

Colorlight

DS20

Distributed Controller

Quick Start Guide v1.0



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1 Safety Information

This product is a professional device for industrial purposes, rather than consumer goods for household use. It is used for specific applications, such as outdoor commercial advertising, public information release, store digital signage, and advertising machines.

To avoid personal injury and equipment damage, please read and comply with the following instructions.

Power supply safety

- The power supply of this device is designed with a wide input voltage range (AC 100-240V). Please use the power cord delivered together with the device or adopt a power cord that complies with the electrical specification of the device.
- Do not put heavy objects on the power cord or the device.
- Power supply for the device must be grounded.
- The device contains live parts. To avoid electric shock, do not disassemble the device without permission.
- To avoid electric shock, do not disassemble the device while it is power-on.
- Turn off the main power supply of the device when it is used in a humid environment or when it has not been used for a long time.
- Disconnect the power supply when the device is not in use.

Operation safety

- Please use this device at altitudes of 5,000 meters or below.
- To prevent device damage, serious personal injury, or even death caused by the device falling, place the device on a stable and level surface.
- To avoid electric shock, do not operate the device with wet hands.
- Do not place or use the device near flammable materials or in an environment with explosive gas or heat sources.
- Do not spill any corrosive chemicals or liquids on or near the device.
- If the device has not been powered on for a long period of time, it must be checked and tested before use.
- Power off the device before cleaning and use dry cloth for the cleaning.
- Keep the heat dissipation hole unblocked and maintain a well-ventilated operation environment so as to ensure the heat generated during operation can dissipate promptly, thus avoiding device damage caused by poor heat dissipation.
- It is suggested to use proper packing or maintain the original packing during transportation to avoid device damage due to strong hit by external forces.
- Be careful to prevent the device from falling while in motion to avoid personal injury or device damage.

Grounding instructions

- This product must be grounded. When equipment fails, the protective grounding contact in the power socket should be reliably connected to the protective grounding terminal in the equipment. This product is equipped with a power cord with a grounding plug. The plug must be plugged into an outlet that is properly installed and grounded in accordance with all local codes and ordinances.
- Improper connection of equipment grounding is able to result in a risk of electric shock. Check with a qualified electrician if you are in doubt as to whether the product is properly grounded. Do not modify the plug included with the product. If the plug is not suitable for the socket, please have a qualified electrician install a suitable socket.

Class A statement

- Warning: Using the product in a residential environment may cause radio interference.

Environmental protection

- Do not dispose of the device and its accessories as regular household wastes. Retire the device as industrial waste. Incineration is strictly prohibited.

Unpacking and inspection

After unpacking, please check the attached packing list and see whether all parts are included. If you find any parts incomplete or missing, please contact the seller promptly.

2 Overview

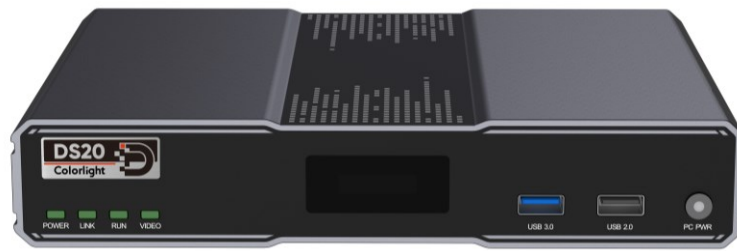


Fig 2-1 DS20 product rendering

DS20 is a distributed controller that boasts networked and server-less characteristics. As an IP KVM device, it integrates functions like video splicing, KVM operator collaboration, and video matrix. In addition to 4K@30Hz or 2K@60Hz input and output, it enables seamless switching, windowing, scaling, and cross-screen display on LED/LCD video walls.

Equipped with multiple control ports, DS20 supports control of IR devices and relays. It also offers management for IoT devices such as air conditioners via the RS232 or RS485 protocol. DS20 offers easy deployment, visualized control, information sharing, collaborative working, and centralized management, making it an ideal solution for scenarios like command centers, data centers and smart campuses.

