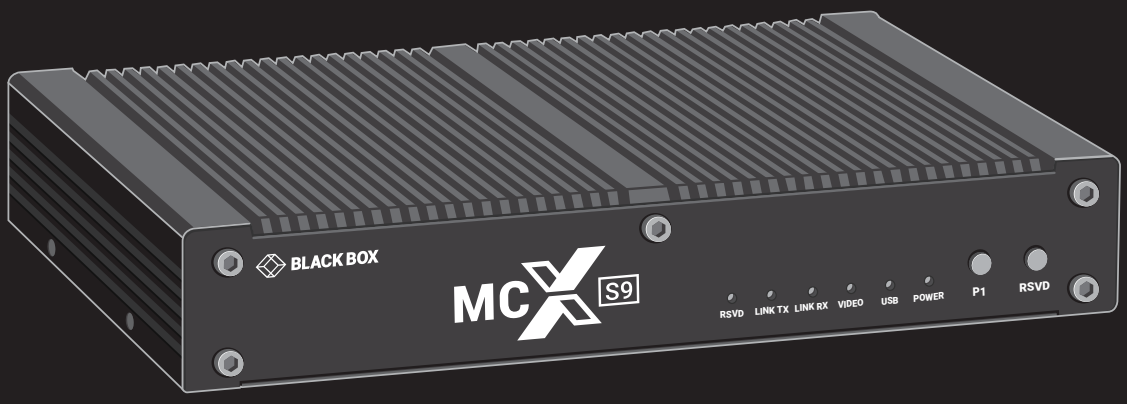
## QUICK INSTALL GUIDE AND USER MANUAL

**MCX-S9-ENC, MCX-S9-DEC, MCX-S9C-ENC, MCX-S9C-DEC, MCX-S9D-ENC**

# MCX S9 ENCODERS & DECODERS

**24/7 TECHNICAL SUPPORT AT 1.877.877.2269 OR VISIT BLACKBOX.COM**




BLACK BOX®

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# IMPORTANT SAFETY INSTRUCTIONS



1. Do not expose this apparatus to rain, moisture, dripping or splashing and do not place objects filled with liquids, such as vases, on the apparatus.
2. Clean this apparatus only with a dry cloth.
3. Do not install or place this unit in a bookcase, built-in cabinet or in another confined space. Ensure that the unit is well ventilated.
4. To prevent the risk of electric shock or a fire hazard caused by overheating, do not obstruct the unit's ventilation openings with newspapers, tablecloths, curtains and similar items.
5. Do not install near any heat sources, such as radiators, heat registers, stoves or other apparatus (including amplifiers) that produce heat.
6. Do not place sources of naked flames, such as lighted candles, on the unit.
7. Unplug this apparatus during lightning storms or when unused for long periods of time.
8. Protect the power cord from being walked on or pinched, particularly at plugs.
9. Only use attachments/accessories specified by the manufacturer.
10. Refer all servicing to qualified service personnel.

## PREPARATION

Before you start installing MCX-S9 products, carefully read and strictly follow the instructions below.

- Only use accessories and cables that are supplied with Black Box products or purchased as required
- Correctly connect all the cables
- Use the correct power supplies and connect them to Black Box devices in accordance with the specification for electric construction

## CONNECTING ONE TX TO ONE RX DIRECTLY

### CONNECTING TX TO RX

1. Connect a video source to the encoder and a display device to the decoder.

2. Connect the MCX-S9-DEC to the MCX-S9-ENC with a network cable that meets the 10GbE specification. Be careful to plug the network cable's RJ-45 connectors into these devices' 10GbE ports.

3. Connect all the devices to their power supplies. After a while, the display will show the content of the video source.

### CONFIGURING TX AND RX

1. Connect your PC to the receiver with a network cable. Plug the network cable's one end into the decoder's LAN port and the other end into your PC's Ethernet port.

2. Configure your PC's network settings with IP address 169.254.1.11 and subnet mask 255.255.0.0, leaving gateway and DNS blank.

3. Launch the matching Manager software, then maximize its window to view more contents. The software will automatically discover the two devices: the transmitter would be shown in the Encoders section and the receiver would be shown in the Decoders section.

4. Adjust the configurations of the two devices if necessary.

## CONNECTING THE TX AND RX TO A SWITCH

1. Connect all MCX-S9-ENC and MCX-S9-DEC units to a 10GbE switch with network cables that meet the 10GbE specification. Be careful to plug the network cable's RJ-45 or fiber connectors into the devices' 10GbE ports.

2. Connect your PC to the switch, making sure that all devices' LAN ports aren't plugged into any network cables.

3. Configure your PC's network settings with IP address 169.254.1.11 and subnet mask 255.255.0.0, leaving gateway and DNS blank.

4. Start the Manager software and maximize its window and the software will discover all devices automatically. The transmitters will be shown in the Encoders section and the receivers will be shown in the Decoders section.

5. Adjust the configurations and control all devices with the Manager.

# CHAPTER 1: SPECIFICATIONS

## TABLE 1-1. SPECIFICATIONS, MCX-S9-ENC SERIES UNITS

| SPECIFICATION | DESCRIPTION |
|---|---|
| **Video** | |
| Input Connectors | (1) HDMI 2.0, (1) DisplayPort 1.2a |
| Input Video Resolutions | 640 x 480[8], 800 x 600[8], 1024 x 768[8], 1280 x 1024[8], 1360 x 768[8], 1440 x 900[8], 1440 x 1050[8], 1600 x 1200[8], 720 x 480[7] (480i59), 720 x 480[7] (480p59), 720 x 576[6] (576i50), 720 x 576[6] (576p50), 1280 x 720[5] (720p50), 1280 x 720[7] (720p59), 1280 x 720[8] (720p60), =1920 x 1080[6] (1080i50), 1920 x 1080[7] (1080i59), 1920 x 1080[8] (1080i60), 1920 x 1080[1] (1080p23), 1920 x 1080[2] (1080p24),1920 x 1080[3] (1080p25), 1920 x 1080[4] (1080p29), 1920 x 1080[5] (1080p30), 1920 x 1080[6] (1080p50), 1920 x 1080[7] (1080p59), 1920 x 1080[8] (1080p60), 3840 x 2160[1] (2160p23), 3840 x 2160[2] (2160p24), 3840 x 2160[4] (2160p25), 3840 x 2160[4] (2160p29), 3840 x 2160[5] (2160p30), 3840 x 2160[5] (2160p60), 4096 x 2160[5] , 4096 x 2160[8]<br>1 = at 23.98 Hz, 2 = at 24 Hz, 3 = at 25 Hz, 4 = at 29.97 Hz, 5 = at 30 Hz, 6 = at 50 Hz, 7 = at 59.94 Hz, 8 = at 60 Hz, 9 = at 75 Hz |
| Output Connectors | (1) RJ-45 10GBASE-T, (1) SFP+ |
| Output Video Resolutions | 640 x 480[8], 800 x 600[8], 1024 x 768[8], 1280 x 1024[8], 1360 x 768[8], 1440 x 900[8], 1440 x 1050[8], 1600 x 1200[8], 720 x 480[7] (480i59), 720 x 480[7] (480p59), 720 x 576[6] (576i50), 720 x 576[6] (576p50), 1280 x 720[5] (720p50), 1280 x 720[7] (720p59), 1280 x 720[8] (720p60), =1920 x 1080[6] (1080i50), 1920 x 1080[7] (1080i59), 1920 x 1080[8] (1080i60), 1920 x 1080[1] (1080p23), 1920 x 1080[2] (1080p24),1920 x 1080[3] (1080p25), 1920 x 1080[4] (1080p29), 1920 x 1080[5] (1080p30), 1920 x 1080[6] (1080p50), 1920 x 1080[7] (1080p59), 1920 x 1080[8] (1080p60), 3840 x 2160[1] (2160p23), 3840 x 2160[2] (2160p24), 3840 x 2160[4] (2160p25), 3840 x 2160[4] (2160p29), 3840 x 2160[5] (2160p30), 3840 x 2160[5] (2160p60), 4096 x 2160[5] , 4096 x 2160[8]<br>1 = at 23.98 Hz, 2 = at 24 Hz, 3 = at 25 Hz, 4 = at 29.97 Hz, 5 = at 30 Hz, 6 = at 50 Hz, 7 = at 59.94 Hz, 8 = at 60 Hz, 9 = at 75 Hz |
| **Audio** | |
| Input Connectors | (1) HDMI, (1) DisplayPort 1.2a, (1) 3.5-mm jack |
| Supported Input | HDMI/DP:<br>LPCM, 2.0/5.1/7.1 channel, 44.1/48/96/192 kHz<br>Dolby True HD, up to 7.1, 192 kHz<br>DTS-HD Master, up to 7.1, 192 kHz<br>Dolby Digital AC-3 (DVD format)<br>DTS version 1 (DVD format);<br>3.5 mm jack:<br>Unbalanced stereo audio |
| Output Connectors | None |
| Supported Output | None |
| **USB** | |
| Connectors | (1) USB Type B |
| **Control** | |
| IR Input | (1) 3.5 mm jack connector, connects to an IR receiver for IR communication with an IR transmitter connecting to another device |
| IR Output | (1) 3.5 mm jack connector, connects to an IR transmitter for IR communication with an IR receiver connecting to another device |
| Control Connectors | (1) 3.5-mm 4-pin Phoenix connector for RS-232 communication; (1) RJ-45 10/100/1000BASE-T Ethernet port |
| Control Method | Ethernet:<br>PC software: for configuring, controlling and upgrading<br>Web browser: for controlling<br>API set: for integrating with the 3rd party control system<br>RS-232:<br>PC software: for testing and upgrading the device itself<br>Common RS-232 device: for bi-directional communication with an RS-232 device connected to another device |

