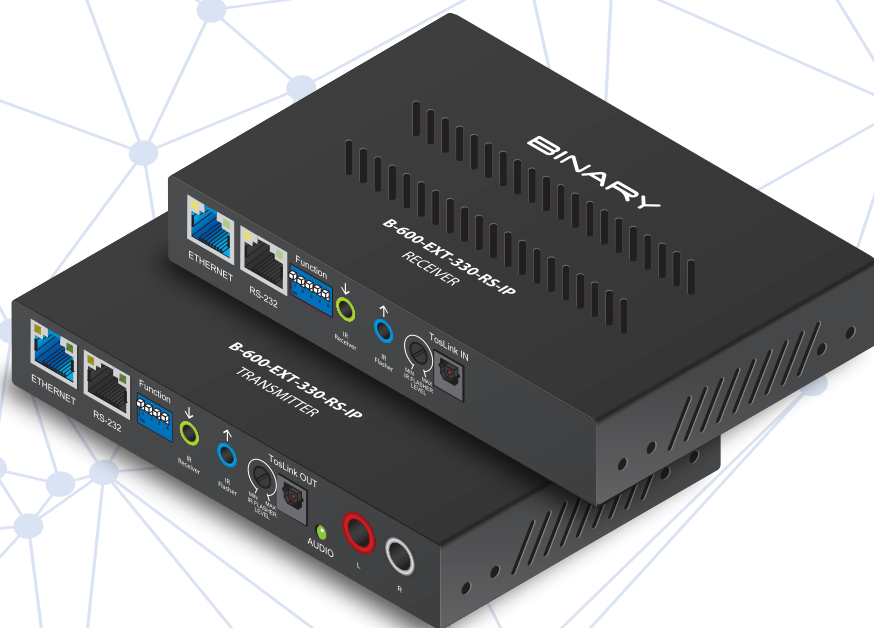


HDBaseT EXTENDER
B-600-EXT-330-RS-IP

BINARY

INSTALLATION
MANUAL



IMPORTANT SAFETY INSTRUCTIONS

To reduce the risk of fire or electric shock, read and follow all instructions and warnings in this manual. Keep this manual for future reference.

1. Do not expose this apparatus to rain or moisture. Do not expose this equipment to dripping or splashing, and ensure that no objects filled with liquids, such as vases, are placed on the equipment. Do not use this apparatus near water.
2. Do not remove cover. No user serviceable parts inside.
3. Clean only with a dry cloth.
4. Do not block any ventilation openings. Install according to manufacturer's instructions.
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 override the safety purpose of the polarized or grounding plug. A polarized plug has two blades, one of which is wider than the other. A grounding plug has two matching blades and a third grounding prong. The wide blade or the third prong is provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
7. Protect the power cord from being walked on or pinched, particularly at the plug end and where the power cord is attached to the apparatus.
8. Only use attachments and accessories specified by the manufacturer.
9. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as when the power supply cord or plug is damaged, liquid has been spilled on or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, the apparatus does not operate normally, or it has been dropped.
10. To completely disconnect this equipment from power, disconnect the power supply cord from the power outlet.



The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated dangerous voltage within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.



The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

**CAUTION**

CAUTION: TO REDUCE THE RISK OF ELECTRICAL SHOCK.

DO NOT REMOVE COVER. NO USER SERVICEABLE PARTS INSIDE.

REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

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1. PRODUCT OVERVIEW

Welcome to Binary. This product is engineered to provide years of exceptional reliability. We appreciate your business, and we stand committed to providing our customers with the highest degree of quality and service in the industry.

This device extends HDMI over a single category cable using HDBaseT technology allowing video and audio transmission to remote displays. In addition, the device is equipped with bidirectional IR, RS-232, IP and USB over 100m single category cable. This extender supports ARC, or Audio Return Channel, a feature allowing audio transmission to an AV system from TV/ displays.

This unit supports all HDMI defined audio and video formats, including 4K2K@30 Hz. The Power over Ethernet (PoE) feature enables the extender to be powered from the transmitter end.

