



# EMX-HD-AUD

## HDMI Audio Extractor w/ EDID Management

- Functions as a pass-through HDMI extender*
- Extracts audio from the HDMI video*
- Provides both digital and analog audio outputs*
- Can learn and Emulate EDID from any display*
- USB port for device management with included software*
- Supports HDCP, HDMI deep-color and 3D*

### CUSTOMER SUPPORT INFORMATION

Order toll-free in the U.S. **800-959-6439**  
FREE technical support, Call **714-641-6607** or fax **7641-6698**  
Mail order: **Hall Research**, 1163 Warner Ave., Tustin, CA 92780  
Web site: [www.hallresearch.com](http://www.hallresearch.com) □ E-mail: [info@hallresearch.com](mailto:info@hallresearch.com)

UMA1201 Rev G



## 1.0 Introduction

Thank you for purchasing the Hall Research EMX-HD-AUD. Use this device to extract the audio from any HDMI video signal for connection to audio equipment. The HDMI signal is reconditioned and boosted as it passes through the device, so it can also serve as an extender. The audio extractor also features EDID management (pass-thru or emulate). So it can emulate any HDMI display and is capable of extracting the audio even if no actual display is connected to the output. Both Toslink (digital) and two channel stereo analog outputs are available on the device. The EMX-HD-AUD is an HDMI transceiver, so it not only re-clocks the video data, it also separates and buffers the DDC channel on which EDID and HDCP are communicated. This can often resolve system-level HDMI signal-chain issues since the EMX-HD-AUD acts as an intelligent intermediary.

The EMX-HD-AUD can be powered from the HDMI source connected to its input and no additional power supply connection is needed for most applications.

The package includes a universal power supply in case the power from the HDMI input source is insufficient. The power supply is plugged in at the USB connector. When the USB port is connected to a PC (cable supplied), the unit is powered by the PC through the USB connection.

The EMX-HD-AUD also provides useful diagnostic information that can help in resolving compatibility of components in the video signal chain.

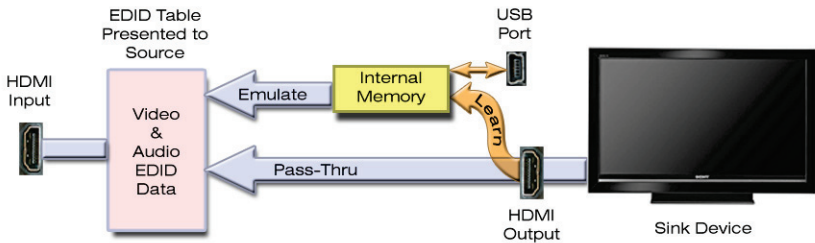
Multi-color LEDs on the unit indicate the mode of operation with regards to EDID routing, and also provide real-time status on the HDMI video and audio signals. For example the LEDs can identify presence of audio and whether it is 2-channel or multi-channel. Similarly the detection of video from source is indicated and it identifies whether there is HDCP on the video or not. When connected to a PC via the USB port, further details about the HDMI signal is available.

The extracted audio is output as analog stereo on a standard 3.5mm connector as well as in digital audio format (SPDIF) on an optical Toslink connector. Normally the audio is left intact on the HDMI output, however the user can remove or mute the audio that is on the HDMI output. Doing so may be advantageous in applications where the connected TV's speakers may be causing interference or echo due to the delay in the audio heard from the TV. Muting the audio output from the HDMI would ensure no sound is heard from the TV even if its volume is turned up.

The EMX-HD-AUD constructs an EDID table (capabilities list) for the connected source. This table is either copied verbatim from the connected display when the unit is in Pass-thru mode, or substitutes an internal EDID data from on board memory when in Emulate mode. The internal EDID data can be learned from any connected display by using the buttons on the box. EDID data can also be uploaded to the EMX-HD-AUD from a PC via the USB port. The device maintains HDCP compliance regardless of the EDID routing mode, so HDCP protected content passes through the system with protection intact even when the EDID is emulated from internal memory.

The EMX-HD-AUD is HDMI 1.3 and 1.4 (deep-color and 3D) compatible, and automatically compensates for the signal degradation caused by long cables of up to 50 ft (15 m) on its input and can drive HDMI cables on its output to 30 ft (10 m).

