ASI5751 and ASI5752

PCI EXPRESS DANTE SOUND CARDS

1 DESCRIPTION

The ASI5751 and ASI5752 are professional PCI Express audio adapters designed for use Dante audio over IP networks.

The ASI5751 provides either 32 Mono streams or 16 stereo streams of playback and record. The ASI5752 delivers 64 channels of Dante input and output that can be routed to WDM devices of 1, 2, 4 or 8 channels.

AudioScience provides ASIControl, an application for configuration and mixing.

2 FEATURES

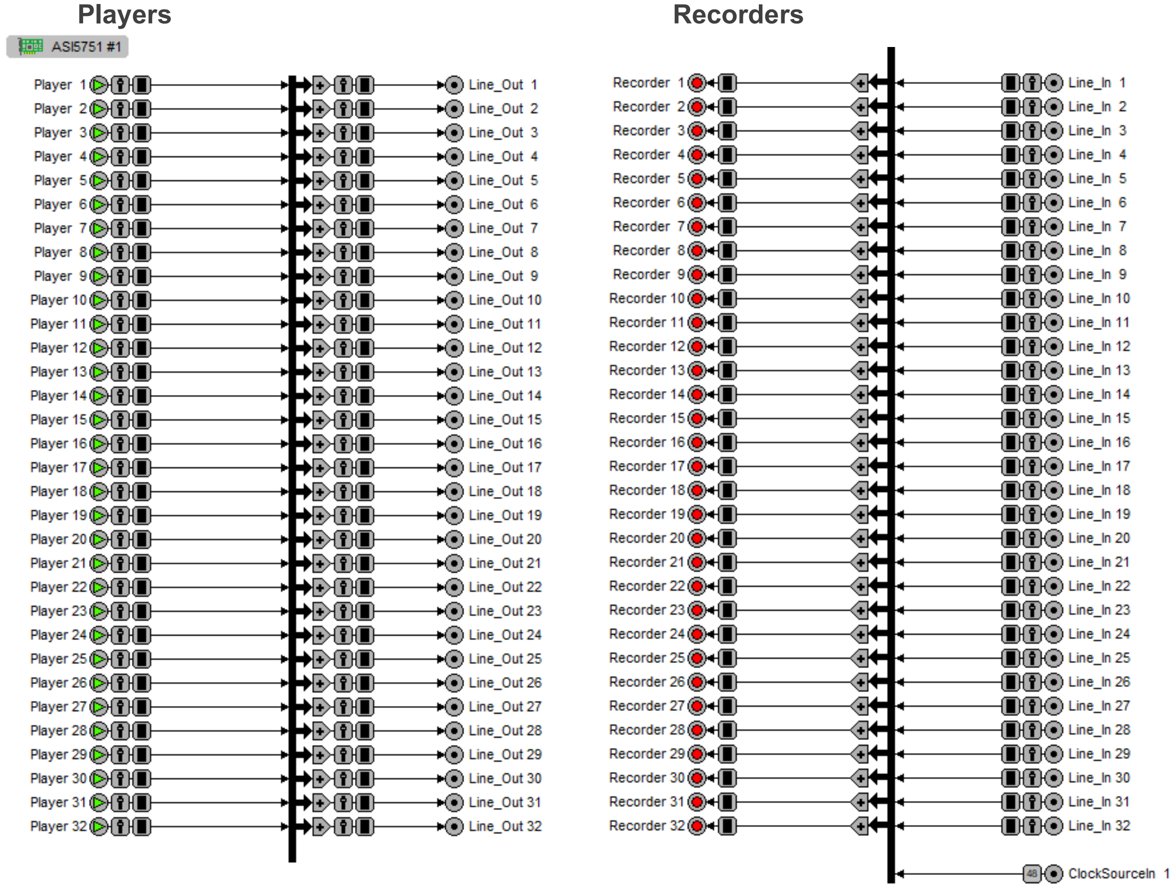
- 32 x 32 Dante I/O on 100Mbit Ethernet (ASI5751)
- 64 x 64 Dante I/O on 100Mbit Ethernet (ASI5752)
- 32 mono/16 stereo streams of PCM playback and 32 mono/16 stereo streams of record (ASI5751)
- WDM devices configurable from 1 to 8 channels (ASI5751)
- Low Profile PCI(e) card allows use in 2U high rackmount computers
- Up to 8 cards in one system
- Windows and Linux software drivers available

