

MX20

LED Display Controller



User Manual

Change History

Document Version	Release Date	Description
V1.4.1	2024-08-13	Updated the descriptions for internal source operations.
V1.4.0	2024-04-26	The "Layer Setting" in the LCD interface of the device has been renamed to "Layer Parameters". Now, it only shows the parameters without allowing any modifications.
V1.0.0	2023-06-09	First release

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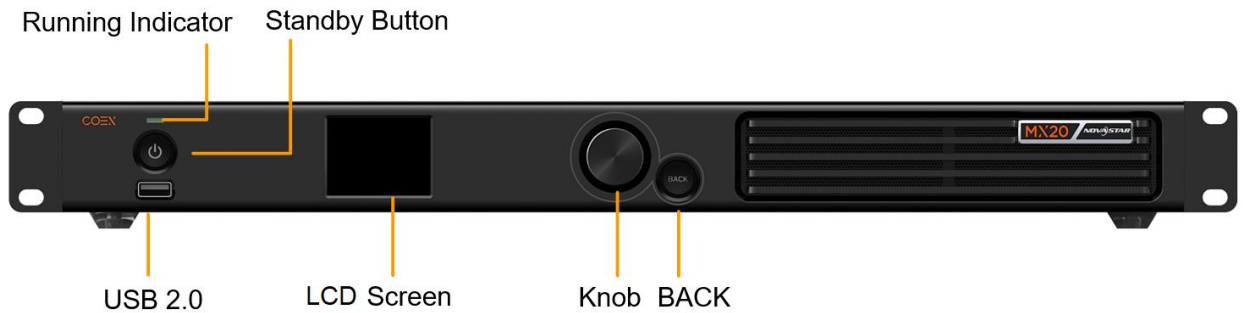
1 Overview

The MX20 is an all-in-one LED display controller in the brand-new control system COEX series of Xi'an NovaStar Tech Co., Ltd. (hereinafter referred to as NovaStar). This controller integrates video processing and video control into one box and offers 2x HDMI 1.3, 1x 3G-SDI input connectors, 6x Ethernet output ports, and 2x 10G optical ports. It can also work with the brand-new software VMP (Vision Management Platform) to provide a better operation and control experience.

This document mainly describes the menu operations on the LCD screen of the controller. For more function operations, see the *VMP Vision Management Platform User Manual*.

2 Appearance

2.1 Front Panel




Name	Description
Running Indicator	<ul style="list-style-type: none"> • Solid red: Standby • Solid blue: The device is being started. • Solid green: The device is running normally. • Flashing red: The device is running abnormally.
Standby Button	<ul style="list-style-type: none"> • Press the button to power on or power off the device. • Hold down the button for 5s or longer to restart the device.
USB 2.0	<ul style="list-style-type: none"> • Connect to a USB drive only to export the device diagnostic result. • Only the NTFS and FAT32 file systems are supported. Others are not supported.
LCD screen	A 2-inch screen that displays the device status, menus, submenus and messages for parameter settings
Knob	<ul style="list-style-type: none"> • On the home screen, press the knob to enter the main menu screen. • On the main menu screen, rotate the knob to select a menu item or adjust the parameter value. Press the knob to confirm the operation. • Hold down the knob and BACK button simultaneously for 5s or longer to lock or unlock the buttons.
BACK	Go back to the previous menu or cancel the current operation.

2.2 Rear Panel



Inputs			
Type	Qty	Description	
HDMI 1.3 IN	2	Resolution	Max resolution: 1920x1200@60Hz Min resolution: 800x600@60Hz

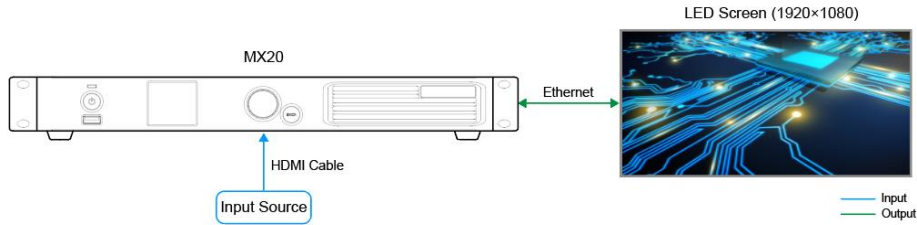
		Max width/height	Max width: 3840 pixels (3840×600@60Hz) Max height: 2560 pixels (800×2560@60Hz)
		Frame Rates	23.98 / 24 / 25 / 29.97 / 30 / 47.95 / 48 / 50 / 59.94 / 60 / 72 / 75 / 85 / 100 / 119.88 / 120 / 143.86 / 144 Hz
		EDID management	Support standard resolutions, up to 1920×1080@60Hz. Support custom input resolutions.
		HDCP	HDCP 1.4 compliant, backwards compatible with HDCP 1.3.
		Interlaced signal inputs	Not supported
3G-SDI IN	1	Standard	Support ST-424 (3G), ST-292 (HD) and ST-259 (SD) standard video inputs. Support 3G-Level A/Level B (DS mode).
		Resolution	Max resolution: 1920×1080@60Hz
		Frame Rates	23.98/24/25/29.97/30/47.95/48/50/59.94/60 Hz
		Interlaced signal inputs	Support MQ level deinterlacing. The interlaced signals will be automatically detected and converted to progressive signals.
Outputs			
Type	Qty	Description	
1–6	6	<p>Gigabit Ethernet output ports. Support hot backup between Ethernet ports.</p> <ul style="list-style-type: none"> • Max device load capacity: 3.9 million pixels • The maximum load capacity per Ethernet port is as follows. For details, see the 11 Ethernet Port Load Capacity. <ul style="list-style-type: none"> – 8bit@60Hz: 659,722 pixels – 10bit@60Hz: 329,861 pixels. When the controller works with the A10s Pro receiving card, the capacity can be up to 494,791 pixels. <p> Note</p> <p>The maximum load capacity is only achieved when the load width of a single port is 128 pixels or more. If the load width is less than that, the load capacity will be reduced accordingly, calculated as (128 - load width) × load height.</p>	
OPT 1–2	2	<p>10G optical output ports</p> <ul style="list-style-type: none"> • OPT 1 transmits the data of Ethernet ports 1 to 6. • OPT 2 is the copy channel of OPT 1. 	
HDMI 1.3 LOOP	2	HDMI loop through. Up to 8 devices can be cabled in one loop.	
3G-SDI LOOP	1	SDI loop through. Up to 8 devices can be cabled in one loop.	
SPDIF OUT	1	A digital audio output (Reserved)	
Controls			
Type	Qty	Description	
ETHERNET	2	<p>Gigabit Ethernet control ports. Support TCP/IP protocol and star topology.</p> <p>They have the same functions without priority and order, and can be connected to VMP software. No switch or router is needed to deploy multiple devices on the same LAN via device cascading as the network switching function is already built in. Up to 20 MX20 devices can be cascaded.</p>	