TABLE 1-1 (CONTINUED). SPECIFICATIONS, MCX-S9-ENC SERIES UNITS

| SPECIFICATION | DESCRIPTION |
|---|---|
| **General** | |
| Operating Temperature | 32 to 104° F (0 to 40° C) |
| Storage Temperature | -4 to +158 F (-20 to +70° C) |
| Humidity | 10 to 90%, noncondensing |
| Product Weight | 3.31 lb. (1.50 kg) |
| Power Supply | 12 VDC |
| Transport Distance | Twisted-Pair:<br>98.4 ft. (30 m) with CAT6 cable,<br>328 ft. (100 m) with CAT6a or CAT7 cable;<br>Fiber:<br>Depends on SFP+ installed |
| Dimensions | Including brackets: 1.8" H x 10.4" W x 5.5" D (4.5 x 23 x 13.9 cm)<br>Without brackets: 1.4" H x 9.1" W x 5.5" D (3.5 x 23 x 13.9 cm) |
| ESD Protection | Human-body Model: ±8 kV (Air-gap discharge)/±4 kV (Contact discharge) |

## TABLE 1-2. SPECIFICATIONS, MCX-S9-DEC SERIES UNITS

| SPECIFICATION | DESCRIPTION |
|---|---|
| **Video** | |
| Input Connectors | (1) RJ-45 10GBASE-T, (1) SFP+ |
| Input Video Resolutions | 640 x 480[8], 800 x 600[8], 1024 x 768[8], 1280 x 1024[8], 1360 x 768[8], 1440 x 900[8], 1440 x 1050[8], 1600 x 1200[8], 720 x 480[7] (480i59), 720 x 480[7] (480p59), 720 x 576[6] (576i50), 720 x 576[6] (576p50), 1280 x 720[5] (720p50), 1280 x 720[7] (720p59), 1280 x 720[8] (720p60), =1920 x 1080[6] (1080i50), 1920 x 1080[7] (1080i59), 1920 x 1080[8] (1080i60), 1920 x 1080[1] (1080p23), 1920 x 1080[2] (1080p24),1920 x 1080[3] (1080p25), 1920 x 1080[4] (1080p29), 1920 x 1080[5] (1080p30), 1920 x 1080[6] (1080p50), 1920 x 1080[7] (1080p59), 1920 x 1080[8] (1080p60), 3840 x 2160[1] (2160p23), 3840 x 2160[2] (2160p24), 3840 x 2160[4] (2160p25), 3840 x 2160[4] (2160p29), 3840 x 2160[5] (2160p30), 3840 x 2160[5] (2160p60), 4096 x 2160[5] , 4096 x 2160[8]<br>1 = at 23.98 Hz, 2 = at 24 Hz, 3 = at 25 Hz, 4 = at 29.97 Hz, 5 = at 30 Hz, 6 = at 50 Hz, 7 = at 59.94 Hz, 8 = at 60 Hz, 9 = at 75 Hz |
| Output Connectors | (1) HDMI 2.0 |
| Output Video Resolutions | 640 x 480[8], 800 x 600[8], 1024 x 768[8], 1280 x 1024[8], 1360 x 768[8], 1440 x 900[8], 1440 x 1050[8], 1600 x 1200[8], 720 x 480[7] (480i59), 720 x 480[7] (480p59), 720 x 576[6] (576i50), 720 x 576[6] (576p50), 1280 x 720[5] (720p50), 1280 x 720[7] (720p59), 1280 x 720[8] (720p60), =1920 x 1080[6] (1080i50), 1920 x 1080[7] (1080i59), 1920 x 1080[8] (1080i60), 1920 x 1080[1] (1080p23), 1920 x 1080[2] (1080p24),1920 x 1080[3] (1080p25), 1920 x 1080[4] (1080p29), 1920 x 1080[5] (1080p30), 1920 x 1080[6] (1080p50), 1920 x 1080[7] (1080p59), 1920 x 1080[8] (1080p60), 3840 x 2160[1] (2160p23), 3840 x 2160[2] (2160p24), 3840 x 2160[4] (2160p25), 3840 x 2160[4] (2160p29), 3840 x 2160[5] (2160p30), 3840 x 2160[5] (2160p60), 4096 x 2160[5] , 4096 x 2160[8]<br>1 = at 23.98 Hz, 2 = at 24 Hz, 3 = at 25 Hz, 4 = at 29.97 Hz, 5 = at 30 Hz, 6 = at 50 Hz, 7 = at 59.94 Hz, 8 = at 60 Hz, 9 = at 75 Hz |
| **Audio** | |
| Input Connectors | None |
| Supported Input | None |
| Output Connectors | (1) HDMI 2.0, (1) 3.5-mm jack |
| Supported Output | HDMI:<br>LPCM, 2.0/5.1/7.1 channel, 44.1/48/96/192 kHz<br>Dolby True HD, up to 7.1, 192 kHz<br>DTS-HD Master, up to 7.1, 192 kHz<br>Dolby Digital AC-3 (DVD format)<br>DTS version 1 (DVD format);<br>3.5 mm jack:<br>Unbalanced stereo audio |
| **USB** | |
| Connectors | (2) USB Type A |
| **Control** | |
| IR Input | (1) 3.5 mm jack connector, connects to an IR receiver for IR communication with an IR transmitter connecting to another device |
| IR Output | (1) 3.5 mm jack connector, connects to an IR transmitter for IR communication with an IR receiver connecting to another device |
| Control Connectors | (1) 3.5-mm 4-pin Phoenix connector for RS-232 communication; (1) RJ-45 10/100/1000BASE-T Ethernet port |
| Control Method | Ethernet:<br>PC software: for configuring, controlling and upgrading<br>Web browser: for controlling<br>API set: for integrating with the 3rd party control system<br>RS-232:<br>PC software: for testing and upgrading the device itself<br>Common RS-232 device: for bi-directional communication with an RS-232 device connected to another device |

TABLE 1-2 (CONTINUED). SPECIFICATIONS, MCX-S9-DEC SERIES UNITS

| SPECIFICATION | DESCRIPTION |
|---|---|
| **General** | |
| Operating Temperature | 32 to 104° F (0 to 40° C) |
| Storage Temperature | -4 to +158 F (-20 to +70° C) |
| Humidity | 10 to 90%, noncondensing |
| Product Weight | 3.31 lb. (1.50 kg) |
| Power Supply | 12 VDC |
| Transport Distance | Twisted-Pair:<br>98.4 ft. (30 m) with CAT6 cable,<br>328 ft. (100 m) with CAT6a or CAT7 cable;<br>Fiber:<br>Depends on SFP+ installed |
| Dimensions | Including brackets: 1.8" H x 10.4" W x 5.5" D (4.5 x 23 x 13.9 cm)<br>Without brackets: 1.4" H x 9.1" W x 5.5" D (3.5 x 23 x 13.9 cm) |
| ESD Protection | Human-body Model: ±8 kV (Air-gap discharge)/±4 kV (Contact discharge) |

