

EDID Emulator for 4K HDR HDMI Signals



Version Information

Version	Release Date	Notes
1	02/17	Initial release

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Operating Notes



IMPORTANT: Visit <http://www.atlona.com/product/AT-ETU-SYNC> for the latest firmware updates and User Manual.

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- repair or facilitate the repair of defective products within a reasonable period of time, restore products to their proper operating condition and return defective products free of any charge for necessary parts, labor and shipping.

OR

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Atlona, Inc. (“Atlona”) Limited Product Warranty

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Important Safety Information

CAUTION
 RISK OF ELECTRIC SHOCK
 DO NOT OPEN

CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK DO NOT OPEN ENCLOSURE OR EXPOSE TO RAIN OR MOISTURE. NO USER-SERVICEABLE PARTS INSIDE REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.



The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance instructions in the literature accompanying the product.

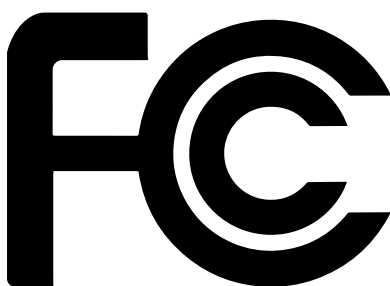


The information bubble is intended to alert the user to helpful or optional operational instructions in the literature accompanying the product.

1. Read these instructions.
2. Keep these instructions.
3. Heed all warnings.
4. Follow all instructions.
5. Do not use this product near water.
6. Clean only with a dry cloth.
7. Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
8. Do not install or place this product near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
9. Do not defeat the safety purpose of a polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
10. Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the product.
11. Only use attachments/accessories specified by Atlona.
12. To reduce the risk of electric shock and/or damage to this product, never handle or touch this unit or power cord if your hands are wet or damp. Do not expose this product to rain or moisture.
13. Unplug this product during lightning storms or when unused for long periods of time.
14. Refer all servicing to qualified service personnel. Servicing is required when the product has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the product, the product has been exposed to rain or moisture, does not operate normally, or has been dropped.



FCC Statement



FCC Compliance and Advisory Statement: This hardware device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: 1) this device may not cause harmful interference, and 2) this device must accept any interference received including interference that may cause undesired operation. This equipment has been tested and found 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 in a commercial installation.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed or used in accordance with the instructions, may cause harmful interference to radio communications. However there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures: 1) reorient or relocate the receiving antenna; 2) increase the separation between the equipment and the receiver; 3) connect the equipment to an outlet on a circuit different from that to which the receiver is connected; 4) consult the dealer or an experienced radio/TV technician for help. Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. Where shielded interface cables have been provided with the product or specified additional components or accessories elsewhere defined to be used with the installation of the product, they must be used in order to ensure compliance with FCC regulations.

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Introduction

The Atlona Etude™ Sync (AT-ETU-SYNC) provides EDID emulation and Hot Plug Detect communication between HDMI® sink and source devices. It detects and corrects for signal integrity issues associated with cabling or connections, and can resolve compatibility problems between a source and sink. The Etude Sync is compatible with high dynamic range (HDR) formats and is HDCP 2.2 compliant. It supports 4K/UHD video @ 60 Hz with 4:4:4 chroma sampling, as well as HDMI data rates up to 18 Gbps. In addition to addressing HDMI signal and device-related issues, the Etude Sync reports HDCP compliance at the source and destination, and can manage EDID communication with the source. This device is ideal for AV system troubleshooting as well as ensuring reliable, consistent performance.

The Etude Sync is for residential and commercial applications with the latest as well as emerging 4K/UHD and HDR sources and displays. It is compatible with all video resolutions, audio formats, and color space formats supported in the HDMI 2.0a specification, plus the ability to pass metadata for HDR content. The Etude Sync includes Atlona's award-winning 10-year limited product warranty and customer support services, so that integrators can specify, purchase, and install with confidence.

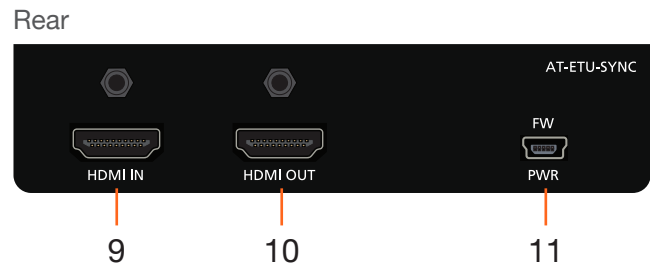
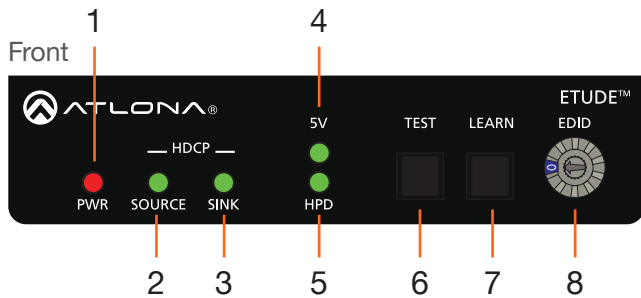
Features