The package includes a universal power supply, a USB cable for connection to a PC, and the User's Manual. Free Windows® PC software is available from the Hall Research website. This software allows reading, saving, manipulating, and writing EDID tables to and from the device. The software can also control the operational modes and provides diagnostics such as indication of the HDMI input signal's video and audio characteristics



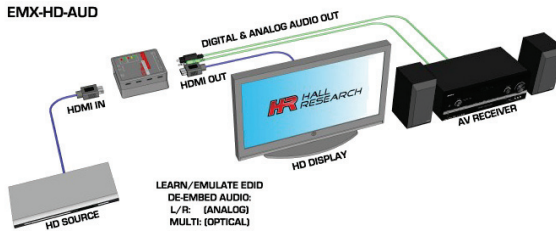
EDID Routing Modes

## 2.0 Features

- Extracts audio from the HDMI video
- Extract audio with or without an actual display connected
- Functions as a pass-through HDMI extender
- Provides both digital and analog audio outputs
- Can remove the audio from the HDMI output signal
- Can learn and Emulate EDID from any display
- LED indicators for Mode and HDMI status
- USB port for device management with free software
- Read and download any display's EDID to your PC
- Upload desired EDID to the device
- Surge protects HDMI input and output
- Supports HDCP, HDMI deep-color and 3D

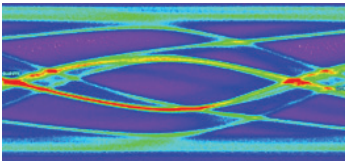
### 3.0 Installation

The EMX-HD-AUD connects between the video source and an optional display device.

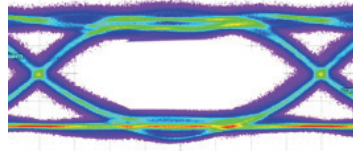


- Connect the included power supply to the mini-USB connector on the video output end of the unit if needed.
- Connect the HDMI or DVI video source to the EMX-HD-AUD video input.
- Connect the EMX-HD-AUD video output to the display device (not required for operation).
- Connect the EMX-HD-AUD 3.5 mm audio output and/or TOSLINK optical output to the external sound system.

Though designed to drive long cables on its output, when used as an extender, it is best to place the EMX-HD-AUD at the end of the long cable. In that way, its automatic equalizer can clean the output signal and open the TMDS “eye”.



TMDS Signal at end of long Cable



TMDS Signal after Equalization

In most applications, the HDMI source should be able to provide enough power to allow the unit to operate without requiring connection of a separate power supply. The only way to find out for sure if a particular source can supply the required power is to try it. If a power supply is deemed necessary, the package includes one that will plug to its USB port. When the EMX-HD-AUD USB port is connected to a PC, it draws power from the USB and no additional power supply is needed.

Connect the video source to the EMX-HD-AUD video input (50 ft or 15 meters max).

Connect the EMX-HD-AUD video output to the display device (30 ft or 10 meters max).

The EMX-HD-AUD LEDs show the current device settings. Refer to the operations section for more information.



Input, Output, and Top views



Model C-HDMI-L-x  
(x = 1.5, 3, 6, 10, 15, 25, 35 or 50 ft)

### 4.0 Default EMULATION resolutions

The following is a list of supported resolutions in the internal EDID of the EMX-HD-AUD as shipped from the factory – the native resolution is highlighted in grey. When the user “learns” a new EDID or uploads a new EDID to the box through the USB port, then this table is overwritten. However the default EDID table can be restored by performing a Factory Default reset (using the free Windows® software, or by pressing buttons as described in Section 6).

RESOLUTION	FREQUENCY	ASPECT RATIO	RESOLUTION	FREQUENCY	ASPECT RATIO
640x480	60, 67, 72, 75	(Aspect 4:3)	720x480i	59.94/60	(Aspect 4:3, 8:9)
800x600	56, 60, 72, 75	(Aspect 4:3)	720x480p	59.94/60	(Aspect 4:3, 8:9)
1024x768	60, 70, 75	(Aspect 4:3)	1280x720p	59.94/60	(Aspect 16:9, 1:1)
<b>1280x720</b>	<b>60</b>	<b>(Aspect 16:9)</b>	1920x1080i	59.94/60	(Aspect 16:9, 1:1)
1280x800	60	(Aspect 16:10)	1920x1080p	50, 59.94/60	(Aspect 16:9, 1:1)
1280x1024	60, 75, 85	(Aspect 5:4)			
1400x1050	60	(Aspect 4:3)			
1440x900	60	(Aspect 16:10)			
1600x1200	60	(Aspect 4:3)			
1680x1050	60	(Aspect 16:10)			
1920x1080	60	(Aspect 16:9)			
1920x1200	60	(Aspect 16:10)			