3 Appearance

3.1 Front Panel

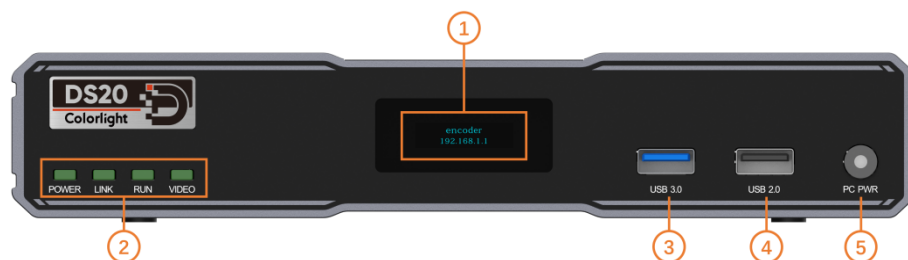


Fig 3-1 DS20 front panel

No.	Name	Description
1	LCD screen	Displays the device node name and IP address.
2	Indicators	- POWER: Displays the power status. - ON: The power supply is normal. - OFF: The power supply is abnormal. - RUN: Displays the device running status. - ON: The device is functioning normally. - OFF: The device is functioning abnormally. - LINK: Displays the network connection status. - ON: The network connection is normal. - OFF: The network connection is abnormal. - VIDEO: Displays the video transmission and processing status.

		- ON: The video stream processing is normal. - OFF: The video stream processing is abnormal or there is no video stream.
3	USB 3.0	• For Decoder-KVM: Connects to the keyboard and mouse for transmitting control signals or to a USB drive for data transfer. • Voltage/Current: 5V/0.9A. • Transfer speed: 2.4Gbps.
4	USB 2.0	• For Decoder-KVM: Connects to the keyboard and mouse for transmitting control signals or to a USB drive for data transfer. • Voltage/Current: 5V/0.5A. • Transfer speed: 240Mbps.
5	PC PWR	Power button, used to power the PC connected via PC CTRL port on/off.

Table 3-1 Description of DS20 front panel

3.2 Rear Panel



Fig 3-2 DS20 rear panel

No.	Name	Description
1	PC CTRL	4-pin phoenix connector: PC control port, connects to PC for transmitting power on/off control signals.
2	RELAY/IR	• 4-pin phoenix connector: Connects to a control device. - RELAY: Connects to a relay for transmitting level control signals. - IR: Connects to an IR device for transmitting IR control signals.
3	RS485/RS232	5-pin phoenix connector: Serial port, connects to a control device for transmitting control signals.
4	VIDEO	• HDMI 2.0: - HDMI IN: 19-pin female connector, for video signal input. - HDMI LOOP: 19-pin female connector, for video signal loop-out. - HDMI OUT: 19-pin female connector, for video stream output. • Supports custom resolution: - Maximum input/output resolution: 4096*2160@30Hz, 1920*1080@60Hz. • Supports HDCP 2.3/1.4 compliant. • Supports audio input.

5	AUDIO	• 3.5mm standard audio I/O port: - IN: For audio signal input. - LOOP: For audio signal loop-out. - OUT: For audio stream output.
6	USB	• USB 3.0 port (left): - For Encoder: Connects to the host for transmitting control signals. - For Decoder-KVM: Connects to the keyboard and mouse for transmitting control signals. • USB 3.0 port (right): - For Decoder-KVM: Connects to the keyboard and mouse for transmitting control signals or to a USB drive for data transfer. • Voltage/Current: 5V/0.9A. • Transfer speed: 2.4Gbps.
7	ETH	• LAN(POE): - 1G LAN port (RJ45 connector), 10/100/1000Mbps adaptive. - Supports POE power supply (12V/2A). • FIBER: - 1G fiber port, 1G/2.5G/5G/10G optical modules supported. - Supports Fiber-LAN backup: It can be used as a backup port for LAN(POE) when used together.
8	12V/2A	Connects to an external 12V/2A DC power supply.