- 4K/UHD capability @ 60 Hz with 4:4:4 chroma sampling, plus support for HDR (High Dynamic Range) formats
- Supports video, audio, and color space formats in the HDMI 2.0a specification
- HDCP 2.2 and 1.4
- LPCM 7.1 audio, Dolby® Digital, Dolby Digital Plus, Dolby Atmos®, Dolby TrueHD, DTS:X™, and DTS-HD Master Audio™
- 3D pass through
- 10 EDID modes
- Allows “learning” of EDID from a sink device
- Essential tool for testing and troubleshooting connectivity issues in any system
- Front-panel indicators provide power and signal status information for +5 volt source supply, hot plug detect, and HDCP
- Restores +5 volt and HPD signals
- Compact and portable

Package Contents

1 x AT-ETU-SYNC
1 x Wall/table mount ears
1 x USB to mini-USB power cable
1 x Installation Guide


Panel Description



- 1 PWR**
Glows red when the unit is powered.
- 2 SOURCE**
Indicates the source status. Refer to [Performing System Tests \(page 14\)](#) for more information.
- 3 SINK**
Indicates the sink status. Refer to [Performing System Tests \(page 14\)](#) for more information.
- 4 5V**
Reports the status of the 5V signal from the source device. Refer to [Performing System Tests \(page 14\)](#) for more information.
- 5 HPD**
Reports the Hot-Plug Detect (HPD) status from the sink device. Refer to [Performing System Tests \(page 14\)](#) for more information.
- 6 TEST**
Press this button to begin the test procedure. Refer to [Performing System Tests \(page 14\)](#) for more information.
- 7 LEARN**
This LED indicator will glow bright green when the switcher is powered. Refer to [Learning an EDID \(page 12\)](#) for more information.
- 8 EDID**
Turn this dial to select the desired EDID mode. Refer to [Selecting an EDID \(page 11\)](#) for more information.
- 9 HDMI IN**
Connect an HDMI cable from the source to this port.
- 10 HDMI OUT**
Connect an HDMI cable from the sink (display) to this port.
- 11 FW / PWR**
Connect the included USB cable to this port. This port is used to power the AT-ETU-SYNC and to update firmware. As of this writing, no firmware updates are available.

Installation

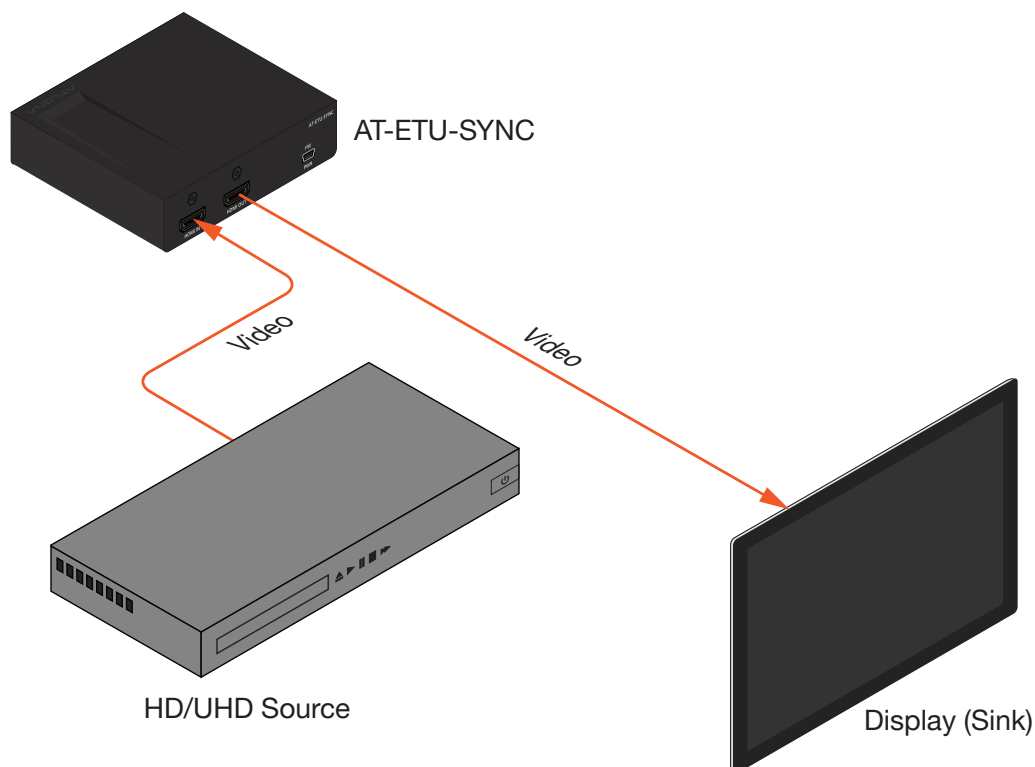
1. Connect an HDMI cable from the source to the **HDMI IN** port on the AT-ETU-SYNC.
2. Connect an HDMI cable from the sink (display) to the **HDMI OUT** port on the AT-ETU-SYNC.

