



# BG-8K-28A

**2x8 8K UHD HDMI 2.1 48Gbps Splitter with Auto Downscaling/  
HDR-to-SDR Conversion/Audio De-Embedding/RS-232  
(8K60/4K120 and VRR/ALLM/QMS/QFT/SBTM Support)**

## User Manual







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## Statement

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

## Safety Precaution

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- 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.





## Introduction

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The BG-8K-28A is a high-performance 48Gbps HDMI™ 2×8 splitter designed for advanced 8K and high-frame-rate AV distribution environments. It supports HDMI 2.1 features including resolutions up to 8K@60Hz (4:2:0, 12-bit) and 4K@120Hz (4:4:4, 12-bit) with full HDCP 2.3 compliance. The unit provides two HDMI inputs that can be manually or automatically switched and simultaneously distributed to eight HDMI outputs. Comprehensive HDR format support—including HDR10, HDR10+, Dolby Vision, HLG, ALLM, and VRR—ensures compatibility with modern source and display devices.

Each HDMI output supports independent downscaling (8K→4K/1080p) and HDR-to-SDR conversion, making the BG-8K-28A ideal for mixed-resolution display systems. The splitter also features audio de-embedding via optical S/PDIF and balanced/unbalanced analog outputs with adjustable gain. Advanced EDID management, a built-in HDMI signal generator for diagnostics, and robust signal processing with equalization and re-timing provide reliable operation across long cable runs. Control is available via front-panel buttons, IR remote, and RS-232 or USB-C API commands, making the unit suitable for both standalone and fully integrated AV control systems.

## Features

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- **HDMI 2.1 & HDCP 2.3 Compliance:** Supports the latest HDMI 2.1 features with full HDCP 2.3 content protection.
- **48Gbps Bandwidth:** Delivers up to 48Gbps video bandwidth for uncompressed 8K and high-frame-rate signals.
- **8K & High Frame Rate Support:** Supports up to 8K@60Hz (4:2:0, 12-bit), 8K@30Hz (4:4:4, 12-bit), and 4K@120Hz (4:4:4, 12-bit).
- **HDR Pass-Through:** Supports HDR, HDR10, HDR10+, Dolby Vision, HLG, ALLM, and VRR formats.
- **2×8 HDMI Distribution:** Switches between two HDMI inputs and distributes the selected source to eight HDMI outputs.
- **Independent Output Downscaling:** Each output supports independent 8K-to-4K or 8K-to-1080p downscaling.
- **HDR to SDR Conversion:** Converts HDR content to SDR independently on each output for legacy display compatibility.
- **Audio De-Embedding:** Extracts HDMI audio to optical S/PDIF and balanced/unbalanced analog outputs.
- **Analog Audio Gain Control:** Provides adjustable gain control for analog audio outputs.
- **Auto & Manual Input Switching:** Supports automatic HDMI 5V detection and manual switching via front panel, IR, or API.
- **Built-In Signal Generator:** Includes an internal test pattern generator for signal verification and troubleshooting.





- **Advanced EDID Management:** Provides multiple EDID presets, pass-through, and user-defined EDID options.
- **Signal Conditioning:** Built-in equalization, re-timing, and signal amplification for stable transmission.
- **Multiple Control Interfaces:** Supports front panel buttons, IR remote, RS-232, and USB-C service control.

## Packing List

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- 1× 48Gbps 2×8 HDMI™ Splitter (BG-8K-28A)
- 1× 12V/2.5A Locking Power Supply (Multinational Plug)
- 1× IR Remote Control
- 1× IR Wideband Receiver Cable (1.5m)
- 1× 3-pin 3.5mm Phoenix Connector
- 1× 5-pin 3.5mm Phoenix Connector
- 2× Rack Mounting Ears
- 4× Mounting Screws (KM3×6)
- 1× User Manual





