MX40 Pro

LED Display Controller



User Manual

Change History

Document Version	Release Date	Description
V1.4.2	2024-10-31	Deleted the Sync Lock related operations from the device's LCD interface.
V1.4.1	2024-08-13	Updated the descriptions for internal source operations.
V1.4.0	2024-04-26	• Added the function of synchronous output from optical and Ethernet ports. • Added the function of setting optical port output mode. Users may choose between 20-port mode and 40-port mode. • Supports importing 3D LUT files with an accuracy of 33x33x33 / 65x65x65. • 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.
V1.2.0	2023-01-03	• Added the function of changing the temperature scale. • Added a layer scaling mode: fill screen. • Support the SNMP and Art-Net protocols.
V1.1.0	2022-11-07	• Updated the description of the USB port on the front panel. • Optimized the description of Ethernet port load capacity.
V1.0.0	2022-07-09	First release

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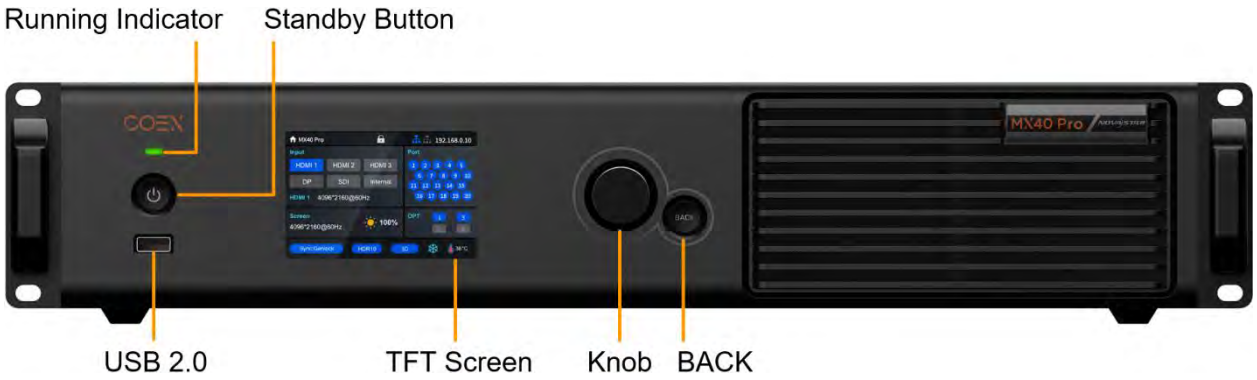
1 Overview

The MX40 Pro is a flagship all-in-one LED display controller with 20 Ethernet ports 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 rich video input connectors (HDMI 2.0, DP 1.2 and 12G-SDI), 20x Ethernet output ports and 4x 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	• 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	• 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	• 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.
TFT Screen	A 3.5-inch screen to display the device status, menus, submenus and messages for parameter settings
Knob	• 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 2.0-1 IN	1	Resolutions	Max resolution: 4096×2160@60Hz/8192×1080@60Hz (Forced) Min resolution: 800×600@60Hz
		Max width/height (Forced)	Max width: 8192 pixels (8192×1080@60Hz) Max height: 8192 pixels (1080×8192@60Hz)
		Frame rates	23.98 / 24 / 25 / 29.97 / 30 / 47.95 / 48 / 50 / 59.94 / 60 / 71.93 / 72 / 75 / 100 / 119.88 / 120 / 143.86 / 144 / 240 Hz
		HDR	Support HDR10 and comply with the SMPTE ST 2084 and SMPTE ST 2086 standards. Support HLG.
		EDID management	Support standard resolutions, up to 3840×2160@60Hz. Support custom input resolutions.
		HDCP	HDCP 2.2 compliant, backwards compatible with HDCP 1.4/HDCP 1.3.
		Interlaced signal inputs	Not supported
HDMI 2.0-2 IN	1	Resolutions	Max resolution: 4096×2160@60Hz/8192×1080@60Hz (Forced) Min resolution: 800×600@60Hz
		Max width/height (Forced)	Max width: 8192 pixels (8192×1080@60Hz) Max height: 7680 pixels (1080×7680@60Hz)
		Frame rates	23.98 / 24 / 25 / 29.97 / 30 / 47.95 / 48 / 50 / 59.94 / 60 / 71.93 / 72 / 75 / 100 / 119.88 / 120 / 143.86 / 144 / 240 Hz
		HDR	Support HDR10 and comply with the SMPTE ST 2084 and SMPTE ST 2086 standards. Support HLG.
		EDID management	Support standard resolutions, up to 3840×2160@60Hz. Support custom input resolutions.
		HDCP	HDCP 2.2 compliant, backwards compatible with HDCP 1.4/HDCP 1.3.
		Interlaced signal inputs	Not supported
HDMI 2.0-3 IN	1	Resolutions	Max resolution: 4096×2160@60Hz/8192×1080@60Hz (Forced) Min resolution: 800×600@60Hz
		Max width/height (Forced)	Max width: 8192 pixels (8192×1080@60Hz) Max height: 7680 pixels (1080×7680@60Hz)
		Frame rates	23.98 / 24 / 25 / 29.97 / 30 / 47.95 / 48 / 50 / 59.94 / 60 / 71.93 / 72 / 75 / 100 / 119.88 / 120 / 143.86 / 144 / 240 Hz

