USER MANUAL

HDMI 2.0 VIDEO EXTENDERS

UPDATE B ⌐ | ⌐ UPDATE A
CTRL

UPDATE B ⌐ | ⌐ UPDATE A
CTRL

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SAFETY PRECAUTIONS

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To ensure the best performance from the product, please read all instructions carefully before using the device. Save this manual for further reference.

- Unpack the equipment carefully and save the original box and packing material for possible future shipment.

- Follow basic safety precautions to reduce the risk of fire, electrical shock, and injury to persons.

- Do not dismantle the housing or modify the product. This may cauase electrical shock or burn.

- Using supplies or parts not meeting the product's specifications may cause damage, deterioration, or malfunction.

- Refer all servicing to qualified service personnel.

- To prevent fire or shock hazard, do not expose the unit to rain, moisture, or install this product near water.

- Do not put any heavy items on the extension cable in case of extrusion.

- Do not remove the housing of the device as openng or removing housing may expose you to dangerous voltage or other hazards.

- Install the device in a location with proper ventilation to avoid damage caused by overheating.

- Keep the product away from liquids.

- Spillage into the housing may result in fire, electrical shock, or equipment damage. If an object or liquid falls or spills on the housing, unplug the unit immediately.

- Do not twist or pull by force the ends of the cable. It can cause malfunction.

- Do not use liquid or aerosol cleaners to clean this unit. Always unplug the power to the device before cleaning.

- Unplug the power cord when left unused for a long period of time.

- Information on disposal for scrapped devices: do not burn or mix with general household waste. Treat the product as normal electrical waste.

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TABLE 1-1. SPECIFICATIONS

SPECIFICATION	DESCRIPTION
Transmitter	
Input	HDMI IN
Output	HDBT OUT
Control Ports	IR IN, IR OUT, RS-232
Receiver	
Input	HDBT IN
Output	HDMI OUT
Control Ports	IR IN, IR OUT, RS-232
General	
Tranmission Mode and Distance	HDBaseT: 1080p < or = 229 ft. (70 m); 4K x 2K < = 131 ft. (40 m)
Resolution	UP to 4K x 2K @ 60 Hz 4: 4:4
Bandwidth	18 Gbps
HDMI Standard	HDMI 2.0 amd HDCP 2.2
Power Supply	Input: 100 to 240 VAC, 50/60 Hz, external power supply; Output: 12 VDC, 2 A
Power Consumption	14 W (max.)
Operating Temperature	32 to 104° F (0 to 40° C)
Storage Temperature	+14 to +122° F (-10 to +50° C)
Humidity	0 to 90% relative humidity
Dimensions	0.6" H x 4.5" W x 3.3" D (1.6 x 11.5 x 8.4 cm)
Weight	Transmitter: 0.330 lb. (0.150 kg): Receiver: 0.337 lb. (.0.153 kg)

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CHAPTER 2: OVERVIEW

2.1 INTRODUCTION

The HDMI 2.0 4K 60Hz 4:4:4 HDR HDBaseT Video Extender, PoC IR, RS-232 consists of a transmitter and a receiver. It extends an 1080p/4K HDMI signal over CAT5e/CAT6a cable up to 229 feet (70 meters) or 131 feet (40 meters) using PoC. It also enables IR and RS-232 passthrough to control a source or display device remotely. The extender uses visually lossless video compression technology (VLC) to ensure the HD lossless transmission of HDR and 4K @ 60 Hz/4:4:4 over CAT5e/CAT6a cable.

2.2 FEATURES

- Supports 4K/UHD/60 Hz/4:4:4
- Supports HDMI 2.0 and HDCP 2.2 and is backwards-compatible to the previous versions
- Maximum transmission distance is up to 131 feet (40 meters) for 4K x 2K and up to 229 feet (70 meters) for 1080p
- Uses CEC, IR, and RS-232 passthrough for long-distance control
- Includes bi-directional PoC for simplied wiring
- Supports HDR
- Includes a DIP switch for Control, Update A, and Update B

2.3 WHAT'S INCLUDED

Your package should include the following items. If anything is missing or damaged, contact Black Box Technical Support at 877-877-2269 or info@blackbox.com

Transmitter (VX-HDB2-TX):
- (1) Transmitter
- (4) Mounting Ears with (4) Screws
- (1) RS-232 Cable
- (1) 12-VDC, 2-A power supply

Receiver (VX-HDB2-RX):
- (1) Receiver
- (8) Plastic cushions
- (1) 3-pin Phoenix connector

