SC-HD-2B

4K UHD HDMI 2.0 Scaler & Audio Embedder / Extractor

Scale HDMI or DVI video
Embed Digital or Analog Audio into HDMI output
Extract (De-embed) Digital and Analog Audio from HDMI input

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FCC Notice

This device complies with Part 15 of the FCC Rules. Operation is subject to the following conditions:
1. This device may not cause harmful interference.
2. This device must accept any interference even if it causes undesired operation.

This equipment has been desinged to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy, and if it is not installed and used in accordance with the instruction manual, it may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.
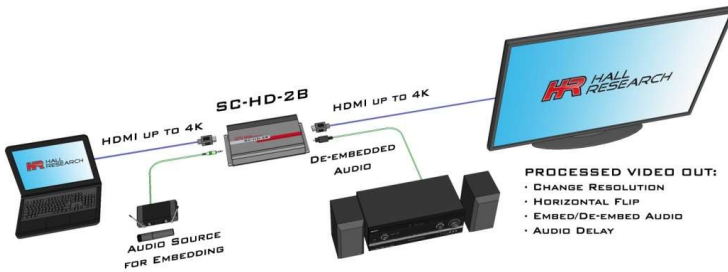
1.0 Introduction

Thank you for purchasing Hall Research's SC-HD-2B. The unit is a video scaler/processor that can convert any HDMI resolution into a user specifiable output resolution. It accepts virtually all PC and HDTV resolutions including 4Kx2K @ 60 Hz with 4:4:4 color. It is a world class scaling engine works in real time with no delay and is capable of flipping the video horizontally or vertically making it ideal for teleprompting, rear projection or semi 3-D holographic applications. Contrast, hue, saturation, and other parameters of video can be manipulated.

Both stereo analog and optical digital audio inputs and outputs are available. The audio from the HDMI input signal can be extracted (de-embedded) and output on both digital as well as stereo analog signal. The audio embedded into the HDMI output is selectable from one of three sources: HDMI input, analog L/R input, or digital optical input.

The SC-HD-2B has the ability to output a wide range of resolutions regardless of the input timing and resolution. The output resolution can automatically match the native resolution of the display connected to its output (based on the EDID setting of the display), or it can be specified by the user.

The SC-HD-2B features an OSD menu for configuration, picture setup, system information and other advanced options. The compact and sturdy enclosure features integrated mounting brackets.

Typical Connection Diagram

Features

- Any video resolution can be scaled up or down to any other resolution
- Supports UHD / 4K @ 60 Hz with 4:4:4 Color on input and output
- Horizontal and Vertical mirroring (x or y-axis flip)
- Analog and digital audio inputs and outputs
- Advanced scaling for real-time frame rate capture & conversion
- By default scales the output to the native resolution of any connected display
- Quick Select button combinations for setting output resolution
- Supports audio extraction without attached display
- Embeds audio to HDMI from analog or digital audio source
- Selectable audio delay up to 150 ms (for lip sync)
- HDMI, HDCP, and DVI Compliant

2.0 Package Contents

Model SC-HD-2B

(x 1) Model SC-HD-2B
(x 1) 5V DC 2.6 A Universal Power Supply (Do Not Substitute)
(x 1) 3.5mm to (2) RCA Audio Cable
(x 1) Product Information Card

3.0 Setup

Installation

- Connect the HDMI source to the SC-HD-2B HDMI Input.
- *Optionally,* connect the Analog or Digital audio source to the 3.5mm or optical TOSLink Input connector.
- Connect the HDMI display to the SC-HD-2B HDMI Output.
- *Optionally,* connect the Analog or Digital audio output to an audio receiver or amplifier.
- Connect power to DC 5V using the included power supply.

NOTE **Setting Resolution Using QUICK SELECT Buttons**

At any time, press the **UP ARROW** ⬆ and **MENU** buttons together to directly set the output resolution to 1080p @60 Hz. Press the **MENU** and **DOWN ARROW** ⬇ buttons together to set the output resolution to NATIVE.