## 5.0 Power Requirements

This device requires 5 Volts DC which can be sourced through the mini-B USB connector (by connecting to the included power supply or a PC's USB port), or from Pin 18 (+5 V) of the HDMI connector.

To power the EMX-HD-AUD from the HDMI or DVI input, the source must be able to supply a minimum of 100 mA (@ 5 vDC). Using a video source with insufficient power capabilities will result in erratic operation and loss of video. If this happens, the user must connect the USB port to a PC or a power supply.

## 6.0 Operation

The EMX-HD-AUD recessed buttons prevent inadvertent changes to its settings. Changing the settings requires a pointed device inserted into the hole to depress the button. Some functions require depressing the button for several seconds.

### VIDEO LEDS

Two LEDs are used to indicate whether the unit is going to use and pass-through the display's EDID connected at the output to the source, or emulate the EDID from data stored in its internal memory. The same LEDs blink to indicate presence of video and the blink rate is an indication of HDCP on the input video.



- **EMULATE**
  - All portions of the EDID pertaining to video are from internally stored memory.
- **PASS-THRU**
  - All portions of the EDID pertaining to video are duplicated from the attached SINK.
- **Video input Status Indication**
  - A slow blink (~1/sec) indicates NON-HDCP content; a fast blink (~2/sec) indicates HDCP content, no blinking indicates no video detected.

**Note:** If the video EDID is set for Pass- Thru but there is nothing connected to the output port, the emulator will automatically revert to internal EDID (as if it were in Emulate mode) so the source is able to read proper EDID. This assures that the source will "detect" a display and output video even if there is no physical display connected.

### AUDIO LEDS

- **MULTI CH**

- All portions of the EDID pertaining to audio are constructed in such a way to indicate that the device supports compressed multi-channel (bitstream). This by itself does not guaranty that the source will send multi-channel audio, as some sources such as blu-ray players have a menu setting to select the audio output mode.



- **2 CH**

- All portions of the EDID pertaining to audio are constructed in such a way to indicate that the device only supports 2-channel LPCM.

- **PASS-THRU**

- The audio portion of the EDID is directly derived from the audio capabilities of attached display (sink).

- **Audio input Status Indication**

- When Audio is embedded on the input HDMI signal, either the MULTI or the 2CH LED positions will be blinking to indicate the type of Audio that is being received. Note that the Analog output (3.5 mm) is muted if the received HDMI audio is multi-channel. In other words, the 3.5mm analog output is only active when the audio in the HDMI signal is 2-channel. If the source is sending multi-channel audio, it is only extracted to the Toslink digital audio output.

- **LEARNING an EDID**

- Press and hold the VIDEO button for approximately 3~5 seconds until the EMULATE LED starts blinking
- Release the button, the EMULATE LED will continue blinking while the unit reads the EDID from the connected output.
- If the EDID read process is successful, then ALL LEDs will illuminate one at a time in a sequential pattern 5 times.
- If the EDID was NOT successfully read, the PASS-THRU and EMULATE VIDEO LEDs will alternately flash 5 times to indicate the error. This usually indicates that either a cable issue exists or the connected OUTPUT device has an invalid EDID.

- **SET FACTORY DEFAULTS**

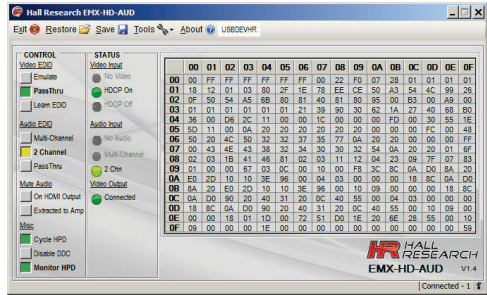
- Simultaneously press and hold BOTH the AUDIO and VIDEO buttons for approximately 3~5 seconds until BOTH the VIDEO EMULATE and AUDIO MULTI LEDs start blinking together.
- Release both buttons.
- After restoring factory defaults, ALL LEDs will illuminate one at a time in a circular pattern 5 times.

