BZBGEAR®

Amplify Your World™

BG-8K-HS41AR

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

User Manual

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-HS41AR is an ultra-thin 4×1 switcher designed for high-performance AV applications. It features three HDMI 2.1 inputs, one USB-C input, and one HDMI output, supporting resolutions up to 8K@60Hz 4:2:0 12-bit (HDMI) and 8K@30Hz 4:2:2 10-bit (USB-C). This switcher is fully compliant with DP 1.4 and HDCP 2.3, and supports advanced video technologies including HDR10, HDR10+, Dolby Vision, and HLG pass-through. With support for HDMI 2.1 features such as VRR, ALLM, QMS, QFT, and SBTM, along with multichannel audio pass-through for Dolby Atmos, DTS:X, and LPCM 7.1CH, it delivers an immersive audio-visual experience.

The BG-8K-HS41AR offers easy control via front-panel buttons, IR remote, and supports both manual and auto-switching between active inputs. Built-in EDID management can be configured using a 3-pin DIP switch on the front panel, with EDID status displayed on the connected monitor. Additional features include CEC control for simplified TV-to-source communication and firmware updates through the service port, making this switcher a versatile solution for home theater, gaming, and professional AV installations.

Features

- **UHD USB-C Quality:** Supports resolutions up to 8K@30Hz (4:2:2, 10-bit) and 4K@120Hz (4:2:2, 10-bit) via USB-C
- **UHD HDMI Quality:** Supports 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)
- **Input Switching Options:** Supports automatic and manual input switching, controllable via front panel buttons and IR remote
- **CEC Control Functionality:** Enables CEC pass-through control from the display (output) to the source device (input)
- **Audio Pass-Through:** Supports LPCM 7.1CH, Dolby TrueHD, Dolby Atmos, DTS-HD Master Audio, and DTS:X audio formats
- **HDR Pass-Through:** Passes through HDR formats, including HDR, HDR10, HDR10+, Dolby Vision, and HLG
- **Advanced HDMI 2.1 Features:** Supports VRR (Variable Refresh Rate), ALLM (Auto Low Latency Mode), QMS (Quick Media Switching), QFT (Quick Frame Transport), and SBTM (Source-Based Tone Mapping)
- **Flexible Input & Output Configuration:** Features 3 × HDMI inputs and 1 × USB-C input, routed to a single HDMI output
- **Advanced EDID Management:** Includes customizable EDID settings for flexible compatibility with various displays and sources
- **Industry Compliance:** Compliant with DisplayPort 1.4 and HDCP 2.3 standards

Packing List

- 1x BG-8K-HS41AR 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	
HDMI Compliance	HDMI 2.1
HDCP Compliance	HDCP 2.3
Video Bandwidth	48Gbps
Audio Latency	No Latency
Video Latency	No Latency
Video Resolution	Up to 8K60 YCbCr 4:2:0 12bit, 8K30 RGB/YCbCr 4:4:4 12bit or 4K120 RGB/YCbCr 4:4:4 12bit
Color Depth	8/10/12-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	12Vp-p
IR Frequency	Wideband 20K–60KHz
Audio Formats	HDMI input/output: LPCM, Dolby Digital/Plus/EX, Dolby True HD, Dolby Atmos, DTS, DTS-EX, DTS-96/24, DTS High Res, DTS-HD Master Audio, DSD Audio de-embedding output: Optical: Up to LPCM/Dolby/DTS 5.1CH, Analog: Only LPCM 2CH
Mechanical	
ESD Protection	IEC 61000-4-2: ±8kV (Air-gap discharge) & ±4kV (Contact discharge)
Input	4x HDMI IN [Type A, 19-pin female]
Output	1x HDMI OUT [Type A, 19-pin female]; 1x OPTICAL AUDIO OUT [S/PDIF, female]; 1x L/R AUDIO OUT [5pin-3.5mm Phoenix connector]
Control Ports	1x RS-232 [3pin-3.5mm Phoenix connector]; 1x IR CTL [3.5mm stereo mini-jack]; 1x SERVICE [USB Type C, Update port]
Housing	Metal Enclosure
Silkscreen Color	Black

