BZBGEAR®

Amplify Your World™

# BG-EXH-4KC7

**4K HDMI/USB-C over HDBaseT 3.0**

**Extender (100m) with USB/1G LAN**

# User Manual

# TABLE OF CONTENTS


| | |
|---|---|
| Statement | 4 |
| Safety Precaution | 4 |
| Surge Protection Strongly Recommended | 4 |
| Introduction | 5 |
| Features | 5 |
| Packing List | 6 |
| Specifications | 7 |
| EDID Setting List | 9 |
| Operation Controls and Functions | 11 |
| IR Pin Definition | 15 |
| API Command Control | 16 |
| ASCII Commands Reference Table | 16 |
| Command List | 16 |
| Front Panel Key Control | 17 |
| Network Access (USB-C) | 17 |
| Source Selection | 18 |
| Internal Pattern Generator | 18 |
| HDCP Settings | 19 |
| USB Configuration | 19 |
| Auto-Switching | 20 |
| EDID Management | 21 |
| Connection Diagram | 22 |
| Troubleshooting | 23 |
| Tech Support | 24 |
| Limited Product Warranty Terms | 24 |
| Mission Statement | 24 |
| Copyright | 24 |

## Statement

Please read these instructions carefully before connecting, operating, or configuring this product. Please save this manual for future reference.

## Safety Precaution

- To prevent damaging this product, avoid heavy pressure, strong vibration, or immersion during transportation, storage, and installation.
- The housing of this product is made of organic materials. Do not expose to any liquid, gas, or solids which may corrode the shell.
- Do not expose the product to rain or moisture.
- To prevent the risk of electric shock, do not open the case. Installation and maintenance should only be carried out by qualified technicians.
- Do not use the product beyond the specified temperature, humidity, or power supply specifications.
- This product does not contain parts that can be maintained or repaired by users. Damage caused by dismantling the product without authorization from BZBGEAR is not covered under the warranty policy.
- Installation and use of this product must strictly comply with local electrical safety standards.

## Surge Protection Strongly Recommended

This device contains sensitive electronic components that may be vulnerable to damage from electrical spikes, surges, lightning strikes, or power fluctuations. To ensure optimal performance and extend the lifespan of your equipment, we strongly recommend using a quality surge protection system.

## Introduction

The BG-EXH-4KC7 HDMI extender is an ideal device for both local and remote viewing purposes. It extends an HDMI signal to an impressive range of up to 40m (132 feet). This makes this unit perfect for point-to-point digital signage applications that demand high-quality HDMI video or in home applications such as extending a game console HDMI connection as this unit supports resolutions of up to 4K@120Hz 4:4:4 with DSC function. Additionally, the extender is designed to extend Infrared (IR) signals from remote controls, enabling convenient control of your video source from your video destination.

## Features

- HDCP 2.2 and DisplayPort 1.4a compliant, 18Gbps video bandwidth
- HDBaseT 3.0 design powered by VS3000 chipset
- Supports up to 4K@60Hz (YUV 4:4:4) per HDMI 2.0b
- 4K60/4K30/1080p transmission up to 328ft (100m) via CAT6A/7 (Standard Mode)
- 1080p 8-bit transmission up to 492ft (150m) via CAT6A/7 (Long Reach Mode)
- TX: 1x HDMI in, 1x USB-C in, 1x HDMI/HDBT out, 1x USB 3.2 host, 3x USB 3.2 clients
- RX: 1x HDBT in, 1x HDMI out, 4x USB 2.0 clients
- USB-C and HDMI inputs support auto/manual switching
- Auto switching via HDMI 5V or signal detection
- TX USB-C supports DP-ALT mode, USB 3.2, 1G Ethernet, and 100W charging
- USB-A ports enable VBUS only when host is connected
- Supports HDR, HDR10, HDR10+, Dolby Vision LLM, and HLG pass-through
- 4K to 1080p downscaling (no frame rate conversion) on HDMI output
- Analog audio de-embedding on both TX and RX
- RS-232 pass-through and API control
- RS-232/CEC for external device power control
- 1G Ethernet and bi-directional IR signal pass-through
- Advanced EDID management
- Bi-directional 24V PoC with switch (USB-C charging from TX power supply only)