2. FEATURES

- Extends all HDMI formats up to:

Resolution	Cat 5e/6/6a/7
1080i/720p 24-bit color	330'
Full HD 1080p 24-bit color	330'
Full HD 1080p 36-bit color	330'
UltraHD 4K2K@30Hz (4:4:4), 4K2K@60Hz (4:2:0)*	300'

*Compatible with HDMI 2.0/ HDCP 2.2

- Supports all HDMI audio formats, including DTS-HD Master and Dolby TrueHD
- Return audio transmission methods including ARC, Analog Stereo and Digital Stereo (SPDIF)
- Bidirectional IR, RS-232, IP, and USB
- PoE capability enables receiver to be powered from the Transmitter end

3. PACKAGE CONTENTS

- 1x B-600-EXT-330-RS-IP Transmitter
- 1x B-600-EXT-330-RS-IP Receiver
- 1x 48V DC, 0.83A Power Supply
- 8x Screws
- 4x mounting ears
- 1x Installation Manual
- 1x Power Supply Label
- 2x HDBaseT Labels

4. DEVICE LAYOUT

4.1. B-600-EXT-330-RS-IP Transmitter

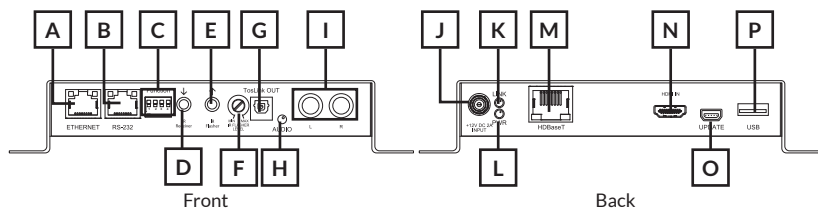


FIGURE 1: Transmitter Layout

A. Ethernet (RJ45)

To communicate IP data between Transmitter and Receiver

B. RS-232

To communicate RS-232 command with the transmitter when connected to a control system

C. DIP Switches

IR RCVR PWR OFF/ON

OFF to connect to control system | ON to connect to IR Receiver

DTE/DCE

To select if serial (RS232) communication via DB-9 is in DTE (up) or DCE (down) mode. An adaptor must be used when connecting the transmitter and receiver using a custom length Cat 5 cable. See page 11

LINK/SERVICE DIP

LINK (up) for passthrough (normal) operation | SERVICE (down) for firmware operation

USB Mode

UP to enable USB-A (Device) | Down to enable USB-B (Host)

D. IR Receiver

IR input to connect to IR Receiver or to output of a control system

E. IR Flasher

IR output to connect to IR Flasher

F. IR Flasher level

Adjusts the intensity of the IR Flasher output

G. TosLink OUT (Digital Audio)

Connect to receive digital audio (Multichannel format only) from the source connected to the receiver.

H. Audio Return LED

Lights up green when audio return is 2 CH, and yellow when audio return is multi channel

I. Analog Audio Outputs

Connect to receive left and right analog stereo audio from source connected to the audio receiver.

J. Thread-locking Power Connector

Connect to the included 48V DC, power supply

K. Link LED

Lights up green when synced with receiver

L. Power LED

Lights up blue when the unit has power

M. HDBaseT (RJ45)

To connect to the HDBaseT RJ45 port on transmitter

N. HDMI IN

HDMI Input which could be connected to the HDMI output of a source

O. USB 2.0 Mini B Port

To connect a USB host to the extender such as a PC or gaming console

P. USB 2.0 A Port

To connect a USB device to the extender such as a mouse or joystick

4.2. B-600-EXT-330-RS-IP Receiver

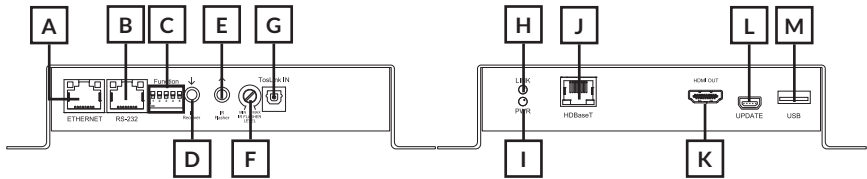


FIGURE 2: Receiver Layout

A. Ethernet (RJ45)

To communicate IP data between Transmitter and Receiver

B. RS-232

To communicate RS-232 command with the transmitter when connected to a control system

