HONO™ AVB 4.4M/4.4D/2.2M/2.2D

FOUR OR TWO CHANNEL MIC/LINE/AES AVB INTERFACES

1 DESCRIPTION

The Hono AVB 4.4M, 4.4D, 2.2M and 2.2D are AVB interfaces in the Hono Mini series designed for use in the professional installed sound market. The Hono AVB 4.4M and 2.2M receive 8 AVB inputs and send them to 4 balanced analog audio outputs (2 on the 2.2M), while simultaneously receiving 4 analog inputs (2 on the 2.2M) of mic/line level balanced audio and transmitting them to 8 AVB outputs. The Hono AVB 4.4D and 2.2D receive 8 AVB inputs and send them to 4 AES/EBU audio outputs (2 on the 2.2D), while simultaneously receiving 4 digital inputs (2 on the 2.2D) of AES/EBU audio and transmitting them as 8 AVB outputs. The Hono AVB Minis are perfect for applications requiring additional inputs or outputs in an existing AVB system.

2 FEATURES

Inputs
- 4 (4.4M) or 2 (2.2M) balanced analog mic/line inputs
- 4 (4.4D) or 2 (2.2D) AES/EBU inputs
- Software adjustable, non-volatile, input levels from –60 to +24dBu
- 100dB DNR, -90dB THD+N, -110dBu EIN
- Software selectable 48V phantom power individually available on all inputs
- 3.81mm pluggable terminal block connectors

Outputs
- 4 (4.4M) or 2 (2.2M) balanced analog line outputs
- 4 (4.4D) or 2 (2.2D) AES/EBU outputs
- Software adjustable, non-volatile output levels from -10 to +24dBu

GPIO
- Four opto-isolated inputs
- Four normally open relay isolated outputs

DSP
- Peak and RMS meters on all audio inputs and outputs
- Mixing of any input to any output

AVB
- Protocols: IEEE1722, IEEE1722.1, IEEE802.1AS, IEEE802.1Q FQTSS, IEEE802.1Q MSRP, IEEE802.1Q MVRP
- 4 AVB inputs and outputs
- Media clock input and output streams
- Stream formats of 1,2,4 and 8 channels
- Assignable channels within streams
- AVnu Alliance certified
- Supports CRF and AAF 32/24 formats
- Supports AVnu ProAV 1.1 and Milan standards

Power
- Power over Ethernet (PoE) 802.3af compliant
- External +5V power supply if POE not being used

Chassis
- Rack mountable using optional 1U front panel
- Wings allow easy mounting
- 5.25 inches W x 3.125 inches L x 1.37 inches H

Control
- All settings adjustable from ASIControl software

3 ARCHITECTS AND ENGINEERS SPECIFICATION

The AVB interface shall provide microphone/line balanced analog audio inputs and line level analog audio outputs or AES/EBU inputs and outputs on plug in terminal block connectors. 48V DC Phantom power shall be provided on each mic/line input. Analog-to-digital and digital-to-analog conversion shall be 24bit at a 48kHz sample rate. The AVB interface shall provide front panel meters to monitor the analog input and output signals. Four channels of input and output shall be provided on an RJ-45 connector. The AVB interface shall be compatible with the AudioScience ASIControl software and 3rd party IEEE1722.1 controller software for configuration and monitoring. The AVB interface shall be powered by IEEE 802.3af Power-over-Ethernet or from an external +5VDC @ 10W power supply. The AVB interface shall be compliant with CE, FCC part 48 and the RoHS directive. Warranty shall be 3 years.

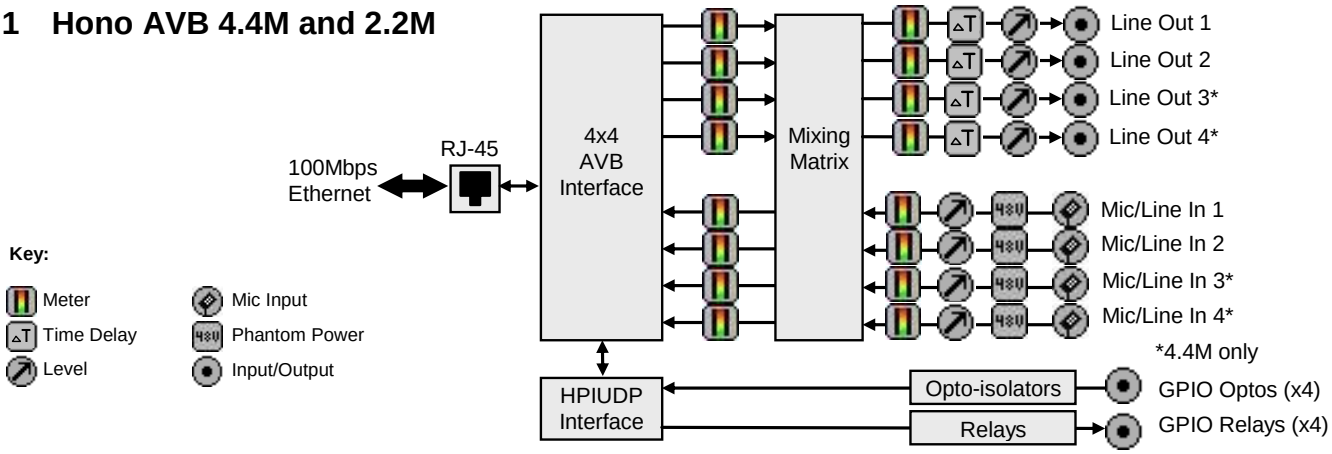
4 SPECIFICATIONS

AVB INPUT/OUTPUT	
Type	100BaseT Ethernet
Connector	RJ-45
Streams	Four input and four output, Media clock stream input and output
Stream formats	IEEE 1722-2011/IEC 61883-6/AM824/MBLA mono channel
Sample Rate	48kHz, 96kHz
Latency	TBD
Control Protocol	IEEE1722.1 -2013 and AudioScience HPI
MICROPHONE/LINE INPUT	
Type	Balanced
Connector	Terminal block
Input Level	-60 to +24dBu in 1dB increments
Input Impedance	5KΩ balanced
Phantom Power	48V @ 5mA max per input, software selectable on each input; on and off
Dynamic Range [1]	>100dB
THD+N [2]	< -90dB
EIN [3]	–100dBu
A/D converter	24bit Over sampling
Frequency Response	20Hz to 20kHz +/-3dB
ANALOG OUTPUT	
Type	Balanced
Connector	Terminal block
Output Level	-10 to +24dBu in 1dBu steps
Load Impedance	-10 to +14dBu:600 ohms or greater 15dBu to +24dBu: 2K ohms or greater
Dynamic Range[1]	>100dB
THD+N[2]	<-90dB
Frequency Response	20Hz to 20kHz +/-3dB
LATENCY (48kHz AVB)	
Analog input across network to Analog out	2ms[4] + 2ms network latency[5] = 4ms @ 48kHz sample rate
Analog input to Analog output	2ms @ 48kHz sample rate
GP OPTO-ISOLATED INPUTS	
Isolation	2000VRMS
Input Drive	4mA typical with internal 5V supply and internal 1K current limiting resistor
Network protocol	AudioScience HPIUDP
GP RELAY OUTPUTS	
Isolation	1500VRMS between relay contacts and coil
Contact Rating	Up to 220VDC/250VAC and 2A, 60W maximum
Network protocol	AudioScience HPIUDP
SYSTEM REQUIREMENTS	
Network switch	AVnu certified network switch with AVB support. Compatible switches are: Extreme X430, X440 and x460 switches with AVB license installed and firmware v15.5.3.4 or greater.
Firmware	Firmware v1.0.2 and later require AudioScience Hono AVB Controller version 1.4.45 or later. When upgrading to v1.0.2 all internally stored configuration settings will be removed.
GENERAL	
Dimensions	6.50"W x 3.125”D x 1.90"H (165mm x 80mm x 48mm)
Weight	24oz, 710g
Operating Temperature	0C to 45C ambient, assuming still air.
Power Requirements	IEEE 802.3af Power-over-Ethernet Class 0 or External +5VDC @ 2A power supply (supplied)
Certifications	CE: EN55022,EN55024 Class A - FCC: Part 15 Subpart B Class A AVnu Pro Audio AVB Level 1.0

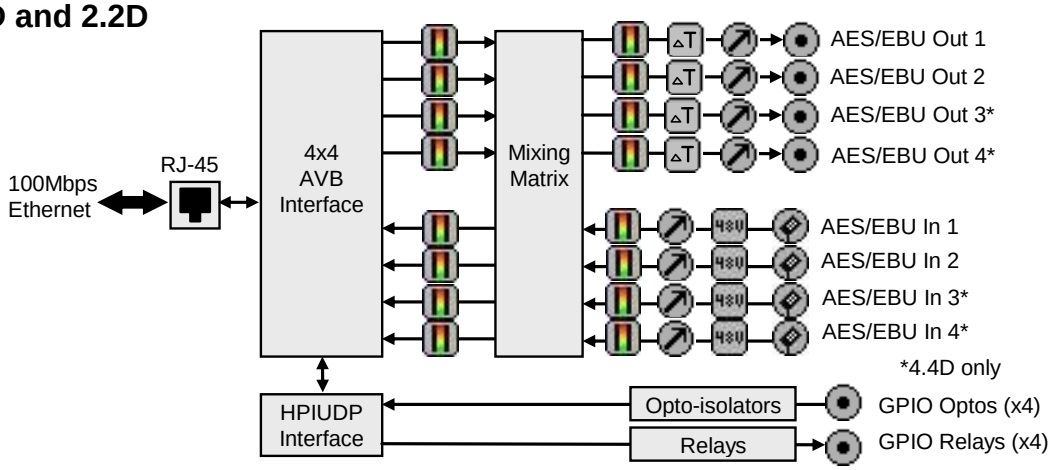
[1] – Dynamic range measured with a –60dBFs sine wave and A weighting filter and 20-20kHz b/w
[2] - THD+N measured using a +20dBu 1kHz sine wave sampled at 48kHz, 20-20kHz b/w and A weighting filter
[3] - With Zs = 150ohms and Input level set to –10dBu
[4] – using firmware 1.0.2 or greater
[5] - Network latency is changeable using the Hono AVB Controller