GENLOCK	1	<p>A pair of Genlock signal connectors. Support Bi-Level, Tri-Level, and Blackburst.</p> <ul style="list-style-type: none"> • IN: Accept the sync signal. • LOOP: Loop the sync signal. <p>The Genlock input signal supports a frame rate range from 23.98 Hz to 60 Hz. For standard Genlock signal generators, up to 20 MX20 devices can be cascaded.</p>
AUX	1	An auxiliary connector that connects to the central control device (RS232) (Reserved)
Power		
100-240V~, 50/60Hz, 2- 0.8A	1	An AC power input connector and switch

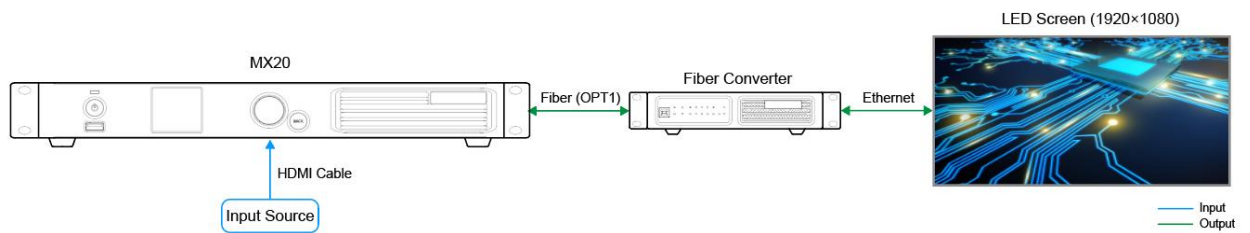
3 Applications

The MX20 has two typical application scenarios as shown below. In those application examples, the LED screen size is 1920×1080.

Application 1: Synchronous Mosaic



Application 2: Long-Distance Transmission via OPT Ports

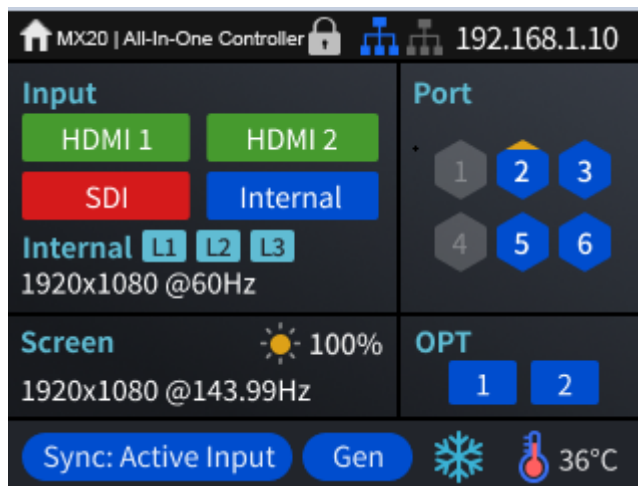


4 UI Introduction

4.1 Home Screen

After the device is powered on, the home screen showing device related information is displayed as follows.






Figure 4-1 Home screen



The home screen shown in [Figure 4-1](#) is described in [Table 4-1](#).

Table 4-1 Home screen descriptions

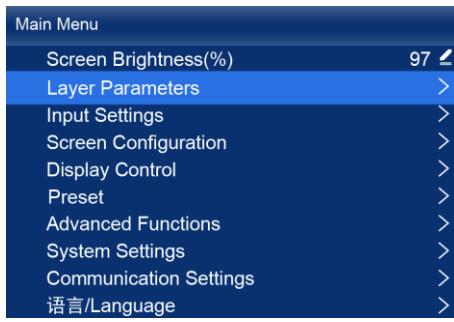
Area	Content	Description
Top line	MX20	The device name. The name can be changed in VMP software.
	All-in-One Controller	The device working mode. <ul style="list-style-type: none"> All-in-One Controller: The video processing and sending functions are available. Send-Only Controller: Only the video sending function is available. For related operations, please refer to 7.1 Switch Working Mode
		The device button lock status. <ul style="list-style-type: none"> When the icon is displayed, the buttons are locked. When the icon is not displayed, the buttons are unlocked. Hold down the knob and BACK button simultaneously for 5s or longer to lock or unlock the buttons.
		The connection status of the controlling Ethernet ports. <ul style="list-style-type: none"> Blue: Connected Gray: Disconnected
	192.168.1.10	The device IP address For related operations, please refer to 7.3 Configure Communication Settings .
Input	HDMI1, HDMI2, SDI, Internal	The device input source type and status. <ul style="list-style-type: none"> Green: The signal is accessed normally and used. Blue: The signal is accessed normally, but not used.

Area	Content	Description
		<ul style="list-style-type: none"> • Red: The signal is abnormal. • Gray: The signal is abnormal and not used. <p>For related operations in the Send-Only Controller working mode, please refer to 5.1.1 Set Input Source.</p>
	Internal 1920×1080@60Hz	<p>The resolution and frame rate of the currently available input source.</p> <p>If multiple input sources are available, the resolution and frame rate of each input source will be displayed one by one. If the input is used by a layer, the layer number will be displayed below.</p> <p>For related operations, please refer to 6.2.2 Set Resolution and Frame Rate (HDMI1 and HDMI2 only).</p>
Screen	1920×1080@143.99Hz	The screen resolution and frame rate.
		<p>The screen brightness</p> <p>For related operations, please refer to 6.5.1 Adjust Screen Brightness.</p>
Port	1–6	<p>The statuses of the Ethernet ports.</p> <ul style="list-style-type: none"> • Blue: Connected • Gray: Disconnected
OPT	1–2	<p>The statuses of the OPT ports.</p> <ul style="list-style-type: none"> • Blue: Connected • Gray: Disconnected
Bottom line	Sync: Active Input	<p>The sync signal currently used and the signal status</p> <ul style="list-style-type: none"> • Sync: Active Input: Sync with the frame rate of the current input source • Sync: Genlock: Sync with the frame rate of the Genlock signal • Sync: Internal: Sync with the frame rate of the internal clock of the device <p>Color code:</p> <ul style="list-style-type: none"> • Blue: The signal is normal. • Red: The signal is abnormal. <p>For related operations, please refer to 6.5.5 Set Sync Source.</p>
		<p>The output display status.</p> <ul style="list-style-type: none"> • : The display is frozen. • : The display is blacked out. • When no icon is displayed, the display is normal. <p>For related operations, please refer to 7.5 Control Display Status.</p>
		The temperature inside the chassis.

4.2 Main Menu

On the home screen, press the knob to enter the main menu screen. When the device working mode is All-in-One Controller, the main menu is shown in [Figure 4-2](#). When the device working mode is Send-Only Controller, the **Layer Parameters** menu is not displayed.

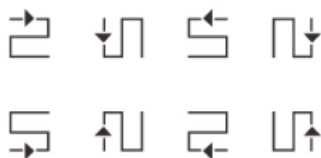
Figure 4-2 Main menu



5 Initial Screen Configuration

If the LED screen, cabinets, data flow and the number of cabinets loaded by Ethernet ports can meet the following requirements, you can configure the screen via the device front panel menu; otherwise, screen configuration in VMP will be your ideal choice.

- Screen: The LED screen must be a regular screen.
- Cabinet: The cabinets must be regular ones of the same size, and function well.
- Data flow: The data must run in the same way for all Ethernet ports and the data flow must be one of the followings. The starting position of the data flow is the first cabinet of Ethernet port 1, and the connections are made in sequence according to the serial number of the Ethernet port.