Table 3-2 Description of DS20 rear panel

4 Hardware Connection

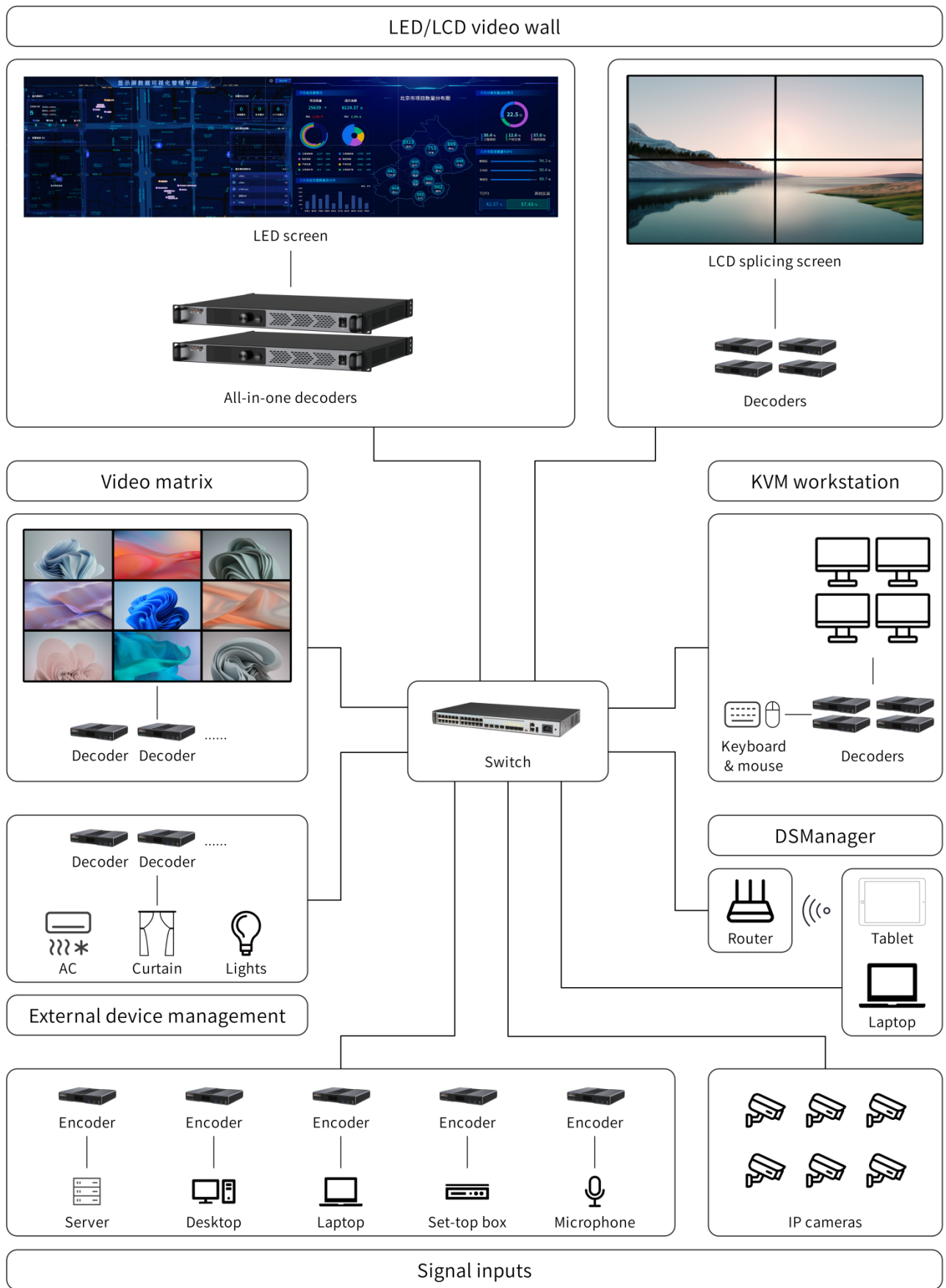


Fig 4-1 System typology

4.1 Network and Power Supply

- The device supports the following three connection methods for network and power supply:
 - ✧ **Connection method 1:** Connect a POE port on the switch to the LAN(POE) port on the device using an Ethernet cable. This establishes network access for the distributed system and provides power supply to the device.

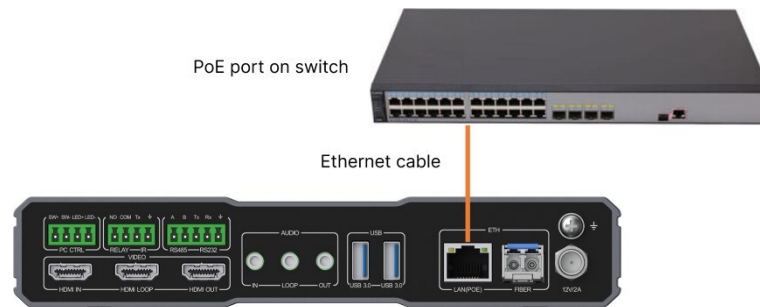


Fig 4-2 Connection method 1

- ✧ **Connection method 2:** Connect a non-POE port on the switch to the LAN(POE) port on the device using an Ethernet cable, establishing network access for the distributed system. Then connect a power adapter to the device's 12V/2A port for device power supply.

