

SP60 Pro

LED Display Controller



Specifications

Change History

Document Version	Release Date	Description
V1.2.0	2024-10-24	<ul style="list-style-type: none"> Added feature descriptions for dynamic Booster, image quality enhancement, and presets. Added support for Delta3 and Delta4 sub-pixel layouts. Supports mixed output via optical port and Ethernet, as well as SPDIF audio output.
V1.1.1	2024-04-07	Updated product information.
V1.1.0	2023-09-06	Added feature descriptions for 8K layers, full-grayscale calibration, and 3D function.
V1.0.0	2023-07-27	First release

Introduction

The SP60 Pro is an LED display controller created by Xi'an NovaStar Tech Co., Ltd. (referred to as NovaStar). It is specifically designed for sub-pixel (virtual pixel) screens and boasts 20 Ethernet ports. This controller combines video processing and control functions and features 2x HDMI 2.0 input ports, 20x Ethernet output ports, and 2x 10G optical ports. It can also work with the brand-new software VMP (Vision Management Platform) to provide a better operation and control experience.

Certifications

CCC, CE, FCC, IC

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

- HDMI input
 - 2x HDMI 2.0 (with loop output)
- 10-bit and 8-bit video inputs
- 3 types of outputs
 - 20x Gigabit Ethernet ports
 - 2x 10G optical ports
 - 1x SPDIF digital audio port
- 2 types of controls
 - 2x Ethernet control ports
 - 1x Auxiliary port

Sub-pixel Technique

The SP60 Pro supports mainstream sub-pixel layouts. Thanks to its pixel enhancement technology, it can display more content on sub-pixel screens without changing the physical pixel density. Different sub-pixel layouts also reduce the number of LED chips and driver ICs required, simplifying the module wiring and improving heat dissipation. When using dynamic sub-pixel rendering technology, it supports the following three modes:

- **Standard:** The default mode, designed to be versatile and user-friendly, making it well-suited for most scenarios.
- **Video:** Ideal for scenarios involving video and image playback. It enhances the visual experience by delivering vibrant and pleasing playback that are especially appealing to the human eye.
- **Document:** Specifically tailored for scenarios with many lines and texts, such as Word/PDF/PPT document display. It ensures a comfortable viewing experience, minimizing eye strain.

Advanced Features

- 2 independent layers
Users can add up to 2 layers. The maximum resolution for a single layer is 8K×2K, or 2 layers of 4K×2K can be spliced together.
- Image scaling
Supports 4 image scaling modes: custom, pixel to pixel, snap to canvas, and fill screen.
- 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.
- Image quality enhancement
Improves the display from three aspects: contrast, detail, and color. It enhances the overall intricacy and richness of the image, sharpens edge details, and makes colors more vivid and full.
- Full-grayscale calibration
Work with NovaStar’s high-precision calibration system and the C3200 scientific grade camera to generate unique calibration coefficients for each grayscale, ensuring uniformity of each grayscale and dramatically improving the image quality.
- 3D
Works with 3D emitter and 3D glasses to bring a fascinating and immersive 3D viewing experience.
- HDR
 - Supports HDR10 and comply with the SMPTE ST 2084 and SMPTE ST 2086 standards.
- Supports HLG.
- Latency
 - Supports low latency and the controller load capacity is not reduced. 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.
 - Supports additional latency. Zero to two frames of latency can be added at the controller.
- 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.
- Crop input source
Allows for input source cropping, enabling the creation of a new input source without impacting the original input source.
- Two working modes
 - In the Send-Only Controller mode, the latency can be reduced by one frame.
 - In the All-In-One Controller mode, the layer and scaling functions are available.

Device Controls

- VMP software control
The device can be connected to the VMP software to provide easy and convenient operations and smart device management.
- Cascading control via Ethernet
The Gigabit Ethernet control ports support TCP/IP protocol and star topology. With their built-in network switching function, serial cascading control of multiple devices can be realized without a switch.
- Supports the SNMP and Art-Net protocols
- Display system monitoring
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 1-1 Function Limitations

Function	Limitation
Dynamic Booster	It is required to work with the A10s Pro receiving card and users need to use a CA410-VP427, CA410-P427, or CA410-P427H colorimeter to perform gamut and brightness correction.