C. DIP Switches

IR RCVR PWR OFF/ON

OFF to connect to control system | ON to connect to IR Receiver

DTE/DCE

To select if serial (RS232) communication via DB-9 is in DTE (up) or DCE (down) mode. An adaptor must be used when connecting the transmitter and receiver using a custom length Cat 5 cable. See page 11

LINK/SERVICE DIP

LINK (up) for passthrough (normal) operation | SERVICE (down) for firmware operation

USB Mode

Up to enable USB-A (Device) | Down to enable USB-B

ARC/SPDIF

To select the audio input to be transmitted to the Transmitter

Down for ARC | Up for TOSLINK

D. IR Receiver

IR input to connect to IR Receiver or to output of a control system

E. IR Flasher

IR output to connect to IR Flasher

F. IR Flasher level

Adjusts the intensity of the IR Flasher output

G. TosLink IN (Digital Audio)

Connect to pass digital audio from a display to the digital or analog outputs of the Transmitter

H. Link LED

Lights up green when synced with receiver

I. Power LED

Lights up blue when the unit has power

J. HDBaseT (RJ45)

To connect to the HDBaseT RJ45 port on transmitter

K. HDMI OUT

HDMI Output to connect to the HDMI input of a display

L. USB 2.0 Mini B Port

To connect a USB host to the extender such as a PC or gaming console

M. USB 2.0 A Port

To connect a USB device to the extender such as a mouse or joystick

5. INSTALLATION

5.1. B-600-EXT-330-RS-IP Transmitter Installation

⚠CAUTION: Do not connect power to the device until all other connections are made and the unit is installed.

1. Run category cable from the location of the transmitter to the remote location of the receiver.
2. Mount the device transmitter in the desired location.
3. Connect the category cable to the device transmitter.
4. Connect the HDMI Out of a source component to the HDMI In of the transmitter using an HDMI cable.
5. Connect the RS-232 DB-9 from a control system if being used.
6. Connect a USB cable to the USB A port to connect a USB Device (Mouse, Joystick, Flash Drive) OR to the USB B port to connect a USB Host (PC, Gaming, TV) if being used.
7. Connect an IR control system to the IR receiver and/or IR flasher if being used. Refer to Section 6.2.
8. Connect analog or digital (toslink) output to audio/video receiver if being used.
9. Connect the 48V DC power supply to the thread-locking power connector. DO NOT plug the power supply into an AC outlet until Receiver Installation is completed.

5.2. B-600-EXT-330-RS-IP Receiver Installation

1. Run category cable from the location of the transmitter to the remote location of the receiver.
2. Mount the device receiver in the desired location.
3. Connect the category cable to the device receiver.
4. Connect an IR flasher and/or IR receiver if being used. Refer to Section 6.2.
5. Connect an HDMI cable from the HDMI Out of device receiver to the display.
6. Connect the RS-232 DB-9 to an RS-232 controllable source if being used.
7. Connect the USB to the USB A port to connect a USB Device (Mouse, Joystick, Flash Drive) OR to the USB B port to connect a USB Host (PC, Gaming, TV) if being used.
8. Connect Toslink cable from TV audio output to device receiver input if being used.
9. Connect 48V power supply to the Transmitter to enable PoE functionality
10. Connect the power supply to the AC outlet.

6. APPLICATIONS

Note: When a power supply is connected to the transmitter, the HDBaseT link sends power to the receiver unit. See Figure 3.

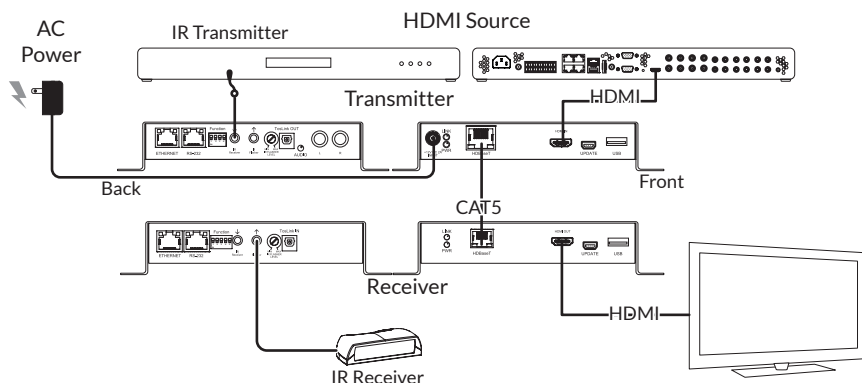


FIGURE 3: Application Diagram

NOTE: If the audio transmitted is Multichannel, TosLink is active, and Analog is inactive. If the audio transmitted is Stereo or 2 Channel, TosLink is inactive and Analog is active. See figure 4.

