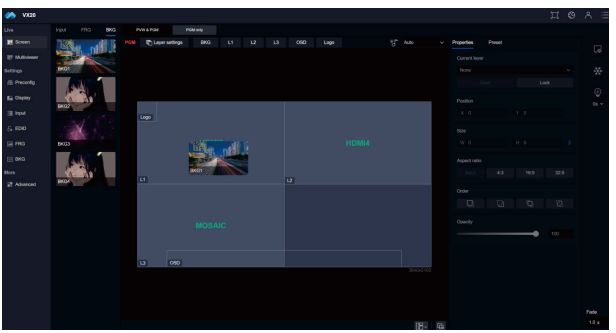


4.4.2.9 Opacity

To adjust the layer opacity, you can drag the slider or enter a custom value. The default is 100%. This function is available only when there is an input signal in the layer.

4.4.3 BKG

Drag a BKG into the BKG layer to automatically fill the layer.



4.4.4 FRG

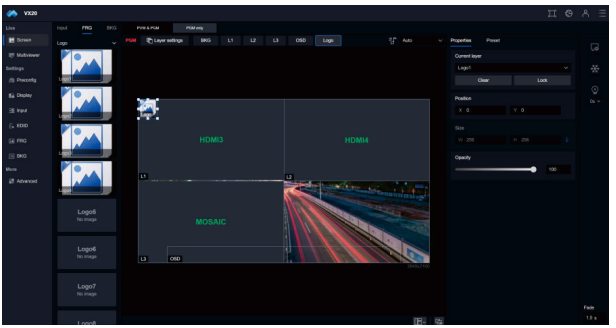
Drag a logo or OSD into the corresponding layer on the canvas. The layer will resize to fit the logo or OSD.

4.4.4.1 Logo

- Manual positioning: Drag the logo to any desired position within the layer.

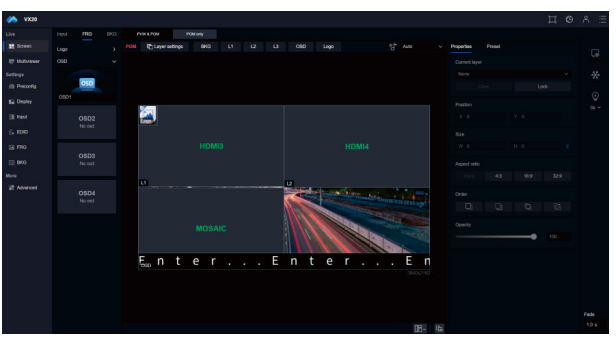
- Lock logo: In the **Properties** panel, click **Lock** to prevent any modifications. Click **Unlock** to unlock it for editing.

- Close logo: In the **Properties** panel, click **Clear** to quickly remove the logo from the current layer.



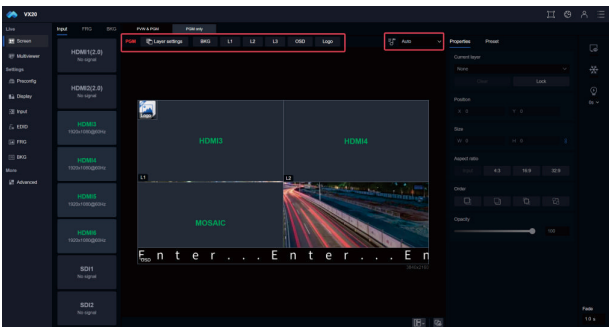
4.4.4.2 OSD

- Custom positioning: Adjust the OSD's coordinates (X, Y) for precise placement.
- Manual positioning: Drag the OSD to any desired position within the layer.
- Speed and direction: Set the movement speed and direction (horizontal or vertical).
- Lock OSD: In the **Properties** panel, click **Lock** to prevent any modifications. Click **Unlock** to unlock it for editing.
- Close OSD: In the **Properties** panel, click **Clear** to quickly remove the OSD from the current layer.

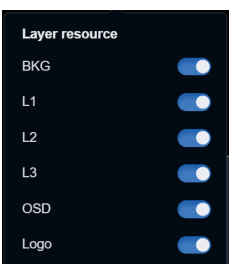


4.5 Canvas

4.5.1 Layers



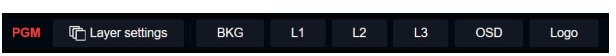
4.5.1.1 Layer Resource



When a layer is enabled, it appears in its default position on the canvas. When a layer is disabled, it will be emptied and removed from the canvas. Re-enabling the layer restores it to its default position, with no inputs retained.

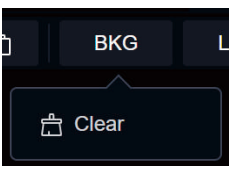
- By default, all layers are enabled.

4.5.1.2 Layer Actions

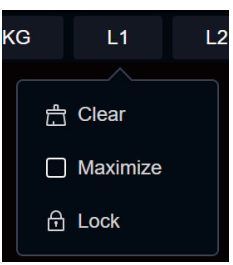


Clicking a layer button selects that layer and brings up the corresponding **Properties** panel.

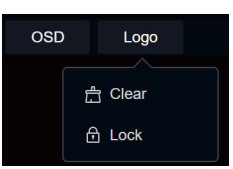
BKG: Holding the pointer over the BKG button reveals a **Clear** option. Click **Clear** to remove the background from the canvas.



L1/L2/L3: Holding the pointer over a layer button (L1, L2, L3) shows options to clear, maximize, or lock the layer.



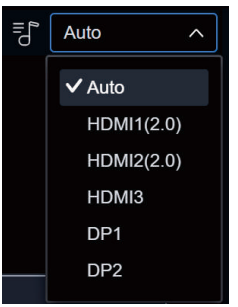
Logo/OSD: Holding the pointer over the Logo or OSD button displays options to clear or lock the layer.



4.5.2 Audio Output

You can adjust the audio output for both PGM and PVW.

- By default, **Auto** is selected, which outputs audio from the top-most layer containing an active input signal.
- Available options include HDMI1(2.0), HDMI2(2.0), HDMI3(1.4), DP1(1.2), and DP2(1.2).
- In **PVW**, audio output options are used for the audio signal for input preview, synchronized with the **Multiviewer** interface.
- In **PGM**, audio output options are used for the audio signal for the program output.



4.6 Screen Functions

4.6.1 PVW & PGM

4.6.1.1 Layout

You can quickly set the PVW layout by selecting a template.

- Available templates: Full screen (default), 1x2, 2x1, 1x3, 2x2, and Custom.
- The custom input box accepts values from 1 to 10.

4.6.1.2 Linked Scaling

When **Linked scaling** is enabled, the scaling levels for PVW and PGM are synchronized.

- Scaling ranges from 100% (default) to 200%.
- PVM and PGM are synchronized for scaling.
- You can adjust the scaling by using <Ctrl> + mouse wheel, spacebar + left-click drag, or pinch gestures on the touchpad.

Navigator:

- Click the reset button to restore the scaling level to 100%.
- At 100% scaling, the navigator is hidden. At other scaling levels, both the navigator and scaling level are displayed on the canvas by default.
- The step size is 5%.

4.6.1.3 Hide Empty Layer

When **Hide empty layer** is enabled, empty layers on the canvas are concealed.

4.6.2 PGM

4.6.2.1 Layout

You can quickly set the PGM layout by selecting a template.

- Available templates: Full screen (default), 1x2, 2x1, 1x3, 2x2, and Custom.
- The custom input box accepts values from 1 to 10.

4.6.2.2 Hide Empty Layer

When **Hide empty layer** is enabled, empty layers on the canvas are concealed.

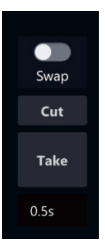
4.6.2.3 Navigator

- Click the reset button to restore the scaling level to 100%.
- At 100% scaling, the navigator is hidden. At other scaling levels, both the navigator and scaling level are displayed on the canvas by default.
- The step size is 5%.

4.7 Sidebar

4.7.1 Console Functions

4.7.1.1 PVM & PGM



- **Cut**

Click **Cut** to synchronize the display from **PVM** to **PGM** without any transition effect.

- **Take**

Click **Take** to synchronize the display from **PVM** to **PGM** with a fade transition. The **Take** button will flash during the fade.

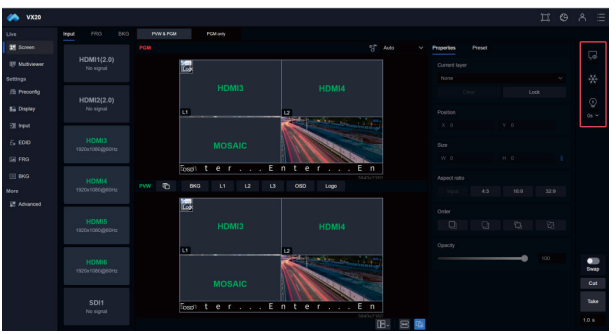
- **Swap**

To swap the displays between PVW and PGM, enable **Swap**, then select a transition effect: **Cut** or **Take**.

4.7.2 Freeze

Enable **Freeze**: Click the freeze icon in the sidebar to enter freeze mode, which will display the last frame on the output screen. The **Multiviewer** area remains operational.

Disable **Freeze**: Click the freeze icon again to exit freeze mode. The screen will resume normal operations, displaying dynamic content.



4.7.3 Blackout

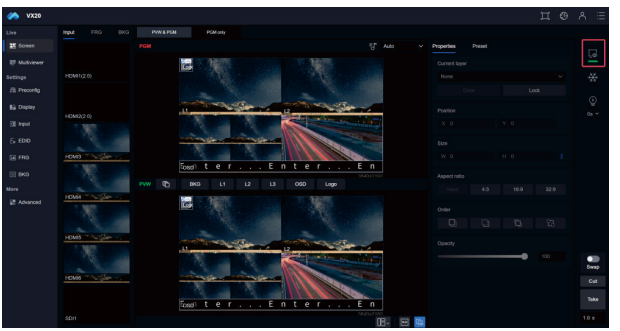
Enable **Blackout**: Click the blackout icon in the sidebar to enable blackout mode. The LED or LCD screen will turn black, and a green indicator will appear below the blackout icon.

Disable **Blackout**: Click the blackout icon again to exit blackout mode. The screen will return to normal display.

Fade to black: Click the blackout icon to open an input box where you can specify the duration, from 0s (default) to 3s, in 0.1s increments. Once set, the screen will fade to black.

