

# MX40 Pro

LED Display Controller



## Specifications

## Change History

| Document Version | Release Date | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|------------------|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| V1.5.0           | 2025-09-30   | <ul style="list-style-type: none"><li>• HDMI 2.0 input supports YCbCr 4:2:0 color sampling format.</li><li>• Supports central control protocol and viewing of device MAC address.</li><li>• Supports SPDIF audio output.</li></ul>                                                                                                                                                                                                                          |
| V1.4.0           | 2024-06-13   | <ul style="list-style-type: none"><li>• Added certification information for KC.</li><li>• Added the function of synchronous output from optical and Ethernet ports.</li><li>• Added the function of setting optical port output mode. Users may choose between 20-port mode and 40-port mode.</li><li>• Supports importing 3D LUT files with an accuracy of 33x33x33 / 65x65x65.</li><li>• Added information for supported receiving card models.</li></ul> |
| V1.2.0           | 2023-01-03   | <ul style="list-style-type: none"><li>• Added the function of changing the temperature scale.</li><li>• Added a layer scaling mode: fill screen.</li><li>• Support the SNMP and Art-Net protocols.</li></ul>                                                                                                                                                                                                                                                |
| V1.1.0           | 2022-11-07   | <ul style="list-style-type: none"><li>• Updated the description of the USB port on the front panel.</li><li>• Optimized the description of Ethernet port load capacity.</li></ul>                                                                                                                                                                                                                                                                           |

## Introduction

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 (supports synchronous output). It can also work with the brand new software VMP (Vision Management Platform) to provide a better operation and control experience.

## Certifications

CCC, CE, RoHS, FCC, IC, UL, CB, KC, EAC

**If the product does not have the relevant certifications required by the countries or regions where it is to be sold, please contact NovaStar to confirm or address the problem.**

**Otherwise, the customer shall be responsible for the legal risks caused or NovaStar has the right to claim compensation.**

## Features

### Inputs and Outputs

- 3 types of inputs
  - 3x HDMI 2.0 (with loop through)
  - 1x DP 1.2
  - 1x 12G-SDI (with loop through)
- 12-bit, 10-bit and 8-bit video inputs
- 3 types of outputs
  - 20x Gigabit Ethernet ports, load capacity up to 9 million pixels
  - 4x 10G optical ports, supporting setting of output mode. Users may choose between 20-port mode and 40-port mode.
  - 1x SPDIF digital audio port
- 3 types of controls
  - 1x Genlock signal input (with loop through)
  - 2x Ethernet control ports
  - 1x Auxiliary port

### Advanced Features

- 4 Independent Layers

Support up to 4x 4K layers and layer priority adjustment in Z order.
- Image Scaling

Each layer supports 4 scaling mode: custom, pixel to pixel, snap to canvas, and fill screen.

- Color Replacement

Replace any color in the image with another color without affecting other colors. It is recommended to choose color with higher saturation for replacement to achieve better outcome.

- 14Ch Color Correction

Supports precise adjustment to the hue, saturation, and brightness of black and white, and the 12 standard colors derived from the three primary colors (RGB).

- Color Curves

Supports adjustment to the RGBW mapping curves of the screen.

- 3D LUT

Use the 3D LUT file (.cube) with an accuracy of  $17 \times 17 \times 17$  /  $33 \times 33 \times 33$  /  $65 \times 65 \times 65$  to adjust the colors of the video source.

- Dynamic Booster

Real-time analysis and dynamic adjustment are made to each frame to significantly improve the display contrast and image details for better visual experience, and effectively control and lower the display power consumption, extending the service life of the LED screen.

- Full-Grayscale Calibration

Work with NovaStar's high-precision calibration system CC3 along with the scientific-grade cameras CC60 and C3200 to generate unique calibration coefficients for each grayscale, ensuring uniformity of each grayscale and dramatically improving the image quality.

- HDR

- Support HDR10 and comply with the SMPTE ST 2084 and SMPTE ST 2086 standards.
- Support HLG.

- 3D

Work with the 3D emitter and 3D glasses to bring a fascinating and immersive 3D viewing experience.

