



BG-4KBHS

**12G/6G/3G/HD-SDI & HDMI 2.0 Bi-Directional Converter
with Audio Embedding and Extraction**

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-4KBHS is a professional 12G/6G/3G/HD-SDI and HDMI 2.0 bi-directional converter with integrated audio embedding and extraction, designed for seamless real-time conversion between HDMI and SDI formats. Supporting full digital conversion, it ensures zero signal loss for both video and audio, while providing up to 8 audio channels, including 7.1 and 5.1 surround sound configurations.

Equipped with a low-jitter SDI output and high-quality analog stereo embedder and extractor, the BG-4KBHS offers versatile integration for both professional SDI workflows and consumer HDMI devices. With broad support for HD and UHD formats up to 4K60 and automatic 12G/6G/3G/HD-SDI detection, it provides a reliable solution for professional video environments that demand high-fidelity signal conversion and flexible audio management.

Features

- **Supported HD & UHD Formats:**
 - 720p: 50, 59.94, 60 Hz
 - 1080i: 50, 59.94, 60 Hz
 - 1080p: 23.97, 24, 25, 29.97, 30, 50, 59.94, 60 Hz
 - 4K2K: 23.98, 24, 25, 29.97, 30, 50, 59.94, 60 Hz
- **High Bit Rate Support:** Handles SDI bit rates of 270 Mbps up to 11.88 Gbps, including fractional rates for broadcast compatibility.
- **Auto SDI Detection:** Automatically detects and switches between 12G, 6G, 3G, and HD-SDI signals.
- **HDMI Support:** Fully compatible with HDMI 2.0 and lower versions for flexible source integration.
- **Audio Channel Support:** Supports up to 8 audio channels, including 7.1 and 5.1 surround sound.
- **Analog Stereo Embedder & Extractor:** Provides high-quality analog audio embedding and extraction for flexible audio routing.
- **Low-Jitter SDI Output:** Ensures stable and reliable SDI signal transmission for professional video workflows.
- **Real-Time Bi-Directional Conversion:** Converts HDMI to SDI and SDI to HDMI without latency or quality loss.
- **Video & Audio Integrity:** Maintains uncompressed, lossless digital video and audio throughout the conversion process.
- **Multi-Format Compatibility:** Compatible with professional SDI equipment and consumer HDMI devices for versatile workflow integration.
- **Compact & Rack-Mountable Design:** Optimized for studio and field applications requiring space-efficient hardware.



Packing List

- 1x BG-4KBHS
- 1x 5V DC Adapter
- 1x Product Manual



Specifications

Technical Specifications	
SDI Standards	12G / 6G / 3G / HD-SDI
HDMI Standards	HDMI 2.0
Auto SDI Detection	12G / 6G / 3G / HD-SDI (Auto)
Video Bandwidth	SDI: 11.88 Gbps, 11.88/1.001 Gbps HDMI: Up to 18 Gbps
Video Support	12G-SDI: 4K2K @50/59.94/60Hz 6G-SDI: 4K2K @23.98/24, 25, 29.97, 30Hz 3G-SDI: 1080p @50/59.94/60Hz HD-SDI: 720p @50/59.94/60Hz, 1080i @50/59.94/60Hz, 1080p @23.98/24/25/29.97/30Hz HDMI: Up to 4K2K @60Hz
Input Signal	1 × SDI 1 × HDMI 1 × Audio
Output Signal	2 × HDMI 1 × SDI 1 × Audio
Output Impedance (SDI)	75Ω
Synchronization Mode	Internal or External
Eye Pattern Characteristics	12G-SDI: Timing jitter: 0.29 UI, Alignment jitter: 0.13 UI 6G-SDI: Timing jitter: 0.18 UI, Alignment jitter: 0.06 UI 3G-SDI: Timing jitter: 0.09 UI, Alignment jitter: 0.03 UI
Cable Equalization	12G-SDI: up to 70m 6G-SDI: up to 100m 3G-SDI: up to 190m HD-SDI: up to 300m
Audio Support	Analog Audio: 2-channel HDMI: Surround Sound (up to 7.1ch)
PCB Stack-up	6-layer board (Impedance control: differential 100Ω; single 50Ω)
Connections	
Input	1 × BNC (SDI) 1 × HDMI 1 × Audio Jack
Output	2 × HDMI 1 × BNC (SDI) 1 × Audio Jack
BNC Connector	75Ω inter-locked socket
HDMI Connector	Type A (19-pin female)