4.7.4 Multiviewer

Enable **Multiviewer**: Click the Multiviewer icon in the sidebar to enter Multiviewer mode. The **Input** list displays real-time images from each input signal, and the **PGM** area shows the current output image.



Exit **Multiviewer**: Click the Multiviewer icon again to exit Multiviewer mode.

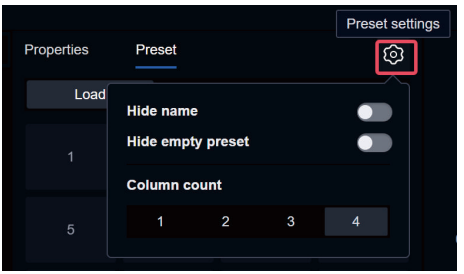
4.8 Preset Management

You can save the display on the screen as a preset. Loading this preset later will restore the saved display configuration.

4.8.1 Preset Settings

Click the  icon to bring up the **Preset settings** window.

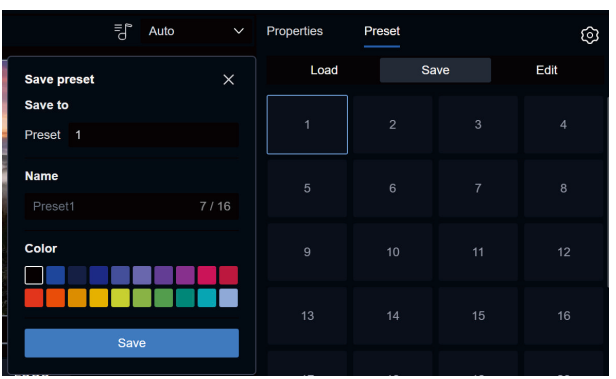
- To hide preset names, click the **Hide name** toggle to the on position.
- To hide unconfigured presets, click the **Hide empty preset** toggle to the on position.
- To set the number of preset columns displayed, select a value from the available options.



4.8.2 Saving Presets

Go to **Screen** > **Preset** > **Save** to open the **Save preset** panel. You can save up to 128 presets, in any order.

- Both PVW and PGM layouts can be saved as presets.
- Background, subtitles, color, and brightness settings can be saved.
- You can customize each preset's name and color label.



4.8.3 Loading Presets

4.8.3.1 PGM Only

Loading a preset in **PGM only** mode will replace the current PGM.

4.8.3.2 PVW & PGM

Loading a preset in **PVW & PGM** mode will replace the current PVM without affecting the PGM.

4.8.4 Editing Presets

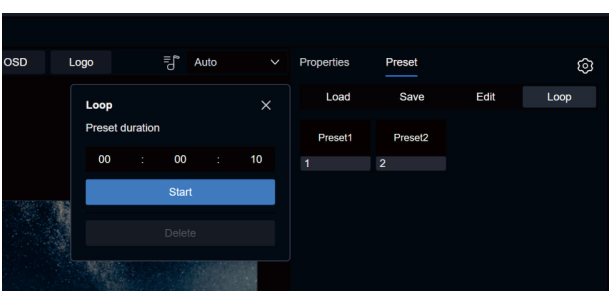
Existing presets are available for editing.

- Multiple presets can be added for looping.
- Supports clearing multiple presets at a time.

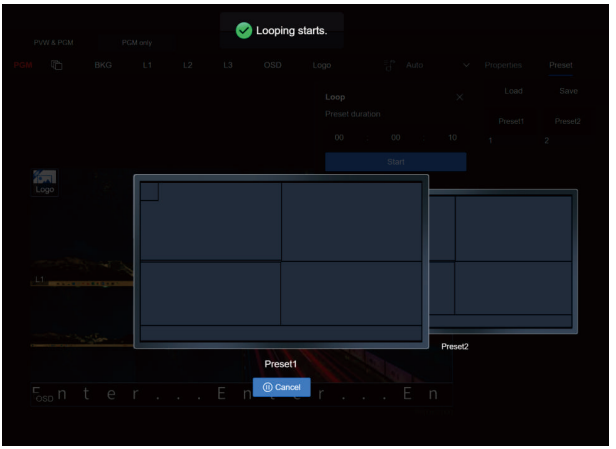
4.8.5 Preset and Loop

Loop playback automatically plays and switches between presets in a specified order and duration, eliminating the need for manual switching. To use this function, multiple presets are required, and you can add presets in the **Add for looping** panel. Note that this function is only available for PGM.

- Preset duration can be set from 10 seconds to 3600 seconds.
- You can delete presets from **Loop** as required.



After configuration, click **Start** to begin loop playback, as shown below.



4.9 Multiviewer

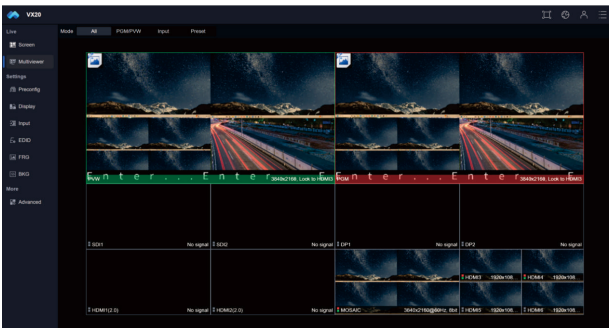
The **Multiviewer** offers different modes for preview and monitoring.

4.9.1 PGM Only

Select **Screen** > **PGM only**, then navigate to **Multiviewer** to access the four available modes: **All**, **PGM/PVW**, **Input**, and **Preset**.

4.9.1.1 All

In **All** mode, the top half of the screen displays the preset image (PVW) and the current output program (PGM), while the bottom half shows the preview of input signals.

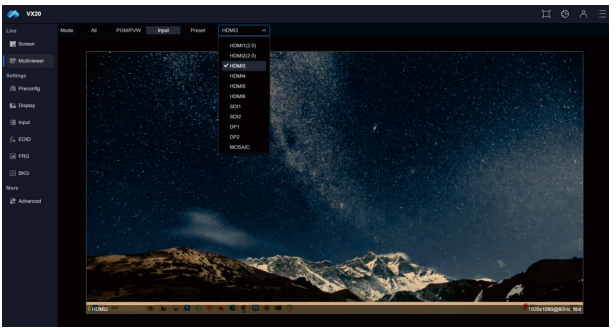


4.9.1.2 PGM/PVW

The **PGM/PVW** mode displays the image in the mode you selected in the **Screen** interface. For example, if PGM is chosen, the screen will show the PGM image.

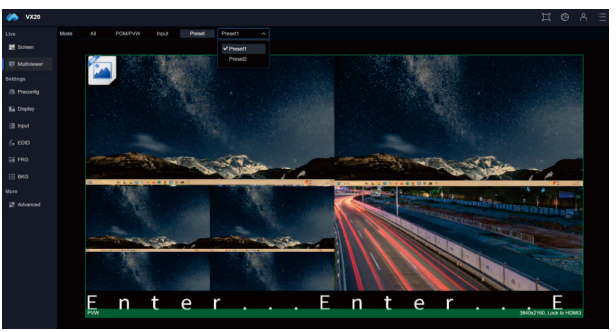
4.9.1.3 Input

The Input mode displays the preview image of the input signal. You can select the input signal you want to preview from the dropdown menu in the tab bar.



4.9.1.4 Preset

The **Preset** mode displays the preview image of the saved preset. You can select the preset you want to preview from the dropdown menu in the tab bar.

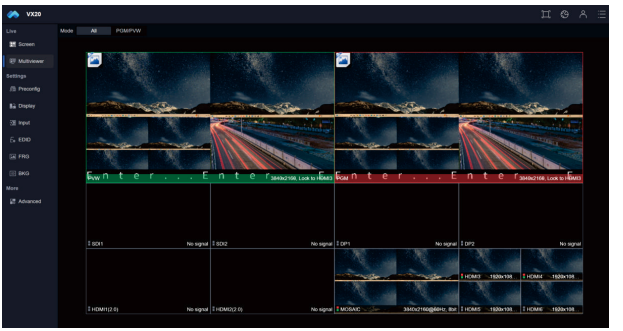


4.9.2 PVW & PGM

Select **Screen** > **PVW & PGM**, then navigate to **Multiviewer** to access the two available modes: **All** and **PGM/PVW**.

4.9.2.1 All

In **All** mode, the top half of the screen displays the preset image (PVW) and the current output program (PGM), while the bottom half shows the preview of input signals.



4.9.2.2 PGM/PVW

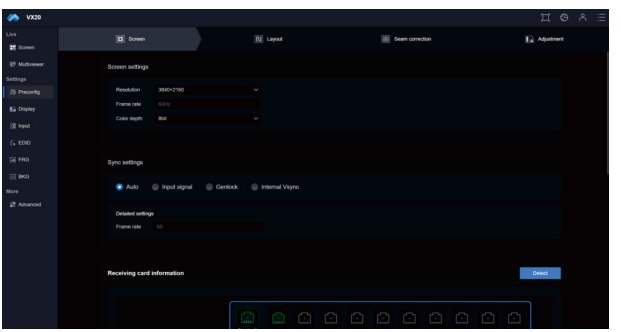
The **PGM/PVW** mode displays the image you selected from the dropdown menu in the tab bar, either PVW or PGM.

4.10 Screen Settings

In the **Preconfig** tab, you can manage screens, configure layout settings, adjust seam correction, disable port output, and perform a factory reset.

4.10.1 Screen

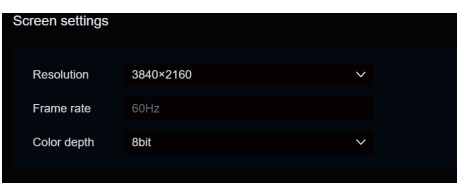
Go to **Preconfig** > **Screen** to access screen and sync settings.



4.10.1.1 Screen Settings

In **Screen settings**, you can configure the screen resolution, frame rate, and color depth as needed. Ensure that the receiving cards in the cabinets support the maximum refresh rate and color depth.

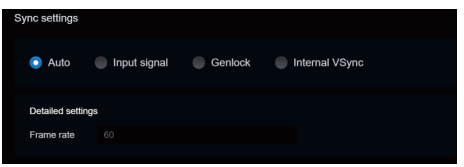
- Maximum canvas size: 13 million pixels (max. width: 16,384; max. height: 8,192)
- Output frame rate: 23.98Hz to 240Hz
- Output color depth: 8bit or 10bit



4.10.1.2 Sync Settings

In **Sync settings**, you can select the sync signal: Internal Vsync, Genlock, or an input signal.

a. Internal Vsync (default)



- The default frame rate is 60Hz. You can adjust the frame rate ranging from 23.97Hz to 240Hz.