## Specifications

| TECHNICAL SPECIFICATIONS  |                                                                                                          |
|---------------------------|----------------------------------------------------------------------------------------------------------|
| HDMI Compliance           | HDMI 2.1                                                                                                 |
| HDCP Compliance           | HDCP 2.3                                                                                                 |
| Video Bandwidth           | 48Gbps                                                                                                   |
| Video Resolution          | Up to 8K@60Hz (4:2:0, 12-bit), 8K@30Hz (4:4:4, 12-bit), 4K@120Hz (4:4:4, 12-bit)                         |
| Color Depth               | 8/10/12-bit                                                                                              |
| Color Space               | RGB, YCbCr 4:4:4 / 4:2:2 / 4:2:0                                                                         |
| HDR Support               | HDR, HDR10, HDR10+, Dolby Vision, HLG                                                                    |
| Audio Formats (HDMI I/O)  | LPCM, Dolby Digital/Plus/EX, Dolby TrueHD, Dolby Atmos, DTS, DTS-EX, DTS-96/24, DTS-HD Master Audio, DSD |
| Optical Audio Output      | Up to LPCM / Dolby / DTS 5.1CH                                                                           |
| Analog Audio Output       | LPCM 2CH                                                                                                 |
| Output Impedance          | 300 Ohm                                                                                                  |
| Max Output Level          | 8.2dBu (2Vrms) balanced / 2.2dBu (1Vrms) unbalanced                                                      |
| Frequency Response        | 20Hz–20kHz (+0.5dB / -1dB)                                                                               |
| Audio Sync Delay          | 0–2.2ms                                                                                                  |
| Signal-to-Noise Ratio     | 99dB @ 2Vrms, 1kHz, A-weighted                                                                           |
| THD+N                     | <0.2% @ 0dBV, 1kHz                                                                                       |
| IR Level                  | 12Vp-p                                                                                                   |
| IR Frequency              | 20–60kHz (wideband)                                                                                      |
| ESD Protection            | ±8kV air discharge, ±4kV contact discharge (IEC 61000-4-2)                                               |
| CONNECTION SPECIFICATIONS |                                                                                                          |
| Input Ports               | 2× HDMI Type-A (19-pin female)                                                                           |
| Output Ports              | 8× HDMI Type-A (19-pin female)                                                                           |
| Optical Output            | 1× S/PDIF Optical                                                                                        |



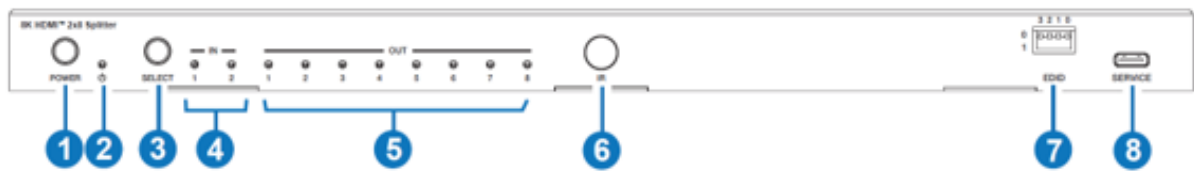
|                                  |                                        |
|----------------------------------|----------------------------------------|
| Analog Audio Output              | 1× L/R (5-pin 3.5mm Phoenix connector) |
| RS-232 Control                   | 1× 3-pin 3.5mm Phoenix connector       |
| IR Control                       | 1× 3.5mm stereo mini-jack (IR IN)      |
| Service Port                     | 1× USB Type-C (firmware upgrade)       |
| <b>MECHANICAL SPECIFICATIONS</b> |                                        |
| Housing                          | Metal enclosure                        |
| Color                            | Black                                  |
| Dimensions                       | 320mm (W) × 100mm (D) × 21.5mm (H)     |
| Weight                           | 810g                                   |
| Power Supply                     | DC 12V / 2.5A                          |
| Power Consumption                | 9.6W (Max)                             |
| Operating Temperature            | 0°C to 40°C / 32°F to 104°F            |
| Storage Temperature              | -20°C to 60°C / -4°F to 140°F          |
| Operating Humidity               | 20%–80% RH (non-condensing)            |
| Storage Humidity                 | 10%–90% RH (non-condensing)            |



