



# BG-IPGEAR-XTREME-CORE

**HDMI 2.1 4K@120Hz Over IP Multicast AV & Control Extension System**

## 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-IPGear-XTREME-CORE is a professional HDMI 2.1 over IP multicast extension system designed for ultra-low-latency transmission of uncompressed UHD video, audio, USB, and control signals over standard 1Gb Ethernet infrastructure. Supporting 4K@120Hz 4:4:4 with full HDCP 2.3 compliance, the system delivers real-time performance suitable for live production, control rooms, simulation, and high-frame-rate gaming applications. Video, audio, USB, and control data can be extended up to 100 meters (330 ft) over Cat5e cabling while maintaining signal integrity and synchronization.

The system supports point-to-point, point-to-many, and multicast configurations when deployed with a managed 1GbE switch supporting IGMP snooping. Proprietary encoding and decoding technology ensures sub-frame latency, stable clocking, and consistent image quality across distributed endpoints. Integrated Ethernet pass-through allows network or internet access at the remote endpoint, reducing the need for additional cabling.

In addition to HDMI transport, the BG-IPGear-XTREME-CORE integrates USB-C-based USB 3.1 Gen 1 and Gen 2 extension, balanced analog audio I/O, bi-directional IR, full-duplex RS-232, and Power over Cable (PoC) support. The platform is designed for scalable IP-based AV systems and supports web-based configuration and firmware updates, with software architecture unified across the O1Stream product family.

## Features

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- **HDMI 2.1 over IP Multicast:** Distributes full-bandwidth HDMI 2.1 signals over standard 1GbE networks with multicast support
- **4K@120Hz 4:4:4 Performance:** Delivers Ultra-HD video with no compression artifacts or chroma loss
- **Ultra-Low Latency:** Less than one frame of latency for real-time, interactive applications
- **Advanced Control Integration:** Supports bi-directional IR, RS-232, Ethernet, and USB 3.1 extension
- **Scalable Network Architecture:** Supports point-to-point, point-to-many, and multicast configurations
- **High-Bit-Rate Audio Support:** Passes uncompressed 7.1ch audio, Dolby TrueHD, DTS-HD MA, and eARC/ARC
- **Balanced Audio I/O:** Professional balanced analog audio input and output via terminal blocks
- **HDCP 2.3 Compliance:** Ensures compatibility with protected content sources



- **VRR & ALLM Support:** Optimized for next-gen gaming and low-latency video playback
- **100m Extension over Cat5e:** Long-distance transmission without proprietary cabling
- **Integrated 1Gb Ethernet Interface:** Supports AV distribution over managed IP networks
- **USB 3.1 Gen 1 & Gen 2 (USB-C):** High-speed peripheral extension between TX and RX
- **EDID Management:** Simplifies system integration and display compatibility
- **HDCP & CEC Bypass:** Improves interoperability with complex AV systems
- **Full-Duplex RS-232 (up to 115,200 bps):** Reliable serial control for professional devices
- **Metal Enclosure with Wall-Mounting:** Durable, installation-ready design
- **Web-Based Configuration & Firmware Updates:** Simplified system setup and maintenance

## Packing List

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- BG-IPGear-XTREME-CORE Transmitter (TX) ×1
- BG-IPGear-XTREME-CORE Receiver (RX) ×1
- 12V / 1A DC Power Adapter (US Plug) ×2
- IR 3.5 mm TX Cable (150 cm) ×1
- IR 3.5 mm RX Cable (150 cm) ×1
- 3-Pin Terminal Block (3.5 mm, 90°) ×2
- Bottom-mount Brackets (Elevated Type) ×4
- M3 × 4 mm Black Screws ×8
- M4 × 20 mm Flat Head Screws ×4
- User Manual ×1