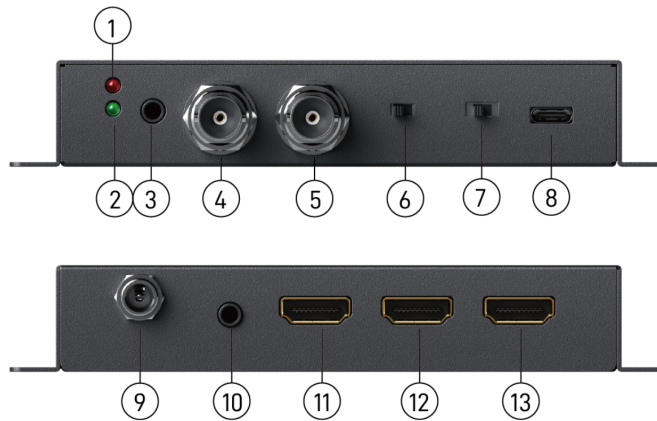


Mechanical Specifications	
Housing	Metal enclosure
Power Supply	+5V DC
Operating Temperature	32 ~ 104°F / 0 ~ 40°C
Storage Temperature	-4 ~ 140°F / -20 ~ 60°C
Relative Humidity	20 ~ 90% RH (no condensation)



Operation Controls and Functions

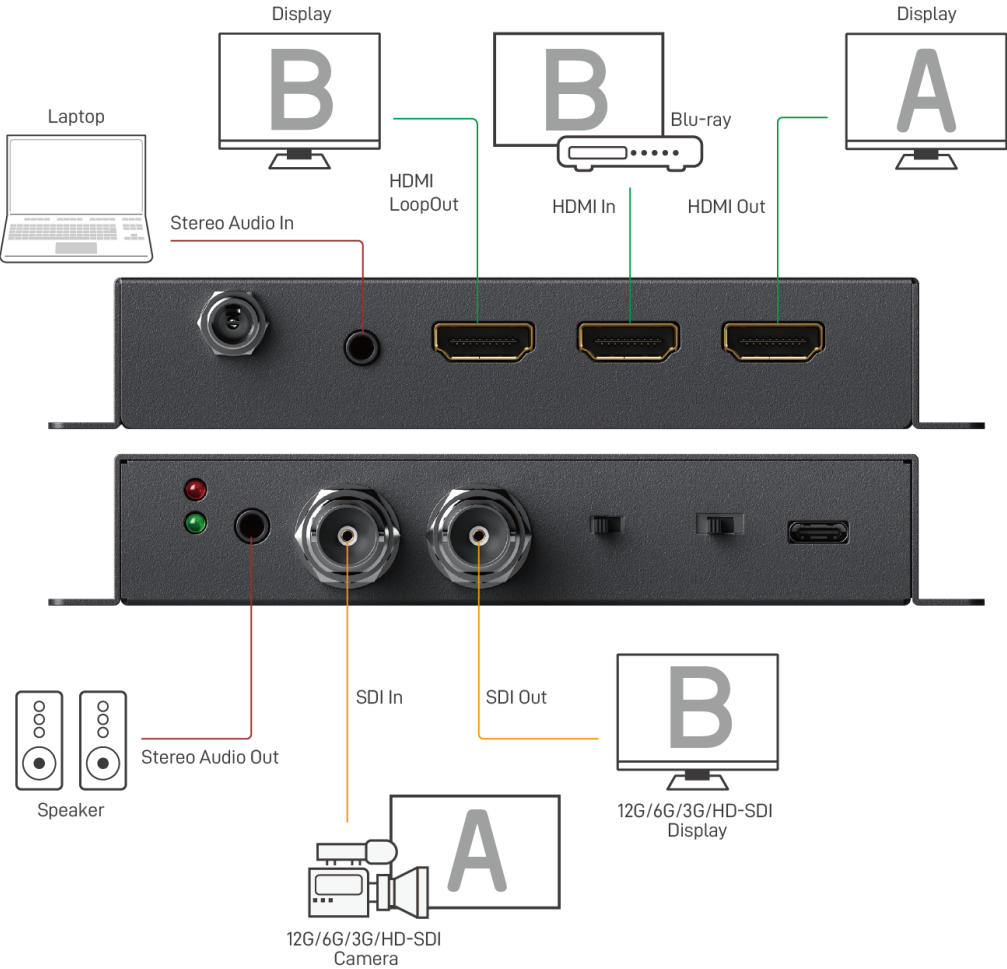
Front and Rear Panel



1. **Power LED:** Indicates device power status.
2. **Signal LED:** Indicates active video signal detection.
3. **Stereo Audio Output:** Extracts stereo audio from SDI or HDMI input.
4. **SDI IN:** Accepts 12G/6G/3G/HD-SDI video input.
5. **SDI OUT:** Outputs 12G/6G/3G/HD-SDI video.
6. **Mode Slide Switch:**
 - a. **Right:** Convert HDMI → SDI
 - b. **Left:** Convert SDI → HDMI
7. **Audio/Firmware Slide Switch:**
 - a. **Right:** F/W update mode
 - b. **Mid:** Use HDMI input audio as SDI audio source
 - c. **Left:** Use stereo audio input as SDI audio source
8. **USB-C Port:** For firmware updates.
9. **DC Power Input (+5V):** Connect to a 5V DC power supply.
10. **Stereo Audio Input:** Embeds stereo audio into SDI output.
11. **HDMI Loop Out:** Pass-through connection for HDMI display monitoring.
12. **HDMI IN:** Connects to an HDMI source (HDMI male-to-male cable).
13. **HDMI OUT:** Connects to an HDMI display (HDMI male-to-male cable).



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.

Copyright

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