5 BLOCK DIAGRAMS

5.1 Hono AVB 4.4M and 2.2M



5.2 Hono AVB 4.4D and 2.2D



6 REVISIONS

Date	Description
November 22 2013	Preliminary
November 26 2013	Update
December 17 2013	Created 2.2M doc
February 7 2014	Added AVB gPTP section
July 15 2014	Updated gPTP section
January 15 2015	Added “System Requirements” section to specs page
January 15 2015	Expanded to include all AVB Mini models
January 16 2015	New picture on page 1
April 14 2015	Added description for AVB_In controls
May 12, 2015	Updated certifications in Specifications section
September 18, 2015	Updated AVB routing and AVB Manager, added troubleshooting
September 21, 2015	Further updates and corrections
March 16 2017	Update stream format information
April 11 2017	Added macOS info
May 30 2017	Added troubleshooting section on updating IP address
September 25 2017	Updates to features and firmware
October 5 2018	Updated factory firmware load section
July 2 2019	Added Milan standard information
Nov 5 2020	Expanded AVB Clock information
June 30 2021	Update “Clear settings” instructions

7 CONTENTS

8 TABLE OF FIGURES

9 IMPORTANT SAFETY INSTRUCTIONS

1. Read these instructions.
2. Keep these instructions.
3. Head all warnings.
4. Follow all instructions.
5. Do not use this apparatus near water.
6. Clean only with a dry cloth.
7. Do not block any ventilation openings. Install in accordance with these instructions.
8. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
9. Protect the power supply cord from being walked on or pinched, particularly at plug ends, convenience receptacles, and the point where they exit from the apparatus.
10. Only use attachments/accessories specified by the manufacturer.
11. Unplug this apparatus during lightning storms or when unused for long periods of time.
12. Refer all servicing to AudioScience. Servicing is required when the apparatus 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 apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.

10 NOTICES

FEDERAL COMMUNICATIONS COMMISSION (FCC) INFORMATION

NOTE: 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 and used in accordance with the instructions, 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 or her own expense.

11 INTRODUCTION

The Hono Mini AVB Mini series of products are AVB™ audio interfaces providing 4 channels of AVB receive and transmit.

Various models provide up to 4 channels of microphone/line in and line out or up to 4 channels of AES/EBU I/O. Each input and output is configured with a pluggable terminal block (Phoenix type) connector).

Additionally each model contains GPIO. The GPIO inputs are opto-isolated and the GPIO outputs are relay based.

The Hono Mini AVB Mini interfaces features a powerful Texas Instruments 32bit floating point DSP that allows sophisticated switching and mixing. LED displays on the unit's front panel show peak meters and AVB status.

The units maybe powered using Power-over-Ethernet (PoE) from the Ethernet port or from an external +5V power supply.

AudioScience provides application software that may be used to set up the Hono Mini AVB Mini interfaces. ASIControl can be used to set all internal features of the unit (such as levels).

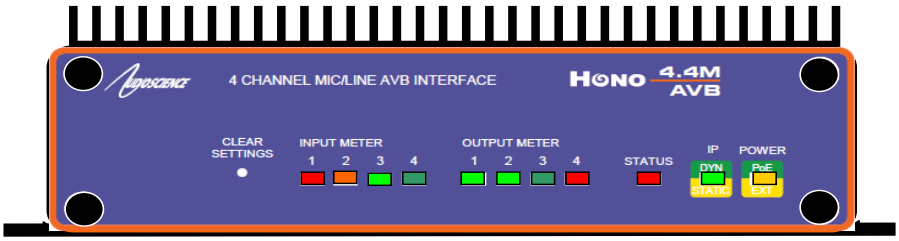
The following table lists the Hono Mini AVB Series and a description of each unit.

Model	Network Protocol	Description
Hono Mini AVB 2.2M	AVB	2 channels of balanced analog mic/line inputs, line outputs
Hono Mini AVB 4.4M	AVB	4 channels of balanced analog mic/line inputs, line outputs
Hono Mini AVB 2.2D	AVB	2 channels of AES/EBU inputs/outputs
Hono Mini AVB 4.4D	AVB	4 channels of AES/EBU inputs/outputs

12 FRONT AND BACK PANELS

12.1 Front Panel

The following diagram shows the front panel of the 4.4M. The 2.2M, 2.2D and 4.4D are similar, except that the 2.2M & 2.2D only have two input and two output meters.



12.1.1 POWER LED

- Green when running from Power over Ethernet (PoE). Note, PoE is only available from the primary RJ45.
- Orange when running from the external +5V DC source.
- Orange + Green when both present.

12.1.2 IP LED

- Green when an IP address has been obtained from a DHCP server or from autoip.
- Orange when a static IP address is configured.
- Orange Blinking when the unit does not have an IP address.

12.1.3 STATUS LED

- Green when everything is OK.
- Orange when the unit is running from its factory (backup) firmware.
- Red Blinking when there is an error.

12.1.4 METER LEDS

- Normally represent the audio level at the Analog or AES/EBU inputs and outputs. Dim green represents a peak level of around -40 dBFs, while red represents -1dBFs. Bright red indicates 0dBFs or overload condition. When an overload condition occurs, the meter will remain bright red for 1 sec before resuming normal metering.

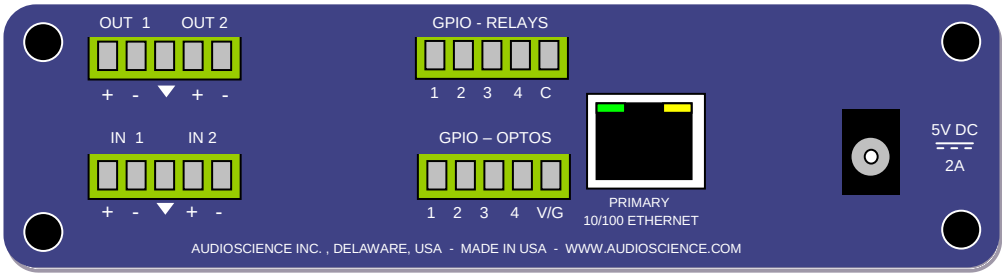
12.1.5 CLEAR SETTINGS

- To load setup image (factory default), power down unit, press and hold button, power up the unit and release the button when you see the power LED blinking.
- To clear all user settings, power down unit, press and hold button, power up the unit and release the button when the LEDs are start showing progress (filling from left to right.
- The unit should restart on its own after completing the update. If not restart the unit manually.

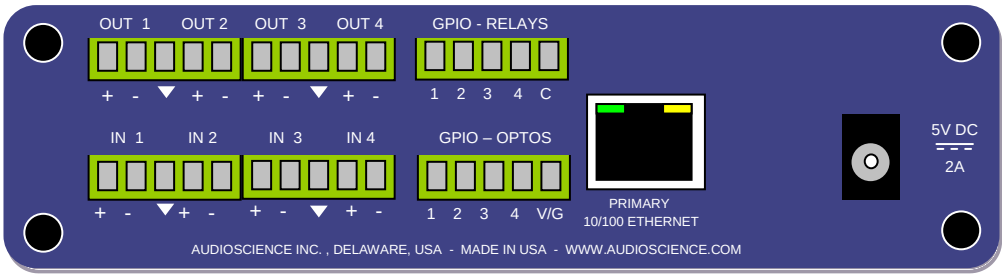
12.2 Back Panels

The following diagram shows the back panel of the 2.2M, 4.4M, 2.2D, 4.4D.

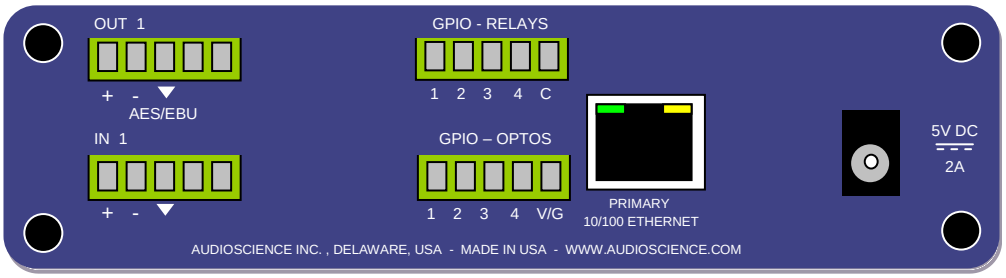
2.2M



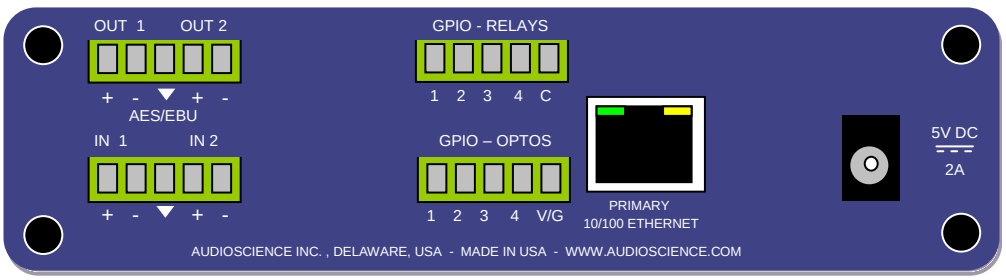
4.4M



2.2D



4.4D



12.2.1 OUT 1..4

2.2M & 4.4M:These are the balanced analog outputs. The middle pin of the 5pin terminal block is Ground
2.2D & 4.4D:These are the AES/EBU outputs. The middle pin of the 5pin terminal block is Ground

12.2.2 IN 1..4

2.2M & 4.4M:These are the balanced analog inputs. The middle pin of the 5pin terminal block is Ground.
2.2D & 4.4D:These are the AES/EBU inputs. The middle pin of the 5pin terminal block is Ground.

12.2.3 GPIO – RELAYS

These are the four GPIO Output relays

12.2.4 GPIO-OPTOS

These are four GPIO opto-isolated inputs. V/G is used to power the optos from either internal or external power.

12.2.5 RJ45 – PRIMARY+PoE

The primary network connection. Also provides PoE power input.