- Latency

- Different screens can have different latency settings. The minimum processing latency of the LED display controller is reduced to 0-frame (less than 1 ms), achieving low latency without reducing the load.
- Supports additional latency. Users can choose to add zero to two frames of latency.

- Preset

For optimal display in various scenarios, users can adjust display parameters such as layers, brightness, color temperature, and gamma ahead of time and save them as presets. Users can save up to 128 customizable presets which can be easily applied or switched with just one click.

- No rectangle restriction

No rectangle restriction for irregular screens. This means when calculating resolutions, blank pixels do not count towards the total capacity. The used load capacity of Ethernet ports is the sum of the resolutions of all cabinets with load.

- Frame Rate Adaptive

Automatically adapt to video inputs with different frame rates ranging from 23.98 Hz to 480 Hz, and support the automatic calculation of optimal screen parameters based on the input source's frame rate. This ensures that the brightness deviation of the screen remains within 5% across different frame rates. It also supports precise frame rate adjustment in 0.01 Hz increments.

- Shutter Fit

Automatically adjusts the driver IC parameters according to the camera shutter angle to fix problems of black lines, grayscale addition, and grayscale loss during camera shooting in xR scenarios.

- Frame Multiplication

- Frame interpolation: Outputs images that are captured from multiple shooting angles with different backgrounds at the same time. Solid green backgrounds can also be inserted to allow for easy post-production adjustments.
- Frequency multiplication: Supports high frame rates of up to 480 Hz. This feature is to accommodate multi-angle camera shooting to improve the screen performance under the camera.

## Device Controls

- VMP software control

The device can be connected to the VMP software to provide easy and convenient operations and smart device management.

- Supports the SNMP, Art-Net, and central control protocols.
- Cascading control via Ethernet

The Gigabit Ethernet control ports support TCP/IP protocol and star topology. 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.

- Automated system monitoring and alarm

Hardware monitoring capabilities that encompass fan speed, module temperatures, voltage levels, and operational status. It automatically detects and reports any device faults or alarm information, ensuring real-time monitoring of the LED screen's operational status.

Table 4-1 Function Limitations

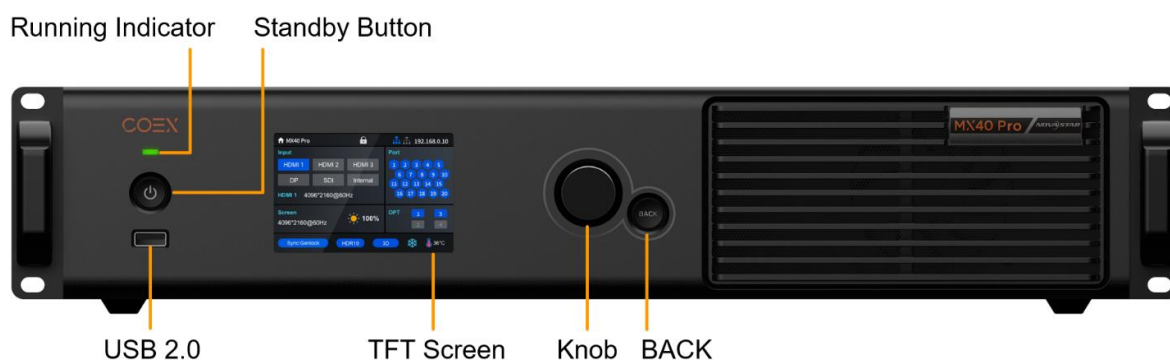
| Function                   | Limitation                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Frame Rate Adaptive        | To use this function, it is required to pair with the A10s Pro and its derivative receiving cards and specific driver ICs (for detailed IC models, please see the product specifications on the NovaStar website at <a href="https://www.novastar.tech/">https://www.novastar.tech/</a> ). Additionally, you must use the Cabinet Tool provided by NovaStar to adjust the driver IC parameters for different frame rates, which will generate the required NCP file. |
| Dynamic Booster            | It is required to work with the A10s Pro receiving card or its derivatives. Users need to use a CA410-VP427, CA410-P427, or CA410-P427H colorimeter to perform the gamut and brightness correction.                                                                                                                                                                                                                                                                  |
| Full Grayscale Calibration | It is required to work with the A10s Pro\A8s Pro receiving card or their derivatives. Users need to use a CC60\C3200 camera to perform full-grayscale calibration.                                                                                                                                                                                                                                                                                                   |
| Calibration Software       | COEX V1.5.0 and later versions no longer support the Calcube2.X. Please use the official version of the CC3 calibration software for calibration.                                                                                                                                                                                                                                                                                                                    |
| 3D                         | 3D cannot be enabled simultaneously with Low Latency and Frame Multiplication. To use the 3D function, specified 3D glasses are needed. For details, please contact NovaStar technical support.                                                                                                                                                                                                                                                                      |
| HDR                        | Supports both automatic parsing and manual settings for HDR. When the input interfaces are HDMI 2.0, HDR10 and HLG are supported. For 12G-SDI, DP 1.2, and non-standard HDR sources, HDR attributes can only be manually overridden.                                                                                                                                                                                                                                 |
| Low Latency                | Low Latency cannot be enabled simultaneously with Genlock, 3D, and Frame Multiplication. Moreover, it is recommended to ensure all Ethernet ports load the cabinets vertically and share the same Y coordinate (all set to 0) when Low Latency is enabled.                                                                                                                                                                                                           |

