MX40 Pro

LED Display Controller

Specifications

Change History

Document Version	Release Date	Description
V1.0_02	2021-09-25	• Added the Genlock feature description. • Updated the low latency feature description.
V1.0_01	2021-09-01	First release

Introduction

NovaStar's flagship 4K LED display controller, the MX40 Pro, offers rich video input connectors (HDMI 2.0, DP 1.2 and 12G-SDI) and 20 Ethernet output ports. It can work with the brand-new VMP screen configuration software to provide users with the ultimate experience.

- VMP software as a perfect fit to configure screens easily and efficiently
  - Regular or irregular screens, they can be configured extremely fast.
  - Advanced Setup mode or simple Launch mode, they can be freely switched to meet different needs.
  - Topology area or properties area, there are big differences and a lot of features to explore.
  - A single device or grouped devices, all are under control.
- Innovative hardware architecture design to make wiring easy and flexible
  - Cascaded devices are controlled via Ethernet and operation commands can be received as soon as they are sent.
  - High bit depth inputs do not reduce the loading capacity by half and blank configurations do not occupy any capacity, using the Ethernet port bandwidth to the full potential.
- Not only a controller, but also a processor with a built-in color adjustment system
  - True 12bit, HDR, wide color gamut, high frame rate, and 3D display technologies are all included.
  - Color replacement and color calibration features can faithfully reproduce the colors.
  - The XR function, LED Image Booster, and Dynamic Booster features can present a smooth image.
  - Work with the calibration system to realize pixel level brightness and chroma calibration and full-grayscale calibration, enabling high brightness consistency and chroma consistency.

Features

Inputs and Outputs

- A variety of input connectors
  - 2x HDMI 2.0 (with loop output)
  - 1x DP 1.2
  - 1x 12G-SDI (with loop output)
- 12-bit/10-bit/8-bit video inputs
- Genlock signal input (with loop output)
- 20x Ethernet outputs
  When the MX40 Pro works with the A10s Pro receiving card, the capacity of loading high bit depth inputs (10bit) will not be halved.
- 4x 10G optical outputs
  The optical ports support copy mode.
- Adaptive to decimal frame rates

23.98/29.97/47.95/59.94/71.93/119.88/143.86/179.82/191.81/215.78/239.76 Hz

Display Effects

- XR function
  Construct virtual scenes via multi-angle displays to effectively solve the problems of camera exposure to light and display synchronization, reshaping the real vision.

- Dynamic Booster
  Significantly improve the display contrast for better visual experience and effectively control and lower the display power consumption.

- Full-Grayscale Calibration
  Make the display brightness and chroma more uniform at different grayscale levels and improve the display image quality, especially the indoor fine-pitch displays.

- HDR function
  HDR10 and HLG video sources are supported. Work with the receiving card that supports the HDR function to correctly parse the 10-bit HDMI HDR video source and faithfully reproduce the original brightness range and color space, allowing for a more lifelike image.

  When the MX40 Pro works with the A10s Pro receiving card, the capacity of loading HDR images will not be halved.

- LED Image Booster
  The LED Image Booster has the following three functions that improve the display effect (the actual effect depends on the driver IC) from different dimensions.

  - Color Management: Switch the color gamut of the screen between multiple gamuts to enable more precise colors on the screen.

  - Precise Grayscale: Individually correct the 65,536 levels of grayscale (16bit) of the driver IC to fix the display problems at low grayscale conditions, such as brightness spikes, brightness dips, color cast and mottling. This function can also better assist other display technologies, such as 22bit+ and individual gamma adjustment for RGB, allowing for a smoother and uniform image.

  - 22bit+: Improve the LED display grayscale by 64 times to avoid grayscale loss due to low brightness and allow for more details in dark areas and a smoother image.

- Pixel level brightness and chroma calibration
  Perform brightness and chroma calibration on each LED to effectively remove brightness differences and chroma differences and greatly improve display brightness consistency and chroma consistency, allowing for better image quality.

- Low latency
  The latency of video source on the sending card end is less than 1 ms and the loading capacity will not be halved when this function is enabled. When the MX40 Pro works with high-latency devices, the latency on the sending card end can be increased as required.

- 3D function
  Work with the receiving card that supports 3D function, the EMT200 3D emitter and 3D glasses to bring a fascinating and immersive 3D viewing experience.

  Videos in Top-and-Bottom, Side-by-Side and Frame Sequential formats are all supported. The loading capacity will be halved when this function is enabled.

- Individual gamma adjustment for RGB
  Work with the receiving card that supports this function to individually adjust the red gamma, green gamma and blue gamma of 10-bit and 12-bit inputs, which can effectively control image non-uniformity at low grayscale conditions and white balance offset, allowing for a more realistic image.

Device Controls

- VMP software control
  Various configurations of screens can be done in the brand-new VMP software of NovaStar. The software functions are practical and easy to use.

- Cascading control via Ethernet
  Up to 10 MX40 Pro devices can be cascaded and uniformly controlled via the control PC.

