HDBaseT EXTENDER
B-540-EXT-330-RS-IP

BINARY

INSTALLATION
MANUAL

FC CE

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. Refer servicing to qualified service personnel.

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** ⚡

TO REDUCE THE RISK OF ELECTRICAL SHOCK:

DO NOT REMOVE COVER. NO USER SERVICEABLE PARTS INSIDE.

REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

CONTENTS

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, and IP over a single category cable.

This unit supports all HDMI defined audio and video formats, including 4K2K@30 Hz and is compatible with HDMI 2.0 and HDCP 2.2 products. The Power over Cable (PoC) feature enables the extender to be powered from either 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'
Ultra HD 4K2K@30 Hz*	330'

*This unit supports HDMI 2.0 and HDCP 2.2 formats

- Supports all HDMI supported audio formats, including DTS-HD Master and Dolby TrueHD
- Bidirectional IR, RS-232, and IP
- PoC capable - can be powered from either the transmitter or receiver

3. PACKAGE CONTENTS

- 1x B-540-EXT-330-RS-IP Transmitter
- 1x B-540-EXT-330-RS-IP Receiver
- 1x 12V DC, 2A Power Supply
- 4x Mounting Ears
- 4x Mounting Screws
- 8x Rubber Feet
- 1x Installation Manual
- 1x Power Supply Label
- 2x HDBaseT Labels
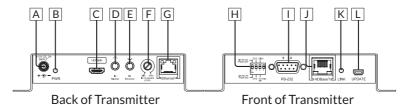
4.1. B-540-EXT-330-RS-IP Transmitter

FIGURE 1: Transmitter Layout

A. Thread-locking Power Connector
Connect to the included 12V DC, 2A power supply

B. Power LED
Lights up blue when the unit has power

C. HDMI IN
HDMI Input to connect to the HDMI output of a source

D. IR Flasher
IR output to connect to IR Flasher

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

F. IR Flasher level
Adjusts the intensity of the IR Flasher output

G. Ethernet (RJ45)
To communicate IP data between Transmitter and Receiver

H. DIP Switches
IR RCVR PWR OFF/ON
OFF to connect to control system | ON to connect to IR Receiver
DCE/DTE
To select if serial (RS232) communication via DB-9 is in DTE or DCE mode
LINK/SERVICE DIP
LINK for passthrough (normal) operation | SERVICE for firmware operation

I. RS-232
To communicate RS-232 command with the receiver when connected to a control system

J. HDBaseT (RJ45)
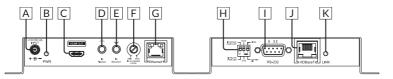To connect to the HDBaseT RJ45 port on receiver

K. Link LED
Lights up green when synced with receiver

L. Update (mini USB port)
To connect mini USB cable when updating firmware

4.2. B-540-EXT-330-RS-IP Receiver

Back of Receiver   Front of Receiver

FIGURE 2: Receiver Layout

A. Thread-locking Power Connector
Connect to the included 12V DC, 2A power Supply

B. Power LED
Lights up blue when the unit has power

C. HDMI Out
HDMI Output which could be connected to the HDMI input of a sink (display)

D. IR Flasher
IR output to connect to IR Flasher

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

F. IR Flasher level
Adjusts the intensity of the IR Flasher output

G. Ethernet (RJ45)
To communicate IP data between Transmitter and Receiver

H. DIP Switches
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I. RS-232
To communicate RS-232 command with the transmitter when connected to a control system

J. HDBaseT (RJ45)
To connect to the HDBaseT RJ45 port on transmitter

K. Link LED
Lights up green when synced with receiver

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

5.1. B-540-EXT-330-RS-IP Transmitter Installation

1. Run category cable from the location of the transmitter to the remote location of the receiver.
2. Mount the transmitter in the desired location.
3. Connect the HDMI Out of a source component using an HDMI cable.
4. Connect the RS-232 DB-9 from a control system if being used.
5. Connect an IR control system to the IR receiver and/or IR flasher if being used. Refer to Section 6.2.
6. Connect the patch cable from the router or network switch to the ethernet port (RJ45).
7. Connect the 12V DC, 2A power supply to the latch-locking power jack, unless PoC is being used to send power from the receiver. DO NOT plug the power supply into an AC outlet until Receiver Installation is completed.