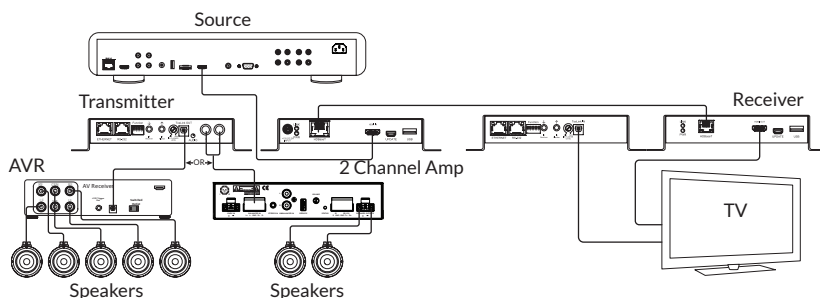


FIGURE 4: Optical Audio Return

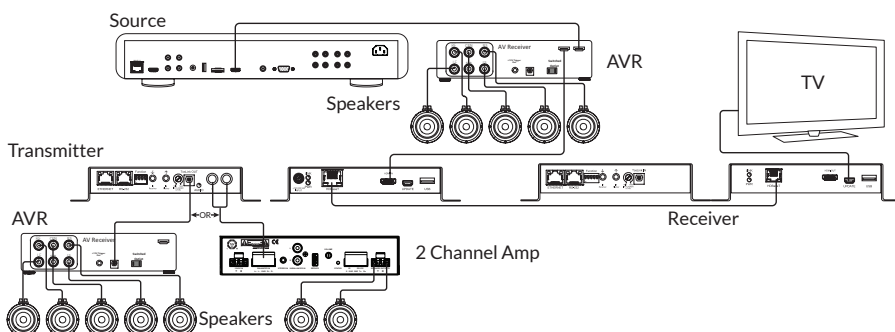


FIGURE 5: Audio Return Channel

In Audio Return Channel (ARC) mode, both the TosLink and Analog outputs will function and transmit an audio signal depending on the audio format coming from the TV. ARC mode allows audio transmission from the TV to the TosLink or Analog outputs on the transmitter without an optical cable connecting the TV to the receiver. For this feature to work however, an AVR must be present in the system design. See figure 5.

Note: If the TV audio format is set to PCM, Stereo, or 2-channel, the transmitter will only transmit via the Analog out port. If the TV audio format is set to Dolby Digital or Multichannel, the transmitter will only transmit via the Toslink output.

FIGURE 6: 6.1. HDBaseT Link (RJ45) Connection TIA/EIA Standard 568-B (Gold Pins Facing Up)

This device is specified to operate with category cables for communication between the transmitter and receiver. The transmission path may include a maximum of two keystones and two patch cables, as long as the total length does not exceed 330' for Cat5e/6/6a/7.

Pin 1	White/Orange	Pin 5	White/Blue
Pin 2	Orange	Pin 6	Green
Pin 3	White/Green	Pin 7	White/Brown
Pin 4	Blue	Pin 8	Brown



FIGURE 6: RJ45 Connections

Note: The HDBaseT Link RJ45 connection includes a 48V signal. Do not connect anything to this port other than an HDBaseT transmitter or receiver.

6.2. IR Control Connections

Bidirectional IR signals can be transmitted between transmitter and receiver through category cable. The IR signal can be generated either from a powered receiver or from a control system. The following section describes these two use cases.

⚠CAUTION: Pinout configurations for IR receivers and control systems vary. Before connecting to this input, review this section carefully in order to match the pinouts for the device.