Table 4-2 Supported receiving card models

| Receiving Card Model    | Supported |
|-------------------------|-----------|
| A10s Pro and its series | Yes       |
| A8s Pro and its series  | Yes       |
| A8s and its series      | Yes       |
| A8s-N                   | Yes       |
| A7s Plus                | Yes       |
| A5s Plus                | Yes       |
| B6s                     | Yes       |

## Appearance

### Front Panel



| Name              | Function                                                                                                                                                                                                                                          |
|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Running indicator | <ul style="list-style-type: none"> <li>• Solid red: Standby.</li> <li>• Solid blue: The device is being powered on.</li> <li>• Solid green: The device is running normally.</li> <li>• Flashing red: The device is running abnormally.</li> </ul> |
| Standby button    | <ul style="list-style-type: none"> <li>• Press the button to power on or power off the device.</li> <li>• Hold down the button for 5s to 10s to restart the device.</li> </ul>                                                                    |
| USB 2.0           | <ul style="list-style-type: none"> <li>• Connect to a USB drive only to export the device diagnostic result.</li> <li>• Only the NTFS and FAT32 file systems are supported. Others are not supported.</li> </ul>                                  |
| TFT Screen        | A 3.5-inch screen to display the device status, menus, submenus and messages for parameter settings.                                                                                                                                              |

| Name | Function                                                                                                                                                                                                                                                                                                                                                                                         |
|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Knob | <ul style="list-style-type: none"> <li>On the home screen, press the knob to enter the main menu screen.</li> <li>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.</li> <li>Hold down the knob and <b>BACK</b> button simultaneously for 5s or longer to lock or unlock the buttons and screen.</li> </ul> |
| BACK | Go back to the previous menu or cancel the current operation.                                                                                                                                                                                                                                                                                                                                    |

## Rear Panel



| Inputs           |     |                           |                                                                                              |
|------------------|-----|---------------------------|----------------------------------------------------------------------------------------------|
| Type             | Qty | Description               |                                                                                              |
| HDMI 2.0-1<br>IN | 1   | Resolutions               | Max resolution: 4096×2160@60Hz/8192×1080@60Hz (Forced)<br>Min resolution: 800×600@60Hz       |
|                  |     | Max width/height (Forced) | Max width: 8192 pixels (8192×1080@60Hz)<br>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.<br>Support HLG. |
|                  |     | EDID management           | Support standard resolutions, up to 3840×2160@60Hz.<br>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       | 1   | Resolutions               | Max resolution: 4096×2160@60Hz/8192×1080@60Hz                                                |