## Packing List

- 1× 4K HDMI/USB-C over HDBaseT 3.0 Extender – Transmitter
- 1× 4K HDMI/USB-C over HDBaseT 3.0 Extender – Receiver
- 2× 3-pin Phoenix Connectors (3.5mm, male)
- 2× 5-pin Phoenix Connectors (3.5mm, male)
- 4× Mounting Ears
- 8× KM3×6 Machine Screws
- 1× IR Blaster Cable (1.5m)
- 1× IR Receiver Cable (1.5m)
- 1× 24V/7.5A Desktop Power Adapter
- 1× User Manual

## Specifications

| Technical Specifications | |
|---|---|
| **HDMI Compliance** | HDMI 2.0b |
| **HDCP Compliance** | HDCP 2.2 |
| **DisplayPort Compliance** | DisplayPort 1.4a |
| **Video Bandwidth** | 18Gbps |
| **Supported Resolutions** | 640×480p60, 800×600p60, 1024×768p60, 1280×1024p60, 1360×768p60, 1440×900p/1050p60, 1600×1200p60, 720×480i/p59.94, 720×576i/p50, 1280×720p50/59.94/60, 1920×1080i50/59.94/60, 1920×1080p23.98/24/25/29.97/30/50/59.94/60, 3840×2160p23.98/24/25/29.97/30/50/59.94/60/100/120, 4096×2160p23.98/24/25/29.97/30/50/59.94/60 |
| **Color Space** | RGB, YCbCr 4:4:4 / 4:2:2, YUV 4:2:0 |
| **Color Depth** | 8/10/12-bit |
| **HDR Support** | HDR, HDR10, HDR10+, Dolby Vision, HLG |
| **IR Level** | 12Vp-p |
| **Audio Formats** | **HDMI/USB-C/HDBT**: LPCM 2/5.1/7.1CH, Dolby (Digital/Plus/EX, TrueHD, Atmos), DTS (EX, 96/24, High Res, HD MA), DSD<br>**Analog Audio**: LPCM 2CH (32–192kHz) |
| **Audio Output Parameters** | Impedance: 600Ω balanced, 300Ω unbalanced<br>Level: 8.2dBu (2Vrms) balanced, 2.2dBu (1Vrms) unbalanced<br>Freq. Response: 20Hz–20kHz (±0.5dB)<br>Dynamic Range: >90dB @ 0dBu<br>S/N Ratio: >90dB @ 0dBu<br>THD+N: <0.01% @ +4dBu<br>Delay: <1ms |
| **USB Support** | **TX**: USB 3.2 Gen 1 (5Gbps), backward compatible with USB 2.0 (480Mbps)<br>**RX**: USB 2.0 (350Mbps) |
| **USB Ports** | **TX Host**: 1x USB-C 3.2 Gen 1, 1x USB-B 3.2 Gen 1<br>**TX Device**: 1x USB-C 3.2 Gen 1, 2x USB-A 3.2 Gen 1<br>**RX Device**: 1x USB-C 2.0, 3x USB-A 2.0 |