3 SPECIFICATIONS

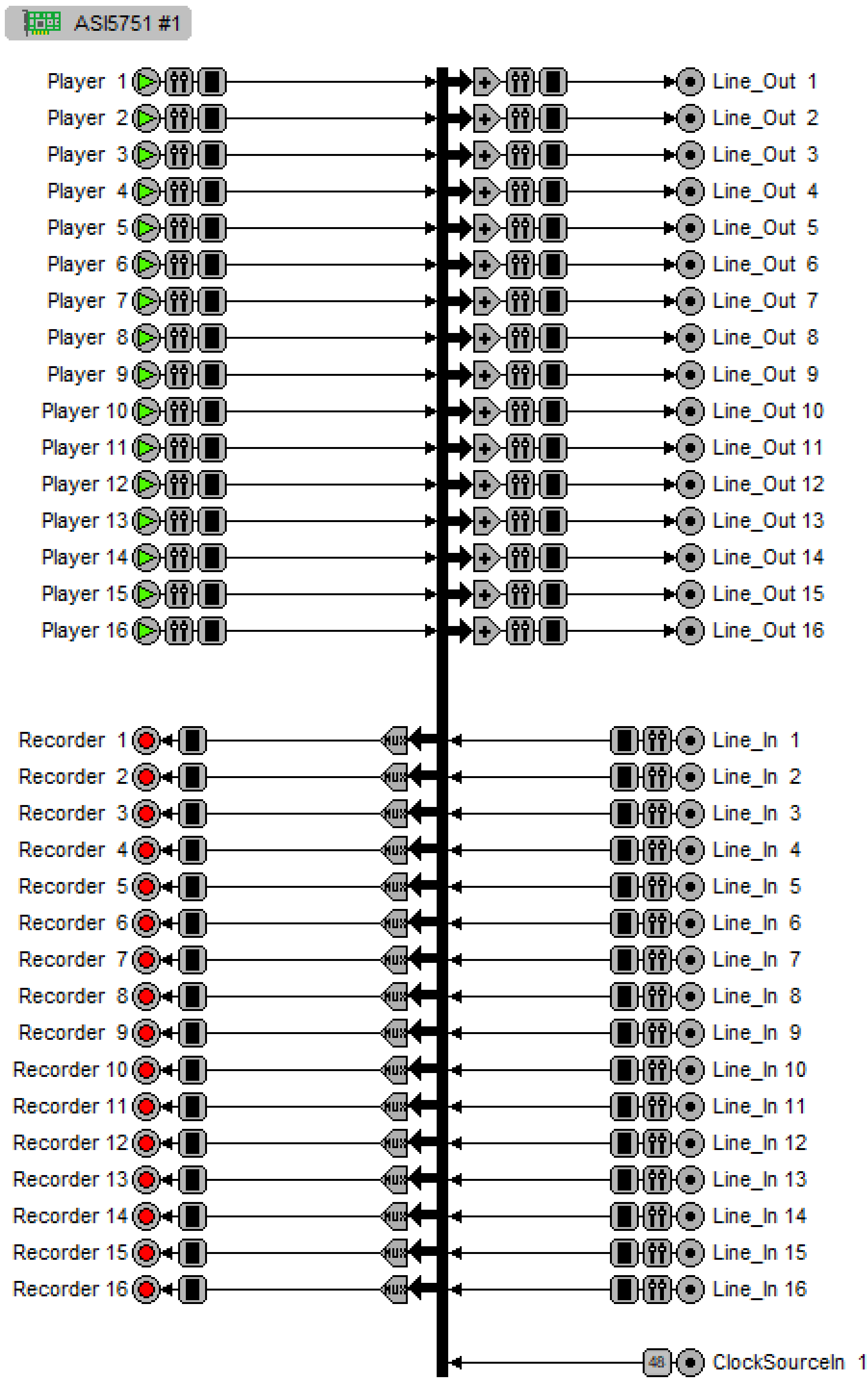
DANTE INPUT/OUTPUT	
Type	1000BaseT Ethernet
Connector	RJ-45
Precision	24bit PCM
Sample Rate - ASI5751	48kHz
Sample Rate - ASI5752	48kHz or 96kHz
Latency	0.25, 0.5, 1.0, 2.0, 5.0ms
SIGNAL PROCESSING	
DSP	Texas Instruments TMS320DM8147@600MHz
Memory	64MB
Audio Formats	8 bit unsigned PCM 16, 24 bit signed PCM 32 bit floating point PCM
Modes	16 Play/Record Stereo
	32 Play/Record Mono
GENERAL	
Bus	X1 PCI Express
Dimensions	PCI half-height form factor – 5.4" x 2.75" x 0.6" (138mm x 70mm x 15mm) Ships with both half height and full height brackets
Weight	8 oz (227g) max
Operating Temperature	0C to 60C
Power Requirements	+3.3V @ TBD, +12V @ TBD