OSD Menu

Press the MENU button to bring up the OSD menu controls on the attached display. Use the up ⬆ and down ⬇ arrows to navigate to the desired menu item, or to change values on a selected sub-menu. Press MENU to select sub-menus, and press MENU again to apply new values. Select EXIT to return to the main menu or exit the OSD. Values in **BOLD*** are factory default settings.
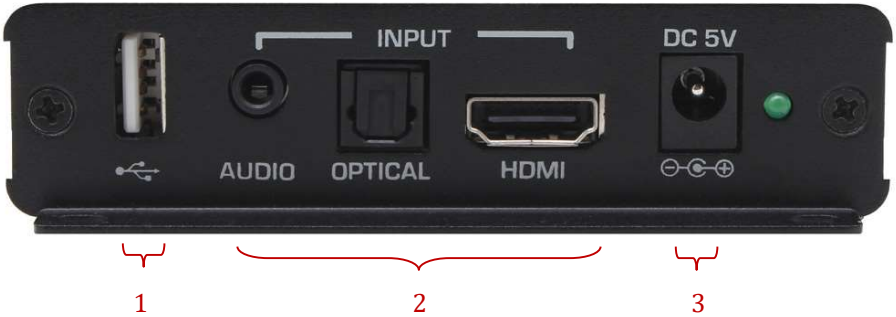
Top Menu	Sub-Menu	Value
VIDEO	OUTPUT	**NATIVE***, 640x480 @60, 800x600 @60, 1024x768 @60, 1280x768 @60, 1280x800 @60, 1280x1024 @60, 1360x768 @60, 1400x1050 @60, 1440x900 @60, 1600x1200 @60, 1680x1050 @60, 1920x1200 @60 RB, 2560x1600 @60 RB, 1920x1080 @60, 1280x720 @60, 2048x1080 @[50, 60], 2560x1440 @60 RB, 480p @60, 720p @60, 1080p @60, 576p @50, 720p @50, 1080p @[50, 24, 25, 30], 2560x1080p @[50, 60], 3840x2160p @[24, 25, 30, 50, 60], 4096x2160p @[24, 25, 30, 50, 60]
	ASPECT	**FULL***, BEST FIT, PAN SCAN, LETTER BOX, UNDER 2, UNDER 1, FOLLOW IN, ZOOM MODE, OVER SCAN
	ZOOM MODE RATIO	(AVAILABLE IN ASPECT ZOOM MODE ONLY) 60-180 (**100***)
	HDCP	SUPPORT OFF, REFER TO SOURCE, **REFER TO DISPLAY***
	NO SIGNAL COLOR	**BLACK***, WHITE, BLUE, RED, GREEN
	BLANK	**OFF***, ON
	FREEZE	**OFF***, ON
	MIRROR	**OFF***, H, V, HV
	AUTO SYNC OFF	**OFF***, 30s, 60s, 3MIN, 5MIN, 10MIN
	OUTPUT SETTINGS	BYPASS ENABLE [**OFF***, ON] OUTPUT 4K(6G) YUV420 [**OFF***, ON] EXIT
	EXIT	
PICTURE	COLOR GAIN R	0-1023 (**512***)
	COLOR GAIN G	0-1023 (**512***)
	COLOR GAIN B	0-1023 (**512***)
	COLOR OFFSET R	0-1023 (**512***)
	COLOR OFFSET G	0-1023 (**512***)