Dimensions (W×D×H)	8.7in × 4.3in × 0.85in / 220mm × 110mm × 21.5mm
Weight	1.3 lbs [595g]
Power Supply	Input: AC100 - 240V 50/60Hz Output: DC 12V/1A (US/EU standards, CE/FCC/UL certified)
Power Consumption	5.4W (Max)
Operating Temperature	14°F ~ 113°F / -10°C ~ 45°C
Storage Temperature	-4°F ~ 140°F / -20°C ~ 60°C
Relative Humidity	20~90% RH (non-condensing)
Recommended HDMI Cable Lengths	8K: 2m/6.6ft (Ultra HDMI 2.1); 4K60: 8m/26ft; 4K24: 12m/39ft; 1080P: 15m/49ft **Note:** Use "Premium High Speed HDMI" cable is highly recommended.

Operation Controls and Functions

Front and Rear Panel

Front Panel
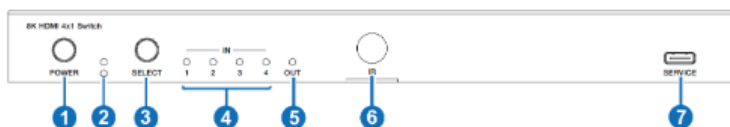
Rear Panel

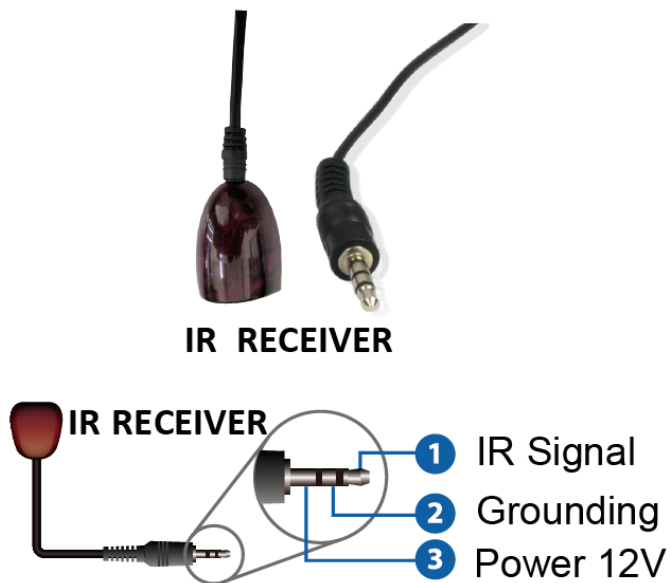| No.	Name	Function Description
1	POWER button	Press the POWER button to power on/off the device.
2	POWER LED	The power LED lights in green when the device is working, and red when the device is in standby.
3	SELECT button	Signal source selection button. Pressing this button will allow the device to switch any of the four HDMI input signals to the HDMI OUT port.
4	IN LED (1~4)	When the HDMI IN 1/2/3/4 port is selected as the signal source input channel, the corresponding green LED will be on.
5	OUT LED	When the HDMI OUT port connects a display device and outputs signal, the green LED will be on.
6	IR Window	IR input signal receiving window.
7	SERVICE	USB-C port for firmware update, software debugging, and API commands controlling.