5.2. B-540-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 receiver in the desired location.
3. Connect the category cable to the 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 receiver to the display.
6. Connect the RS-232 DB9 to an RS-232 controllable source if being used.
7. Connect the ethernet RJ45 to an ethernet enabled device if being used.
8. Connect the 12V DC, 2A power supply to the latch-locking power jack, unless PoC is being used to send power from the transmitter.
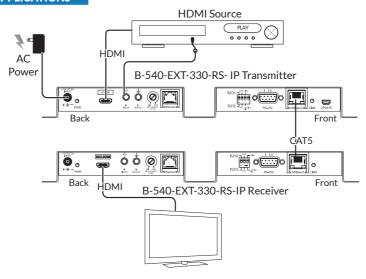9. Connect the power supply to the AC outlet.

HDMI Source

FIGURE 3 : Application Diagram

Note: When a power supply is connected to either the transmitter or receiver, the HDBaseT link sends power to the other unit. Only one unit requires a power supply to be connected.

6.1. HDBaseT Link (RJ45) Connection

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 category cable.

TIA/EIA Standard 568-B (Gold Pins Facing Up)

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

TIA/EIA-568-B

FIGURE 4: RJ45 Connections

Note: The HDBaseT Link RJ45 connection includes a 12V 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.
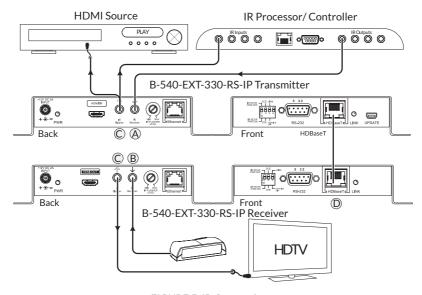

FIGURE 5: IR Connections

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.
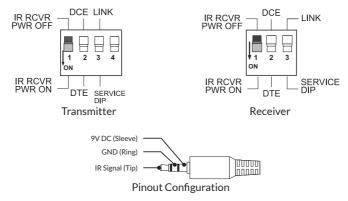

FIGURE 6: Point-to-Point IR settings

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.
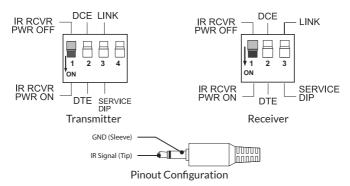

FIGURE 7 : Control System IR settings

6.2.3. IR Flasher Out— Mono (3.5mm)

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

GND (Sleeve)

IR Signal (Tip)

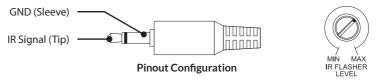MIN   MAX
IR FLASHER
LEVEL

Pinout Configuration

FIGURE 8: 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.
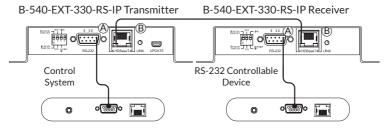
B-540-EXT-330-RS-IP Transmitter   B-540-EXT-330-RS-IP Receiver

Control System

RS-232 Controllable Device

FIGURE 9: RS-232 Connections

Ⓐ RS-232 Control (DB-9)- See Section 6.3.1

Ⓑ HDBaseT Link category - See Section 6.1

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.
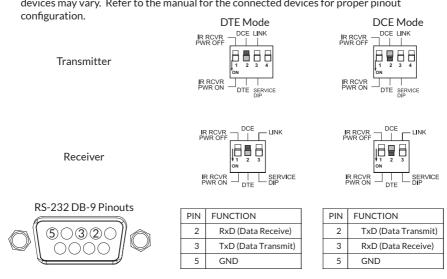