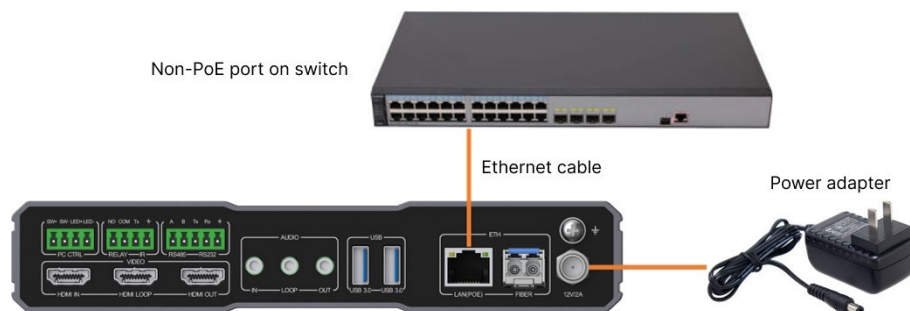


Fig 4-3 Connection method 2

- ✧ **Connection method 3:** Insert the optical modules into the switch's fiber optic port and the device's FIBER port, and connect the two ports using a fiber optic cable, establishing network access for the distributed system. Then connect a power adapter to the device's 12V/2A port for device power supply.

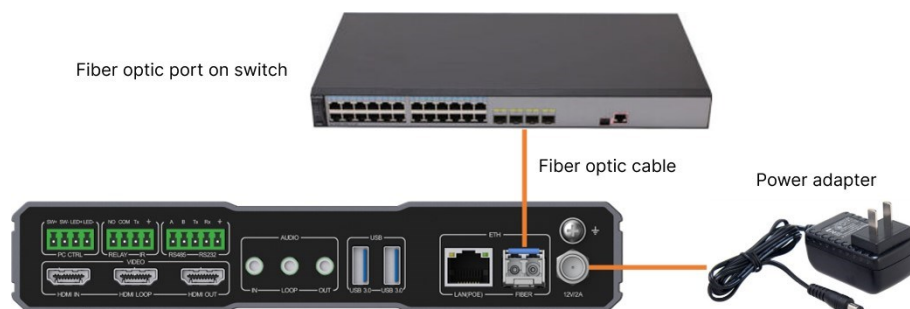


Fig 4-4 Connection method 3

Network backup instruction

The device's FIBER port does not support POE power supply. Therefore, when connecting both the LAN(POE) port and the FIBER port to the switch for network backup, it is important to ensure power supply by connecting a power adapter. This prevents the device from losing power in case of disconnection from the LAN(POE) port.

4.2 Encoder

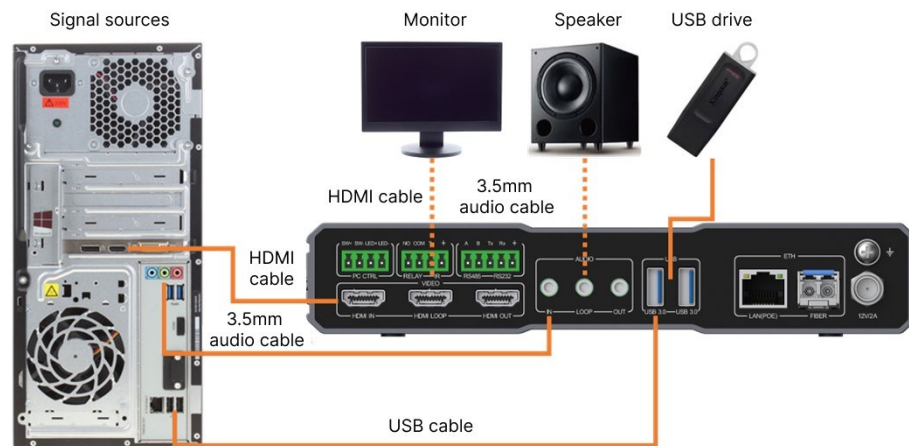


Fig 4-5 Encoder hardware connection

4.2.1 Input Connection

HDMI port

Connect the video signal to the encoder's HDMI IN port using an HDMI cable to enable video signal input.

