



BG-IPGEAR-XTREME-PRO

**4K/8K UHD HDMI 2.1 AV over IP Multicast Transceiver with
Seamless Matrix Switching/Video Wall/Multiview/KVM/USB & PoE
Support over 1 Gigabit Network**

User Manual







TABLE OF CONTENTS

| | |
|----------------------------------|----|
| Statement | 4 |
| Safety Precaution | 4 |
| Introduction | 5 |
| Features | 5 |
| Packing List | 6 |
| Specifications | 7 |
| Operation Controls and Functions | 10 |
| Connection Diagram | 12 |
| Tested Equipment List | 14 |
| IR Pass-Through | 15 |
| HDMI Pin Definition | 16 |
| Web Control | 17 |
| Troubleshooting | 18 |
| Tech Support | 19 |
| Limited Product Warranty Terms | 19 |
| Mission Statement | 20 |
| Copyright | 20 |



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.



Introduction

The BG-IPGear-XTREME-PRO is a high-performance HDMI 2.1 AV over IP multicast transceiver system designed for extending Ultra-HD video, audio, and control signals across standard IP networks. Supporting HDMI 2.1 and HDCP 2.3, the BG-IPGear-XTREME-PRO delivers resolutions up to 4K@144Hz 4:4:4 and 8K@60Hz 4:2:2 (DSC) with ultra-low latency (less than one frame). Using Cat.5e/6/6a/7 cabling, the system supports transmission distances of up to 170m (560ft) while maintaining uncompressed video and high-bit-rate audio quality.

Configured as a bi-directional transceiver, the BG-IPGear-XTREME-PRO can operate as either a transmitter or receiver and supports Point-to-Point, Point-to-Many, and Multicast video distribution when deployed with a managed 1GbE network switch supporting IGMP snooping. In addition to video transport, the system supports USB 3.1, KVM (mouse roaming), bi-directional IR, RS-232 control, ARC/eARC, and analog/digital audio extension and extraction, enabling full system control and peripheral access at remote endpoints.

The BG-IPGear-XTREME-PRO is designed for professional AV and high-resolution distribution environments such as digital signage, control rooms, healthcare facilities, corporate AV, broadcast applications, and advanced gaming or visualization systems. Device configuration, system management, and firmware updates are supported through dedicated control software. Certain advanced features may be dependent on firmware version; refer to the latest firmware documentation or contact technical support for current feature availability.

Features

- **HDMI 2.1 & HDCP 2.3 Support:** Ensures compatibility with the latest HDMI sources and protected content.
- **Ultra-High Resolution Video:** Supports up to 4K@144Hz 4:4:4 and 8K@60Hz 4:2:2 (DSC) video transmission.
- **HDMI 2.1 Over IP Extension:** Extends HDMI video, audio, and control signals up to 170m (560ft) over Cat.5e/6/6a/7 cabling.
- **Low-Latency Transmission:** Delivers end-to-end latency of less than one frame.
- **Transceiver Operation:** Configurable as either a transmitter or receiver for flexible system deployment.
- **Multicast Video Distribution:** Supports Point-to-Point, Point-to-Many, and Multicast streaming over IP networks.
- **IGMP-Compatible Networking:** Operates with managed 1GbE switches supporting IGMP snooping.
- **USB 3.1 & KVM Support:** Enables remote USB device access and mouse roaming for KVM applications.



- **USB-C DisplayPort Alt Mode:** Supports video input from USB-C sources using DP 1.4 Alt Mode.
- **Simultaneous HDMI & DP Input:** Allows HDMI and DisplayPort inputs to be connected concurrently.
- **VRR & ALLM Support:** Supports Variable Refresh Rate and Auto Low Latency Mode for gaming and real-time content.
- **Audio Extension & Extraction:** Supports HDMI audio pass-through, extraction, and independent analog/digital audio paths.
- **Advanced Audio Format Support:** Supports uncompressed 7.1ch audio including Dolby TrueHD and DTS-HD Master Audio.
- **ARC & eARC Support:** Enables audio return channel functionality from compatible displays.
- **Bi-Directional IR Pass-Through:** Supports full-frequency IR control from 20kHz to 60kHz in both directions.
- **RS-232 Control:** Supports full-duplex RS-232 communication up to 115,200 bps.
- **EDID Management:** Provides EDID handling to ensure stable source-to-display compatibility.
- **CEC & HDCP Bypass:** Supports HDMI CEC control and HDCP pass-through where applicable.
- **Video Wall Support:** Enables multi-display video wall configurations with rotation and image flipping.
- **Multi-Window Display Modes:** Supports PiP, PbP, and PoP display configurations.
- **Custom Scaling:** Allows output resolution scaling to match connected displays.
- **Seamless Switching:** Supports smooth signal switching without visible interruptions.
- **Auto Equalization:** Automatically optimizes signal integrity over long cable runs.
- **Software Configuration & Control:** Supports device setup, firmware updates, and signal control via management software.
- **Integrated 1GbE Network Port:** Provides a dedicated Ethernet interface for IP video transport.