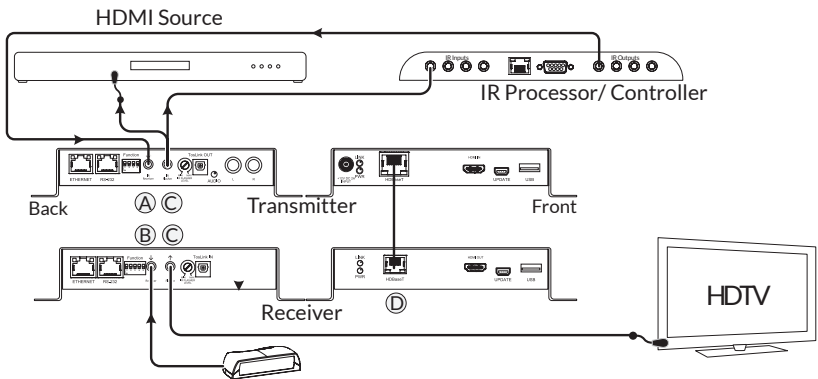


FIGURE 7: IR Connections

Note: Arrow direction indicates signal flow.

- Ⓐ IR Receiver In-3.5 mm Mono—See Section 6.2.2
- Ⓑ IR Receiver In-3.5 mm Stereo—See Section 6.2.1
- Ⓒ IR Flasher Out-3.5 mm Mono—See Section 6.2.3
- Ⓓ HDBaseT Link category cable (RJ45)—See Section 6.1

6.2.1. Point-to-Point IR Control – Stereo (3.5mm) IR Receiver

When using a powered IR receiver, the DIP switch for IR RCVR PWR should be set to ON. In this case a 3.5mm (1/8") stereo jack has to be used to send 9V DC power to the receiver.

⚠CAUTION: DO NOT connect a mono cable to this connection as damage may occur.

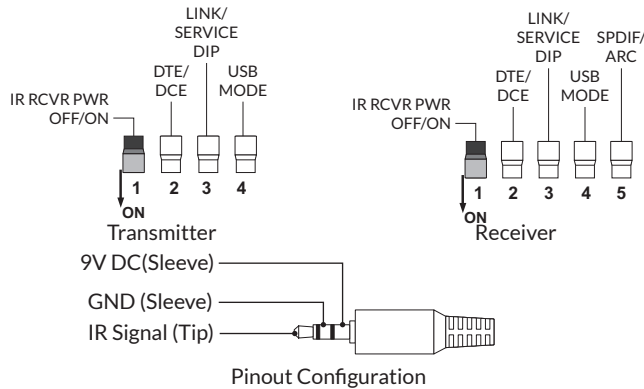


FIGURE 8: Point-to-Point IR settings

6.2.2. Control System - Mono (3.5mm) IR Receiver

When using a control system which generates the signal through a mono jack, the IR RCVR PWR switch should be in the OFF position.

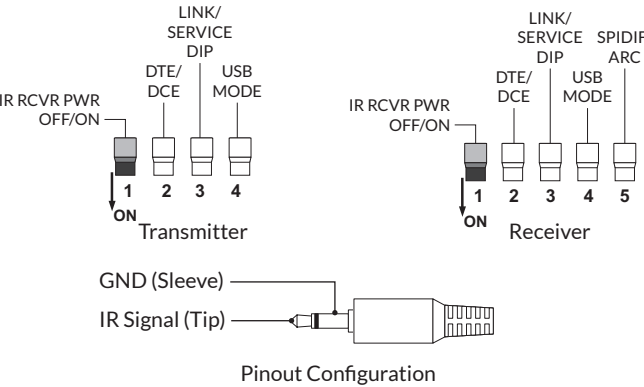
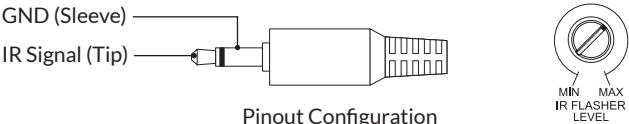


FIGURE 9: Control System IR settings

6.2.3. IR Flasher Out – Mono (3.5mm)

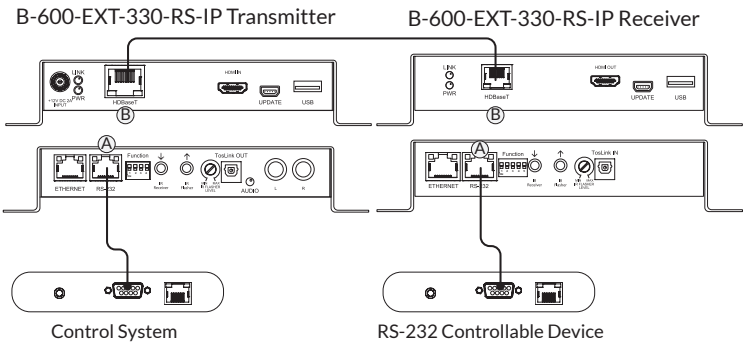
The IR Flasher level adjusts the intensity of the IR Flasher output