CHAPTER 2: OVERVIEW

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2.4 HARDWARE DESCRIPTION

2.4.1 TRANSMITTER

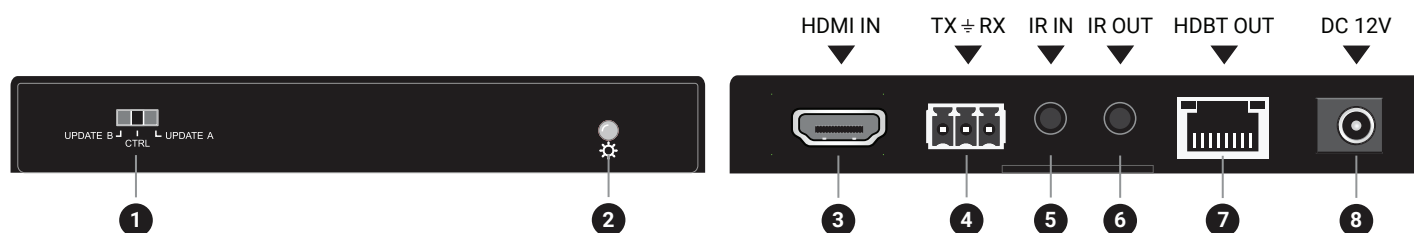Figure 2-1 shows the front and back panels of the Transmitter. Table 2-1 describes their components.

FIGURE 2-1. TRANSMITTER FRONT AND BACK PANELS

TABLE 2-1. TRANSMITTER COMPONENTS

NUMBER IN FIGURE 2-1	COMPONENT	DESCRIPTION
1	MODE switcher	• CTRL: RS-232 passthrough control mode • UPDATE A: Update IC program, connect a PC to the RS-232 port, then double-click the update file (.bat) • UPDATE B: Update compression IC program (the upgrade method is the same as the above UPDATE A)
2	Power LED	RED: DC power present
3	HDMI IN	Connect to HDMI source
4	3-pin terminal block	Connect to control device (PC)
5	IR IN	Works with far-end IR OUT port, connect with IR receiver (with carrier) to collect an IR signal to control a far-end display device from local
6	IR OUT	Works with far-end IR IN port, connect with IR emitter to send an IR signal to control an input source device from remote
7	HDBT OUT	Connect to the HDBT IN socket on the receiver via CAT5e/6a cable
8	12-VDC power port	Supports bidirectional PoC via a 12-VDC, 2-A power adapter

CHAPTER 2: OVERVIEW

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2.4.2 RECEIVER

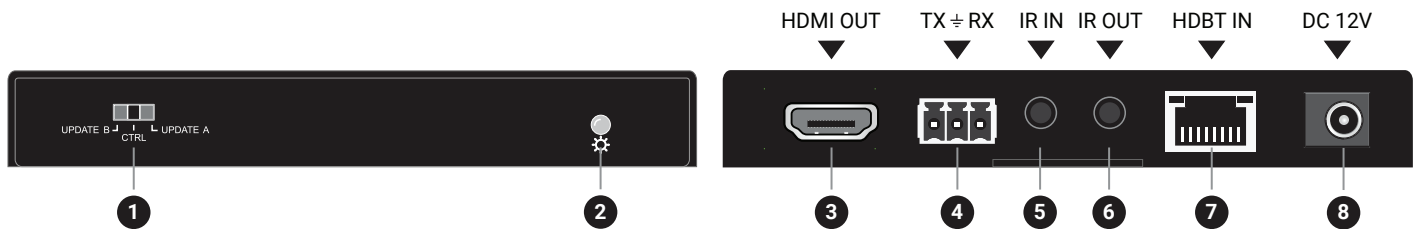Figure 2-2 shows the front and back panels of the Receiver. Table 2-2 describes their components.