Packing List

- 1 × BG-IPGear-XTREME-PRO HDMI 2.1 over IP Multicast Transceiver
- 1 × IR Blaster
- 1 × IR Receiver
- 1 × 12V DC Power Adapter
- 1 × User Manual



Specifications

| Technical Specifications | |
|----------------------------|--|
| Role of Usage | HDMI 2.1 over IP Transceiver |
| HDMI Compliance | HDMI 2.1 |
| HDCP Compliance | HDCP 2.3 |
| Video Bandwidth | Up to FRL 6 (48Gbps) |
| Video Resolution | 8K@30 4:4:4, 8K@60Hz 4:2:0 Uncompressed, 8K@60Hz 4:2:2 DSC 4K@144Hz 4:4:4, 4K@120Hz 4:4:4 |
| HDMI over UTP Distance | Up to 170m (560ft) over Cat.5e/6/6a/7 at 4K@144Hz 4:4:4 / 8K@60Hz 4:2:2 (DSC) |
| Latency | Less than 1 frame |
| Encoding / Decoding | Multi-encode and decode (proprietary codecs) |
| EDID Management | Supported |
| CEC / HDCP Bypass | Supported |
| Equalization | Auto |
| Full Duplex Mode | Supported at 4K@120Hz 4:4:4 |
| Video & Audio | |
| Color Formats | RGB, YCbCr 4:4:4 / 4:2:2 |
| Audio Formats | Uncompressed digital audio up to 7.1ch |
| High Bit Rate Audio | Dolby TrueHD, DTS-HD Master Audio |
| Audio Extension | HDMI audio pass-through and extraction |
| Analog Audio | Bi-directional analog audio pass-through |
| ARC / eARC | Supported |
| Control & Signal Extension | |
| IR Pass-Through | Bi-directional (20kHz–60kHz) |
| RS-232 | Full duplex, up to 115,200 bps |
| USB Support | USB 3.1 Gen1 host mode and USB 3.1 Gen2 UVC device mode |



| | |
|------------------------------------|---|
| KVM Function | Mouse roaming supported |
| Seamless Switching | Supported |
| Networking | |
| Network Interface | Integrated 1GbE Ethernet port |
| Switching Support | Managed switch with IGMP Snooping |
| Broadcast Modes | Point-to-Point, Point-to-Many, Multicast |
| VLAN Support | 802.1Q VLAN |
| Display Functions | |
| Video Wall | Supported |
| Image Rotation / Flip | Supported |
| Multi-Window Modes | PiP, PbP, PoP |
| Scaling | Custom output scaling |
| Connectors | |
| HDMI Ports | 2 × HDMI Type-A (19-pin female) |
| USB Ports | USB Type-A, Type-B, USB-C |
| USB-C Video | DisplayPort 1.4 Alt Mode |
| Audio Ports | 3.5mm (IR receiver, IR blaster, stereo audio) |
| Optical Audio | 2 × TOSLINK |
| Network Port | 1 × RJ-45 (8P8C) |
| Control Port | 1 × RS-232 |
| Electrical & Mechanical | |
| Housing | Metal enclosure |
| Mounting | Wall-mountable (mounting hardware included) |
| Power Supply | 12V DC |
| Power Consumption | Refer to product label |
| Operating Temperature | 0°C to 40°C (32°F to 104°F) |
| Storage Temperature | -20°C to 60°C (-4°F to 140°F) |

