CPLUS-H2SDI

HDMI to 12G-SDI Converter

Operation Manual

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SAFETY PRECAUTIONS

Please read all instructions before attempting to unpack, install or operate this equipment and before connecting the power supply. Please keep the following in mind as you unpack and install this equipment:

- Always follow basic safety precautions to reduce the risk of fire, electrical shock and injury to persons.
- To prevent fire or shock hazard, do not expose the unit to rain, moisture or install this product near water.
- Never spill liquid of any kind on or into this product.
- Never push an object of any kind into this product through any openings or empty slots in the unit, as you may damage parts inside the unit.
- Do not attach the power supply cabling to building surfaces.
- Use only the supplied power supply unit (PSU). Do not use the PSU if it is damaged.
- Do not allow anything to rest on the power cabling or allow any weight to be placed upon it or any person walk on it.
- To protect the unit from overheating, do not block any vents or openings in the unit housing that provide ventilation and allow for sufficient space for air to circulate around the unit.
- Please completely disconnect the power when the unit is not in use to avoid wasting electricity.

VERSION HISTORY

REV.	DATE	SUMMARY OF CHANGE
RDV1	2022/02/18	Preliminary release

CONTENTS

1. INTRODUCTION

This HDMI to 12G-SDI Converter allows HDMI signals up to 4K UHD+ to be converted for use in native 12G-SDI video systems. This makes it easier for professionals to integrate and distribute non-HDCP HDMI signals from both consumer and prosumer video equipment, such as video cameras and laptops, within their professional video production environment while still providing a local HDMI output for monitoring purposes. Additionally, the inclusion of an analog stereo input lets users optionally insert external audio into the SDI output signal along with the primary video. Basic control is available via front panel buttons.

2. APPLICATIONS

- Display HDMI video signals on professional SDI displays
- Consumer HDMI to broadcast SDI video signal conversion
- 4K UHD HDMI signal conversion to 12G SDI

3. PACKAGE CONTENTS

- 1× HDMI to 12G-SDI Converter
- 1× 5V/2.6A DC Power Adapter
- 1× Operation Manual

4. SYSTEM REQUIREMENTS

- Non-HDCP HDMI source equipment such as media players, video game consoles, or set-top boxes.
- SDI receiving equipment such as editing/recording decks, professional studio monitors, or video broadcast equipment.

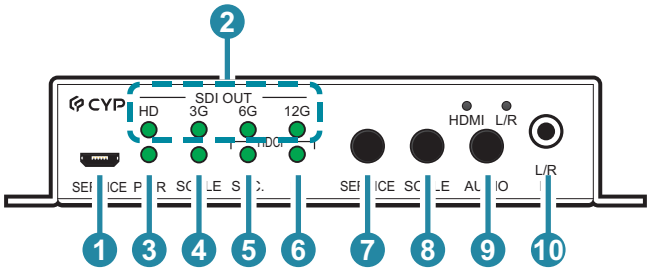
5. FEATURES

- HDMI 2.0 and DVI 1.0 compliant
- HDCP 1.x and 2.2 compliant

  *Note: HDCP encoded content can only be output over the HDMI output. The SDI output will be blocked in the case of HDCP conte*nt.
- 1 HDMI video input & 1 analog stereo audio input
- 3 mirrored outputs (2×12G-SDI, 1×HDMI)
- Supports up to 4K UHD^{+} (18Gbps, 4K@50/60Hz 4:4:4, 8-bit) digital video input.
- SDI output supports the following SMPTE standards: ST 292-1 Level A, ST 425-1, ST 2081-10, ST 2082-10
- SDI signal extension distance varies based on signal type: 80 meters (12G-SDI), 100 meters (6G-SDI) 200 meters (3G-SDI), or 260 meters (HD-SDI)
- 4K sources can be optionally downscaled to 1080p when output over the HDMI output to support lower cost local monitoring options
- Supports pass-through of LPCM audio (up to 8 channels) from the HDMI input, or 2 channels from the analog audio input
- Controllable via front panel controls

6. OPERATION CONTROLS AND FUNCTIONS

6.1 Front Panel



1. **SERVICE Port:** This port is reserved for firmware update use only.
2. **SDI OUT LEDs:** These LEDs will illuminate to indicate the SDI output format currently in use.
3. **PWR LED:** This LED will illuminate to indicate the unit is on and receiving power.
4. **SCALE LED:** This LED illuminate when the HDMI output is being downscaled.
5. **HDCP SRC LED:** This LED will illuminate when the HDMI source contains an HDCP encoded signal.
6. **HDCP IN LED:** This LED will illuminate to indicate that the HDMI input supports HDCP sources.
7. **SERVICE Button:** Press this button to put the unit into its firmware update mode.