4 BLOCK DIAGRAMS

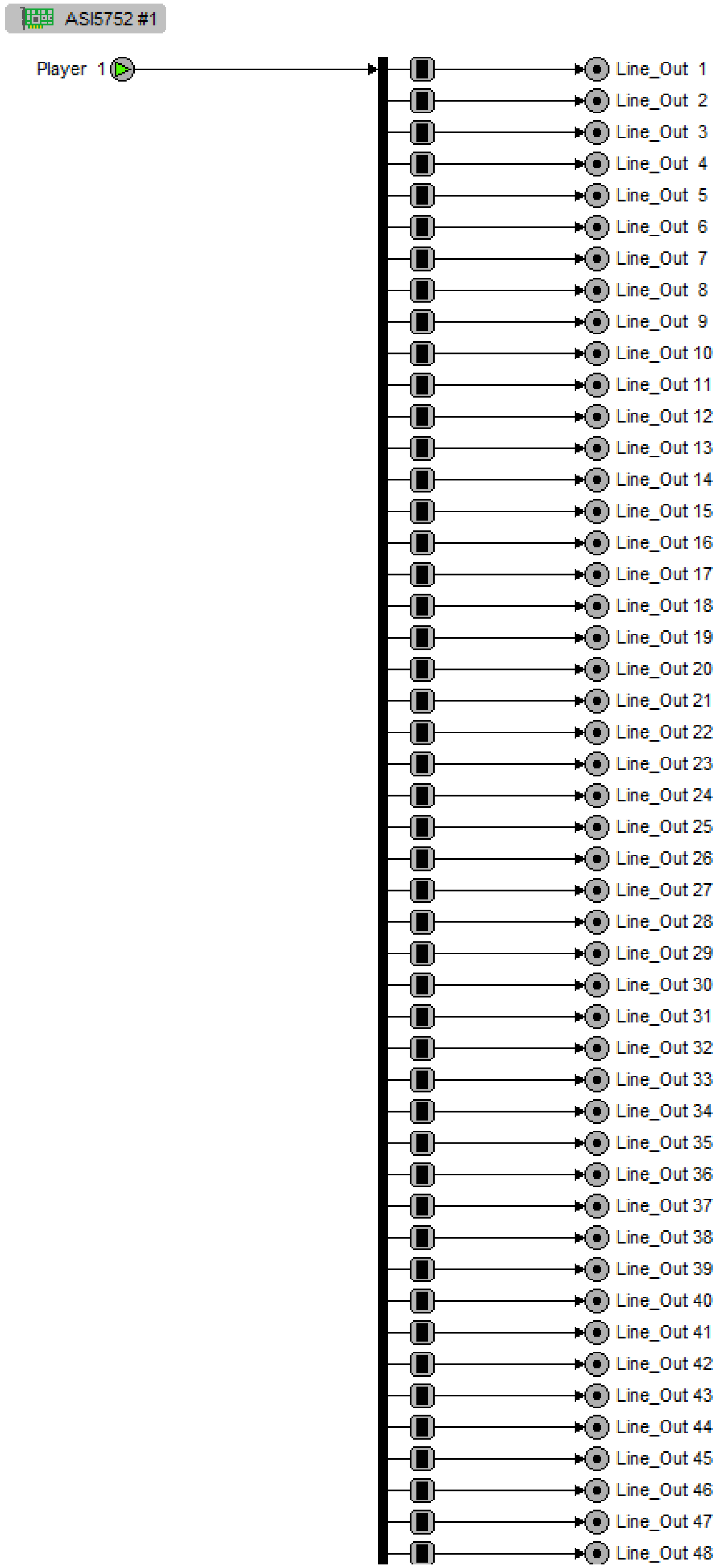
4.1 32-Play (mono) mode (ASI5751)