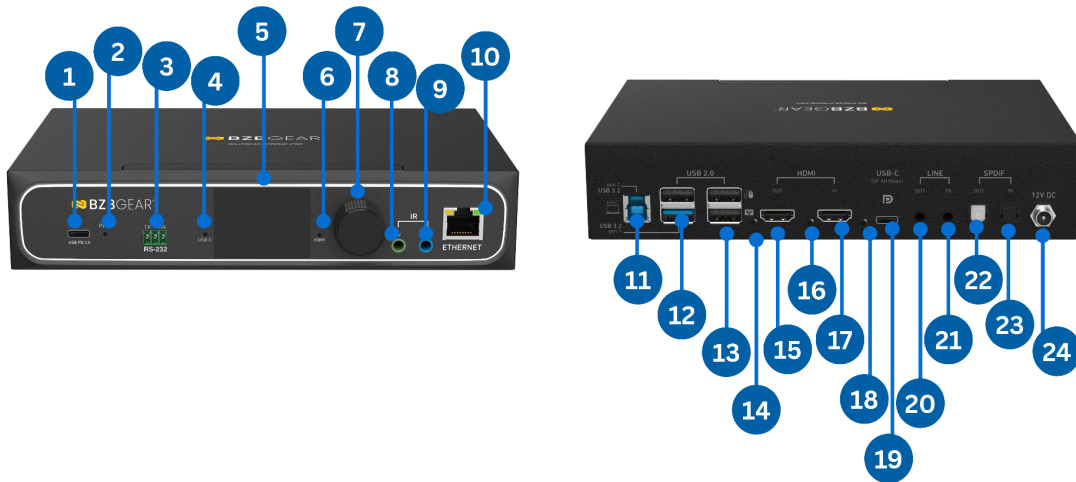


| | |
|------------------------|--|
| Relative Humidity | 20%–90% RH (non-condensing) |
| Dimensions (W × D × H) | 220 × 105 × 44 mm (8.7 × 4.1 × 1.7 in) |
| Weight | 680 g (24 oz) |



Operation Controls and Functions

Front and Rear Panel



Front Panel

1. **USB-C Power Port:** USB Type-C power input port. Use the 12V DC input as the primary power source.
2. **Power LED Indicator:** Illuminates to indicate the unit is powered on.
3. **RS-232 Port:** 3-pin Phoenix serial interface for RS-232 control.
4. **USB-C Source LED Indicator:** Indicates the active USB-C video input status.
5. **LCD Display:** 2.0-inch LCD screen for system status and on-screen display (OSD) menu navigation.
6. **HDMI Source LED Indicator:** Indicates the active HDMI input status.
7. **Control Knob:** Used to navigate and adjust OSD menu settings displayed on the LCD screen.
8. **IR Receiver Port:** 3.5mm IR input jack for connecting an external IR receiver cable.
9. **IR Blaster Port:** 3.5mm IR output jack for connecting an external IR blaster cable.
10. **1G Ethernet IN/OUT:** RJ-45 port for Cat.5e/6/6a/7 cable connection to another unit or managed Ethernet switch. *Note: Power over Ethernet (PoE) is not supported; use the 12V DC power supply.*

Rear Panel

11. **USB 3.1 Gen 2 (Type-B) Port:** USB upstream port for connecting to a host PC.
12. **USB Hub Ports:** USB device connection ports.
 - **Top Port:** USB 2.0
 - **Bottom Port:** USB 3.1 Gen 1
13. **USB 2.0 Port:** Dedicated USB 2.0 port for keyboard, mouse, or other USB devices.
14. **HDMI Output LED Indicator:** Indicates active HDMI output signal status.



