4K HDR HDBaseT Extender with IR, RS-232, Ethernet, & Audio Breakout
B-660-EXT-444-100A

BINARY

INSTALLATION
MANUAL

FC CE

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.

FCC WARNINGS

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential 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. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more 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 the dealer or an experienced radio/TV technician for help.

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

TRADEMARKS

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1. PRODUCT OVERVIEW

The B-660-EXT-444-100A is a 4K HDR HDBaseT extender that supports 4K@60Hz 4:4:4 8bit including DCI 4K (4096 x 2160), and HDCP 2.2 compatibility. It can transmit 1080P signals up to 100m/330ft and 4K@60Hz signals up to 70m/230ft via Cat 5e/6 cable, and transmit 1080P and 4K@60Hz 4:4:4 8bit signals up to 100m/330ft via Cat 6a/7 cable.

The B-660-EXT-444-100A supports bi-directional IR pass through, CEC pass through, RS-232 pass through, and ethernet pass-through. With bi-directional PoC support, only one power adapter is needed. The extender also supports HDMI IN audio de-embedding (analog and digital) on the 3.5mm analog and Toslink audio output ports.

Two independent 4-pin Video and Audio EDID DIP Switches provide a variety of EDID combinations to fit the needs of the installation and operation environment. The 4-pin Function DIP Switches provide a variety of configurations and upgrading requirements to fit multiple application scenarios.

2. FEATURES

- Supports resolutions up to 4K@60Hz 4:4:4 8bit and HDCP 2.2.
- Supports HDR (High Dynamic Range), including HDR 10, HLG up to 4K@60 and HDR 10+, and Dolby Vision up to 4K@30Hz.
- Supports digital and analog audio de-embedding.
- Over a Cat 5e/6 cable, HDBT transmits 4K@60Hz 4:4:4 8bit up to 70m/230ft, and 1080P up to 100m/330ft; Over a Cat 6a/7 cable, HDBT transmits 4K@60Hz 4:4:4 8bit and 1080P up to 100m/330ft.
- DIP Switches to configure EDID, IR, RS-232 functions and FW update.
- CEC pass through capable.
- Supports bi-directional IR pass through, RS-232 pass through, and Ethernet pass through.
- Bi-directional PoC, one power adapter at either transmitter or receiver side can power both units.

3. PACKAGE CONTENTS

- 1 x B-660-EXT-444-100A Extender
- 1 x DC 12V Power Adapter with US Pins
- 4 x Mounting Ears (with Screws)
- 4 x Drywall Screws
- 8 x Rubber Feet
- 1 x Installation Manual

4.1. B-660-EXT-444-100A Transmitter

Front Panel

1. **POWER LED**

   On: Transmitter is powered on

   Off: Transmitter is powered off.

2. **STATUS LED**

   Blinking: The transmitter is working properly.

   Off: The transmitter is not working properly.

3. **LINK LED**

   On: HDBT link is normal.

   Off: No HDBT link.

4. **HDCP LED**

   On: HDCP signal is being transmitted.

   Blinking: No-HDCP signal is being transmitted.

   Off: No signal is being transmitted.

5. **Video**

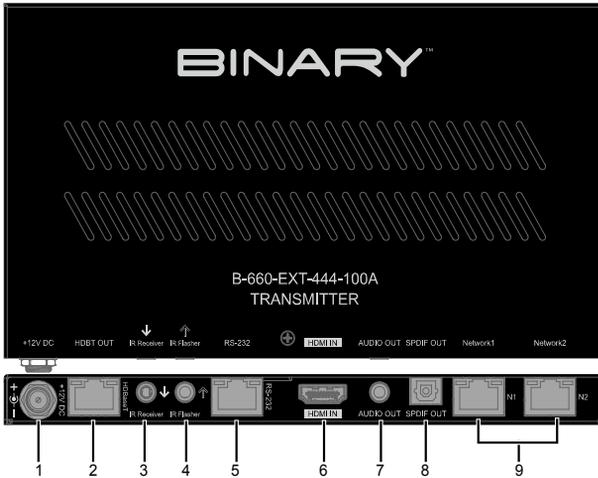   Video EDID DIP Switch. For more information, see EDID Management Section.