- Number of cabinets loaded by Ethernet ports: If n ports are used to load the cabinets, the number of cabinets loaded by each of the first $(n-1)$ ports must be the same and the integral multiple of the number of cabinet rows or columns, and it must be greater than or equal to the number of cabinets loaded by the last port.

5.1 Swift Layout via Front Panel Screen

5.1.1 Set Input Source

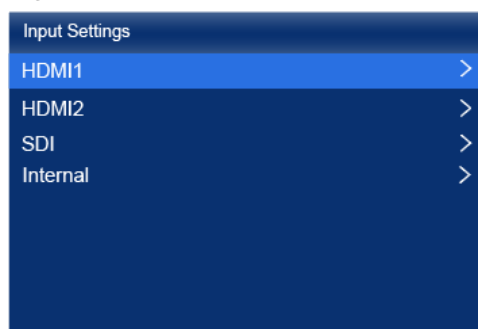
Select the desired input source and complete the related settings, such as resolution and frame rate. If the resolutions of the input source and screen are the same, the image can be displayed pixel to pixel. A lower frame rate may result in image flickering at low refresh rate, while a higher frame rate helps stabilize the display image.

Note

Input source settings are required for screen configuration in the Send-Only Controller working mode and not required in the All-in-One Controller mode.

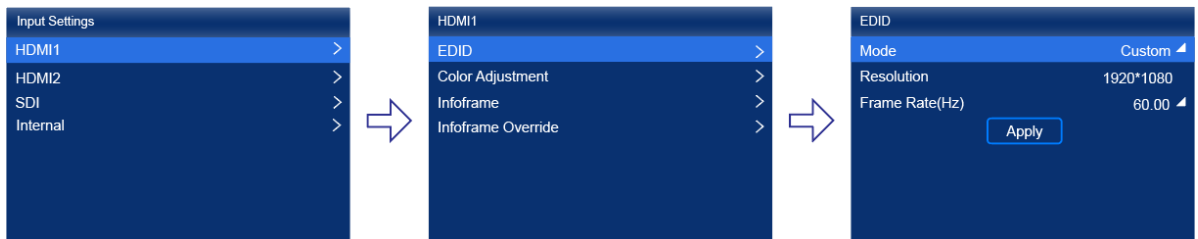
Step 1 On the main menu screen, choose **Input Settings** to select a video source.

Figure 5-1 Select input source



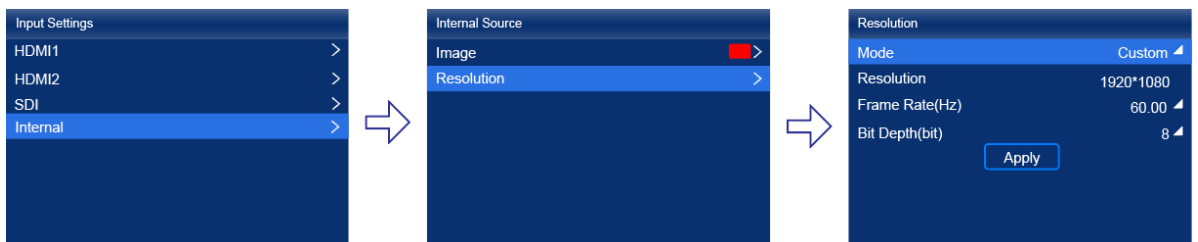
Step 2 Perform the corresponding operations for the input source according to the input source type. For the SDI sources, please skip this step.

- External input sources (HDMI1, HDMI2)



- Choose *input source* > EDID. The *input source* is HDMI1 or HDMI2.
- Set **Mode** to **Custom** or **Standard**, and then set the resolution and frame rate.
 Custom: Set the resolution manually.
 Standard: Select the desired resolution from the drop-down options.
- After the settings are done, tap **Apply**.

- Internal sources



- Choose **Internal** > **Image**, and navigate to the sub-menu. Then, select a picture.
- When the relevant parameters of the image are displayed, set the parameters according to your actual needs; otherwise, please skip this step.
- Press the **BACK** button to go back to the upper-level menu and select **Resolution**.
- Set **Mode** to **Custom** or **Standard**, and then set the resolution and frame rate.
- After the settings are done, tap **Apply**.

5.1.2 Load Cabinet Config File

When the cabinet cannot display images normally, send the cabinet configuration file (.rcfgx) to the cabinet and save it to let the cabinet display image normally. Before the operation, please import cabinet configuration file with VMP, or store the cabinet configuration file in the root directory of a USB drive and insert it into the USB port on the device front panel.

- Step 1 On the main menu screen, choose **Screen Configuration** > **Send Cabinet Config File**.

Figure 5-2 Send cabinet config file



- Step 2 Select the target configuration file.
- Step 3 Select **Yes** in the displayed dialog box.

After the configuration file is successfully sent, a message appears on the menu screen and then you will automatically return to the configuration file screen.

- Step 4 Press the **BACK** button to go back to the upper-level menu.
- Step 5 Select **Save to RV Card**.
- Step 6 Select **Yes** in the displayed dialog box.

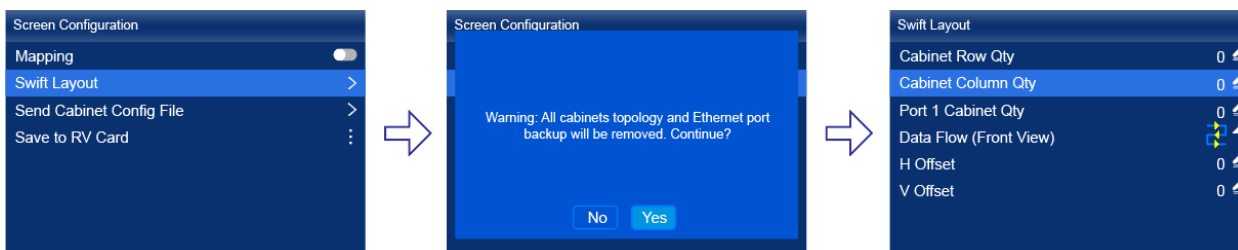
After the configuration file is successfully saved, a message appears on the menu screen.

5.1.3 Swift Layout

Set the screen configuration parameters to quickly complete the cabinet connection, so that the LED screen can display the input source image normally.

Step 1 On the main menu screen, choose **Screen Configuration > Swift Layout**.

Figure 5-3 Swift Layout



Step 2 Select **Yes** in the displayed dialog box.

Step 3 Set screen configuration parameters as required.

- Cabinet Row Qty: Set the quantity of cabinet rows.
- Cabinet Column Qty: Set the quantity of cabinet columns.
- Port 1 Cabinet Qty: Set the quantity of the cabinets loaded by Ethernet port 1.
- Data Flow (Front View): Select the data flow for the cabinets loaded by Ethernet port 1.
- H Offset: Set the horizontal offset of the displayed image.
- V Offset: Set the vertical offset of the displayed image.

5.2 Free Screen Configuration via VMP

The VMP software can be used to configure either the regular screens or complex screens, and supports free wiring of the cabinets, plus the ability of calculating the used load capacity according to the cabinets that are actually loaded. For the details of performing the free screen configuration, please refer to *VMP Vision Management Platform User Manual*.