# Operation Controls and Functions

## Front and Rear Panel

### Front Panel

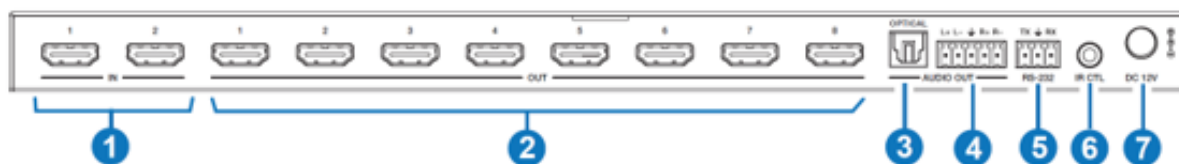


| No. | Name                 | Description                                                       |
|-----|----------------------|-------------------------------------------------------------------|
| 1   | POWER Button         | Press to power on the unit; press and hold to enter standby mode. |
| 2   | POWER LED            | Green indicates powered on; red indicates standby mode.           |
| 3   | SELECT Button        | Cycles between HDMI input 1 and input 2.                          |
| 4   | IN LED (1-2)         | Indicates the currently selected active HDMI input source.        |
| 5   | OUT LED (1-8)        | Indicates active connection status of each HDMI output port.      |
| 6   | IR Window            | Receives IR remote control signals.                               |
| 7   | EDID DIP Switch      | Used to select EDID mode based on predefined DIP settings.        |
| 8   | SERVICE Port (USB-C) | USB-C service port for firmware updates and maintenance.          |





## Rear Panel



| No. | Name             | Description                                                                                  |
|-----|------------------|----------------------------------------------------------------------------------------------|
| 1   | IN (1-2)         | HDMI input ports for connecting source devices such as PCs, media players, or game consoles. |
| 2   | OUT (1-8)        | HDMI output ports for connecting displays such as TVs, monitors, or projectors.              |
| 3   | OPTICAL (S/PDIF) | Digital audio output for connection to amplifiers or audio processors.                       |
| 4   | L/R Audio Out    | Analog audio output (balanced/unbalanced) with gain control support.                         |
| 5   | RS-232           | Serial control port for integration with control systems and API commands.                   |
| 6   | IR CTL           | External IR receiver input for extended IR control.                                          |
| 7   | DC 12V           | Power input connector (12V/2.5A locking power supply).                                       |



## EDID Settings

The BG-8K-28A features an 8-position EDID DIP switch that allows users to select predefined EDID modes for optimal compatibility between source and display devices. EDID settings determine the supported resolution, audio format, and color depth communicated to the source device.