6. **Audio**

   Audio EDID DIP Switch. For more information, see EDID Management Section.

7. **Function**

   Function DIP Switch. For more information, see Function Setting Section.

1. **+12V DC**

   Connect the 12V power cord provided.

2. **HDBT OUT**

   Connect to the receiver via a Cat x cable.

3. **IR Receiver**

   Connect to an IR receiver cable.

4. **IR Flasher**

   Connect to an IR emitter cable.

5. **RS-232**

   RJ45 port. Connect to a RS-232 control device for RS-232 pass through/ firmware upgrade.

6. **HDMI IN**

   Connect to an HDMI source device.

7. **AUDIO OUT**

   3.5mm analog audio out, HDMI IN audio de-embedding. Connect to an audio system such as amplifier.

8. **SPDIF OUT**

   HDMI IN audio de-embedding, digital audio out. Connect to an audio system such as AV receiver.

9. **Network 1&2**

   Connect to ethernet devices or to the network.

4.2. B-660-EXT-444-100A Receiver

Front Panel

1. **POWER LED**

   On: Receiver is powered on

   Off: Receiver is powered off

2. **STATUS LED**

   Blinking: The receiver is working properly.

   Off: The receiver is not working properly.

3. **LINK LED**

   On: HDBT link is normal.

   Off: No HDBT link.

4. **HDCP LED**

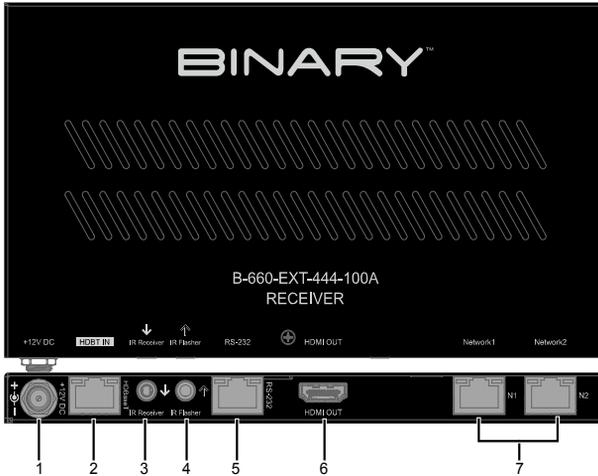   **On:** HDCP signal is being received.

   Blinking: No-HDCP signal is being received.

   Off: No signal is being received.

5. **Function**

   Function DIP Switch. For more information, see Function Setting Section.

Rear Panel

1. **+12V DC**

   Connect the 12V power cord provided.

2. **HDBT IN**

   Connect to the transmitter via a Cat 5e/6/6a/7 cable.

3. **IR Receiver**

   Connect to an IR receiver cable.

4. **IR Flasher**

   Connect to an IR emitter cable.

5. **RS-232**

   RJ45 port. Connect to a RS-232 control device such as a PC for RS-232 pass through or firmware upgrade.

6. **HDMI OUT**

   Connect to an HDMI display.

7. **Network 1&2**

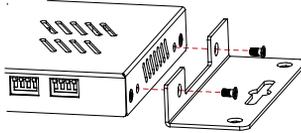   Connect to ethernet devices or to the network.

5.1. Installation

Before installation, please ensure the device is disconnected from the power supply.

Steps to install the device on a suitable position:

1. Attach the mounting ears to the enclosure using the screws provided in the package.

2. The mounting ear is attached to the enclosure as shown.

3. Repeat steps 1-2 for the other side of the transmitter.

4. Mount the transmitter in the rack mount with the mounting screws.

5. Repeat steps 1-4 to install the receiver.

5.2. Wiring

Warnings:

- Before wiring, disconnect the power from all devices.

- During wiring, connect and disconnect the cables gently.

Steps for device wiring:

1. **Connect HDMI IN**

   Connect the HDMI sources (such as PC, Blu-ray player, Apple TV, 4K media player, etc) to the HDMI IN of the transmitter.