 **IMPORTANT:** The AT-ETU-SYNC is a High Dynamic Range (HDR) device. For best performance, use premium HDMI cables that are HDR-certified. The HDMI cable between the AT-ETU-SYNC and the display (sink) and the should not exceed 15 feet (4.5 meters).

3. Connect the included 5V DC power supply to the **FW / PWR** port on the AT-ETU-SYNC.
4. Connect the 5V DC power supply to an available AC outlet.

Connection Diagram

The illustration below, shows the proper location of the AT-ETU-SYNC in a basic source-sink setup. The location of the AT-ETU-SYNC will vary, depending on the system. Before using the AT-ETU-SYNC as an EDID emulator, an EDID must be selected or learned. Refer to [Selecting an EDID \(page 11\)](#) and [Learning an EDID \(page 12\)](#) for more information.



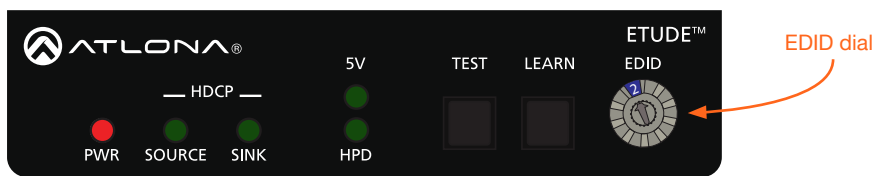
Basic Operation

Selecting an EDID

The AT-ETU-SYNC includes 10 EDID modes, which can be selected using the **EDID** dial. Refer to [EDID Modes \(page 17\)](#), for details on supported features for each EDID mode.

Mode	Description	Mode	Description
0	Learn mode	5	4K 60 4:2:0 / multichannel (HD lossless)
1	1080p 3D / 2 channel	6	4K 60 4:2:0 HDR / 2 channel
2	1080p 3D / multichannel (lossless)	7	4K 60 4:2:0 HDR / multichannel (HD lossless)
3	1080p DVI	8	4K 60 4:4:4 8-bit / 2 channel
4	4K 60 4:2:0 / 2 channel	9	4K 60 4:4:4 8-bit / multichannel (HD lossless)

1. Power the AT-ETU-SYNC.
2. Rotate the **EDID** dial to the desired EDID mode (0 - 9). Refer to the table above for a listing of available EDID modes.



IMPORTANT: By default, EDID mode 0 is blank. If an EDID has not been saved to mode 0, then refer to [Learning an EDID \(page 12\)](#) for information.

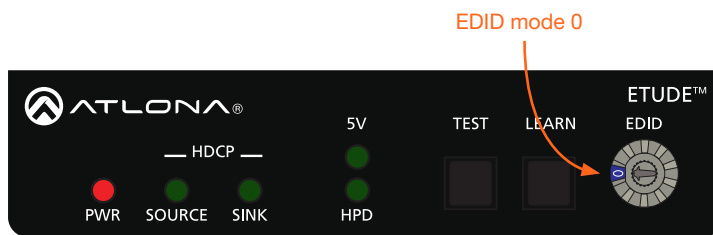
3. Connect an HDMI cable from the display to the **HDMI OUT** port on the AT-ETU-SYNC.
4. Connect another HDMI cable from the source to the **HDMI IN** port on the AT-ETU-SYNC.
5. Connect the 5V DC power supply between the **FW / USB** port, on the AT-ETU-SYNC, and an available AC outlet.
6. Power the source.
7. Power the sink device.
8. The source will use the selected EDID mode when sending audio/video data to the sink device.

NOTE: The **EDID** dial can be set to any EDID mode, while the AT-ETU-SYNC is powered and connected to the system.

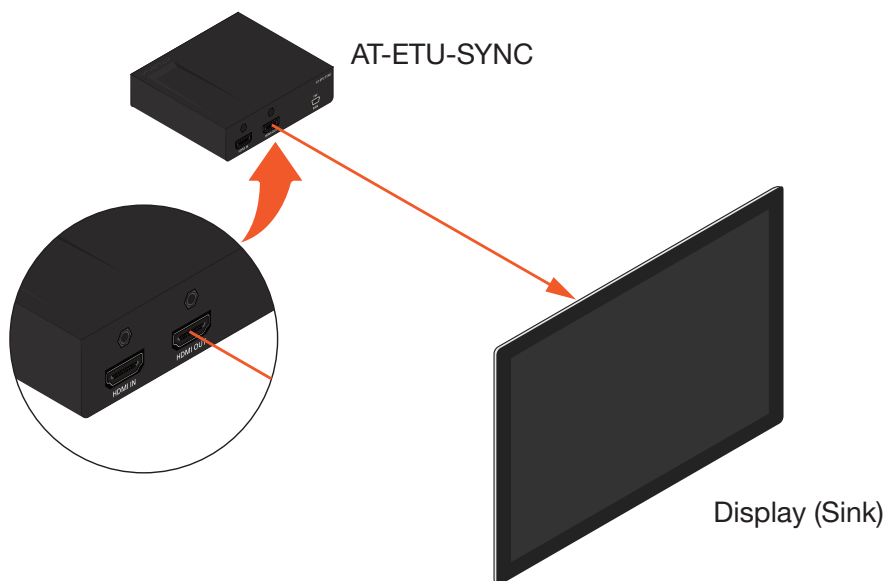
Learning an EDID

The AT-ETU-SYNC has the ability to learn the EDID from another device, using EDID mode 0. Once learned, the EDID data will be read by the source, providing all the necessary details of the type of signal that will be sent to the sink device.