6 Display Effect Adjustment

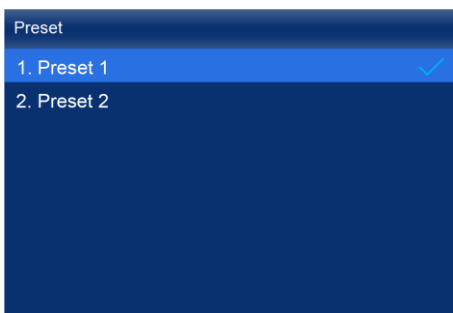
6.1 Apply Presets

Apply a saved preset in VMP to the device to quickly complete display effect adjustment.

Step 1 On the main menu screen, select **Preset**.

The saved presets in VMP are displayed on the menu screen, as shown in [Figure 6-1](#).

Figure 6-1 Presets



Step 2 Select a preset.

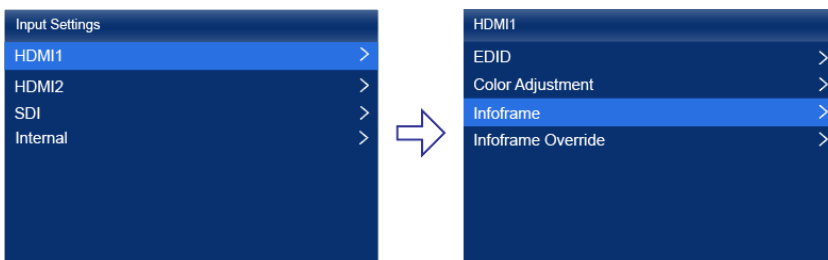
6.2 Set External Input Source Parameters

6.2.1 View Input Source Information

View the attribute values of the external input source, including the resolution, frame rate, bit depth, color gamut, etc.

Step 1 On the main menu screen, select **Input Settings** > *input source* > **Infoframe**. The *input source* is HDMI1, HDMI2, or SDI.

Figure 6-2 Input source information



When the device working mode is All-in-One Controller, the **Select Input** menu is not displayed.

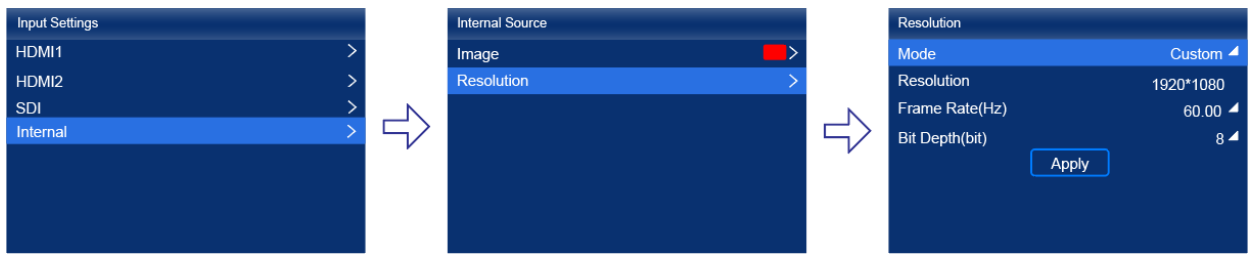
Step 2 View the input source information.

6.2.2 Set Resolution and Frame Rate (HDMI1 and HDMI2 only)

Set the resolution and frame rate of the external input source. If the resolutions of the input source and screen are the same, the image can be displayed pixel to pixel. A lower frame rate may result in image flickering at low refresh rate, while a higher frame rate helps stabilize the display image.

Step 1 On the main menu screen, select **Input Settings** > *input source* > **EDID**. The *input source* is HDMI1 or HDMI2.

Figure 6-3 EDID



When the device working mode is All-in-One Controller, the **Select Input** menu is not displayed.

Step 2 Set **Mode** to **Custom** or **Standard**, and then set the resolution and frame rate.

- Custom: Set the resolution manually.
- Standard: Select the desired resolution from the drop-down options.

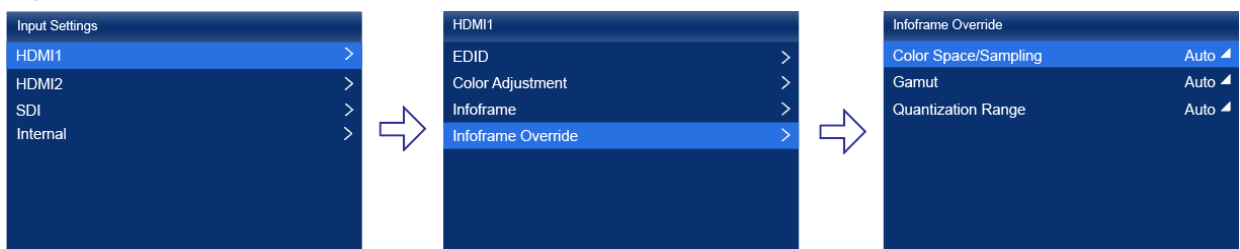
Step 3 After the settings are done, tap **Apply**.

6.2.3 Adjust Color

Set the inframe override parameters of the external input source and adjust the color. The override parameter will be used in the calculation of color adjustment. If the value of this parameter is not set manually, the value that comes with the input source will be used.

Step 1 On the main menu screen, select **Input Settings** > *input source* > **Infotrame Override**. The *input source* is HDMI1, HDMI2, or SDI.

Figure 6-4 Infotrame override



When the device working mode is All-in-One Controller, the **Select Input** menu is not displayed.

Step 2 Set the override parameters as required.

Select **Auto** and the device will read the attribute value that comes with the input source.

Step 3 Press the **BACK** button to go back to the upper-level menu.

Step 4 Select **Color Adjustment**.

Step 5 Set the related parameters.

Parameter	Description
Black Level	It is used to adjust the brightness of the dark areas of the image. The smaller the value, the darker the dark part of the screen.
Contrast	It is used to adjust the brightness of the highlight areas of the image. The greater the value, the brighter the highlight part of the screen. Contrast and black level together affect the overall contrast of the image.
Saturation	It is used to adjust the color purity of the image. The greater the value, the more vivid the color.
Hue	It is used to adjust the color effect of the displayed image color.
Red Shadow/Green	It is used to adjust the brightness of the dark areas of the image. The principle is the

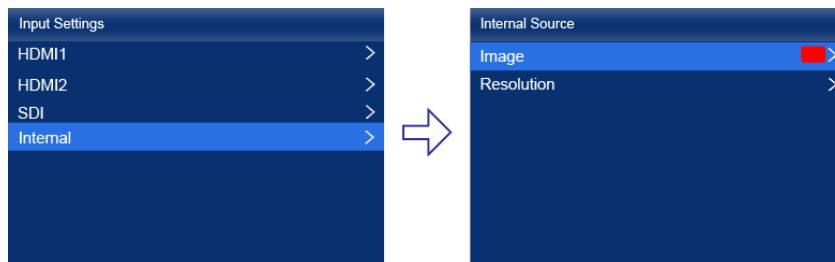
Shadow/Blue Shadow	same as that of black level, but only the RGB components are adjusted.
Red Highlight/Green Highlight/Blue Highlight	It is used to adjust the brightness of the highlight areas of the image. The principle is the same as that of contrast, but only the RGB components are adjusted.