### EDID DIP Switch Configuration

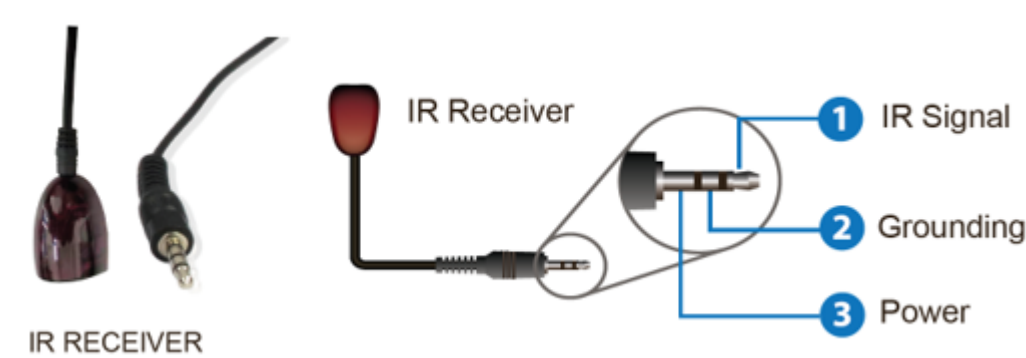
| DIP Setting | EDID Mode Description                                           |
|-------------|-----------------------------------------------------------------|
| 0000        | EDID Pass-Through (Copy from Sink 1) – Default                  |
| 0001        | 1080p@60Hz, 2CH PCM Audio                                       |
| 0010        | 1080p@60Hz, 5.1CH DTS/Dolby Audio                               |
| 0011        | 4K@60Hz 4:4:4 8-bit, 2CH PCM Audio                              |
| 0100        | 4K@60Hz 4:4:4 8-bit, 5.1CH DTS/Dolby Audio                      |
| 0101        | 4K@120Hz 4:4:4 10-bit HDR/DV, 2CH PCM Audio                     |
| 0110        | 4K@120Hz 4:4:4 10-bit HDR/DV, 5.1CH DTS/Dolby Audio             |
| 0111        | 4K@120Hz 4:4:4 12-bit HDR/DV, 2CH PCM Audio                     |
| 1000        | 4K@120Hz 4:4:4 12-bit HDR/DV, 5.1CH DTS/Dolby Audio             |
| 1001        | 8K@60Hz 4:2:0 10-bit HDR/DV, 2CH PCM Audio                      |
| 1010        | 8K@60Hz 4:2:0 10-bit HDR/DV, 5.1CH DTS/Dolby Audio              |
| 1011        | 8K@60Hz 4:2:0 12-bit HDR/DV, 2CH PCM Audio                      |
| 1100        | 8K@60Hz 4:2:0 12-bit HDR/DV, 5.1CH DTS/Dolby Audio              |
| 1101        | 8K@60Hz 4:2:0 12-bit HDR/DV with VRR/DSC, 2CH PCM Audio         |
| 1110        | 8K@60Hz 4:2:0 12-bit HDR/DV with VRR/DSC, 5.1CH DTS/Dolby Audio |
| 1111        | User Defined EDID / Firmware Defined Mode                       |

### Notes on EDID Operation

- EDID settings apply to all input ports unless configured otherwise via API commands.
- Pass-through mode copies EDID directly from Sink 1 (first active display).
- User-defined EDID can be uploaded and selected via API commands for custom configurations.
- Incorrect EDID selection may result in reduced resolution or audio compatibility issues.



## IR Pin Definition



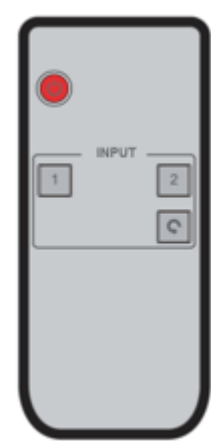
The IR IN port supports external infrared receiver connection for extended control range.

| Pin    | Signal      | Description              |
|--------|-------------|--------------------------|
| Tip    | IR Signal   | Infrared signal input    |
| Ring   | Power (12V) | IR receiver power supply |
| Sleeve | Ground      | Ground reference         |

**Note:** Use only the provided IR receiver cable to avoid damage or incorrect operation.

## IR Remote

The included IR remote allows basic control of input switching and power functions.



- **Power Button:** Turns the device ON or places it into standby mode.
- **Input 1 Button:** Selects HDMI Input 1 as the active source.
- **Input 2 Button:** Selects HDMI Input 2 as the active source.
- **Input Switch Button:** Cycles between HDMI Input 1 and Input 2.

### Operation Notes:

- Ensure the IR receiver is properly connected to the IR IN port for remote functionality.
- Direct line-of-sight is recommended for optimal performance.
- Interference from strong lighting or reflective surfaces may reduce IR range.





## API Commands

The BG-8K-28A supports ASCII-based API control via RS-232 or USB-C service port. Commands must be terminated with `<CR><LF>`.