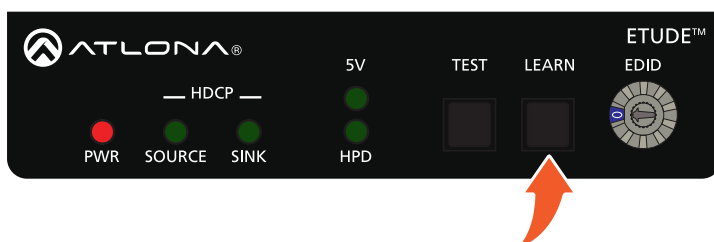
1. Disconnect the AT-ETU-SYNC from the system.
2. Power the AT-ETU-SYNC.
3. Rotate the **EDID** dial to EDID mode 0, as shown.



4. Connect an HDMI cable from the sink device to the **HDMI OUT** port on the AT-ETU-SYNC. Make sure that the sink device is powered-on.

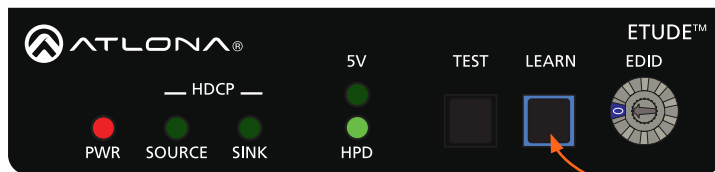


5. Press and hold the **LEARN** button on the AT-ETU-SYNC until the **HPD** light glows green.



6. Release the **LEARN** button.






During the process, the **LEARN** button will flash blue as the EDID data is copied into memory.



Flashes blue while learning EDID

If the EDID was successfully learned, then the **LEARN** button will turn off. If an error was encountered during the operation, then the **LEARN** button will flash red.

If an error is encountered, disconnect the power from the AT-ETU-SYNC, power-cycle the sink device, then repeat steps 4 through 6. If after several attempts, the error is encountered, then this may indicate that the sink device has a bad or corrupt EDID.

LED/Button	State		Description
LEARN	Flashing blue		EDID being learned.
	Off		EDID learned successfully.
	Flashing red		Error learned EDID. <ul style="list-style-type: none"> • Bad or corrupt EDID on sink. • No sink device present or detected. • Make sure sink is powered. • Check for proper connection between sink device and AT-ETU-SYNC. • Possible bad cable.
HPD	Solid green		Sink device OK.
	Off		Sink device not detected.

7. Reconnect the source (or other intermediate device) to the **HDMI IN** port on the AT-ETU-SYNC. The source will read the EDID data stored in EDID mode 0 and use this information to send the proper audio and video formats to the sink device.

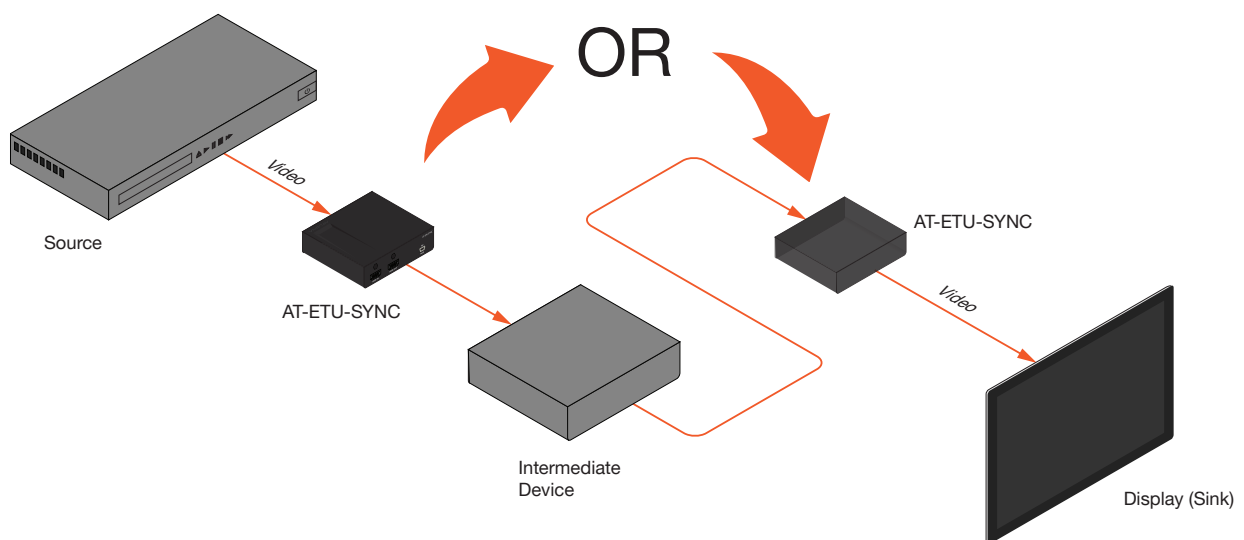
NOTE: EDID data will remain in EDID mode 0, even after power is disconnected. To learn a new EDID and overwrite the existing EDID data in mode 0, repeat steps 1 through 6.

