

VDM-4010 / 4020

# 4K Over IP Matrix Encoder/Decoder User Guide



Publish date: June 2021



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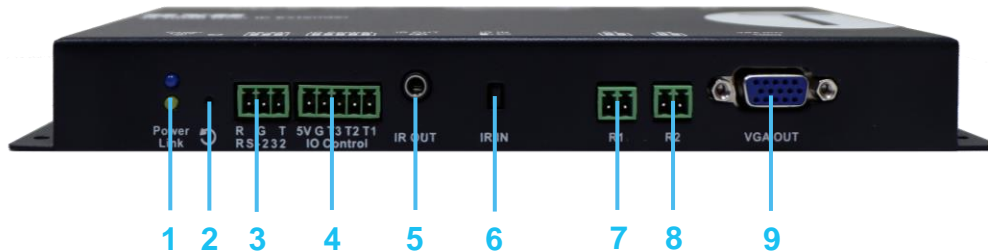
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## Product Overview

- VDM is an AV over IP solution that extends the distance of HDMI, USB, IR, RS-232, and USB signals with pixel-perfect quality.
- Equipped with VDM-4010 Encoder and VDM-4020 Decoder. The VDM-4010 enables the connection with PC or any HDMI output devices. The VDM-4020 can connect with HDMI / DVI-D monitors, microphones, loudspeakers, USB peripherals (keyboard / mouse / flash drive), and RS232 devices.
- All the LAN / SFP switches and hubs run on standard Gigabit Ethernet networks and TCP / IP protocol.

# Physical Description

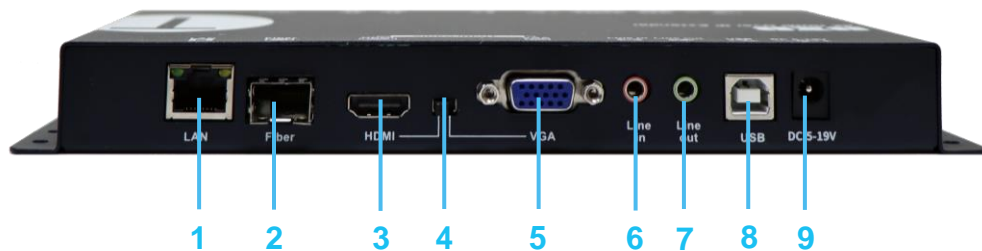
## VDM-4010 Front View



1. **Blue LED indicator (Power / Status) & green LED indicator (Link):**
  - Blue LED flashes / Green LED off → the device is booting
  - Blue LED lights / Green LED off → no data transfer in progress or network cable unplugged
  - Blue LED lights / green LED flashes → connecting
  - Blue LED lights / green LED lights → network communication established
2. **Reboot:** restart the device.
3. **RS-232:** bidirectional RS-232 transmission. The baud rate can be configured via web-based interface.
4. **IO Control:** IO control interface.
5. **IR OUT:** connect to an emitter (sold separately).
6. **IR IN:** transmit the received IR signal to the decoder endpoint and control its devices (receiver sold separately).
7. **R1:**
  - Get shorted once → disconnect with the VDM-4020.
  - Keep shorted until Power LED and Link LED flash → reset to the default values.
8. **R2:**
  - Get shorted once → select Video Mode or Graphic Mode. Video Mode for improving the compression ratio and reduce the bandwidth; Graphic Mode for the uncompressed bandwidth.
  - Get shorted for 3 seconds → select Anti-Dither Off or Anti-Dither 1/2 mode. The ATI graphic card enables the activation of Anti-Dither 1/2 mode to reduce the compression ratio and improve the video quality.
  - Keep shorted until the Power LED and Link LED flash → transmit the EDID of the connected HDMI display for device detection.
9. **VGA OUT:** connect a VGA monitor to this connector..

# Physical Description

## VDM-4010 Rear View



1. **LAN:** transform the signal into TCP/IP packet to the decoder endpoints. You can use a Gigabit switch for extension.
2. **Fiber:** connect to a fiber-optic network using single-mode LC SFP cables (module is sold separately).
3. **HDMI IN:** connect a video source to this connector.
4. **DIP:** manually select HDMI / VGA input.
5. **VGA IN:** connect a VGA source.
6. **Line IN:** analog audio input for delivering the audio signal to the decoder.
7. **Line out:** for microphone output.
8. **USB Hub (USB-to-PC):** for connection to a PC or other USB hosts.
9. **DC 5V-19V JACK:** connect to the BXB 12V power adapter.