FIGURE 2-2. RECEIVER FRONT AND BACK PANELS

TABLE 2-2. RECEIVER COMPONENTS

NUMBER IN FIGURE 2-2	COMPONENT	DESCRIPTION
1	MODE switcher	• CTRL: RS-232 passthrough control mode • UPDATE A: Update IC program, connect a PC to the RS-232 port, then double-click the update file (.bat) • UPDATE B: Update compression IC program (the upgrade method is the same as the above UPDATE A)
2	Power LED	RED: DC power present
3	HDMI OUT	Connect to HDMI display
4	3-pin terminal block	Connect to control device (PC)
5	IR IN	Works with far-end IR OUT port, connect with IR receiver (with carrier) to collect an IR signal to control a far-end display device from local
6	IR OUT	Works with far-end IR IN port, connect with IR emitter to send an IR signal to control an input source device from remote
7	HDBT IN	Connect to the HDBT OUT socket on the transmitter via CAT5e/6a cable
8	12-VDC power port	Supports bidirectional PoC via a 12-VDC, 2-A power adapter

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CHAPTER 3: INSTALLATION

3.1 USAGE PRECAUTIONS

- ◆ System should be installed in a clean environment with proper temperature and humidity.
- ◆ All of the power switches, plugs, sockets and power cords should be insulated.
- ◆ All devices should be connected before power on.
- ◆ Use shielded straight-through CAT5e/CAT6a cable with TIA/EIA 568B terminations for good transmission.

3.2 SYSTEM DIAGRAM

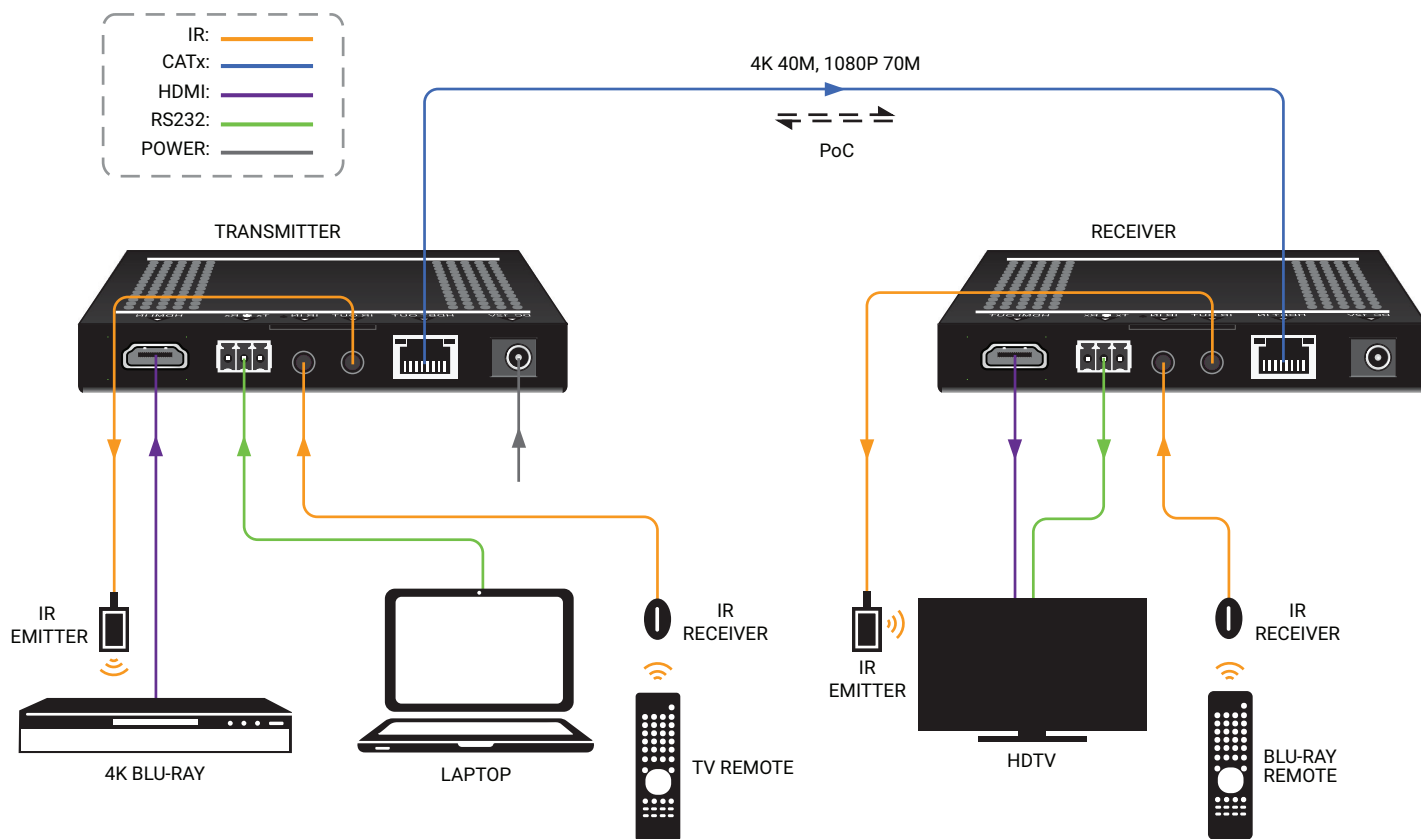The following diagram illustrates a typical installation.

