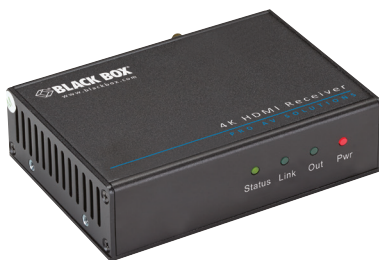


Video Extender - 4K HDMI, IR, RS-232 Transmitter and Receiver

User Manual

Transmit an HDMI signal up to 230 feet (70 meters)
over CAT5e/CAT6 cable.



**Customer
Support
Information**

Order toll-free in the U.S.: Call 877-877-BBOX (outside U.S. call 724-746-5500)
FREE technical support 24 hours a day, 7 days a week: Call 724-746-5500 or fax
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FEDERAL COMMUNICATIONS COMMISSION AND
INDUSTRY CANADA RADIO FREQUENCY INTERFERENCE STATEMENTS

This equipment generates, uses, and can radiate radio-frequency energy, and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio communication. It has been tested and found to comply with the limits for a Class A computing device in accordance with the specifications in Subpart B of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference when the equipment is operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user at his own expense will be required to take whatever measures may be necessary to correct the interference.

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

This digital apparatus does not exceed the Class A 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 la classe A prescrites dans le Règlement sur le brouillage radioélectrique publié par Industrie Canada.

Normas Oficiales Mexicanas (NOM)
Electrical Safety Statement
INSTRUCCIONES DE SEGURIDAD

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.

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 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 conectado 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 objetos líquidos 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: Objetos 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.

Safety Precautions

Safety Precautions

For reliable operation of the equipment and personnel safety, follow the guidelines below for installation, use, and maintenance of the device.

1. The system must be grounded properly. Do not use two-blade plugs and ensure the alternating power supply ranges from 100 to 240 VAC and 50 to 60 Hz.
2. Do not put the control panel in an environment that is not within the its temperature tolerance.
3. Because the switch's power generates heat when running, be sure the working environment is properly ventilated to avoid damage caused by equipment overheating.
4. Turn off the general power switch in humid weather or when the control panel will be left unused for long time.
5. Before operating, be sure that the alternating current wire is pulled out of the power supply.
6. NEVER open the casing of the equipment, DO NOT repair it on your own. This might be harmful to persons or the equipment.
7. DO NOT splash any liquids on or around the equipment.

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1. Specifications

Input	
Input Signal	Transmitter: (1) HDMI, (1) IR, (1) RS-232; Receiver: (1) IR, (1) RJ-45, (1) RS-232
Input Connector	Transmitter: (1) HDMI F, (1) 3.5-mm jack, (1) 3-pin screw terminal; Receiver: (1) 3.5-mm jack, (1) RJ-45, (1) 3-pin screw terminal
Video Signal	HDMI 1.4
Audio	Digital audio, transmit through HDMI audio
Output	
Output Signal	Transmitter: (1) RJ-45, (1) IR, (1) RS-232; Receiver: (1) HDMI, (1) IR, (1) RS-232
Output Connector	Transmitter: (1) RJ-45, (1) 3.5-mm jack, (1) 3-pin screw terminal; Receiver: (1) HDMI F, (1) 3.5-mm jack, (1) 3-pin screw terminal

Output (continued)	
Video Signal	HDMI 1.4
General	
Resolution	800 x 600 @ 60 Hz, 1024 x 768 @ 60 Hz, 1280 x 720 @ 60Hz, 1280 x 1024 @ 60Hz, 1366 x 768 @ 60Hz, 1600 x 1200 @ 60 Hz, 1920 x 1080 @ 60 Hz, 1920 x 1200 @ 60 Hz, 3D, 4K x 2K
Transmission	Distance: 230 ft. (70 m); Mode: HDBaseT
SNR	>70 dB @ 10 MHz--100 MHz
Bandwidth	10.2 Gbps
THD	<0.005% at 1 kHz
HDMI Standard	HDMI 1.4, 3D, HDCP
Impedance	75 ohms
Physical	
Dimensions	1.2"H x 4.3"W x 3"D (3 x 11 x 7.7 cm)
Weight	1.1 lb. (0.5 kg)
Power	
Power Supply	Input: 100–240 VAC, 50/60 Hz; Output: 24-VDC, 1.25 A
Consumption	9.6 W
Environmental	
Operating Temperature	-14 to 104° F (-10 to +40° C)
Operating Humidity	10 to 90%