- Available frame rates: 29.97Hz, 30Hz, 50Hz, 59.94Hz, 60Hz, 120Hz, and 240Hz.

- Custom frame rates are supported with compatible receiving cards.

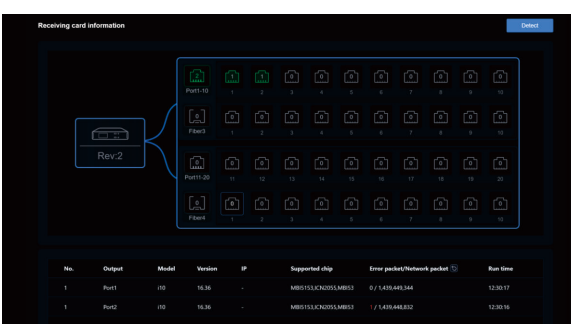
b. Genlock

To use Genlock as the sync signal, connect a Genlock signal generator or another VX20 to the GENLOCK-LOOP port for a stable frame rate. The signal format will then be recognized.

c. Input signal

When **Input signal** is selected as the sync signal, its frame rate matches that of the active signal selected from the input signal list in the **Screen** interface.

4.10.1.3 Receiving Card Information



In **Receiving card information**, click **Detect** to automatically retrieve details of connected receiving cards. Select the desired port to view information such as model, version, supported chip, error packet/network packet, and run time.

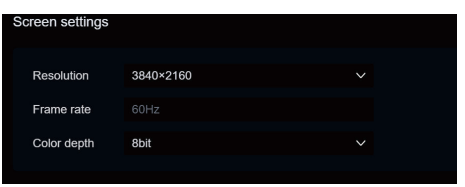
4.11 Layout

4.11.1 Layout Settings

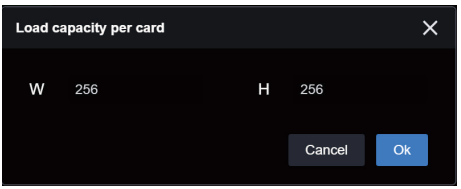
Step 1: After logging into the web application, go to **Preconfig** > **Layout**. Confirm the cabinet size, the number of receiving cards per network port, and the cabling between cabinets according to the device's output port load capacity and the structure of the LED screen cabinets.

- U_OUT_20×1G_RJ45 output board: 20×1G Ethernet ports, loading up to 655,360 pixels per port.
- U_OUT_8×5G_RJ45 output board: 8×5G Ethernet ports, loading up to 655,360×5×0.9 pixels per port.
- U_OUT_4×10G_FIBER output board: 4×10G fiber ports, loading up to 655,360×10 pixels per port.

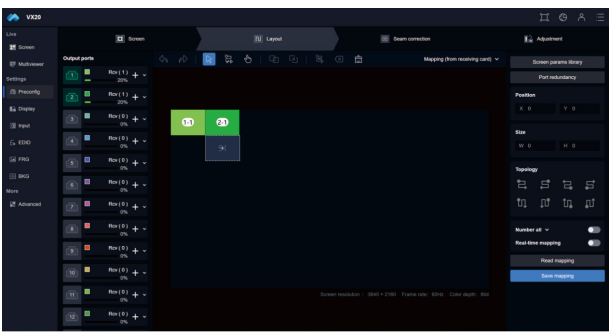
Step 2: Go to **Screen settings** to configure the screen resolution, frame rate, and color depth. Ensure that the receiving cards connected to the cabinets support the maximum refresh rate and color depth.



Step 3: Set the load capacity for the receiving cards. Click the expander arrow "﹀" to open the **Load capacity per card** window, and enter the load capacity that matches the cabinet size.

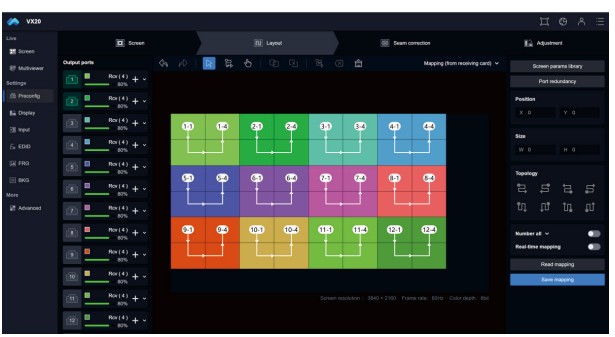


Step 4: Click "+" to add the required number of receiving cards based on the card count per network port. Then, configure their mapping to match the actual cabinet cabling.



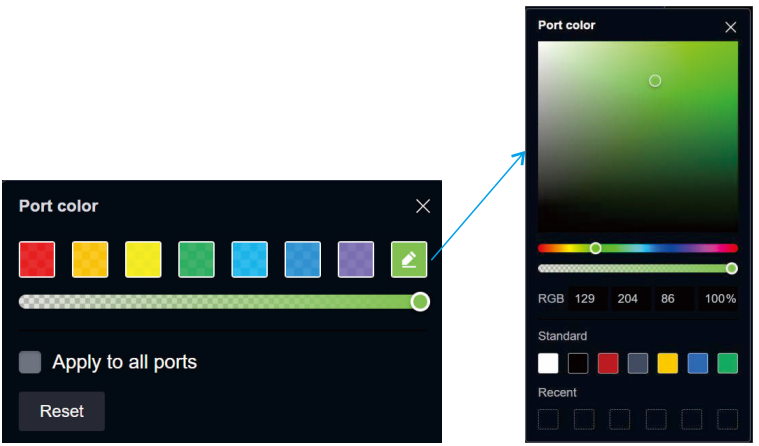
Step 5: (Optional) If multiple ports use the same mapping, select the existing mapping, press **CTRL + C** to copy it, and then press **Ctrl +V** to paste it to the corresponding area. This completes the mapping for all receiving cards.

Step 6: Click **Save mapping** to store the mapping.

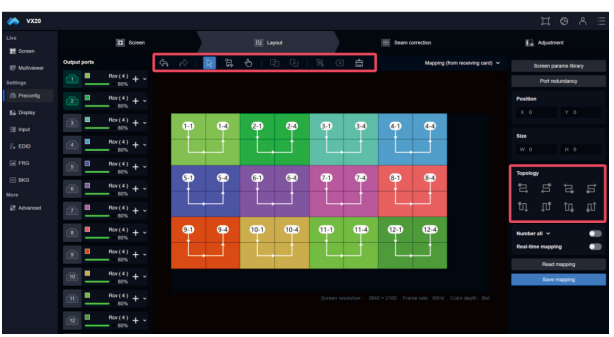


Auxiliary Function – Change Port Color

To change the port color, go to **Preconfig** > **Layout**. Click the color selector next to the port to customize its color.

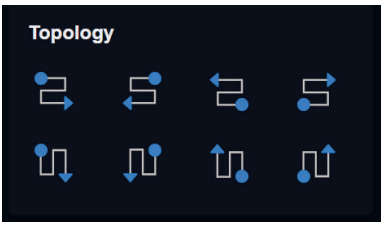


4.11.2 Auxiliary Functions



a. Automatic topology

To automatically configure the distribution of the receiving cards, select the topology that matches the actual cabinet cabling.

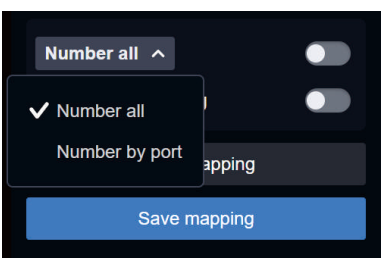


Common topology

b. Numbering

- Number all: When enabled, displays the positions and numbers of all receiving cards, including each card's location controlled by a network port, with corresponding numbers (e.g., "1", "2", "3").

- Number by port: When enabled, displays the position and number of a selected receiving card controlled by a specific network port, showing the port, card position, and corresponding numbers (e.g., "1", "2", "3").

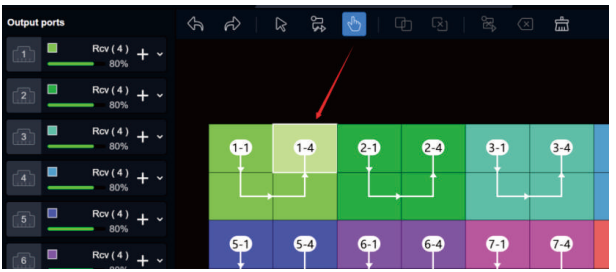


c. Real-time mapping

When enabled, real-time mapping updates the receiving card distribution in by lighting up the corresponding cabinets on the screen. This helps test the current mapping.

d. Highlight

When enabled, click on the screen area you want to highlight. This identifies the receiving cards controlled by the highlighted network port. The edges of the selected cabinet flash sequentially in blue, red, green, and white.



e. Custom topology

To manually configure the distribution of the receiving cards, drag your mouse in the direction of the actual cabinet cabling to complete the topology.

f. Group

Select multiple receiving cards connected to the same output network port, then click **Group** to combine them.

g. Ungroup

Select a receiving card group, then click **Ungroup** to split it.

h. Clear topology

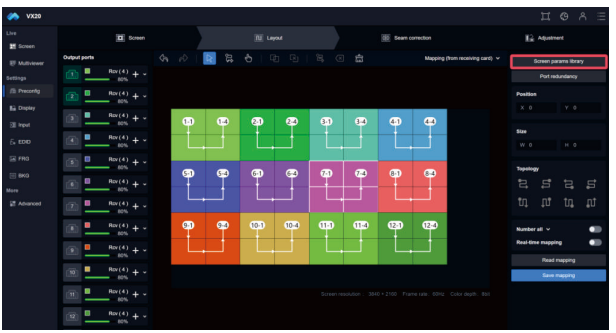
Select the receiving cards for which you want to remove the topology, then click **Clear topology.**

i. Delete receiving card

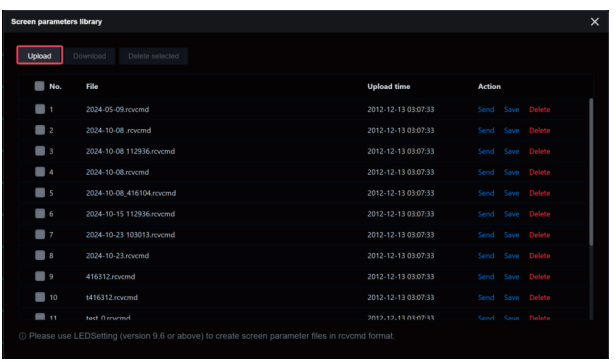
Select the receiving card you want to delete, then click **Delete** to remove it. This action deletes a single receiving card.