2. **Connect HDBT OUT**

   Connect HDBT OUT of the transmitter to HDBT IN of the receiver with Cat 5e/6/7 cables.
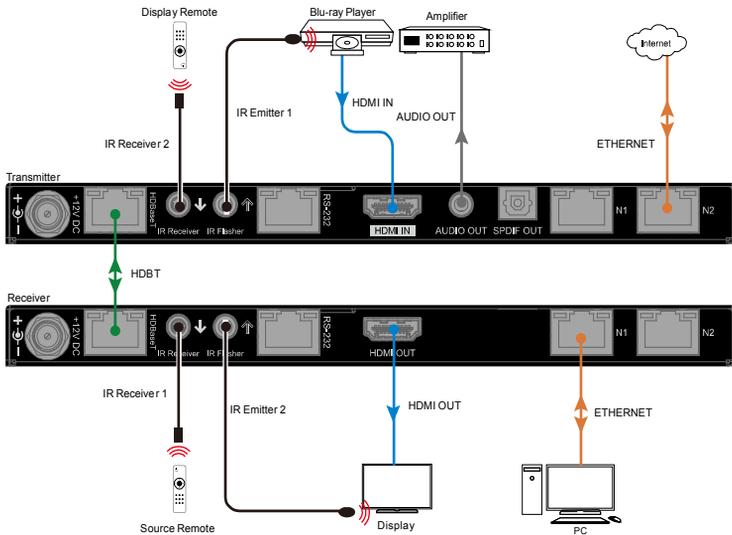
3. **Connect HDMI OUT**

   Connect HDMI display device (such as TV, projector) to the HDMI OUT of the receiver.

4. **Connect for additional control options:**

   - IR Pass Through: Connect IR emitter cable to IR Flasher port or IR receiver cable to IR Receiver port of the transmitter, and connect IR receiver cable to IR Receiver port or IR emitter cable to IR Flasher port of the receiver. The source remote can control the source at receiver side, the display remote can control display at the transmitter side.

   - RS-232 Pass Through: To set RS-232 mode see "Function Setting" Section, below. Connect control devices such as PC to RS-232 ports of transmitter and receiver to realize RS-232 pass through. For details, see RS-232 Control Connections Section.

   - ETHERNET Pass Through: Connect Network port of transmitter or receiver to the local network, connect a PC to the Network port of receiver or transmitter, the PC can be connected to the local network.
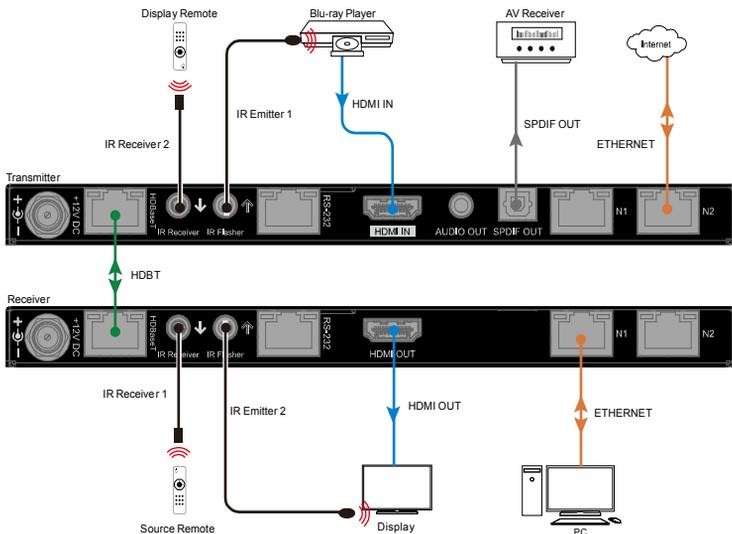
5. **Connect the DC 12V power cord provided.**

6. **Power on all attached devices.**

Application Diagram 1

To connect HDMI de-embedding audio for amplification, when using 3.5mm AUDIO OUT, the transmitter AUDIO dip switch should be set to 2CH PCM. At this time, the SPDIF OUT will also output 2-channel.