| Inputs        |     |                           |                                                                                              |
|---------------|-----|---------------------------|----------------------------------------------------------------------------------------------|
| Type          | Qty | Description               |                                                                                              |
| IN            |     |                           | (Forced)<br>Min resolution: 800×600@60Hz                                                     |
|               |     | Max width/height (Forced) | Max width: 8192 pixels (8192×1080@60Hz)<br>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.<br>Support HLG. |
|               |     | EDID management           | Support standard resolutions, up to 3840×2160@60Hz.<br>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)<br>Min resolution: 800×600@60Hz       |
|               |     | Max width/height (Forced) | Max width: 8192 pixels (8192×1080@60Hz)<br>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.<br>Support HLG. |
|               |     | EDID management           | Support standard resolutions, up to 3840×2160@60Hz.<br>Support custom input resolutions.     |
|               |     | HDCP                      | HDCP 2.2 compliant, backwards compatible with HDCP 1.4/HDCP 1.3.                             |
|               |     | Interlaced signal inputs  | Not supported.                                                                               |

| Inputs     |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                             |
|------------|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|
| Type       | Qty | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                             |
| DP 1.2     | 1   | Resolutions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Max resolution: 4096×2160@60Hz/8192×1080@60Hz (Forced)<br><br>Min resolution: 800×600@60Hz                  |
|            |     | Max width/height (Forced)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Max width: 8192 pixels (8192×1080@60Hz)<br><br>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                     |
|            |     | EDID management                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Support standard resolutions, up to 3840×2160@60Hz.<br><br>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. |
|            |     | Resolutions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Max resolution: 4096×2160@60Hz<br><br>Min resolution: 720×480i@59.94Hz                                      |
|            |     | Frame rates                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 23.98/24/25/29.97/30/47.95/48/50/59.94/60 Hz                                                                |
|            |     | 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  | <p>Gigabit Ethernet output ports. Support hot backup between Ethernet ports.</p> <ul style="list-style-type: none"><li>• Max device load capacity: 9 million pixels</li><li>• Max output width/height: 16,384 pixels</li><li>• The maximum load capacity per Ethernet port is as follows. For details, refers to <a href="#">Ethernet Port Load Capacity</a>:<ul style="list-style-type: none"><li>– 8bit@60Hz: 659,722 pixels</li><li>– 10bit@60Hz: 494,791 pixels (available only with the A10s Pro or A8s Pro receiving cards)</li><li>– 10/12bit@60Hz: 329,861 pixels</li></ul></li></ul> |                                                                                                             |

| Inputs  |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|---------|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Type    | Qty | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|         |     |  <b>Note</b><br><p>The load capacity of a single Ethernet port can only achieve its maximum when the load width is 128 pixels or more. If the load width is less than that, the load capacity will be reduced accordingly, calculated as <math>(128 - \text{load width}) \times \text{load height}</math>.</p> <p>When using the Ethernet port, pair it with a CAT5E cable for a maximum length of 100 meters.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| OPT 1-4 | 4   | <p>10G optical output ports with a transmission rate of 10.3125 Gbps.</p> <p>Supports setting of output mode. Users may choose between 20-port mode and 40-port mode.</p> <ul style="list-style-type: none"> <li>• 20-port mode: <ul style="list-style-type: none"> <li>– OPT 1 transmits the data of Ethernet ports 1 to 10. OPT 3 is the copy channel of OPT 1.</li> <li>– OPT 2 transmits the data of Ethernet ports 11 to 20. OPT 4 is the copy channel of OPT 2.</li> <li>– You can use the optical port alongside the physical Ethernet port, with priority given in the following order: OPT 1/2 &gt; OPT 3/4 &gt; Ethernet ports 1-20.</li> </ul> </li> <li>• 40-port mode: <ul style="list-style-type: none"> <li>– OPT 1 transmits the data of Ethernet ports 1 to 10.</li> <li>– OPT 2 transmits the data of Ethernet ports 11 to 20.</li> <li>– OPT 3 transmits the data of Ethernet ports 21 to 30.</li> <li>– OPT 4 transmits the data of Ethernet ports 31 to 40.</li> <li>– You can use the optical port alongside the physical Ethernet port, with priority given in the following order: OPT 1/2 &gt; Ethernet ports 1-20.</li> </ul> </li> </ul>  <b>Note</b> <ul style="list-style-type: none"> <li>• The product doesn't include an optical module by default. If you need one, it's recommended to choose a compatible NovaStar product.</li> <li>• When both the optical and Ethernet ports are used simultaneously, please do NOT connect the controller'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.</li> <li>• When Ethernet port backup is enabled in 40-port mode, the first 20 Ethernet ports are backed up by the last 20 Ethernet ports. When switching to the 20-port mode, please remember to remove the loop backup setup of the</li> </ul> |