# Physical Description

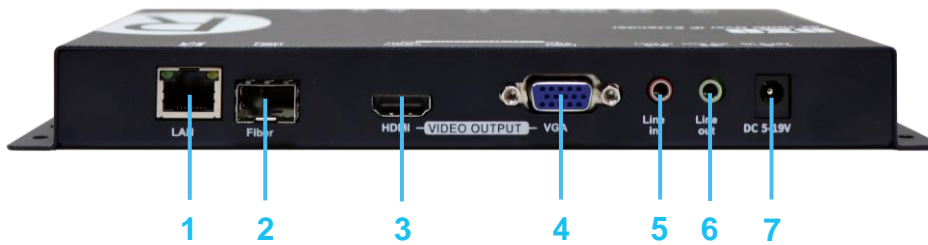
## VDM-4020 Front View



1. **Blue LED indicator (Power / Status) & green LED indicator (Link):**
  - Blue LED flashes / Green LED off → the device is booting
  - Blue LED lights / Green LED off → disconnection
  - Blue LED lights / green LED flashes → connecting
  - Blue LED lights / green LED lights → link established
2. **Reboot:** restart the device.
3. **RS-232:** bidirectional RS-232 transmission.
4. **IO Control:** IO control interface.
5. **IR OUT:** connect to an emitter (emitter sold separately).
6. **IR IN:** transmit the received IR signal to the headend and control its devices.
7. **R1:**
  - Get shorted once → after seeing the menu, get R2 shorted to see the available VDM-4010 in sequence. Get R1 shorted again to select a specific VDM-4010.
  - Keep shorted until Power LED and Link LED flash → reset to the default values.
8. **R2:**
  - Get shorted once → get / give up the USB control privilege when multiple VDM-4020 connect to the same VDM-4010.
  - Get shorted for 3 seconds → select Anti-Dither Off or Anti-Dither 1/2 mode. The ATI graphic card enables the activation of Anti-Dither 1/2 mode to reduce the compression ratio and improve the video quality.
  - Keep shorted until the Power LED and Link LED flash → copy the EDID of the connected HDMI display to the VDM-4010.
9. **USB port x 2:** connect to a keyboard and mouse for controlling the PC. Connection with the keyboard can invoke the hotkey function.
10. **USB port x 2 (console):** connect to USB peripherals such as keyboard and mouse to control the PC or connect to a flash driver for reading the contents of files.

# Physical Description

## VDM-4020 Rear View



1. **LAN:** transform the signal into TCP / IP packet to the decoder endpoints. You can use a Gigabit switch for extension.
2. **Fiber:** connect to a fiber-optic network using single-mode LC SFP cables (module is sold separately).
3. **HDMI OUT:** connect to an HDMI monitor.
4. **VGA OUT:** connect to a VGA monitor.
5. **LINE IN:** for microphone input.
6. **LINE OUT:** deliver the audio signal of microphone to the loudspeaker.
7. **DC 5V-19V JACK:** connect to the BXB 12V power adapter.

## Connecting VDM-4010 / 4020

Please refer to the following steps for connecting VDM-4010 and VDM-4020:

1. Connect an HDMI monitor to the HDMI IN of VDM-4020.
2. When a VDM-4020 is connected, the start-up screen would be invoked on the display. If not, please check the LED indicator of VDM-4020, the connection of HDMI cable, and the input source. Make sure all these settings are accurate and well-deployed.
3. You can connect multiple VDM-4020 and VDM-4010 over the same TCP / IP LAN. Please make sure the IGMP function of your network switch is enabled.
4. Always use CAT6 or CAT7 UTP cables (568B) connecting the VDM-4010 and VDM-4020.
5. Connect a video source ( for example, PC or media player ) to the input of the VDM-4010 and power it on. If you need USB transmission, please connect the USB input port of VDM-4010 to the PC so that the VDM-4020 can get the USB control privilege .
6. VDM-4020 can get the USB control privilege once it has connected to a VDM-4010. The second VDM-4020 would only get the image. If the second VDM-4020 requires the control privilege , you should get shorted the R1 junction of VDM-4020 for 3 seconds. The original VDM-4020 would lose the control privilege. However, keyboard and mouse are excepted from this condition.
7. The VDM-4010 is equipped with a VGA output port. You can use a VGA cable connecting to a local display.
8. VDM-4020 is equipped with a USB port for connecting to keyboard, mouse, flash drive, and other USB peripherals.
9. The RS-232 ports enables bidirectional transmission. Its default baud rate is 115200. The baud rate is configurable via using the web interface. To change the baud rate, just check the IP of VDM-4010 and VDM-4020 and log in to the web interface. IP: 169.254.x.x; subnet mask: 255.255.0.0
10. Optionally, to transport IR control commands, connect an IR emitter to the VDM-4010 and connect an IR receiver from the VDM-4020 to the devices such as blue-ray player, DVR, and media player. Just send IR data to the VDM-4020, the signal would be transmitted to the VDM-4010.