4.11.3 Screen Params Library

Screen Params Library is used to save screen parameter files.



Click **Upload** to select and upload locally saved screen parameter files to the library. You can save up to 200 parameter files.



Download: Download the selected screen parameter files to your local device.

Delete selected: Delete the selected screen parameter files from the library.

Send/Save: Send or save selected screen parameters to all network ports with configured topology.

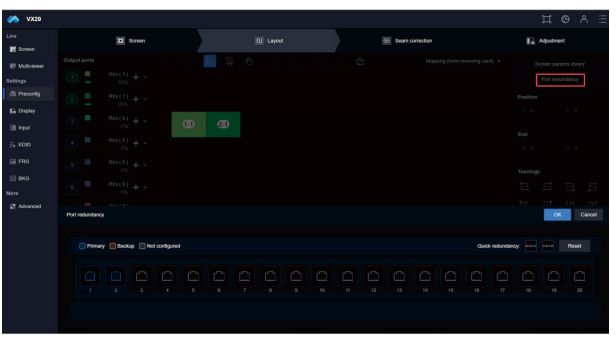
4.11.4 Ethernet Port Redundancy

The VX20 supports connecting 2 Ethernet ports to the same screen, so that when the main port fails, the backup one can seamlessly take the role for output, ensuring a stable image display.

Step 1: Connect the primary and backup ports of the 1G Ethernet board to the receiving cards to form a loop of primary-backup Ethernet ports.

Step 2: In the web application, access **Preconfig** > **Layout**, and then configure and save the receiving cards mapping controlled by the primary Ethernet port.

Step 3: Click **Port redundancy** in the upper left corner of the tab. You can select between 2 redundancy methods: **Quick redundancy** and **Manual** (redundancy).



- Quick redundancy: Supports evenly split redundancy and adjacent redundancy within board.

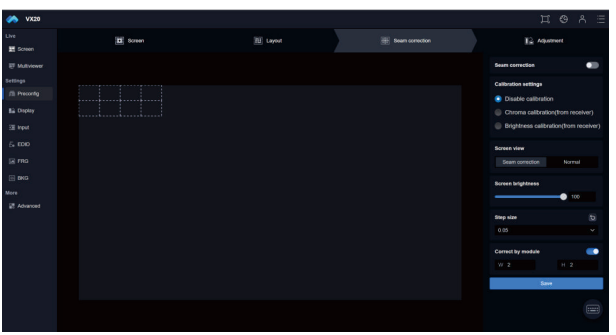
- Manual redundancy: Select a port as the primary port and then select its backup port.

When you finish the primary-backup settings, click ✕ in the upper right corner to return to the previous interface and save the current receiving cards mapping.

4.12 Seam Correction

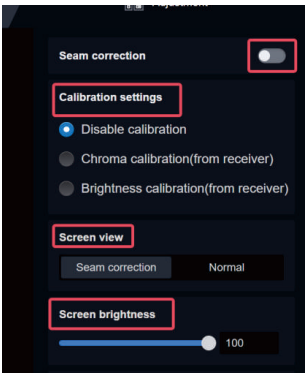
Seam correction enhances display uniformity by adjusting dark or bright lines on the screen. Before using this function, ensure that the receiving cards are connected, configured with topology, and support seam correction. If any receiving cards do not support this function, upgrade them to a compatible version.

Go to **Preconfig** > **Screen**, and click **Detect** to detect connected receiving cards. Then, go to the **Seam correction** tab, where detected receiving cards appear in the center, with the control panel on the right. Scroll to zoom in/out for a closer view, or adjust the zoom level proportionally in the navigator.



Step 1: Enable **Seam correction** in the upper right. In **Calibration settings**, select **Disable calibration**. In **Screen view**, select **Seam correction**.

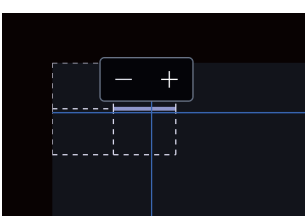
Step 2: Adjust the screen brightness to 20%, then check the seam status. If the seam brightness is too high, reduce it; if it is too low, increase it.



Step 3: Select a suitable step size for the correction. The smaller the step size, the more subtle the correction effect will be.

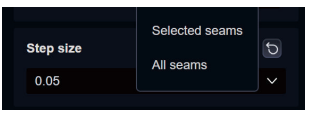
Step 4: Enable **Correct by module** and enter the W and H values, which must be divisors of the receiving card's W and H values. The detected receiving cards will be evenly distributed on the canvas.

Step 5: Select the target seam (the selected seam will blink on the screen), and then click "+" to increase the seam brightness, or click "-" to reduce the seam brightness.

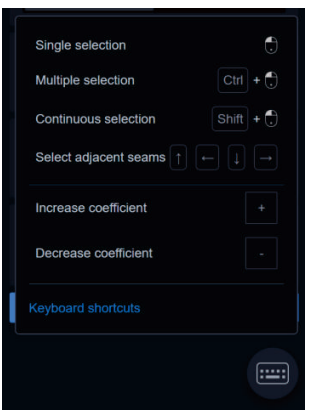


Step 6: After correction, click Save to complete seam correction.

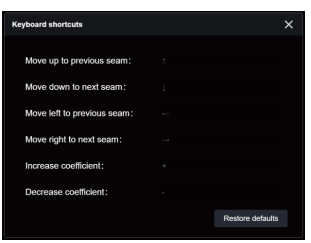
Reset coefficients: Click the icon for resetting seam brightness coefficients ( ). To reset the brightness for all seams, select **All seams**. To reset the brightness for specific seams, select the target seam(s), then click **Selected seams**.



Keyboard shortcuts: Click the keyboard icon in the lower right to view current keyboard shortcuts.

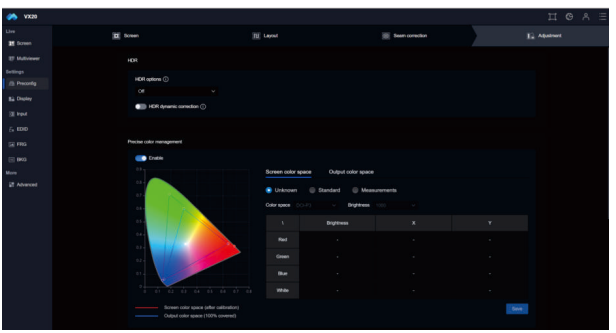


Go to **Keyboard shortcuts** to customize the shortcuts for seam correction.



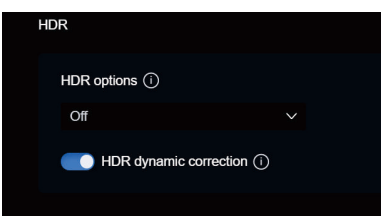
4.13 Adjustment

Go to **Preconfig** > **Adjustment** to access settings for **HDR**, **Precise color management**, **Additional delay frame**, **Bypass mode**, and the output mode of Fiber 3 and Fiber 4.



4.13.1 HDR

Click **HDR** to access HDR settings. By default, HDR is off, but you can choose from **Auto** or **Force to HDR**, with multiple output color space options available.



Click  to enable **HDR dynamic calibration**. Ensure the screen's color and brightness parameters are accurate both before and after calibration (check in the **Precise color management** tab).

Note

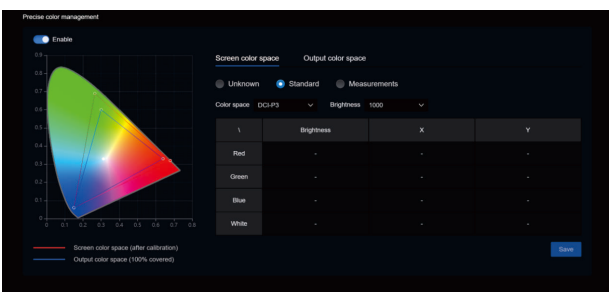
Enabling **HDR** will automatically activate **Precise color management** if it is not already enabled. Ensure that the receiving card's firmware version supports **Precise color management**.

4.13.2 Precise Color Management

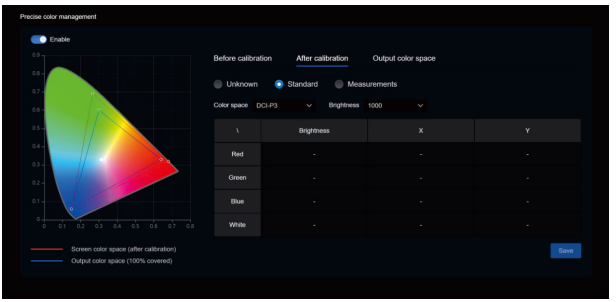
Go to **Preconfig** > **Adjustment**, and enable **Precise color management**. Wait 1 to 2 seconds for the screen's current output color gamut to fully load.

4.13.2.1 Color Space Conversion

Precise color management without HDR dynamic calibration: Converts the current color gamut to the target gamut. For example, if the screen's color space is set to Rec.2020 and the output color space is sRGB, the red triangle represents the screen's color space, while the blue triangle represents the output color space. As shown in the figure below, the screen displays 100% of the colors after conversion.



Precise color management with HDR dynamic calibration: The calibration adjusts the screen's color space similarly. For example, if the screen's color space after calibration is set to Rec.2020 and the output color space is sRGB, the red triangle represents the screen's color space, while the blue triangle represents the output color space. As shown in the figure below, the screen displays 100% of the colors after conversion.



4.13.2.2 Conversion of Measurements

Without HDR Dynamic Calibration:

Step 1: Confirm the screen's color space.

a. Enable Test pattern, set the grayscale values for red, green, and blue to 255. Drag the solid red, green, and blue blocks into the window, respectively.

b. Ensure the testing environment is dim and free from strong light interference. Use a color meter to measure the Lv, X, and Y values for the solid red, green, and blue colors. Measure each color 10 times at 2-second intervals, and record the data in the table. Calculate the average and overall standard deviation using the formula: f(x)=STDEV (range).

c. Enter the measured Lv, X, and Y values into the measurement fields. Compare these values to the standard gamut. If the color coverage is 100% or near 100%, you can confirm the screen's color space.

d. Alternatively, if the screen's input color space is already known, you can use that information.