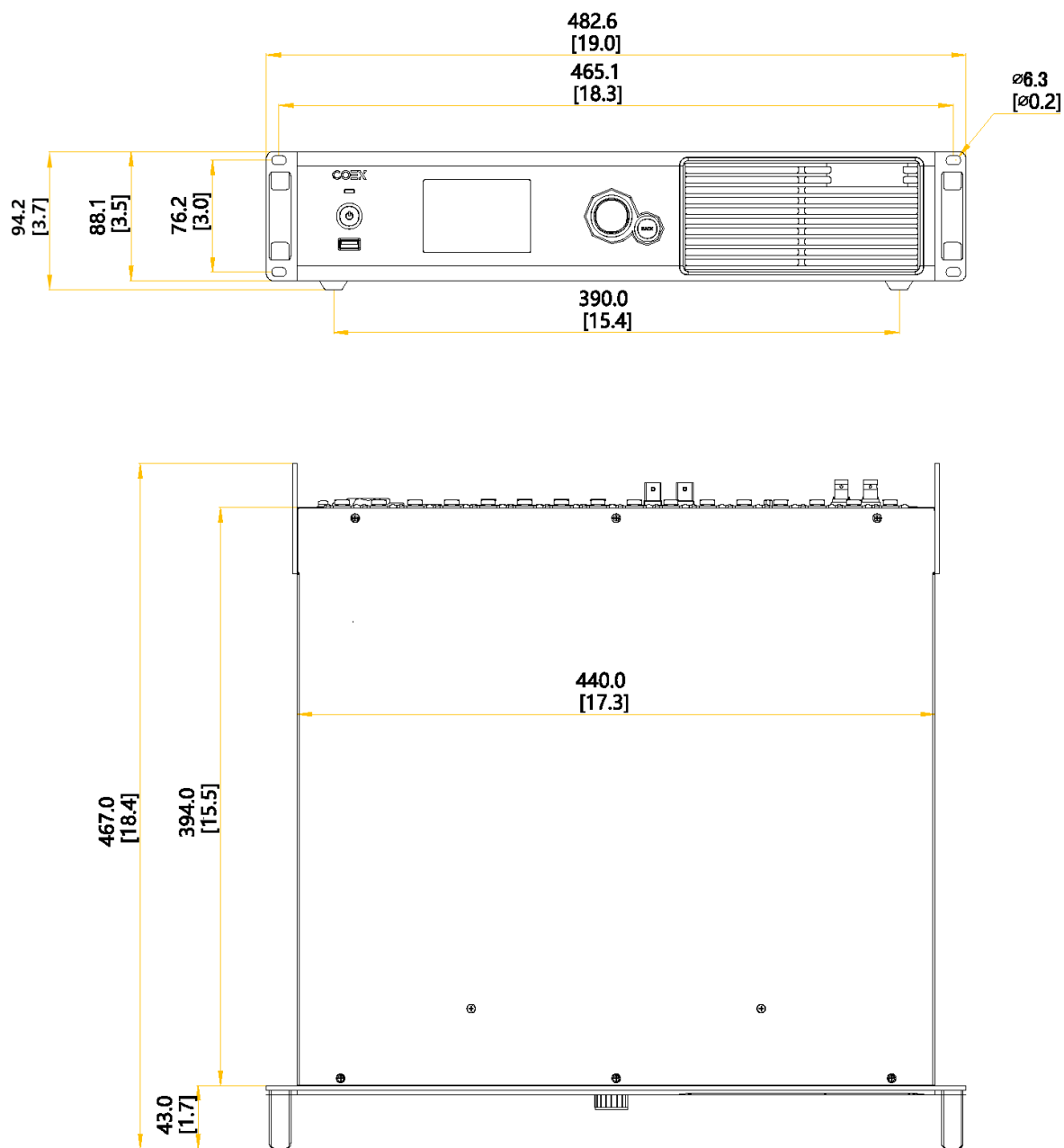
| Inputs             |     |                                                                                                                                                                                                                                                                                                                                                                                                    |
|--------------------|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Type               | Qty | Description                                                                                                                                                                                                                                                                                                                                                                                        |
|                    |     | receiving card.                                                                                                                                                                                                                                                                                                                                                                                    |
| 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. You can select one of the connected input sources (HDMI 2.0_2 or HDMI 2.0_3) for audio output.                                                                                                                                                                                                                                                                             |
| Controls           |     |                                                                                                                                                                                                                                                                                                                                                                                                    |
| Type               | Qty | Description                                                                                                                                                                                                                                                                                                                                                                                        |
| ETHERNET           | 2   | Gigabit Ethernet control ports. Support TCP/IP protocol and star connection.<br>They have the same functions without priority and order, and can be connected to VMP software and central control devices. 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 can be cascaded. |
| GENLOCK            | 1   | A pair of Genlock signal connectors. Support Bi-Level, Tri-Level, and Blackburst.<br><ul style="list-style-type: none"> <li>• IN: Accept the sync signal</li> <li>• LOOP: Loop the sync signal</li> </ul> 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 can be cascaded.                                  |
| AUX                | 1   | An auxiliary connector for connecting to central control devices (RS232).                                                                                                                                                                                                                                                                                                                          |
| Power              |     |                                                                                                                                                                                                                                                                                                                                                                                                    |
| 100-240V~, 50/60Hz | 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.