4.2 16-Play (stereo) mode (ASI5751)



4.3 Low-latency Mode (ASI5752)



5 REVISIONS

Date	Description
October 2023	Preliminary
March 2024	Initial public release
April 4, 2024	Added Compandor and EQ sections
Jan 14 2025	Added ASI5752

6 INTRODUCTION

6.1 About Dante

Based on industry standards, Audinate created Dante, an uncompressed, multi-channel digital media networking technology, with near-zero latency and synchronization. Dante is the preferred audio networking solution that has been adopted by more pro-audio AV manufacturers than any other networking technology. Interoperability is not a dream of the future, but a reality today. Hundreds of Dante-enabled products are available from the world's leading manufacturers, enabling you to mix devices from multiple manufacturers.

One cable does it all. Dante does away with heavy, expensive analog or multicore cabling, replacing it with low-cost, easily-available CAT5e, CAT6, or fiber optic cable for a simple, lightweight, and economical solution. Dante integrates media and control for your entire system over a single, standard IP network.

Dante systems can easily scale from a simple pairing of a console to a computer, to large capacity networks running thousands of audio channels. Because Dante uses logical routes instead of physical point-to-point connections, the network can be expanded and reconfigured at any time with just a few mouse clicks.

7 CONTENTS

8 INTRODUCTION

The ASI5751 and ASI5752 are PCI Express audio adapters. The ASI5751 provides 32 x 32 channels of Dante receive and transmit while the ASI5752 offers 64 x64 channels of Dante I/O.

AudioScience provides application software ASIControl that may be used to set up the devices.

9 CONNECTORS

The ASI5751 and ASI5752 use standard, dual RJ-45 connectors.

10 CABLES

The cards are connected to a Dante network using a standard Ethernet cable. The Ethernet cable is not supplied.

11 HARDWARE INSTALLATION

This section explains how to install one or more AudioScience adapters in a computer.

11.1 Setting Adapter Index – One Adapter in the PC

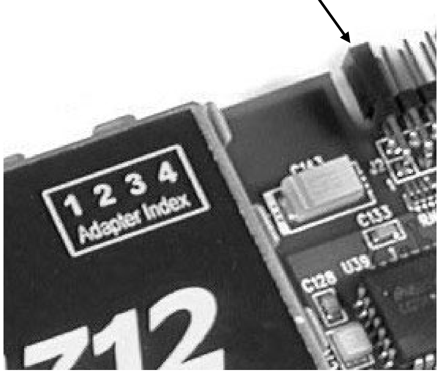
1. Make sure your computer is turned off.

2. PCI adapters should be installed in any empty PCI slot and PCIe adapters should be installed in any x1 (or greater) PCIe slot.

3. Make sure the adapter jumper is set to adapter index #1, the factory default. For a new card no changes need to be made. For an AudioScience adapter from another installation, check that it is set to adapter index #1.