## TABLE 1-3. SPECIFICATIONS, MCX-S9C-ENC SERIES UNITS

| SPECIFICATION | DESCRIPTION |
|---|---|
| **Video** | |
| Input Connectors | (1) HDMI 2.0, (1) DisplayPort 1.2a |
| Input Video Resolutions | 640 x 480[8], 800 x 600[8], 1024 x 768[8], 1280 x 1024[8], 1360 x 768[8], 1440 x 900[8], 1440 x 1050[8], 1600 x 1200[8], 720 x 480[7] (480i59), 720 x 480[7] (480p59), 720 x 576[6] (576i50), 720 x 576[6] (576p50), 1280 x 720[5] (720p50), 1280 x 720[7] (720p59), 1280 x 720[8] (720p60), =1920 x 1080[6] (1080i50), 1920 x 1080[7] (1080i59), 1920 x 1080[8] (1080i60), 1920 x 1080[1] (1080p23), 1920 x 1080[2] (1080p24),1920 x 1080[3] (1080p25), 1920 x 1080[4] (1080p29), 1920 x 1080[5] (1080p30), 1920 x 1080[6] (1080p50), 1920 x 1080[7] (1080p59), 1920 x 1080[8] (1080p60), 3840 x 2160[1] (2160p23), 3840 x 2160[2] (2160p24), 3840 x 2160[4] (2160p25), 3840 x 2160[4] (2160p29), 3840 x 2160[5] (2160p30), 3840 x 2160[5] (2160p60), 4096 x 2160[5] , 4096 x 2160[8]<br>1 = at 23.98 Hz, 2 = at 24 Hz, 3 = at 25 Hz, 4 = at 29.97 Hz, 5 = at 30 Hz, 6 = at 50 Hz, 7 = at 59.94 Hz, 8 = at 60 Hz, 9 = at 75 Hz |
| Output Connectors | (1) RJ-45 10GBASE-T |
| Output Video Resolutions | 640 x 480[8], 800 x 600[8], 1024 x 768[8], 1280 x 1024[8], 1360 x 768[8], 1440 x 900[8], 1440 x 1050[8], 1600 x 1200[8], 720 x 480[7] (480i59), 720 x 480[7] (480p59), 720 x 576[6] (576i50), 720 x 576[6] (576p50), 1280 x 720[5] (720p50), 1280 x 720[7] (720p59), 1280 x 720[8] (720p60), =1920 x 1080[6] (1080i50), 1920 x 1080[7] (1080i59), 1920 x 1080[8] (1080i60), 1920 x 1080[1] (1080p23), 1920 x 1080[2] (1080p24),1920 x 1080[3] (1080p25), 1920 x 1080[4] (1080p29), 1920 x 1080[5] (1080p30), 1920 x 1080[6] (1080p50), 1920 x 1080[7] (1080p59), 1920 x 1080[8] (1080p60), 3840 x 2160[1] (2160p23), 3840 x 2160[2] (2160p24), 3840 x 2160[4] (2160p25), 3840 x 2160[4] (2160p29), 3840 x 2160[5] (2160p30), 3840 x 2160[5] (2160p60), 4096 x 2160[5] , 4096 x 2160[8]<br>1 = at 23.98 Hz, 2 = at 24 Hz, 3 = at 25 Hz, 4 = at 29.97 Hz, 5 = at 30 Hz, 6 = at 50 Hz, 7 = at 59.94 Hz, 8 = at 60 Hz, 9 = at 75 Hz |
| **Audio** | |
| Input Connectors | (1) HDMI, (1) 3.5-mm jack |
| Supported Input | HDMI/DP:<br>LPCM, 2.0/5.1/7.1 channel, 44.1/48/96/192 kHz<br>Dolby True HD, up to 7.1, 192 kHz<br>DTS-HD Master, up to 7.1, 192 kHz<br>Dolby Digital AC-3 (DVD format)<br>DTS version 1 (DVD format);<br>3.5 mm jack:<br>Unbalanced stereo audio |
| Output Connectors | None |
| Supported Output | None |
| **Control** | |
| IR Input | (1) 3.5 mm jack connector, connects to an IR receiver for IR communication with an IR transmitter connecting to another device |
| IR Output | (1) 3.5 mm jack connector, connects to an IR transmitter for IR communication with an IR receiver connecting to another device |
| Control Connectors | (1) 3.5-mm 4-pin Phoenix connector for RS-232 communication; (1) RJ-45 10/100/1000BASE-T Ethernet port |
| Control Method | Ethernet:<br>PC software: for configuring, controlling and upgrading<br>Web browser: for controlling<br>API set: for integrating with the 3rd party control system<br>RS-232:<br>PC software: for testing and upgrading the device itself<br>Common RS-232 device: for bi-directional communication with an RS-232 device connected to another device |

TABLE 1-3 (CONTINUED). SPECIFICATIONS, MCX-S9C-ENC SERIES UNITS

| SPECIFICATION | DESCRIPTION |
|---|---|
| **General** | |
| Operating Temperature | 32 to 104° F (0 to 40° C) |
| Storage Temperature | -4 to +158 F (-20 to +70° C) |
| Humidity | 10 to 90%, noncondensing |
| Product Weight | 3.31 lb. (1.50 kg) |
| Power Supply | 12 VDC |
| Transport Distance | Twisted-Pair:<br>98.4 ft. (30 m) with CAT6 cable,<br>328 ft. (100 m) with CAT6a or CAT7 cable |
| Dimensions | 1.38" H x 8.27" W x 5.47" D (3.51 x 21.01 x 13.89 cm) |
| ESD Protection | Human-body Model: ±8 kV (Air-gap discharge)/±4 kV (Contact discharge) |

TABLE 1-4. SPECIFICATIONS, MCX-S9C-DEC SERIES UNITS

| SPECIFICATION | DESCRIPTION |
|---|---|
| **Video** | |
| Input Connectors | (1) RJ-45 10GBASE-T |
| Input Video Resolutions | 640 x 480[8], 800 x 600[8], 1024 x 768[8], 1280 x 1024[8], 1360 x 768[8], 1440 x 900[8], 1440 x 1050[8], 1600 x 1200[8], 720 x 480[7] (480i59), 720 x 480[7] (480p59), 720 x 576[6] (576i50), 720 x 576[6] (576p50), 1280 x 720[5] (720p50), 1280 x 720[7] (720p59), 1280 x 720[8] (720p60), =1920 x 1080[6] (1080i50), 1920 x 1080[7] (1080i59), 1920 x 1080[8] (1080i60), 1920 x 1080[1] (1080p23), 1920 x 1080[2] (1080p24),1920 x 1080[3] (1080p25), 1920 x 1080[4] (1080p29), 1920 x 1080[5] (1080p30), 1920 x 1080[6] (1080p50), 1920 x 1080[7] (1080p59), 1920 x 1080[8] (1080p60), 3840 x 2160[1] (2160p23), 3840 x 2160[2] (2160p24), 3840 x 2160[4] (2160p25), 3840 x 2160[4] (2160p29), 3840 x 2160[5] (2160p30), 3840 x 2160[5] (2160p60), 4096 x 2160[5] , 4096 x 2160[8]<br>1 = at 23.98 Hz, 2 = at 24 Hz, 3 = at 25 Hz, 4 = at 29.97 Hz, 5 = at 30 Hz, 6 = at 50 Hz, 7 = at 59.94 Hz, 8 = at 60 Hz, 9 = at 75 Hz |
| Output Connectors | (1) HDMI 2.0 |
| Output Video Resolutions | 640 x 480[8], 800 x 600[8], 1024 x 768[8], 1280 x 1024[8], 1360 x 768[8], 1440 x 900[8], 1440 x 1050[8], 1600 x 1200[8], 720 x 480[7] (480i59), 720 x 480[7] (480p59), 720 x 576[6] (576i50), 720 x 576[6] (576p50), 1280 x 720[5] (720p50), 1280 x 720[7] (720p59), 1280 x 720[8] (720p60), =1920 x 1080[6] (1080i50), 1920 x 1080[7] (1080i59), 1920 x 1080[8] (1080i60), 1920 x 1080[1] (1080p23), 1920 x 1080[2] (1080p24),1920 x 1080[3] (1080p25), 1920 x 1080[4] (1080p29), 1920 x 1080[5] (1080p30), 1920 x 1080[6] (1080p50), 1920 x 1080[7] (1080p59), 1920 x 1080[8] (1080p60), 3840 x 2160[1] (2160p23), 3840 x 2160[2] (2160p24), 3840 x 2160[4] (2160p25), 3840 x 2160[4] (2160p29), 3840 x 2160[5] (2160p30), 3840 x 2160[5] (2160p60), 4096 x 2160[5] , 4096 x 2160[8]<br>1 = at 23.98 Hz, 2 = at 24 Hz, 3 = at 25 Hz, 4 = at 29.97 Hz, 5 = at 30 Hz, 6 = at 50 Hz, 7 = at 59.94 Hz, 8 = at 60 Hz, 9 = at 75 Hz |
| **Audio** | |
| Input Connectors | None |
| Supported Input | None |
| Output Connectors | (1) HDMI 2.0, (1) 3.5-mm jack |
| Supported Output | HDMI:<br>LPCM, 2.0/5.1/7.1 channel, 44.1/48/96/192 kHz<br>Dolby True HD, up to 7.1, 192 kHz<br>DTS-HD Master, up to 7.1, 192 kHz<br>Dolby Digital AC-3 (DVD format)<br>DTS version 1 (DVD format);<br>3.5 mm jack:<br>Unbalanced stereo audio |
| **Control** | |
| IR Input | (1) 3.5 mm jack connector, connects to an IR receiver for IR communication with an IR transmitter connecting to another device |
| IR Output | (1) 3.5 mm jack connector, connects to an IR transmitter for IR communication with an IR receiver connecting to another device |
| Control Connectors | (1) 3.5-mm 4-pin Phoenix connector for RS-232 communication; (1) RJ-45 10/100/1000BASE-T Ethernet port |
| Control Method | Ethernet:<br>PC software: for configuring, controlling and upgrading<br>Web browser: for controlling<br>API set: for integrating with the 3rd party control system<br>RS-232:<br>PC software: for testing and upgrading the device itself<br>Common RS-232 device: for bi-directional communication with an RS-232 device connected to another device |