12.2.6 5V DC Jack

Provides input for an external +5V @ 2A power supply (supplied with the unit)

13 HARDWARE INSTALLATION

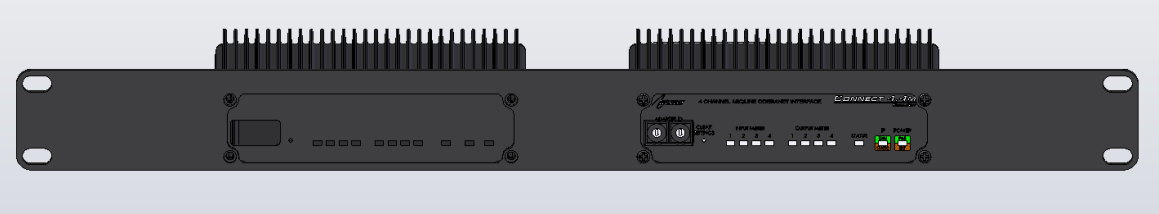
13.1 Mounting

13.1.1 Flange Mounting

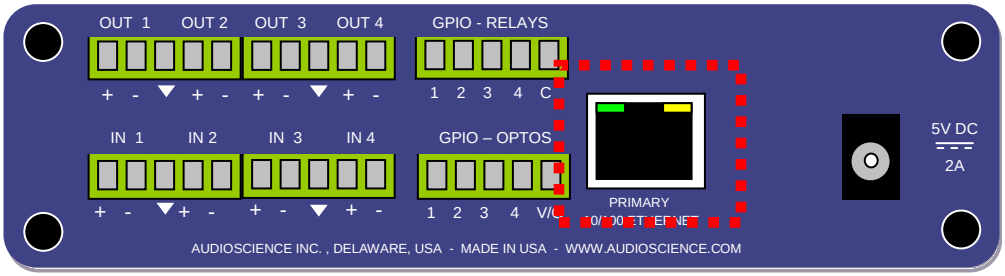
The Hono Mini AVB interface mounts using the flanges on the side of the unit

13.1.2 Rack Mounting

The Hono Mini AVB interface can be rack mounted using the optional rackmount bracket (p/n ENC2305). This bracket can mount up to two Hono Minis.



13.2 Ethernet Connection



A CAT-5 or better (CAT-5e, CAT-6 etc) network cable is required for 100baseT Ethernet operation. The cable length between the Hono Mini interface and a network switch should not exceed 100 meters (328 feet)

13.2.1 PoE Power

If your network provides power-over-ethernet (PoE) capability, then you can use it to power the Hono Mini.

13.2.2 External +5V Power

The Hono Mini AVB interface can use external +5V power, supplied using a 2.5mm DC plug. This power takes priority over the PoE power if both are supplied at the same time

14 OPERATION

14.1 Power up sequence

This section describes the power up sequence.

14.1.1 Power

Apply power to the unit by either using a PoE enabled network on the primary RJ45 jack or by plugging in the external +5V power supply. You may apply both at the same time, but the external power supply will take priority.

14.1.2 Firmware images

The Hono Mini AVB interface boots from a firmware image stored in flash memory. There are two independent firmware images stored in every unit. The two images are named “Factory” and “Update”. The “Factory” image is a reference image that is in place should a “bad” image be downloaded to the device. The “Update” image is the image that can be updated in the field if required.

NOTE: Firmware v1.0.2 and later require AudioScience Hono AVB Controller version 1.1.45 or later.
NOTE: When upgrading to v1.0.2 all internally stored configuration settings will be removed. We recommend you use ASIControl to save your configuration (Adapter->Configuration->Save) before updating the firmware, then restore it (Adapter->Configuration->Restore) when the update is done.

14.1.3 Firmware loading sequence

When first powered up, each Hono Mini AVB interface performs the following sequence:

1. Checks for a valid “Update” firmware image.
2. Loads the Update image and starts running it.
3. Loads any control settings that may have been stored to flash.

In the case where the “Update” image is determined to be corrupt, the Factory image is loaded. This situation is noted by the STATUS LED being lit as orange.

14.1.4 Loading the factory firmware image

The Hono Mini AVB interface can be forced to load the factory firmware image by depressing the CLEAR SETTINGS button on front panel as power is applied to the device. Keep the button depressed while power is applied. The STATUS LED will be lit as orange. With the unit in this state, it should appear in the top panel of ASIControl as an ASI2615 but no information will be available in the lower left pane. At this point, there are 2 options you can use to load a new firmware file.

14.1.4.1 Browser method for updating firmware

1. Right click on the unit in the top pane and click “Open in browser”. Your default browser should open to the Hono’s “About” page. From here, click “Firmware update” then click the Browse button to locate a new firmware to load. This method assumes you have a specific version you would like to load saved somewhere on your system.
2. Click the “Upload” button. You will see a status indicator, when the update is finished you will be taken to a “Firmware update report” page and the unit will reboot.
3. After the unit has started up you will see the full web interface and the new firmware will be active.

14.1.4.2 ASIControl method for updating firmware

1. Open ASIControl and locate the unit in the top pane.
2. Right click and select “Update AudioScience Firmware…”
3. This will open the Firmware update utility. From here you can select “Download latest firmware” to grab the current release version or use the file select dropdown box to select a specific version.
4. By default, the only unit selected to update is the one you clicked on but you can update multiple units by clicking their check box if you wish.
5. Once you have a file selected, click “Upload firmware to adapters”.
6. You will see a small status indicator showing progress and the unit(s) will reboot once the new firmware is loaded.

15 SOFTWARE INSTALLATION

AudioScience makes audio adapters and drivers for various operating systems. Enhancements to an adapter's utility come from the integrators software that uses the audio driver to implement sophisticated audio playback and recording functions.

15.1 Drivers for Windows 10, 7, Server 2008, Server 2012

Typically, drivers are not included with the hardware and will need to be downloaded from the AudioScience website. They can be found here: http://www.audioscience.com/internet/download/win_drivers.htm

The first step is to determine what type of driver is needed for your operating system. Drivers are available for 32-bit and 64-bit Windows systems.

Driver 3.10 and later present the user with three install options during installation:

- Install Standard PCI/PCIe Driver.
- Install Standard + Network Audio Driver.
- Remove all driver components

Traditional installs should select the first of these options. Users of AudioScience CobraNet and AVB products should select the second option with the "+Network Audio Driver." in the text.

15.1.1 Combo Driver

The Combo driver installs WDM devices by default and presents an option to "Install legacy 32-bit WAVE driver" in case your application requires it. Download the file named ASICOMBO_xxxxxx.EXE from www.audioscience.com and run it (_xxxxxx is the version number). After the EXE has run, reboot your computer and the audio adapter will be operational. If the cover is off the computer, one can see one or two blinking LEDs on top of the card indicating its DSP is running and communicating with the driver.

Verify that the adapter is running using ASIControl (see ASIControl section in this document).

15.1.2 ASIO

All AudioScience drivers also install an ASIO driver interface. It is installed by default.

15.1.3 Driver Failure

In the event that an adapter's driver fails to load correctly, the OS's event viewer should be checked. The event log is accessed from the Administrative Tools applet in Windows Control Panel under Event Viewer. The Windows Logs\System view should be selected.

If two or more adapters are installed in the same system, the first thing to check is that the adapters were assigned unique adapter numbers. If issues persist, please email support@audioscience.com.

15.2 Drivers for Linux

The latest Linux driver can be downloaded from the AudioScience website – www.audioscience.com

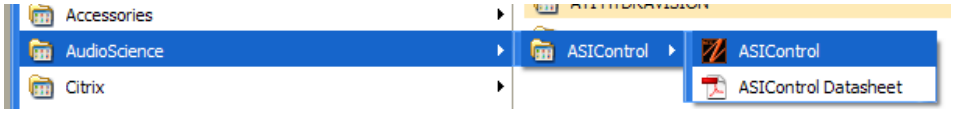
15.3 Applications for Windows

AudioScience provides ASIControl for adapter set-up and configuration.

15.3.1 ASIControl

All Windows drivers install an AudioScience application called ASIControl that can be used to setup and verify functionality of adapters. ASIControl provides a common interface for users across all driver types.

From the Windows Start menu, navigate to Start→Programs→AudioScience and run the ASIControl program.



16 APPLE MAC SOFTWARE INSTALLATION

16.1 Applications for Apple macOS

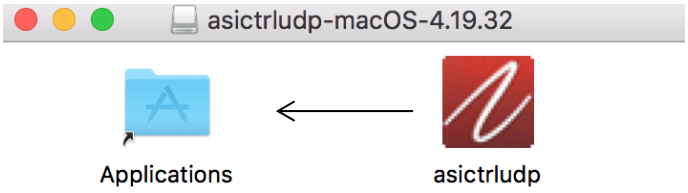
AudioScience provides ASIControlUDP for AVB configuration in the Apple macOS.

16.1.1 ASIControlUDP

Download the ASIControlUDP macOS installer from our website here:

http://www.audioscience.com/internet/download/apps.htm#ASIControlUDP

Double-click the DMG file and drag asictrludp to the Applications folder shortcut. After the application is dragged to the Applications folder, you can run it normally - from the Finder or Launchpad. Eject the DMG file by moving it to the Trash.



17 ASICONTROL CONFIGURATION

If there is more than one NIC in the PC, upon startup, ASIControl will first prompt the user for which network interface to use to communicate with AVB devices.

To preserve control changes made to the Hono Mini AVB interface, ASIControl must be shut down. This will save control settings to the unit's flash memory, allowing the settings to be restored after a power cycle.