Step 2: Select the desired output color space.

To convert to a specific color space, select an option from the dropdown menu: Rec.2020, DCI-P3, Rec.709, Rec.601, sRGB, NTSC, or PAL. You can also define a custom color space or leave the current color space unchanged.

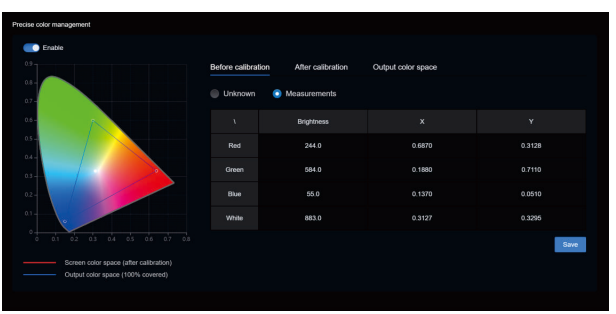
With HDR Dynamic Calibration:

Step 1: Confirm the screen's color space before calibration.

a. Enable Test pattern and set the grayscale values for red, green, and blue to 255. Drag the solid red, green, and blue blocks into the window, respectively.

b. Ensure the testing environment is dim and free from strong light interference. Use a color meter to measure the Lv, X, and Y values for the solid red, green, and blue colors. Measure each color 10 times at 2-second intervals, and record the data in the table. Calculate the average and overall standard deviation using the formula: f(x)=STDEV (range).

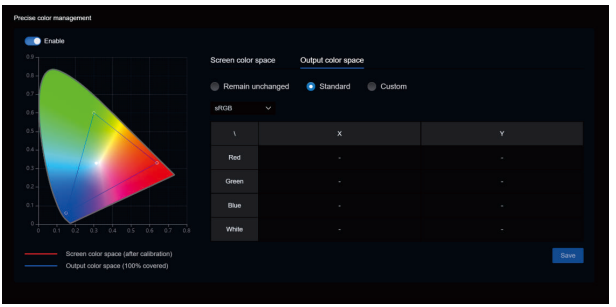
c. Enter the measured Lv, X, and Y values into the measurement fields, then click Save to store the pre-calibration measurements.



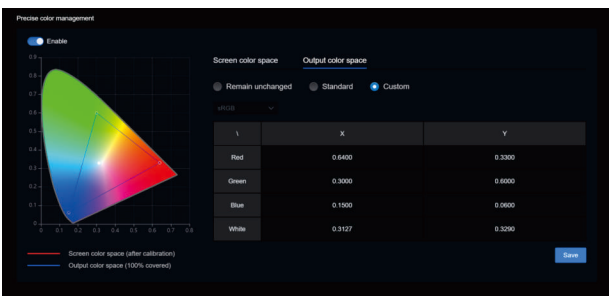
Step 2: Confirm the output color space after calibration.

To convert to a specific color space, select an option from the dropdown menu: Rec.2020, DCI-P3, Rec.709, Rec.601, sRGB, NTSC, or PAL. You can also define a custom color space.

Quickly select a standard color space as shown below.



Define a custom color space as shown below.

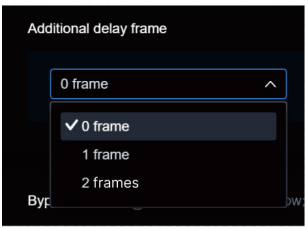


Step 3: Select the target output color space.

To convert to a specific color space, select an option from the dropdown menu: Rec.2020, DCI-P3, Rec.709, Rec.601, sRGB, NTSC, or PAL. You can also define a custom color space or leave the current color space unchanged.

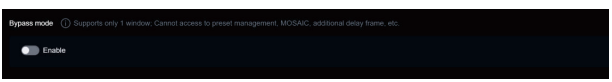
4.13.3 Additional Delay Frame

In an operating environment with multiple screens, you can set appropriate additional delay frames for synchronizing the displays.



4.13.4 Bypass Mode

When **Bypass mode** is enabled, the delay will decrease from 1 frame to 0 frame.



Limitations:

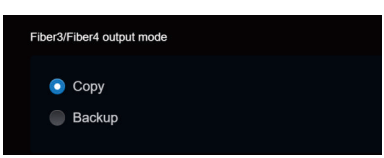
1) In **Bypass mode**, the device works as an independent processor, offers pixel-to-pixel output, and supports only one layer.

2) In this mode, the functions of preset and looping preset, MOSAIC signal, additional delay frame, and layer 1 and layer 2 are all unavailable.

3) The total pixels of the input displayed on the layer should not exceed 8,847,360 pixels.

4.13.5 Fiber3/Fiber4 Mode

You can switch the output mode of the fiber ports Fiber3 and Fiber4 between **Copy** and **Backup**.



Copy: Copies data for output, ideal for long-distance transmission.

Backup: Backs up data for output, ideal for ensuring display stability.

4.14 Display Settings

In the Display tab, you can use test patterns for testing display, and perform color and brightness adjustment.

4.14.1 Test Pattern

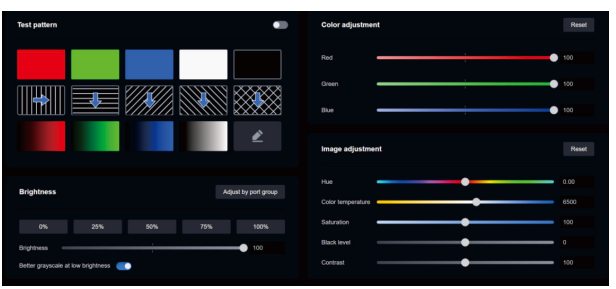
Switch on the toggle to start displaying the selected test pattern on the screen for display test.

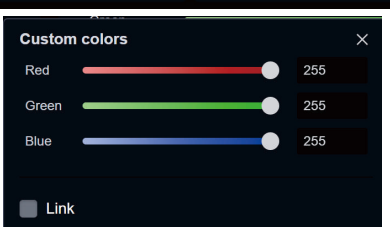
- 14 provided patterns;
- Supports custom pattern:

  If the output color depth of the screen group is 8 bit, the grayscale range is 0 to 255;

  If the output color depth of the screen group is 10 bit, the grayscale range is 0 to 1023.

  Custom pattern supports a linked adjustment of RGB values.

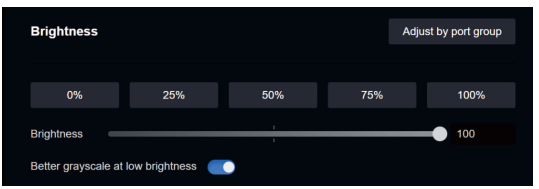




4.14.2 Brightness Adjustment

Under **Brightness**, you can adjust brightness by dragging the slider. The range of brightness is between 0% to 100%.

The device supports precise adjustment. You can hover over the input box for spin buttons, or directly enter desired value into the box.



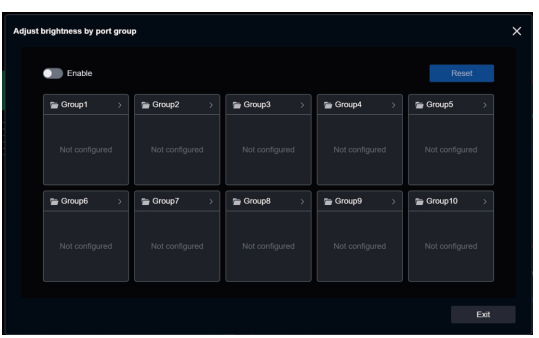
4.14.3 Better Grayscale at Low Brightness

Better grayscale at low brightness is enabled by default. With this function enabled, the display effect in low brightness environment can be improved. You can switch off the toggle to disable the function.

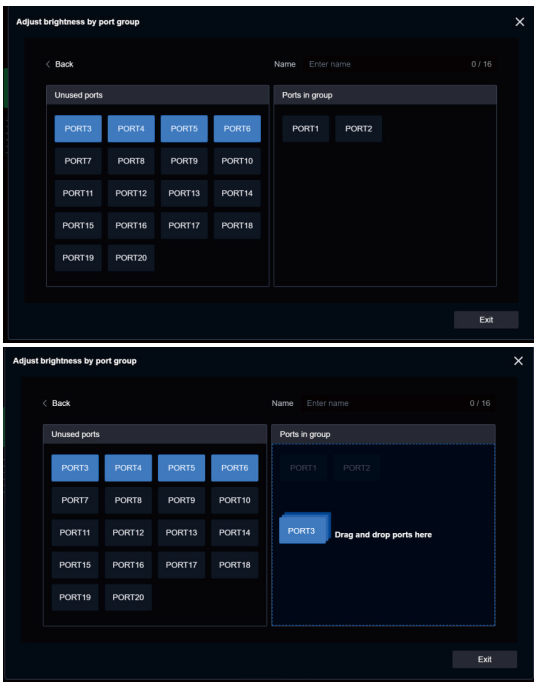
4.14.4 Adjust Brightness by Port Group

You can group the ports and adjust the brightness in batch after the grouping.

Step 1: Switch on the toggle to enable **Adjust brightness by port group**. The device supports 10 groups, respectively named as Group1 to Group10 by default. Click the arrow icon of each group to access the window where you can select ports for the selected group.



Step 2: Select and drag target ports from the left side to the right side for grouping.



- Supports renaming group.
- Supports dragging multiple ports at a time.
- Supports dragging ports back from the right side to the left side.

Step 3: Click **Exit** to return to the groups interface. You can drag the slider or click the "+" or "-" buttons in each group icon to adjust the brightness of all ports in the group. The brightness range is 0% to 100%.

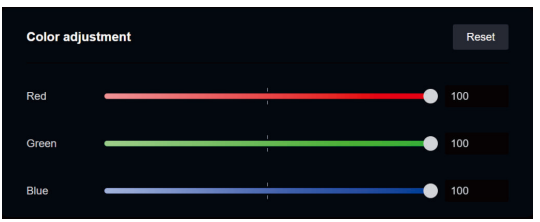
Clicking **Reset** at the upper right corner can reset all groupings..

4.14.5 Color Adjustment

In **Color adjustment**, you can adjust the display of colors red, green, and blue.