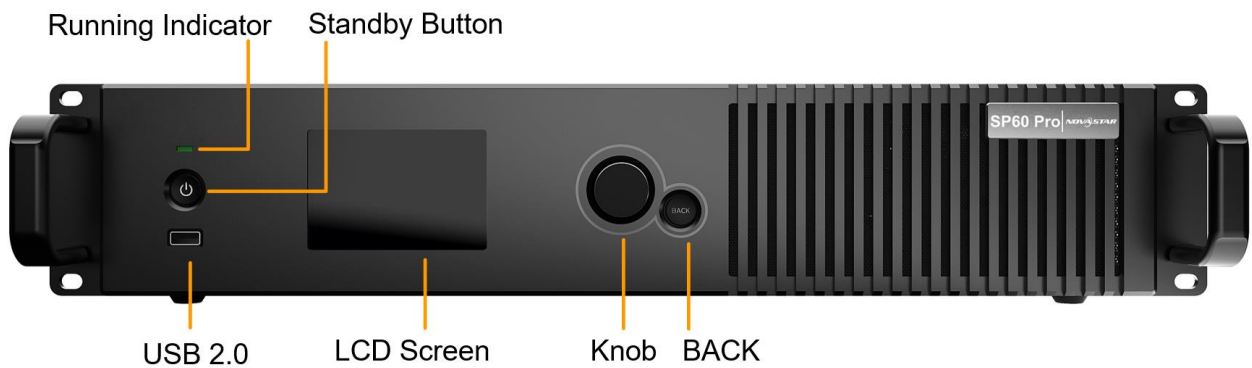
Full Grayscale Calibration	It is required to work with the A8s Pro (2-layer grayscale) or A10s Pro (4-layer grayscale) receiving card and users need to use a C3200 or CC60 camera to perform full-grayscale calibration.
Low Latency	Low Latency cannot be enabled simultaneously with 3D. Moreover, it is recommended to ensure all Ethernet ports load the cabinets vertically and share the same Y coordinate (all set to 0) when Low Latency is enabled.

Note

The SP60 Pro must be used in conjunction with receiving cards that support dynamic sub-pixel rendering solutions, including models A8s Pro, A10s Pro, MRV532, NV3210, BR624L, and NS6323A.

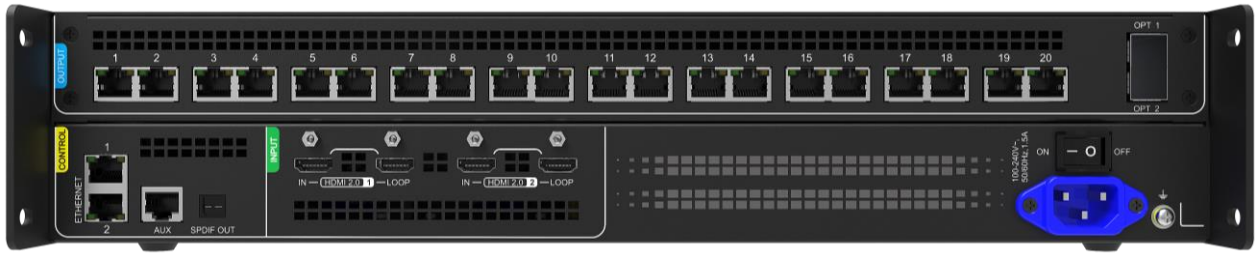
Appearance

Front Panel




Name	Description
Running indicator	<ul style="list-style-type: none"> • Solid red: Standby • Solid blue: The device is being powered on. • Solid green: The device is running normally. • Flashing red: The device is running abnormally.
Standby button	<ul style="list-style-type: none"> • Press the button to power on or power off the device. • Hold down the button for 5s to 10s to restart the device.
USB 2.0	<ul style="list-style-type: none"> • Connect to a USB drive only to export the device diagnostic result. • Only the NTFS and FAT32 file systems are supported. Others are not supported.
LCD screen	A 3.5-inch screen that displays the device status, menus, submenus and messages for parameter settings
Knob	<ul style="list-style-type: none"> • On the home screen, press the knob to enter the main menu screen. • On the main menu screen, rotate the knob to select a menu item or adjust the parameter value. Press the knob to confirm the operation. • Hold down the knob and BACK button simultaneously for 5s or longer to lock or unlock the buttons.
BACK	Go back to the previous menu or cancel the current operation.