| | |
|---|---|
| **USB Power Supply** | **TX Host**: 1x USB-C (100W charging)<br>**TX Device**: 1x USB-C (1A), 2x USB-A (1.5A)<br>**RX Device**: 1x USB-C (1A), 3x USB-A (1A) |
| **Transmission Distance** | HDMI/USB-C cable: 16.4ft (5m)<br>USB 3.2 Gen 1 cable: 5.9ft (1.8m)<br>CAT6A/7: 328ft (100m) @ 4K60 (Standard), 492ft (150m) @ 1080p (Long Reach) |
| **ESD Protection** | ±8kV (Air), ±4kV (Contact) — IEC 61000-4-2 |
| **Transmitter Connections** | **Inputs**: 1x HDMI, 1x USB-C<br>**Outputs**: 1x HDBT (PoC), 1x HDMI, 1x AUDIO<br>**Control**: 1x LAN, 1x RS-232, 1x USB-C (Service), 1x USB-B (Host), 1x USB-C + 2x USB-A (Devices), 1x IR IN, 1x IR OUT |
| **Receiver Connections** | **Input**: 1x HDBT<br>**Outputs**: 1x HDMI, 1x AUDIO<br>**Control**: 1x LAN, 1x RS-232, 1x USB-C (Service), 1x USB-C + 3x USB-A (Devices), 1x IR IN, 1x IR OUT |
| **Mechanical Specifications** | |
| **Housing / Color** | Metal Enclosure / Black |
| **Dimensions (W×D×H)** | TX/RX: 8.2in × 4.8in × 0.87in / 208mm × 122mm × 22mm |
| **Weight** | TX: 1.51 lbs [687g], RX: 1.4 lbs [636g] |
| **Power Supply** | Input: AC 100–240V 50/60Hz<br>Output: DC 24V/7.5A (CE/FCC/UL certified) |
| **Power Consumption** | Max 173W (with USB-C charging, PoC to RX)<br>Max 73W (without USB-C charging) |
| **Operating Temp** | 32°F to 104°F / 0°C to 40°C |
| **Storage Temp** | -4°F to 140°F / -20°C to 60°C |
| **Operating Humidity** | 20%–80% (non-condensing) |
| **Storage Humidity** | 10%–90% (non-condensing) |
| **Recommended HDMI Cable Length** | 4K60: 16.4ft (5m) 4K24: 33ft (10m) 1080p60: 49ft (15m)<br><br>**Use Premium High-Speed HDMI cables** |

**Note:** In HDBaseT Long Reach Mode, due to bandwidth limitations, only USB HID devices (such as keyboards and mice) are supported. USB 2.0 devices are not supported in this mode. Additionally, when using the USB pass-through function, the serial baud rate may be limited.