## Dimensions



Tolerance:  $\pm 0.3$  [ $\pm 0.012$ ] Unit: mm [inch]

## Product Specifications

|                           |                       |                    |
|---------------------------|-----------------------|--------------------|
| Electrical Specifications | Power input           | 100-240V~, 50/60Hz |
|                           | Max power consumption | 95 W               |
| Operating                 | Temperature           | -20°C to +45°C     |

|                         |               |                                                                                                                                                                                      |
|-------------------------|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Environment             | 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 × 94.2 mm × 467.0 mm (foot pad included)                                                                                                                                    |
|                         | Net weight    | 7.5 kg                                                                                                                                                                               |
|                         | Gross weight  | 10.5 kg<br>Note: It is the total weight of the product, accessories, and packing materials packed according to the packing specifications.                                           |
| Packing Information     | Packing box   | 5950.0 mm × 575.0 mm × 215.0 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"> <li>• 1x Power cord</li> <li>• 1x Ethernet cable</li> <li>• 1x HDMI cable</li> <li>• 1x DP cable</li> <li>• 1x Certificate of Approval</li> </ul> |
| 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.

## Video Source Specifications

| Input    | Resolution |                    | Color Space | Sampling | Bit Depth  | Integer Frame Rate (Hz) |
|----------|------------|--------------------|-------------|----------|------------|-------------------------|
| HDMI 2.0 | 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 |                         |
|          |            |                    |             | 4:2:0    | 8/10/12bit | 30/48/50/60             |
|          |            | 3840×2160          | RGB / YCbCr | 4:4:4    | 12bit      | 24/25/30                |
|          |            |                    |             |          | 10bit      | 24/25/30/48/50          |

| Input  | Resolution |                       | Color Space    | Sampling | Bit Depth  | Integer Frame Rate (Hz)                                          |
|--------|------------|-----------------------|----------------|----------|------------|------------------------------------------------------------------|
|        |            |                       | YCbCr          |          | 8bit       | 24/25/30/48/50/60                                                |
|        |            |                       |                | 4:2:2    | 8/10/12bit |                                                                  |
|        |            |                       |                | 4:2:0    | 8/10/12bit | 48/50/60                                                         |
|        |            | 2K1K<br>2560×1440     | RGB /<br>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 |                                                                  |
|        |            |                       |                |          | 4:2:0      |                                                                  |
|        |            |                       |                |          | 8/10/12bit | 75/100/120                                                       |
|        |            | 1920×1080             | RGB /<br>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                          |
|        |            |                       | YCbCr          | 4:2:2    | 8/10/12bit |                                                                  |
|        |            |                       |                |          | 4:2:0      |                                                                  |
|        |            |                       |                |          | 8/10/12bit | 120/144/240                                                      |
| DP 1.2 | 4K         | 4096×2160<br>(Forced) | RGB /<br>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                                             |
|        |            |                       | YCbCr          | 4:2:2    | 8/10/12bit |                                                                  |
|        |            | 3840×2160             | RGB /<br>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                                             |
|        |            |                       | YCbCr          | 4:2:2    | 8/10/12bit | (75 Hz needs to be forced)                                       |
|        | 2K1K       | 2560×1440             | RGB /<br>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 /<br>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 |                                                                  |