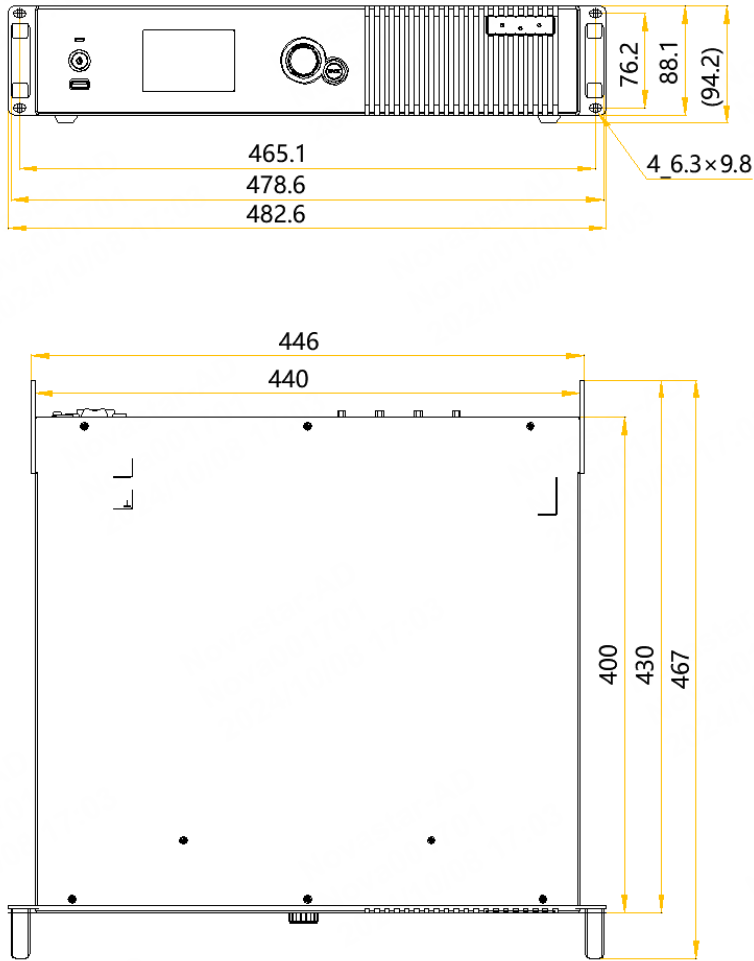
Rear Panel



Inputs			
Type	Qty	Description	
HDMI 2.0-1 IN & HDMI 2.0-2 IN	2	Resolution	Max resolution: 4096×2160@60Hz or 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	Support HDCP 2.2, backwards compatible with HDCP1.4 / 1.3.
		Interlaced signal inputs	No support
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"> • The maximum sub-pixel load capacity of the device is 17.69 million. • For Delta1 sub-pixel layout, the maximum sub-pixel load capacity of a single port is: <ul style="list-style-type: none"> – 8bit@60Hz: 1.3 million pixels. – 10bit@60Hz: 0.975 million pixels. – 8bit@120Hz: 0.65 million pixels. • For RGGB sub-pixel layout, the maximum sub-pixel load capacity of a single port is: <ul style="list-style-type: none"> – 8bit@60Hz: 1.95 million pixels. – 10bit@60Hz: 1.56 million pixels. – 8bit@120Hz: 0.975 million pixels. • For Delta3 sub-pixel layout, the maximum sub-pixel load capacity of a single port is: <ul style="list-style-type: none"> – 8bit@60Hz: 1.95 million pixels. – 10bit@60Hz: 1.4625 million pixels. – 8bit@120Hz: 0.65 million pixels. • For Delta1 sub-pixel layout, the maximum sub-pixel load capacity of a single port is: <ul style="list-style-type: none"> – 8bit@60Hz: 2.6 million pixels. – 10bit@60Hz: 1.95 million pixels. – 8bit@120Hz: 1.3 million pixels. <p> Note:</p> <ul style="list-style-type: none"> – Please note that when calculating the load capacity, do not exceed the total load capacity of the device.
OPT 1–2	2	<p>10G optical output ports</p> <ul style="list-style-type: none"> • OPT 1 outputs the data on Ethernet ports 1 to 10. • OPT 2 outputs the data on Ethernet ports 11 to 20. • Supports mixed output through both optical and Ethernet ports. <p>Ethernet ports associated with different numbered optical ports support selective output. When both are connected, the priority is: Optical ports > Ethernet ports.</p>
HDMI 2.0 LOOP	2	An HDMI loop output connector
SPDIF OUT	1	A digital audio output port that allows you to choose and output audio from one of two HDMI input sources.
Controls (CONTROL area)		
Type	Qty	Description
ETHERNET	2	<p>Gigabit Ethernet control ports. Support TCP/IP protocol and star connection.</p> <p>They have the same functions without priority and order, and can be connected to VMP software. No switch or router is needed to deploy multiple devices on the same LAN via device cascading as the network switching function is already built in. Up to 20 SP60 Pro can be cascaded.</p>
AUX	1	An auxiliary connector that connects to the central control device (RS232) (Reserved)
Power		
100-240V~, 50/60Hz, 1.5A	1	An AC power input connector and switch

