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KU20

LED Display Controller



Specifications

Change History

Document Version	Release Date	Description
V1.1.0	2023-02-08	• Added the All-In-One Controller working mode. • Added the image scaling function. • Added the temperature scale switching function. • Support the SNMP and Art-Net protocols. • Support 8-bit output bit depth only (10-bit supported by customized program).
V1.0.2	2022-11-24	• Updated the description of the USB port on the front panel. • Added a table of load capacity per Ethernet port. • Added the limitations of some functions.
V1.0.1	2022-10-24	Updated the appearance diagram.
V1.0.0	2022-10-11	First release

Introduction

The KU20 is an LED display controller with 6 Ethernet ports in the brand-new control system COEX series of Xi'an NovaStar Tech Co., Ltd. (hereinafter referred to as NovaStar). This controller offers 1x HDMI input, 6x Ethernet outputs and 1x optical 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, FCC, IC, UL, CB, PSE, RCM, KC

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
  1x HDMI 1.3 input (with loop through)
- 10-bit and 8-bit video inputs
- Ethernet outputs
  6x Ethernet ports, load capacity up to 3.9 million pixels
- Optical output
  1x 10G optical output

Advanced Features

- Image scaling
  Support 2 image scaling modes: custom and pixel to pixel.
- 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.

- Pixel level brightness and chroma calibration
  Work with NovaStar's high-precision calibration system to calibrate the brightness and chroma of each pixel, effectively eliminating differences and enabling high consistency for both brightness and chroma.
- Latency
  - Support low latency. The latency at the controller is 0 frame (less than 1 ms) and the load capacity is not reduced.
  - Support additional latency. Zero to two frames of latency can be added at the controller.
- Frame Rate Adaptive
  The controller is adaptive to various video input frame rates, including decimal frame rates. Custom frame rates are also supported and the step size of fine tuning frame rate is as small as 0.01 Hz.
- Display system monitoring
  Support monitoring of the device status and screen status. Any fault and alarm information can be reported actively.
- Two working modes
  Support the All-In-One Controller and Send-Only Controller working modes. 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.
- Support the SNMP and Art-Net 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.

Function Limitations

- The Frame Rate Adaptive function can be achieved when the KU20 works with the A10s Pro receiving card. Currently supported driver ICs include MBI5264, MBI5253B, ICND2055, ICND2065, ICND2059 and ICND2069. In addition, the .ncp file generated by the Cabinet Tool from NovaStar must be used.
- The Full Grayscale Calibration function can be achieved when the KU20 works with the A10s Pro receiving card.

Appearance

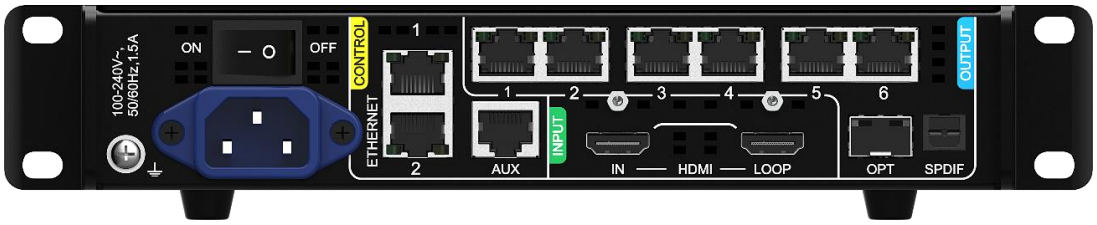
Front Panel



Name	Description
Running Indicator	• Solid red: Standby • Solid blue: The device is being started. • Solid green: The device is running normally. • Flashing red: The device is running abnormally.

Name	Description
Standby Button	• Press the button to power on or power off the device. • Hold down the button for 5s or longer to restart the device.
USB 2.0	• Connect to a USB drive only to export the device diagnostic result and send the cabinet configuration file. • Only the NTFS and FAT32 file systems are supported. Others are not supported.
LCD Screen	A 2.0-inch screen to display the device status, menus, submenus and messages for parameter settings
Knob	• On the home screen, press the knob to enter the main menu screen. • On the main menu screen, rotate the knob to select a menu item or adjust the parameter value. Press the knob to confirm the operation. • Hold down the knob and **BACK** button simultaneously for 5s or longer to lock or unlock the buttons.
BACK	Go back to the previous menu or cancel the current operation.