| Input   | Resolution |           | Color Space | Sampling | Bit Depth | Integer Frame Rate (Hz) |
|---------|------------|-----------|-------------|----------|-----------|-------------------------|
| 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.
- When using YCbCr 4:2:0 input, all frame rates need to be forced. Standard graphics cards only support a 4K resolution at 50/60 Hz. Other resolutions and frame rates require a source device that supports this color space and sampling to be forced.

## Ethernet Port Load Capacity

### When Working with A10s Pro\A8s Pro and Their Derivative Receiving Cards

When working with the A10s Pro\A8s Pro and their derivative 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 × 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                                        | 1,649,306 | 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 |

| Max Load Capacity per Ethernet Port (Pixels) |         |         |         |
|----------------------------------------------|---------|---------|---------|
| Frame Rate / Bit Depth                       | 8bit    | 10bit   | 12bit   |
| 144 Hz                                       | 274,884 | 206,163 | 137,442 |
| 240 Hz                                       | 164,931 | 123,698 | 82,465  |

## When Working with Other Armor Series Receiving Cards

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  $\times 24 \times$  Frame rate  $< 1000 \times 1000 \times 1000 \times 0.95$
- 10bit: Load capacity  $\times 48 \times$  Frame rate  $< 1000 \times 1000 \times 1000 \times 0.95$
- 12bit: Load capacity  $\times 48 \times$  Frame rate  $< 1000 \times 1000 \times 1000 \times 0.95$

| Max Load Capacity per Ethernet Port (Pixels) |           |         |         |
|----------------------------------------------|-----------|---------|---------|
| Frame Rate / Bit Depth                       | 8bit      | 10bit   | 12bit   |
| 24 Hz                                        | 1,649,306 | 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

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

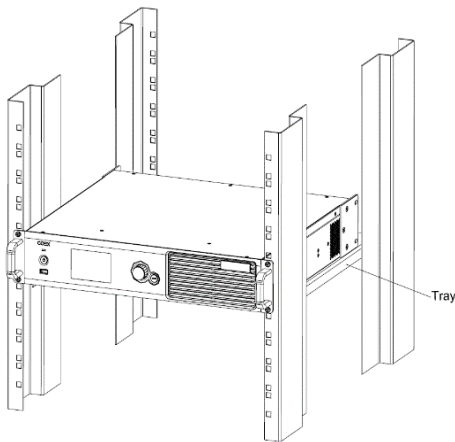
## Notes and Cautions

### Notes for Battery

- The battery is not intended to be replaced.
- Disposal of a battery into fire or a hot oven, or mechanically crushing or cutting of a battery can result in an explosion.
- Leaving a battery in an extremely high temperature surrounding environment can result in an explosion or the leakage of flammable liquid or gas.
- A battery subjected to extremely low air pressure may result in an explosion or the leakage of flammable liquid or gas.

### Notes for Installation

When the product needs to be installed on the rack, 4 screws at least M5\*12 should be used to fix it. The rack for installation shall bear at least 9kg weight.



- Elevated Operating Ambient – If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Therefore, consideration should be given to installing the equipment in an environment compatible with the maximum ambient temperature (T<sub>ma</sub>) specified by the manufacturer.
- Reduced Air Flow – Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised.
- Mechanical Loading – Mounting of the equipment in the rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.
- Circuit Overloading – Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on overcurrent

protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.

- Reliable Earthing – Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (e.g. use of power strips).

## FCC Caution

- Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.
- This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.
- Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

## Others

- This product can only be placed horizontally. Do not mount vertically or upside-down.
- This is Class A product. In a domestic environment, this product may cause radio interference in which case the user may be required to take adequate measures.

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