Dimensions



Tolerance: ±0.3 Unit: mm

Specifications

Electrical Specifications	Power input	100-240V~, 50/60Hz, 1.5A
	Max power consumption	82 W
Operating Environment	Temperature	-20°C to +50°C
	Humidity	0% RH to 80% RH, non-condensing
Storage Environment	Temperature	-30°C to +80°C
	Humidity	0% RH to 95% RH, non-condensing
Physical Specifications	Dimensions	482.6mm × 94.2mm × 467.0mm
	Net weight	7.4 kg
	Gross weight	10.2 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	<ul style="list-style-type: none"> • 1x Power cord • 1x Ethernet cable • 1x HDMI cable • 1x Certificate of Approval
IP Rating	IP20 Please prevent the product from water intrusion and do not wet or wash the product.	

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

Video Source Specifications

Input	Resolution		Color Space	Sampling	Bit Depth	Integer Frame Rate (Hz)
HDMI 2.0-1 / HDMI 2.0-2	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	8/10bit	
		3840×2160	RGB / YCbCr	4:4:4	10bit	24/25/30/48/50
					8bit	24/25/30/48/50/60
			YCbCr	4:2:2	8/10bit	
	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	8/10bit	
		1920×1080	RGB / YCbCr	4:4:4	10bit	24/25/30/48/50/60/72/75/100/120/144
					8bit	24/25/30/48/50/60/72/75/100/120/144/240 (240 Hz needs to be forced)
			YCbCr	4:2:2	8/10bit	

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.

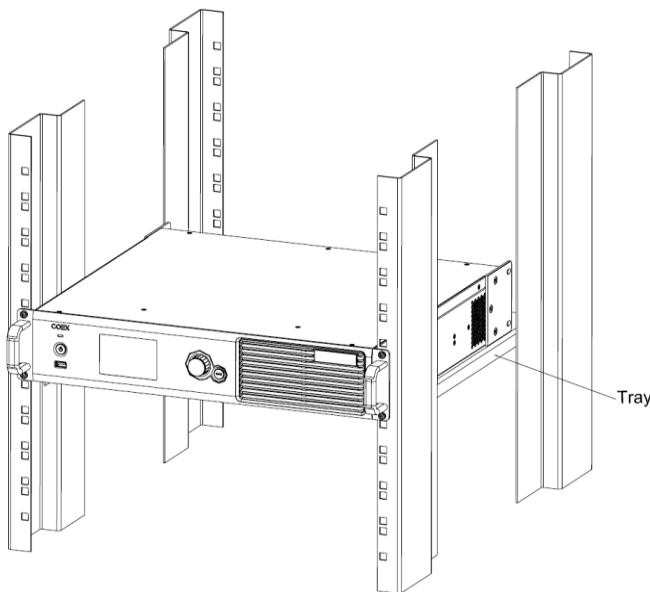
Notes and Cautions

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 29.6 kg 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_{ma}) 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).

Warning

- Operating this device in a domestic environment may cause radio interference.
- When using the device, please ensure it is placed horizontally. Do not flip or place it vertically.

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