2. Overview

2.1 Introduction

The Video Extender —4K HDMI, IR, RS-232 Transmitter (AVS-HDB-TX) and Receiver (AVS-HDB-RX) is an HDMI/IR/RS232 twisted pair extender including a transmitter (AVS-HDB-TXT) and receiver (AVS-HDB-TXR). The AVS-HDB-TX uses HDBaseT technology to transmit an HDMI signal, and the maximum transmission distance is up to 230 feet (70 meters) over CAT5e/CAT6 cable. CEC, bi-directional RS-232 and IR control, and PoC are supported by the AVS-HDB-TX/AVS-HDB-RX extender pair.

2.2 Features

- Supports Full HD: Delivers resolutions including 800 x 600 @ 60 Hz, 1024 x 768 @ 60 Hz, 1280 x 720 @ 60Hz, 1280 x 1024 @ 60Hz, 1366 x 768 @ 60Hz, 1600 x 1200 @ 60 Hz, 1920 x 1080 @ 60 Hz, 1920 x 1200 @ 60 Hz, 3D, 4K x 2K
- Maximum transmission distance is up to 70 meters over a single CAT5e/CAT6 cable.
- High Bandwidth: 10.2 Gps.
- HDTV Compatible, HDMI 1.4 and HDCP compliant.
- Supports PoC and CEC.
- Connects to a display to transmit EDID and HPD signals continuously via a CAT5e cable.
- Uses HDBaseT technology.
- Uses bi-directional RS232/IR control.
- LED indicators show status.
- Housed in a wall/table-mountable aluminum enclosure.

NOTE: Use a CAT5e cable with low impedance (shielded twisted pair should be well grounded) for proper transmission.

2.3 What's Included

Your package should include the following items. If anything is missing or damaged, contact Black Box Technical Support at 724-746-5500 or info@blackbox.com.

Transmitter (AVX-HDB-TX):

- Video Extender —4K HDMI, IR, RS-232 Transmitter (AVS-HDB-TX)
- (2) mounting brackets
- (4) rubber feet
- (4) screws
- (1) RS-232 cable
- (1) 24-VDC power adapter
- Video Extender —4K HDMI, IR, RS-232 Receiver (AVS-HDB-RX)
- (2) mounting brackets
- (4) rubber feet
- (4) screws
- (1) RS-232 cable
- (1) 24-VDC power adapter

To download the user manual from the Black Box Web site:

1. Go to www.blackbox.com
2. Enter the part number (AVS-HDB-TX or AVS-HDB-RX) in the search box:
3. Click on the "Resources" tab on the product page, and select the document you wish to download.

2.4 Hardware Description

Figures 2-1 and 2-2 show the front and back panels of the transmitter. Table 2-1 describes its components.

Figures 2-3 and 2-4 show the front and back panels of the receiver. Table 2-2 describes its components.

2.4.1 4K HDMI, IR, RS-232 Transmitter (AVS-HDB-TX)

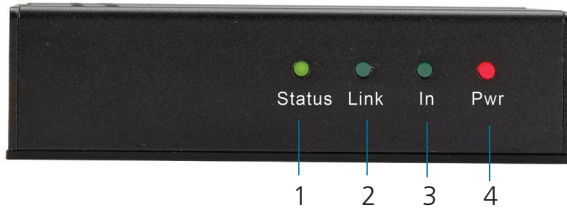


Figure 2-1. Transmitter front panel.

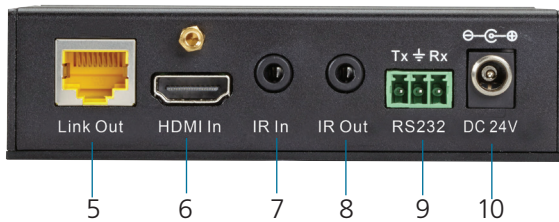


Figure 2-2. Transmitter back panel.

Table 2-1. Transmitter components.