# Network Switch Selection

Recommended brands and model names of network switch:

Brand	Model Name
Cisco	Catalyst 2960-X
Cisco	3560CX series
Cisco	SG350-10
Cisco	SG350X-24
Cisco	SG550X-24
Netgear	GS728/752TPv2
Netgear	S3200-28x-PoE+
Netgear	S3300 Series
Netgear	M4300 Series
ZyXEL	GS1920
ZyXEL	GS2210
ZyXEL	XS3700
Dell	PowerConnect 5524
Dell	PowerConnect 2816

# Configurations

1. To make the PC get the signal of the connected monitor from VDM-4020, just keep the R2 junction shorted until the start-up screen displayed on the monitor. After that, the connected VDM-4010 would receive the EDID. The EDID would be saved to the VDM-4010 until the next update. After the PC accurately detects the monitor, please reboot the VDM-4010 to restore.
2. To make the PC get the signal of the connected monitor of VDM-4010, just keep the R2 junction shorted until the start-up screen displayed on the monitor. After that, the saved EDID in the VDM-4010 would be updated to the data belonging to the connecting monitor.
3. If the following messages shown on the bottom left corner of the monitor connected with VDM-4020:

**Trying to find the transmitter...** → VDM-4020 is unable to find the available VDM-4010. Please check the connection and power supply of the VDM-4010.

**Network link is down** → the cable to the VDM-4020 is loose of connection, please check the RJ-45 cabling.

**USBIP\_USER init OK!** → The VDM-4020 is the first decoder connecting to the VDM-4010 and is waiting for the output display. It's also had the USB control privilege .

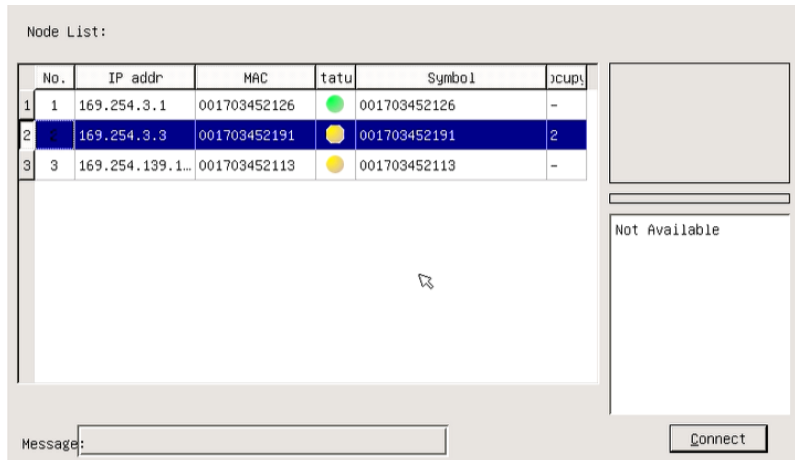
**All services initialized - please standby** →The VDM-4020 is the second decoder connecting to the VDM-4010 and is waiting for the output display. It doesn't have the USB control privilege .

4. The message shown at the bottom-right corner of the start-up screen of VDM-4020 monitor:

```
FW: 19-Aug-30 ad8c
Local IP: 169.254.4.199
Remote IP: 169.254.2.107
ID: 001703404095
```

- FW: firmware version
- Local IP: the IP address of the VDM-4020
- Remote: the IP address of the VDM-4010
- ID: MAC address of the VDM-4020

5. As the R1 junction of VDM-4020 get shorted, the VDM-4020 would start searching the available VDM-4010, as the image shown below:

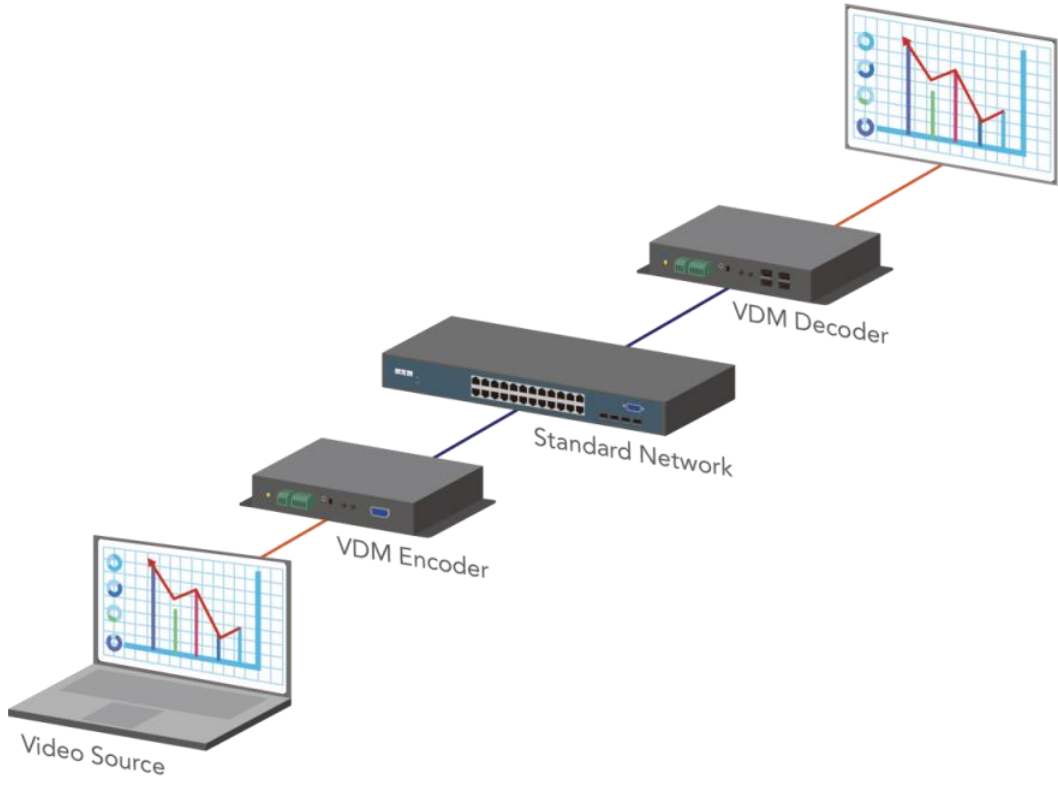


6. Get the R2 junction shorted again. For getting R2 shorted each time, you can select the connecting VDM-4010 in sequence. Finally, get the R1 junction shorted to connect to the VDM-4010 instantly.

**Note:**

- The HDMI input is compatible with DVI VESA standard.
- Supported video resolutions: 480i/p, 576i/p, 720p, 1080i/p, 4K2K.
- The VDM-4010 is built-in with EDID of HDMI format. If changing EDID is required, please refer to [P7](#).

# 1-to-1 Connection



# Problemshooting

Problem	Verification	Cause(s)	Action
<p><b>The endpoint video is not being displayed; but you can see the start-up screen</b></p>	<p>The green LED of VDM-4020 does not light. The connected monitor displays</p> <p><code>Network link is down</code></p>	The Ethernet cable connection may be faulty	Verify all cables are connected securely / change cables
	<p>The green LED of VDM-4020 does not light. The connected monitor displays</p> <p><code>Press the link button to connect</code></p>	Disabled network communication	Get R1 junction shorted again or re-select the VDM-4010
	<p>The green LED of VDM-4020 flashes. The connected monitor displays</p> <p><code>Trying to find the transmitter...</code></p>	Disconnect with any VDM-4010	Get R1 junction shorted again or re-select the VDM-4010
		Can not find any VDM-4010	
	<p>The green LED of VDM-4020 lights. The connected monitor displays</p> <p><code>All services initialized - please standby</code></p>	Connected; but the input device of VDM-4010 is failed with video output	Check if the PC or media player has outputted the image to the headend
	<p>The green LED of VDM-4010 is off</p>	The Ethernet cable may be loose of connection	Verify all cables are connected securely / change cables
	<p>Get R1 junction of VDM-4020 shorted for 5 seconds. The menu would be shown. If not, please check the possible causes.</p>	Get shorted for too many times at a time	The command is sent in sequence. Until each command has been sent, you can get it shorted once for the next command. If the short-circuit does not work, please re-deliver the power.
	<p>For many-to-many transmission, the switch should support IGMP. If not, the display would be failed.</p>	Without IGMP	Deploy a switch that supports IGMP
With IGMP		The IGMP of your switch may have problems. Please ask the supplier for firmware update.	