8	EDID DIP switch	Use the 4-pin DIP switch to set EDID information. 0000 – EDID pass-through (Copy from Sink 1) (factory default) 0001 – HDMI 1080p@60Hz, Audio 2CH PCM 0010 – HDMI 1080p@60Hz, Audio 5.1CH DTS/DOLBY 0011 – HDMI 4K@60Hz 4:4:4, 8-bit, Audio 2CH PCM 0100 – HDMI 4K@60Hz 4:4:4, 8-bit, Audio 5.1CH DTS/DOLBY 0101 – HDMI 4K@120Hz 4:4:4, 10-bit HDR/DV, Audio 2CH PCM 0110 – HDMI 4K@120Hz 4:4:4, 10-bit HDR/DV, Audio 5.1CH DTS/DOLBY 0111 – HDMI 4K@120Hz 4:4:4, 12-bit HDR/DV, Audio 2CH PCM 1000 – HDMI 4K@120Hz 4:4:4, 12-bit HDR/DV, Audio 5.1CH DTS/DOLBY 1001 – HDMI 8K@60Hz 4:2:0, 10-bit HDR/DV, Audio 2CH PCM1010 – HDMI 8K@60Hz 4:2:0, 10-bit HDR/DV, Audio 5.1CH DTS/DOLBY 1011 – HDMI 8K@60Hz 4:2:0, 12-bit HDR/DV, Audio 2CH PCM 1100 – HDMI 8K@60Hz 4:2:0, 12-bit HDR/DV, Audio 5.1CH DTS/DOLBY 1101 – HDMI 8K@60Hz 4:2:0, 12-bit HDR/DV, Audio 2CH PCM – Inc VRR/DSC 1110 – HDMI 8K@60Hz 4:2:0, 12-bit HDR/DV, Audio 5.1CH DTS/DOLBY – Inc VRR/DSC 1111 – EDID Software if possible or HDMI 1080p@60Hz, Audio 2CH PCM
9	HDMI IN port (1~4)	HDMI signal input ports, connected to HDMI source devices such as DVD or PS5 using HDMI cables.
10	HDMI OUT port	HDMI signal output port, connected to an HDMI display device such as a TV or monitor using an HDMI cable.
11	OPTICAL (AUDIO OUT)	Optical fiber audio output port.
12	L+ L- R+ R- (AUDIO OUT)	Analog audio output port, supporting balanced (max 2Vrms) and unbalanced (max 1Vrms) audio output.Balanced: L+, L-, R+, R-Unbalanced: L+, R+
13	RS-232	RS-232 serial port, used for API commands control.
14	IR CTL	12V IR signal receiving port.
15	DC 12V	DC 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

 Press the **POWER** button to turn the device on or set it to standby mode.

Input Selection

 1 / 2 / 3 / 4: Press any of these buttons to switch the HDMI OUT port to the corresponding HDMI IN 1 / 2 / 3 / 4 input source.
 CYCLE: Press this button to cycle through HDMI input sources 1 to 4 sequentially 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>

ASCII Commands

Error Codes

Code	Description
E00	Unknown command
E01	Parameter out of range
E02	Error reading EDID data

Commands

Command Code	Description	Example	Feedback / Response	Factory Default
?	List all commands	?	List all commands	—
help	List all commands	help!	List all commands	—
get fw version	Get firmware version	get fw version	mcu boot: vx.xx.xxmcu app: vx.xx.xx	—
set power on/off	Power the device on/off	set power on / set power off	power onsystem initializing... initialization finished! fw version x.xx.xx power off	—
get power	Get power status	get power	power on / power off	—
set reboot	Reboot device	set reboot	reboot...system initializing... initialization finished! fw version x.xx.xx	—