Number in Figure 2-1 or 2-2	Component	Description
1	On LED	<ul style="list-style-type: none"> • Blinks green when unit is working. • Turns OFF when unit is not working.
2	Link LED	Twisted pair status indicator: lights green when the connection is good.
3	HDCP LED	<ul style="list-style-type: none"> • Lights green when the connected device supports HDCP. • Blinks green when the connected device does not support HDCP.
4	Power LED	Lights red when power is on.
5	RJ-45 connector	HDBT Out: Connects to the HDBT In port of the receiver via a CAT5e cable.
6	HDMI connector	HDMI in: Connects to the HDMI source.
7	IR In sensor	Connects to the IR receiver to accept IR signal from the AVS-HDB-RX.

Table 2-1 (continued). Transmitter components.

Number in Figure 2-1 or 2-2	Component	Description
8	IR out sensor	Connects to the IR transmitter to receive IR signals from the AVS-HDB-RX.
9	3-pin terminal block	RS-232 serial port: connects to the control terminal and supports bidirectional RS-232 control.
10	Barrel connector	Links to a 24-VDC power supply. <i>NOTE: The power supply is not required at the transmitter (AVS-HDB-TX) if the receiver (AVS-HDB-RX) connects to a power supply.</i>

2.4.2 4K HDMI, IR, RS-232 Receiver (AVS-HDB-RX)

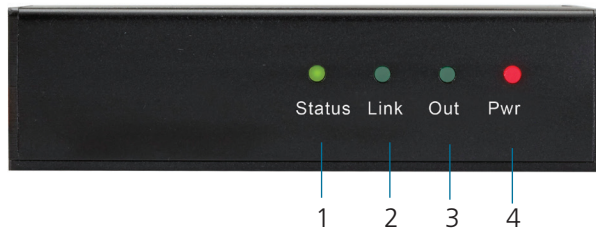


Figure 2-3. Receiver front panel.

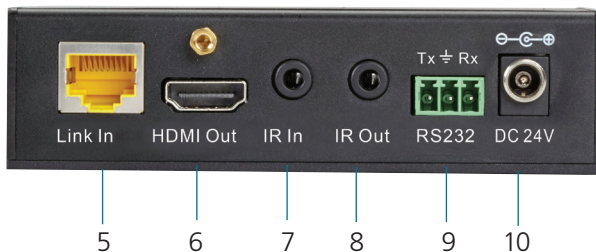


Figure 2-4. Receiver back panel.

Table 2-2. Receiver components.

Number in Figure 2-3 or 2-4	Component	Description
1	On LED	<ul style="list-style-type: none">• Blinks green when unit is working.• Turns OFF when unit is not working.
2	Link LED	Twisted pair status indicator: lights green when the connection is good.
3	HDCP LED	<ul style="list-style-type: none">• Lights green when the connected device supports HDCP.• Blinks green when the connected device does not support HDCP.
4	Power LED	Lights red when power is on.
5	RJ-45 connector	HDBT IN: Connects to the HDBT Out port of the transmitter via a CAT5e cable.
6	HDMI connector	HDMI Out: Connects to the HDMI display.
7	IR In sensor	Connects to the IR receiver to send signal from the AVS-HDB-TX to the AVS-HDB-RX.
8	IR out sensor	Connects to the IR transmitter to receive IR signal from the AVS-HDB-RX.
9	3-pin terminal block	RS-232 serial port: connects to the control terminal and supports bidirectional RS-232 control.
10	Barrel connector	Links to a 24-VDC power supply. <i>NOTE: The power supply is not required at the receiver (AVS-HDB-RX if the transmitter (AVS-HDB-TX) connects to a power supply.</i>

3. System Connection

3.1 Usage Precautions

1. Install the system in a clean environment that has a proper temperature and humidity.
2. Make sure that all of the power switches, plugs, sockets and power cords are insulated and safe.
3. Connect all devices before powering on.