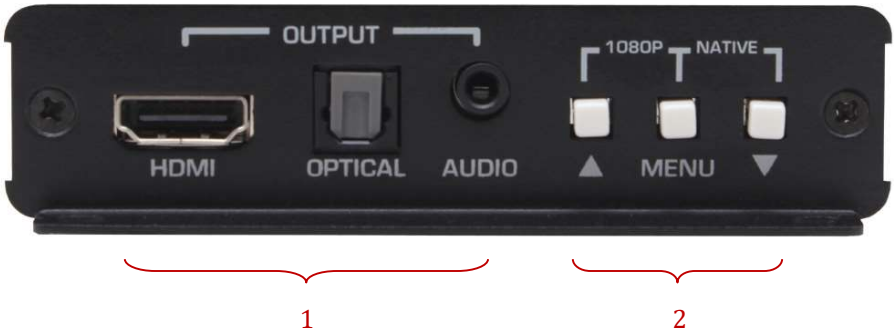| SC-HD-2B		
PICTURE	COLOR OFFSET B	0-1023 (**512***)
	BRIGHTNESS	0-60 (**30***)
	CONTRAST	0-60 (**30***)
	HUE	0-60 (**30***)
	SATURATION	0-60 (**30***)
	SHARPNESS	0-60 (**0***)
	NR	**OFF***, LOW, MIDDLE, HIGH, AUTO
	RESET PICTURE	
	EXIT	
AUDIO	SOURCE	**AUTO***, TOSLINK, ANALOG
	VOLUME	0-100 (**80***)
	HDMI MUTE	**OFF***, ON
	TOSLINK MUTE	**OFF***, ON
	ANALOG MUTE	**OFF***, ON
	RESET AUDIO	
	EXIT	
OSD	H POSITION	0-60 (**30***)
	V POSITION	0-60 (**30***)
	TIMER	**OFF***, 5s, 10s, 15s, 20s, 25s, 30s, 35s, 40s, 45s, 50s, 55s, 60s
	TRANSPARENT	0-50 (**50***)
	DISPLAY	OFF, ON, **5s***, 10s
	RESET OSD	
	EXIT	
EDID	HDMI EDID	**FHD 2CH***, FHD MCH, UHD 2CH, UHD MCH, UHD+ 2CH, UHD+ MCH, OUTPUT, AUTO OUTPUT
	EXIT	
RESET	RESET ALL	
	EXIT	
FW UPDATE	UPDATE FROM USB	
	EXIT	
INFORMATION	IN FORMAT	[CURRENT STATUS DETAILS]
	IN COLOR	
	IN RESOLUTION	
	IN HDCP	
	OUT FORMAT	
	OUT COLOR	
	OUT RESOLUTION	
	OUT HDCP	
	SINK HDCP	
	MODEL NUMBER	
	VERSION	
EXIT		

4.0 Connector and Indicator Functions

Input Connections

1) USB: USB-A connector is provided for firmware upgrade.
2) INPUT: Video and audio inputs. HDMI accepts resolutions up to 4K UHD. Audio input is user-selectable via OSD menu: HDMI, Optical TOSLink, or Analog Audio.
3) DC 5V: Power input. Do not substitue.

Output Connections

1) OUTPUT: Video and audio outputs. HDMI is output at user-selectable resolution up to 4K UHD. Audio output is available on all connecitons: HDMI, Optical TOSLink, and Analog Audio.

NOTE   Analog audio output is only available if the source sends 2-channel audio. Selecting a multi-channel EDID will cause the audio output will only be available via HDMI and Optical TOSLink.

2) OSD MENU: With a display connected to HDMI OUTPUT, use MENU button to bring up the OSD menu. Use arrows to navigate, and MENU button to make selections.

    a.   1080P: Press ⬆ + MENU to set HDMI OUTPUT to 1080p.

    b.   NATIVE: Press ⬇ + MENU to set HDMI OUTPUT to Native.

5.0 Troubleshooting

If you are experiencing problems getting the SC-HD-2B to work properly, please use the following troubleshooting suggestions.

- Ensure the correct power supply is used. Never plug in a power supply with a voltage higher than 5V DC, as this will damage the unit.

- Try restoring factory defaults by pressing and holding the **UP ARROW** ⬆ and **DOWN ARROW** ⬇ buttons simultaneously for 3 seconds.

- As shipped, the SC-HD-2B output resolution is defaulted to NATIVE. This means it will read the EDID of the attached display, and set the scaled output to match the preferred timing found in the EDID. If the scaler has been set to a different output, use the Quick Select buttons to reset the output (see Section 3).

- If the OSD is available, but no video source is displayed, ensure that the source resolution is set to one of the formats supported by the SC-HD-2B (see Section 7).

- If you are having trouble with your display device not going into a power saving state, change the AUTO SYNC OFF menu setting from OFF to the desired time to stop outputting a video signal.

Contacting Hall Research

If you determine that your SC-HD-2B is malfunctioning, do not attempt to repair the unit. Instead, contact Hall Research Technical Support at 714-641-6607. To return the unit to Hall Research you must first get a Return Authorization (RMA) number. Package the unit carefully, if returning. We recommend that you use the original container.

