



## **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

UMA1280 REV N/C

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CUSTOMER  
SUPPORT  
INFORMATION

Order toll-free in the U.S. 800-959-6439  
FREE technical support: 714-641-6607 or [support@hallresearch.com](mailto:support@hallresearch.com)  
**Hall Research**, 1163 Warner Ave. Tustin, CA 92780  
[www.hallresearch.com](http://www.hallresearch.com)

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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 designed 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.

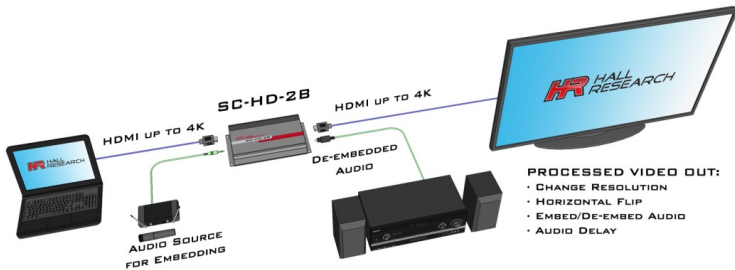
## 1.0 Introduction

Thank you for purchasing Hall Research's SC-HD-2B. This unit can convert and scale HDMI or DVI video in to various output resolutions. Video can also be manipulated in several other ways. For example, the output can be horizontally flipped (mirrored along x-axis), or hue, saturation, and other salient parameters of video can be manipulated. The mirroring feature is useful for teleprompter and rear projection systems.

The unit takes advantage of the HDMI signal's ability to embed audio along with video. 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 PC or HDTV video signal can be scaled up or down to any other PC or HDTV resolution
- Analog and digital audio inputs and outputs
- Supports audio extraction without attached display
- Embeds audio into HDMI from analog or digital audio source
- Horizontal mirroring (x-axis flip)
- Advanced scaling for real-time frame rate capture & conversion
- Selectable audio delay up to 150 ms (for lip sync)

## SC-HD-2B

- OSD adjustment of contrast, brightness, color, size, sampling clock, phase, position, audio source and delay
- HDMI, HDCP, and DVI Compliant
- Supports 50/60 Hz frame rate conversion
- Quick Select button combinations for setting output resolution

## 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.

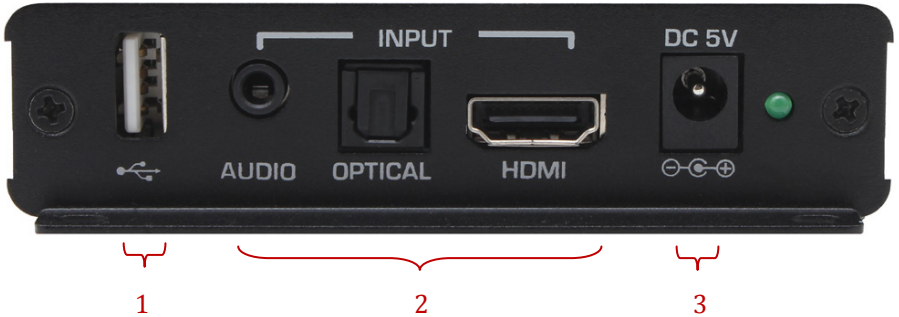
| Top Menu | Sub-Menu        | Value   |
|----------|-----------------|---|
| VIDEO    | OUTPUT          | <b>NATIVE*</b> , 640x480 @60, 800x600 @60, 1024x768 @60, 1280x768 @60, 1280x800 @60, 1280x1024 @60, 1360x768 @60, 1400x1050 @60, 1440x900 @60, 1600x1200 @60, 1680x1050 @60, 1920x1200 @60 RB, 2560x1600 @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          | <b>FULL*</b> , 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 ( <b>100*</b> )   |
|          | HDCP            | SUPPORT OFF, REFER TO SOURCE, <b>REFER TO DISPLAY*</b>  |
|          | NO SIGNAL COLOR | <b>BLACK*</b> , WHITE, BLUE, RED, GREEN   |
|          | BLANK           | <b>OFF*</b> , ON  |
|          | FREEZE          | <b>OFF*</b> , ON  |
|          | MIRROR          | <b>OFF*</b> , H, V, HV  |
|          | AUTO SYNC OFF   | <b>OFF*</b> , 30s, 60s, 3MIN, 5MIN, 10MIN   |
|          | OUTPUT SETTINGS | BYPASS ENABLE [ <b>OFF*</b> , ON]<br>OUTPUT 4K(6G) YUV420 [ <b>OFF*</b> , ON]<br>EXIT   |
|          | EXIT            |   |
| PICTURE  | COLOR GAIN R    | 0-1023 ( <b>512*</b> )  |
|          | COLOR GAIN G    | 0-1023 ( <b>512*</b> )  |
|          | COLOR GAIN B    | 0-1023 ( <b>512*</b> )  |
|          | COLOR OFFSET R  | 0-1023 ( <b>512*</b> )  |
|          | COLOR OFFSET G  | 0-1023 ( <b>512*</b> )  |