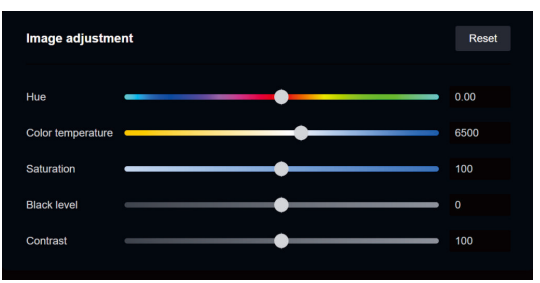
- Supports dragging sliders (0 to 255) for adjustment.

- Supports precise adjustment: hover over the editing box and adjust the value using the spin buttons, with a step size of 1; or directly enter the desired value.



4.14.6 Image Adjustment

You can adjust the color temperature, hue, contrast, black level, and saturation of the image.



- **Color temperature**: Ranges between 2000 to 10000; supports precise adjustment (step: 1); 6500 by default.

- **Hue**: Ranges between -30.00 to 30.00; supports precise adjustment (step: 0.24); 0.00 by default.

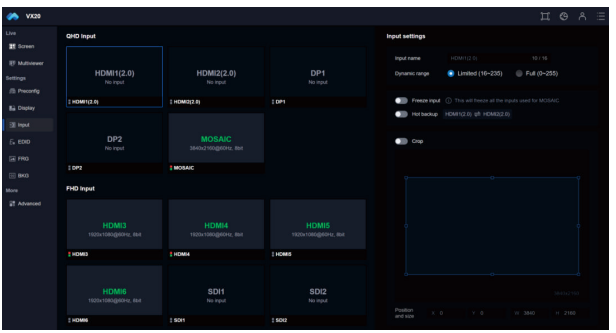
- **Contrast**: Ranges between 0 to 200; Supports precise adjustment (step: 1); 0 by default.

- **Saturation**: Ranges between 0 to 200; Supports precise adjustment (step: 1); 100 by default.

- **Black level**: Ranges between 0 to 200%; Supports precise adjustment (step: 1); 100% by default.

4.15 Input Settings

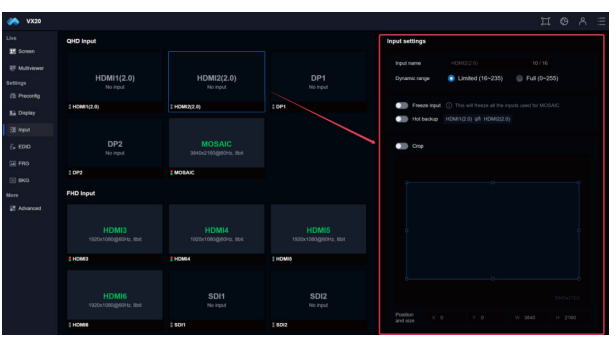
You can modify the input signal. The basic information of the signal is shown on the main part of the interface, and customizable items are shown on the right-side pane.



4.15.1 Regular Input Settings

4.15.1.1 View Input Information

Clicking on an input signal can bring up a corresponding setting panel on the right side of the interface.



4.15.1.2 Rename Input

In the **Input settings** pane, you can enter the desired name in the field **Input name** for the selected input.

- Length: 1 to 16 real characters.
- Character type: No limitation.

4.15.1.3 Dynamic Range

For the dynamic display range of an input signal, you can switch between **Limited (16-235)** and **Full (0-255)**.

4.15.1.4 Hot Backup

When **Hot backup** is enabled, you can configure backup relations between two input signals, so that if one signal added to the canvas fails, its backup signal will automatically serve as the output image.

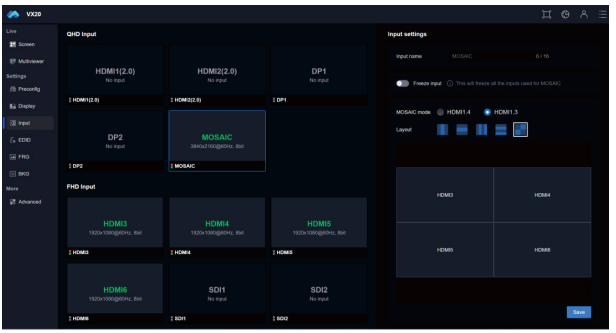
4.15.1.5 Crop

You should select an input signal before enabling **Crop**.

- Supports custom crop. The cropping frame can be freely moved.
- Supports precise crop. You can modify the position of the cropping frame (the **X** and **Y** coordinates) and resize the frame (**W** and **H** for width and height).

After applying the crop, a cropping icon will appear on the cropped signal.

4.15.2 MOSAIC Signal Settings



4.15.2.1 Rename MOSAIC Signal

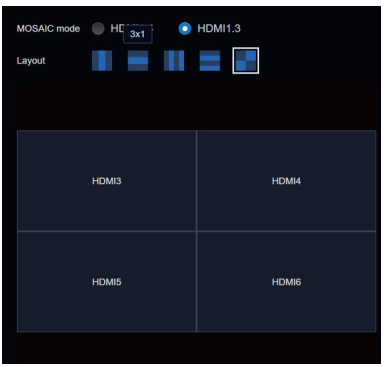
In the **Input settings** pane, you can enter the desired name in the field **Input name** for the MOSAIC signal.

- Length: 1 to 16 real characters.
- Character type: No limitation.

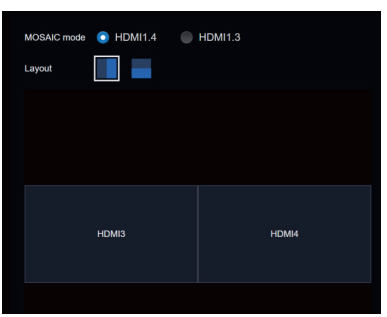
4.15.2.2 MOSAIC Mode

Available modes for MOSAIC splicing include **HDMI1.4** and **HDMI1.3**, each supporting different signal layouts.

- **HDMI1.3**: Supports 1×3, 1×4, 3×1, 4×1, and 2×2 signal layouts. HDMI 3/4/5/6 are arranged in sequence from left to right, top to bottom, for the splicing.



- HDMI1.4: Supports 1×2 and 2×1 signal layouts. HDMI3/4 are arranged in sequence from left to right or top to bottom for the splicing.

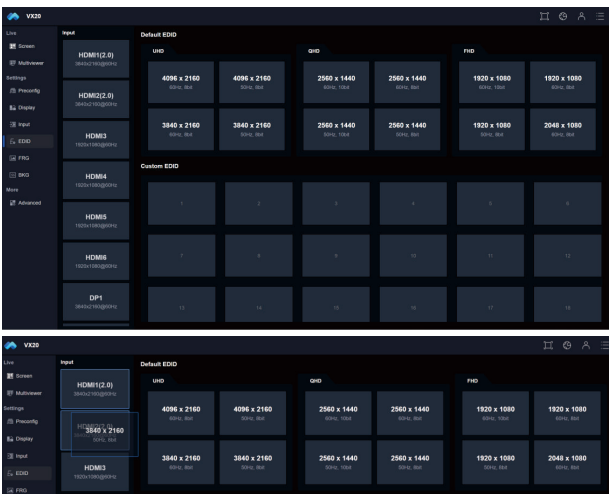


4.16 EDID

In the tab **EDID**, you can modify the resolution, color depth, and timing standard of the input signals. In terms of resolution, you can either select a provided option, or set a custom one as needed.

4.16.1 Default EDID

For the resolution of an EDID, you can select one from the provided options. After completing setting an EDID, you can drag and drop it to the desired input on the left side for application. Once the graphics card of the host PC reads the new EDID, the input signal also changes its resolution correspondingly.



4.16.2 Custom EDID

You can add a custom EDID, or modify the parameters of an existing EDID as needed.

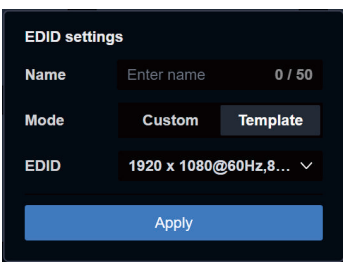
To create a custom EDID, take the following steps:

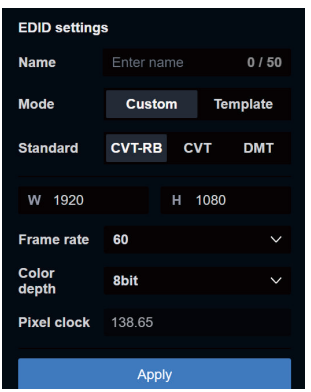
Step 1: Click **Add** to bring up the window for creating an EDID file.

- **W**: The width (resolution) of the input signal.
- **H**: The height (resolution) of the input signal.
- **Frame rate**: The frame rate of the input signal (60Hz by default).
- **Color depth**: Available options include 8bit and 10bit.

- **Standard**: The timing standard within the EDID file. Available options include: DMT, CVT, CVT-RB, and Custom.

- **Pixel clock**: This value is determined automatically according to the previous setting items.



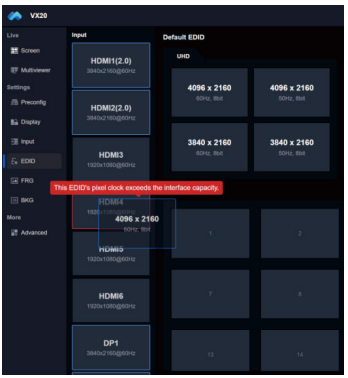


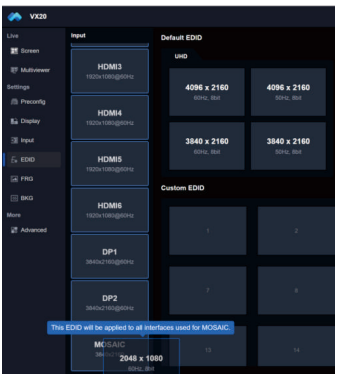
Step 2: Click **Apply** to save the EDID. Next, drag and drop the new EDID to the desired input on the left side for application.

Once the graphics card of the host PC reads the new EDID file, the input signal also changes its resolution correspondingly.

Note

1. **Pixel clock** is only available in **Custom** mode (custom EDID). The maximum value of the pixel clock depends on the interface type:
   - 2K interface (HDMI1.3): up to 165MHz;
   - 4K@30Hz interface (HDMI1.4): up to 340MHz;
   - 4K@60Hz interface (DP1.2 / HDMI2.0): up to 600Mhz.
2. Changing the EDID of the MOSAIC signal will change that of its constituent signals simultaneously.