## Specifications

Technical Specifications	
HDMI Compliance	HDMI 2.1
HDCP Compliance	HDCP 2.3
Maximum Video Bandwidth	Up to 48Gbps (FRL 6)
Maximum Resolution	Up to 4K@120Hz 4:4:4
Transmission Distance	Up to 100 m (330 ft) over Cat5e
Network Interface (AV)	Integrated 1GbE (RJ-45)
Network Requirements	Managed 1GbE switch with IGMP Snooping (for multicast)
Distribution Modes	Point-to-Point, Point-to-Many, Multicast
Video Latency	< 1 frame
Video Processing	Proprietary multi-encode / decode
Audio Formats	Uncompressed 7.1ch HDMI, Dolby TrueHD, DTS-HD Master Audio
ARC / eARC Support	Yes
VRR / ALLM Support	Yes
EDID Management	Supported
HDCP / CEC Bypass	Supported
IR Pass-Through	Bi-directional (20 kHz – 60 kHz)
RS-232 Control	Full-duplex, up to 115,200 bps
Connectivity	
USB Support	<ul style="list-style-type: none"> <li>• <b>USB Connector Type:</b> USB-C</li> <li>• <b>USB Standards:</b> USB 3.1 Gen 1 &amp; USB 3.1 Gen 2</li> </ul>
Ethernet Pass-Through	10/100 Mbps (Point-to-Point mode only)
Audio Connectivity	<ul style="list-style-type: none"> <li>• <b>Balanced Audio Level:</b> 3.975 Vrms / 12 dBV (600Ω)</li> <li>• <b>Audio Connector:</b> 5-pin terminal block (Balanced In / Out)</li> </ul>

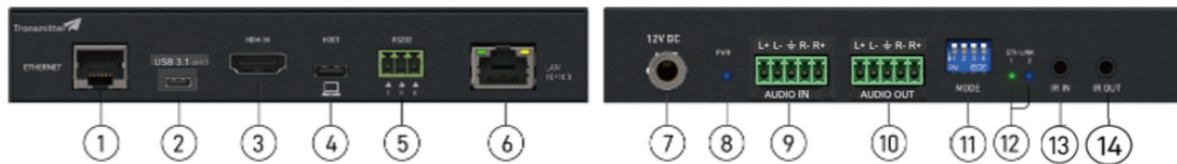


HDMI Connector	Type-A (19-pin female)
USB Connector	USB Type-A, USB Type-C
RS-232 Connector	3-pin terminal block
IR Connector	3.5 mm (IR Blaster / IR Receiver)
<b>Mechanical Specifications</b>	
Housing	Metal enclosure
Mounting	Wall-mountable
Power Supply	12V DC, PoC
Operating Temperature	0°C to 40°C (32°F to 104°F)
Storage Temperature	-20°C to 60°C (-4°F to 140°F)
Operating Humidity	20% to 90% RH (non-condensing)
ESD Protection	±15kV (air), ±8kV (contact)
PCB Construction	4-layer board, impedance controlled



## Operation Controls and Functions

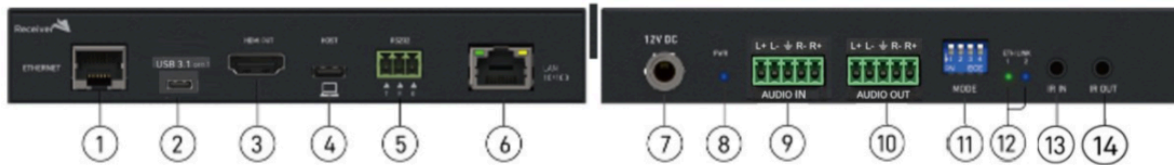
### Transmitter Unit (BG-IPGear-XTREME-CORE-TX)



1. **1G Ethernet (PoC / AV OUT)**  
Connect a Cat5e or higher cable to link the transmitter to the receiver directly or to a managed 1GbE network switch for IP-based AV distribution. Supports Power over Cable (PoC).
2. **USB 3.1 Gen 1 (USB-C)**  
Connect USB peripheral devices for extension to the receiving unit.
3. **HDMI IN**  
Connect an HDMI source device such as a PC, media player, or gaming console.
4. **USB 3.1 Gen 2 (USB-C)**  
Connect to a host PC for high-speed USB extension.
5. **RS-232 Terminal Block**  
3-pin terminal block for serial control. Pin order (left to right): **TX / RX / GND**.
6. **Ethernet Pass-Through (10/100 LAN)**  
Provides Ethernet pass-through for network or internet access at the remote endpoint (supported in point-to-point mode only).
7. **12V DC Power Input**  
Interlocking power jack for connection to the supplied 12V DC power adapter.
8. **Power LED Indicator**  
Illuminates when the transmitter is powered on.
9. **Audio IN (Balanced, 5-Pin Terminal Block)**  
Balanced analog audio input for external audio sources.
10. **Audio OUT (Balanced, 5-Pin Terminal Block)**  
Balanced analog audio output for routing audio to external equipment.
11. **DIP Switch**  
Used for system configuration, including Ethernet pass-through and firmware update mode selection.
12. **LAN Status LED**  
Indicates Ethernet link status and activity.
13. **IR Receiver Port (3.5 mm)**  
Connect the IR receiver to capture infrared control signals from a remote control.
14. **IR Blaster Port (3.5 mm)**  
Connect the IR blaster to transmit infrared control signals to the source device.