AUDIO port

Connect the audio signal to the encoder's AUDIO IN port using a 3.5mm audio cable to enable audio signal input.

USB port

- When the video signal comes from a computer, the KVM operations are supported. Connect the video source to the USB 3.0 port on the encoder using a USB cable to enable control signal interaction.
- Supports firmware update via a USB drive. Place the software package in the root directory of a USB drive, and connect the USB drive to the encoder's USB port to enable automatic software update.

Notes on encoder's USB ports

- Only the left USB 3.0 port on the rear panel can be connected to a computer. Control signals can then be exchanged to enable KVM operations.
- The right USB 3.0 port on the rear panel and the two USB ports on the front panel support firmware update via a USB drive.

4.2.2 Loop-out Connection

HDMI port

Connect the encoder's HDMI LOOP port to the monitor using an HDMI cable for video signal loop-out. This allows you to view the input video information on the monitor.

AUDIO port

Connect the encoder's AUDIO LOOP port to a speaker or headphone using a 3.5mm audio cable for audio signal loop-out. This allows you to check the input audio through the speaker or headphone.

4.3 Decoder (Screen Mode)

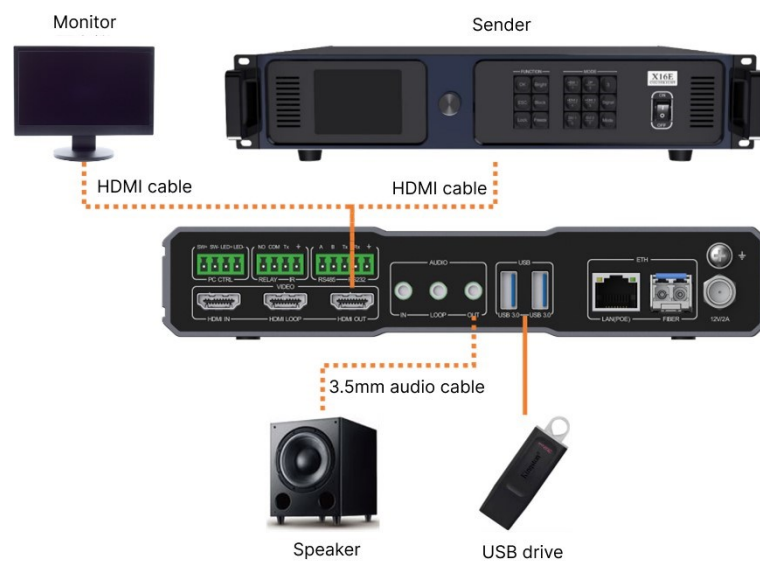


Fig 4-6 Decoder (Screen mode) hardware connection

HDMI port

Connect the decoder's HDMI OUT port to the sender or an LCD screen using an HDMI cable to enable video stream output.

AUDIO port

Connect the decoder's AUDIO OUT port to the sender, speaker, or headphone using a 3.5mm audio cable to enable audio stream output.

USB port

Supports firmware update via a USB drive. Place the software package in the root directory of a USB drive, and connect the USB drive to the decoder's USB port to enable automatic software update.

4.4 Decoder (Matrix Mode)

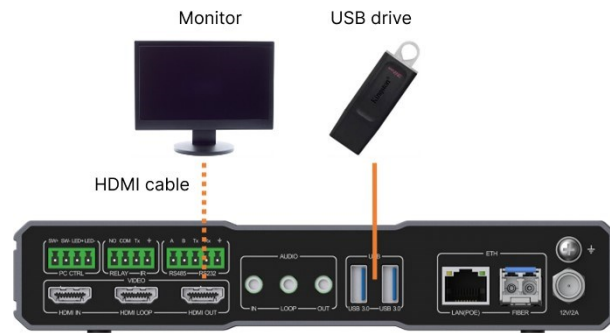


Fig 4-7 Decoder (Matrix mode) hardware connection

HDMI port

Connect the decoder's HDMI OUT port to an LCD screen using an HDMI cable to enable video stream output.

USB port

Supports firmware update via a USB drive. Place the software package in the root directory of a USB drive, and connect the USB drive to the decoder's USB port to enable automatic software update.