6.3 Set Internal Input Sources

Select the internal source stored in the device and set the related parameters for screen testing and troubleshooting.

Step 1 On the main menu screen, select **Input Settings** > **Internal**.

Figure 6-5 Internal source



When the device working mode is All-in-One Controller, the **Select Input** menu is not displayed.

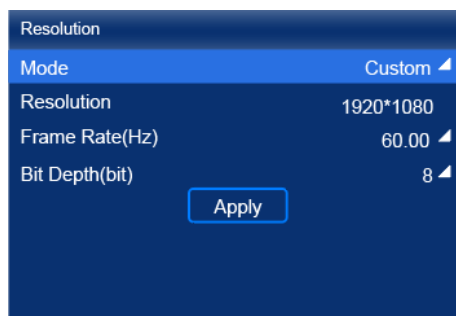
Step 2 Select **Image** to navigate to the sub-menu and select a picture.

Step 3 When the relevant parameters of the image are displayed, set the parameters according to your actual needs; otherwise, please skip this step.

Step 4 Press the **BACK** button to go back to the upper-level menu and select **Resolution**.

Step 5 Set **Mode** to **Custom** or **Standard**, and then set the resolution, frame rate and bit depth.

Figure 6-6 Resolution parameters



- Custom: Set the resolution manually.
- Standard: Select the desired resolution from the drop-down options.

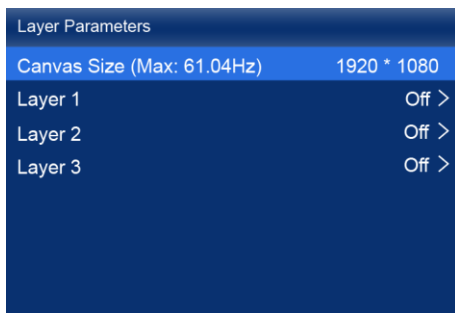
Step 6 After the settings are done, tap **Apply**.

6.4 View Layer Parameters (All-In-One Controller Mode only)

The LCD screen of the controller is designed to only display layer parameters. To create or configure layers, please connect to VMP for these operations. For detailed instructions, please refer to *VMP Vision Management Platform User Manual*.

Step 1 On the main menu screen, select **Layer Parameters**.

Figure 6-7 Layer parameters



Step 2 View the **Canvas Size** and the max frame rate.

Step 3 Select a layer and view the related parameters.

- Input Source: The number of the layer that is using this input source is displayed in the input source information area.
- Scaling Mode: The scaling mode currently being applied.
 - Custom: Customized width and height.
 - Pixel to Pixel: Same as the width and height of the input source
 - Snap to Canvas: Same as the width and height of the canvas
 - Fill Screen: Same as the width and height of the screen
- Width: The layer width.
- Height: The layer height.
- H Position: The horizontal coordinate (X) of the layer on the canvas.
- V Position: The vertical coordinate (Y) of the layer on the canvas.
- Priority: The Z coordinate of the layer on the canvas. The greater the value, the higher priority.
- Crop: The status of the input crop, as well as the size and position of the crop.
- Border: The status of the layer border, as well as the border thickness and color.

Step 4 If necessary, select other layers and view the related parameters

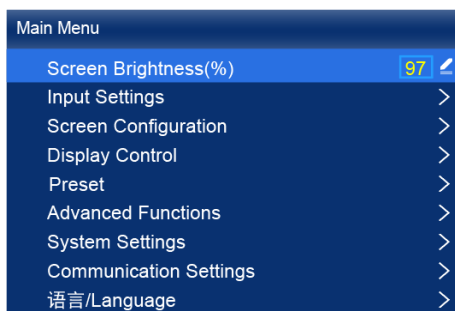
6.5 Set Output Parameters

6.5.1 Adjust Screen Brightness

Adjust and save the screen brightness.

Step 1 On the main menu screen, select **Screen Brightness** and press the knob to let the brightness value become editable.

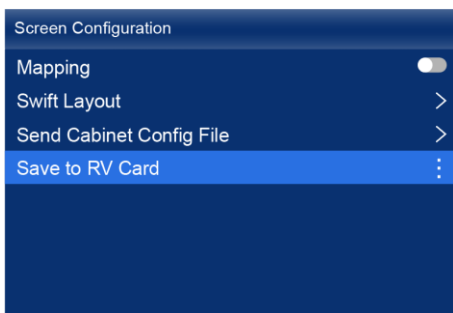
Figure 6-8 Screen brightness (the Send-Only Controller mode as example)



Step 2 Rotate the knob to adjust the brightness to the target value, and then press the knob to confirm.

Step 3 Select **Screen Configuration > Save to RV Card**.

Figure 6-9 Save to RV card



Step 4 Select **Yes** in the displayed dialog box.

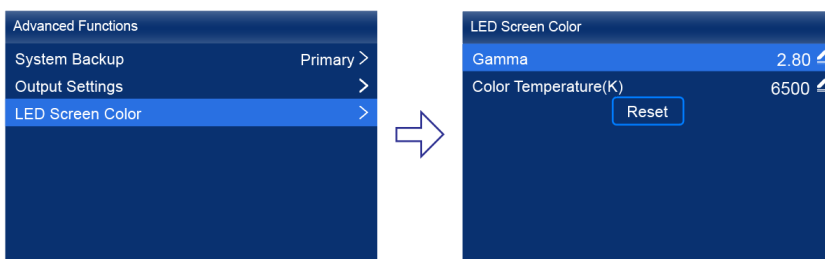
After the brightness value is successfully saved, a message appears on the menu screen.

6.5.2 Adjust Gamma and Color Temperature

Adjust and save the Gamma and color temperature.

Step 1 On the main menu screen, select **Advanced Functions > LED Screen Color**.

Figure 6-10 LED screen color



Step 2 Adjust the Gamma value.

1. Select Gamma and press the knob to let the value become editable.
2. Rotate the knob to adjust the Gamma to the target value, and then press the knob to confirm.

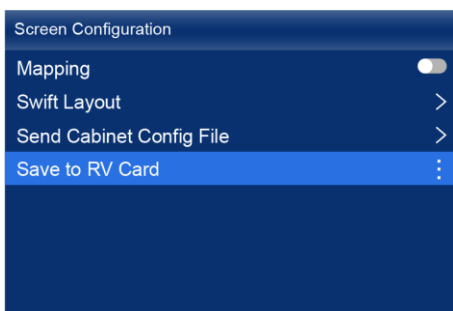
Step 3 Adjust the color temperature value.

1. Select **Color Temperature** and press the knob to let the value become editable.
2. Rotate the knob to adjust the temperature to the target value, and then press the knob to confirm.

If you want to restore the parameters to the defaults, select **Reset**.

Step 4 Press the **BACK** button to go back to the main menu, and then select **Screen Configuration > Save to RV Card**.

Figure 6-11 Save to RV card



Step 5 Select **Yes** in the displayed dialog box.