Performing System Tests

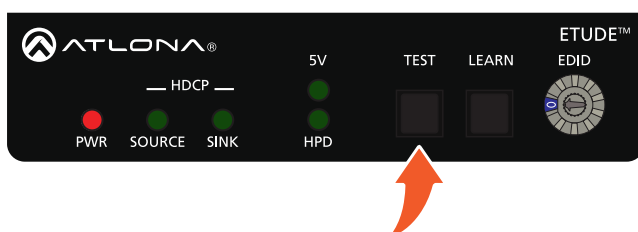
The AT-ETU-SYNC features a **TEST** button which tests the source, sink, or the entire system to aid in troubleshooting connectivity issues.

In-Line Testing

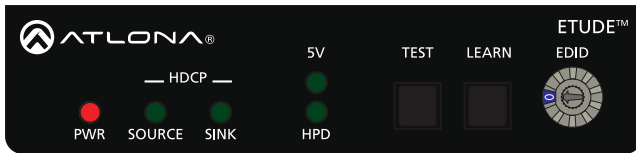
1. Power the AT-ETU-SYNC.
2. Position the AT-ETU-SYNC between the source and sink. The actual position of the AT-ETU-SYNC will depend upon the setup. In the illustration, below, an intermediate device (such as a switcher, splitter, or matrix) has been introduced. If no intermediate devices are present, then connect the AT-ETU-SYNC between the source and the display (sink).
 - Problem is suspected between the sink and any upstream devices:
 - a. Connect an HDMI cable from the intermediate device to the **HDMI IN** port on the AT-ETU-SYNC.
 - b. Connect an HDMI cable from the **HDMI OUT** port on the AT-ETU-SYNC to the display (sink).
 - If the problem is suspected between the source and the intermediate device(s):
 - a. Connect an HDMI cable from the source to the **HDMI IN** port on the AT-ETU-SYNC.
 - b. Connect an HDMI cable from the **HDMI OUT** port on the AT-ETU-SYNC to the intermediate device.














3. Press and release the **TEST** button on the front panel of the AT-ETU-SYNC.



4. The **SOURCE**, **SINK**, **5V**, and **HPD** indicators will display the current testing results. Refer to the table, below.



LED	State		Description
SOURCE	Solid green		Source is HDCP 2.2
	Flashing green		Source is HDCP 1.4
	Solid red		The source is not HDCP-compliant
SINK	Solid green		Sink is HDCP 2.2
	Flashing green		Sink is HDCP 1.4
	Solid red		Sink is not HDCP-compliant
5V	Solid red		5V signal from the source is not detected
	Solid green		5V signal from the source is present
	Off		No source device is detected <ul style="list-style-type: none"> • Check that a source device is connected • Verify the integrity of the HDMI cable connected to the source device
HDP	Solid red		HDP is low. The AT-ETU-SYNC will generate
	Off		No sink device is detected <ul style="list-style-type: none"> • Check that a sink device is connected • Verify the integrity of the HDMI cable connected to the sink

5. After the test procedure is complete all LED indicators, except for the **PWR** indicator, will turn off.

Source Testing

1. Power the AT-ETU-SYNC.
2. Connect an HDMI cable from the source to the **HDMI IN** port on the AT-ETU-SYNC.
3. Press and release the **TEST** button on the front panel of the AT-ETU-SYNC.
4. The **SOURCE** and **5V** indicators will display the testing results. Note that since a sink device is not present, the **HPD** and **SINK** indicators are ignored. Refer to the table on the previous page.

Sink Testing

1. Power the AT-ETU-SYNC.
2. Connect an HDMI cable from the sink to the **HDMI OUT** port on the AT-ETU-SYNC.
3. Press and release the **TEST** button on the front panel of the AT-ETU-SYNC.
4. The **SINK** and **HPD** indicators will display the testing results. Note that since a source device is not present, the **5V** and **SOURCE** indicators are ignored. Refer to the table on the previous page.



NOTE: When the EDID dial is set to EDID mode 0, during a test procedure, the **LEARN** button will glow blue. If the EDID dial is set to any other mode, then the **LEARN** button will remain “off”. Setting the EDID mode will not affect the results of the test procedure.