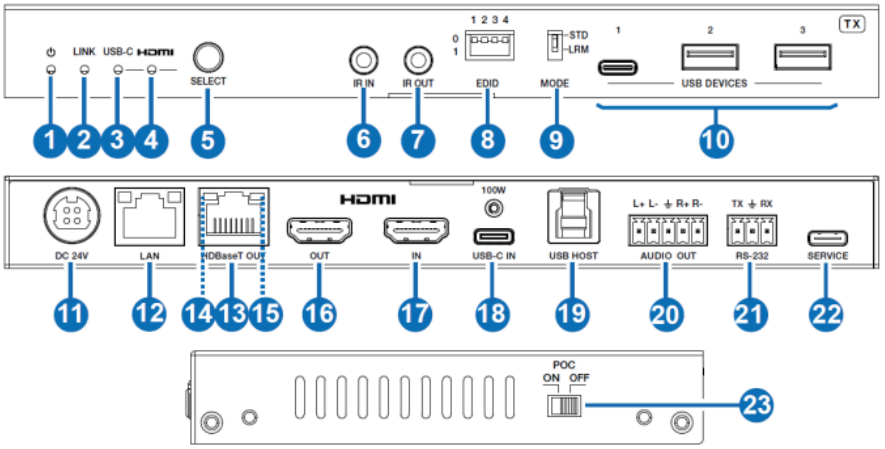
## EDID Setting List

| DIP Switch | Video Format | Audio Format | Description |
|---|---|---|---|
| 0000 | **Auto Detect** (Default) | Auto | Automatically selects optimal EDID |
| 0001 | HDMI 1080p @ 60Hz | 2CH PCM | Standard Full HD with stereo audio |
| 0010 | HDMI 4K @ 30Hz, 4:4:4, 8-bit | 2CH PCM | 4K UHD at 30Hz, 8-bit color, stereo audio |
| 0011 | HDMI 4K @ 60Hz, 4:4:4, 8-bit | 2CH PCM | Smooth 4K with stereo audio |
| 0100 | HDMI 1080p @ 60Hz | 5.1CH DTS/Dolby | Full HD with surround sound |
| 0101 | HDMI 1080p @ 60Hz | 7.1CH DTS/Dolby/HD | Full HD with advanced surround sound |
| 0110 | HDMI 4K @ 60Hz, 4:4:4, 8-bit | 5.1CH DTS/Dolby | High-quality 4K with surround sound |
| 0111 | HDMI 4K @ 60Hz, 4:4:4, 8-bit | 7.1CH DTS/Dolby/HD | High-quality 4K with immersive audio |

| | | | |
|---|---|---|---|
| 1000 | HDMI 1920x1200 @ 60Hz | 2CH PCM | WUXGA resolution with stereo audio |
| 1001 | DVI 1920x1080 @ 60Hz | None | DVI video only (No audio) |
| 1010 | DVI 1920x1200 @ 60Hz | None | Higher res DVI video only (No audio) |
| 1011 | **Pass-through (Copy from TX)** | As detected | Copies EDID from HDMI OUT on transmitter |
| 1100 | **Pass-through (Copy from RX)** | As detected | Copies EDID from HDMI OUT on receiver |
| 1101 | **User Defined 1** | Custom | User-loaded EDID profile 1 |
| 1110 | **User Defined 2** | Custom | User-loaded EDID profile 2 |
| 1111 | **Software Controlled** | Software Defined | EDID managed via software interface |

# Operation Controls and Functions

## Transmitter Panels

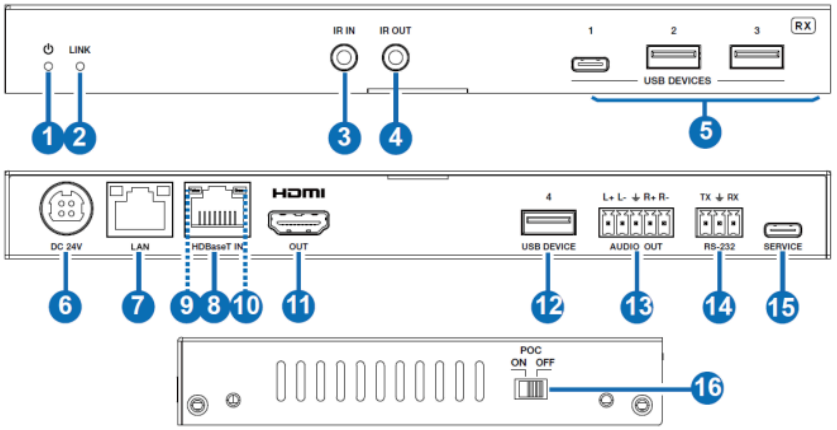



| No. | Name | Function Description |
|---|---|---|
| 1 | Power LED (Red) | Indicates the transmitter is powered on. |
| 2 | LINK LED (Green) | - On: Good connection between transmitter and receiver- Flashing: Poor connection- Off: No connection |
| 3 | USB-C LED (Green) | Lights up when the USB-C IN port is selected as the video input channel. |
| 4 | HDMI LED (Green) | Lights up when the HDMI IN port is selected as the video input channel. |
| 5 | SELECT Button | Press to switch between HDMI and USB-C video input. |
| 6 | IR IN | IR signal input port; connect to IR receiver cable. |
| 7 | IR OUT | IR signal output port; connect to IR blaster cable. |
| 8 | EDID DIP Switch | Used for EDID configuration. Refer to the EDID setting list. Note: Only when the switch is set to 1111 can EDID be set via API commands. |