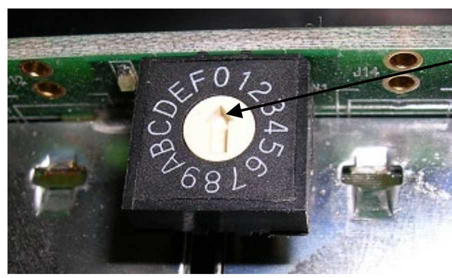
Depending on the adapter family, there are different ways of setting the adapter index.

For ASI5000 and ASI6000 families, there is an adapter jumper that must be set. The left most position represents adapter index #1.



For ASI5300, ASI6300, ASI8700, and ASI8900 families, there is a rotary switch.

NOTE: Position 0 (zero) represents adapter #1, position 1 is adapter #2, etc.



4. Turn on the computer and let it boot. Under **Windows,** a dialog box may pop up informing you that the computer has detected a new Multimedia Audio card. Cancel out of this dialog box and proceed to the software installation section of this datasheet.

11.2 Setting Adapter Index - Two or More Adapters in the PC

1. Make sure your computer is turned off.

2. PCI adapters should be installed in any empty PCI slots and PCIe adapters should be installed in any x1 (or greater) PCIe slots. Different adapter types can coexist in the same computer; for example, an ASI6416 and ASI8921 will work if installed in the same PC. Different adapter types still require unique adapter index numbers.

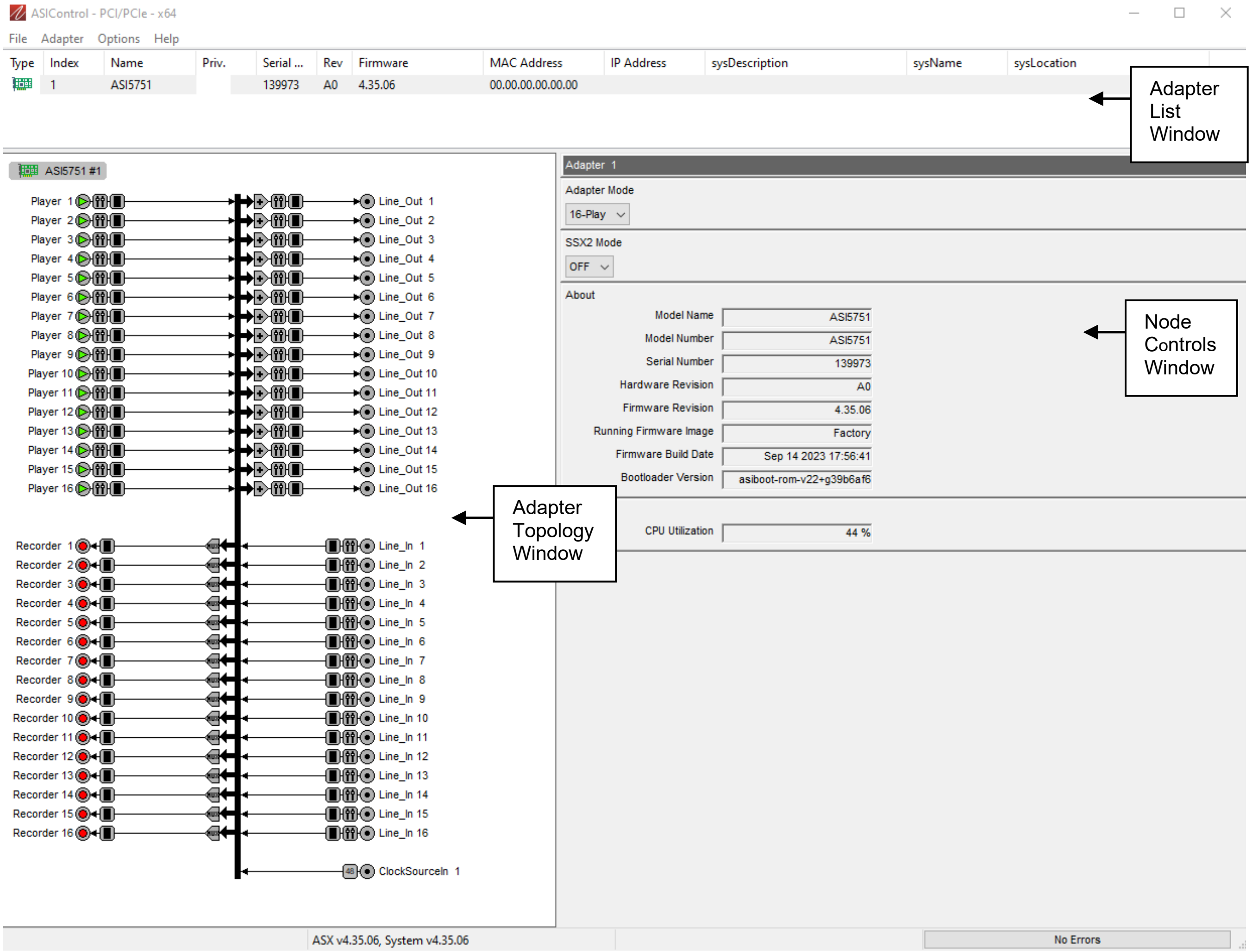
3. Each adapter in the PC needs to have its adapter jumper/rotary switch position set to unique numbers. If you are installing two adapters, the first one would be set to adapter index #1 and the second to adapter index #2.