Application Diagram 2

When using SPDIF OUT for surround sound, the transmitter AUDIO dip switch should be set to COMPRESSED 5.1. At this time, the 3.5mm AUDIO OUT terminal will be muted.

6.   EDID MANAGEMENT

EDID is configured by Video and Audio DIP Switch. The default setting is Auto, please refer to the following table to configure.
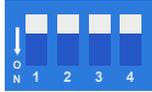
Video		DIP Switch Position			
EDID	Resolution	1	2	3	4
0	Auto (Default)	Up	Up	Up	Up
1	1080P SDR	Up	Up	Up	Down
2	1080P HDR	Up	Up	Down	Up
3	4K@30 SDR	Up	Up	Down	Down
4	4K@30 HDR	Up	Down	Up	Up
5	4K@60 4:2:0 SDR	Up	Down	Up	Down
6	4K@60 HDR	Up	Down	Down	Down

Audio		DIP Switch Position			
EDID	Resolution	1	2	3	4
0	Auto (Default)	Up	Up	Up	Up
1	2CH (PCM)	Up	Up	Up	Down
2	6CH (PCM)	Up	Up	Down	Up
3	Compressed 5.1	Up	Up	Down	Down
4	8CH (PCM)	Up	Down	Up	Up
5	Compressed 7.1	Up	Down	Up	Down

7. FUNCTION SETTING

IR, RS-232 and other functions can be configured by the Function DIP Switches. The default setting is "Up, Up, Up, Up", please refer to the following table to configure.

TX Function Settings				
IR/RS-232/ FW Update	4-Pin DIP Positions			
	1	2	3	4
IR RCVR PWR OFF (12v)	Up	-	-	-
IR RCVR PWR ON (12v)	Down	-	-	-
DTE (RS-232)	-	Up	-	-
DCE (RS-232)	-	Down	-	-
RS-232 pass-thru	-	-	Up	Up
System f/w update	-	-	Down	Up
HDBT f/w update	-	-	Up	Down
Reserved	-	-	Down	Down

RX Function Settings				
IR/RS-232/ FW Update	4-Pin DIP Positions			
	1	2	3	4
IR RCVR PWR OFF (12v)	Up	-	-	-
IR RCVR PWR ON (12v)	Down	-	-	-
DTE (RS-232)	-	Up	-	-
DCE (RS-232)	-	Down	-	-
RS-232 pass-thru	-	-	Up	Up
System f/w update	-	-	Down	Up
HDBT f/w update	-	-	Up	Down
Reserved	-	-	Down	Down

8.1.   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 100 m for category cable and resolution desired.

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
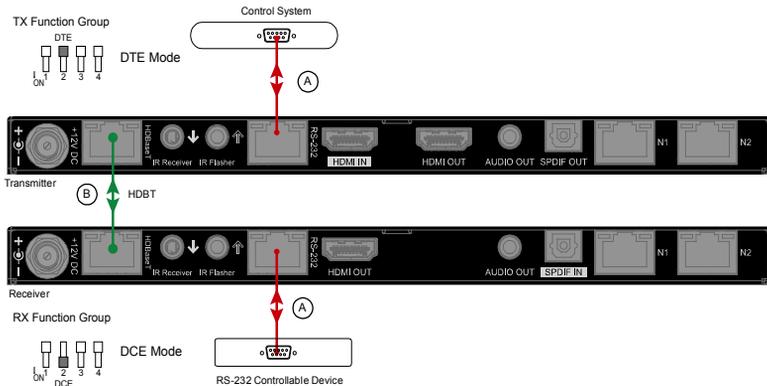
TIA/EIA-568-B