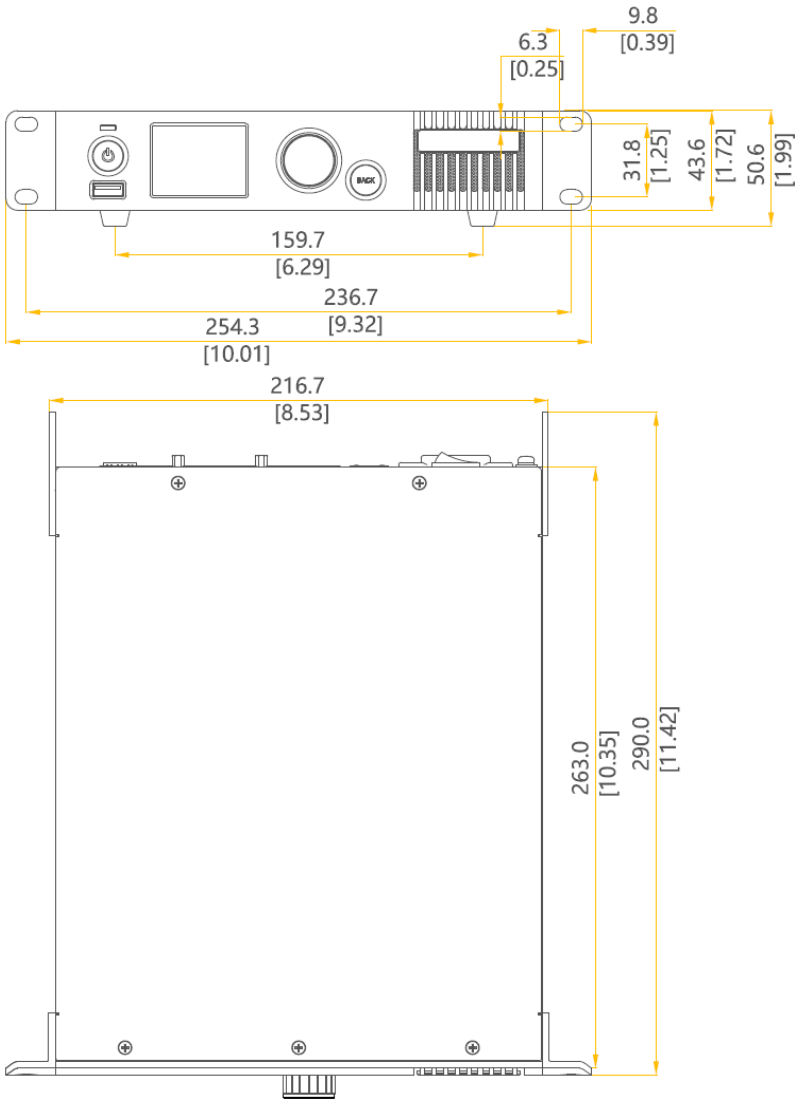
Rear Panel



Inputs			
Type	Qty	Description	
HDMI IN	1	Resolutions	Max resolution: 1920×1200@60Hz Min resolution: 800×600@60Hz
		Max width/height	Max width: 3840 (3840×600@60Hz) Max height: 2560 (800×2560@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 Hz
		EDID management	Support standard resolutions, up to 1920×1200@60Hz. Support custom input resolutions.
		HDCP	HDCP 1.4 compliant
		Interlaced signal inputs	Not supported
Outputs			
Type	Qty	Description	
1–6	6	Gigabit Ethernet output ports. Support hot backup between Ethernet ports. • Max device load capacity: 3.9 million pixels • The maximum load capacity per Ethernet port is 659,722 pixels (8bit@60Hz). For details, see the Ethernet Port Load Capacity section. Note: The customized KU20 program supports 10-bit output when it works with the A10s Pro receiving card. If needed, please contact NovaStar for customization.	
OPT	1	10G optical output port	
HDMI LOOP	1	HDMI loop through. Up to 8 devices can be cabled in one loop.	
SPDIF	1	A digital audio output (Reserved)	

Controls		
Type	Qty	Description
ETHERNET	2	Gigabit Ethernet control ports. Support TCP/IP protocol and star topology. They have the same functions without priority and order, and can be connected to VMP software. No switch or router is needed to deploy multiple devices on the same LAN via device cascading as the network switching function is already built in. Up to 20 KU20 devices can be cascaded.
AUX	1	An auxiliary port that connects to the central control device (RS232) (Reserved)
Power		
100-240V~, 50/60Hz, 1.5A	1	An AC power input connector and switch

Dimensions



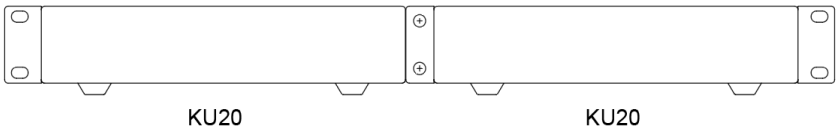
Tolerance: ±0.3 [±0.012] Unit: mm

[inch]