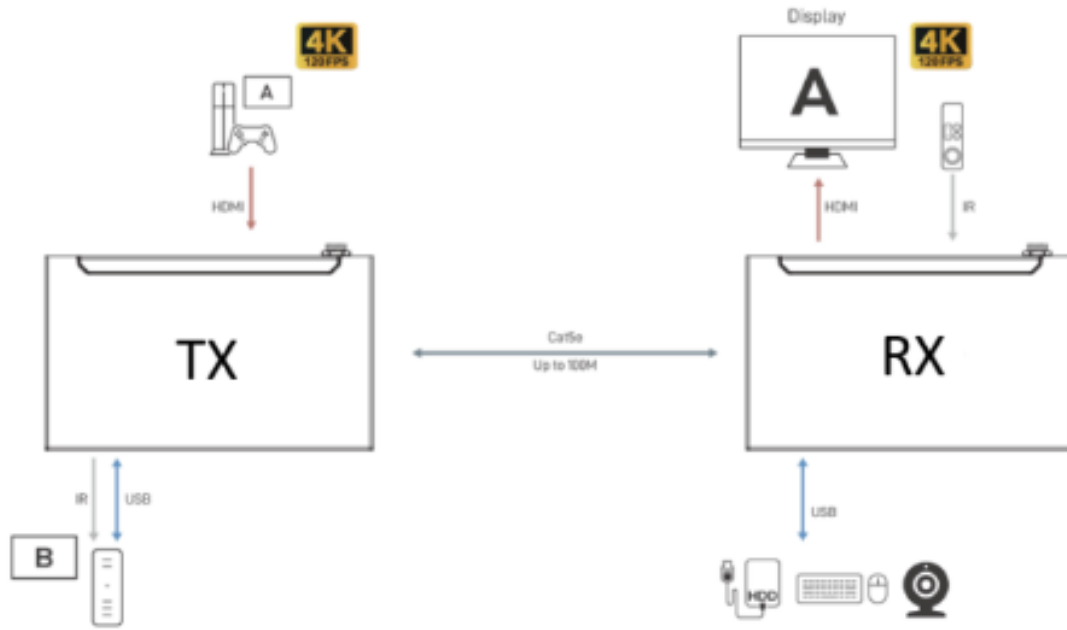
15. **HDMI Input LED Indicator:** Indicates active HDMI input signal status.
16. **USB-C Input LED Indicator:** Indicates active USB-C video input signal status.
17. **HDMI OUT:** HDMI output port for connecting to a display device.
18. **HDMI IN:** HDMI input port for connecting an HDMI source device.
19. **USB-C (DP Alt Mode) IN:** USB-C video input supporting DisplayPort Alt Mode.
20. **Stereo Audio OUT:** 3.5mm analog stereo audio output. *Audio follows HDMI output.*
21. **Stereo Audio IN:** 3.5mm analog stereo audio input.
22. **TOSLINK OUT:** Optical S/PDIF digital audio output. *Audio follows HDMI output.*
23. **TOSLINK IN:** Optical S/PDIF digital audio input.
24. **12V DC Power Input:** Connect the included 12V DC power supply.

Operational Notes:

- When configured as a **Transmitter**, the HDMI OUT port is currently non-functional.
- When configured as a **Receiver**, the HDMI IN port is disabled by design.