DDC Reclocking

DDC relocking, sometimes referred to as “clock stretching”, is a method for correcting sync issues on the DDC line. The DDC line (also known as the I²C bus) is part of the HDMI interface and is responsible for transmitting EDID and HDCP information from the sink to the source. The DDC line contains two signal lanes: SDA (data) and SCL (clock). Most of the time, the timing between these two lanes is correct. However, lengthy cables and/or intermediate devices between the source and sink, can introduce synchronization problems between these two lanes. This can result in a variety of issues, such as flashing picture, drop-outs, artifacts, and incorrect resolution.

Placing the AT-ETU-SYNC in-line, between the source and sink, will usually correct these issues. Experimenting with the position of the AT-ETU-SYNC, within the system - particularly when intermediate devices are installed - may be necessary to obtain the correct results. If the problem persists, contact an Atlona Technical Support Engineer for assistance.



NOTE: Some HDMI devices do not support clock-stretching.

Appendix

EDID Modes

The AT-ETU-SYNC comes with ten EDID modes. Mode 0 is used to record an external EDID and modes 1 through 9 are pre-programmed. The details for each EDID mode are listed below.

EDID Mode	Supported Features
0	No data until learned
1	1920 x 1080p at 60Hz - HDTV (16:9, 1:1) [Native] (3D support) 1280 x 720p at 60Hz - HDTV (16:9, 1:1) (3D support) 1920 x 1080i at 30Hz - HDTV (16:9, 1:1) (3D support) 720 x 480p at 60Hz - EDTV (16:9, 32:27) 1920 x 1080p at 24Hz - HDTV (16:9, 1:1) (3D support) 1920 x 1080p at 30Hz - HDTV (16:9, 1:1) (3D support) 640 x 480i at 30Hz - SDTV (16:9, 1:1) YCbCr 4:4:4, YCbCr 4:2:2 Top-Bottom, Side-by-Side LPCM 2-channel, 16/20/24 bit depths at 44/48/96/192 kHz FL/FR
2	1920 x 1080p at 60Hz - HDTV (16:9, 1:1) [Native] (3D support) 1280 x 720p at 60Hz - HDTV (16:9, 1:1) (3D support) 1920 x 1080i at 60Hz - HDTV (16:9, 1:1) (3D support) 720 x 480p at 60Hz - EDTV (16:9, 32:27) 1920 x 1080p at 24Hz - HDTV (16:9, 1:1) (3D support) 1920 x 1080p at 30Hz - HDTV (16:9, 1:1) (3D support) YCbCr 4:4:4, YCbCr 4:2:2 Top-Bottom, Side-by-Side LPCM 2-channel, 16/20/24 bit depths at 32/44/48/88/96/176/192 kHz LPCM 6-channel, 16/20/24 bit depths at 32/44/48/88/96/176/192 kHz LPCM 8-channel, 16/20/24 bit depths at 32/44/48/88/96/176/192 kHz AC-3 6-channel, 680k max. bit rate at 32/44/48 kHz DTS 6-channel, 1536k max. bit rate at 32/44/48/88/96 kHz DD+ 8-channel at 32/44/48 kHz DVD-A 8-channel at 48/96/192 kHz DTS-HD 8-channel, 16-bit at 44/48/88/96/176/192 kHz FL/FR, FLFE, FC, RL/RR, RC, RLC/RRC
3	1920 x 1080p at 60Hz - VESA STD [Native] 720 x 400p at 70Hz - IBM VGA 640 x 480p at 60Hz - IBM VGA 800 x 600p at 60Hz - VESA 1024 x 768p at 60Hz - VESA 1280 x 720p at 60Hz - VESA STD 1280 x 960p at 60Hz - VESA STD 1280 x 1024p at 60Hz - VESA STD 1440 x 900p at 60Hz - VESA STD 1600 x 1200p at 60Hz - VESA STD 1680 x 1050p at 60Hz - VESA STD
4	3840 x 2160p at 60Hz (16:9) [Native] 1920 x 1080p at 60Hz - HDTV (16:9, 1:1) 1920 x 1080p at 50Hz - HDTV (16:9, 1:1) 1920 x 1080i at 60Hz - HDTV (16:9, 1:1) 1920 x 1080i at 50Hz - HDTV (16:9, 1:1) 1920 x 1080p at 24Hz - HDTV (16:9, 1:1)