Pinout Configuration
FIGURE 10: IR Flasher Out

6.3. RS-232 Control Connections

Bidirectional RS-232 signals are transmitted between the device transmitter and receiver over the category cable. The transmitter may be connected to a control system, and the receiver may be connected to an RS-232 controllable device.



- Ⓐ RS-232 Control (DB-9)- See Section 6.3.1
- Ⓑ HDBaseT Link category - See Section 6.1

FIGURE 11: RS-232 Connections

6.3.1. RS-232 Control (DB-9) Connection

To eliminate the need to make crossover or null modem cables, the RS-232 pinouts can be configured for DCE or DTE. Set switch 2 to DCE if the connected device is DCE, and to DTE if the connected device is DTE.

Typically the control system will be DTE and the controlled device will be DCE, however, devices may vary. Refer to the manual for the connected devices for proper pinout configuration.

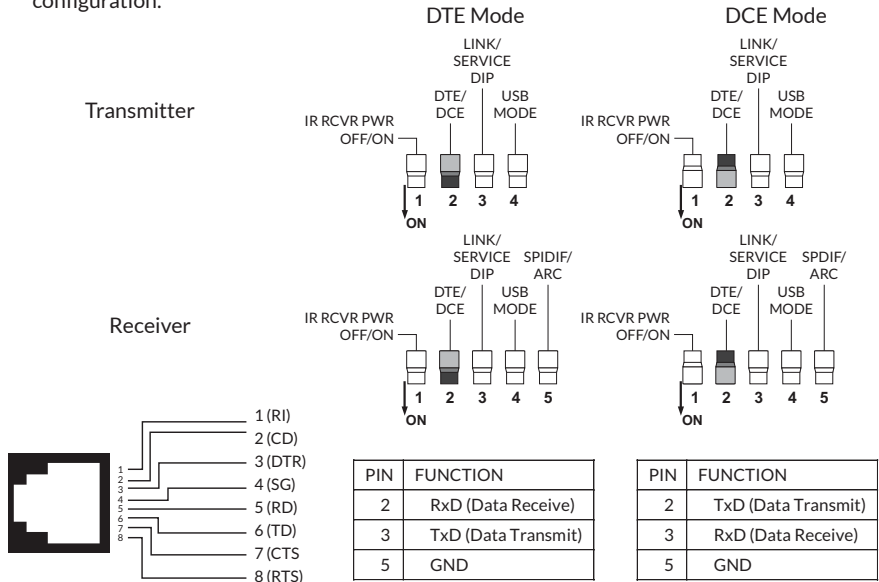
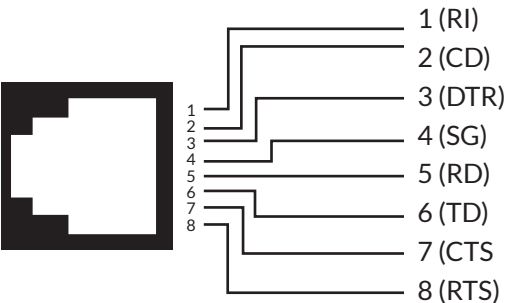


FIGURE 12: RS-232 Modes and Connections

6.3.2. EIA-561 Serial Port (RJ45) Connection

See the diagram below for the EIA-561 interface pinout.



6.3.3. RS-232 Operation Mode / Firmware Update Operation

The RS-232 connection can also be used for firmware updates in addition to sending RS-232 signals. The DTE/DCE switch is used to set the RS-232 Mode.

Note: The SERVICE/LINK switch must set to LINK during normal RS-232 passthrough operation.

To perform firmware updates, the DIP switches must be set to DTE and SERVICE. Detailed instructions and updated firmware will be posted to www.snapav.com as they are released.

Note: The DIP switch should be set to LINK during normal operation.