Table 1-1 Video source features

Input Connector	Bit Depth	Sampling Format	Max. Input Resolution
HDMI 2.0 1	8bit	RGB 4:4:4	4096×2160@60Hz 8192×1080@60Hz (Forced)
		YCbCr 4:4:4	
		YCbCr 4:2:2	
	10bit	RGB 4:4:4	4096×2160@30Hz 4096×1080@60Hz
		YCbCr 4:4:4	
		YCbCr 4:2:2	4096×2160@60Hz
	12bit	RGB 4:4:4	4096×2160@30Hz 4096×1080@60Hz
		YCbCr 4:4:4	
		YCbCr 4:2:2	4096×2160@60Hz

Input Connector	Bit Depth	Sampling Format	Max. Input Resolution
HDMI 2.0 2	8bit	RGB 4:4:4	4096×2160@60Hz 8192×1080@60Hz (Forced)
		YCbCr 4:4:4	
		YCbCr 4:2:2	
	10bit	RGB 4:4:4	4096×2160@30Hz 4096×1080@60Hz
		YCbCr 4:4:4	
		YCbCr 4:2:2	4096×2160@60Hz
DP 1.2	8bit	RGB 4:4:4	4096×2160@60Hz 8192×1080@60Hz (Forced)
		YCbCr 4:4:4	
		YCbCr 4:2:2	
	10bit	RGB 4:4:4	4096×2160@30Hz 4096×1080@60Hz
		YCbCr 4:4:4	
		YCbCr 4:2:2	4096×2160@60Hz
	12bit	RGB 4:4:4	4096×2160@30Hz 4096×1080@60Hz
		YCbCr 4:4:4	
		YCbCr 4:2:2	4096×2160@60Hz
12G-SDI	10bit	YCbCr 4:2:2	4096×2160@60Hz

Appearance

Front Panel

Name	Description
Running Indicator	• Flashing red: Standby • Solid red first and solid blue at last: The device is being powered on. • Solid green: The device is running normally.
Power Button	• Press the button to power on or power off the device. • Hold down the button for 5s or longer to restart the device when it is powered on.
USB 2.0	A maintenance port used to send cabinet configuration files and export the diagnostic result
TFT Screen	Display the device status, menus, submenus and messages.
Knob	• On the home screen, press the knob to enter the main menu screen.

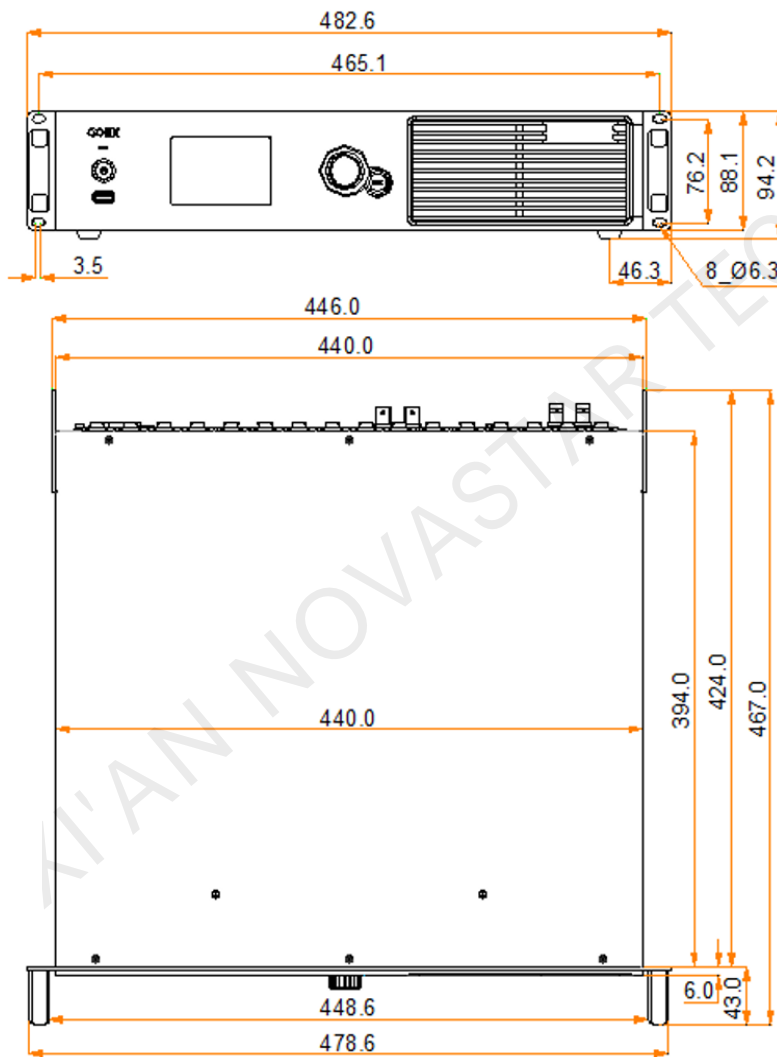| Name	Description
	• On the main menu screen, rotate the knob to select a menu item or adjust the parameter value. Press the knob to confirm the operation. • Hold down the knob and **BACK** button simultaneously for 5s or longer to lock or unlock the buttons.
BACK	Exit the current menu or cancel the operation.