		HDR	Support HDR10 and comply with the SMPTE ST 2084 and SMPTE ST 2086 standards. Support HLG.
		EDID management	Support standard resolutions, up to 3840×2160@60Hz. Support custom input resolutions.
		HDCP	HDCP 2.2 compliant, backwards compatible with HDCP 1.4/HDCP 1.3.
		Interlaced signal inputs	Not supported
DP 1.2	1	Resolutions	Max resolution: 4096×2160@60Hz/8192×1080@60Hz (Forced) Min resolution: 800×600@60Hz
		Max width/height (Forced)	Max width: 8192 pixels (8192×1080@60Hz) Max height: 8192 pixels (1080×8192@60Hz)
		Frame rates	23.98 / 24 / 25 / 29.97 / 30 / 47.95 / 48 / 50 / 59.94 / 60 / 71.93 / 72 / 75 / 100 / 119.88 / 120 / 143.86 / 144 / 240 Hz
		HDR	HDR video is accepted with manual HDR configuration in VMP.
		EDID management	Support standard resolutions, up to 3840×2160@60Hz. Support custom input resolutions.
		HDCP	HDCP 1.3 compliant
		Interlaced signal inputs	Not supported
12G-SDI IN	1	Standards	Support ST-2082 (12G), ST-2081 (6G), ST-424 (3G) and ST-292 (HD) standard video inputs. Support 3G-Level A/Level B (DS mode).
		Resolutions	Max resolution: 4096×2160@60Hz Min resolution: 720x480i@59.94Hz
		Frame rates	23.98/24/25/29.97/30/47.95/48/50/59.94/60 Hz
		HDR	HDR video is accepted with manual HDR configuration in VMP.
		Interlaced signal inputs	Support interlaced signal inputs, including 1080i/576i/480i.
		Cables	Recommend using the CANARE-12G SDI coaxial cable. Cables up to 50 meters are supported.
Outputs			
Type	Qty	Description	

1–20	20	Gigabit Ethernet output ports. Support hot backup between Ethernet ports. • Max device load capacity: 9 million pixels • The maximum load capacity per Ethernet port is as follows. For details, see chapter 11 Ethernet Port Load Capacity. – 8bit@60Hz: 659,722 pixels – 10bit@60Hz: 494,791 pixels (available only with the A10s Pro receiving card) – 10bit/12bit@60Hz: 329,861 pixels Note • While in the 20-port mode, 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. • While in the 40-port mode, the maximum load capacity is only achieved when the load width of a single port is 192 pixels or more. If the load width is less than that, the load capacity will be reduced accordingly, calculated as (192 - load width) × load height.
OPT 1–4	4	10G optical output ports Supports setting of output mode. Users may choose between 20-port mode and 40-port mode. • 20-port mode: – OPT 1 transmits the data of Ethernet ports 1 to 10. OPT 3 is the copy channel of OPT 1. – OPT 2 transmits the data of Ethernet ports 11 to 20. OPT 4 is the copy channel of OPT 2. – You can use the optical port alongside the physical Ethernet port, with priority given in the following order: OPT 1/2 > OPT 3/4 > Ethernet ports 1–20. • 40-port mode: – OPT 1 transmits the data of Ethernet ports 1 to 10. – OPT 2 transmits the data of Ethernet ports 11 to 20. – OPT 3 transmits the data of Ethernet ports 21 to 30. – OPT 4 transmits the data of Ethernet ports 31 to 40. – You can use the optical port alongside the physical Ethernet port, with priority given in the following order: OPT 1/2 > Ethernet ports 1–20. Note • When both the optical and Ethernet ports are used simultaneously, please do NOT connect the device's Ethernet port with the same number as the one of the optical port to the receiving card at the same time. If they are connected simultaneously, the display effect of the optical port will take precedence. • When Ethernet port backup is enabled in 40-port mode, the last 20 Ethernet ports are backed up by the first 20 Ethernet ports. When switching to the 20-port mode, please remember to remove the loop backup setup of the receiving card. • While in the 40-port mode, additional Ethernet ports can be used to create easier screen topology without reducing the device's maximum load capacity.
HDMI 2.0-1 LOOP	1	HDMI loop through. Up to 8 devices can be cabled in one loop.
HDMI 2.0-2 LOOP	1	
HDMI 2.0-3 LOOP	1	
12G-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	Gigabit Ethernet control ports. Support TCP/IP protocol and star topology. 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 MX40 Pro devices can be cascaded.
GENLOCK	1	A pair of Genlock signal connectors. Support Bi-Level, Tri-Level, and Blackburst. • IN: Accept the sync signal. • LOOP: Loop the sync signal. The Genlock input signal supports a frame rate range from 23.98 Hz to 60 Hz. For standard Genlock signal generators, up to 20 MX40 Pro devices can be cascaded.
AUX	1	An auxiliary port that connects to the central control device (RS232) (Reserved)
Power		
100-240V~, 50/60Hz, 1.5A	1	An AC power input connector and switch

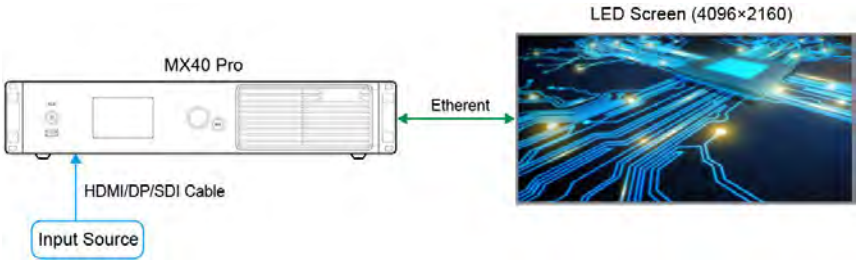
Note

The maximum input resolution and maximum width and height of HDMI and DP connectors must be obtained by setting the graphics card.