4.5 Decoder (KVM Mode)

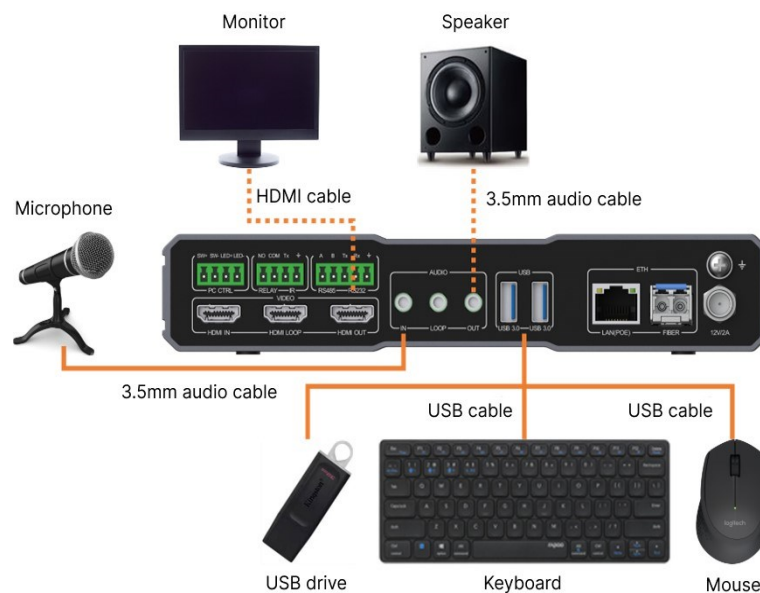


Fig 4-8 Decoder (KVM mode) hardware connection

4.5.1 Input Connection

AUDIO port

Supports voice calls. Connect the microphone to the decoder's AUDIO IN port using a 3.5mm audio cable to enable audio stream input.

USB port

- Supports control via keyboard and mouse. Connect the keyboard and mouse to the decoder's USB port using a USB cable to enable control signal interaction.
- Supports data pass-through when the video signal comes from a computer. Connect a USB drive to the decoder's USB port to enable data interaction between the USB drive connected to the decoder and the computer connected to the encoder.
- Supports firmware update via a USB drive. Place the software package in the root directory of a USB drive, and connect the USB drive to the decoder's USB port to enable automatic software update.

Notes on decoder's USB ports

- Decoder (KVM mode): The right USB 3.0 port on the rear panel and the two USB ports on the front panel support data pass-through.
- Decoder (KVM mode): All USB ports support control via keyboard and mouse, allowing for both wireless keyboard and mouse control as well as mixed port connections.
- Decoder (Screen/Matrix/KVM mode): All USB ports support update via a USB drive.

4.5.2 Output Connection

HDMI port

Connect the decoder's HDMI OUT port to the monitor using an HDMI cable to enable video stream output.

AUDIO port

Connect the decoder's AUDIO OUT port to the speaker or headphone using a 3.5mm audio cable to enable audio stream output.

5 Software Operations

5.1 Introduction

The Rhino System consists of DSManager, DSConfig, and DSKvm. To access DSManager and DSConfig, you can visit Colorlight's official website at www.lednets.com for download and installation. However, DSKvm does not require any download or installation. Please ensure that you have an HDMI cable to connect the LCD monitor to the HDMI OUT port on the DS20 decoder(KVM mode). Once you have configured the KVM-related parameters in DSManager, you can log in to DSKvm for further operations.