TABLE 1-4 (CONTINUED). SPECIFICATIONS, MCX-S9C-DEC SERIES UNITS

| SPECIFICATION | DESCRIPTION |
|---|---|
| **General** | |
| Operating Temperature | 32 to 104° F (0 to 40° C) |
| Storage Temperature | -4 to +158 F (-20 to +70° C) |
| Humidity | 10 to 90%, noncondensing |
| Product Weight | 3.31 lb. (1.50 kg) |
| Power Supply | 12 VDC |
| Transport Distance | Twisted-Pair:<br>98.4 ft. (30 m) with CAT6 cable,<br>328 ft. (100 m) with CAT6a or CAT7 cable |
| Dimensions | 1.38" H x 8.27" W x 5.47" D (3.51 x 21.01 x 13.89 cm) |
| ESD Protection | Human-body Model: ±8 kV (Air-gap discharge)/±4 kV (Contact discharge) |

# CHAPTER 2: OVERVIEW

## 2.1 ABOUT THIS MANUAL

This manual provides information on the MCX-S9 series encoders and decoders that deliver 4K UHD uncompressed or light compressed video over 10GbE Ethernet networks, and discusses how to install and use them.

The term MCX-S9 series units are used to refer to all encoder and decoder models, MCX-S9-ENC/MCX-S9-DEC series units indicate all encoders or decoders, while an MCX-S9 series unit means a single encoder or decoder.

## 2.2 INTRODUCTION

MCX-S9 series encoders and decoders provide a flexible, powerful, and scalable solution at resolutions up to 4096 x 2160 @ 60 Hz, 3840 x 2160 @ 60 Hz (4:4:4) and 3840 x 2160 @ 60 Hz (4:2:0 10-bit HDR). They allow uncompressed UHD media to be switched and distributed over standard 10GbE Ethernet networks. A local area network is covered long distances over fiber optic cable (distance depends on the SFP+ installed), or up to 328 feet (100 m) over a single CAT6a cable or above. Standard features such as bi-directional serial, bi-directional IR and independent analog audio input/output are included. They are the perfect solution for any zero-frame latency and signal routing applications. Common applications include classrooms, conference rooms, performing arts, and broadcasts.

## 2.3 PORT DIFFERENCES

The following three ports are the main differences among MCX-S9 series units. “Yes” means this model contains the corresponding port while “No” means not included.

TABLE 2-1. PORT DIFFERENCES

| MODELS | 10GBE COPPER PORT | 10GBE FIBER PORT | USB PORT |
|---|---|---|---|
| MCX-S9-ENC | Yes | Yes | Yes |
| MCX-S9-DEC | Yes | Yes | Yes |
| MCX-S9D-ENC | Yes | Yes | Yes |
| MCX-S9C-ENC | Yes | No | No |
| MCX-S9C-DEC | Yes | No | No |

## 2.4 FEATURES

- HDMI 2.0 and HDCP 2.2 compliant
- Lossless distribution of most timing formats
- Light compression when the raw data rate exceeds the 10Gb Ethernet bandwidth
- Supports input and output resolutions up to 4096 x 2160 @ 60 Hz, 3840 x 2160 @ 60 Hz (4:4:4) and 3840 x 2160 @ 60 Hz (4:2:0 10-bit HDR)
- Supports point-to-point transmission distance up to 328 feet (100 meters) through the 10GbE copper port or up to long distances (distance depends on the SFP+ installed) through the 10GbE small-form-pluggable (SFP+) port
- Zero-frame latency
- Supports independent analog audio input and output at 2 channels, 24 bits @ 48 kHz/channel
- Supports bi-directional IR, allowing control of remote source and display devices
- Supports bi-directional serial, allowing control of remote RS-232 devices

- Bandwidth needed: 4K signals at about 6 to 8 Gbps, 1080p signals at about 1.485 Gbps
- Works with Windows PC configurator for device control, device management, and device upgrade
- Offers point-to-point, point-to-multipoint, multipoint-to-point, and multipoint-to-multipoint applications
- Input: one HDMI 2.0 input, one DisplayPort 1.2a input, and one 3.5-mm jack audio input (for MCX-S9-ENC, MCX-S9D-ENC, MCX-S9C-ENC), one 10GbE copper input (for MCX-S9-DEC, MCX-S9C-DEC), one 10GbE fiber input (for MCX-S9-DEC)
- Output: one 10GbE copper output (for MCX-S9-ENC, MCX-S9D-ENC, MCX-S9C-ENC), one 10GbE fiber output (for MCX-S9-ENC, MCX-S9D-ENC), one HDMI output and one analog audio output (for MCX-S9-DEC, MCX-S9C-DEC)
- Streams HDMI or DisplayPort signals over IP networks
- Capable of outputting IP streams that can easily be decoded and viewed on the multiple decoders
- Supports communications protocols used on the Internet such as TCP/IP, ARP, DHCP, ICMP (ping), IGMP

## 2.5 WHAT'S INCLUDED

**MCX-S9-ENC, MCX-S9D-ENC or MCX-S9C-ENC:**

- (1) Encoder
- (1) 12-VDC, 3-A power adapter (with US/UK/EU/AU cord)
- (1) 3.5-mm, 4-pin Phoenix male connector
- (1) IR Emitter
- (2) Mounting ears (with screws)

**MCX-S9-DEC or MCX-S9C-DEC:**

- (1) Decoder
- (1) 12-VDC, 3-A power adapter (with US/UK/EU/AU cord)
- (1) 3.5-mm, 4-pin Phoenix male connector
- (1) IR Wideband Receiver (30 to 50 kHz)
- (2) Mounting ears (with screws)

## 2.6 HARDWARE DESCRIPTION

### 2.6.1 MCX-S9-ENC OR MCX-S9D-ENC UNIT

**MCX-S9-ENC or MCX-S9D-ENC Series Unit Front Panel**

Figure 2-1 shows the front panel of the MCX-S9-ENC series unit. Table 2-2 describes its components.