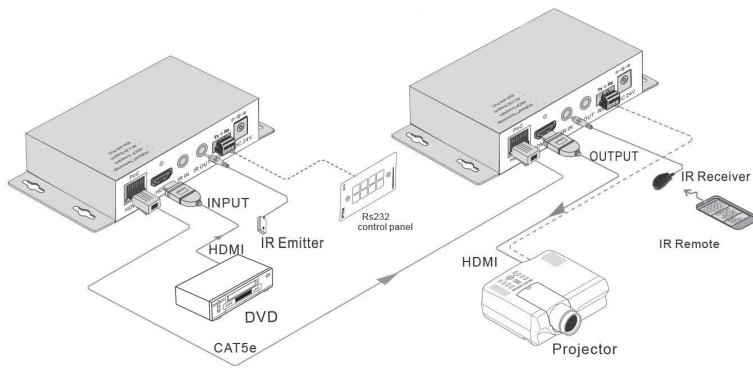


Figure 3-1. Connections.

3.2 Connection Procedure

Step 1: Connect an HDMI source (such as a Blu-ray™ DVD) to the HDMI IN port of AVS-HDB-TX with HDMI cable.

Step 2: Connect the HDBT OUT port of AVS-HDB-TX to the HDBT IN port of the AVS-HDB-RX through a CAT5e/CAT6 cable.

Step 3: Connect an HDMI display (such as HDTV) to the HDMI OUT port of the AVS-HDB-RX with HDMI cable.

Step 4: Both AVS-HDB-TX and AVS-HDB-RX have IR IN and OUT. When one end is used as an IR receiver, the other end will be used as an IR transmitter.

For example: When "IR IN" of AVS-HDB-TX connects to an IR receiver, the IR transmitter must be connected to "IR OUT" of the AVS-HDB-RX.

Step 5: Connect the RS-232 port of the devices to control to the receiver or the transmitter.

Step 6: Connect the 24-VDC power adapter to either the transmitter or receiver.

NOTE: The power supply is not required at the transmitter (AVS-HDB-TX if the receiver (AVS-HDB-RX) connects to a power supply

The power supply is not required at the receiver (AVS-HDB-RX if the transmitter (AVS-HDB-TX) connects to a power supply.

3.3 Application

Use the AVS-HDB-TX and AVS-HDB-RX for computer monitoring, conference rooms, large-screen displays, television, education applications and more.

3.4 Twisted-Pair Cable Connection

The twisted pair used with the extender MUST be a straight-through cable. The connectors can be T568A or T568B, but both sides must be the same.

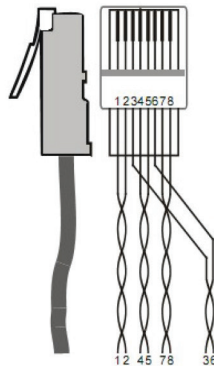


Figure 3-2. Cable pinout diagram.

NOTE: Cable connectors must be metal, and the shielded layer must be connected to the connector's metal shell to ground the cable.

3.5 Extending Transmission Distance

The AVS-HDB-TX and AVS-HDB-RX extenders work with the Multi-Format Video Scaler with Extension - 5-Port (AVSC-5DA1-HDB) to extend the transmission distance of an HDMI/IR/RS-232 signal.

4. Troubleshooting and Maintenance

Problems/Causes/Solutions

Table 4-1. Problems/Causes/Solutions.

Problems	Causes	Solutions
Output images in display appear with ghost.	Incorrect setting on the display.	Check the display's setting.
	Bad quality cable	Try another high-quality connection cable.
No output image when switching.	No signal at the input/output end.	Check with an oscilloscope or multimeter to see if there is a problem at the input/output end.
	Failed or loose connection.	Make sure the connection is good.
	The extender is broken.	Contact Black Box Technical Support at 724-746-5500 or info@blackbox.com.
Cannot control the device by a PC through the RS-232 port.	Wrong RS-232 communications parameters.	Make sure the RS-232 communication parameters are correct.
	The extender is broken.	Contact Black Box Technical Support at 724-746-5500 or info@blackbox.com.
Static becomes stronger when connecting the video connectors.	Bad grounding.	Check the grounding and make sure it is connected well.
Cannot control the device via RS-232/IR.	The extender is broken.	Contact Black Box Technical Support at 724-746-5500 or info@blackbox.com.

If your problem persists after you follow the above troubleshooting steps, contact Black Box Technical Support at 724-746-5500 or info@blackbox.com.

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