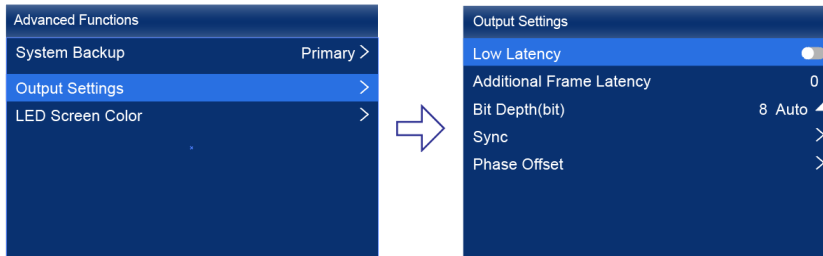
After the values are successfully saved, a message appears on the menu screen.

6.5.3 Set Low Latency


The low latency function is used to reduce the delay at the controller, or increase the latency when the device works with high-latency equipment.

Step 1 On the main menu screen, choose **Advanced Functions > Output Settings**.

Figure 6-12 Low latency

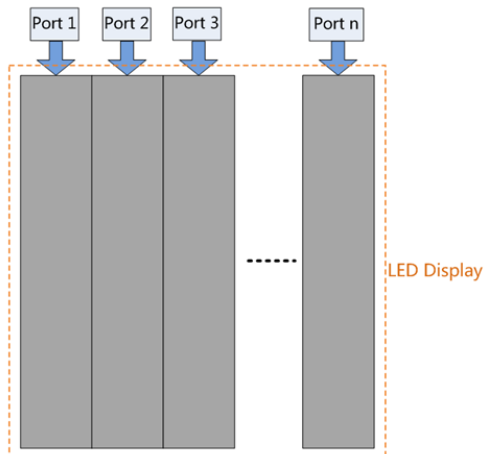


Step 2 Perform any of the following operations as required.

- Enable low latency
Set the **Low Latency** switch to  to enable the low latency function.
- Set additional frame latency
 - a. Select **Additional Frame Delay** and press the knob to let the value become editable.
 - b. Rotate the knob to adjust the parameter to the target value, and then press the knob to confirm.

Note

- When low latency is enabled, the sync signal source cannot be set to Genlock.
- The latency at the controller is 0 frame (less than 1 ms) in Send-Only Controller working mode and 1 frame in All-in-One Controller working mode.
- To enable low latency, please make sure all Ethernet ports load the cabinets vertically and share the same Y coordinate. Free screen configuration (for example, Ethernet port 2 loads cabinets horizontally, or its Y coordinate is different from that of Ethernet port 1) will reduce the load capacity.

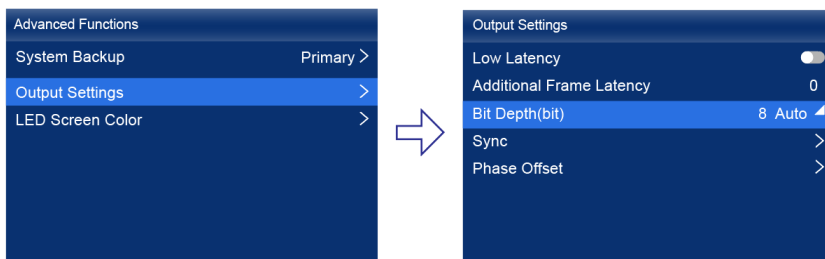


6.5.4 Set Bit Depth

Set the output bit depth of the input source.

Step 1 On the main menu screen, choose **Advanced Functions > Output Settings**.

Figure 6-13 Bit depth



Step 2 Select the desired bit depth value from the listed ones.

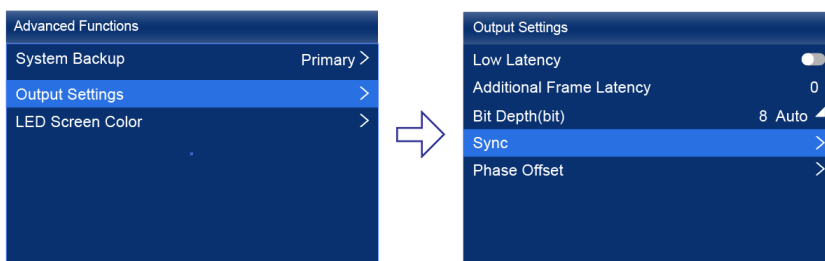
If **Auto** is selected, the output bit depth is the same as the input bit depth.

6.5.5 Set Sync Source

Select a synchronization signal for the display frame rate and set the phase offset.

Step 1 On the main menu screen, select **Advanced Functions > Output Settings > Sync**.

Figure 6-14 Sync



Step 2 Select **Sync Source** and then select the desired sync source from the drop-down options.

- Active Source: Sync with the frame rate of the active source.
- Genlock: Sync with the frame rate of the Genlock signal.
- Internal: Sync with the frame rate of the controller's internal clock. When this option is selected, a related parameter **Frame Rate** is displayed. You can select a value from its drop-down options.

Step 3 Press the **BACK** button to go back to the upper-level menu.

Step 4 Select **Phase Offset**.

Step 5 Select **Adjustment Mode** and then select the desired mode from the drop-down options.

- Off: Turn off the phase offset function.
- Angle: The related parameter **Angle** can be set.
- Fraction: The related parameter **Fraction** can be set.
- Absolute: The related parameters **Lines** and **Pixels** can be set when the sync source is **Active Source**.

Note

When low latency is enabled, the sync source cannot be set to Genlock. When the sync source is Genlock, low latency cannot be enabled.

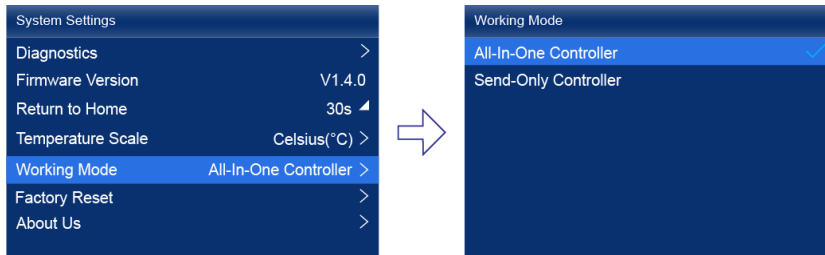
7 Device Management

7.1 Switch Working Mode

Set the device working mode to All-in-One Controller or Send-Only Controller.

Step 1 On the main menu screen, select **System Settings > Working Mode**.

Figure 7-1 Working mode



Step 2 Select **All-in-One Controller** or **Send-Only Controller**.

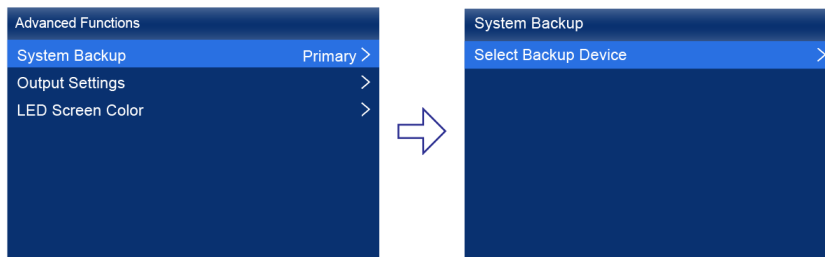
Step 3 Select **Yes** in the displayed dialog box.