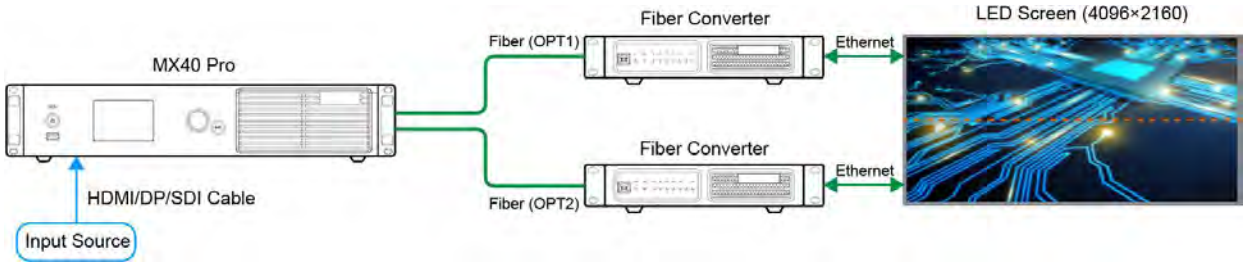
3 Applications

The MX40 Pro has two typical application scenarios as shown below. In those application examples, the LED screen size is 4096×2160.

Application 1: Output via Ethernet Ports



Application 2: Long-Distance Transmission via OPT Ports

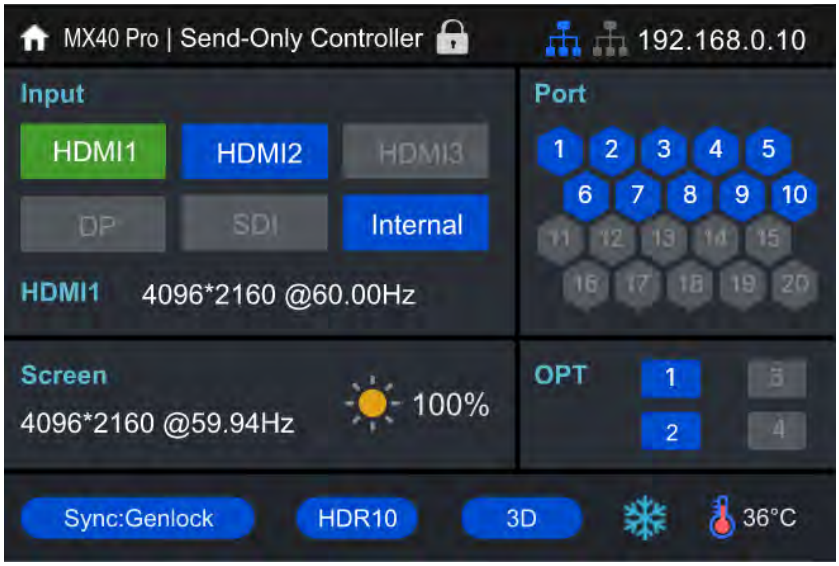


4 UI Introduction

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 is shown in Figure 4-1 and the home screen descriptions are shown in Table 4-1.

Table 4-1 Home screen descriptions

Area	Content	Description
Top line	MX40 Pro	The device name The name can be changed in VMP software.
	Send-Only Controller	The device working mode • 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 • When the icon displayed: The buttons are locked. • When the icon 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 Ethernet ports • Blue: Connected • Gray: Disconnected
	192.168.0.10	The device IP address For related operations, please refer to 7.2 Configure Communication Settings Set an IP Address.

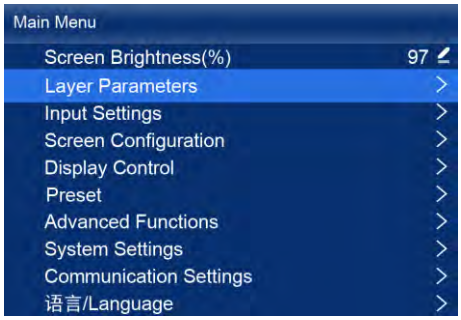
Area	Content	Description
Input	HDMI1, HDMI2, HDMI3, DP, SDI, Internal	The device input source type and status • Green: The signal is accessed normally and used. • Blue: The signal is accessed normally, but not used. • Red: The signal is not accessed, or the accessed signal is abnormal. • Gray: The signal is abnormal and not used. For related operations in the Send-Only Controller working mode, please refer to 5.1.1 Set Input Source.
	HDMI1 4096*2160@60.00Hz	The resolution and frame rate of the currently available input source 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 the layer, the layer number will be displayed below. For related operations, please refer to 6.2.2 Set Resolution and Frame Rate (HDMI1, HDMI2, HDMI3 and DP only).
Screen	4096*2160@59.94Hz	The screen resolution and frame rate
		The screen brightness For related operations, please refer to 6.5.1 Adjust Screen Brightness.
Port	1–20	The statuses of the Ethernet ports. (While in 40-port mode, the statuses are displayed in groups of 20 Ethernet ports each time.) • Blue: Connected • Gray: Disconnected
OPT	1–4	The statuses of the OPT ports • Blue: Connected • Gray: Disconnected
Bottom line	Sync: Genlock	The sync signal currently used and the signal status • 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 Color code: • Blue: The signal is normal. • Red: The signal is abnormal.
	HDR10	The format of the dynamic range For-related operations, please refer to 6.2.4 Set HDR Parameters (HDMI1, HDMI2, HDMI3, DP and SDI).
	3D	The 3D function status • The icon displayed: The 3D function is turned on. • The icon not displayed: The 3D function is turned off. For related operations, please refer to 6.5.3 Enable 3D Function.
		The output display status. For related operations, please refer to 7.4 Control Display Status. • : The display is frozen. •  : The display is blacked out

Area	Content	Description
		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.