17.1 ASIControl Layout

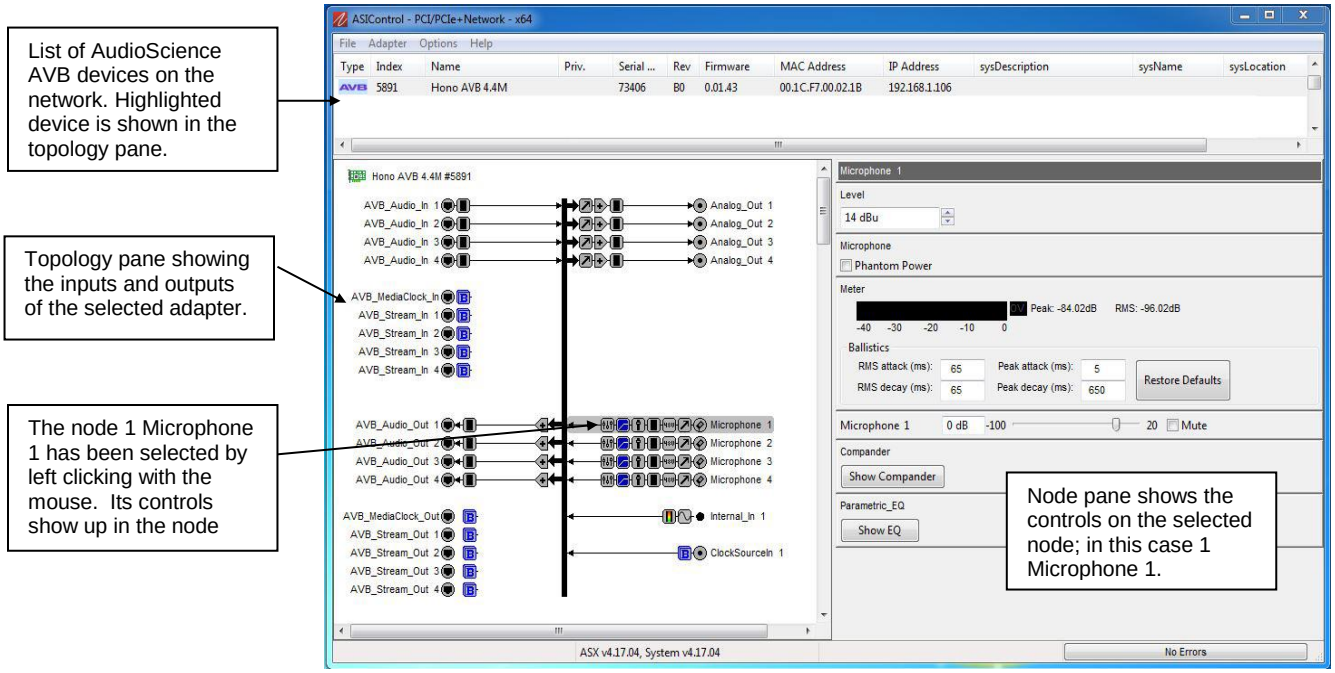


Figure 1. ASIControl layout

17.1.1 About

This control displays information about the installed Hono AVB.

17.1.1.1 Interface

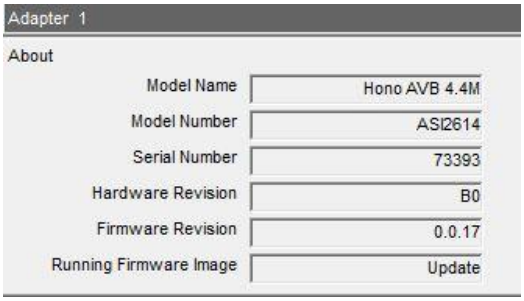


Figure 1. Adapter About information seen in right side of ASIControl.

Model Name:
The model name is displayed here.

Model Number:
The model number is displayed here.

Serial Number:
The serial number is displayed here.

Hardware Revision:
This lists the hardware revision.

Firmware Revision:

The firmware version is displayed; usually the same as the driver version installed.

17.1.2 Status

This control displays information on various dynamic parameters.

17.1.2.1 Interface

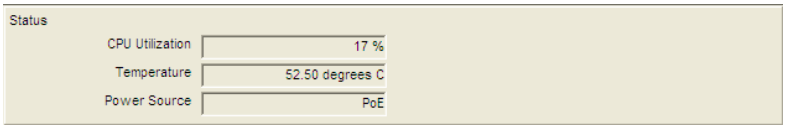


Figure 2. The Status user interface

CPU Utilization:
This shows the loading of the adapter's CPU load in percent.

Temperature:
The internal temperature in degrees C is shown here.

Power Source:
PoE indicates the unit is running off Power-over-Ethernet. External indicates it is using the external +5V adapter.

17.1.3 Level

The levels in dBu for the adapter's line_outs and line_ins can be adjusted here. In the example below, the Line_Out 1 node in the topology view of ASIControl has been selected. Its Level will show up on the right side of ASIControl. The same is done for a Line_In to see its Level.

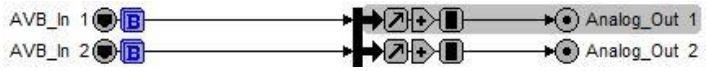


Figure 3. Using ASIControl to select Analog_Out 1

17.1.3.1 Interface

Figure 4. Level displayed by ASIControl for Line_Out 1

Level:

The line out level can be adjusted by clicking the  arrows or by typing values in to set the appropriate level. Consult the specification section of this datasheet for the range of supported levels.

17.1.3.2 Developer

17.1.3.2.1 Windows APIs

Wave/Mixer – Analog levels are controlled using mixerSetControlDetails() on a control of type signed and with the name Level/Trim.
HPI – Analog levels are controlled using the HPI_LevelSet() API.
ASX – Analog level are controlled using the ASX_Level_Set() API.
DirectSound – TBD.

17.1.3.2.2 Linux APIs

HPI – Analog levels are controlled using the HPI_LevelSet() API.
ASX – Analog level are controlled using the ASX_Level_Set() API.
ALSA – TBD.

17.1.4 Meter

Meters in ASIControl are located on audio nodes and display the audio level as the audio signal passes through the node. Most AudioScience devices return both RMS and peak level readings and ASIControl displays both simultaneously.

17.1.4.1 Interface

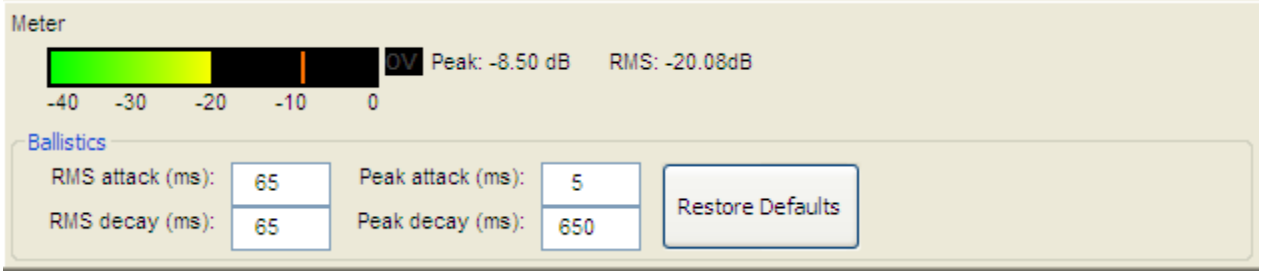


Figure 5. A stereo peak meter display; RMS is green and peak is yellow

To the right of the peak meter is the absolute readings in dBFS. These can be useful when testing input tones of a specific known level.

17.1.4.2 Developer

17.1.4.2.1 Windows APIs

Wave/Mixer – Meters are read using mixerGetControlDetails() on a control of type signed and with type "Peak" the name "Peak Meter". A minimum value is 0 and maximum is 32767. The interface returns the peak readings only, not the RSM level. It confirms to expected Windows functionality.
HPI – Meters are read using the HPI_Meterxxx() API.
ASX – Meters are read using the ASX_Meter_xxx() API.
DirectSound – TBD.

17.1.4.2.2 Linux APIs

HPI – Meters are read using the HPI_Meterxxx() API.
ASX – Meters are read using the ASX_Meter_xxx() API.
ALSA – TBD.

17.1.5 AES/EBU I/O

The Hono AVB 2.2D and 4.4D have AES/EBU I/O.

- Hono AVB 2.2D – 1 AES/EBU output and 1 AES/EBU input (2 channel I/O)
- Hono AVB 4.4D – 2 AES/EBU outputs and 2 AES/EBU inputs (4 channel I/O)

17.1.5.1 AES/EBU Inputs

Each AES/EBU input has a sample rate converter (SRC) on it and so may have a sample rate that is asynchronous to the rest of the system. Valid sample rates are 32, 44.1, 48, 64, 88.2 and 96kHz.

17.1.5.2 AES/EBU Outputs

The AES/EBU outputs are clocked at 48kHz, the same rate as the AVB interface and cannot be changed.

17.1.6 Input and Output Volume Adjustment

All outputs from the Hono Mini AVB interface have volume adjustments in their path that support a range of –100 to + 20 dB. The nodes that support this are Analog_Out 1-4, AVB_Audio_Out 1-4 and AES/EBU_Out 1-2.

Figure 7. Using ASIControl to select Analog_Out 1

Clicking on Analog_Out 1 in the topology pane of ASIControl will show a list of volumes in the node view pane. Below is an image of the Level section, the first volume control and the Meter control shown in the node pane. The meter is found after the full list of volumes (the Hono Mini AVB interface incorporates AudioScience's anything to anywhere' mixing).

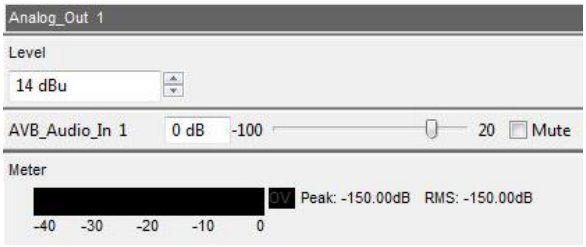


Figure 6. ASIControl node displays with volume

The volumes are self-explanatory. Just drag the sliders. All lineouts also have an audio path (with volume) from the corresponding line in. This can be use useful in verifying the correct operation of the audio modules without having to send the audio across an AVB network.

17.1.7 Audio Delay – Future feature

The audio delay block supports user programmable delay per audio output. By default, each output has a maximum of approximately 80 milliseconds of delay assigned to it. If a larger delay is required, more delay storage can be assigned from the global unallocated pool of storage. The maximum delay is 10 seconds.

17.1.7.1 Interface

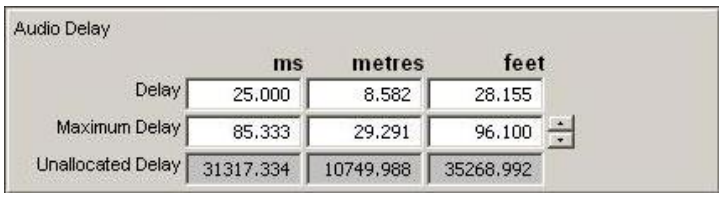


Figure 7. Audio Delay displayed in right pane of ASIControl for Line_Out 1

Delay:
The audio delay is specified in MS (milliseconds), metres, and feet in the user interface. It can be adjusted by typing in new values.