## SC-HD-2B

|             |                 |  |
|-------------|-----------------|--|
| PICTURE     | COLOR OFFSET B  | 0-1023 ( <b>512*</b> )   |
|             | BRIGHTNESS      | 0-60 ( <b>30*</b> )  |
|             | CONTRAST        | 0-60 ( <b>30*</b> )  |
|             | HUE             | 0-60 ( <b>30*</b> )  |
|             | SATURATION      | 0-60 ( <b>30*</b> )  |
|             | SHARPNESS       | 0-60 ( <b>0*</b> )   |
|             | NR              | <b>OFF*</b> , LOW, MIDDLE, HIGH, AUTO  |
|             | RESET PICTURE   |  |
|             | EXIT            |  |
| AUDIO       | SOURCE          | <b>AUTO*</b> , TOSLINK, ANALOG   |
|             | VOLUME          | 0-100 ( <b>80*</b> )   |
|             | HDMI MUTE       | <b>OFF*</b> , ON   |
|             | TOSLINK MUTE    | <b>OFF*</b> , ON   |
|             | ANALOG MUTE     | <b>OFF*</b> , ON   |
|             | RESET AUDIO     |  |
|             | EXIT            |  |
| OSD         | H POSITION      | 0-60 ( <b>30*</b> )  |
|             | V POSITION      | 0-60 ( <b>30*</b> )  |
|             | TIMER           | <b>OFF*</b> , 5s, 10s, 15s, 20s, 25s, 30s, 35s, 40s, 45s, 50s, 55s, 60s              |
|             | TRANSPARENT     | 0-50 ( <b>50*</b> )  |
|             | DISPLAY         | OFF, ON, <b>5s*</b> , 10s  |
|             | RESET OSD       |  |
|             | EXIT            |  |
| EDID        | HDMI EDID       | <b>FHD 2CH*</b> , 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 substitute.

### 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 connections: 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).

## 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

|             |   |
|-------------|---|
| Standards   | DVI (single link)<br>HDMI 2.0<br>HDCP 1.4, 2.2  |
| Connectors  | (1) HDMI input, (1) Analog Audio Input (3.5mm stereo)<br>(1) Digital Audio Input (TOSLINK)<br>(1) HDMI output<br>(1) Analog Audio Output (3.5mm stereo)<br>(1) Digital Audio Output (TOSLINK)<br>(1) 2.0 mm 5V DC Power Input |
| Resolutions | DVI signal      VGA (640x480) thru WUXGA (1920x1200)<br>HDTV signal    480p through UHD+ (4096x2160@60Hz)   |
| Bandwidth   | 600 MHz / 18 Gbps   |

### 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   |
| Temp/humidity           | Storage: -4 to +140 °F (-20 to +60 °C) / 20% to 90%, non-condensing<br>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<br>~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)<br>Depth includes mounting flanges   |
| Product weight          | Model Only 0.77 lbs (0.35kg) each   |
|                         | 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

| Supported PC Resolution  | HDMI Input | HDMI Output |
|--------------------------|------------|-------------|
| 640x480 @60/72/75/85     | ✓          | 60Hz        |
| 800x600 @ 56/60/72/75/85 | ✓          | 60Hz        |
| 1024x768 @60/70/75/85    | ✓          | 60Hz        |
| 1280x720 @50/60          | ✓          | 60Hz        |
| 1280x768 @60/75/85       | ✓          | 60Hz        |
| 1280x800 @60/60RB        | ✓          | 60Hz        |
| 1280x1024 @60            | ✓          | ✓           |
| 1360x768 @60             | ✓          | ✓           |
| 1400x1050 @60/60RB       | ✓          | 60Hz        |
| 1440x900 @60/60RB        | ✓          | 60Hz        |
| 1600x1200 @60            | ✓          | ✓           |
| 1680x1050 @60/60RB       | ✓          | 60Hz        |
| 1920x1080 @60            | ✓          | ✓           |
| 1920x1200 @60            | ✓          | ✓           |
| 2560x1600 @60            | ✓          | ✓           |
| 2048x1080 @50/60         | ✓          | ✓           |
| 2560x1440 @60RB          | ✓          | ✓           |

| Supported TV Resolution    | HDMI Input | HDMI Output |
|----------------------------|------------|-------------|
| 720x480i @60               | ✓          | ✗           |
| 720x480p @60               | ✓          | ✓           |
| 720x576i @50               | ✓          | ✗           |
| 720x756p @50               | ✓          | ✓           |
| 1280x720p @50/60           | ✓          | ✓           |
| 1920x1080i @50/60          | ✓          | ✗           |
| 1920x1080p @24/25/30/50/60 | ✓          | ✓           |
| 2560x1080p @50/60          | ✓          | ✓           |
| 3840x2160p @24/25/30/50/60 | ✓          | ✓           |
| 4096@2160p @24/25/30/50/60 | ✓          | ✓           |



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