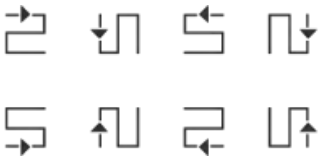
Figure 4-2 Main menu



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 Quick Configuration via Front Panel Screen

5.1.1 Set Input Source

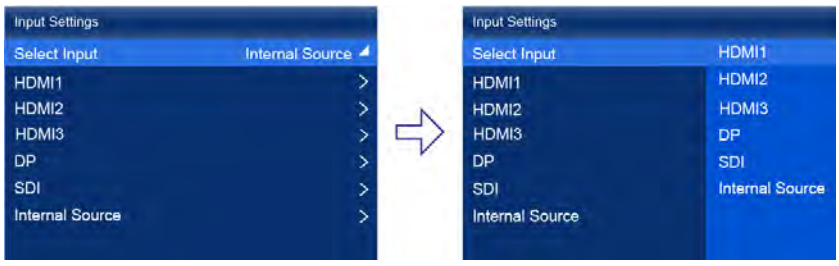
Select the desired input source and complete the related settings, such as resolution and frame rate. If the resolutions of the input source and screen are the same, the image can be displayed pixel to pixel. A lower frame rate may result in image flickering, while a higher frame rate helps stabilize 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** > **Select Input** 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, HDMI3, DP)

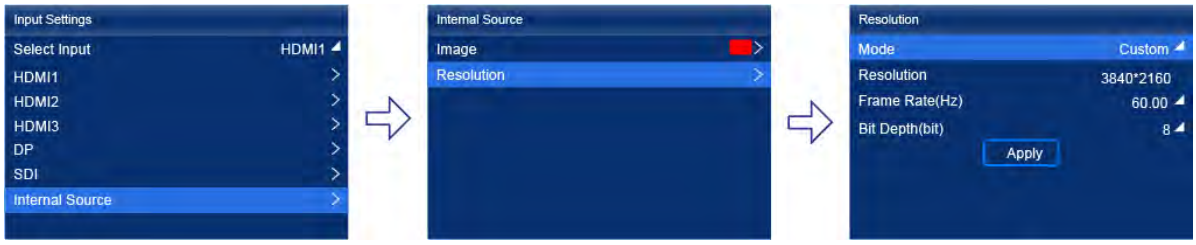


a. Choose *input source* > EDID. The *input source* is HDMI1, HDMI2, HDMI3 or DP.
b. Set **Mode** to **Custom** or **Standard**, and then set the resolution and frame rate.

   Custom: Set the resolution manually.

   Standard: Select the desired resolution from the drop-down options.
c. After the settings are done, click **Apply**.

- Internal sources



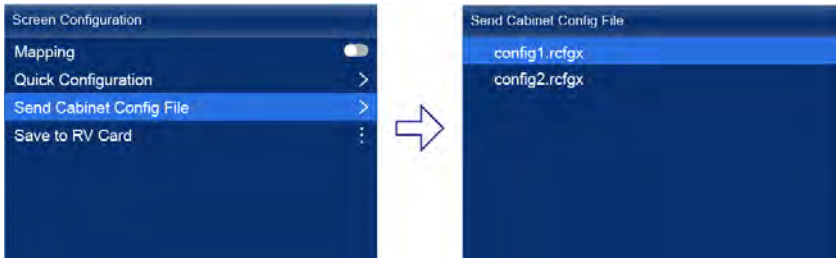
a. Choose **Internal Source** > **Image**, and navigate to the sub-menu. Then, select a picture.
b. When the relevant parameters of the image are displayed, set the parameters according to your actual needs; otherwise, please skip this step.
c. Press the **BACK** button to go back to the upper-level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

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 then you will automatically return to 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.

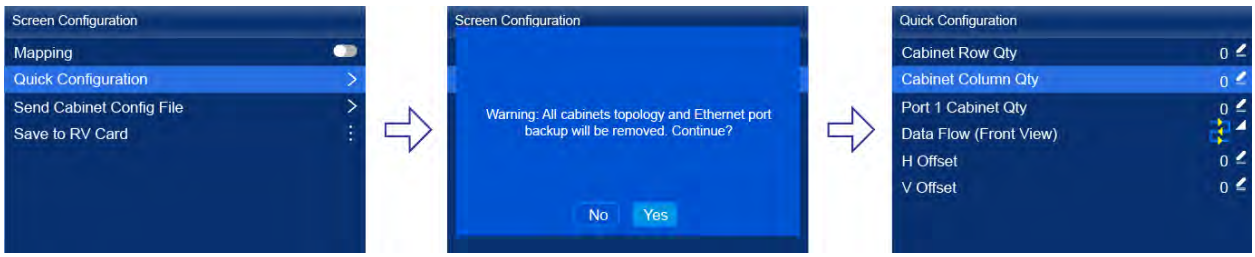
After the configuration file is successfully saved, a message appears on the menu screen.

5.1.3 Configure the Screen Quickly

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** > **Quick Configuration**.

Figure 5-3 Quick configuration



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

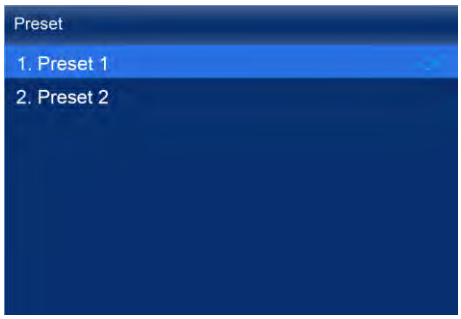
6.1 Apply Presets

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 is 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 (HDMI1, HDMI2, HDMI3, DP, SDI)

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, choose **Input Settings** > *input source* > **Infoframe**. The *input source* is HDMI1, HDMI2, HDMI3, DP 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, HDMI2, HDMI3 and DP 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, while a higher frame rate helps stabilize the display image.

Step 1 On the main menu screen, choose **Input Settings** > *input source* > **EDID**. The *input source* is HDMI1, HDMI2, HDMI3 or DP.

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.