17.1.7.2 Developer

17.1.7.2.1 Windows APIs

HPI – The Audio Delay is a block control. See functions then Mixer, Blocks, Audio Delay.
ASX –TBD.

17.1.7.2.2 Linux APIs

HPI – The Audio Delay is a block control. See functions then Mixer, Blocks, Audio Delay.
ASX – TDB
ALSA – TBD.

17.1.8 Signal Generator

In the topology pane of ASIControl, click on Internal_In 1 to see the Signal Generator information in the node pane.

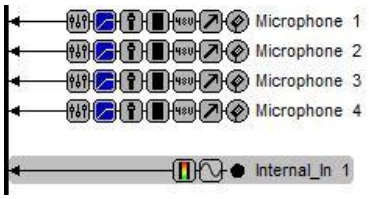


Figure 8. Internal node as seen in ASIControl

17.1.8.1 Interface

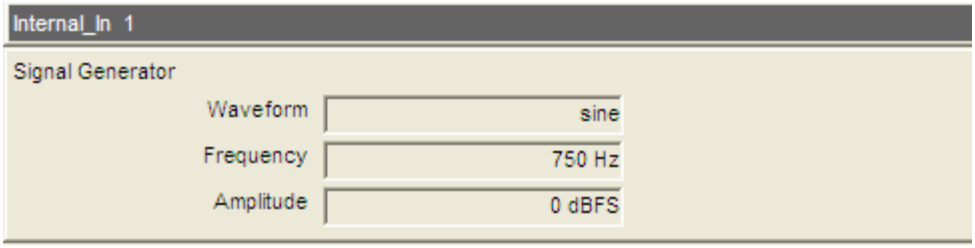


Figure 9. Signal Generator User Interface as seen in ASIControl

Waveform:
The signal generator waveform type is fixed as a Sinewave.

Frequency:
The frequency is fixed at 750Hz.

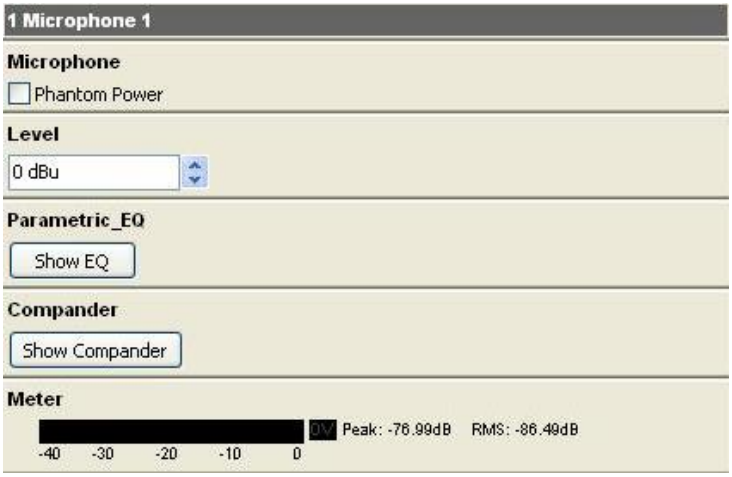
Amplitude:
The amplitude is fixed at 0dBFS.

17.2 Mic/Line input configuration

For each mic/line input, the following can be configured

- Phantom power
- Input Level (Sensitivity)
- Parametric Equalizer (future)
- Compressor/Limiter (future)

Here are the controls as viewed in ASIControl's node pane (its right pane):



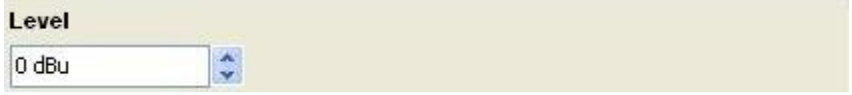
Further information on each control follows.

17.2.1 Phantom Power

Phantom power (48v) can be set on/ off independently for each channel by checking/unchecking the checkbox.

Note: Phantom power cannot be turned on and will be disabled if the Level is higher than -4dBu.

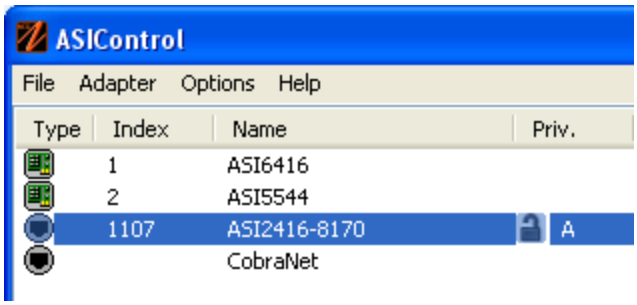
17.2.2 Input Level



The input level can be set between –60 and +26dBu in 1dB increments by either using the up/down arrows to the right of the Level textbox or by clicking in the Level textbox, typing in a particular number, and then hitting the <Tab> key on the keyboard.

17.3 Access control using passwords – Future feature

Beginning with driver 4.10.00, some AudioScience adapters support password protected access to adapter controls. In ASIControl, an adapter that supports passwords shows a padlock in its adapter information line of the adapter list window. For example see



By default, if a password has not been set, the adapter operates as if there is no active password. Any user has complete access to all the device functionality.

The access control system supports 3 different “user” login levels. They levels their associated privileges are outlined in the following table.

Username	Controls	Scripting	Configuration Save/restore	Passwords
Admin	Read/write	Read/write	Read/write	Write
User	Read	No access	No access	No access
Guest	Read	No access	No access	No access

Password information is stored on the adapter itself, not the host computer, so if a different computer is used to control the adapter, the same passwords should be used.

17.3.1 Login in states

17.3.1.1 Admin

This is the default state if no passwords have been set on the device. Or, the user has logged in using the Administrator password. This is indicated in the ASIControl as: A

17.3.1.2 User

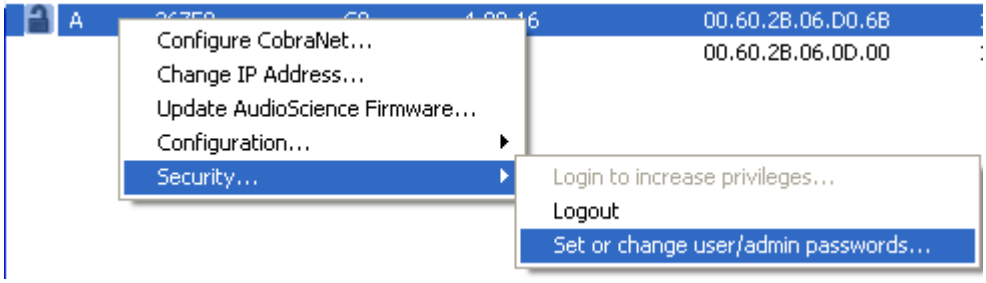
The user successfully has logged in using the User password. This is indicated in the ASIControl as: U

17.3.1.3 Guest

If passwords have been set, but the user has not logged on, the Guest privilege level in invoked. This is indicated in the ASIControl as: G

17.3.1.4 Setting passwords

Right click on the highlighted adapter and follow the menu tree to



the “Set…” option. The following dialog will show.

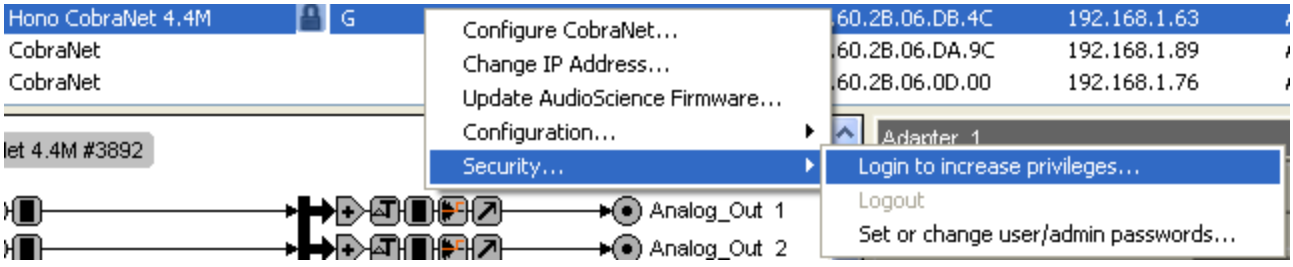
Select User or Admin from the first combo box and enter the new password in the two password fields.

Upon setting a password for the first time on a device that has never had a password before, Adim rights are assumed to be in place for the current user, so after setting the password the user should logout if they wish the adapter to be secured.

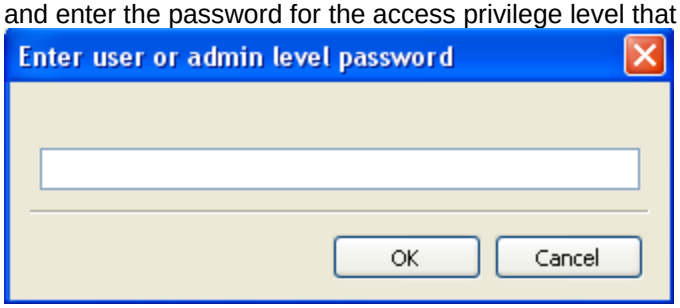
Note that on an PCI or PCIe adapter that has password support, the user should not power down or restart the PC within 30 seconds of changing the passwords. In other words, permanent storage of the updated passwords settings can take up to 30 seconds.

17.3.1.5 Logging in

Right click on the adapter in the list to login and increase user rights.

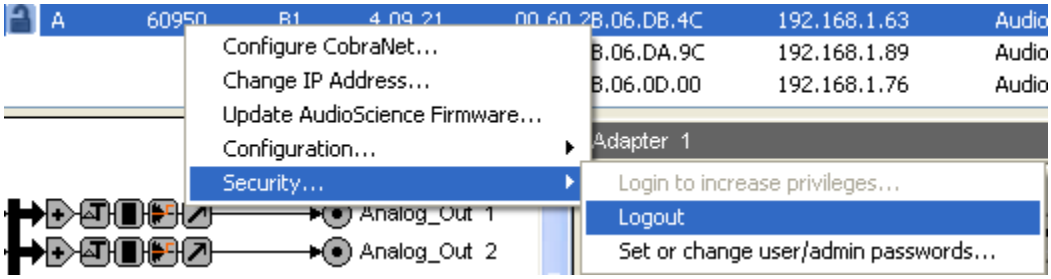


and enter the password for the access privilege level that you wish to use.



