BZBGEAR®

Amplify Your World™

BG-8K-HS21AR

8K UHD 2×1 HDMI Switcher – HDMI 2.1, 48Gbps, 8K60/4K120, HDR, Audio De-Embedding, EDID Management, Signal Generator

User Manual

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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-8K-HS21AR is a high-performance 2×1 HDMI switcher designed to seamlessly switch between two 8K HDMI sources and deliver crystal-clear video to a single 8K display. Supporting resolutions up to 8K@60Hz 4:2:0 12-bit, 8K@30Hz 4:4:4 12-bit, and 4K@120Hz 4:4:4 12-bit, this device ensures stunning visual quality in compliance with the HDMI 2.1 and HDCP 2.3 standards. Full compatibility with HDR10, HDR10+, Dolby Vision, and ALLM/VRR pass-through guarantees exceptional color performance and dynamic range for a premium viewing experience.

Beyond video switching, the BG-8K-HS21AR features digital and analog audio de-embedding, offering analog audio output with gain control. A built-in HDMI signal generator simplifies troubleshooting and diagnostics, while advanced EDID management and integrated signal equalization ensure stable and reliable signal transmission. Users can operate the device through front panel buttons, an IR remote, or RS-232 API commands, with auto or manual switching modes for added flexibility.

Features

- **8K & 4K120 Support:** Up to 8K@60Hz YCbCr 4:2:0 12-bit, 8K@30Hz RGB/YCbCr 4:4:4 12-bit, and 4K@120Hz RGB/YCbCr 4:4:4 12-bit
- **HDMI Audio Formats:** LPCM, Dolby Digital/Plus/EX, Dolby TrueHD, Dolby Atmos, DTS, DTS-EX, DTS 96/24, DTS High-Resolution Audio, DTS-HD Master Audio, and DSD.
- **Flexible Switching Modes:** Supports both automatic and manual input switching.
- **Multiple Control Options:** Control via front panel buttons, IR remote, and RS-232 API commands.
- **Versatile Audio De-Embedding:** Extracts both digital and analog audio with analog output featuring adjustable gain control.
- **HDR Pass-Through:** Compatible with HDR, HDR10, HDR10+, Dolby Vision, ALLM (Auto Low Latency Mode), and VRR (Variable Refresh Rate)
- **HDCP 2.3 Compliant:** Ensures secure transmission of protected content.
- **Enhanced Signal Integrity:** Equipped with built-in equalization, retiming, and signal driving capabilities.
- **Advanced EDID Management:** Offers flexible EDID handling for optimal device compatibility.
- **Compact and Install-Friendly Design:** Designed for easy integration into a variety of professional AV environments.

Packing List

- 1x BG-8K-HS21AR Switcher
- 1x IR Remote
- 1x 5pin-3.5mm Phoenix Connector (male)
- 1x 3pin-3.5mm Phoenix Connector (male)
- 1x IR Wideband Receiver Cable (1.5m)
- 2x Mounting Ear
- 4x Machine Screw (KM3*4)
- 1x 12V/1A Multinational Locking Power Supply
- 1x User Manual