Rear Panel

Inputs (INPUT area)		
Connector	Qty	Description
HDMI 2.0-1 IN	1	• Maximum resolution: 4096×2160@60Hz/8192×1080@60Hz (Forced) • Minimum resolution: 800×600@60Hz • Support custom input resolutions. 　Maximum width: 8192 (8192×1080@60Hz) 　Maximum height: 8192 (1080×8192@60Hz) • Support common standard resolutions, up to 3840×2160@60Hz. • Supported frame rates: 23.98/24/25/29.97/30/47.95/48/50/59.94/60/71.93/72/75/100/119.88/120/143.86/144/150/179.82/180/191.81/192/200/215.78 /216/239.76/240 Hz • Support the HDR function. • Support EDID management. • Support HDCP 2.2, backwards compatible with HDCP 1.4/1.3. • Support 48 kHz dual channel audio transmission. (Reserved) • Do NOT support interlaced signal input.
HDMI 2.0-2 IN	1	• Maximum resolution: 4096×2160@60Hz/8192×1080@60Hz (Forced) • Minimum resolution: 800×600@60Hz • Support custom input resolutions. 　Maximum width: 8192 (8192×1080@60Hz) 　Maximum height: 7680 (1080×7680@60Hz) • Support common standard resolutions, up to 3840×2160@60Hz. • Supported frame rates: 23.98/24/25/29.97/30/47.95/48/50/59.94/60/71.93/72/75/100/119.88/120/143.86/144/150/179.82/180/191.81/192/200/215.78/216/239.76/240 Hz • Support EDID management. • Support HDCP 2.2, backwards compatible with HDCP 1.4/1.3. • Support 48 kHz dual channel audio transmission. (Reserved) • Do NOT support interlaced signal input.
DP 1.2	1	• Maximum resolution: 4096×2160@60Hz/8192×1080@60Hz (Forced)

		• Minimum resolution: 800×600@60Hz
		• Support custom input resolutions.
		Maximum width: 8192 (8192×1080@60Hz)
		Maximum height: 8192 (1080×8192@60Hz)
		• Support common standard resolutions, up to 3840×2160@60Hz.
		• Supported frame rates: 23.98/24/25/29.97/30/47.95/48/50/59.94/60/71.93/72/75/100/119.88/120/143.86/144/150/179.82/180/191.81/192/200/215.78/216/239.76/240 Hz
		• Support EDID management.
		• Support HDCP 1.3.
		• Do NOT support interlaced signal input.
12G-SDI IN	1	• Maximum resolution: 4096×2160@60Hz
		• 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).
		• Do NOT support input resolution settings.
		• Support frame rates up to 60 Hz.
		• Support deinterlacing processing. (Reserved)

Outputs (OUTPUT area)

Connector	Qty	Description
1–20	20	20x Neutrik Gigabit Ethernet ports • Capacity per port up to 650,000 pixels (8bit), 480,000 pixels (10bit), or 320,000 pixels (12bit). • Support redundancy between Ethernet ports. When the green and yellow indicators stay on simultaneously, the Ethernet port is connected to a Gigabit Ethernet cable and the connection is available.
OPT 1–4	4	Four 10G optical ports When the four optical ports are used for output simultaneously, they support copy mode: • OPT 1 copies and outputs the data on Ethernet ports 1–10. • OPT 2 copies and outputs the data on Ethernet ports 11–20. • OPT 3 is the copy channel of OPT 1 or Ethernet ports 1–10. • OPT 4 is the copy channel of OPT 2 or Ethernet ports 11–20.
HDMI 2.0-1 LOOP	1	An HDMI loop output connector
HDMI 2.0-2 LOOP	1	An HDMI loop output connector
12G-SDI LOOP	1	An SDI loop output connector
SPDIF OUT	1	A digital audio output connector (Reserved)

Control (CONTROL area)

Connector	Qty	Description
ETHERNET	2	2x Ethernet control ports They have the same functions and can be connected to the control PC or used for device cascading control.

GENLOCK	1	A pair of Genlock signal connectors. Support Bi-Level, Tri-Level and black burst.
		• IN: Accept the sync signal.
		• LOOP: Loop the sync signal.
		For standard Genlock signal generators, up to 10 MX40 Pro devices can be cascaded.
AUX	1	An auxiliary connector that can be connected to the central control device (RS232) or 3D synchronizer (Reserved)
Power		
100-240V~, 50/60Hz, 2A	1	An AC power input connector and switch

Dimensions

Tolerance: ±0.3   Unit: mm

Specifications

Electrical Specifications	Power input	100-240V~, 50/60Hz, 2A
	Maximum power consumption	70 W
Operating Environment	Temperature	–20ºC to +60ºC
	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
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 Quick Start Guide
IP Rating	IP20 Please prevent the product from water intrusion and do not wet or wash the product.	

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

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