17.3.1.6 Logging out

After completing privileged operations, logout is performed by right clicking on the adapter and selecting the logout option.

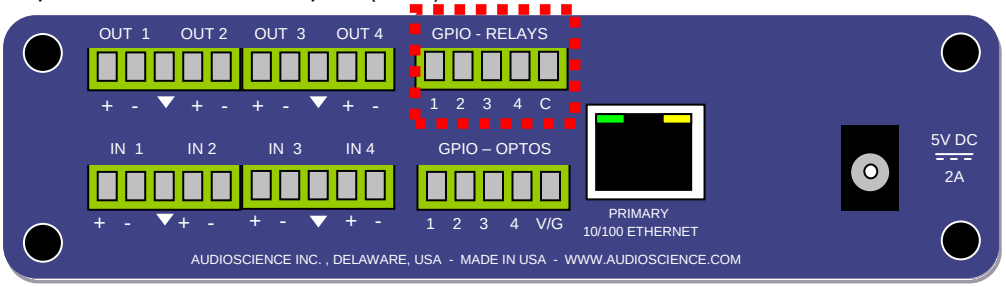


17.4 GPIO

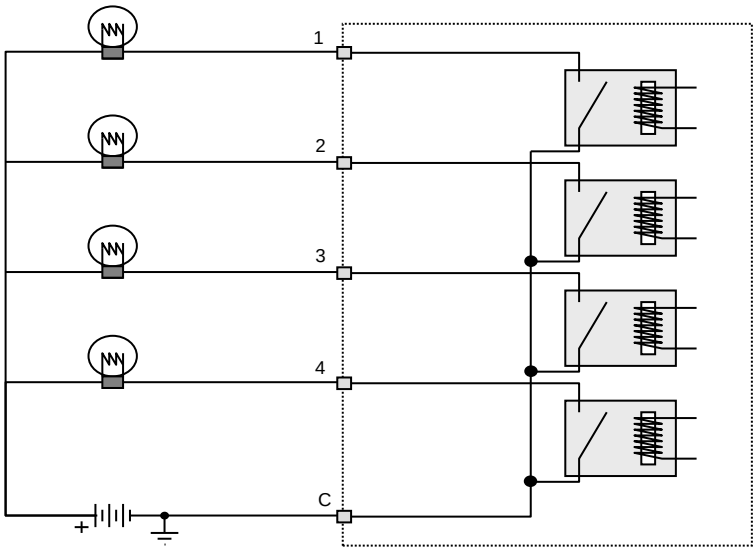
General Purpose Input/Output (GPIO)

17.4.1 Outputs

The Hono Mini provides four GPIO outputs (1…4).

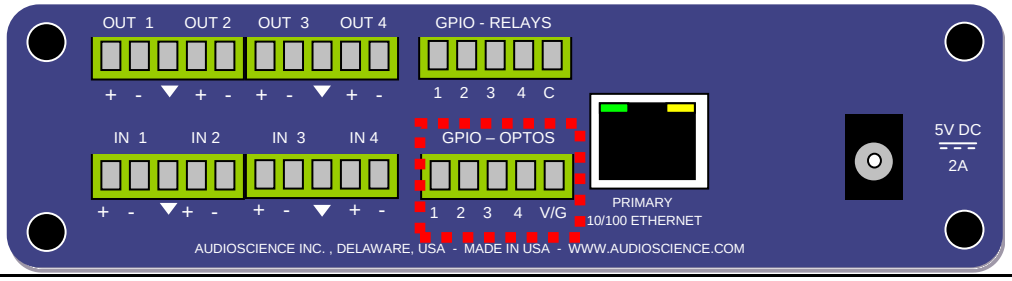


Each outputs consists of a normally open relay with one side connected to a common pin (C). The current through each relay should be limited to 500mA.

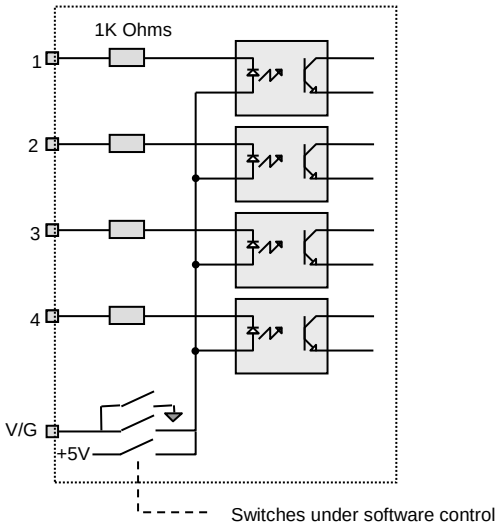


17.4.2 Inputs

The Hono Mini GPIO provides four opto-isolated inputs (1...4).



The voltage powering the LED in the opto-isolator may either be supplied from an external source through the V/G pin or may be powered from the Hono Mini's internal +5V supply. The opto-isolator voltage is software selectable using ASIControl and the setting is stored in the units non-volatile memory,

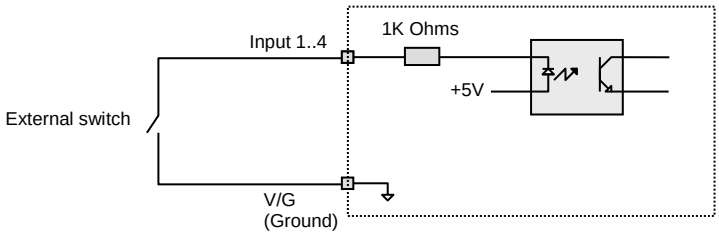


17.4.2.1 V/G Pin Function - Ground

When using the internal voltage source, the V/G pin becomes ground. Connecting an opto-isolator input to V/G will turn it on. Approximately 5mA is needed to fully turn on each opto-isolator. When using the internal +5V power source then the internal 1K ohm current limiting resistors are all that is needed.

NOTE: In this mode the opto-isolators are not being used as isolators.

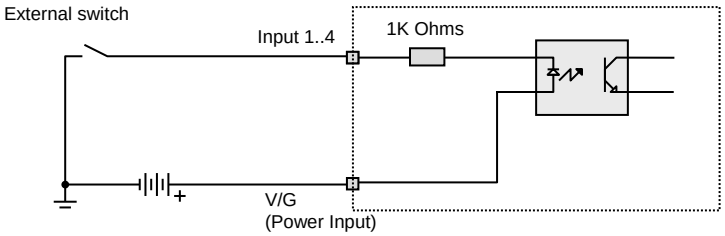
The following diagram shows the connections needed if using this mode.



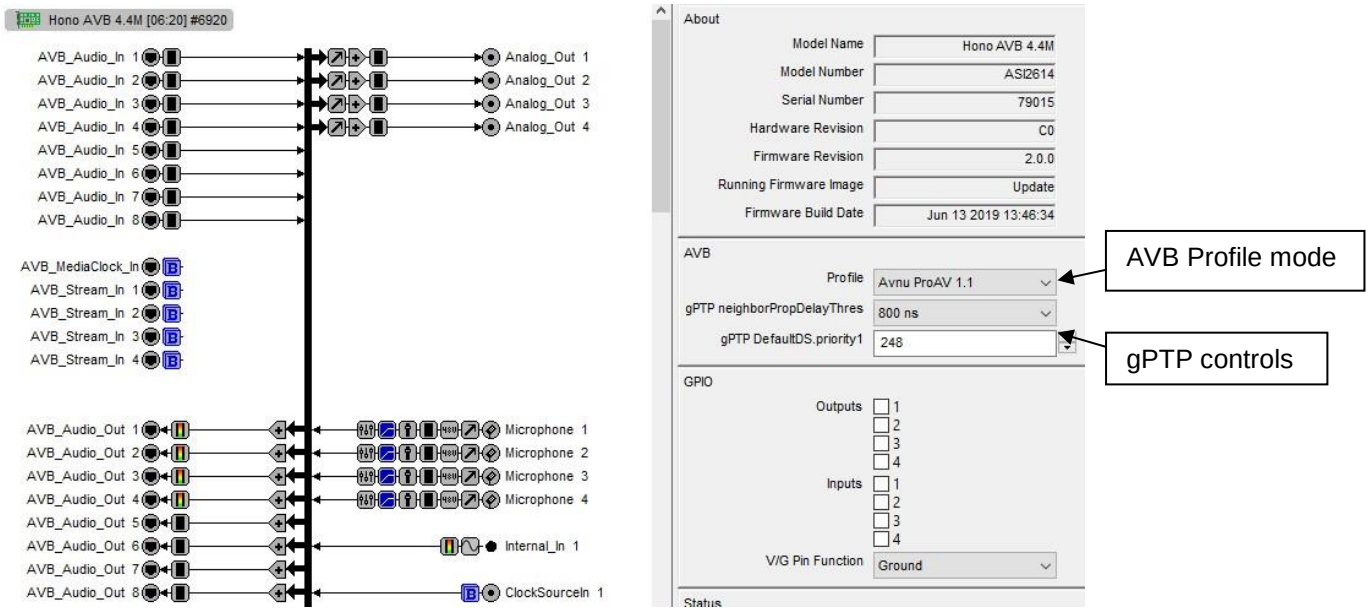
17.4.2.2 V/G Pin Function – Power Input

When using an external power source for the opto-isolators, the V/G pin becomes an input for the external voltage. In this mode, a maximum external voltage of +14V can be used, so as not to damage the opto-isolators.

Use the following diagram as a guide to connections:



17.5 gPTP Configuration settings



neighborPropDelayThres:
The Hono AVB's port's AScapable flag is set to false when the measured pDelay to its neighbor exceeds a specified threshold. The can be set to either 800ns (default) or 4 s. For hardware units, after changing the value the "Status" LED on the front of the unit will flash while changes are saved. Do not reset the device while the "Status" LED is flashing or your changes will not be stored.

DefaultDS.priority1:
You can also set the DefaultDS.priority1 in this section (value range 0-255) For hardware units, changes to this value will also cause the "Status" LED to flash while changes are saved. Do not reset the device while the "Status" LED is flashing or your changes will not be stored. If you want the device to never be the grandmaster, set the priority field to 255. A reboot/restart will be required for this update to take effect.