PIN	FUNCTION
2	RxD (Data Receive)
3	TxD (Data Transmit)
5	GND

PIN	FUNCTION
2	TxD (Data Transmit)
3	RxD (Data Receive)
5	GND

FIGURE 10: RS-232 Modes and Connections

6.3.2. 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.
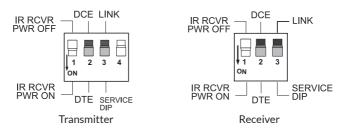

FIGURE 11: Firmware Update settings

6.4. IP Control Connections

Bidirectional Ethernet signals are transmitted between the B-540-EXT-330-RS-IP Transmitter and Receiver over the Cat 5e/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.
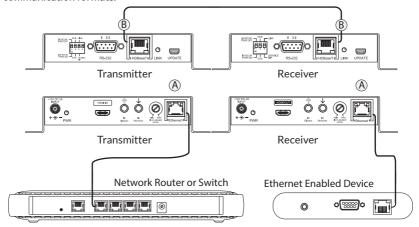

FIGURE 12: IP Control Connection Layout

Ⓐ 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. Thread-Locking Power Supply

This extender pair is Power over Cable capable and therefore can be powered from either the transmitter or receiver. When a power supply is connected to either the transmitter or receiver, the HDBaseT link sends power to the other end.

⚠**CAUTION: Do not** connect the power supply to the device until it is completely installed and all connections have been made.

Technical	Transmitter	Receiver
HDMI Compliance	HDMI 3D	
HDCP Compliance	Yes	
Video Bandwidth	10.2 Gbps	
HDMI over UTP Transmission	1080i/720p 24-bit color: 330' (Cat 5e/6/6a/7) Full HD 1080p 24-bit color: 330' (Cat 5e/6/6a/7) Full HD 1080p 36-bit color: 330' (Cat 5e/6/6a/7) Ultra HD 4K2K@30 Hz (4:4:4:) 230 ft (Cat 5e/6), 330 ft (Cat 6a/7) Ultra HD 4K2K@60 Hz (4:2:0:) 230 ft (Cat 5e/6), 330 ft (Cat 6a/7)	
Input TMDS Signal	1.2V (peak-to-peak)	
Input DDC Signal	5V (peak-to-peak, TTL)	
ESD Protection	(1) Human body model: ±5kV (air-gap discharge) & ±8kV (contact discharge) (2) Core chipset — ±8kV	
IR Signal (Bidirectional)	Carrier frequency: 20–60kHz	
Connections		
HDBaseT Link	1x RJ45	1x RJ45
HDMI	1x HDMI Type A (19-pin female)	1x HDMI Type A (19-pin female)
IR Receiver (In)	3.5mm Stereo/Mono	1x 3.5mm Stereo/Mono
IR Flasher (Out)	1x 3.5mmMono	1x 3.5mm Mono
RS-232 passthrough	DB-9	DB-9
IP pass-through	Ethernet	Ethernet
Power	Latch-Locking	
Controls		
DIP switch 1	IR RCVR PWR OFF/ON	
DIP switch 2	RS-232 Pin Configuration (DCE /DTE)	
DIP switch 3	RS-232 Operation Mode (SERVICE/LINK)	
Mechanical		
Housing	Metal enclosure	
Dimensions	6.25" x 3.1" x 1.3"	
Weight	1.1 lb	
Power Supply	12V DC, 2A	
Power Consumption	12W (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. CONTACTING TECH SUPPORT

Phone: 866. 838.5052

For SnapAV customers, snapav.com

For Aisle 8 customers, onaisle8.com

9. WARRANTY

2-Year Limited Warranty

This Binary Product has 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 prior notification and an assigned return authorization number (RA).

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