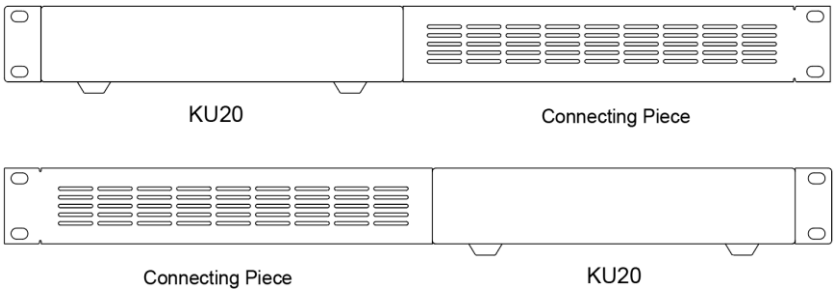
Assembling Effect Diagram

A single KU20 device is half-1U in width. Two KU20 devices, or one KU20 device and a connecting piece can be combined into one assembly that is 1U in width. The assembly can be mounted in a standard 19-inch rack.

Assembly of Two KU20



Assembly of a KU20 and a Connecting Piece



Product Specifications

Electrical Specifications	Power input	100-240V~, 50/60Hz, 1.5A
	Max power consumption	25 W
Operating Environment	Temperature	–20ºC to +50ºC
	Humidity	0% RH to 80% RH, non-condensing
Storage Environment	Temperature	–30ºC to +80ºC
	Humidity	0% RH to 95% RH, non-condensing
Physical Specifications	Dimensions	254.3 mm × 50.6 mm × 290.0 mm
	Net weight	2.1 kg
	Gross weight	3.1 kg Note: It is the total weight of the product, accessories, and packing materials packed according to the packing specifications.
Packing Information	Outer box	387.0 mm × 173.0 mm × 359.0 mm, kraft paper box
	Packing box	362.0 mm × 141.0 mm × 331.0 mm, white cardboard box
	Accessories	• 1x Power cord • 1x Ethernet cable • 1x HDMI cable • 1x Supporting bracket A (with nuts), 1x Supporting bracket B (without nuts) • 1x Connecting piece • 12x M3*8 screws • 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	Bit Depth	Color Space/Sampling	Max Input Resolution
HDMI 1.3	8bit/10bit	RGB 4:4:4	1920×1200@60Hz
		YCbCr 4:4:4	
		YCbCr 4:2:2	

Ethernet Port Load Capacity

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

Load capacity × 24 × Frame rate < 1000 × 1000 × 1000 × 0.95

Max Load Capacity per Ethernet Port (Pixels)	
Frame Rate / Bit Depth	8bit
24 Hz	1,649,305
25 Hz	1,583,333
30 Hz	1,319,444
50 Hz	791,667
60 Hz	659,722
120 Hz	329,861

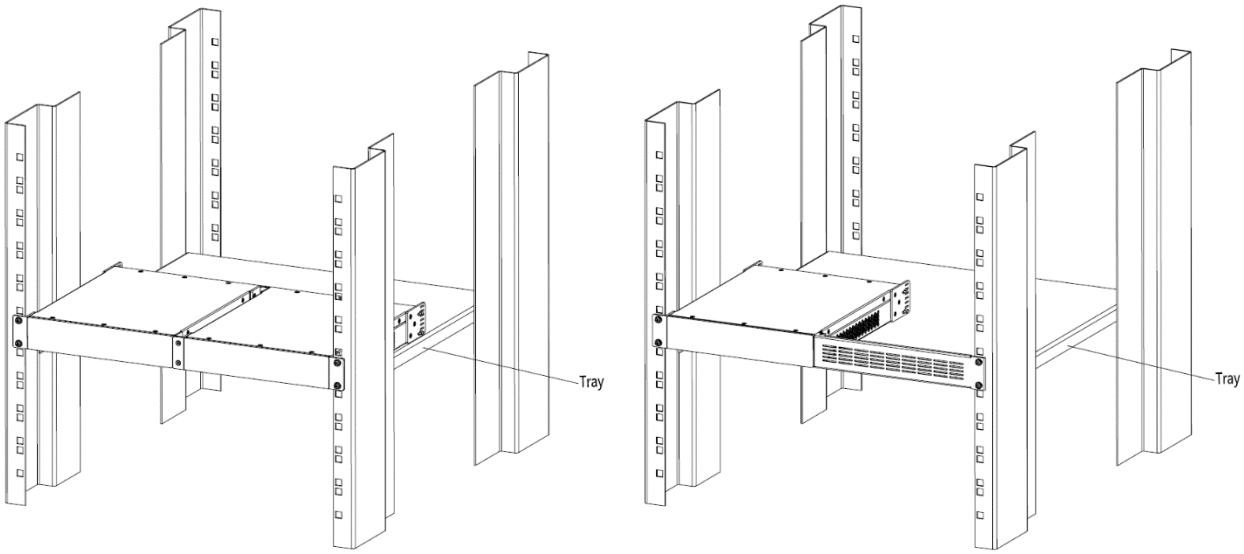
Notes and Cautions

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 (Tma) 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.