### Communication Settings

- **Service Port (USB-C Virtual RS-232):** 115200bps, 8 data bits, 1 stop bit, no parity (fixed)
- **RS-232 Port (Phoenix Connector):** 4800–115200bps configurable, 8 data bits, 1 stop bit, no parity
- **Command Termination:** `<CR><LF>`

### Basic System Commands

| Command          | Function                    | Example                      | Response                  |
|------------------|-----------------------------|------------------------------|---------------------------|
| ?                | List all available commands | ?                            | Command list output       |
| help             | List all available commands | help                         | Command list output       |
| get fw version   | Get firmware version        | get fw version               | 1.0.0                     |
| set power on/off | Power ON or OFF device      | set power on / set power off | Power status message      |
| get power        | Get power status            | get power                    | On / Off                  |
| set reboot       | Reboot system               | set reboot                   | System rebooting message  |
| set reset        | Factory reset device        | set reset                    | Reset confirmation prompt |
| get status       | Get full system status      | get status                   | System status report      |

### Control & Interface Commands

| Command       | Function                     | Example   | Response  |
|---------------|------------------------------|-----------|-----------|
| set IR on/off | Enable or disable IR control | set IR on | IR On/Off |
| get IR        | Get IR status                | get IR    | IR On/Off |



|                |                                    |             |            |
|----------------|------------------------------------|-------------|------------|
| set key on/off | Enable or disable front panel keys | set key off | Key On/Off |
| get key        | Get front panel key status         | get key     | Key status |
| set baud x     | Set RS-232 baud rate (1–6)         | set baud 6  | 115200     |

### Input Control Commands

| Command               | Function                      | Example           | Response                  |
|-----------------------|-------------------------------|-------------------|---------------------------|
| set input x           | Select HDMI input (0–2)       | set input 1       | Input 1 selected          |
| get input             | Get active input              | get input         | Input HDMI 1              |
| get hdmi5v            | Check HDMI 5V detection       | get hdmi5v        | HDMI 1: 5V / HDMI 2: none |
| set autoswitch on/off | Enable/disable auto switching | set autoswitch on | On/Off                    |
| get autoswitch        | Get auto-switch status        | get autoswitch    | On/Off                    |

### Output Control Commands

| Command                  | Function                | Example                  | Response    |
|--------------------------|-------------------------|--------------------------|-------------|
| set output x downscale y | Set output scaling mode | set output 0 downscale 1 | Applied     |
| get output x downscale   | Get output scaling mode | get output 0 downscale   | Status list |
| set output x display y   | Set output display mode | set output 0 display 2   | Applied     |
| get output x display     | Get output display mode | get output 0 display     | Status list |
| set output x HDCP y      | Set HDCP mode           | set output 0 HDCP 1      | Applied     |
| get output x HDCP        | Get HDCP status         | get output 0 HDCP        | Status list |

### Internal Signal Generator

| Command           | Function                | Example           | Response             |
|-------------------|-------------------------|-------------------|----------------------|
| set generator x y | Set test pattern output | set generator 1 1 | 8K color bar         |
| get generator     | Get generator status    | get generator     | Resolution + pattern |



### Generator Modes:

- Resolution selection (x = 1–15): 8K30, 4K120, 4K60, 1080p, etc.
- Pattern selection (y = 1–13): color bar, checkerboard, ramp, PRBS, etc.

### Audio Commands

| Command                | Function                       | Example               | Response      |
|------------------------|--------------------------------|-----------------------|---------------|
| set analog mute on/off | Mute analog audio              | set analog mute on    | On/Off        |
| get analog mute        | Get mute status                | get analog mute       | On/Off        |
| set analog gain x      | Set analog gain (-79dB to 0dB) | set analog gain -10dB | Applied       |
| get analog gain        | Get gain level                 | get analog gain       | Current value |

### EDID Commands

| Command         | Function          | Example         | Response  |
|-----------------|-------------------|-----------------|-----------|
| set edid x to y | Set EDID mode     | set edid 0 to 3 | Applied   |
| get edid x      | Get EDID setting  | get edid 0      | EDID list |
| get edid data x | Get EDID raw data | get edid data 0 | Hex dump  |
| set user edid x | Set custom EDID   | set user edid 1 | Success   |
| get user edid x | Get user EDID     | get user edid 1 | EDID data |