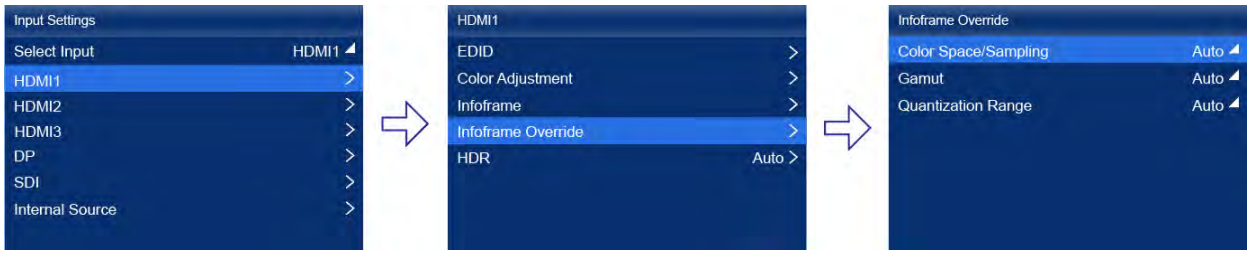
Step 3 After the settings are done, click **Apply**.

6.2.3 Adjust Color (HDMI1, HDMI2, HDMI3, DP, SDI)

Set the infoframe 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, choose **Input Settings** > *input source* > **EDID**. The *input source* is HDMI1, HDMI2, HDMI3, DP or SDI.

Figure 6-4 Infoframe 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.

Parameter	Description
Hue	It is used to adjust the color effect of the displayed image color.
Red Shadow/Green Shadow/Blue Shadow	It is used to adjust the brightness of the dark areas of the image. The principle is the 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.

6.2.4 Set HDR Parameters (HDMI1, HDMI2, HDMI3, DP and SDI)

Set the parameters used during the process of parsing HDR video sources.

Step 1 On the main menu screen, choose **Input Settings** > *input source* > **HDR**. The *input source* is HDMI1, HDMI2, HDMI3, DP, or SDI.

Figure 6-5 HDR



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

Step 2 Select **HDR** and select the HDR format from the listed options.

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

Step 3 Select **HDR10 Parameters** to complete the related settings. If the HDR format is SDR here, no parameters need to be set.

HDR-related parameters include:

- PQ mode: The mapping method of video source brightness.
  - ST2084 (PQ): This mode 1:1 maps the brightness of the video source. The part that exceeds the maximum screen brightness will still be adjusted to the maximum screen brightness.
  - ST2086 (Linear mapping): This mode linearly maps the brightness of the video source. It globally adjusts the video source brightness according to the maximum screen brightness to ensure that the ratio of the brightness of the entire source content remains unchanged.
- MaxCLL Override: When the **MaxCLL Override** switch is , the **MaxCLL** parameter takes effect.
- MaxCLL: Override the maximum video source brightness and adjust the brightness to a specified value.

To restore the parameters to the defaults, select **Reset**.

Note

The HDR function supports automatic parsing and manual setting. The properties of 12G-SDI sources, DP1.2 sources and non-standard HDR sources can be manually set to HDR properties.

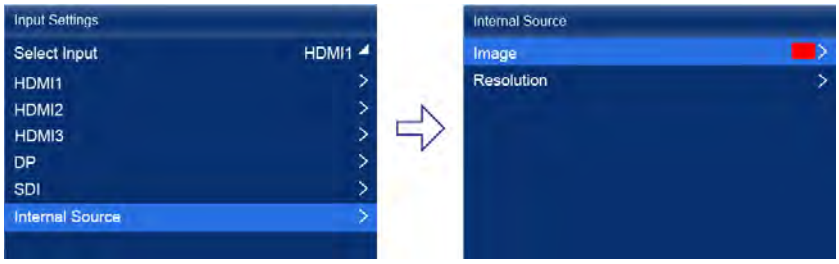
Using the HDR function reduces the MX40 Pro load capacity by less than half if the MX40 Pro works with the A10s Pro receiving card. For details, see 11 Ethernet Port Load Capacity.

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, choose **Input Settings** > **Internal Source**.

Figure 6-6 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 6-7 Resolution parameters



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

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

6.4 View Layers 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 6-8 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

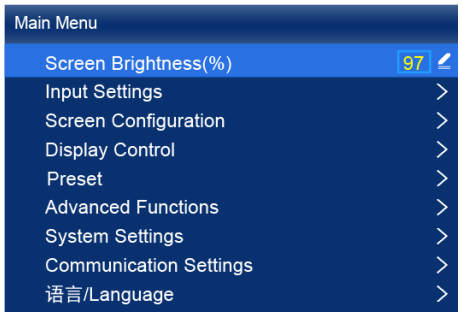
6.5 Set Output Parameters

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.

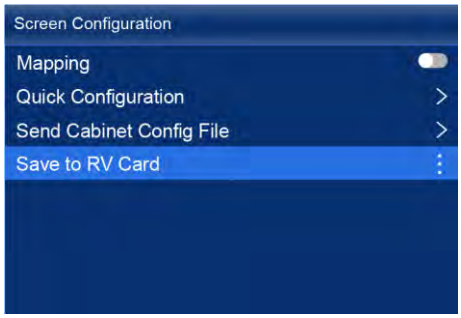
Figure 6-9 Screen brightness (the Send-Only Controller mode as example)



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

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

Figure 6-10 Save to RV card



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

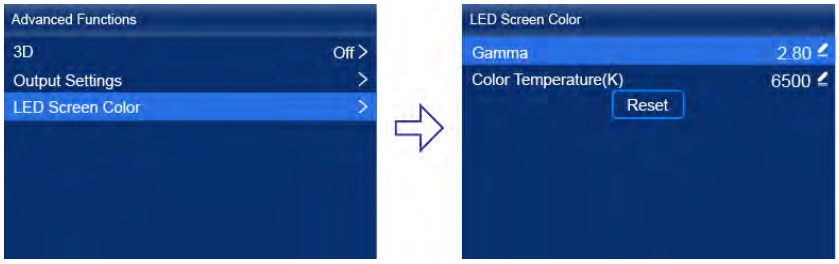
After the brightness value is successfully saved, a message appears on the menu screen.