| | | |
|---|---|---|
| 9 | MODE Switch | Switches HDBaseT operating mode:- STD (Standard Mode): Default; supports up to 4K60 over 100m (CAT6A/7)- LRM (Long Reach Mode): Supports up to 1080p 8-bit over 150m (CAT6A/7) |
| 10 | USB Device Ports | Three USB 3.2 device ports (2× USB-A, 1× USB-C) for connecting peripherals such as keyboard, mouse, or flash drives. |
| 11 | DC 24V Power Input | Input for 24V/7.5A power adapter. Note: Supports PoC (Power over Cable); only one of TX/RX needs to be powered. |
| 12 | LAN Port | 1G Ethernet pass-through:- Yellow LED: Flashes at 1000Mbps- Green LED: Flashes at 100Mbps |
| 13 | HDBaseT OUT | Connects to HDBaseT IN on the receiver via CAT6A/7 cable. Carries HDMI, Ethernet, and USB signals. |
| 14 | Data Signal Indicator (Yellow) | - On: Video signal with HDCP encryption- Flashing: Video signal without HDCP- Off: No video signal transmission |
| 15 | Link Signal Indicator (Green) | Same functionality as LINK LED (see item #2). |
| 16 | HDMI OUT | HDMI loop-out port for local video display. |
| 17 | HDMI IN | HDMI video input port for the source device. |
| 18 | USB-C IN | USB Type-C port with 4 functions: - Video signal input - USB 3.2 Gen 1 data transmission (when selected) - 100W charging (only when TX is powered) - 1G Ethernet access |
| 19 | USB HOST | USB 3.2 Gen 1 host port; connect to PC. |
| 20 | AUDIO OUT | Analog audio output port: - Balanced: L+, L–, GND, R+, R– (up to 2Vrms) - Unbalanced: L+, GND, R+ (up to 1Vrms) |
| 21 | RS-232 | Serial port for signal pass-through and API control. |

| | | |
|---|---|---|
| 22 | SERVICE Port | USB 2.0 Type-C port used for firmware updates and API control. |
| 23 | PoC Switch | Enables or disables 24V Power over Cable: - ON (default): PoC enabled - OFF: Local 24V power supply required |

## Receiver Panels

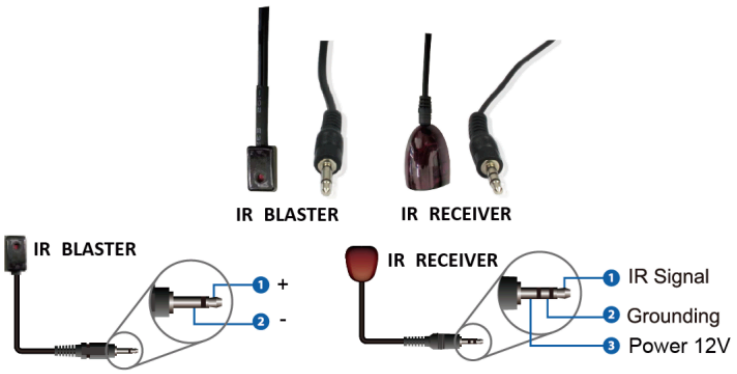



| No. | Name | Function Description |
|---|---|---|
| 1 | **Power LED** | Red LED indicates the receiver is powered on. |
| 2 | **LINK LED (Green)** | **On:** Good connection between transmitter and receiver. **Flashing:** Poor connection. **Off:** No connection. |
| 3 | **IR IN** | IR signal input port, connect to IR receiver cable. |
| 4 | **IR OUT** | IR signal output port, connect to IR blaster cable. |
| 5 | **USB Device Ports** | Three USB 2.0 ports (2 × USB-A, 1 × USB-C), for mouse, keyboard, flash drive, or other USB devices. |
| 6 | **DC 24V Input** | 24V/7.5A DC power supply input. Supports **PoC** (Power over Cable): Only one unit (transmitter or receiver) requires power. |