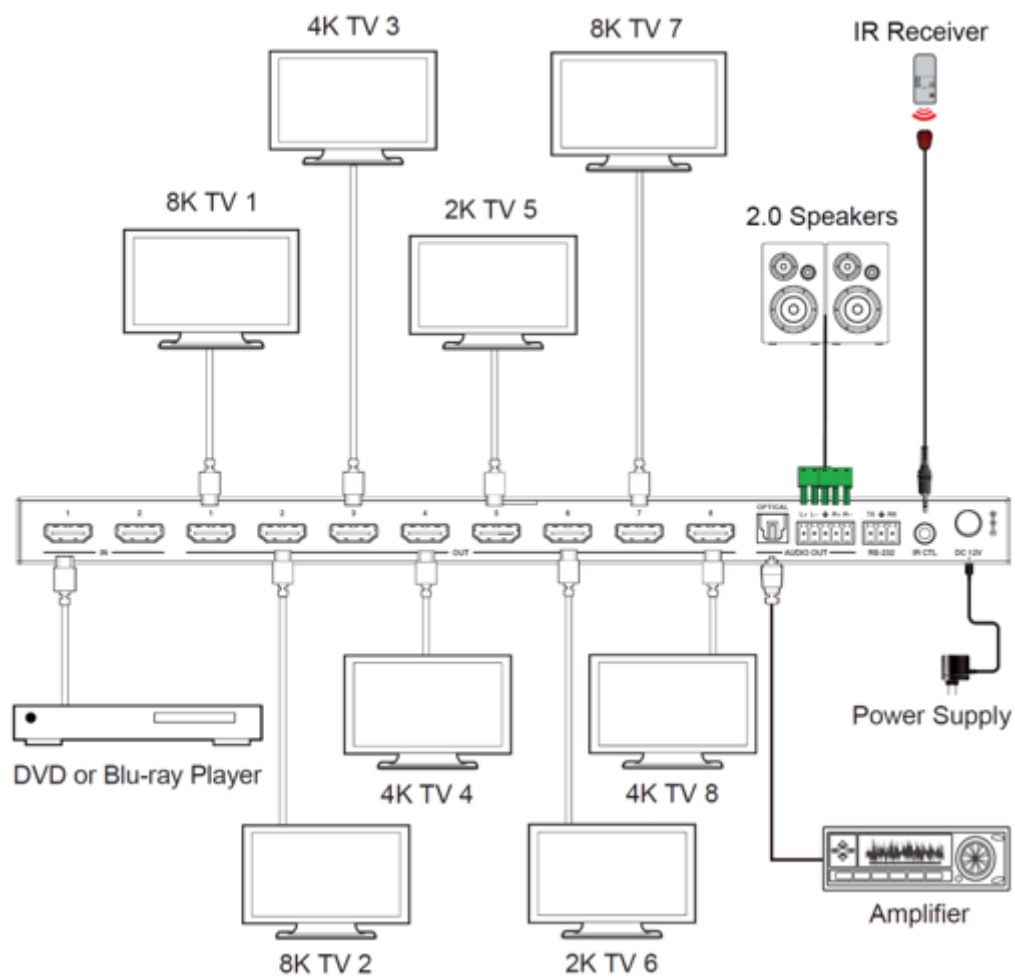
### Notes

- All commands are case-sensitive.
- Invalid commands return an error or no response.
- Some settings may require reboot to take effect.

EDID and HDCP changes may temporarily interrupt video output.



## 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. 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

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Have technical questions? We may have answered them already!

Please visit BZBGear's support page ([bzbgear.com/support](https://bzbgear.com/support)) for helpful information and tips regarding our products. Here you will find our Knowledge Base ([bzbgear.com/knowledge-base](https://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](https://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:

| <b>Phone</b>   | <b>Email</b>                                                 | <b>Live Chat</b>                              |
|----------------|--------------------------------------------------------------|-----------------------------------------------|
| 1.888.499.9906 | <a href="mailto:support@bzbgear.com">support@bzbgear.com</a> | <a href="https://bzbgear.com">bzbgear.com</a> |

## Limited Product Warranty Terms

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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](https://bzbgear.com/warranty).

For questions, please call 1.888.499.9906 or email [support@bzbgear.com](mailto:support@bzbgear.com).

## Mission Statement

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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.

## Copyright

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