## Receiver Unit (BG-IPGear-XTREME-CORE-RX)



### 1. 1G Ethernet (PoC / AV IN)

Connect a Cat5e or higher cable from the transmitter or a managed 1GbE network switch. Supports Power over Cable (PoC).

### 2. USB 3.1 Gen 1 (USB-C)

Connect USB peripheral devices for extension from the transmitting unit.

### 3. HDMI OUT

Connect to an HDMI display such as a monitor, TV, or projector.

### 4. USB 3.1 Gen 2 (USB-C)

Connect to a host PC for high-speed USB extension.

### 5. RS-232 Terminal Block

3-pin terminal block for serial control. Pin order (left to right): **TX / RX / GND**.

### 6. Ethernet Pass-Through (10/100 LAN)

Provides Ethernet pass-through for network or internet access at the receiver (supported in point-to-point mode only).

### 7. 12V DC Power Input

Interlocking power jack for connection to the supplied 12V DC power adapter.

### 8. Power LED Indicator

Illuminates when the receiver is powered on.

### 9. Audio IN (Balanced, 5-Pin Terminal Block)

Balanced analog audio input for external audio sources.

### 10. Audio OUT (Balanced, 5-Pin Terminal Block)

Balanced analog audio output for connection to powered speakers, mixers, or amplifiers.

### 11. DIP Switch

Used for system configuration, including Ethernet pass-through and firmware update mode selection.

### 12. LAN Status LED

Indicates Ethernet link status and activity.

### 13. IR Receiver Port (3.5 mm)

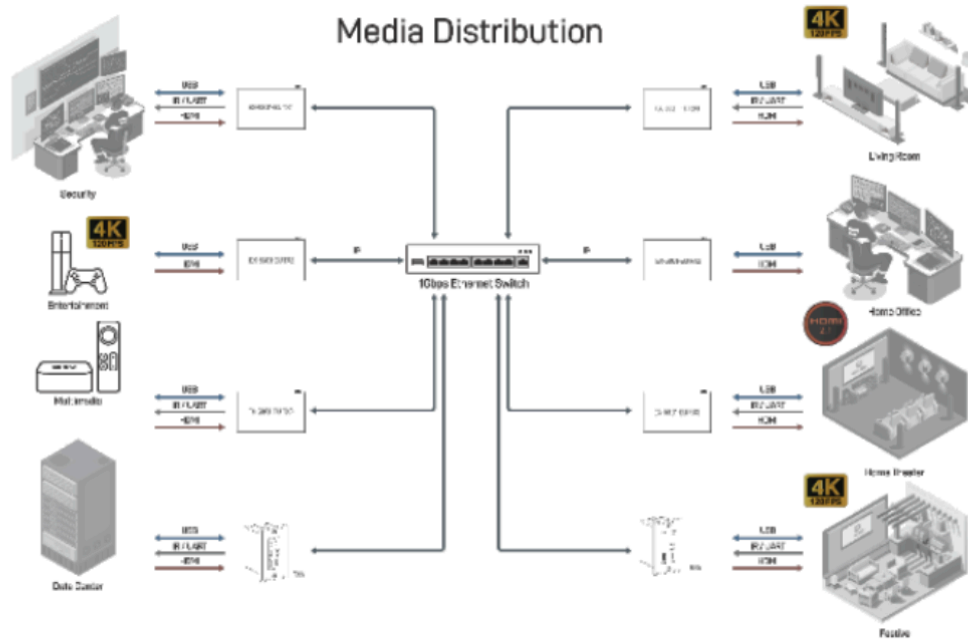
Connect the IR receiver to receive infrared control signals from the display-side location.