7.2 Set a Backup Device

Specify a backup device for the current device so that the backup device can take over the primary device when it fails.

Step 1 On the main menu screen, select **Advanced Functions > System Backup > Select Backup Device**.

Figure 7-2 System backup



Step 2 Select a device from the devices found.

Step 3 Select **Yes** in the displayed dialog box.

A prompt will be displayed after the operation is successful.

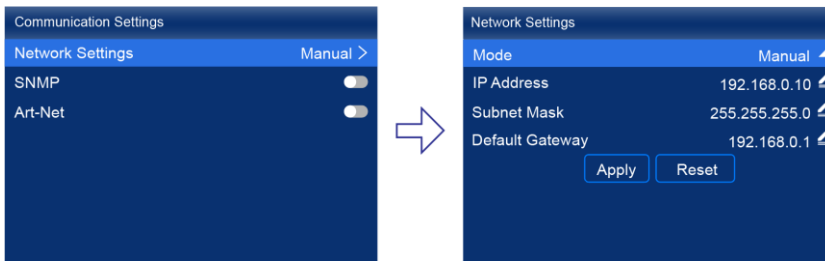
7.3 Configure Communication Settings

Set an IP Address

Manually set a static IP address for the device or set up the device to automatically obtain an IP address.

Step 1 On the main menu screen, select **Communication Settings > Network Settings**.

Figure 7-3 Network settings



Step 2 Select **Mode** and then select a mode from the drop-down options.

- Manual: Manually set a static IP address for the device.
- Auto: The device automatically obtains an IP address.

Step 3 If the manual mode is selected, set an **IP Address**, **Subnet Mask** and **Default Gateway** and select **Apply**. If the automatic mode is selected, this step is not required.

If you want to reset the IP address to the default, select **Reset**.

Set the Protocol Switch

Set the SNMP and Art-Net protocol switch status.

Note

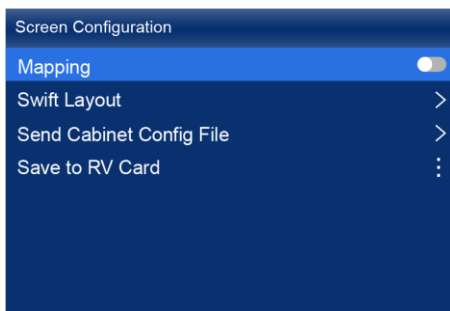
For details, see the *SNMP Protocol Instructions* and *Art-Net Protocol Instructions*.


7.4 Enable Mapping

After the Mapping function is enabled, cabinets can display some information, such as the Ethernet port number and receiving card number, allowing users to easily obtain the locations and connection topology of receiving cards.

Step 1 On the main menu screen, select **Screen Configuration > Mapping**.

Figure 7-4 Mapping



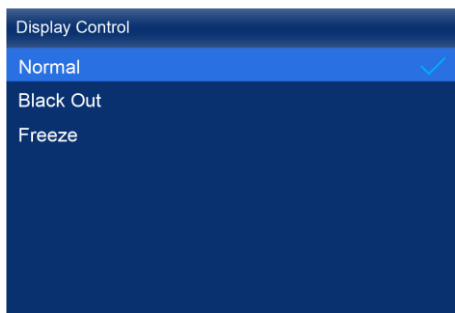
Step 2 Enable the Mapping function by toggling on this switch .

7.5 Control Display Status

Set the display loaded by the controller to a black screen or frozen status.

Step 1 On the main menu screen, select **Display Control**.

Figure 7-5 Display Control



Step 2 Select a display status as required.

- Normal: Display the normal output screen.
- Freeze: Make the output screen always display the current frame. The input source is played normally.
- Blackout: Make the output screen go black. The input source is played normally.

7.6 Diagnostics

7.6.1 Upon Powering Up

When the device is powered on, it automatically conducts a diagnostic process:

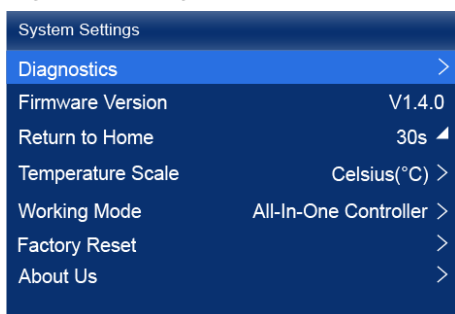
- Normal startup: All functions of the MX20 are available for use.
- Abnormal startup: Depending on the displayed error message, you can choose to export the diagnostic results or continue to operate in a limited functionality state.

7.6.2 Maintenance

Perform device diagnostics, then view and export the result.

Step 1 On the main menu screen, select **System Settings > Diagnostics**.

Figure 7-6 Diagnostics

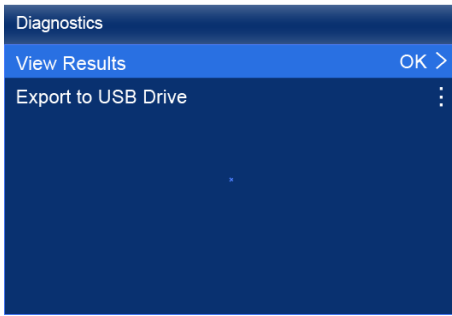


Step 2 Select **Yes** in the displayed dialog box.

After the diagnostics operation is complete, the diagnostic result will be displayed.

Step 3 Select **Close** to close the dialog box and the screen as shown in [Figure 7-7](#) is displayed.

Figure 7-7 After diagnostics



Step 4 Perform any of the following operations as required.

- View the diagnostic results
Select **View Results** to enter the report page and view the results.
- Export the diagnostic result to a USB drive
 - a. Insert the USB drive to the USB port on the front panel of the device.
 - b. Select **Export to USB Drive**.
A prompt will be displayed after the operation is successful.

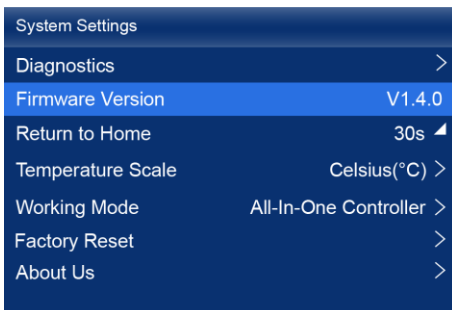
7.7 View the Firmware Version

View the current firmware program version of the device.

Step 1 On the main menu screen, choose **System Settings**.

Step 2 View the current firmware program version next to **Firmware Version**.

Figure 7-8 Firmware version



7.8 Reset to Factory Settings

Reset part or all of the device data to the factory settings.

Step 1 On the main menu screen, select **System Settings > Factory Reset**.

Figure 7-9 Factory reset



Step 2 Do any of the following according to the data you want to reset.

- Reset part of the data
Reset all the data except the imported files, network parameters, language settings, and device name.
 - a. Select **Keep User Data**.
 - b. Select **Yes** in the displayed dialog box.

The device restarts automatically while the data is being reset.
- Reset all the data (This action cannot be undone.)
Reset all the data to factory settings.
 - a. Select **Reset All**.
 - b. Select **Yes** in the displayed dialog box.

The device restarts automatically while the data is being reset.