6.5.2 Adjust Gamma and Color Temperature

Adjust and save the Gamma and color temperature.

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

Figure 6-11 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.

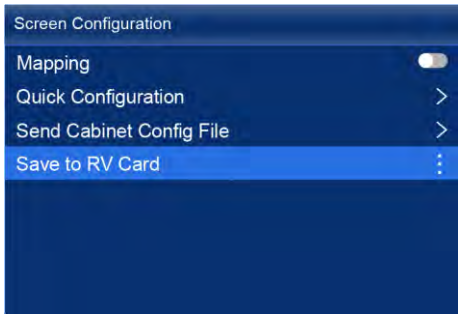
Step 3 Adjust the color temperature value.

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 choose **Screen Configuration** > **Save to RV Card**.

Figure 6-12 Save to RV card



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

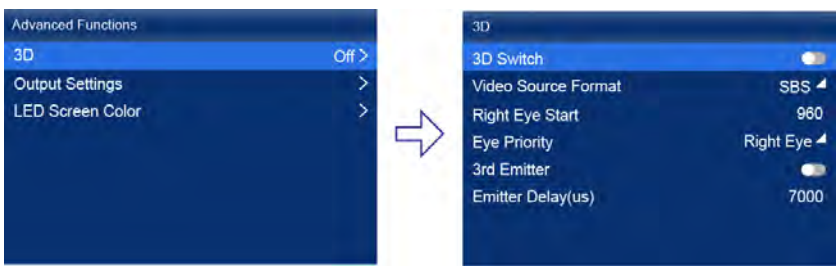
After the values are successfully saved, a message appears on the menu screen.

6.5.3 Enable 3D Function

Turn on the 3D function and set the related parameters.

Step 1 On the main menu screen, choose **Advanced Functions** > **3D**.

Figure 6-13 3D



Step 2 Turn on the 3D function by setting the 3D switch to .

Step 3 Set the related parameters.

- **Video Source Format**: Set the format of the 3D video source. Set the format to **SBS**, **TAB** or **Frame SEQ** according to the format of the accessed video source.
- **Right Eye Start**: Set the start position of the right eye image. When the video source format is SBS or TAB, and the left and right eye images are provided, this parameter can be set.
- **Eye Priority**: Set which image is sent first, the right eye image or the left eye image. Wear the 3D glasses to watch the display. If the display is abnormal, set the parameter value to the other one. If the display is normal, the setting is done.
- **3rd Emitter**: When a third-party 3D signal emitter is used, set the switch to .
- **Emitter Delay**: Set the delay time of sending the synchronization signal from the 3D signal emitter to the 3D glasses. This setting ensures that the switching between left and right eye images of the 3D glasses is in sync with the switching between the left and right eye images on the display. This parameter applies to both the NovaStar and third-party emitters.

Note

To use the 3D function, specified 3D glasses are needed. For details, please contact NovaStar technical support.

6.5.4 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 6-14 Low latency



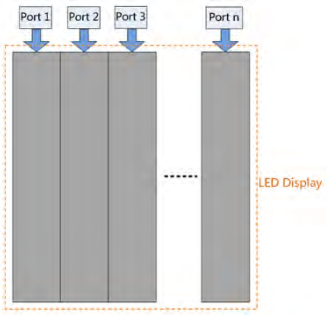
Step 2 Perform any of the following operations as required.

- Enable low latency

  Set the **Low Latency** switch to to enable the low latency function.
- Set additional frame latency
  a. Select **Additional Frame Latency** 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 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.

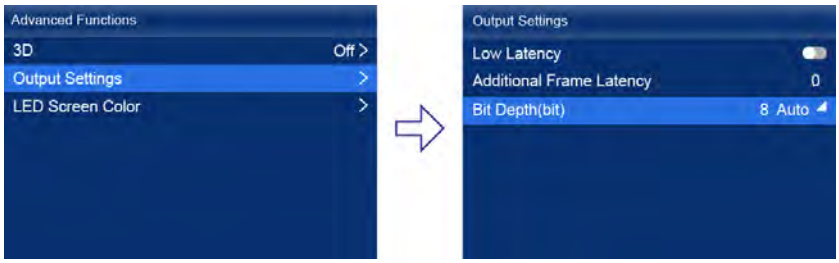


6.5.5 Set Bit Depth

Set the output bit depth of the input source.

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

Figure 6-15 Bit depth



Step 2 Select **Bit Depth** and then select the desired bit depth value from the drop-down options.

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

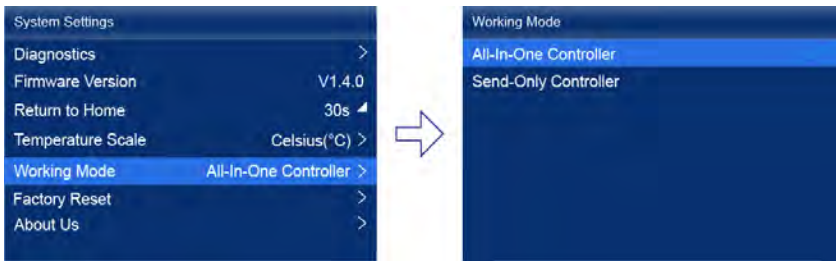
7 Device Management

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, choose **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 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, choose **Communication Settings** > **Network Settings**.