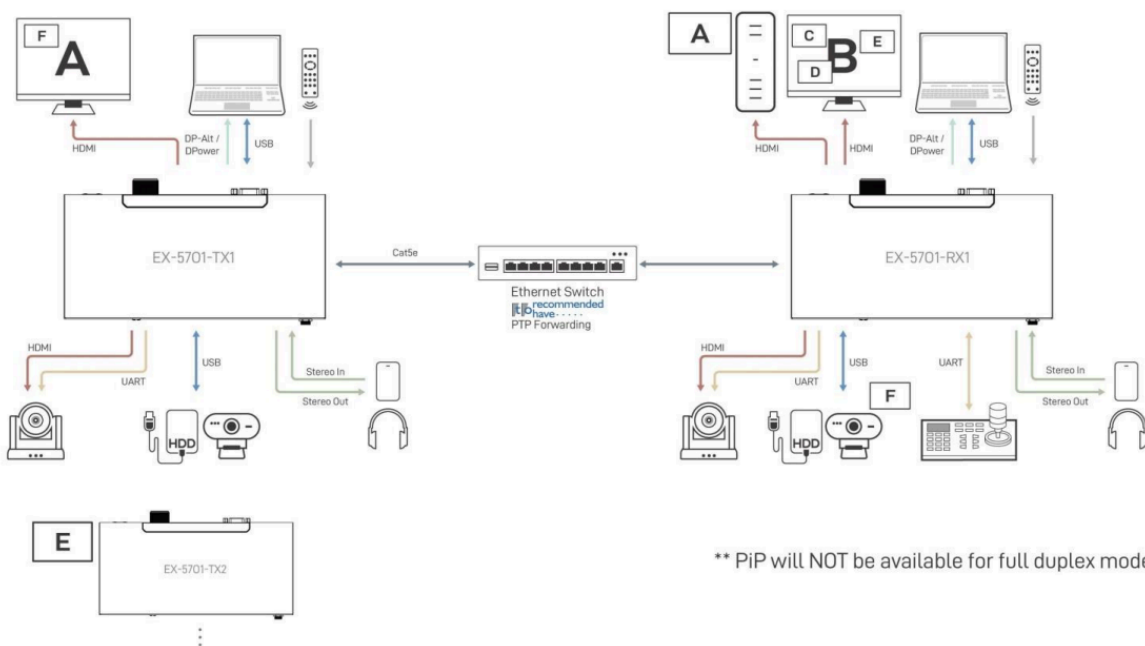
Connection Diagram



The system can be connected in **Point-to-Point** mode or through a **managed Ethernet switch**. When using an Ethernet switch, ensure the following requirements are met:

7. **Jumbo Frames:** The switch must support jumbo frames of **at least 8000 bytes**.
8. **IGMP Snooping:** IGMP snooping must be enabled on the switch.
9. **Power Requirements:** Power over Ethernet (PoE) is not supported. Use the supplied **12V DC power adapter** to power each device.

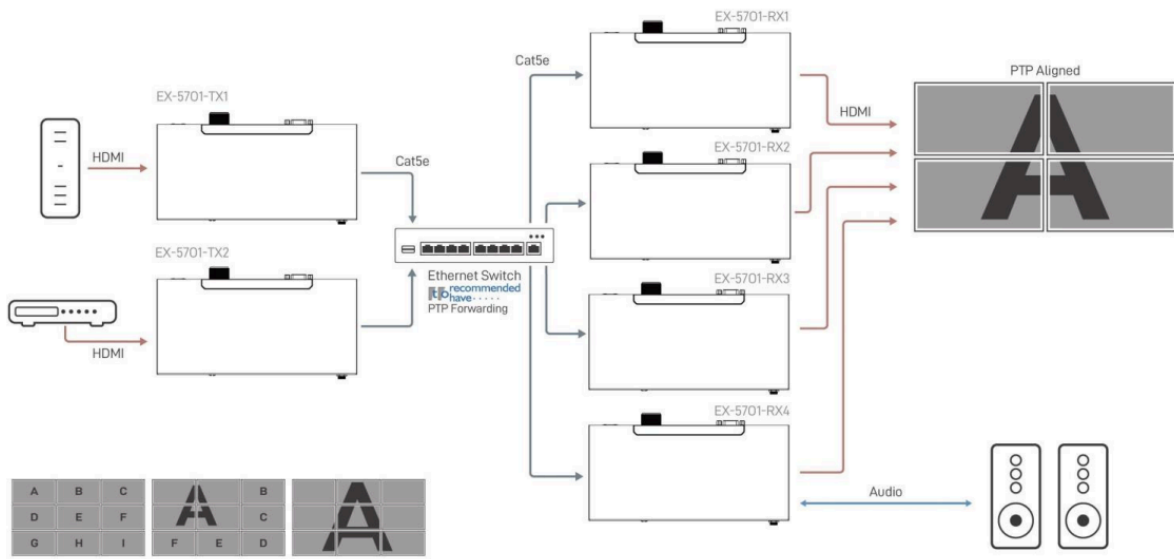
Commercial Conference Extender/Transceiver



** PiP will NOT be available for full duplex mode.



Commercial TV Wall





Tested Equipment List

The following source, display, and peripheral devices were used during internal validation testing of the **BG-IPGear-XTREME-PRO**. Compatibility and performance behavior are based on these test results and may vary depending on firmware version, signal format, and system configuration.