5.2 System Requirements

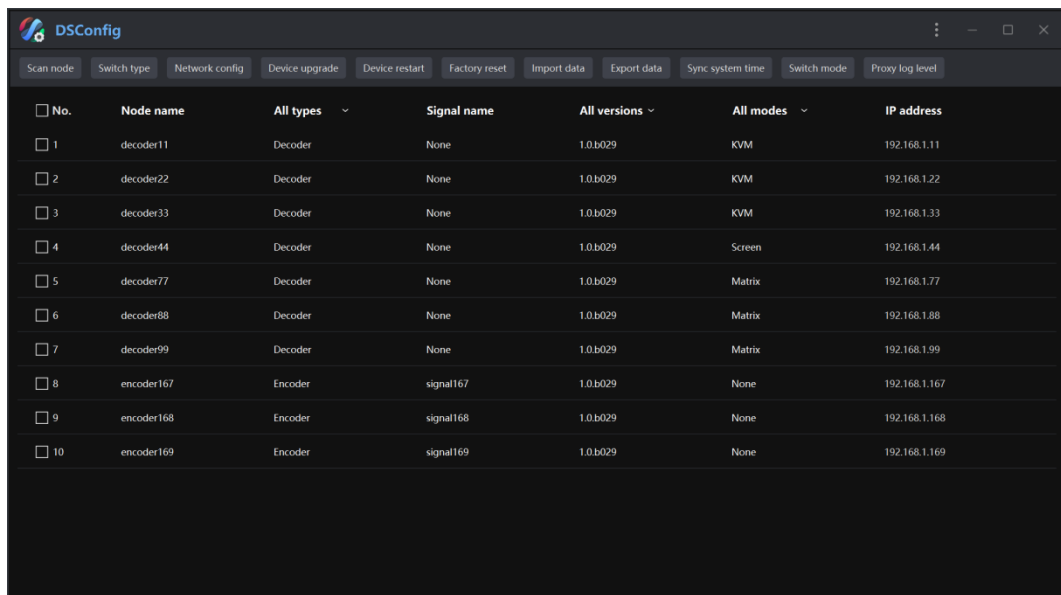
The recommended system requirements for using DSConfig and DSManager are as follows:

- **Operating system:** Windows 10 (64-bit) or later
- **CPU:** 2.0GHz or faster
- **RAM:** 8GB or higher
- **Graphics memory:** 512MB or higher

5.3 DSConfig

This feature allows you to discover devices in DSConfig.

- Click **Scan node**. Once the "Loading" prompt disappears, the list below will display all DS20 devices, including encoders and decoders, connected in the distributed system network.
- The device list is sorted based on IP addresses and provides information such as node name, device type, signal name (for encoders), version, mode (for decoders), and IP address.



No.	Node name	All types	Signal name	All versions	All modes	IP address
1	decoder11	Decoder	None	1.0.b029	KVM	192.168.1.11
2	decoder22	Decoder	None	1.0.b029	KVM	192.168.1.22
3	decoder33	Decoder	None	1.0.b029	KVM	192.168.1.33
4	decoder44	Decoder	None	1.0.b029	Screen	192.168.1.44
5	decoder77	Decoder	None	1.0.b029	Matrix	192.168.1.77
6	decoder88	Decoder	None	1.0.b029	Matrix	192.168.1.88
7	decoder99	Decoder	None	1.0.b029	Matrix	192.168.1.99
8	encoder167	Encoder	signal167	1.0.b029	None	192.168.1.167
9	encoder168	Encoder	signal168	1.0.b029	None	192.168.1.168
10	encoder169	Encoder	signal169	1.0.b029	None	192.168.1.169

Fig 5-1 Scan node

Note

See [Rhino System User Manual](#) for more operation details.

5.4 DSManager

- Prerequisites:

- ✧ The current device (control PC) is connected to the network and does not have any IP conflicts with other devices.
- ✧ Administrator account
 - Username: admin
 - Password: clt123456

Notes on IP configuration for Control PC

- To ensure network communication, the control PC must be manually configured with a static IP address within the same network segment as the devices.
- When configuring a static IP address, it is important to choose an IP address that is not assigned to any other device to avoid IP conflicts.
- In the event of an IP conflict between the static IP address of the control PC and other devices on the network, corresponding prompts will appear when attempting to log into DSConfig and DSManager on the control PC.

- Procedures:

Step 1 Double-click the DSManager program (.exe) to access the login interface.

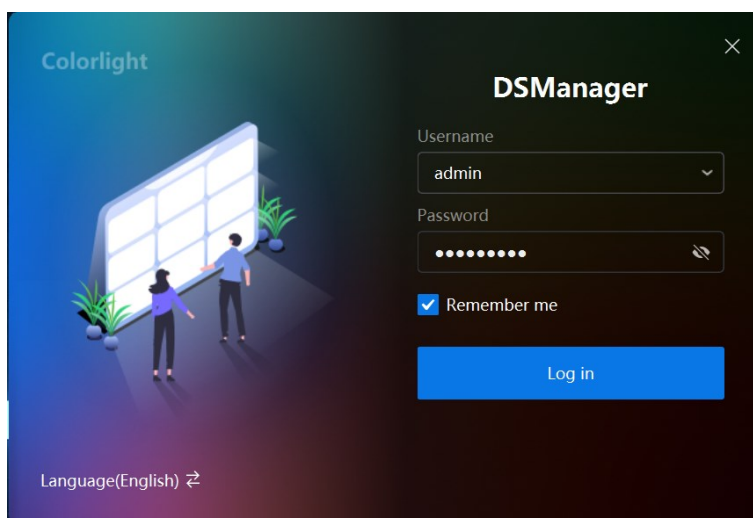


Fig 5-2 Login interface

Step 2 Enter the username and password for the administrator account, then click **Log in**. Upon successful login, you will be redirected to the **Video wall** interface.