Figure 7-2 Network settings



Step 2 Choose **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

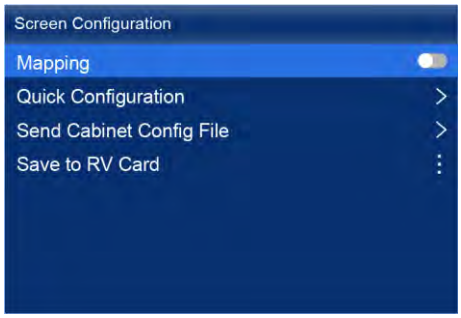
For details, see the *SNMP Protocol Instructions* and *Art-Net Protocol Instructions*.

7.3 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, choose **Screen Configuration** > **Mapping**.

Figure 7-3 Mapping



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

7.4 Control Display Status

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

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

Figure 7-4 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.

7.5 Diagnostics

7.5.1 Upon Powering Up

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

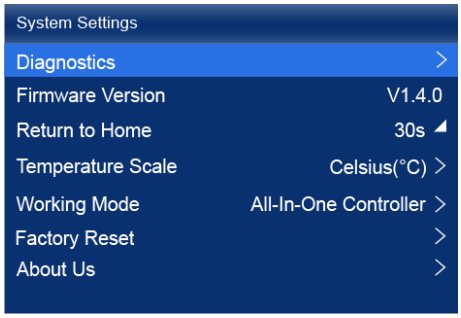
- Normal startup: All functions of the MX40 Pro are available for use.
- Abnormal Startup: Based on the error message displayed, select **Export** Log to obtain the diagnostic results. If there are only warning messages (in orange), you can choose **Continue** to proceed in a limited functionality mode. However, if there are error messages (in red), usage cannot be continued.

7.5.2 Maintenance

Perform device diagnostics, then view and export the result.

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

Figure 7-5 Diagnostics

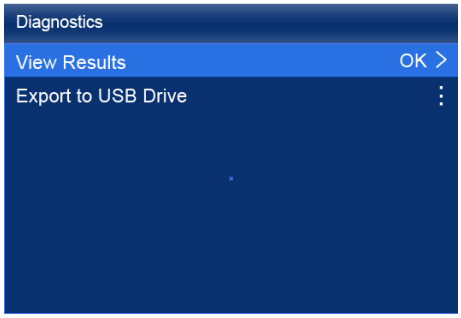


Step 2 Select **Yes** in the displayed dialog box.

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 7-6 is displayed.

Figure 7-6 After diagnostics



Step 4 Do any of the following 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.

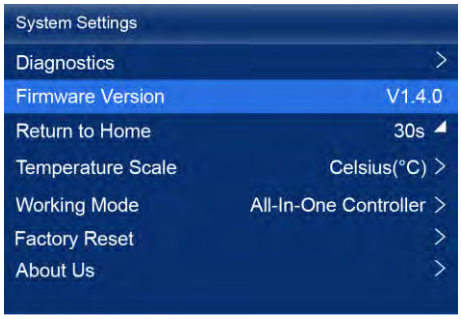
7.6 View the Firmware Version

View the current firmware program version of the device.

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

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

Figure 7-7 Firmware version



7.7 Reset to Factory Settings

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

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

Figure 7-8 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

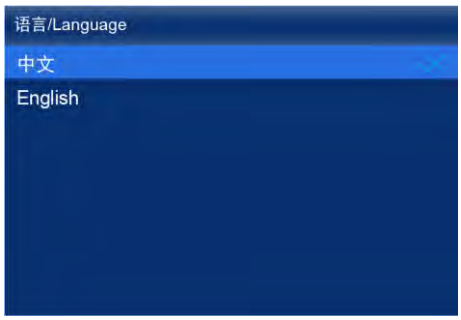
8.1 Set Language

Change the system language of the device.

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

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

Figure 8-1 Language



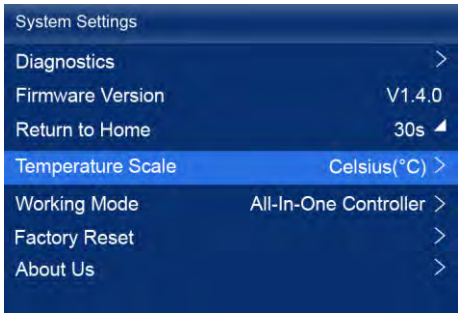
8.2 Set Temperature Scale

Change the system temperature scale of the device.

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

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

Figure 8-2 Temperature scale



8.3 Set Session Timeout

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

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

Figure 8-3 Session timeout value



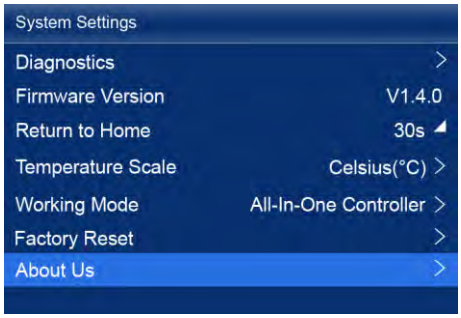
Step 2 Select **30s**, **1min** or **5min** from the drop-down options as required.

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, choose **System Settings** > **About Us**.