EDID Mode	Supported Features
4 (continued)	1920 x 1080p at 25Hz - HDTV (16:9, 1:1) 1920 x 1080p at 30Hz - HDTV (16:9, 1:1) 1280 x 720p at 60Hz - HDTV (16:9, 1:1) 1280 x 720p at 50Hz - HDTV (16:9, 1:1) 720 x 480p at 60Hz - EDTV (16:9, 32:27) 720 x 576p at 50Hz - EDTV (16:9, 64:45) 720 x 480i at 60Hz - Doublescan (16:9, 32:27) 720 x 576i at 50Hz - Doublescan (16:9, 64:45) YCbCr 4:4:4, YCbCr 4:2:2 LPCM 2-channel, 16/20/24 bit depths at 44/48/96/192 kHz FL/FR
5	3840 x 2160p at 60Hz (16:9) [Native] 1920 x 1080p at 60Hz - HDTV (16:9, 1:1) 1920 x 1080p at 50Hz - HDTV (16:9, 1:1) 1920 x 1080i at 60Hz - HDTV (16:9, 1:1) 1920 x 1080i at 50Hz - HDTV (16:9, 1:1) 1920 x 1080p at 24Hz - HDTV (16:9, 1:1) 1920 x 1080p at 25Hz - HDTV (16:9, 1:1) 1920 x 1080p at 30Hz - HDTV (16:9, 1:1) 1280 x 720p at 60Hz - HDTV (16:9, 1:1) 1280 x 720p at 50Hz - HDTV (16:9, 1:1) 720 x 480p at 60Hz - EDTV (16:9, 32:27) 720 x 576p at 50Hz - EDTV (16:9, 64:45) 720 x 480i at 60Hz - Doublescan (16:9, 32:27) 720 x 576i at 50Hz - Doublescan (16:9, 64:45) YCbCr 4:4:4, YCbCr 4:2:2 LPCM 2-channel, 16/20/24 bit depths at 32/44/48/88/96/176/192 kHz LPCM 6-channel, 16/20/24 bit depths at 32/44/48/88/96/176/192 kHz LPCM 8-channel, 16/20/24 bit depths at 32/44/48/88/96/176/192 kHz AC-3 6-channel, 640k max. bit rate at 32/44/48 kHz DTS 6-channel, 1536k max. bit rate at 44/48/88/96 kHz DD+ 8-channel at 44/48 kHz DVD-A 8-channel at 48/96/192 kHz DTS-HD 8-channel, 16-bit at 44/48/88/96/176/192 kHz FL/FR, FLFE, FC, RL/RR, RLC/RRC
6	3840 x 2160p at 60Hz (16:9) [Native] 1920 x 1080p at 60Hz - HDTV (16:9, 1:1) 1920 x 1080p at 50Hz - HDTV (16:9, 1:1) 1920 x 1080i at 60Hz - HDTV (16:9, 1:1) 1920 x 1080i at 50Hz - HDTV (16:9, 1:1) 1920 x 1080p at 24Hz - HDTV (16:9, 1:1) 1920 x 1080p at 25Hz - HDTV (16:9, 1:1) 1920 x 1080p at 30Hz - HDTV (16:9, 1:1) 1280 x 720p at 60Hz - HDTV (16:9, 1:1) 1280 x 720p at 50Hz - HDTV (16:9, 1:1) 720 x 480p at 60Hz - EDTV (16:9, 32:27) 720 x 576p at 50Hz - EDTV (16:9, 64:45) 720 x 480i at 60Hz - Doublescan (16:9, 32:27) 720 x 576i at 50Hz - Doublescan (16:9, 64:45) YCbCr 4:4:4, YCbCr 4:2:2 LPCM 2-channel, 16/20/24 bit depths at 44/48/96/192 kHz FL/FR