17.6 AVB: Profile

Starting with firmware version 2.0.0, you can change the AVB Profile the unit will use to communicate with other AVB equipment. There are 2 options, the legacy Avnu ProAV 1.1 and the new Milan standard designed for greater interoperability between devices from different manufacturers. See the Milan website for more information: https://avnu.org/Milan/

17.6.1 Avnu ProAV 1.1

- Avnu certification level 1.1.
- Uses formats of type IEC61883-6_AM824
- Proprietary auto connect method

17.6.2 Milan

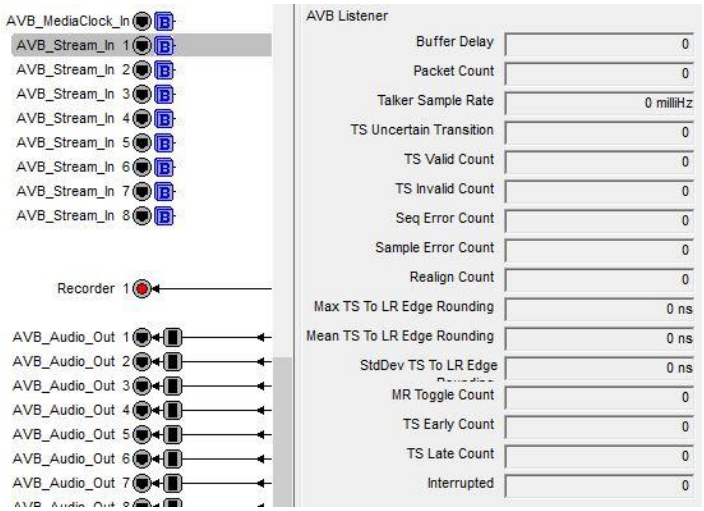
- AudioScience is not Milan certified at this time
- Uses formats of type AAF and CRF
- Implements many unsolicited responses
- Uses Milan listener connection state machine and Milan auto connect method

17.7 Auto Connect

Starting with firmware version 2.0.0, the unit will attempt to reconnect the streams that were active when power was lost. Prior versions offered a drop down option to enable/disable this feature.

17.8 AVB_In

Clicking on any available “AVB_Stream_In” will provide the following information as seen below.



*TS is an abbreviation for timestamp.

Buffer Delay

Packet Count
The number of 1722 packets received for this stream.

Talker Sample Rate

TS Uncertain Transition
The timestamp uncertain transition counter is incremented whenever timestamp uncertain field in the 1722 header transitions from false to true. Typically this indicates that the talker loses its PTP timebase for some reason.

TS Valid Count
This counts the number of 1722 packets received with the timestamp valid bit set. Under normal operation every 3 in 4 1722 packets will have the timestamp valid bit set.

TS Invalid Count
This counts the number of 1722 packets received with the timestamp valid bit not set. Under normal operation every 1 in 4 1722 packets will not have the timestamp valid bit set.

Seq Error Count
Every AVTP 1722 audio packet has a sequence number that increments every packet. The sequence error records any instances where examination of the sequence number indicates that it did not increment by one.

Sample Error Count
The sample error count increment for every 1722 IEC 61883 sample decoded that does not have 0x40 in the most significant byte.

Realign Count
When unpacking 1722 audio, the expectation is that the audio from every packet butts up exactly against the audio of the previous sample. This means that there are no overlaps or holes in the audio sample sequence. The realign count records the number of times that there was an overlap or gap during the packet unpack process. In normal operation this counter should remain zero.

Max/Mean/StdDev TS to LR Edge Rounding
These fields measure the delta between the embedded 802.1AS presentation timestamp and the L/R edge of the Hono Mini's media clock. When the Hono is listening to an AVTP 1722 audio stream, every packet with a valid timestamp is positioned in an output buffer according to its presentation time. The Hono "knows" the timestamps of its own media clock in relation to its audio output buffer. The rounding field is a measure of how much rounding occurs when determining which output "bin" to unpack the AVTP audio in to.

Under normal operation the StdDev should be less than 10ns. The expected mean depends on the implementation of the talker. Some talkers deliberately make their PTP timestamp in the middle of the sample time so that jitter is less likely to cause alignment to transition over a mediaclock edge. The most important thing is to look for the mean offset to remain stable. If is it incrementing or decrementing it indicates that the talker and listener mediaclocks are not locked.

18 AVB AUDIO ROUTING IN ASICONTROL

The following section describes how AVB routing and channel mappings work in AudioScience AVB products.

18.1 AVB Routing concepts and terminology

AVB input streams (Listener streams) are shown as AVB_Stream_In # in ASIControl. AudioScience supports streams formats of 1,2,4,8,16 and 32 channels. By default all AVB streams are set to 1 channel (mono).

AVB output streams (Talker streams) are shown as AVB_Stream_Out # in ASIControl. AudioScience supports streams formats of 1,2,4,8,16 and 32 channels. By default all AVB streams are set to 1 channel (mono).

IEEE 1722.1(AVDECC) mappings are used to define how audio channels within a stream are routed to the embedded mixer in the Hono AVB device. AVB_Audio_In nodes, which are all mono, are used as the mixer audio input nodes for AVB Input Streams (Listeners) audio. AVB_Audio_Out nodes, which are all mono, are used as the mixer audio output nodes for AVB Output Streams (Listeners) audio.

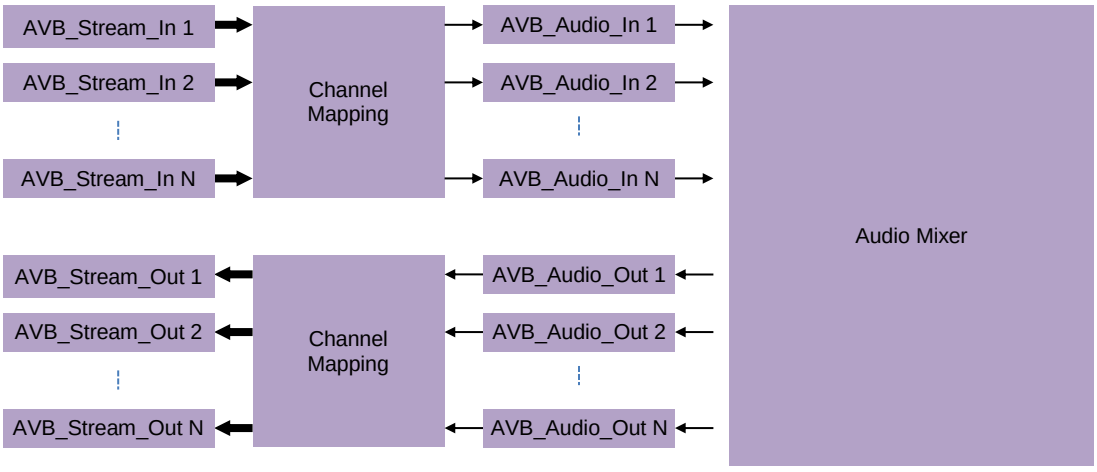


Figure 10. AVB Data flow

18.2 AVDECC configurations

Beginning with Hono AVB Endpoint firmware 1.0.0 and VSC build 4.19.30, two AVDECC configurations are supported. The configurations can be changed by the Configuration drop down in the AudioScience Hono AVB Controller. The first (default) configuration is labelled "Static" and consists of streams that do not have any configurable mappings. The second configuration is labelled "Dynamic" and supports user configurable mappings to route audio to and from the input and output streams.

18.3 Launch AVB Controller

18.3.1 Windows

To access the mappings dialog, right click on an AVB adapter in the ASIControl adapter list and select “Launch Hono AVB Controller”.

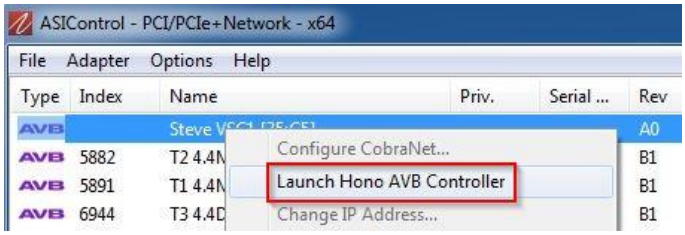
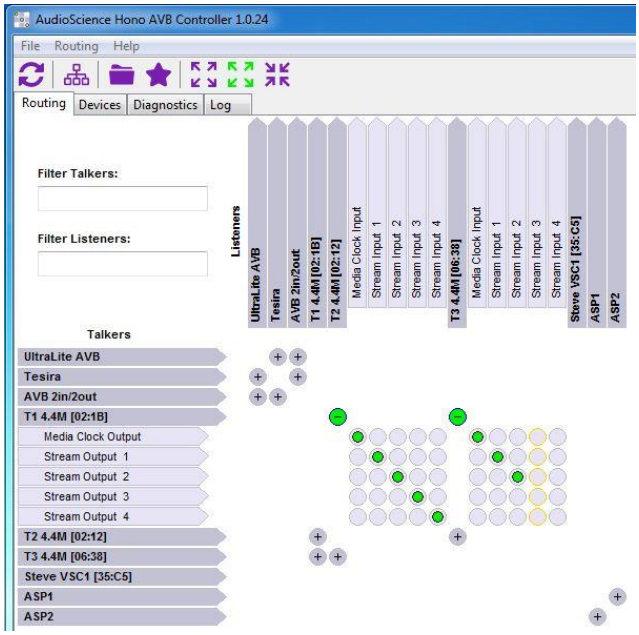


Figure 11. Launch Hono AVB Controller in ASIControl

This will launch a separate program that should have been installed with our driver and you will see the “AudioScience AVB Controller” as shown below.