Figure 8-4 About us



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

9 Product Specifications

Electrical Specifications	Power input	100-240V~, 50/60Hz, 1.5A
	Max power consumption	95 W
Operating Environment	Temperature	–20ºC to +50ºC
	Humidity	0% RH to 80% RH, non-condensing
Storage Environment	Temperature	–30ºC to +80ºC
	Humidity	0% RH to 95% RH, non-condensing
Physical Specifications	Dimensions	482.6 mm × 94.2 mm × 467.0 mm
	Net weight	7.5 kg
	Gross weight	10.5 kg Note: It is the total weight of the product, accessories, and packing materials packed according to the packing specifications.
Packing Information	Packing box	660.0 mm × 570.0 mm × 210.0 mm, kraft paper box
	Accessory box	408.0 mm × 290.0 mm × 50.0 mm, white cardboard box
	Accessories	• 1x Power cord • 1x Ethernet cable • 1x HDMI cable • 1x DP 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 2.0-1	4K	4096×2160 (Forced)	RGB / YCbCr	4:4:4	12bit	24/25/30
					10bit	24/25/30/48/50
					8bit	24/25/30/48/50/60
			YCbCr	4:2:2	8/10/12bit	
		3840×2160	RGB / YCbCr	4:4:4	12bit	24/25/30
					10bit	24/25/30/48/50
					8bit	24/25/30/48/50/60
			YCbCr	4:2:2	8/10/12bit	
	2K1K	2560×1440	RGB / YCbCr	4:4:4	12bit	24/25/30/48/50/60/75
					10bit	24/25/30/48/50/60/75/100
					8bit	24/25/30/48/50/60/75/100/120
			YCbCr	4:2:2	8/10/12bit	
		1920×1080	RGB / YCbCr	4:4:4	12bit	24/25/30/48/50/60/72/75/100/120/144
					10bit	
					8bit	24/25/30/48/50/60/72/75/100/120/144/240 (240 Hz needs to be forced)
			YCbCr	4:2:2	8/10/12bit	
HDMI 2.0-2 / HDMI 2.0-3	4K	4096×2160 (Forced)	RGB / YCbCr	4:4:4	10bit	24/25/30/48/50
					8bit	24/25/30/48/50/60
			YCbCr	4:2:2	8/10/12bit	
		3840×2160	RGB / YCbCr	4:4:4	10bit	24/25/30/48/50
					8bit	24/25/30/48/50/60
			YCbCr	4:2:2	8/10/12bit	
	2K1K	2560×1440	RGB / YCbCr	4:4:4	10bit	24/25/30/48/50/60/75/100
					8bit	24/25/30/48/50/60/75/100/120
			YCbCr	4:2:2	8/10/12bit	
		1920×1080	RGB / YCbCr	4:4:4	10bit	24/25/30/48/50/60/72/75/100/120/144
					8bit	24/25/30/48/50/60/72/75/100/120/

Input	Resolution		Color Space	Sampling	Bit Depth	Integer Frame Rate (Hz)
			YCbCr	4:2:2	8/10/12bit	144/240 (240 Hz needs to be forced)
DP 1.2	4K	4096×2160 (Forced)	RGB / YCbCr	4:4:4	12bit	24/25/30/48/50
					10bit	24/25/30/48/50/60
					8bit	
			YCbCr	4:2:2	8/10/12bit	
		3840×2160	RGB / YCbCr	4:4:4	12bit	24/25/30/48/50
					10bit	24/25/30/48/50/60
					8bit	24/25/30/48/50/60/75 (75 Hz needs to be forced)
			YCbCr	4:2:2	8/10/12bit	
	2K1K	2560×1440	RGB / YCbCr	4:4:4	12bit	24/25/30/48/50/60/75/100
					10bit	24/25/30/48/50/60/75/100/120
					8bit	24/25/30/48/50/60/75/100/120/144 (144 Hz needs to be forced)
			YCbCr	4:2:2	8/10/12bit	
		1920×1080	RGB / YCbCr	4:4:4	12bit	24/25/30/48/50/60/75/100/120/144 (144 Hz needs to be forced)
					10bit	
					8bit	24/25/30/48/50/60/75/100/120/144 /240 (240 Hz needs to be forced)
			YCbCr	4:2:2	8/10/12bit	
12G-SDI	4K	4096×2160	YCbCr	4:2:2	10bit	24/25/30/48/50/60
		3840×2160				
	2K1K	2048×1080				
		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 × 24 × Frame rate < 1000 × 1000 × 1000 × 0.95
- 10bit: Load capacity × 32 × Frame rate < 1000 × 1000 × 1000 × 0.95
- 12bit: Load capacity × 48 × Frame rate < 1000 × 1000 × 1000 × 0.95

Max Load Capacity per Ethernet Port (Pixels)			
Frame Rate / Bit Depth	8bit	10bit	12bit
24 Hz	1,649,305.556	1,236,979	824,653
25 Hz	1,583,333	1,187,500	791,667
30 Hz	1,319,444	989,583	659,722
50 Hz	791,667	593,750	395,833
60 Hz	659,722	494,792	329,861
120 Hz	329,861	247,396	164,931
144 Hz	274,884	206,163	137,442
240 Hz	164,931	123,698	82,465

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 × 24 × Frame rate < 1000 × 1000 × 1000 × 0.95
- 10bit: Load capacity × 48 ×Frame rate < 1000 × 1000 × 1000 × 0.95
- 12bit: Load capacity × 48 × Frame rate < 1000 × 1000 × 1000 × 0.95

Max Load Capacity per Ethernet Port (Pixels)			
Frame Rate / Bit Depth	8bit	10bit	12bit
24 Hz	1,649,305.556	824,653	824,653
25 Hz	1,583,333	791,667	791,667
30 Hz	1,319,444	659,722	659,722
50 Hz	791,667	395,833	395,833
60 Hz	659,722	329,861	329,861
120 Hz	329,861	164,931	164,931
144 Hz	274,884	137,442	137,442
240 Hz	164,931	82,465	82,465

Note

- While in the 20-port mode, 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.
- While in the 40-port mode, the maximum load capacity is only achieved when the load width of a single port is 192 pixels or more. If the load width is less than that, the load capacity will be reduced accordingly, calculated as (192 - load width) × load height.

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