For ASI5000 and ASI6000 families, the position to the right of index #1, when jumpered, represents adapter index #2. The next position represents #3, and the rightmost position, when jumpered, represents #4.

4. Turn on the computer and let it boot. Under Windows, a dialog box will pop up informing you that the computer has detected a new Multimedia Audio card. Cancel out of this dialog box and proceed to the software installation section of this datasheet.

12 OPERATION USING ASICONTROL

Using ASIControl, the ASI5751 will look similar to the following (in 16-Play mode)



12.1 User Interface

ASIControl consists of three main windows: the adapter list in the top portion of the window, the adapter topology view on the left hand side and the node control list on the right hand side.

12.1.1 Adapter List Window

The top portion of ASIControl shows a list of all the adapters that the application has found. By default, only bus based (i.e. PCI and/or PCI Express) adapters will be shown. If network support has been installed with the driver then AudioScience and other 3rd party CobraNet devices will be shown.

Adapters are listed in order of adapter index. For bus-based adapters, this is determined by the adapter index jumper on the card. For AudioScience network devices such as the ASI2416 this is calculated from the units MAC address. 3rd party network devices are listed last as they have no AudioScience index.

12.1.2 Adapter Topology Window

The left hand side of ASIControl contains the topology view of the adapter. It is essentially a block diagram of the device showing the available physical inputs and outputs on the right hand side. On the left hand side, bus based adapters show player and recorder streams, while CobraNet adapters show their network connections.

Each of these inputs and outputs is referred to as a Node and each Node contains one or more Controls on it. The topology shows each Control as a small square icon. A non-exhaustive list of nodes follows:

- Line In
- Line Out
- AES/EBU In
- AES/EBU Out
- Player
- Recorder
- Tuner
- Clock Source In
- CobraNet In
- CobraNet Out

Hovering the mouse over a particular node will highlight it. Clicking on a node will bring up the controls resident on that node in the right hand control list.

There is an adapter node in the top left corner. Clicking on this will show adapter specific controls and properties on the right hand side.

12.1.3 Node Controls Window

The right hand side of ASIControl shows the controls associated with the selected node on the topology view. The controls are arranged, from top to bottom, in order of audio signal flow, i.e. the audio signal can be viewed as entering the node at the top control and leaving at the bottom control.

12.2 Controls

The following subsections list all of the controls for the ASI5751. Each control's interface as it appears in ASIControl is detailed and where applicable, the API to use the control is described.

12.2.1 Adapter Information

This control displays information about the installed adapter or network device.