HDBaseT RJ45 Connections

Note: The HDBaseT Link RJ45 connection includes a 48V signal. Do not connect anything to this port other than a B-660-EXT-444-100A transmitter or receiver.
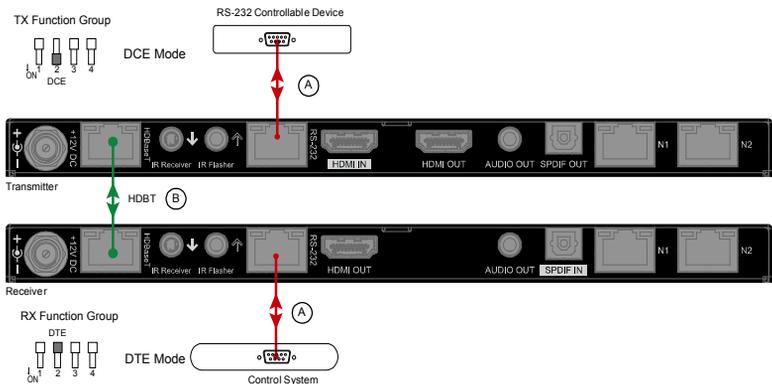
8.2.   RS-232 Control Connections

- 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.

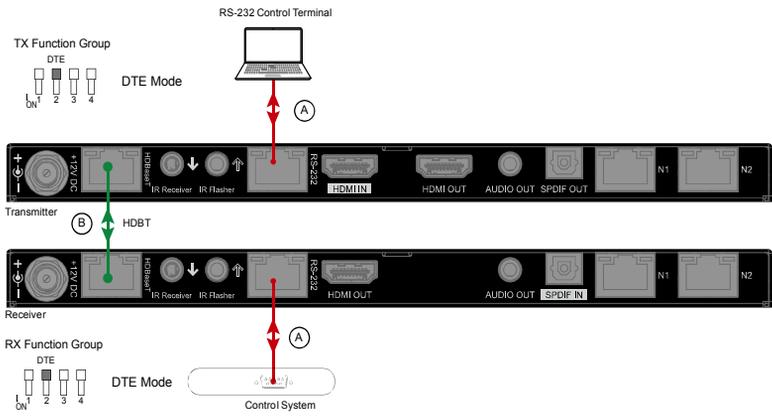(A) RS-232 Control (DB-9) - See Section 8.2.1

(B) HDBaseT Link Category - See Section 8.1

Example 1

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Example 2

TX Function Group

DCE Mode

RS-232 Controllable Device

(A)

Transmitter

HDBT (B)

Receiver

RX Function Group

DTE

DTE Mode

(A)

Control System

Example 2

Example 3

RS-232 Control Terminal

TX Function Group

DTE

DTE Mode

(A)

Transmitter

(B) HDBT

Receiver

RX Function Group

DTE

DTE Mode

(A)

Control System

Example 3

Labels on transmitter/receiver panels: +12V DC, HDBaseT, IR Receiver, IR Flasher, RS-232, HDMI IN, HDMI OUT, AUDIO OUT, SPDIF OUT, SPDIF IN, N1, N2
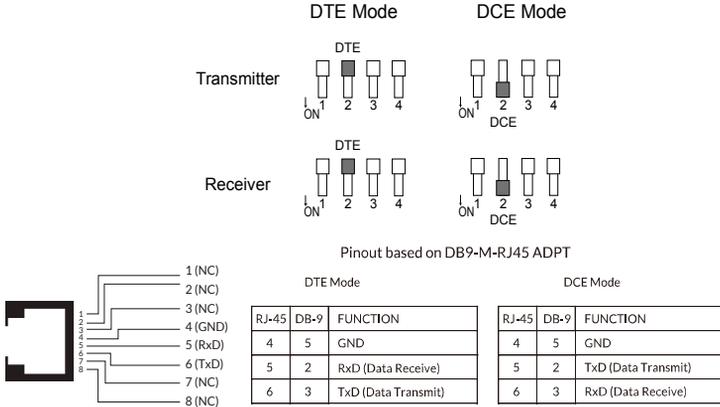
8.2.1. RS-232 Control (DB-9) Connection

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.