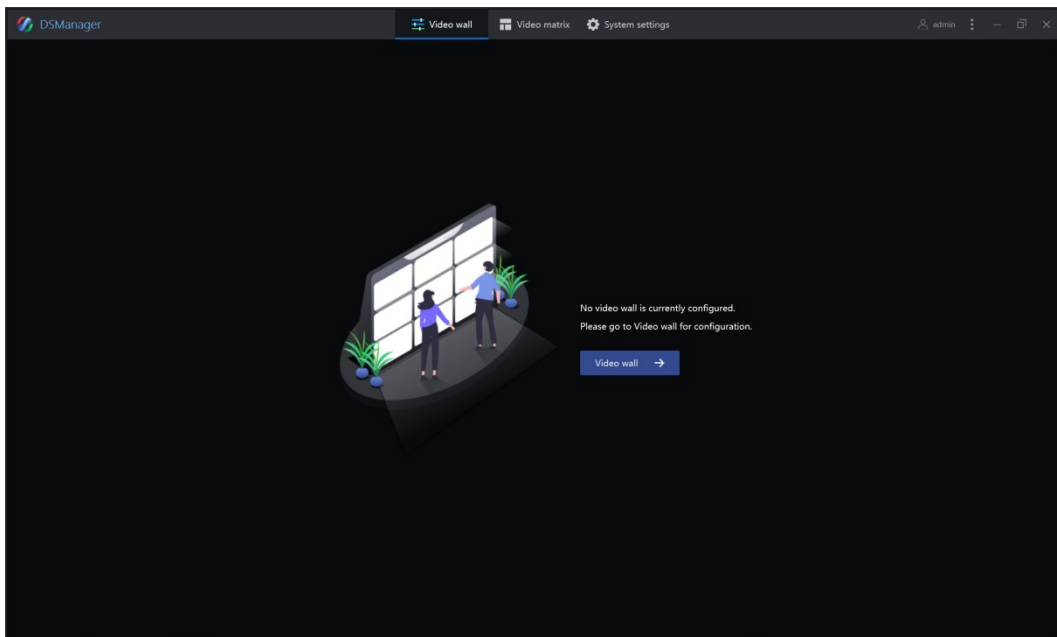


Fig 5-3 Main interface after initial login

Note

See **Rhino System User Manual** for more operation details.

5.5 DSKvm

- **Prerequisites:**

- ✧ In DSConfig, there should be decoders configured in **KVM** mode.
- ✧ In DSManager, complete the KVM workstation settings using decoders-**KVM**.

- **Procedures:**

Step 1 Connect the decoder to a monitor and access the login interface.

Step 2 Enter the correct username and password. Click **Log in** to access the signal interface.



Fig 5-4 Login

Note

- See **Rhino System User Manual** for more operation details.
- The account used to log in to DSKvm is configured under **DSManager > System settings > Permission**.

6 Troubleshooting Guide

Problem	Possible Cause	Solution
No display	Poor power contact	Check the power connector and ensure good contact
	Device powered off	Make sure the POWER button is on
Poor image quality such as "double image"	Unqualified HDMI cable	Replace with high-quality cable
	HDMI cable too long	Lower the signal resolution or shorten the cable
No image output after signal switching	No signal source input for the channel after switching	Check the proper signal input
	Poor cable contact	Check the input and output cables and ensure good contact
No response from the device	Internal damage of the device	Contact technical support

7 Statement

7.1 Certifications

CE, FCC, IC, UKCA

- **Note:** If the product does not have the relevant certifications required by the countries or regions where it is to be sold, please contact Colorlight to confirm or address the problem as soon as possible. Otherwise, the customer shall be responsible for the legal risks or Colorlight has the right to claim compensation.

7.2 Legal Statement

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