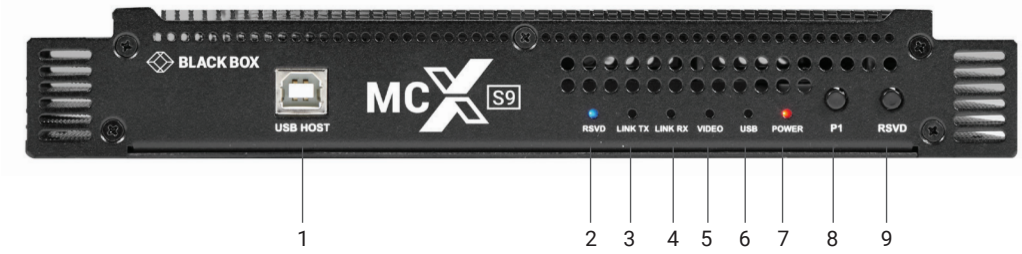


FIGURE 2-1. FRONT PANEL (MCX-S9-ENC OR MCX-S9D-ENC SERIES UNIT)

**TABLE 2-2. FRONT-PANEL (MCX-S9-ENC OR MCX-S9D-ENC SERIES UNIT) COMPONENTS**

| NUMBER IN FIGURE 2-1 | COMPONENT | DESCRIPTION |
|---|---|---|
| 1 | (1) USB Type B port | Connect to a host computer. |
| 2 | (1) RSVD LED | Reserved for future use. |
| 3 | (1) Link TX LED | Blinking: The device is sending Ethernet data.<br>Off: The device is not sending Ethernet data. |
| 4 | (1) Link RX LED | On: The device is processing the video signal but is not receiving Ethernet data.<br>Off: The device is not processing the video signal nor receiving Ethernet data.<br>Blinking: The device is processing the video signal and receiving Ethernet data. |
| 5 | (1) Video LED | On: A stable video signal is detected.<br>Off: No stable video signal is detected. |
| 6 | (1) USB LED | Blinking: A USB device is connected. |
| 7 | (1) Power LED | On: The encoder is powered on.<br>Off: The encoder is powered off. |
| 8 | (1) P1 button | Press once to select input from HDMI or DisplayPort. |
| 9 | (1) RSVD button | Reserved for future use. |

### MCX-S9-ENC or MCX-S9D-ENC Series Unit Back Panel

Figure 2-2 shows the back panel of the MCX-S9-ENC or MCX-S9D-ENC series unit. Table 2-3 describes its components.

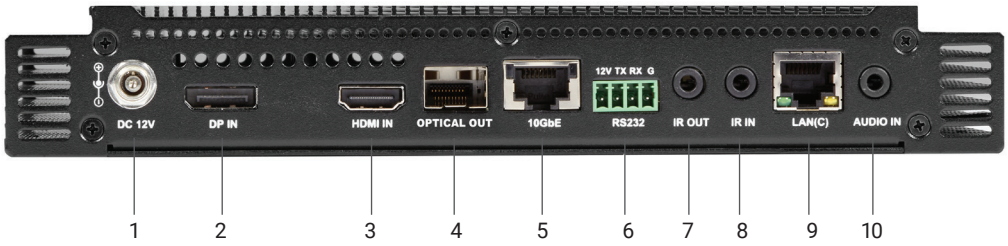


FIGURE 2-2. BACK PANEL (MCX-S9-ENC OR MCX-S9D-ENC SERIES UNIT)

### TABLE 2-3. BACK- PANEL (MCX-S9-ENC OR MCX-S9D-ENC SERIES UNIT) COMPONENTS

| NUMBER IN FIGURE 2-2 | COMPONENT | DESCRIPTION |
|---|---|---|
| 1 | (1) 12-VDC power connector | Connect to the power adapter provided. |
| 2 | (1) DisplayPort in connector | Connect this port to a DisplayPort source device. |
| 3 | (1) HDMI in connector | Connect this port to an HDMI source device. |
| 4 | (1) Optical OUT port | Connect this 10GbE fiber port to a 10GbE Ethernet switch for IP stream output using a 10GbE SFP+ fiber optic transceiver. |
| 5 | (1) 10GbE OUT port | Connect this 10GbE copper port to a 10GbE Ethernet switch for IP stream output. |
| 6 | (1) RS-232 port | Connect this port to an RS-232 device such as a computer for bidirectional serial communication with an RS-232 device connected to another MCX-S9 unit on the network. |
| 7 | IR OUT | Connect to an IR transmitter for IR communication with an IR receiver in another MCX-S9 series unit on the network. |
| 8 | IR IN | Connect to an IR receiver for IR communication with an IR transmitter in another MCX-S9 series unit on the network. |
| 9 | (1) RJ-45 LAN port | 10/100/1000BASE-T: Connect this port to a switch, a router or a computer for signal routing, device management, and device upgrading via control software PC configurator. |
| 10 | Audio IN | Connect to an audio input device, such as a computer or a mobile phone, for audio input. |

## 2.6.2 MCX-S9-DEC UNIT

**MCX-S9-DEC Series Unit Front Panel**

Figure 2-3 shows the front panel of the MCX-S9-DEC series unit. Table 2-4 describes its components.

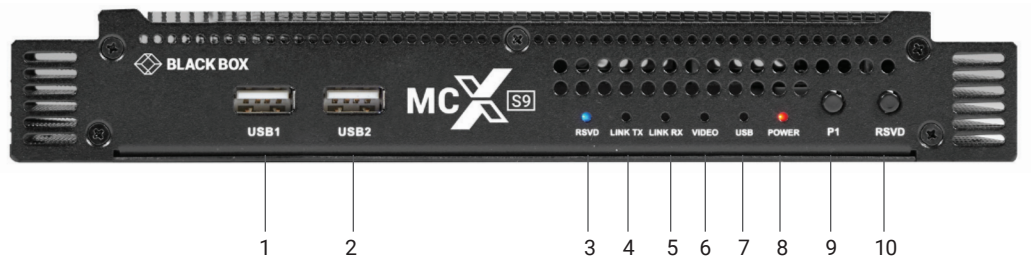


FIGURE 2-3. FRONT PANEL (MCX-S9-DEC SERIES UNIT)

### TABLE 2-4. FRONT PANEL (MCX-S9-DEC SERIES UNIT) COMPONENTS

| NUMBER IN FIGURE 2-3 | COMPONENT | DESCRIPTION |
|---|---|---|
| 1, 2 | (2) USB Type A ports | Connect to a USB device such as a keyboard or mouse. |
| 3 | (1) RSVD LED | Reserved for future use. |
| 4 | (1) Link TX LED | Blinking: The device is sending Ethernet data.<br>Off: The device is not sending Ethernet data. |
| 5 | (1) Link RX LED | On: The device is processing the video signal but is not receiving Ethernet data.<br>Off: The device is not processing the video signal nor receiving Ethernet data.<br>Blinking: The device is processing the video signal and receiving Ethernet data. |
| 6 | (1) Video LED | On: A stable video signal is detected.<br>Off: No stable video signal is detected. |
| 7 | (1) USB LED | Blinking: A USB device is connected. |
| 8 | (1) Power LED | On: The encoder is powered on.<br>Off: The encoder is powered off. |
| 9 | (1) P1 button | Press once to copy the connected HDMI display's EDID to all MCX transmitters in the network. |
| 10 | (1) RSVD button | Reserved for future use. |

### MCX-S9-DEC Series Units Back Panel

Figure 2-4 shows the front panel of the MCX-S9-DEC series unit. Table 2-5 describes its components.

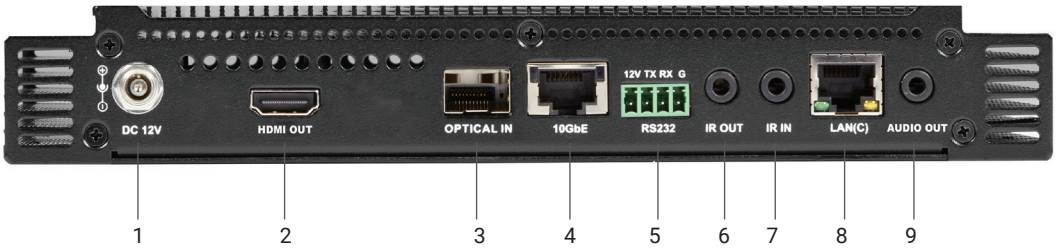


FIGURE 2-4. BACK PANEL (MCX-S9-DEC SERIES UNIT)

TABLE 2-5. BACK PANEL (MCX-S9-DEC SERIES UNIT) COMPONENTS

| NUMBER IN FIGURE 2-4 | COMPONENT | DESCRIPTION |
|---|---|---|
| 1 | (1) 12-VDC power connector | Connect to the power adapter provided. |
| 2 | (1) HDMI Out connector | Connect this port to an HDMI display device. |
| 3 | (1) Optical IN port | Connect this 10GbE fiber port to a 10GbE Ethernet switch for IP stream input using a 10GbE SFP+ fiber optic transceiver. |
| 4 | (1) 10GbE IN port | Connect this 10GbE copper port to a 10GbE Ethernet switch for IP stream output. |
| 5 | (1) RS-232 port | Connect this port to an RS-232 device such as a computer for bidirectional serial communication with an RS-232 device connected to another MCX-S9 unit on the network. |
| 6 | IR OUT | Connect to an IR transmitter for IR communication with an IR receiver in another MCX-S9 series unit on the network. |
| 7 | IR IN | Connect to an IR receiver for IR communication with an IR transmitter in another MCX-S9 series unit on the network. |
| 8 | (1) RJ-45 LAN port | 10/100/1000 BASE-T: Connect this port to a switch, a router or a computer for signal routing, device management, and device upgrading via control software PC configurator. |
| 9 | Audio OUT | Connect to an audio output device, such as an amplifier, speaker, or an earphone for audio output. |

## 2.6.3 MCX-S9C-ENC UNIT

**MCX-S9C-ENC Series Unit Front Panel**

Figure 2-5 shows the front panel of the MCX-S9C-ENC series unit. Table 2-6 describes its components.