4.17 FRG

4.17.1 Logo

Step 1: Access the **FRG** tab. In the logo settings panel, click **Add** or **Manage** to add images.

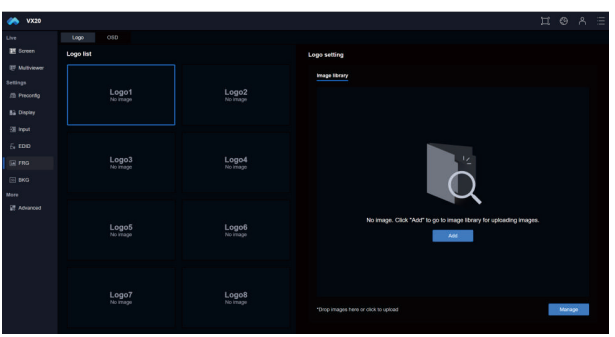
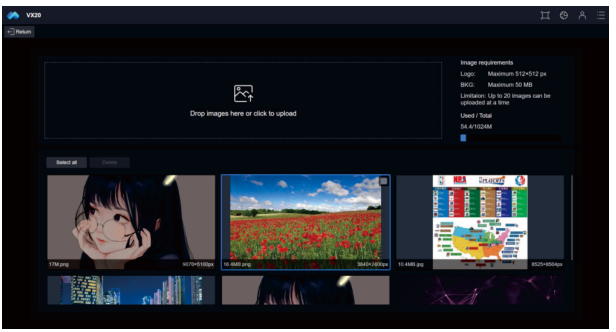


Image library:



Step 2: In **Image library**, click **Drop images here or click to upload** and upload images as needed.

- Supports selecting multiple images with <Ctrl> being pressed and held.

- Supports drag-and-drop action for uploading multiple images from the host PC to the library.

Step 3: Return to the **FRG** tab and the uploaded images will be displayed on the lower right area. Select a desired logo on the left side of the tab and then select the desired image on the right side. You can also drag and drop the image to the desired logo.

- The maximum resolution of a logo is 512×512.

- The maximum number of logo is 10.

Step 4: Drag and drop the logo to the logo area in the PVW view.

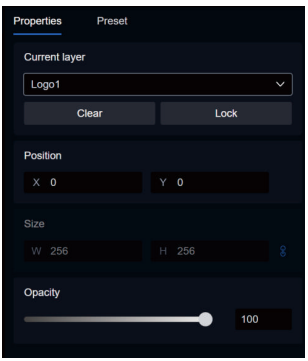
The logo will then be displayed. The display effect of the logo on an LED or LCD screen is the same as that in the window area of the web app.

- Supports dragging the logo in the window or modifying the logo's coordinates for precise placement.

- In the **Properties** pane of the logo, you can click **Lock** to disable all modification to the logo.

- In the **Properties** pane of the logo, you can click **Clear** to hide the logo display.

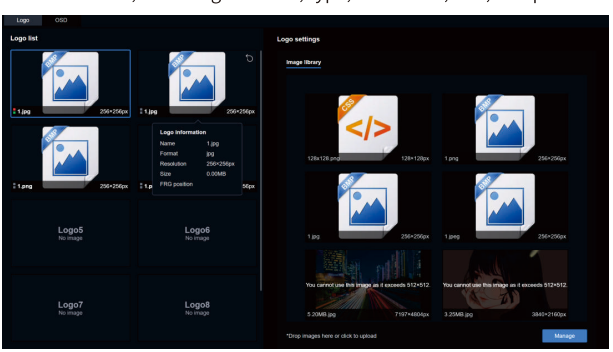
- In the **Properties** pane, you can modify the opacity of the logo.



4.17.1.1 Supported Features for Logo

a. In **FRG** tab

(1) View logo image's information: You can hover over an image in the logo list to view its detailed information, including its name, type, resolution, size, and position.



(2) Reset logo: You can see the icon for resetting logo ( ) by hovering over the logo image. Clicking the icon can reset the logo in the corresponding position.

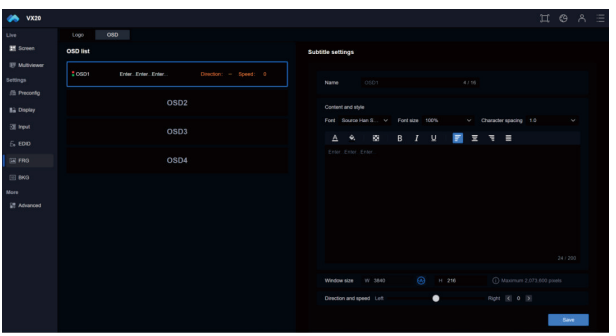
b. In **Image library**

Supports uploading, selecting all existing images at a time, and deleting images.

Note

The **Image library** works for both the **BKG** and **FRG** tabs.

4.17.2 OSD

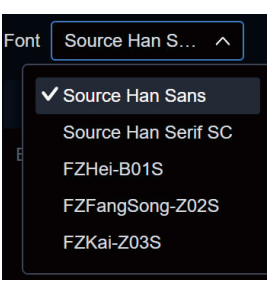


Step 1: In the **FRG** tab, click **OSD** to access corresponding tab. Select a subtitle in the OSD list and then edit the subtitle. You can add up to 4 subtitles.

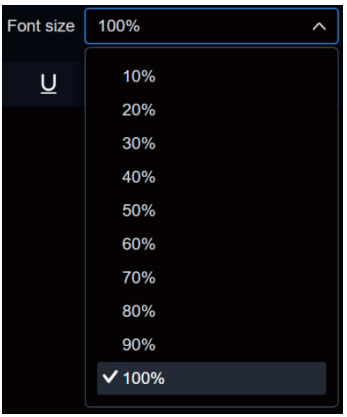
(1) Edit subtitle name: You can edit or modify the subtitle name (default: OSD1).

(2) Edit subtitle content:

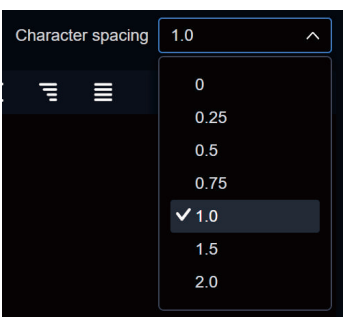
- **Font**: Select the desired font.



- **Font size**: Select a font size for the subtitle. The default size is 100%, with a decrement of 10% down to a minimum of 10%.



- **Character spacing**: 0 by default, with an increment of 0.25 to a maximum of 2.



- **Text color**: Click the icon to select the desired text color. You can edit the RGB value for a custom color, or select a standard color or a recently used color.

- **Background color**: Click the icon to select the desired background color. You can edit the RGB value for a custom color, or select a standard color or a recently used color.

- **Opacity**: Click the icon to adjust the opacity of the subtitle. You can drag the slider below or enter a custom value. The subtitle is set with 100% opacity by

- Supported font styles include: Bold, Italic, and Underline.
- Supported text formats include: Align left, Center, Align right, and Distributed.

- Each subtitle supports up to 200 characters.
- **Direction and speed**: Drag the slider toward **Left** or **Right** for a corresponding scrolling direction. Clicking the left / right arrow can decrease / increase the scrolling speed (0 to 20) of the subtitle.

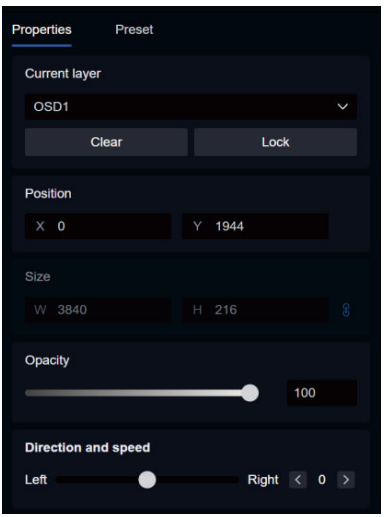
- **Size**: Edit the **W** and **H** input boxes for the width and height of the subtitle.

Step 2: After entering the subtitle content and complete setting the text style (text color, size, etc.), click **Save** to finish adding the subtitle.

Step 3: Drag and drop the OSD to the OSD area in the PVW view.

The OSD will then be displayed. You can modify its parameters and apply the modification in real time in the **Properties** pane.

- Supports dragging the OSD in the display area or modifying its coordinates for precise placement.
- Supports defining the scrolling direction and speed of the OSD.
- In the **Properties** pane, you can click **Lock** to disable all modification to the subtitle.
- In the **Properties** pane, you can click **Clear** to hide the current subtitle.



4.18 BKG

4.18.1 Image Background

Step 1: Access **BKG** tab. In **BKG settings**, click **Add** or **Manage** to add images.

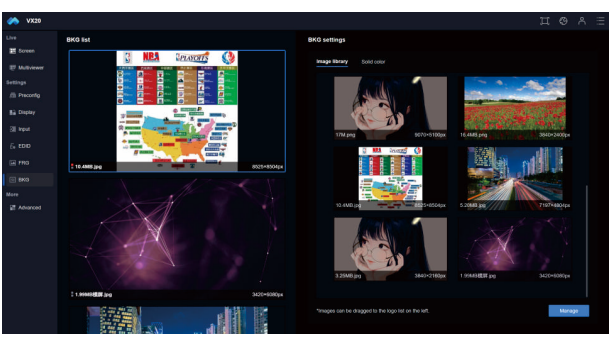
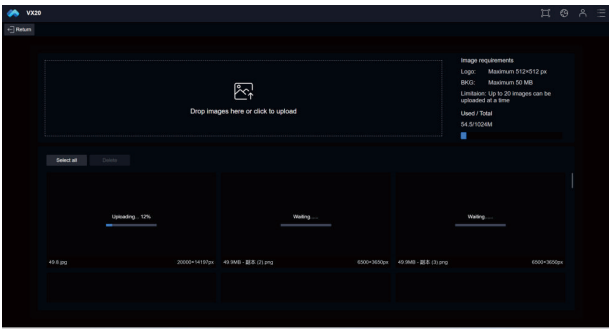


Image library:



Step 2: In **Image library,** click **Drop images here or click to upload** and upload images as needed.

- Supports selecting multiple images with <Ctrl> being pressed and held.

- Supports drag-and-drop action for uploading multiple images from the host PC to the library.