Specifications

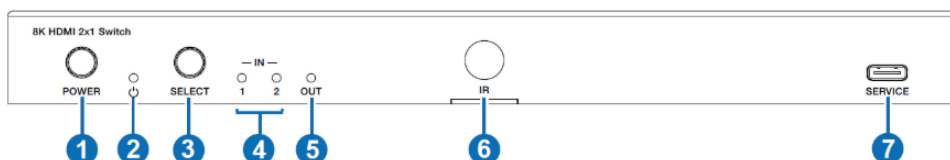| Technical Specifications	
HDMI Compliance	HDMI 2.1
HDCP Compliance	HDCP 2.3
Video Bandwidth	48 Gbps
Audio Latency	No latency
Video Latency	No latency
Video Resolution	Up to 8K@60 YCbCr 4:2:0 12-bit, 8K@30 RGB/YCbCr 4:4:4 12-bit, or 4K@120 RGB/YCbCr 4:4:4 12-bit
Color Depth	8-bit / 10-bit / 12-bit
Color Space	RGB, YCbCr 4:4:4, YCbCr 4:2:2, YCbCr 4:2:0
HDR	HDR, HDR10, HDR10+, Dolby Vision, HLG
IR Level	12 Vp-p
IR Frequency	Wideband 20 kHz – 60 kHz
Audio Formats	HDMI Input/Output: LPCM, Dolby Digital/Plus/EX, Dolby TrueHD, Dolby Atmos, DTS, DTS-ES, DTS-96/24, DTS High Res, DTS-HD Master Audio, DSD Audio De-embedding Output: Optical: Up to LPCM/Dolby/DTS 5.1CH Analog: LPCM 2CH only
ESD Protection	IEC 61000-4-2: ±8 kV (air-gap discharge), ±4 kV (contact discharge)
Input Ports	2x HDMI IN [Type A, 19-pin female]
Output Ports	1x HDMI OUT [Type A, 19-pin female] 1x Optical Audio OUT [S/PDIF, female] 1x L/R Audio OUT [5-pin 3.5mm Phoenix connector]
Control Interfaces	1x RS-232 [3-pin 3.5mm Phoenix connector] 1x IR CTL [3.5mm stereo mini-jack] 1x SERVICE [USB Type-C, update port]
Mechanical Specifications	
Housing	Metal enclosure
Silkscreen Color	Black
Dimensions (W×D×H)	8.7in × 4.3in × 0.85in / 220 mm × 110 mm × 21.5 mm

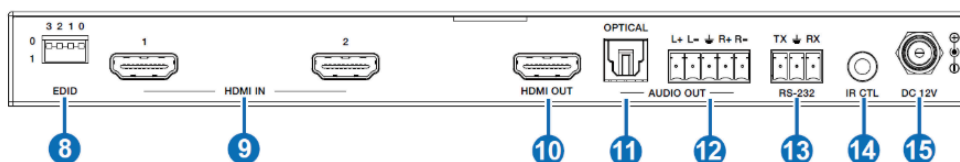|	
Weight	1.3 lbs [595 g]
Power Supply	Input: AC 100–240V, 50/60 Hz Output: DC 12V/1A (US/EU standards, CE/FCC/UL certified)
Power Consumption	5.04 W (Max)
Operating Temperature	14°F to 113°F / -10°C to 45°C
Storage Temperature	-4°F to 140°F / -20°C to 60°C
Relative Humidity	20% to 90% RH (non-condensing)
Recommended HDMI Cable	Video Resolution 8K – 2 m / 6.6 ft (Ultra HDMI 2.1) 4K60 – 8 m / 26 ft 4K24 – 12 m / 39 ft 1080P – 15 m / 49 ft
The use of a "Premium High-Speed HDMI" cable is highly recommended.	

Operation Controls and Functions

Front and Rear Panel

Front Panel

Rear Panel

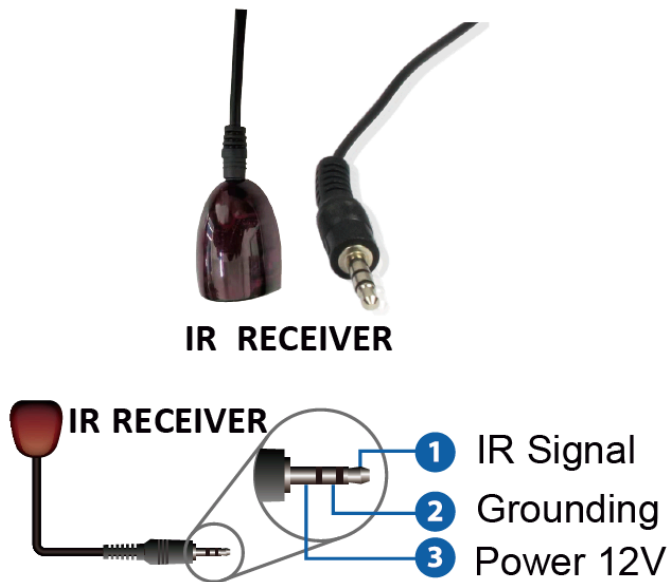| No.	Name	Function Description
1	POWER button	Press to power the device on or off.
2	POWER LED	Lights green when the device is operating; red when in standby.
3	SELECT button	Signal source selection button. Press to switch between the two HDMI input signals to the HDMI OUT port.
4	IN LED (1~2)	Lights green when HDMI IN 1 or 2 is selected as the signal source.
5	OUT LED	Lights green when a display is connected and receiving a signal from the HDMI OUT port.
6	IR Window	Receives IR remote control signals.
7	SERVICE	USB-C port for firmware updates, software debugging, and API command control.