For information on the AudioScience Hono AVB Controller, download the datasheet from our website here:

http://www.audioscience.com/internet/products/avb/datasheet_hono_avb_controller.pdf

18.3.2 Apple macOS

Apple macOS supports two modes of AVB operation: Direct Connect and Virtual Entity. Using Direct Connect, an AudioScience Hono AVB device can easily operate as a multichannel Apple Mac audio interface. When in Virtual mode, an Apple Mac can operate as an AVB Device available for custom routing to/from a Hono device.
For information on how to set up Direct Connect and Virtual Entity, please download the accompanying quick start guides:

www.audioscience.com/internet/products/avb/quickstart_Direct_Connect_Static_Hono.pdf
www.audioscience.com/internet/products/avb/quickstart_Virtual_Entity_Hono.pdf

19 AVB NETWORK SETUP

This section outlines the steps in setting up an AVB network using AudioScience AVB devices. Integrators who are familiar with AVB can skip this section. The following sections discuss gPTP setup and MediaClock configuration.

gPTP

gPTP is an implementation of IEEE802.1AS that supports propagating a common timebase across an Ethernet LAN. One of the gPTP clocks on the network becomes the master clock after negotiating with all the other gPTP peers.
In a typical plug-and-play environment, the AVnu certified switch will become the gPTP master and all other devices will slave off it. Unless an integrator wishes to explicitly assign a particular device to be the gPTP master (using priority1 gPTP settings), default settings will work fine.

MediaClock

In addition to the timebase, the MediaClock must be configured. The MediaClock controls the sample rate of the AVB device and should be thought of as the "Word Clock" from studio audio configurations. The integrator should decide up front which device is going to deliver MediaClock to all the AVB devices on the network. Typical configurations will use the separate MediaClock stream for connecting the MediaClock between devices.

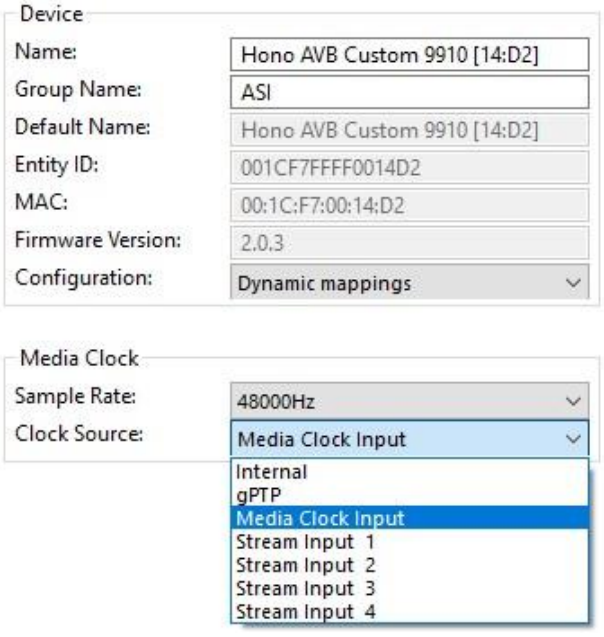
Optionally, if an AVB endstation is used only as a listener, one of the listener (Input Streams) can be configured to act as the MediaClock.

Under normal operation, the MediaClock would be connected before the audio streams are started so that the sample clock on the AVB device is running at the correct rate before audio is passed.

19.1 Setting MediaClock

Setting the MediaClock on your AudioScience device is done as part of establishing a connection between 2 units. There are different programs that can be used for establishing connections and device settings; this example uses the Hono AVB Controller from AudioScience to demonstrate the available options.

As you can see from the example below, AudioScience AVB devices offer several options for configuring the MediaClock. This is found under the “Device Config” tab in Hono AVB Controlller.



19.1.1 Media Clock Sample Rate

This sets the native sample rate of the hardware device. Options are 48000Hz and in some cases 96000Hz. Set this rate to match the other AVB equipment in your setup that you wish to connect too. These MUST match in an AVB setup or you will not be able to establish a connection.

19.1.2 Clock Source

The Clock Source is used to establish how this unit will sync to other devices in your network. The options are:

19.1.2.1 Internal

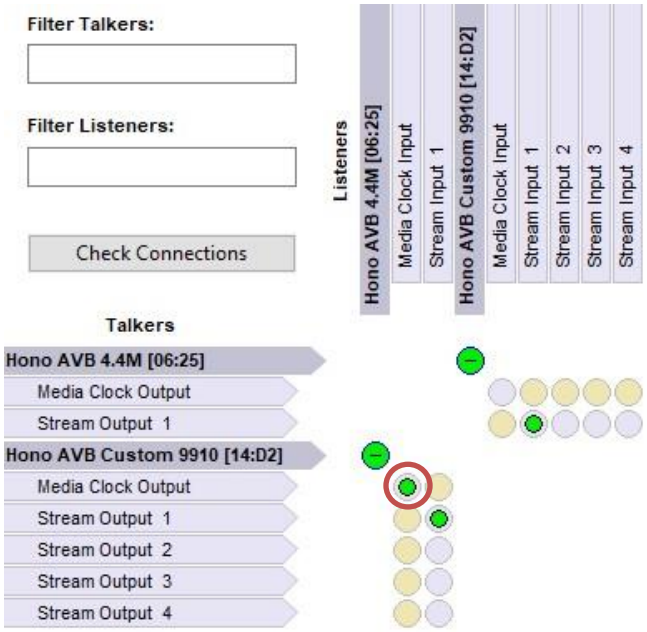
Internal means the unit will NOT sync to any other units but will run its own clock. Internal is usually used when the unit you are configuring is going to act as the MediaClock for other devices in your network.

19.1.2.2 gPTP

gPTP is strictly a debug setting and we do not recommend you use it during normal operation.

19.1.2.3 Media Clock Input

Media Clock Input is used to sync this device with another device on the network that has a distinct Media Clock Output. Not all AVB devices offer this option but AudioScience has included it in our AVB spec as an alternative to using Stream Inputs. It is important to remember that in order for this to work, you MUST also establish a specific channel connection between a Talker's Media Clock Output and a Listener's Media Clock Input as shown below.



In this example, the Hono AVB Custom 9910 has its Clock Source set to Internal (meaning it will be the master clock) and the Hono AVB 4.4M has its Clock Source set to Media Clock Input. Then a connection is established between the devices in the routing tab as shown in the red circle.

19.1.2.4 Stream Input 1 – 4

Stream Inputs 1 – 4 can be used to sync to devices that offer in-stream sync only. All AVB devices should offer this as an option. This sends a sync signal along with an AVB audio signal in the same stream. A connection must be established between the 2 units in order for them to sync. If you set this to Stream Input 2 but do not have connection between one of the Talker's Stream Outputs and the Listener's Stream Input 2 then you will not get a valid clocking source.

19.1.3 Media Clock issues

The most common indicators of MediaClock issues are audio glitches on the Listener devices. Double check the settings above to determine that you have created a valid Media Clock structure for your network.

20 AVB TROUBLESHOOTING

The following section lists some possible problem areas that should be checked before contacting AudioScience technical support.

20.1 Switch and Network issues

20.1.1 Switch requirements

If you are experiencing connection or transmission issues the first thing to check is your network switch. AudioScience AVB currently only supports the following switch hardware:

Extreme X430, X440 and X460 switches with AVB license installed

In addition to only supporting the models listed, you must have firmware v15.5.3.4 or greater installed in order for your switch to communicate with AudioScience AVB products.

20.2 IP Address recovery (hardware devices)

In the event your Hono AVB hardware device is set to an IP address that is inaccessible from your current PC it is possible to connect to the device using a self-assigned 169.xxx.xxx.xxx address. In order to be able to communicate with the unit at this address you will need to clear the IP address on your system's NIC and allow it to assign itself its own 169.xxx.xxx.xxx address (this address range is the default used by TCP/IP when no DHCP server can be found).

20.2.1 Windows

In Windows you can accomplish this with the following steps.

1. Open a Command Prompt.
2. Type "ipconfig" and press enter, this will display information for all the NICs in your system.
3. Type "ipconfig /release" and press enter, this will remove the current IP address from ALL network devices. (If you have many devices and do not wish to remove the IP address from all of them, run "ipconfig /?" for instructions on how to pick a specific adapter when running these commands)
4. Wait about 10 seconds or so and type "ipconfig" and press enter again. If the IP address has been cleared and reassigned your NIC should now have an IPv4 address starting with 169.
5. Open ASIControl and check to see if the unit you need is now accessible. If it is you should see an IP address listed for it in the 169.xxx.xxx.xxx range. You should now be able to right click the unit in the top pane of ASIControl and select "Change IP Address…" This will open up the unit's configuration page in a browser (Firefox, Chrome or IE) and will display the "IPv4 Configuration" window showing the standard IP address that is currently assigned to the unit (not the 169 address).
6. Either choose the "DHCP" option or enter a new IP address that is on the same subnet as your usual network address and click "Apply" The unit should reset with the new IP address.
7. You can now return to the Command Prompt window and type "ipconfig /renew" and your NIC should reset its address to an acceptable IP for your network. You can type "ipconfig" again to confirm it no longer has a 169 address.
8. Once your IP is reset to its usual range, open ASIControl again and check that you can now see the unit on the same network.

20.2.2 MAC

20.2.2.1 Method 1:

In order to configure a computer running OSX to connect to a local-link address follow these steps:

1. Go to "System Preferences" -> "Network",

2. Choose the network interface to modify (it will have a green dot indicating it is connected and in use), then click on the “Advanced” button and then the “TCP/IP” tab.
3. Make a note of the settings currently in use then select “Manual” from the configuration mode drop down box and fill in 169.254.1.1 as IPv4 address and 255.255.0.0 as subnet mask. Click “OK” and then “Apply”.
4. You will then need to determine what the 169.xxx.xxx.xxx address of your AVB device is. To do that you will need to install the MAC version of ASIControl available here: http://www.audioscience.com/internet/download/apps.htm
5. Open ASIControl and check to see if the unit you need is now accessible. If it is you should see an IP address listed for it in the 169.xxx.xxx.xxx range. You should now be able to right click the unit in the top pane of ASIControl and select “Change IP Address…” This will open up the unit’s configuration page in a browser (Firefox, Chrome or IE) and will display the “IPv4 Configuration” window showing the standard IP address that is currently assigned to the unit (not the 169 address).
6. Either choose the “DHCP” option or enter a new IP address that is on the same subnet as your usual network address and click “Apply” The unit should reset with the new IP address.
7. In order to return to the previous configuration repeat the process in steps 1-3 above and revert the settings to their previous values.

20.2.2.2 Method 2:

If you know the unit’s serial number you can also access it’s web browser with this method.

The OSX method uses ZeroConf/Bonjour to lookup up the device’s IP address.

Open a web browser and type **asi2614-73393.local** in the URL box (where 73393 would be replaced with the serial number of the target Hono AVB device).