FIGURE 2-5. FRONT PANEL (MCX-S9C-ENC SERIES UNIT)

### TABLE 2-6. FRONT PANEL (MCX-S9C-ENC SERIES UNIT) COMPONENTS

| NUMBER IN FIGURE 2-5 | COMPONENT | DESCRIPTION |
|---|---|---|
| 1 | (1) RSVD LED | Reserved for future use. |
| 2 | (1) Link TX LED | Blinking: The device is sending Ethernet data.<br>Off: The device is not sending Ethernet data. |
| 3 | (1) Link RX LED | On: The device is processing the video signal but is not receiving Ethernet data.<br>Off: The device is not processing the video signal nor receiving Ethernet data.<br>Blinking: The device is processing the video signal and receiving Ethernet data. |
| 4 | (1) Video LED | On: A stable video signal is detected.<br>Off: No stable video signal is detected. |
| 5 | (1) USB LED | Blinking: A USB device is connected. |
| 6 | (1) Power LED | On: The encoder is powered on.<br>Off: The encoder is powered off. |
| 7 | (1) P1 button | Press once to select input from HDMI or DisplayPort. |
| 8 | (1) RSVD button | Reserved for future use. |

### MCX-S9C-ENC Series Unit Back Panel

Figure 2-6 shows the back panel of the MCX-S9C-ENC series unit. Table 2-7 describes its components.

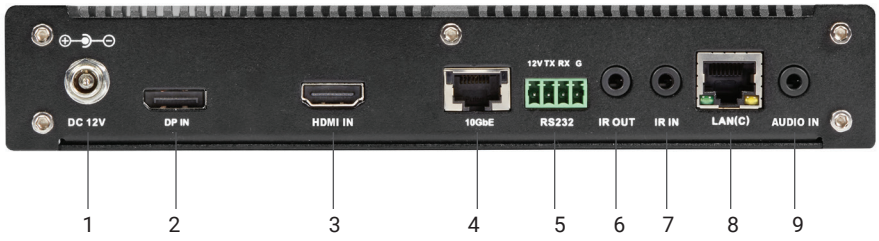


FIGURE 2-6. BACK PANEL (MCX-S9C-ENC SERIES UNIT)

TABLE 2-7. BACK PANEL (MCX-S9C-ENC SERIES UNIT) COMPONENTS

| NUMBER IN FIGURE 2-6 | COMPONENT | DESCRIPTION |
|---|---|---|
| 1 | 12-VDC power connector | Connect to the power adapter provided. |
| 2 | (1) DisplayPort in connector | Connect this port to a DisplayPort source device. |
| 3 | (1) HDMI in connector | Connect this port to an HDMI source device. |
| 4 | (1) 10GbE OUT port | Connect this 10GbE copper port to a 10GbE Ethernet switch for IP stream output. |
| 5 | (1) RS-232 port | Connect this port to an RS-232 device such as a computer for bidirectional serial communication with an RS-232 device connected to another MCX-S9 unit on the network. |
| 6 | IR OUT | Connect to an IR transmitter for IR communication with an IR receiver in another MCX-S9 series unit on the network. |
| 7 | IR IN | Connect to an IR receiver for IR communication with an IR transmitter in another MCX-S9 series unit on the network. |
| 8 | (1) RJ-45 LAN port | 10/100/1000 BASE-T: Connect this port to a switch, a router or a computer for signal routing, device management, and device upgrading via control software PC configurator. |
| 9 | Audio IN | Connect to an audio input device, such as a computer or a mobile phone, for audio input. |

## 2.6.4 MCX-S9C-DEC UNIT

**MCX-S9C-DEC Series Unit Front Panel**

Figure 2-7 shows the front panel of the MCX-S9C-DEC series unit. Table 2-8 describes its components.


FIGURE 2-7. FRONT PANEL (MCX-S9C-DEC SERIES UNIT)

### TABLE 2-8. FRONT PANEL (MCX-S9C-DEC SERIES UNIT) COMPONENTS

| NUMBER IN FIGURE 2-7 | COMPONENT | DESCRIPTION |
|---|---|---|
| 1 | (1) RSVD LED | Reserved for future use. |
| 2 | (1) Link TX LED | Blinking: The device is sending Ethernet data.<br>Off: The device is not sending Ethernet data. |
| 3 | (1) Link RX LED | On: The device is processing the video signal but is not receiving Ethernet data.<br>Off: The device is not processing the video signal nor receiving Ethernet data.<br>Blinking: The device is processing the video signal and receiving Ethernet data. |
| 4 | (1) Video LED | On: A stable video signal is detected.<br>Off: No stable video signal is detected. |
| 5 | (1) USB LED | Blinking: A USB device is connected. |
| 6 | (1) Power LED | On: The encoder is powered on.<br>Off: The encoder is powered off. |
| 7 | (1) P1 button | Press once to copy the connected HDMI display's EDID to all MCX transmitters in the network. |
| 8 | (1) RSVD button | Reserved for future use. |

### MCX-S9C-DEC Series Unit Back Panel

Figure 2-8 shows the back panel of the MCX-S9C-DEC series unit. Table 2-9 describes its components.

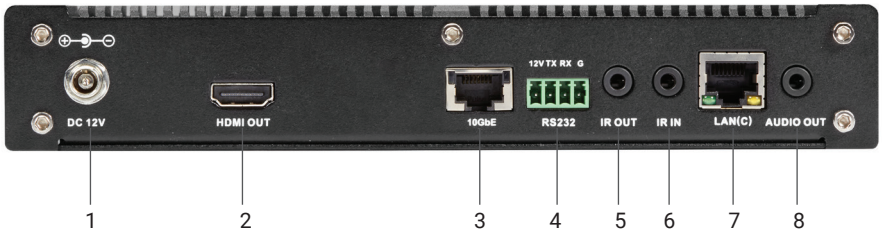


FIGURE 2-8. BACK PANEL (MCX-S9C-DEC SERIES UNIT)

### TABLE 2-9. BACK PANEL (MCX-S9C-DEC SERIES UNIT) COMPONENTS

| NUMBER IN FIGURE 2-8 | COMPONENT | DESCRIPTION |
|---|---|---|
| 1 | 12-VDC power connector | Connect to the power adapter provided. |
| 2 | HDMI OUT | Connect to an HDMI display source. |
| 3 | 10GbE IN | Connect this 10GbE copper port to a 10GbE Ethernet switch for IP stream input. |
| 4 | RS-232 | Connect to an RS-232 device, such as a PC, for bi-directional serial communication with an RS-232 device connected to another MCX-S7 series unit on the network. |
| 5 | IR OUT | Connect to an IR transmitter for IR communication with an IR receiver in another MCX-S7 series unit on the network. |
| 6 | IR IN | Connect to an IR receiver for IR communication with an IR transmitter in another MCX-S7 series unit on the network. |
| 7 | LAN | 10/100/1000 BASE-T: Connect this port to a switch, a router or a computer for signal routing, device management, and device upgrading via control software PC configurator. |
| 8 | Audio OUT | Connect to an audio receiver such as an amplifier, a speaker or an earphone for audio input. |

# CHAPTER 3: TYPICAL APPLICATIONS

MCX-S9 series units allow any model of encoder and decoder to be linked, offering various applications to meet your requirements.

The following four typical applications are available for your reference: Point-to-Point, Point-to-Multipoint, Multipoint-to-Multipoint, and Multipoint-to-Point.

This section uses units with 10GbE copper ports as an example.

The fiberoptic ports' cabling configuration is similar.