| | | |
|---|---|---|
| 7 | **LAN Port** | 1G Ethernet pass-through. **Yellow LED:** 1000Mbps. **Green LED:** 100Mbps. |
| 8 | **HDBaseT IN** | Connects to HDBaseT OUT on the transmitter via CAT6A/7 cable. Transfers HDMI, network, and USB signals. |
| 9 | **Data Signal Indicator (Yellow)** | **On:** Video signal with HDCP encryption. **Flashing:** Video signal without HDCP. **Off:** No video signal. |
| 10 | **Link Signal Indicator (Green)** | Same status as LINK LED: **On:** Good connection. **Flashing:** Poor connection. **Off:** Not connected. |
| 11 | **HDMI OUT** | HDMI signal output, connect to TV, monitor, or other HDMI display device. |
| 12 | **USB DEVICE** | USB 2.0 port for connecting mouse, keyboard, flash drive, or other USB device. |
| 13 | **AUDIO OUT** | Analog audio output supporting: - **Balanced**: L+, L-, GND, R+, R- (up to 2Vrms) - **Unbalanced**: L+, GND, R+ (up to 1Vrms) |
| 14 | **RS-232** | RS-232 serial port for signal pass-through and API command control. |
| 15 | **SERVICE Port** | USB 2.0 Type-C port used for firmware updates and API command access. |
| 16 | **PoC Switch** | 24V PoC (Power over Cable) toggle switch: **ON:** PoC enabled (default). **OFF:** PoC disabled—requires local DC power. |

## IR Pin Definition

**The definitions for the IR Receiver and Blaster pins are provided below:**




Note:

- When the angle between the IR receiver and the remote control is within ±45°, the effective transmission range is 0–5 meters.
- When the angle is within ±90°, the range extends up to 0–8 meters.

## API Command Control

This product supports control via API commands for flexible integration with external systems. To get started, connect the product to a PC or control system using one of the following methods:

- **RS-232 Control**: Use a 3-pin Phoenix connector cable to connect the product's RS-232 port to your PC or control system.
- **USB-C Control**: Use a USB-C cable to connect the product's SERVICE port directly to a PC.

Once connected, launch a serial command tool on your PC and send ASCII commands to control the device. A complete list of supported ASCII commands is provided below.

# ASCII Commands Reference Table

| Interface | Description | Baud Rate | Data Bit | Stop Bit | Parity |
|---|---|---|---|---|---|
| USB-C (Service Port) | Virtual RS-232 for internal debugging (command line) | 115200 (Fixed) | 8 | 1 | None |
| Phoenix RS-232 | For external control systems | 2400~115200 (Configurable) | 8 | 1 | None |

**Command List**

| Command Code | Description | Example | Feedback | Default |
|---|---|---|---|---|
| ? / help | List all available commands | ? or help | List all commands | – |

| | | | | |
|---|---|---|---|---|
| get fw version | Get firmware versions | get fw version | TX FW v1.00.00 RX FW v1.00.00 | – |
| set reboot | Reboot the device | set reboot | Rebooting... Initializing... Done | – |
| set reset | Factory reset | set reset | Prompt to confirm with “Yes” | – |
| get status | Get system status | get status | Returns system info | – |

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**Front Panel Key Control**

| Command Code | Description | Example | Feedback | Default |
|---|---|---|---|---|
| set tx key on/off | Enable/disable TX front panel key | set tx key on | Set TX key on | On |
| get tx key | Get TX front panel key status | get tx key | On or Off | On |

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**Network Access (USB-C)**

| Command Code | Description | Example | Feedback | Default |
|---|---|---|---|---|
| set tx Usbc AccessNetwork on/off | Enable/disable USB-C network access | set tx Usbc AccessNetwork on | Set TX USB-C access network on | On |

| | | | | |
|---|---|---|---|---|
| get tx Usbc AccessNetwork | Get USB-C network access status | get tx Usbc AccessNetwork | On or Off | On |

**Source Selection**

| Command Code | Description | Example | Feedback | Default |
|---|---|---|---|---|
| set tx source x | Set input source (0~4) x=0: Off, 1: USB-C, 2: HDMI, 3: AVMute, 4: Pattern | set tx source 1 | Set TX source to USB-C | 1 |
| get tx source | Get current input source | get tx source | USB-C, HDMI, etc. | – |