# Problemshooting

Problem	Verification	Cause(s)	Action
<b>The endpoint video is not being displayed and flashing to a black screen</b>	For many-to-many transmission, the switch should support IGMP. If not, the display would be failed.	Without IGMP	Deploy a switch that supports IGMP
		With IGMP	The IGMP snooping of your switch may have problems. Please ask the supplier for firmware update.
	The blue LED of VDM-4020 does not light	No-power condition	Check the power supply of VDM-4020
	The green LED of VDM-4020 lights	Connected; but the video output of VDM-4010 is not in progress	Check if the PC or media player has outputted the image to the headend
		Monitor problem	Ensure the monitor is powered on and switching to the correct video source
The green LED of VDM-4020 flashes	Connection problem of the monitor	Check the connection between the VDM-4020 and the monitor	
<b>With many-to-many transmission, the endpoint video is intermittent (via LAN switch)</b>	Check if the switch supports IGMP snooping	Without IGMP	Deploy a switch that supports IGMP snooping
		With IGMP	Ensure the IGMP is activated.
	Check if the Link LED of VDM-4010 and VDM-4020 both light or flash. Ensure you use a 1-port 1G switch		If only one LED flashes, it indicates the network flow is insufficient (under 1G)
			The IGMP snooping of your switch may have problems. Please ask the supplier for firmware update.

# Problemshooting

Problem	Verification	Cause(s)	Action
<b>With 1-to-1 transmission, the endpoint video is intermittent (via LAN switch)</b>	Check if the Link LED of VDM-4010 and VDM-4020 both light or flash. Ensure you use a 1-port 1G switch	If only one LED flashes, it means the network flow is insufficient (under 1G)	Change another switch with 1-port 1G.
	Check if the network cable exceeds the length of 100m	The distance between each node should be no more than 100m	Decrease the connection distance or add a 1G switch
	Check if the intermittent problem has occurred when the input device of VDM-4010 outputs the video	Problem with the input device or software	Ask the supplier to improve
<b>With 1-to-1 transmission, the endpoint video is intermittent (disconnect with the switch)</b>	The Link LED of VDM-4010 and VDM-4020 should light or flash.	The connection distance may exceed 100m	Decrease the connection distance or add a 1G switch
<b>A buzzing uttered as connecting the HDMI monitor</b>	Check the connected VDM-4010 is deployed normally	Differences of the input devices may cause this problem	Cut off the power of the input source and reboot VDM-4010. When the green LED flashes, turn on the monitor again.
<b>The 4K2K resolution is unsupported</b>	Check if the graphic card or input device supports 4K2K	Problem with the input device or software	Ask the supplier to improve
	Ensure the monitor supports 4K2K resolution and the COPY EDID mode is activated.	Copy the correct EDID of the RX monitor to the VDM-4010 for device detection.	Ensure VDM-4020 has connected to VDM-4010. Keep the R2 shorted until the Link LED flashes. After connecting to VDM-4010, the EDID would be copied to VDM-4010. Now, reboot VDM-4010 and select 4K2K image. Finally, re-deliver current to VDM-4020 to restore to the original mode.

# Problemshooting

Problem	Verification	Cause(s)	Action
<b>Via using the HDMI interface to deliver audio, the audio output of the monitor is not functioning</b>	Check if the monitor has equipped the HDMI input and loudspeaker	Problem with the monitor	Change a monitor with HDMI input and loudspeaker
	If the input device is PC, ensure the graphic card supports HDMI	HDMI unsupported	Change a graphic card that supports HDMI
		HDMI supported	Go to the cPanel to set the audio as outputted from the graphic card
	Incorrect EDID sent from the VDM-4010. The EDID may be saved as DVI format. Please copy the correct EDID again.	Copy the correct EDID of the endpoint monitor to the VDM-4010	Ensure VDM-4020 has connected to VDM-4010. Keep the R2 shorted until the Link LED flashes. After connecting to VDM-4010, the EDID would be copied to the VDM-4010. At this time, reboot VDM-4010 and select 4K2K resolution. Finally, deliver current again to VDM-4020 for restoring to the original mode.





## **BXB Electronics Co., Ltd.**

6F-1, No.288-5, Xinya Rd., Qianzhen Dist., Kaohsiung City 80673, Taiwan

TEL +886 ( 7 ) 9703838

FAX +886 ( 7 ) 9703883

[www.bxbsystem.com](http://www.bxbsystem.com)