## 3.1 POINT-TO-POINT

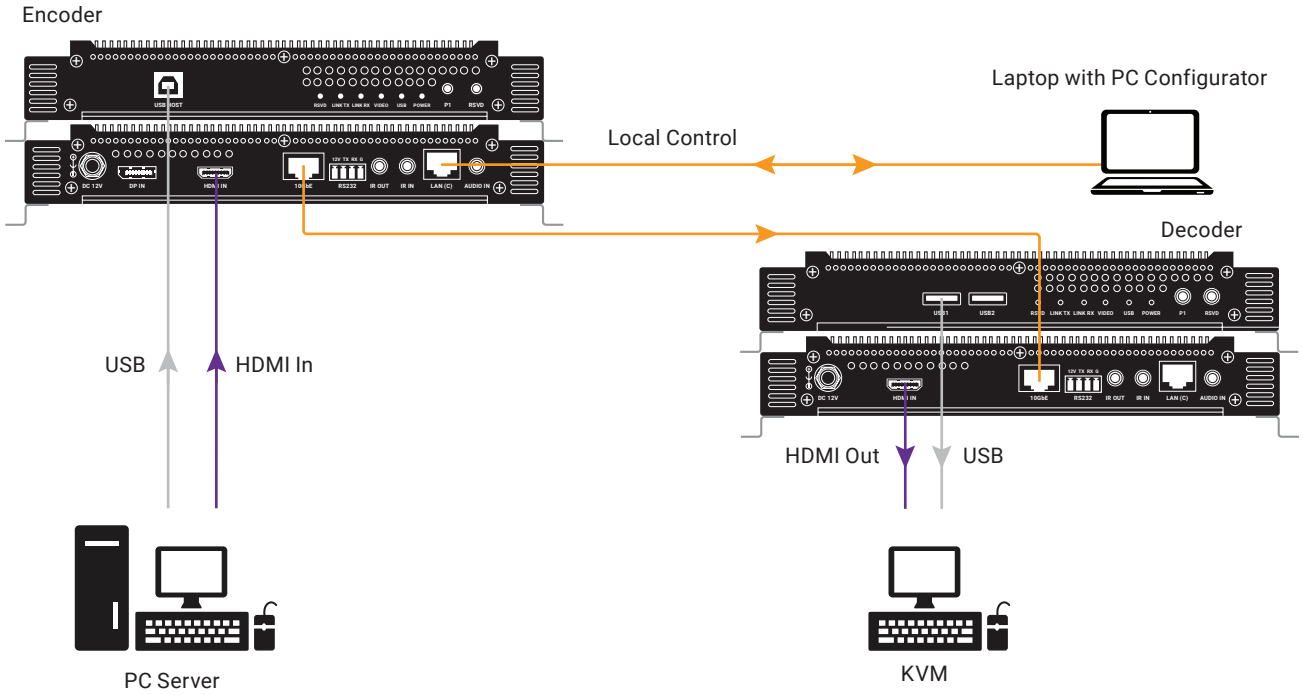


FIGURE 3-1. POINT-TO-POINT APPLICATION

# CHAPTER 3: TYPICAL APPLICATIONS

## 3.2 POINT-TO-MULTIPOINT

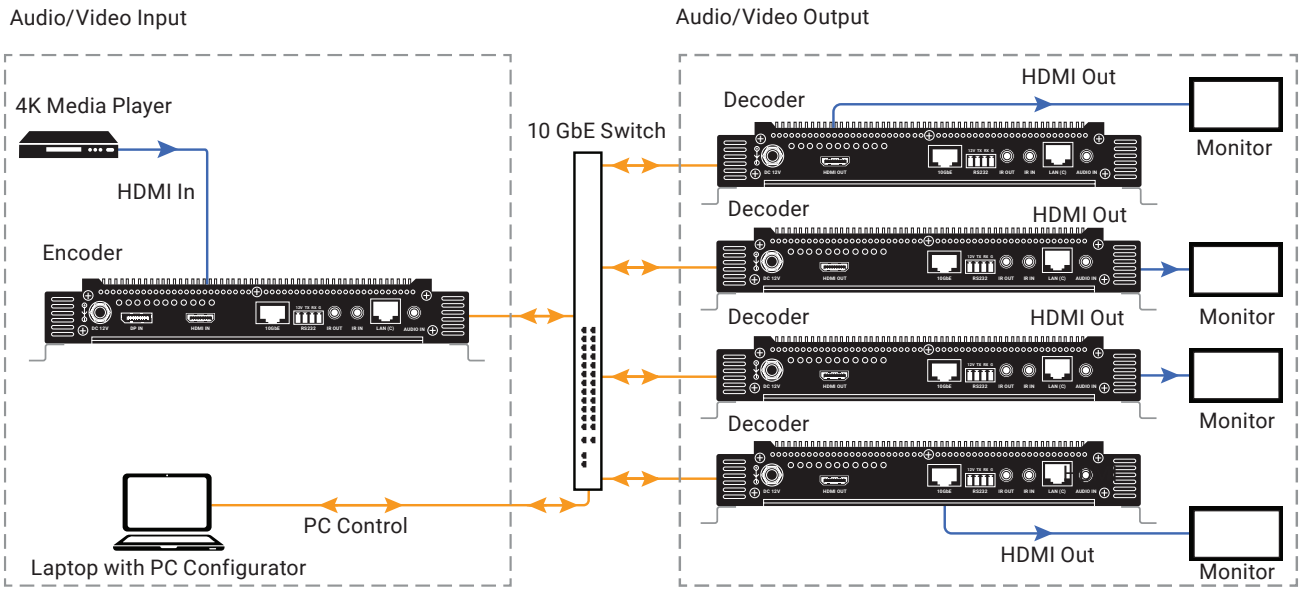


FIGURE 3-2. POINT-TO-MULTIPOINT APPLICATION

## 3.3 MULTIPOINT-TO-POINT

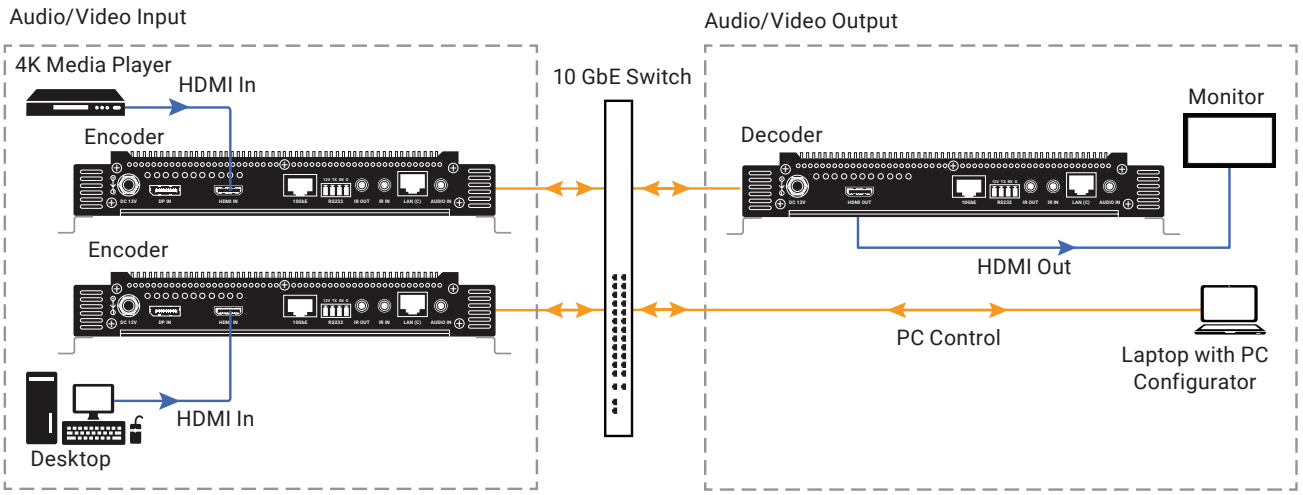


FIGURE 3-3. MULTIPOINT-TO-POINT APPLICATION

## 3.4 MULTIPOINT-TO-MULTIPOINT

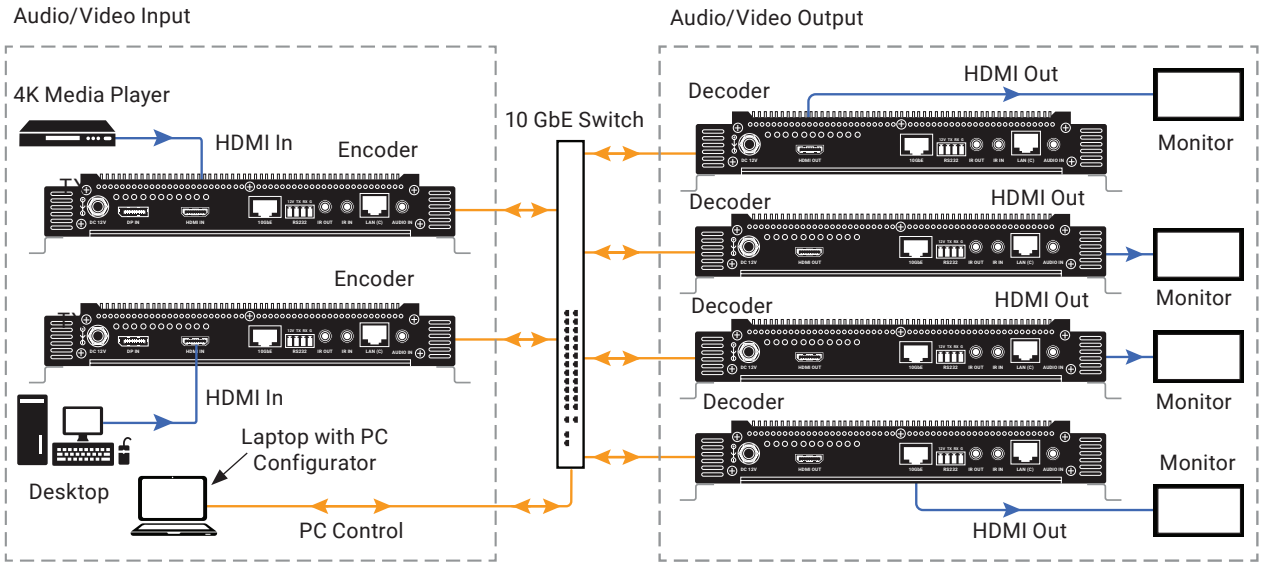


FIGURE 3-4. MULTIPOINT-TO-MULTIPOINT APPLICATION

# CHAPTER 4: HARDWARE INSTALLATION

**WARNINGS:**

**Before the installation, disconnect the power supplies from all the devices.**

**Transmitter and receiver modules in fiber optic transceivers should be correctly connected to separate fiber cables.**

**This section uses units with 10GbE copper ports as an example. The fiberoptic units' cabling is similar.**

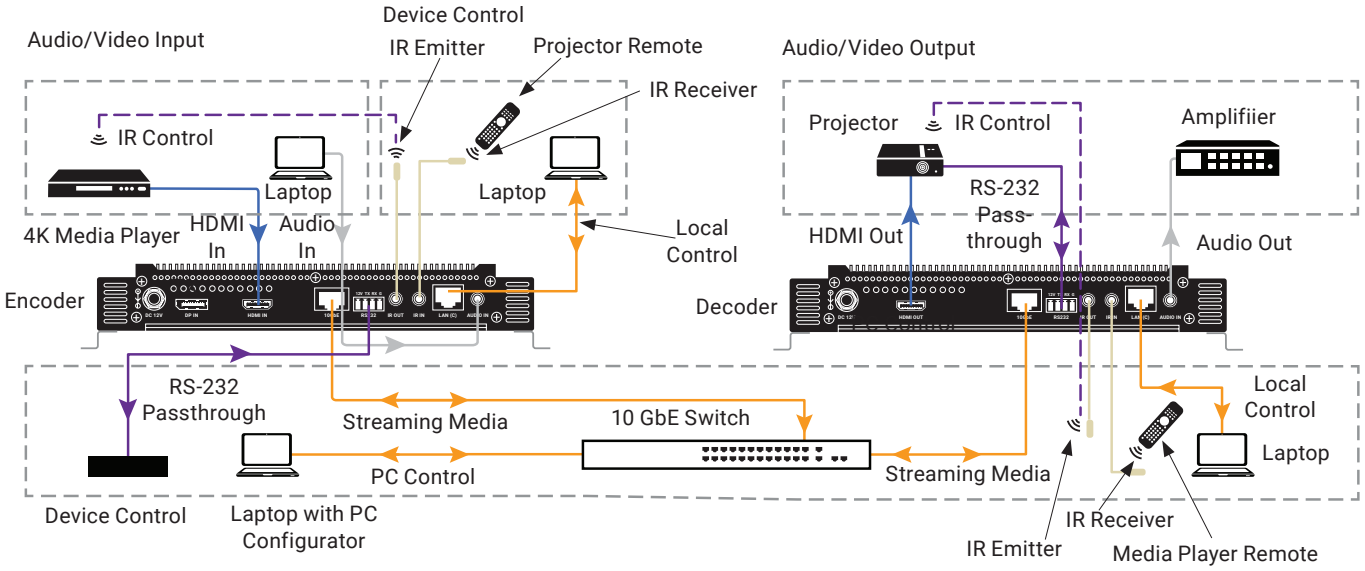


FIGURE 4-1. INSTALLATION DIAGRAM

# APPENDIX A: REGULATORY INFORMATION

## A.1 FCC CLASS B STATEMENT

Class B Digital Device. This equipment has been tested and found to comply with the limits for a Class B computing device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. This equipment generates, uses, and can radiate radio frequency energy, and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. If this equipment does cause harmful interference to radio or telephone reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult an experienced radio/TV technician for help.

CAUTION: Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

To meet FCC requirements, shielded cables and power cords are required to connect this device to a personal computer or other Class B certified device.

This digital apparatus does not exceed the Class B limits for radio noise emission from digital apparatus set out in the Radio Interference Regulation of Industry Canada.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de classe B prescrites dans le Règlement sur le brouillage radioélectrique publié par Industrie Canada.

## A.2 CE AND ROHS2

This product complies with CE and ROHS2 certifications.

# APPENDIX A: REGULATORY INFORMATION

## A.3 NOM STATEMENT

1. Todas las instrucciones de seguridad y operación deberán ser leídas antes de que el aparato eléctrico sea operado.
2. Las instrucciones de seguridad y operación deberán ser guardadas para referencia futura.
3. Todas las advertencias en el aparato eléctrico y en sus instrucciones de operación deben ser respetadas.
4. Todas las instrucciones de operación y uso deben ser seguidas.
5. El aparato eléctrico no deberá ser usado cerca del agua—por ejemplo, cerca de la tina de baño, lavabo, sótano mojado o cerca de una alberca, etc.