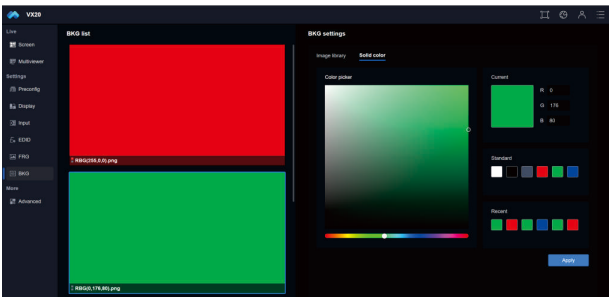
Step 3: Return to the **BKG** tab and the uploaded images will be displayed on the lower right area. Select a desired BKG on the left side of the tab and then select the desired image on the right side. You can also drag and drop the image to the desired BKG.

- The maximum number of BKG is 4.

Step 4: Drag and drop the BKG to the BKG area in the PVW view.

4.18.2 Solid-Color Background

Step 1: Access **BKG** tab. In **BKG settings**, click **Add** or **Manage** to add images.



- Supports custom color. You can use the color picker and the color strip below the color picker to select a desired color as the background.
- Supports modifying the RGB value for a desired color.
- Supports selecting a standard color or a recently used color.

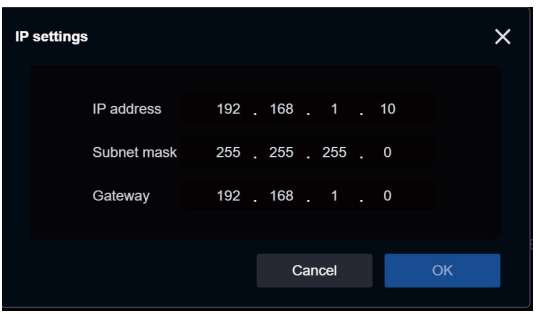
4.19 Advanced Settings

VX20 supports IP settings, data backup, processor redundancy, port output on/off status control, and factory reset. You can find these features in **More** > **Advanced**.

4.19.1 IP Settings

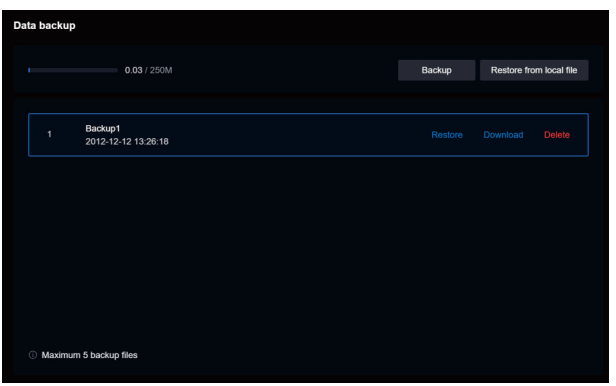
In the **Advanced** tab, you can click **IP settings** to view the IP address, subnet mask, and gateway of the current device.

If you want to change the device's IP, click **Edit** to bring up an editing window. Modify the IP and then click **OK**. The web app will automatically log out the current account and return to the login page. Please ensure that the new IP address is within the same LAN as the host PC but not identical.



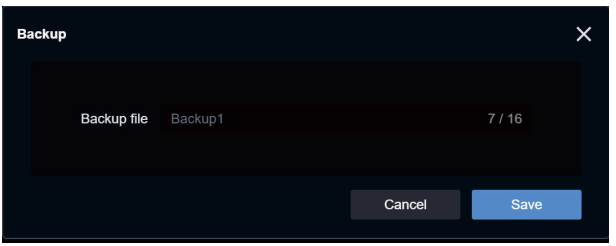
4.19.2 Data Backup

In the **Advanced** tab, you can click **Data backup** to view the existing backup files.



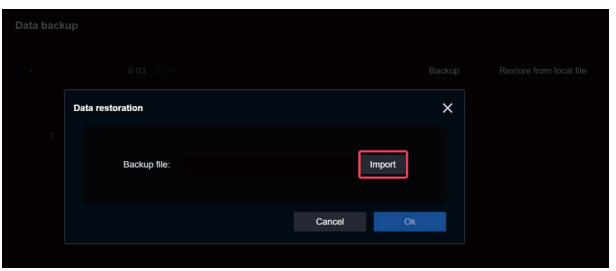
If you want to create a new backup with the current settings, click **Backup** and name the file in the pop-up window. Then, click **Save** to save the current settings (including layers, logo, BKG, etc.) as a backup file. VX20 supports saving 5 backup files at a time.

If you want to change the device's IP, click **Edit** to bring up an editing window. Modify the IP and then click **OK**. The web app will automatically log out the current account and return to the login page. Please ensure that the new IP address is within the same LAN as the host PC but not identical.



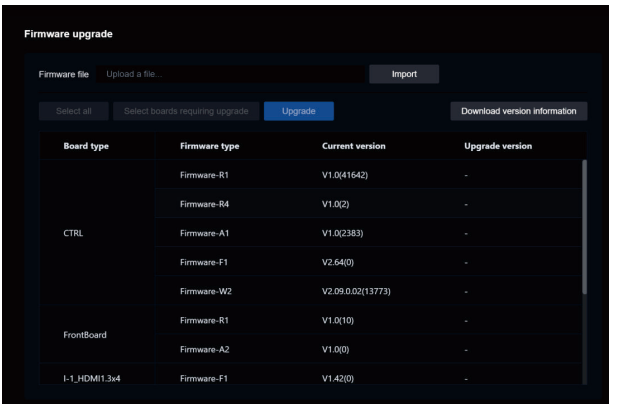
If you want to restore device settings with an existing backup file, find the desired backup in the list and then click **Restore** on the same row. You can also delete or download a backup file by clicking the corresponding buttons on the same row.

If you want to restore device settings with a local backup file, click **Restore from local file** and then import the file to the system.

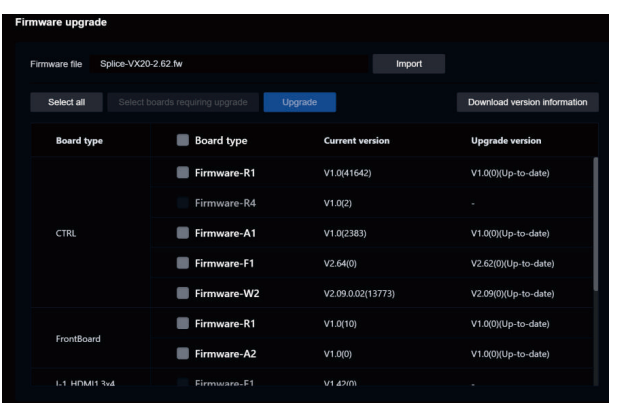


4.19.3 Firmware Upgrade

In the **Advanced** tab, you can click **Firmware upgrade** to view and downlow the current version information of the device, and upgrade the firmware if needed.



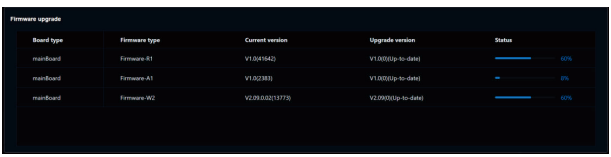
If you want to upgrade the device's firmware, please contact Colorlight's technical support for the upgrade packages (.fw file). After getting the upgrade files, you can click **Import** to upload the files. You can then view the available upgrade version on the backup list below. Clicking **Select boards requiring upgrade** will select all firmware that can be upgraded. You can also select some desired boards for upgrade.



After selecting desired boards, click **Upgrade** to start the upgrade.

Note

If the power breaks or other failure occurs during the upgrade, the process will fail and you will have to upgrade again. Please contact Colorlight's technical support for help if needed.



Please power cycle the device after the upgrade process completed and check the firmware version of the boards to make sure that the upgrade is successful.

4.19.4 Processor Redundancy

In the **Advanced** tab, you can click **Processor redundancy** to enable/disable the function. The current device will serve as the backup device when this function is enabled.

To configure processor redundancy, you should prepare two VX20 devices with identical configurations, with one working as the primary device, and the other as the backup. The two devices should connect to the same display at a time, so that when failure occurs to any one of the devices, the other one can seamlessly take the role for output, ensuring a stable image display.

You can take the following steps for the configuration:

Step 1: Prepare two VX20 devices with the same firmware version and different IP addresses, and connect them to the same network. Connect a PC to the same network too.

Step 2: Respectively connect the two devices' output ports (1G-RJ45 / 10G-FIBER) of the same type to the receiving cards.

Step 3: Select one VX20 as the primary device, and save the correct receiving cards mapping to the receiving cards and then light up the LED display. Next, switch on the toggle (**Processor redundancy**) of the other device. The primary device will automatically send the receiving cards mapping in reverse order to the backup device.

4.19.5 Disable Port Output

In the **Advanced** tab, you can click **Disable port output** to enable or disable output via the Ethernet ports. When this function is enabled, the screen will displays black.

4.19.6 Factory Reset

In the **Advanced** tab, you can click **Factory reset** if you want to restore the device to its factory settings. You can keep the account data or IP settings. After you made a selection, click **Reset** to start restoring the device to its factory settings with the selected items kept. If both items are not selected, the IP address will be reset to the default address: 192.168.1.10.

05 TROUBLESHOOTING GUIDE

Problem	Possible Cause	Solution
No image display on the LED screen.	Poor power contact.	Check the power connector and ensure a good contact.
	Device powered off.	Make sure the POWER button is on.
Poor image quality such as "double image".	The HDMI cable is unqualified.	Replace with a higher-quality cable.
	The HDMI cable is too long.	Lower the signal resolution or use a shorter HDMI cable.
No image output after signal switching	The new output channel has no signal.	Check the input signal connection.
	Poor cable contact.	Check the input and output cables and ensure good contact.
No response from the device.	Internal damage of the device.	Contact Colorlight technical support.

06 STATEMENTS

Due to possible changes in product batches and production processes, the text and pictures in the document may be adjusted and revised to match accurate product information, specifications, and features. Colorlight may make improvements and changes to this document without prior notice. Please refer to the actual product.

Thank you for choosing Colorlight Cloud Tech Ltd. product. If you have any questions or suggestions during use, please contact us through official channels. We will do our utmost to provide support and listen to your valuable suggestions. For more information and updates, please visit www.colorlightinside.com or scan the QR code.

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