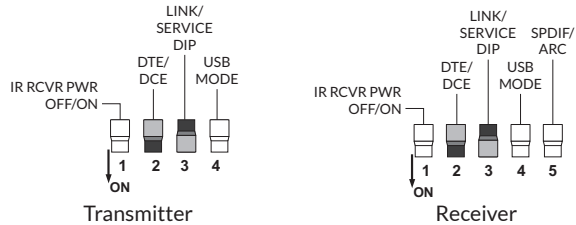


FIGURE 13: Firmware Update settings

6.4. IP Control Connections

Bi-directional Ethernet signals are transmitted between the B-600-EXT-330-RS-IP Transmitter and Receiver over the Cat5e/6 cable. The most common use is to send Ethernet signals for Networked TVs or any device in the remote location that has an Ethernet connection. This connection is only to be used for standard Ethernet signals and cannot be used for other communication formats.

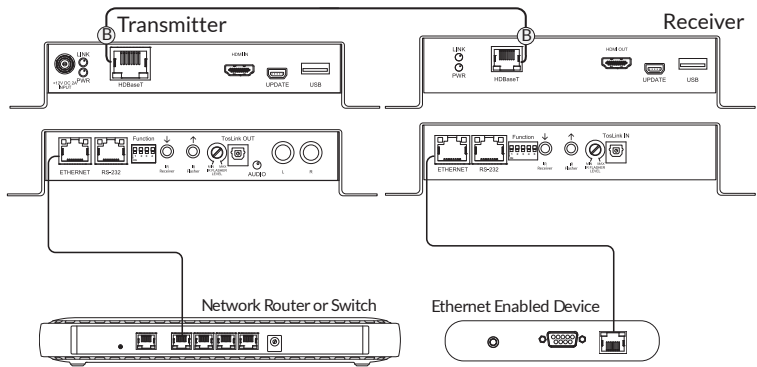


FIGURE 14: IP Control Connections

- Ⓐ Ethernet (RJ45)
- Ⓑ HDBaseT Link category - See Section 6.1

Note: This connection is for 10/100 BaseT Ethernet ONLY. DO NOT connect a cable from an HDBaseT port.

6.5 Audio Connections

Depending on the output of the television, audio/video receiver, or other source device, audio may be transmitted in three different ways. ARC is a supported feature of this HDMI extender which requires no additional connection than the existing HDMI.

The extender also supports alternate methods for sending audio from the TV back to the amplifier (AVR). The Analog outputs on the Transmitter will be active anytime the audio is stereo. The TosLink is active on the Transmitter when receiving multichannel audio.

The Receiver can send audio from the TV using the TosLink connection instead of the ARC function of the HDMI connection. Connect left (white) and right (red) analog audio cables on the transmitter to output analog audio to an audio/video receiver, and switch the SPIDIF/ARC DIP Switch to the SPIDIF (Up) position. To send Audio from the TV using ARC, the DIP switch must be in the ARC (Down) position.

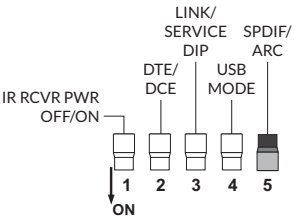


FIGURE 15: Receiver DIP Switch Position for ARC

6.6. USB Connections

The transmitter and receiver have both a USB A port and USB Mini B port. Set the DIP switch to activate the USB A OR USB Mini B port. USB A is the Up position, and USB B is the Down position

The USB A port is for USB Devices such as a keyboard, mouse, or gaming controller. The USB Mini B port is for a USB Host such as a PC, gaming console, or TV. When using the USB function, it works like a long USB extension cable from A to B. Set the Transmitter to USB B, and set the Receiver to USB A to ensure a proper connection between the mouse, gaming controller, or keyboard to the host device.

Note: The extender supports USB 2.0 but at a reduced speed less than 480Mb/sec.