6. El aparato eléctrico debe ser usado únicamente con carritos o pedestales que sean recomendados por el fabricante.
7. El aparato eléctrico debe ser montado a la pared o al techo sólo como sea recomendado por el fabricante.
8. Servicio—El usuario no debe intentar dar servicio al equipo eléctrico más allá a lo descrito en las instrucciones de operación. Todo otro servicio deberá ser referido a personal de servicio calificado.
9. El aparato eléctrico debe ser situado de tal manera que su posición no interfiera su uso. La colocación del aparato eléctrico sobre una cama, sofá, alfombra o superficie similar puede bloquea la ventilación, no se debe colocar en libreros o gabinetes que impidan el flujo de aire por los orificios de ventilación.
10. El equipo eléctrico deber ser situado fuera del alcance de fuentes de calor como radiadores, registros de calor, estufas u otros aparatos (incluyendo amplificadores) que producen calor.
11. El aparato eléctrico deberá ser connectado a una fuente de poder sólo del tipo descrito en el instructivo de operación, o como se indique en el aparato.
12. Precaución debe ser tomada de tal manera que la tierra fisica y la polarización del equipo no sea eliminada.
13. Los cables de la fuente de poder deben ser guiados de tal manera que no sean pisados ni pellizcados por objetos colocados sobre o contra ellos, poniendo particular atención a los contactos y receptáculos donde salen del aparato.
14. El equipo eléctrico debe ser limpiado únicamente de acuerdo a las recomendaciones del fabricante.
15. En caso de existir, una antena externa deberá ser localizada lejos de las lineas de energia.
16. El cable de corriente deberá ser desconectado del cuando el equipo no sea usado por un largo periodo de tiempo.
17. Cuidado debe ser tomado de tal manera que objectos liquidos no sean derramados sobre la cubierta u orificios de ventilación.
18. Servicio por personal calificado deberá ser provisto cuando:
    A: El cable de poder o el contacto ha sido dañado; u
    B: Objectos han caído o líquido ha sido derramado dentro del aparato; o
    C: El aparato ha sido expuesto a la lluvia; o
    D: El aparato parece no operar normalmente o muestra un cambio en su desempeño; o
    E: El aparato ha sido tirado o su cubierta ha sido dañada.

# APPENDIX B: DISCLAIMER/TRADEMARKS

## B.1 DISCLAIMER

Black Box Corporation shall not be liable for damages of any kind, including, but not limited to, punitive, consequential or cost of cover damages, resulting from any errors in the product information or specifications set forth in this document and Black Box Corporation may revise this document at any time without notice.

## B.2 TRADEMARKS USED IN THIS MANUAL

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# NOTES

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