8 Basic System Settings

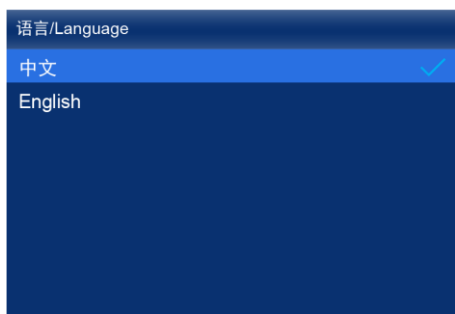
8.1 Set Language

Change the system language of the device.

Step 1 On the main menu screen, select **语言/Language**.

Step 2 Select **中文** or **English** as required.

Figure 8-1 Language

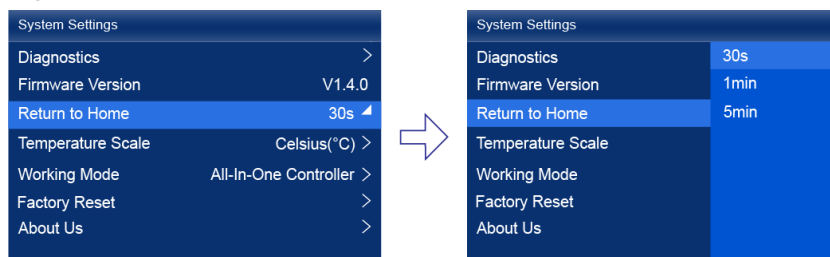


8.2 Set Session Timeout

Specify a certain amount of time for session timeout after which the LCD will return to the home screen automatically if no action is performed during the specified time.

Step 1 On the main menu screen, select **System Settings > Return to Home**.

Figure 8-2 Session timeout value



Step 2 Select **30s**, **1min** or **5min** from the drop-down options as required.

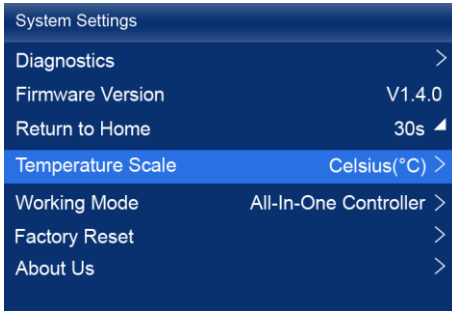
8.3 Set Temperature Scale

Change the system temperature scale of the device.

Step 1 On the main menu screen, select **System Settings > Temperature Scale**.

Step 2 Select **Celsius(°C)** or **Fahrenheit(°F)** as needed.

Figure 8-3 Temperature scale

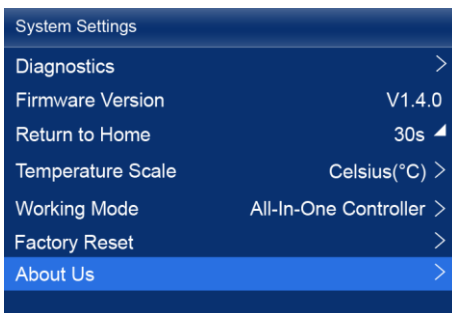


8.4 View Service Information

View the service information of NovaStar, allowing users to ask questions and give feedback.

Step 1 On the main menu screen, select **System Settings > About Us**.

Figure 8-4 About Us



Step 2 View the official website, support email address and service hotline of NovaStar.

9 Product Specifications

Electrical Specifications	Power input	100-240V~, 50/60Hz, 2- 0.8A
	Maximum power consumption	50 W
Operating Environment	Temperature	-20°C to +50°C
	Humidity	0% RH to 80% RH, non-condensing
Storage Environment	Temperature	-30°C to +80°C
	Humidity	0% RH to 95% RH, non-condensing
Physical Specifications	Dimensions	482.6 mm × 49.9 mm × 384.0 mm
	Net weight	4.5 kg
	Gross weight	8.1 kg Note: It is the total weight of the product, accessories, and packing materials packed according to the packing specifications.
Packing Information	Packing box	612.0 mm × 220.0 mm × 600.0 mm, kraft paper box
	Accessory box	408.0 mm × 294.0 mm × 51.0 mm, white cardboard box
	Accessories	<ul style="list-style-type: none"> • 1x Power cord • 1x Ethernet cable • 1x HDMI cable • 1x Certificate of Approval
IP Rating	IP20 Please prevent the product from water intrusion and do not wet or wash the product.	

The amount of power consumption may vary depending on various factors such as product settings, usage, and environment.

10 Video Source Specifications

Input	Resolution		Color Space	Sampling	Bit Depth	Integer Frame Rate (Hz)
HDMI 1.3	2K1K	2560×1440 (Forced)	RGB / YCbCr	4:4:4	10bit	24/25/30
					8bit	
		YCbCr	4:2:2	8/10bit		
		1920×1080	RGB / YCbCr	4:4:4	10bit	24/25/30/48/50
				8bit	24/25/30/48/50/60	
	YCbCr		4:2:2	8/10bit		
3G-SDI	2K1K	2048×1080	YCbCr	4:2:2	10bit	24/25/30/48/50/60
		1920×1080				

 **Note:**

The table above only displays a selection of common resolutions and integer frame rates. Decimal frame rates are also supported, allowing for automatic frame rate adaptation from the highest frame rate of each resolution down to 23.98/29.97/47.95/59.94/71.93/119.88/143.86 Hz

11 Ethernet Port Load Capacity

When Working with A10s Pro Receiving Card

The formula of calculating the load capacity per Ethernet port and the detailed parameters are as follows.

- 8bit: Load capacity $\times 24 \times \text{Frame rate} < 1000 \times 1000 \times 1000 \times 0.95$
- 10bit: Load capacity $\times 32 \times \text{Frame rate} < 1000 \times 1000 \times 1000 \times 0.95$

Max Load Capacity per Ethernet Port (Pixels)		
Frame Rate / Bit Depth	8bit	10bit
24 Hz	1,649,305.556	1,236,979
25 Hz	1,583,333	1,187,500
30 Hz	1,319,444	989,583
50 Hz	791,667	593,750
60 Hz	659,722	494,792
120 Hz	329,861	247,396
144 Hz	274,884	206,163

When Working with Other Armor Series Receiving Cards

The formula of calculating the load capacity per Ethernet port and the detailed parameters are as follows.

- 8bit: Load capacity $\times 24 \times \text{Frame rate} < 1000 \times 1000 \times 1000 \times 0.95$
- 10bit: Load capacity $\times 48 \times \text{Frame rate} < 1000 \times 1000 \times 1000 \times 0.95$

Max Load Capacity per Ethernet Port (Pixels)		
Frame Rate / Bit Depth	8bit	10bit
24 Hz	1,649,305.556	824,653
25 Hz	1,583,333	791,667
30 Hz	1,319,444	659,722
50 Hz	791,667	395,833
60 Hz	659,722	329,861
120 Hz	329,861	164,931
144 Hz	274,884	137,442

Note

The maximum load capacity is only achieved when the load width of a single port is 128 pixels or more. If the load width is less than that, the load capacity will be reduced accordingly, calculated as $(128 - \text{load width}) \times \text{load height}$.

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