EDID Mode	Supported Features
7	<p>3840 x 2160p at 60Hz (16:9) [Native] 1920 x 1080p at 60Hz - HDTV (16:9, 1:1) 1920 x 1080p at 50Hz - HDTV (16:9, 1:1) 1920 x 1080i at 60Hz - HDTV (16:9, 1:1) 1920 x 1080i at 50Hz - HDTV (16:9, 1:1) 1920 x 1080p at 24Hz - HDTV (16:9, 1:1) 1920 x 1080p at 25Hz - HDTV (16:9, 1:1) 1920 x 1080p at 30Hz - HDTV (16:9, 1:1) 1280 x 720p at 60Hz - HDTV (16:9, 1:1) 1280 x 720p at 50Hz - HDTV (16:9, 1:1) 720 x 480p at 60Hz - EDTV (16:9, 32:27) 720 x 576p at 50Hz - EDTV (16:9, 64:45) 720 x 480i at 60Hz - Doublescan (16:9, 32:27) 720 x 576i at 50Hz - Doublescan (16:9, 64:45) YCbCr 4:4:4, YCbCr 4:2:2 LPCM 2-channel, 16/20/24 bit depths at 32/44/48/88/96/176/192 kHz LPCM 6-channel, 16/20/24 bit depths at 44/48/88/96/176/192 kHz LPCM 8-channel, 16/20/24 bit depths at 32/44/48/88/96/176/192 kHz AC-3 6-channel, 640k max. bit rate at 32/44/48 kHz DTS 6-channel, 1536k max. bit rate at 44/48/88/96 kHz DD+ 8-channel at 44/48 kHz DTS-HD 8-channel, 16-bit at 44/48/88/96/176/192 kHz FL/FR, FLFE, FC, RL/RR, RLC/RRC</p>
8	<p>3840 x 2160p at 60Hz (16:9) [Native] 1920 x 1080p at 60Hz - HDTV (16:9, 1:1) 1920 x 1080p at 50Hz - HDTV (16:9, 1:1) 1920 x 1080i at 60Hz - HDTV (16:9, 1:1) 1920 x 1080i at 50Hz - HDTV (16:9, 1:1) 1920 x 1080p at 24Hz - HDTV (16:9, 1:1) 1920 x 1080p at 25Hz - HDTV (16:9, 1:1) 1920 x 1080p at 30Hz - HDTV (16:9, 1:1) 1280 x 720p at 60Hz - HDTV (16:9, 1:1) 1280 x 720p at 50Hz - HDTV (16:9, 1:1) 720 x 480p at 60Hz - EDTV (16:9, 32:27) 720 x 576p at 50Hz - EDTV (16:9, 64:45) 720 x 480i at 60Hz - Doublescan (16:9, 32:27) 720 x 576i at 50Hz - Doublescan (16:9, 64:45) YCbCr 4:4:4, YCbCr 4:2:2 LPCM 2-channel, 16/20/24 bit depths at 44/48/96/192 kHz FL/FR</p>
9	<p>3840 x 2160p at 60Hz (16:9) [Native] 1920 x 1080p at 60Hz - HDTV (16:9, 1:1) 1920 x 1080p at 50Hz - HDTV (16:9, 1:1) 1920 x 1080i at 60Hz - HDTV (16:9, 1:1) 1920 x 1080i at 50Hz - HDTV (16:9, 1:1) 1920 x 1080p at 24Hz - HDTV (16:9, 1:1) 1920 x 1080p at 25Hz - HDTV (16:9, 1:1) 1920 x 1080p at 30Hz - HDTV (16:9, 1:1) 1280 x 720p at 60Hz - HDTV (16:9, 1:1) 1280 x 720p at 50Hz - HDTV (16:9, 1:1) 720 x 480p at 60Hz - EDTV (16:9, 32:27) 720 x 576p at 50Hz - EDTV (16:9, 64:45) 720 x 480i at 60Hz - Doublescan (16:9, 32:27)</p>

EDID Mode	Supported Features
9 (continued)	720 x 576i at 50Hz - Doublescan (16:9, 64:45) YCbCr 4:4:4, YCbCr 4:2:2 LPCM 2-channel, 16/20/24 bit depths at 32/44/48/88/96/176/192 kHz LPCM 6-channel, 16/20/24 bit depths at 32/44/48/88/96/176/192 kHz LPCM 8-channel, 16/20/24 bit depths at 32/44/48/88/96/176/192 kHz AC-3 6-channel, 640k max. bit rate at 32/44/48 kHz DTS 6-channel, 1536k max. bit rate at 44/48/88/96 kHz DD+ 8-channel at 44/48 kHz DVD-A 8-channel at 48/96/192 kHz DTS-HD 8-channel, 16-bit at 44/48/88/96/176/192 kHz FL/FR, FLFE, FC, RL/RR, RLC/RRC

Specifications

Video	
HD/SD	4096x2160@24/25/30/50/60Hz, 3840x2160@24/25/30/50/60Hz, 2048x1080p, 1080p@23.98/24/25/29.97/30/50/59.94/60Hz, 1080i@50/59.94/60Hz, 720p@50/59.94/60Hz, 576p, 576i, 480p, 480i
VESA	2560x1600, 2048x1536, 1920x1200, 1680x1050, 1600x1200, 1440x900, 1400x1050, 1366x768, 1360x768, 1280x1024, 1280x800, 1152x768, 1024x768, 800x600, 640x480
Color Space	YUV, RGB
Chroma Subsampling	4:4:4, 4:2:2, 4:2:0
Color Depth	8-bit, 10-bit, 12-bit

Audio	
Analog In	PCM 2Ch, LPCM 5.1, LPCM 7.1, Dolby® Digital, Dolby Digital Plus, Dolby TrueHD, DTS® 5.1, DTS-HD Master Audio™, DTS:X™, Dolby Atmos®
Sample Rate	32 kHz, 44.1 kHz, 48 kHz, 88.2 kHz, 96 kHz, 176.4 kHz, 192 kHz
Bit Rate	24-bit (max.)

Resolution / Distance	4K/UHD - Feet / Meters		1080p - Feet / Meters	
HDMI @ 60 Hz	6	2	30	10
HDMI @ 24 Hz	16	5	50	15

Signal	
Bandwidth	18 Gbps
CEC	No
HDCP	2.2

Temperature	Fahrenheit	Celsius
Operating	32 to 122	0 to 50
Storage	-4 to 140	-20 to 60
Humidity (RH)	20% to 90%, non-condensing	

Power	
Consumption	6.5 W
Supply	Input: 100 - 240 V AC, 50/60 Hz Output: 5 V DC, 1 A

Dimensions	Inches	Millimeters
H x W x D	1.02 x 4.29 x 3.50	26 x 109 x 89
H x W x D (w/ ears)	1.02 x 5.00 x 3.74	26 x 127 x 95

Weight	Pounds	Kilograms
Device	0.6	0.27

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