## 7.0 Free Windows Software GUI

The EMX-HD-AUD is controllable via a free Windows™ based GUI available on the Hall Research website at <http://www.hallresearch.com>.



All of the device features, and more, are accessible from the GUI. EDID files can be exported and modified using 3<sup>rd</sup> party software and imported back into the EMX-HD-AUD. The device is also capable of writing custom EDID data back to compatible display devices.



The user guide for the Software GUI is only available on the website.

## 8.0 Troubleshooting

**No LEDs illuminate** ..... **Verify cabling and check power supply**

Device will not remember settings or will not LEARN and EDID or the LEDs only momentarily FLASH when buttons are pushed

**No Video** ..... **Verify cabling and check power supply.**

**Verify HDCP compliant display for HDCP content.**  
**Verify the GUI DDCcontrol is enabled if HDCP required.**

**No Audio** ..... **Verify source audio and video formats**

**Verify EDID has audio capabilities**

If neither MULTI nor 2CH LED's are blinking, input may be DVI rather than HDMI video. Ensure GUI 'MUTE' controls are set correctly and not MUTED. The 3.5mm stereo audio is only active when the HDMI audio format is LPCM. No 'Down Conversion' of the digital audio is possible. LPCM, Dolby and DTS audio comes from the TOSLink connector.

**EDID Not Learned Correctly** ..... **Ensure VIDEO & AUDIO modes not changed**

When an EDID is learned, the EMX-HD-AUD will be in Pass-Thru modes for both Video and Audio. In these modes, the EDID will remain un-touched and can be exported, if desired.

If either VIDEO or AUDIO modes are changed; the EDID will be mixed to have audio capabilities. The previous 'un-touched' EDID will no longer be available unless previously exported.

## 9.0 Returning unit for Repair

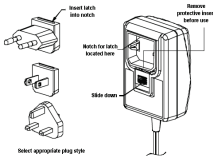
If you need to transport or ship your unit: Package it carefully. We recommend that you use the original container.

The EMX-HD-AUD has no user serviceable parts. Opening the unit will void the warranty.

Before you ship the units back to Hall Research for repair or return, contact us to get a Return Authorization (RMA) number.

## 10.0 Specifications

Power Supply.....(North American)  
 5 vDC, 1.2 ADC  
 USB-A to mini-B cable  
 90-264 VAC, 47-63 HZ  
 CE/FCC/UL



(Export)  
 5 vDC, 1.2 ADC  
 Integral mini-B cable  
 90-264 VAC, 47-63 HZ  
 CE/FCC/UL  
 Inter-changeable blades

Size ..... 2.71" (W) x 2.825" (D) x 1.25" (H)  
 (68.83 mm) x (71.76 mm) x (31.75 mm)

Weight ..... 1 Lb (0.453 kg)

Operating Temperature ..... 32 to 122 DegF (0 to 50 DegC)

Storage Temperature ..... -40 to 185 DegF (-40 to 85 DegC)

Humidity ..... 10 to 90% non-condensing

Cooling ..... Convection

Enclosure type ..... Black Plastic ABS-94V0, UL File #56070

Vibration ..... ISTA 1A in carton (International Safe Transit Association)

Safety ..... CE

EMI/EMC ..... CE, FCC Class A

MTBF ..... 90,000 hours

Warranty ..... 2 years parts and labor

USB ..... 1.1 Full Speed

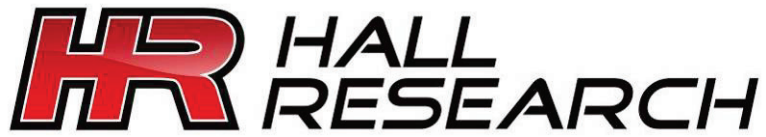
Supported video formats ..... DVI 1.0  
 HDMI™ 1.4  
 HDCP 1.0

Supported audio formats ..... LPCM (2, 5 and 7 channel)  
 Dolby 5.1 or 7.1  
 DTS 5.1  
 16, 20, 24 bit

## 11.0 Trademarks

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