8	EDID DIP switch	4-pin DIP switch for EDID configuration: 0000 - EDID pass-through (Copy from Sink 1) (Factory Default) 0001 - 1080p@60Hz, Audio 2CH PCM 0010 - 1080p@60Hz, Audio 5.1CH DTS/Dolby 0011 - 4K@60Hz 4:4:4 8-bit, Audio 2CH PCM 0100 - 4K@60Hz 4:4:4 8-bit, Audio 5.1CH DTS/Dolby 0101 - 4K@120Hz 4:4:4 10-bit HDR/DV, Audio 2CH PCM 0110 - 4K@120Hz 4:4:4 10-bit HDR/DV, Audio 5.1CH DTS/Dolby 0111 - 4K@120Hz 4:4:4 12-bit HDR/DV, Audio 2CH PCM 1000 - 4K@120Hz 4:4:4 12-bit HDR/DV, Audio 5.1CH DTS/Dolby 1001 - 8K@60Hz 4:2:0 10-bit HDR/DV, Audio 2CH PCM 1010 - 8K@60Hz 4:2:0 10-bit HDR/DV, Audio 5.1CH DTS/Dolby 1011 - 8K@60Hz 4:2:0 12-bit HDR/DV, Audio 2CH PCM 1100 - 8K@60Hz 4:2:0 12-bit HDR/DV, Audio 5.1CH DTS/Dolby 1101 - 8K@60Hz 4:2:0 12-bit HDR/DV, Audio 2CH PCM (Incl. VRR/DSC) 1110 - 8K@60Hz 4:2:0 12-bit HDR/DV, Audio 5.1CH DTS/Dolby (Incl. VRR/DSC) 1111 - EDID via software if available, or 1080p@60Hz, Audio 2CH PCM
9	HDMI IN port (1~2)	HDMI input ports. Connect to source devices such as DVD players or game consoles using HDMI cables.
10	HDMI OUT port	HDMI output port. Connect to a display device such as a TV or monitor using an HDMI cable.
11	OPTICAL (AUDIO OUT)	Optical audio output port.
12	L+/L-/R+/R- (AUDIO OUT)	Analog audio output port. Supports: – Balanced output (max 2Vrms): L+, L-, R+, R- – Unbalanced output (max 1Vrms): L+, R+
13	RS-232	RS-232 serial port for API command control.
14	IR CTL	12V IR signal receiving port.
15	DC 12V	12V/1A power input port.

IR Cable Pin Assignment
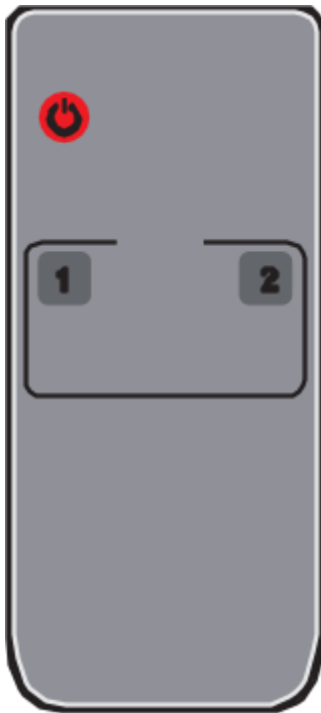
The IR receiver cable pin assignment is as follows:

IR RECEIVER

IR RECEIVER
1. IR Signal
2. Grounding
3. Power 12V

Note:

- When the angle between the IR receiver and the remote control is within ±45°, the effective transmission distance is 0–5 meters.