**Internal Pattern Generator**

| Command Code | Description | Example | Feedback | Default |
|---|---|---|---|---|
| set tx pattern x y | Set resolution and pattern x=16 (resolutions), y=112 (patterns) | set tx pattern 1 2 | Set TX pattern 4K60Hz checkboard | – |
| get tx pattern | Get current pattern generator setting | get tx pattern | TX pattern 4K60Hz checkboard | – |

### HDCP Settings

| Command Code | Description | Example | Feedback | Default |
|---|---|---|---|---|
| set tx input x hdcp y | Set HDCP on input (x=0~2), y=0: Off, 1: 1.4, 2: 2.2 | set tx input 0 hdcp 2 | TX all inputs HDCP 2.2 | HDCP 2.2 |
| get tx input x hdcp | Get HDCP status of inputs | get tx input 0 hdcp | Status per input | – |
| set tx output x hdcp y | Set HDCP on output (x=02), y=03 modes | set tx output 2 hdcp 1 | Set TX HDMI output HDCP auto | Auto |
| get tx output x hdcp | Get HDCP status of outputs | get tx output 0 hdcp | HDCP status per output | – |

### USB Configuration

| Command Code | Description | Example | Feedback | Default |
|---|---|---|---|---|
| set tx usb x | Set USB source: 0=Follow video, 1=USB-C, 2=USB-B | set tx usb 0 | Set USB source to follow video | 0 |
| get tx usb | Get current USB source | get tx usb | Follow video, USB-C, etc. | – |

| | | | | |
|---|---|---|---|---|
| get tx usbh5v x | Get USB host input 5V status | get tx usbh5v 0 | Power status of USB inputs | – |
| set tx usbd5v x to y | Set USB device 5V output (03), y=02 | set tx usbd5v 0 to 1 | Follow host, etc. | 1 |
| get tx usbd5v x | Get USB device 5V output status | get tx usbd5v 0 | Status per port | – |