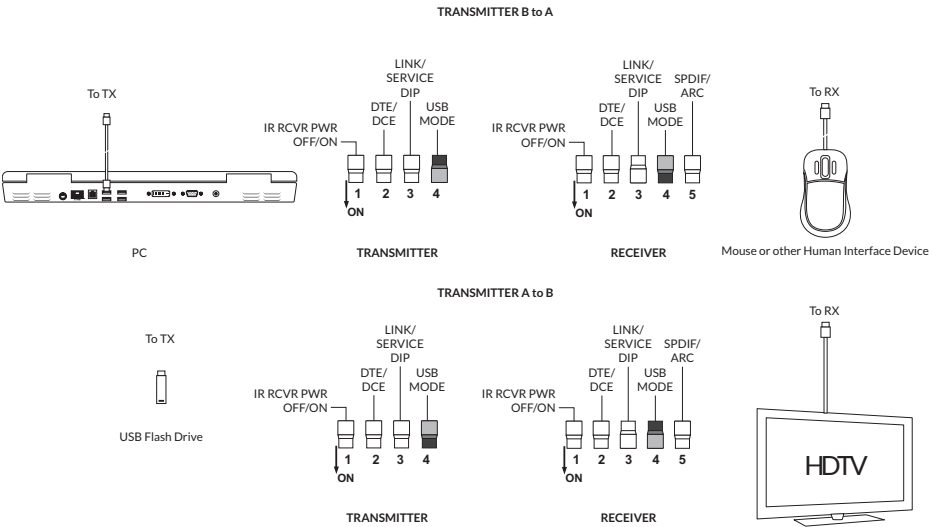


FIGURE 16: DIP Switch Position for USB Connection

7. SPECIFICATIONS

Technical	Transmitter	Receiver
HDMI Compliance		HDMI 2.0
HDCP Compliance		HDCP 2.2
Video Bandwidth		10.2 Gbps
HDMI over UTP Transmission	Cat 5e/6/6a/7	1080i/720p 24-bit color: 330' Full HD 1080p 24-bit color: 330' Full HD 1080p 36-bit color: 330' Ultra HD 4K2K 4:4:4 @30Hz: 300' Ultra HD 4K2K 4:2:0 @60Hz: 300'
Input TMDS Signal		1.2V (peak-to-peak)
Input DDC Signal		5V (peak-to-peak, TTL)
ESD Protection	(1) Human body model: $\pm 15\text{kV}$ (air-gap discharge) & $\pm 8\text{kV}$ (contact discharge) (2) Core chipset — $\pm 8\text{kV}$	
IR Signal (Bidirectional)		Carrier frequency: 20–60kHz

Connections	Transmitter	Receiver
HDBaseT Link	1x RJ45	1x RJ45
HDMI	1x HDMI Type A (19-pin female)	1x HDMI Type A (19-pin female)
IR Receiver (In)	1x 3.5mm Mono/Stereo	1x 3.5mm Mono/Stereo
USB A	1x	1x
USB Mini B	1x	1x
Analog Audio	L/R	–
Digital Audio (Toslink)	1x	1x
IR Flasher (Out)	1x 3.5mm Mono	1x 3.5mm Mono
RS-232 pass-through	1x RJ45	1x RJ45
Power	Thread-Locking	DC-IN

Controls

DIP switch 1	IR RCVR PWR OFF/ON
DIP switch 2	RS-232 Pin Configuration (DTE or DCE)
DIP switch 3	RS-232 Operation Mode (SERVICE/LINK)
DIP switch 4	USB Type A/Type B
DIP switch 5	SPIDIF/ARC (Rx Only)

Mechanical	Transmitter	Receiver
Housing	Metal enclosure	
Dimensions	6.25"x3.1"x1.3"	6.25"x3.1"x1.3"
Weight	1.1 lbs.	
Power Supply	48V DC, 0.83A	
Power Consumption	24W (max)	
Operation Temperature	32–104°F	
Storage Temperature	–4–140°F	
Relative Humidity	20–90% RH (no condensation)	
Certifications and Compliance	Product: CE, FCC, RoHS	
	Power Supply: CE, FCC, RoHS, UL	

8. SUPPORT

866.838.5052

For SnapAV customers, snapav.com

For Aisle 8 customers, onaisle8.com

9. WARRANTY

2-Year Limited Warranty

Binary™ products have a 2-Year Limited Warranty. This warranty includes parts and labor repairs on all components found to be defective in material or workmanship under normal conditions of use. This warranty shall not apply to products that have been abused, modified, or disassembled. Products to be repaired under this warranty must be returned to a designated service center with an assigned return authorization (RA) number. Contact technical support for an RA number.

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