FIGURE 3-1. TYPICAL INSTALLATION

NOTE: The HDBaseT receiver does not need a power adapter. It can be powered by the transmitter with PoC support.

CHAPTER 3: INSTALLATION

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3.3 CONNECTION PROCEDURE

STEP 1: Connect an HDMI source (such as Blu-ray™ DVD) to the HDMI IN port of transmitter with HDMI cable.

STEP 2: Connect the HDBT OUT port of the transmitter to the HDBT IN port of the receiver, with a single CAT5e/CAT6a cable.

STEP 3: Connect an HDMI display (such as HDTV) to the HDMI OUT port of the receiver with an HDMI cable.

STEP 4: Both transmitter and receiver have IR IN and OUT. When one end is used as an IR receiver, the signal sent from the end can only be transmitted via the other end.

For example: When "IR IN" of transmitter connects with an IR receiver, the IR emitter must connect to IR OUT of Receiver.

STEP 5: Connect the RS232 port of the devices to be controlled and the receiver or the transmitter.

STEP 6: Connect the 24-VDC power adapter to the transmitter. Both transmitter and receiver will receive power via the PoH function.

3.4 TWISTED-PAIR CABLE CONNECTION

The twisted-pair cable used in this extender MUST be a straight-through cable.

TABLE 3-1. TIA/EIA 568A AND 568B PINNING

TIA/EIA 568A		TIA/EIA 568B	
PIN	**CABLE COLOR**	**PIN**	**CABLE COLOR**
1	Green/White	1	Orange/White
2	Green	2	Orange
3	Orange/White	3	Green/White
4	Blue	4	Blue
5	Blue/White	5	Blue/White
6	Orange	6	Green
7	Brown/White	7	Brown/White
8	Brown	8	Brown
1st Ground	4–5	1st Ground	4–5
2nd Ground	3–6	2nd Ground	3–6
3rd Ground	1–2	3rd Ground	1–2
4th Ground	7–8	4th Ground	7–8
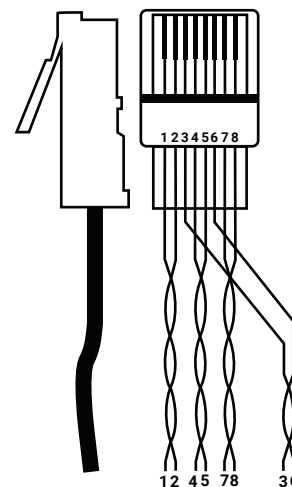
NOTE: Cable connectors MUST be metal and the shielded layer of the cable MUST be connected to the connector's metal shell to make a better transmission.

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PROBLEMS/SOLUTIONS

Problem: No image on display.

Possible Solutions:

1. Make sure that the display device has been set to the correct input.

2. Ensure that the HDMI cables used for both the source/transmitter and the receiver/display are properly connected and are working. Test the HDMI cables directly from a source to display and ensure their operation.

3. Ensure that the CAT5e/CAT6a cable has not been damaged and that it has been terminated correctly with T568B on both ends. A temporary length of CAT5e/Cat6 can be used for testing to ensure that the devices are all compatible and working properly.

4. Make sure the power supply is properly grounded.

NOTE: Known issues with HDMI 1.2 source devices: Older compatibility (HDMI 1.2) may result in HDBaseT transmission issues. Please contact Technical Support at 877-877-2269 or info@blackbox.com for a solution to these issues.

Problem: Color loss or poor picture quality.

Possible Solutions:

1. Make sure that the HDMI cables used for both the source and transmitter and the receiver and display are properly connected and are of good quality. Test the HDMI cables directly from a source to display and ensure their picture quality.

2. Ensure proper grounding of the power supply.

3. If the static becomes stronger or picture quality becomes worse when connecting the video connectors, this may be due to improper grounding.

4. Check the grounding and make sure all the components are properly grounded to a common ground. Improper grounding may cause damage to the receiver.

NOTE: If your problem still remains after following the troubleshooting steps listed above, contact Black Box Technical Support at 877-877-2269 or info@blackbox.com

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APPENDIX A: REGULATORY INFORMATION

A.1 FCC 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

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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.

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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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