- When the angle is within ±90°, the transmission distance extends up to 8 meters.

IR Remote

Power

 Turn the device on or set it to standby mode.

INPUT

 1 / 2: Press the "1" or "2" button to select the corresponding HDMI input (HDMI IN 1 or HDMI IN 2) and route it to the HDMI OUT port.

 ◄/►: Press this button to cycle between HDMI IN 1 and HDMI IN 2 and output the selected source to the HDMI OUT port.

ASCII Communication Protocol Overview

- **Service Port:** USB-C virtual RS-232 (Internal debug)
- **Baud Rate (Service Port):** 115200 (Fixed)
- **Data Bit:** 8
- **Stop Bit:** 1
- **Parity Bit:** None
- **Command End Mark:** <CR><LF>

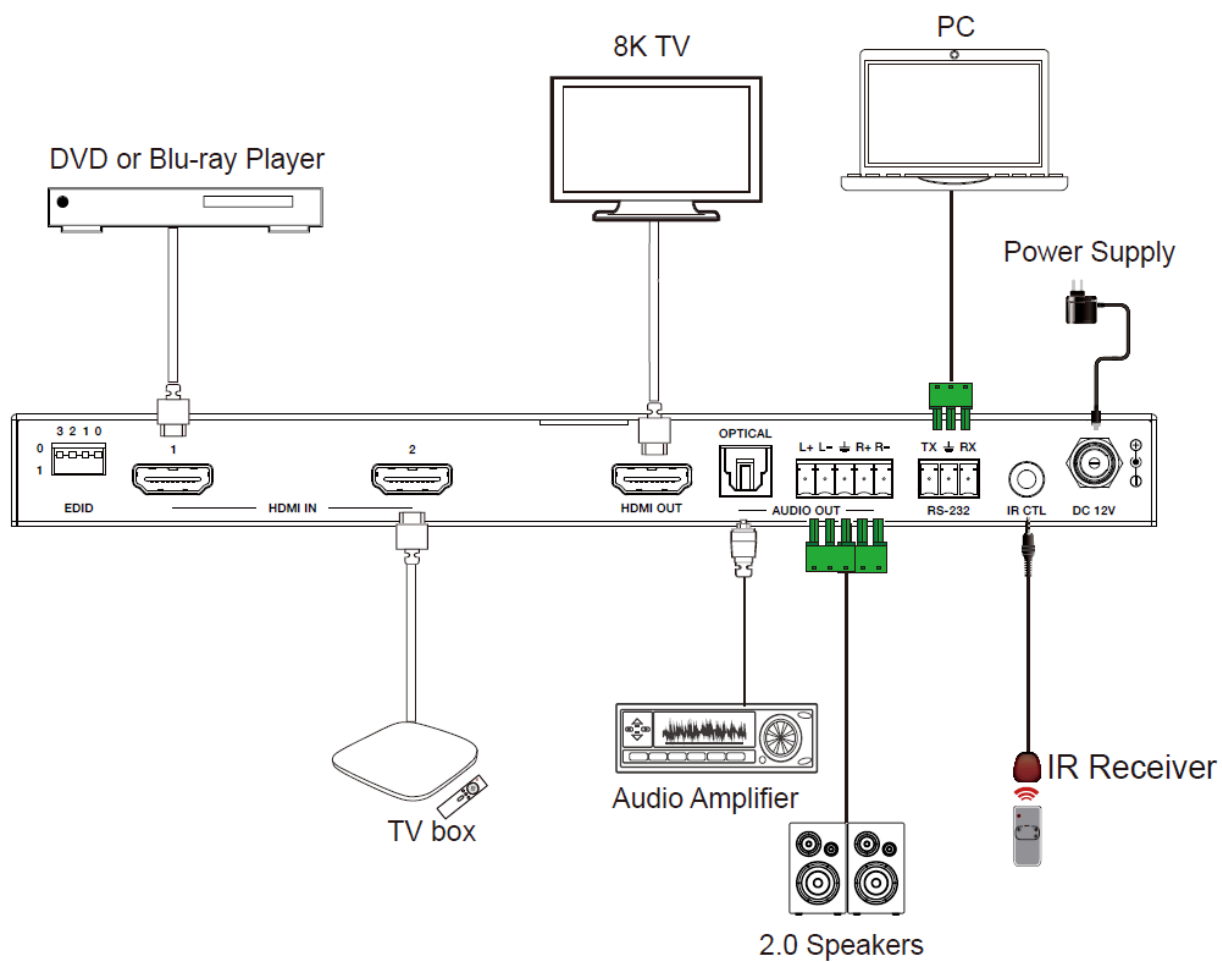| Command Code	Function Description	Example	Feedback	Factory Default
?	Get the list of all commands	?	list all commands	
help	Get the list of all commands	help!	list all commands	
get fw version	Get firmware version	get fw version	mcu boot:vx.xx.xx mcu app:vx.xx.xx	
set power on/off	Set device power on/off	set power on / set power off	power on / power off	
get power	Get device power status	get power	power on / power off	
set reboot	Reboot the device	set reboot	reboot…	
set reset	Reset to factory defaults	set reset	reset to factory defaults	
get status	Get system status	get status	See detailed note (feedback spans multiple lines)	
set IR on/off	Set IR on/off	set IR on / set IR off	IR on / IR off	on
get IR	Get IR on/off status	get IR	IR on / IR off	
set key on/off	Set front panel key on/off	set key on / set key off	key on / key off	on