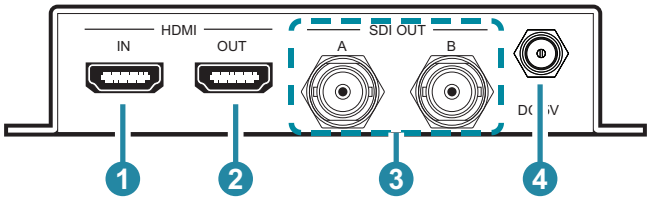
   Firmware Update Process: To update firmware after pressing the button, connect the unit to a PC/laptop via the Micro-USB Service port and the unit will appear as an external drive. Drag an appropriate firmware file onto this drive and the unit will automatically begin the update process. After the update completes, the unit will automatically reboot.
8. **SCALE Button:** Press this button to enable or disable the HDMI output's 4K to 1080p downscaling function.

   Note: 3840x2160 will be downscaled to 1920x1080. 4096x2160 will be downscaled to 2048x1080. YUV 4:2:2 format sources cannot be downscaled.

9. **AUDIO Button & LEDs:** Press this button to toggle the audio source to embed between HDMI audio and analog audio. The LEDs will illuminate to indicate which source is currently selected.

10. **L/R IN Port:** Connect to the analog stereo output of a device such as an audio player or PC.

6.2 Rear Panel



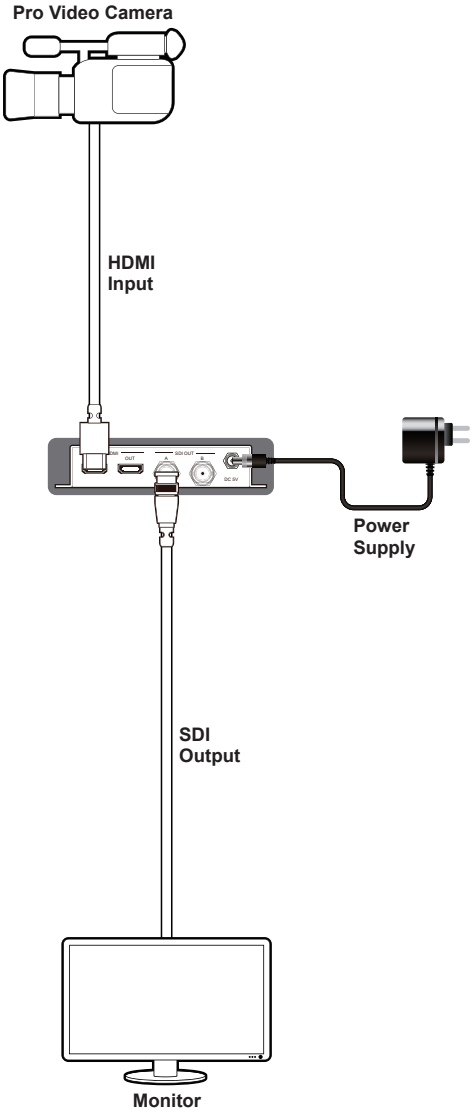
1. **HDMI IN Port:** Connect to HDMI source equipment such as a media player, game console, or set-top box. DVI sources are supported with the use of an HDMI to DVI adapter.

2. **HDMI OUT Port:** Connect to an HDMI TV, monitor, or amplifier for digital video and audio output.

3. **SDI OUT A~B Ports:** Connect to SDI receiving equipment such as editing/recording decks, professional studio monitors, or video broadcast equipment.

4. **DC 5V Port:** Plug the 5V DC power adapter into this port and connect it to an AC wall outlet for power.

7. CONNECTION DIAGRAM



8. SPECIFICATIONS

8.1 Technical Specifications

HDMI Bandwidth	18Gbps
SDI Bandwidth	12Gbps
SMPTE Standard Support	ST 292-1 Level A ST 425-1 ST 2081-10 ST 2082-10
Input Ports	1×HDMI (Type-A) 1×Unbalanced Stereo Audio (3.5mm)
Output Ports	2×12G-SDI (BNC) 1×HDMI (Type-A)
Service Port	1×USB 2.0 (Micro-B)
Power Supply	5V/2.6A DC (US/EU standards, CE/FCC/UL certified)
ESD Protection (HBM)	±8kV (Air Discharge) ±4kV (Contact Discharge)
Dimensions (W×H×D)	128mm×25mm×75mm [Case Only] 128mm×25mm×94mm [All Inclusive]
Weight	347g
Chassis Material	Metal (Steel)
Chassis Color	Black
Operating Temperature	0˚C – 40˚C/32˚F – 104˚F
Storage Temperature	-20˚C – 60˚C/-4˚F – 140˚F
Relative Humidity	20 – 90% RH (Non-condensing)
Power Consumption	6.138W