DTE Mode   DCE Mode

Transmitter

Receiver

Pinout based on DB9-M-RJ45 ADPT

1 (NC)
2 (NC)
3 (NC)
4 (GND)
5 (RxD)
6 (TxD)
7 (NC)
8 (NC)

DTE Mode

RJ-45	DB-9	FUNCTION
4	5	GND
5	2	RxD (Data Receive)
6	3	TxD (Data Transmit)

DCE Mode

RJ-45	DB-9	FUNCTION
4	5	GND
5	2	TxD (Data Transmit)
6	3	RxD (Data Receive)

RS-232 Modes and Connections

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9. SPECIFICATIONS

Technical	
Input/Output Port	Transmitter: 1 x HDMI IN, 1 x HDBT OUT, 1 x HDMI OUT, 1 x IR Receiver,1 x IR Flasher, 1 x RS-232 (RJ45), 1 x AUDIO OUT (3.5mm analog audio out), 1 x SPDIF OUT, 2 x ETHERNET, 1 x DC 12V IN Receiver: 1 x HDMI OUT, 1 x HDBT IN, 1 x IR Receiver, 1 x IR Flasher, 1 x RS-232 (RJ45), 1 x AUDIO OUT, 1 x SPDIF IN, 2 x ETHERNET, 1 x DC 12V IN
Input/Output Signal Type	HDMI with 4K@60Hz YUV 4:4:4, HDCP 2.2, including DCI 4K (4090x2160)
Input/Output Resolution Supported	VESA: $800x600^8$, $1024x768^8$, $1280x768^8$, $1280x800^8$, $1280x960^8$, $1280x1024^8$, $1360x768^8$, $1366x768^8$, $1440x900^8$, $1600x900^8$, $1600x1200^8$, $1680x1050^8$, $1920x1200^8$, $2560x1440^8$, $2560x1600^8$ SMPTE: $1280x720P^{6,7,8}$, $1080I^{6,7,8}$, $1920x1080P^{1,2,3,4,5,6,7,8}$, $3840x2160P^{2,3,5,6,8}$, $4096x2160P^{2,3,5,6,8}$ NOTE: ^{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} = 60 Hz, ^{9} = 75 Hz
Audio Format	HDMI IN/OUT: Fully supports audio formats in HDMI 2.0 specification, including PCM 2.0/5.1/7.1, Dolby TrueHD™, Dolby Atmos™, DTS-HD Master Audio™ and DTS:X™ 3.5mm Analog AUDIO OUT: PCM 2.0 SPDIF: PCM 2.0, Dolby Digital™, DTS 5.1™
Maximum Data Rate	HDMI IN & HDMI OUT: 18Gbps
Control Method	IR, RS-232, CEC, DIP Switches

General	
Operating Temperature	0°C to 40°C (32°F to 104°F)
Storage Temperature	-20°C to 60°C (-4°F to 140°F)
Humidity	10% to 90%, non-condensing
ESD Protection	Human-body Model: ±15kV (Air-gap discharge)
Power Supply	DC 12V 3A
Power Consumption (Max)	Receiver is powered by transmitter: 24.05W Transmitter is powered by receiver: 23.67W Transmitter and receiver are powered separately: Transmitter: 8.95W, Receiver: 11.05W
Device Dimension (W x H x D)	194mm x 15.4mm x 110mm/7.64" x 0.61" x 4.33" (Transmitter/Receiver, without mounting ears)
Product Weight	0.42kg/0.93lb

9.1. Transmission Distance

Note: Straight-through category cable wired to T568B standard is recommended.

Cable Type	Range	Supported Video
Cat 5e/6	100m/330ft	Up to 1080P@60Hz 36bpp
	70m/230ft	1080P@60Hz 48bpp
Cat 6a/7	100m/330ft	4K@30Hz 24bpp 4K@60 4:2:0 24bpp 4K@60 4:4:4 24bpp
HDMI	Recommended max length of 3m/10ft	All supported resolutions

10. 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 SnapAV or a designated service center with prior notification and an assigned return authorization number (RA).

11. SUPPORT

Need Help? Contact Tech Support!

If you need further clarification, please call tech support at **800.838.5052**, or email **support@ snapav.com**. For other information, instructional videos, support documentation, or ideas, visit our website and view your item's product page at **www.snapav.com**.

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