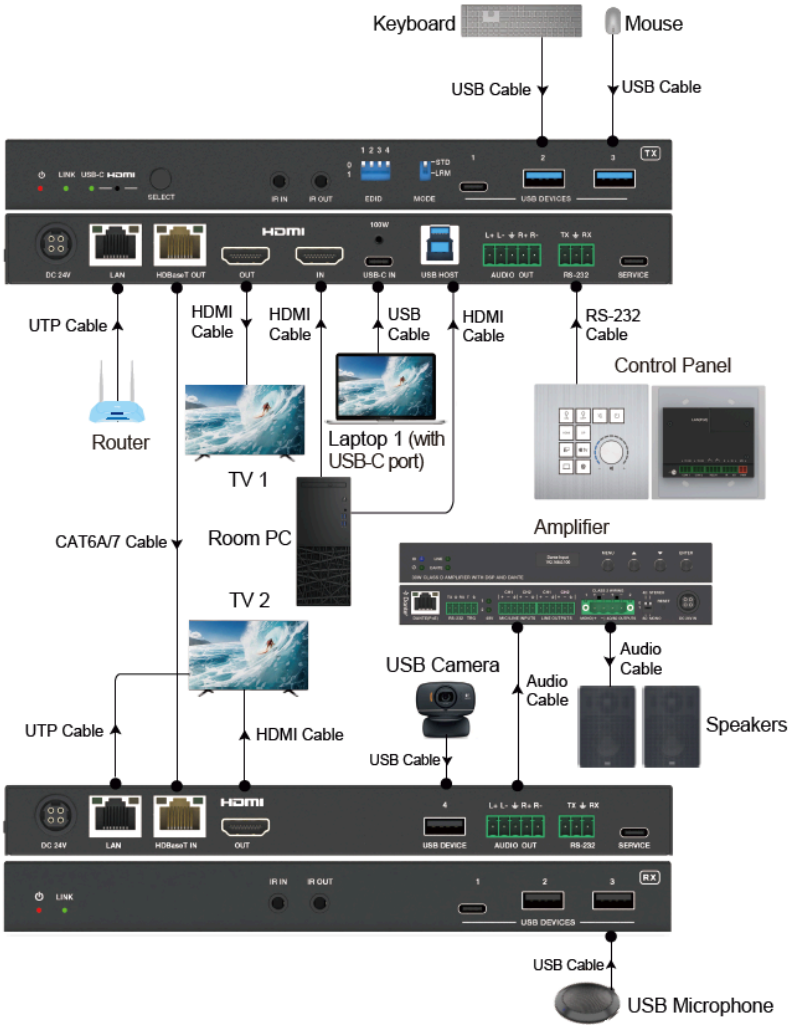
**Auto-Switching**

| Command Code | Description | Example | Feedback | Default |
|---|---|---|---|---|
| set tx autoswitch on/off | Enable/disable auto-switching | set tx autoswitch on | Set TX autoswitch on | On |
| get tx autoswitch | Get auto-switching status | get tx autoswitch | On or Off | On |
| set tx autoswitch mode x | Set mode: 0=5V detection, 1=Signal detection | set tx autoswitch mode 1 | Signal detection | Signal detection |
| get tx autoswitch mode | Get current auto-switching mode | get tx autoswitch mode | Signal detection, etc. | – |

### EDID Management

| Command Code | Description | Example | Feedback | Default |
|---|---|---|---|---|
| set tx edid x to y | Assign EDID to input (x=02), preset (y=119) | set tx edid 0 to 1 | Set EDID to HDMI 1080p@60Hz, 2CH | 1 |
| get tx edid x | Get current EDID of input | get tx edid 0 | EDID info per port | – |
| get tx edid data x | Get raw EDID data from input | get tx edid data 1 | Hexadecimal data or block | – |

## Connection Diagram



## Troubleshooting

| Problems | Causes | Solutions |
|---|---|---|
| No Power / All LED off | Power supply not connected, connected fully, or wrong power supply. | Check if the power supply is connected correctly and the output voltage value is within recommended specifications. |
| No sound or sound issues | The HDMI connection is faulty, the audio format is not supported by the displays, or the source player is set to another port for audio output | Check if the HDMI cables are connected correctly.<br>Check if the audio format is supported by the display and that a user has not changed the supported audio format on the player`s audio output. Ensure output settings from the HDMI source device as set correctly. |
| No picture or picture flickers | The HDMI cable may be faulty or the category cable quality is faulty. | Check if the HDMI and category cable connections are correct and undamaged. Change to another good working HDMI cable or category cable (CAT6 or better cable is recommended). |

## Tech Support

Have technical questions? We may have answered them already!

Please visit BZBGEAR's support page (bzbgear.com/support) for helpful information and tips regarding our products. Here you will find our Knowledge Base (bzbgear.com/knowledge-base) with detailed tutorials, quick start guides, and step-by-step troubleshooting instructions. Or explore our YouTube channel, BZB TV (youtube.com/c/BZBTVchannel), for help setting up, configuring, and other helpful how-to videos about our gear.

Need more in-depth support? Connect with one of our technical specialists directly:

| **Phone** | **Email** | **Live Chat** |
|---|---|---|
| 1.888.499.9906 | support@bzbgear.com | bzbgear.com |

## Limited Product Warranty Terms

Pro Line: 5-year warranty from the date of purchase for AV/Broadcasting products bought on or after August 1, 2024.

Essential Line: 3-year warranty from the date of purchase for AV/Broadcasting products bought on or after August 1, 2024.

Cables: Lifetime Limited Product Warranty.

For complete warranty information, please visit bzbgear.com/warranty.

For questions, please call 1.888.499.9906 or email support@bzbgear.com.

## Mission Statement

BZBGEAR is a breakthrough manufacturer of high-quality, innovative audiovisual equipment ranging from AVoIP, professional broadcasting, conferencing, home theater, to live streaming solutions. We pride ourselves on unparalleled customer support and services. Our team offers system design consultation, and highly reviewed technical support for all the products in our catalog. BZBGEAR delivers quality products designed with users in mind.

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