8.2 VIDEO SPECIFICATIONS

Supported Resolutions (Hz)	Input	Output	
	HDMI	HDMI	SDI
720×400p@70/85	×	×	×
640×480p@60/72/75/85	×	×	×
720×480i@60	×	×	×
720×480p@60	×	×	×
720×576i@50	×	×	×
720×576p@50	×	×	×
800×600p@56/60/72/75/85	×	×	×
848×480p@60	×	×	×
1024×768p@60/70/75/85	×	×	×
1152×864p@75	×	×	×
1280×720p@50/59.94/60	✓	✓	✓
1280×768p@60/75/85	×	×	×
1280×800p@60/75/85	×	×	×
1280×960p@60/85	×	×	×
1280×1024p@60/75/85	×	×	×
1360×768p@60	×	×	×
1366×768p@60	×	×	×
1400×1050p@60	×	×	×
1440×900p@60/75	×	×	×
1600×900p@60RB	×	×	×
1600×1200p@60	×	×	×
1680×1050p@60	×	×	×
1920×1080i@50/59.94/60	✓	✓	✓
1920×1080p@23.98/24/25/29.97/30	✓	✓	✓
1920×1080p@50/59.94/60/100/120	✓	✓	✓
1920×1200p@60RB	×	×	×

Supported Resolutions (Hz)	Input	Output	
	HDMI	HDMI	SDI
2560×1440p@60RB	×	×	×
2560×1600p@60RB	×	×	×
2048×1080p@23.98/24/25/29.97/30	✓	✓	✓
2048×1080p@50/59.94/60	✓	✓	✓
3840×2160p@23.98/24/25/29.97/30	✓	✓	✓
3840×2160p@50/59.94/60 (4:2:0)	✓	✓	✓
3840×2160p@24, HDR10	×	×	×
3840×2160p@50/60 (4:2:0), HDR10	×	×	×
3840×2160p@50/59.94/60	✓	✓	✓
4096×2160p@23.98/24/25/29.97/30	✓	✓	✓
4096×2160p@50/59.94/60 (4:2:0)	✓	✓	✓
4096×2160p@24, HDR10	×	×	×
4096×2160p@50/60 (4:2:0), HDR10	×	×	×
4096×2160p@50/59.94/60	✓	✓	✓

8.3 Audio Specifications

8.3.1 Digital Audio

HDMI Input / Output	
LPCM	
Max Channels	8 Channels
Sampling Rate (kHz)	32, 44.1, 48, 88.2, 96, 176.4, 192
Bitstream	
Supported Formats	Standard & High-Definition

SDI Output	
LPCM	
Max Channels	8 Channels
Sampling Rate (kHz)	48, 96
Bitstream	
Supported Formats	None

8.3.2 Analog Audio

Analog Input	
Max Audio Level	2Vrms
Impedance	30kΩ
Type	Unbalanced

8.4 Cable Specifications

Cable Length	720p 12-bit	1080p 12-bit	4K30 (4:4:4) 8-bit	4K60 (4:4:4) 8-bit
High Speed HDMI Cable				
HDMI Input	15m	10m	5m	3m
HDMI Output	15m	10m	5m	3m
Coaxial SDI Cable (Belden 1694A 6GHz Cable)				
SDI Output	260m	200m	100m	80m

Note: SDI cable distance measurements are based on Belden 1694A 6GHz cable. Operating distance may vary if different quality cables are used.

Bandwidth Category Examples:

- **1080p (FHD Video)**
  - Up to 1080p@60Hz, 12-bit color
  - Data rates lower than 5.3Gbps or below 225MHz TMDS clock
- **4K30 (4K UHD Video)**
  - 4K@24/25/30Hz & 4K@50/60Hz (4:2:0), 8-bit color
  - Data rates higher than 5.3Gbps or above 225MHz TMDS clock but below 10.2Gbps
- **4K60 (4K UHD+ Video)**
  - 4K@50/60Hz (4:4:4, 8-bit)
  - 4K@50/60Hz (4:2:0, 10-bit HDR)
  - Data rates higher than 10.2Gbps

9. ACRONYMS

ACRONYM	COMPLETE TERM
4K UHD	4K Ultra-High-Definition (10.2Gbps max)
4K UHD+	4K Ultra-High-Definition (18Gbps max)
COAX	Coaxial
dB	Decibel
DVI	Digital Visual Interface
EDID	Extended Display Identification Data
Gbps	Gigabits per second
HD	High-Definition
HDCP	High-bandwidth Digital Content Protection
HDMI	High-Definition Multimedia Interface
HDR	High Dynamic Range
kHz	Kilohertz
LED	Light-Emitting Diode
LPCM	Linear Pulse-Code Modulation
MHz	Megahertz
SDI	Serial Digital Interface
SNR	Signal-to-Noise Ratio
THD+N	Total Harmonic Distortion plus Noise
TMDS	Transition-Minimized Differential Signaling
UHDTV	Ultra-High-Definition Television
USB	Universal Serial Bus
VGA	Video Graphics Array
WUXGA (RB)	Widescreen Ultra Extended Graphics Array (Reduced Blanking)
XGA	Extended Graphics Array
Ω	Ohm

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