get key	Get front panel key status	get key	key on / key off	
set baud x	Set RS-232 baud rate (x=1~6)	set baud 6	baud rate 115200	115200
get baud	Get RS-232 baud rate	get baud	baud rate 115200	
set input x	Set input video source (x=0~2)	set input 1	input HDMI 1	1
get input	Get input port	get input	input HDMI 1	
get hdmi5v	Get HDMI 5V detection	get hdmi5v	HDMI 1: 5V / HDMI 2: none	
set autoswitch x	Set auto-switching (x=on/off)	set autoswitch on	autoswitch on / autoswitch off	on
get autoswitch	Get auto-switching status	get autoswitch	autoswitch on / autoswitch off	
set output display y	Set output display mode (y=0~3)	set output display 2	output display input video / AVMUTE / internal pattern	1
get output display	Get output display mode	get output display	off / input video / AVMUTE / internal pattern	
set output HDCP y	Set HDCP mode (y=0~4)	set output HDCP 1	follow sink / source / force HDCP 1.4 / 2.2	1
get output HDCP	Get HDCP mode	get output HDCP	follow sink / source / force HDCP 1.4 / 2.2	
set analog mute x	Set analog audio mute (x=on/off)	set analog mute on	analog mute on / off	off
get analog mute	Get analog audio mute status	get analog mute	analog mute on / off	

set analog gain x	Set analog audio gain (x=0dB ~ -79dB)	set analog gain -79dB	analog gain -79dB	0dB
get analog gain	Get analog audio gain value	get analog gain	analog gain -79dB	
set generator x y	Set signal generator resolution and pattern	set generator 1 1	generator 8K30Hz color bar	
get generator	Get signal generator resolution and pattern	get generator	generator 8K30Hz color bar	
set edid x to y	Set EDID for input ports (x=02, y=032)	set edid 0 to 0	EDID: HDMI 1080p@60Hz, Audio 2CH PCM	HDMI 1080p@60Hz, Audio 2CH PCM
get edid x	Get EDID of input ports (x=0~2)	get edid 0	HDMI input 1/2: HDMI 1080p@60Hz, Audio 2CH PCM	
get edid data x	Get raw EDID data (x=0~2)	get edid data 0	<00 FF FF FF….>	
set user edid x	Set custom EDID (x=1~2, y=256 bytes)	set user edid 1 <00 FF...>	user defined 1 EDID is loaded successfully	
get user edid x	Get user defined EDID (x=1~2)	get user edid 1	user defined 1 EDID <00 FF...>	

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

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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