6.0 Specifications

Video

Bandwidth	600 MHz / 18 Gps
Input Ports	(1) HDMI
	(1) 3.5 mm Analog Audio
	(1) Digital Audio (TOSLink)
	(1) USB (Service Only)
Output Ports	(1) HDMI
	(1) 3.5 mm Analog Audio
	(1) Digital Audio (TOSLink)
Resolutions	DVI signal VGA (640x480) thru WUXGA (1920x1200)
	HDTV signal 480p through UHD+ (4096x2160@60Hz)

Analog Audio Input

Audio Level	2 Vrms Max
Impedance	49.9 Kohm
Type	Unbalanced

Analog Audio Output

Audio Level	2 Vrms Max
THD+N	< -80 dB @ 0 dBFS 1 kHz (A-wt)
SNR	>70 dB @ 0 dBFS
Freq. Response	< +/- 3 dB @ 20 Hz- 20 kHz
Crosstalk	< -70 dB @ 10 kHz
Type	Unbalanced

Optical Audio Input

Sampling Rate (kHz)	32, 44.1, 48, 82, 88.2, 96, 176.4, 192

Optical Audio Output

Sampling Rate (kHz)	48

HDMI Cable Length

Input	1080p 8-bit: 15 m 1080p 12-bit: 10 m 4K 8-bit: 3 m
Output	1080p 8-bit: 15 m 1080p 12-bit: 10 m 4K 8-bit: 3 m

General

Power Supply	100 VAC to 240 VAC, 50-60 Hz, 0.6 A, External; 5 VDC, 2.6 A (US/EU Standard, CE/FCC/UL Certified)
Temp/humidity	Storage: -4 to +140 °F (-20 to +60 °C) 20% to 90%, non-condensing Operating: +32 to +104 °F (0 to +40 °C) 20% to 90%, non-condensing
Typical DC Current Draw	5 VDC, 2.6 A Power Supply ~2.2 A Max.
Cooling	Convection
Enclosure type	Metal (Aluminum)
Dimensions	4.02" x 0.98" x 6.5" W x H x D (102 mm x 25 mm x 165 mm) Depth includes mounting flanges
Product weight	Model Only 0.77 lbs (0.35kg) Shipping 2.85 lbs (1.29 kg)
Safety	CE
EMI/EMC	CE, FCC Class A
MTBF	90,000 hours (estimate)
Warranty	3 years parts and labor

Specifications are subject to change without notice

7.0 Supported Input and Output Resolutions

Input Resolutions Supported		Output Resolutions	
640x480 (VGA)	60/72/75/85 Hz	640x480 (VGA)	60 Hz
800x600 (SVGA)	56/60/72/75/85 Hz	800x600 (SVGA)	60 Hz
1024x768 (XGA)	60/70/75/85 Hz	1024x768 (XGA)	60 Hz
1280x720	50/60 Hz	1280x720	60 Hz
1280x768	50/60 Hz	1280x768	60 Hz
1280x800(WXGA)	60/60RB Hz	1280x800 (WXGA)	60 Hz
1280x1024 (SXGA)	60 Hz	1280x1024 (SXGA)	60 Hz
1360x768	60 Hz	1360x768	60 Hz
1400x1050	60/60 RB Hz	1400x1050	60 Hz
1440x900 (WXGA+)	60/60 RB Hz	1440x900 (WXGA+)	60 Hz
1600x1200 (UXGA)	60 Hz	1600x1200 (UXGA)	60 Hz
1680x1050 (WSXGA)	60/60 RB Hz	1680x1050 (WSXGA)	60 Hz
1920x1080	60 Hz	1920x1080	60 Hz
1920x1200 (WUXGA)	60 Hz	1920x1200 (WUXGA)	60 Hz
2560x1600	60 Hz	2560x1600	60 Hz
2048x1080	50/60 Hz	2048x1080	60 Hz
2560x1440	60 RB Hz	2560x1440	60 Hz
720x480I	60 Hz	720x480I	NONE
720x480P	60 Hz	720x480P	60 Hz
720x576I	50 Hz	720x576I	NONE
720x576P	50 HZ	720x576P	50 HZ
1280x720p	50/60 Hz	1280x720p	50/60 Hz
1920x1080i	50/60 Hz	1920x1080i	NONE
1920x1080p	24/25/30/50/60 Hz	1920x1080p	24/25/30/50/60 Hz
2560x1080p	50/60 Hz	2560x1080p	50/60 Hz
3840x2160p	24/25/30/50/60 Hz	3840x2160p	24/25/30/50/60 Hz
4096x2160p	24/25/30/50/60 Hz	4096x2160p	24/25/30/50

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