set reset	Factory reset	set reset	reset to factory defaultssystem initializing... initialization finished! fw version x.xx.xx	—
get status	Get system status	get status	See note below	—
set IR on/off	Enable/disable IR	set IR on / set IR off	IR on / IR off	on
get IR	Get IR status	get IR	IR on / IR off	—
set key on/off	Enable/disable front panel key	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
Baud options	1 = 4800, 2 = 9600, 3 = 19200, 4 = 38400, 5 = 57600, 6 = 115200	—	—	—
get baud	Get RS-232 baud rate	get baud	baud rate 115200	—
set input x	Select input video (x = 0–4)	set input 1	input HDMI 1	1
Input options	0 = Off, 1–4 = HDMI input 1–4	—	—	—
get input	Get input port	get input	input HDMI 1	—
get hdmi5v	Get HDMI 5 V status	get hdmi5v	HDMI 1: 5VHDMI 2: noneHDMI 3: 5VHDMI 4: none	—
set autoswitch x	Enable/disable auto switching (HDMI 5 V detection)	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 display mode (y = 0–3)	set output display 2	output display off / input video / AVMUTE / internal pattern	1
Display modes	0 = Off, 1 = Input video, 2 = AVMUTE, 3 = Internal pattern	—	—	—

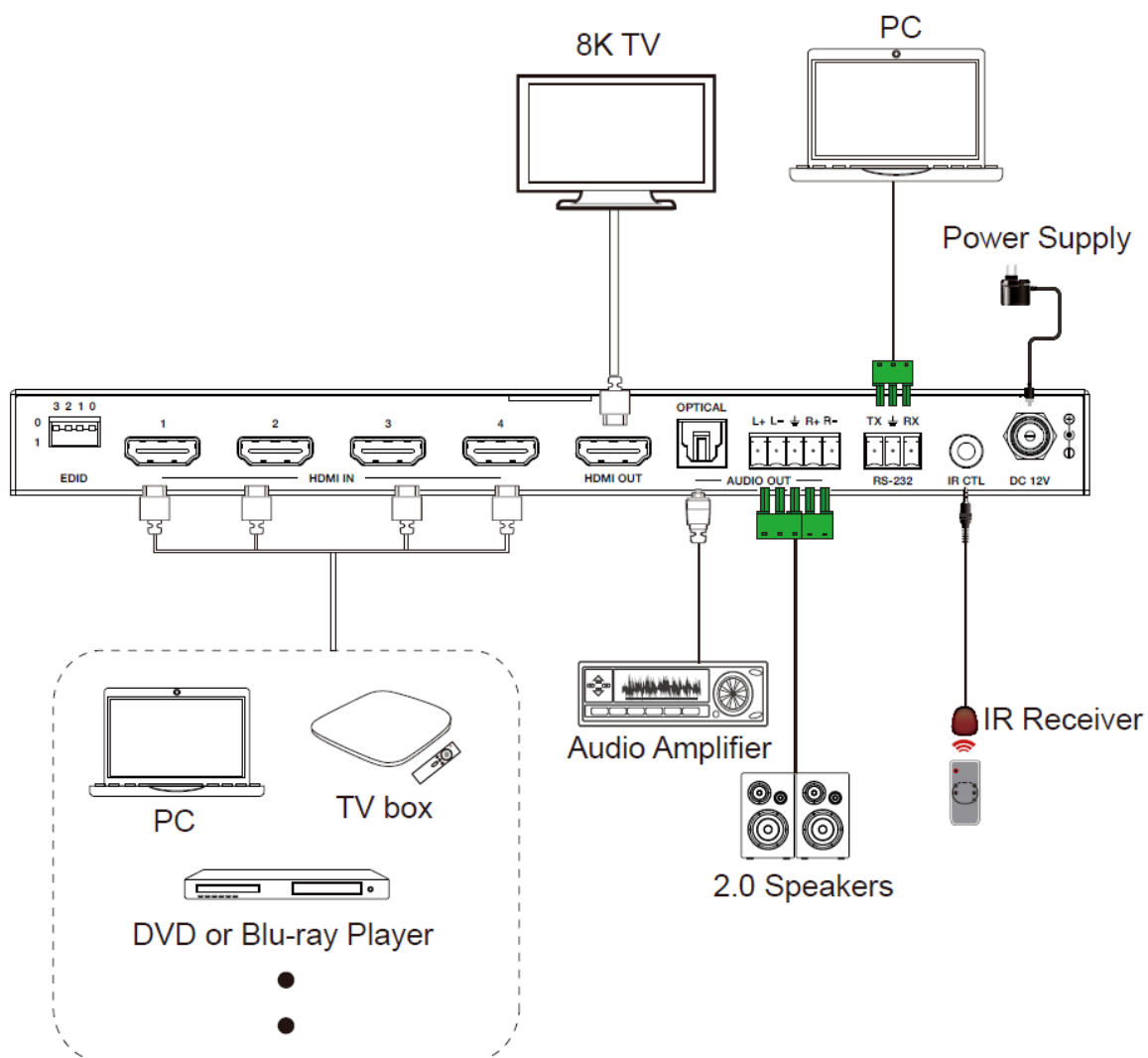| get output display	Get display mode	get output display	output display off / input video / AVMUTE / internal pattern	—
set output HDCP y	Set HDCP (y = 0–4)	set output HDCP 1	output HDCP follow sink / follow source / force HDCP 1.4 / force HDCP 2.2	1
HDCP modes	0 = Reserved, 1 = Follow sink, 2 = Follow source, 3 = Force HDCP 1.4, 4 = Force HDCP 2.2	—	—	—
get output HDCP	Get HDCP mode	get output HDCP	output HDCP follow sink / follow source / force HDCP 1.4 / force HDCP 2.2	—
set analog mute x	Mute analog audio (x = On/Off)	set analog mute on	analog mute on / analog mute off	off
get analog mute	Get analog mute status	get analog mute	analog mute on / analog mute off	—