### 14. IR Blaster Port (3.5 mm)

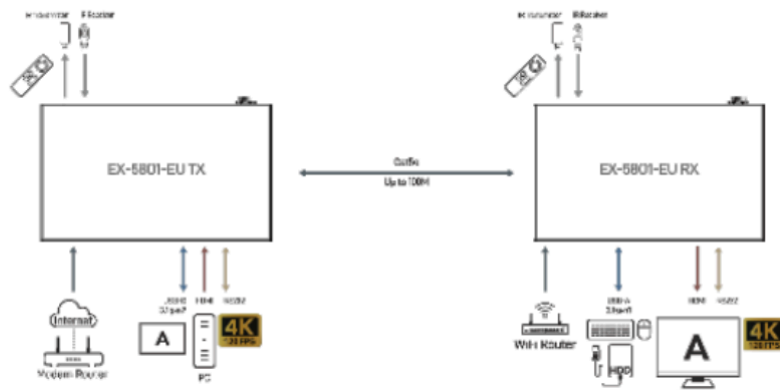
Connect the IR blaster to transmit infrared control signals to the display or controlled device.



# Connection Diagram



### HDMI 2.1 Extender





## IR Pass-Through

The BG-IPGear-XTREME-CORE supports **bi-directional IR pass-through**, allowing infrared control signals to be transmitted between the transmitter (TX) and receiver (RX).



### IR Connections

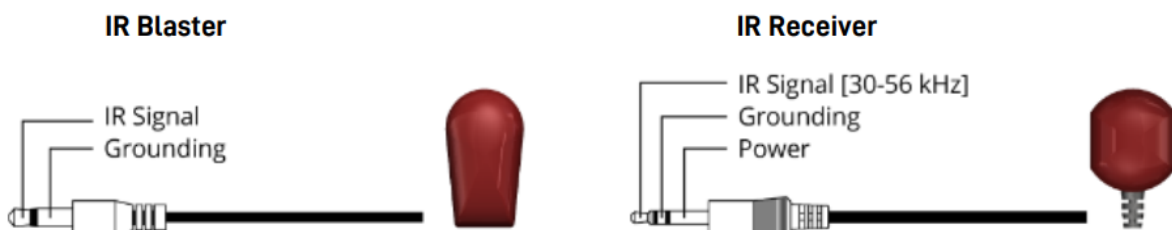
- **IR Receiver (3.5 mm):** Connect the IR receiver to capture IR commands from a remote control.
- **IR Blaster (3.5 mm):** Connect the IR blaster and position it in front of the IR window of the device to be controlled.

IR signals received on one unit are transmitted to the opposite unit and emitted through the connected IR blaster. IR pass-through supports a full frequency range of **20 kHz to 60 kHz**.

### Installation Notes

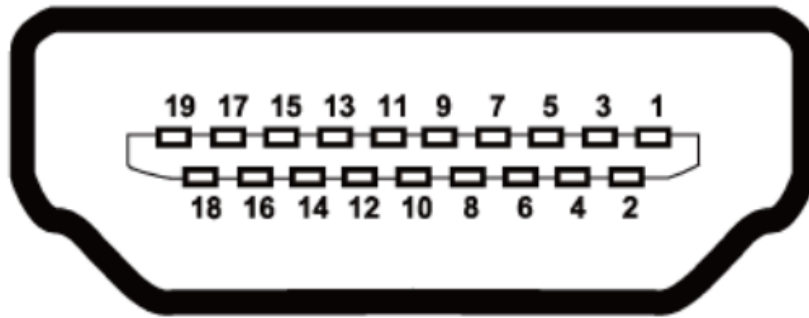
- Ensure the IR receiver has a clear line of sight to the remote control.
- Place the IR blaster directly over or near the IR sensor of the target device.
- IR extension cables longer than **2 m (6 ft)** are not recommended.
- Incorrect placement or connection may result in IR control failure and is not covered under warranty.

### IR Pin Definition





## HDMI Pin Definition



**Type A (Receptacle) HDMI**

Pin 1	TMDS Data2+	Pin 11	TMDS Clock Shield
Pin 2	TMDS Data2 Shield	Pin 12	TMDS Clock-
Pin 3	TMDS Data2-	Pin 13	CEC
Pin 4	TMDS Data1+	Pin 14	Reserved (N.C. on device)
Pin 5	TMDS Data1 Shield	Pin 15	SCL
Pin 6	TMDS Data1-	Pin 16	SDA
Pin 7	TMDS Data0+	Pin 17	DDC/CEC Ground
Pin 8	TMDS Data0 Shield	Pin 18	+5V Power
Pin 9	TMDS Data0-	Pin 19	Hot Plug Detect
Pin 10	TMDS Clock+		



## 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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