| Category | Brand / Model | Interface | Tested Configuration / Notes |
|------------|-----------------------------------|---------------------|--------------------------------|
| Source | Sony PlayStation 5 | HDMI | 4K@120Hz, YCbCr 4:2:2 verified |
| Source | NVIDIA RTX 3060 GPU | HDMI | 4K@144Hz, RGB verified |
| Source | ASUS B1408C (Notebook) | USB-C (DP Alt Mode) | 4K@30Hz verified |
| Source | MSI Katana A17 AI B8VX (Notebook) | USB-C (DP Alt Mode) | 4K@60Hz verified |
| Display | ASUS VG28UQL1A | HDMI | 4K@144Hz, RGB verified |
| Display | ASUS XG32UQ | HDMI | 4K@144Hz, RGB verified |
| USB Device | Logitech C310 Webcam | USB 2.0 | MJPEG mode verified |
| USB Device | Spedal AF926H Webcam | USB 2.0 | MJPEG mode verified |
| USB Device | Kingston DataTraveler Exodia | USB 3.0 | Mass storage verified |

Note:

This list reflects devices tested internally and does not guarantee compatibility with all third-party equipment. The list is also not limited to the equipment listed. Device behavior may vary based on resolution, color format, EDID settings, and firmware version.



IR Pass-Through

The BG-IPGear-XTREME-PRO supports **bi-directional IR pass-through**, allowing remote control of source or display devices from either end of the system using standard IR extenders.



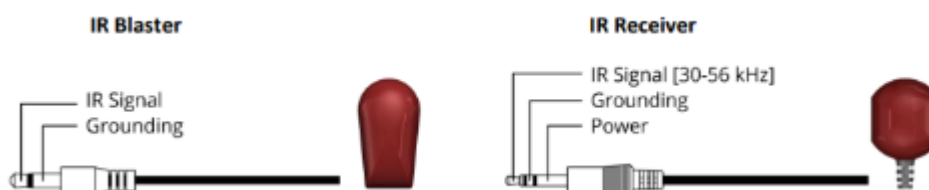
IR Extenders

- **IR Blaster:** Transmits IR control signals received from the IR receiver on the opposite unit to control the connected device.
- **IR Receiver:** Receives IR commands from a device's remote control and forwards them to the connected system.



Incorrect placement of IR Blaster and Receiver may result in the failure of the IR extenders. Please check carefully before plugging in the IR extender to the respective IR sockets. Warranty will not cover the damage.

IR Socket Definitions



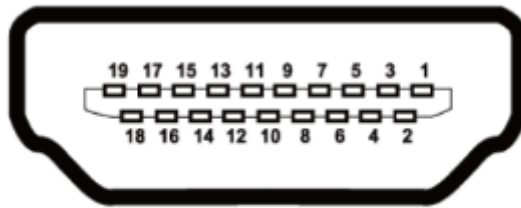
- **IR BLASTER Port:** 3.5mm jack for connecting the IR blaster cable to emit IR control signals.
- **IR RECEIVER Port:** 3.5mm jack for connecting the IR receiver cable to capture IR control signals.

IR Cable Compatibility

Standard third-party IR extension cables that conform to the 3.5mm IR pinout may be used as replacements if necessary. For reliable operation, **IR cable lengths should not exceed 2 meters (6 feet)**.



HDMI Pin Definition



Type A (Receptacle) HDMI

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



Web Control

Ensure that the control PC and the **BG-IPGear-XTREME-PRO** are connected to the **same network subnet**. Configure the IP address of the control PC accordingly. If the Web Control interface cannot be accessed, verify the network settings and physical connections.

Accessing the Web Control Interface

1. Power on the **BG-IPGear-XTREME-PRO**.
 2. After startup, the device's IP address will be displayed on the front panel LCD.
 3. Open a web browser on the control PC and enter the displayed IP address into the address bar (for example: <http://169.254.119.38>).
 4. Press **Enter** to access the Web Control interface.
 5. The Web Control user interface will appear.
-

Web Control Parameters

- **Device ID:** Assigns a unique device identification number. Valid range: **0–255**.
 - **MAC Mode:** Mac Address rewriting
-

Note:

If a connected USB device is not recognized correctly, select **“Reboot”** on the Web Control page, then disconnect and reconnect the USB device to the host PC.



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

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.

Copyright

All the contents in this manual and its copyright are owned by BZBGear. No one is allowed to imitate, copy, or translate this manual without BZBGear's permission. This manual contains no guarantee, standpoint expression or other implies in any form. Product specification and information in this manual is for reference only and subject to change without notice.

All rights reserved. No reproducing is allowed without acknowledgement.