set analog gain x	Set analog audio gain (0 dB to –79 dB)	set analog gain –79dB	analog gain –79dB	0dB
get analog gain	Get analog audio gain	get analog gain	analog gain –79dB	—
set generator x y	Set generator resolution (x = 1–15) and pattern (y = 1–13)	set generator 1 1	generator 8K30Hz color bar	—
Generator resolution	01 = 8K 30Hz, 02 = 4K 120Hz, 03 = 4K 100Hz, 04 = 5K 60Hz, 05 = 5K 50Hz, 06 = 5K 30Hz, 07 = 5K 25Hz, 08 = 5K 24Hz, 09 = 4K 60Hz, 10 = 4K 50Hz, 11 = 4K 25Hz, 12 = 4K 24Hz, 13 = 1080p 60Hz, 14 = 480p 60Hz, 15 = 5760p 50Hz	—	—	—
Generator pattern	01 = Color bar, 02 = Checkerboard, 03 = Strip, 04 = Red, 05 = Green, 06 = Blue, 07 = White, 08 = Ramp, 09 = Red ramp, 10 = Green ramp, 11 = Blue ramp, 12 = PRBS, 13 = Black	—	—	—

get generator	Get generator settings	get generator	generator 8K30Hz color bar	—
set edid x to y	Set EDID for input ports (x = 0–4)	set edid 0 to 0set edid 1 to 1	Reflects EDID set for inputs	See default below
EDID input options	x = 0 (all inputs), 1–4 = HDMI inputs 1–4	—	—	—
EDID presets	00 = HDMI 1080p 60Hz, 2CH PCM (default), 01–17 = 4K options, 18–26 = 8K options w/ VRR/DSC, 27–29 = DVI/HDMI 1920x1200, 30–31 = User EDIDs, 32 = Pass-through	—	—	—
get edid x	Read EDID settings	get edid 0	Shows EDID for inputs	—
get edid data x	Read raw EDID data	get edid data 0	Hex dump of EDID from inputs	—
set user edid x <y>	Set user-defined EDID (x = 1–2, y = 256-byte EDID)	set user edid 1 <00 FF FF FF …>	User EDID loaded successfully	—
get user edid x	Get user-defined EDID	get user edid 1	Shows user EDID data	—

Notes on getting status

- The output spans multiple lines.

- Intermediate lines end with <LF><CR>.

- The final line ends with <CR><LF>.

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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