12.2.1.1 Interface

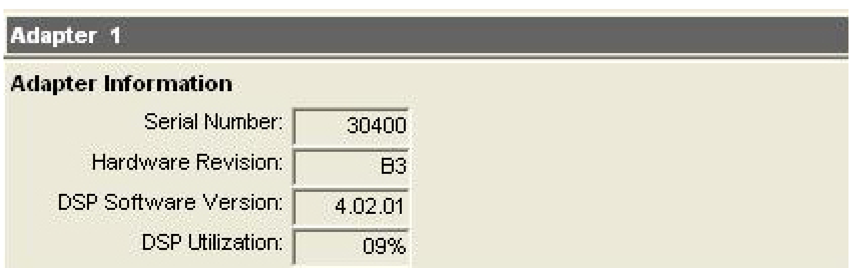


Figure 1. Adapter information seen in right side of ASIControl.

Serial Number:
The serial number is displayed here.
Hardware Revision:
This lists the hardware revision.
DSP Software Version:
The DSP software version is displayed; usually the same as the driver version installed.
DSP Utilization:
This shows the loading of the adapter's DSP in percent.
Note: Utilization should be kept below 90%.

12.2.2 Adapter Mode

The Adapter_Mode control changes the number of players/recorders/lineouts that an adapter has. Not all sample rates/formats are supported; changing the mode of the adapter allows for best functionality with certain sample rates/formats. Not all adapters have the same modes, and not all adapters have modes. Please see datasheets on specific adapters, available at www.audioscience.com, to learn more.

12.2.2.1 Interface

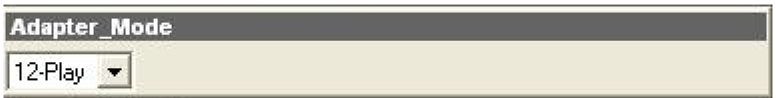


Figure 2. Adapter_Mode in ASIControl.

Selecting the appropriate mode from the list using the dropdown arrow changes the Adapter_Mode setting. A reboot is necessary after changing adapter mode. The mode setting is saved to the adapter's EEPROM.
The ASI5751 supports 2 adapter modes: 16-Play and Mono).

12.2.2.2 16-Play (ASI5751)

This mode supports 16 stereo Play streams and 16 stereo Record streams.

12.2.2.3 Mono (ASI5751)

This mode supports 32 mono Play streams and 32 mono Record streams with full mixing capabilities. Mono mode supports mapping a single Play device to a mono Dante channel, allowing independent audio output on each channel.

12.2.2.4 Low-latency (ASI5752)

This mode supports a single multichannel audio stream enabling live sound processing in ASIO and Core Audio Applications. This single stream can be configured as 1,2,4 or 8 WDM devices.

12.2.3 Player

The Player control supports playback of an audio file from the computer's hard drive.

12.2.3.1 Interface

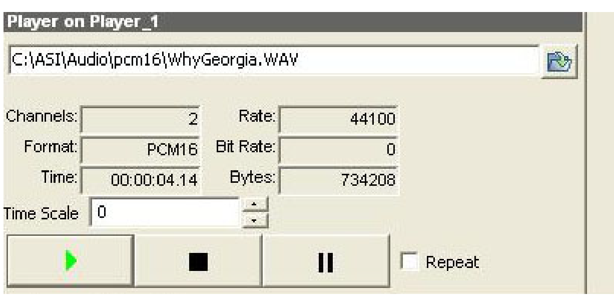


Figure 3. A player in ASIControl.

The first line of static text contains the selected playback file. Below the filename is the file information; playback time and playback bytes, the timescale select options, the player control buttons and the file repeat option.

12.2.3.2 How To Play a File

The first step in playing a file is to select the file to play. Use the **file icon button** to navigate to the desired file. After opening the file, the complete filename, including the path, will appear immediately to the left of the file open icon. At this point the file information is also filled in so that it contains the following fields: "**Channels**", "**Rate**", "**Format**", and "**Bit Rate**". Most of there are self-explanatory. The "**Rate**" refers to the sample rate of the audio recorded in the file. The "**Bit Rate**" applies only to MPEG compression and is set to 0 for all other formats.

At this point the percentage time scaling without pitch shift can be set if desired. The default of 0 indicates that time scaling is disabled. The valid range of settings is +/- 20 percent.

The "**Repeat**" check box indicates whether the file should be played again after playback has completed. It can be set either before playback has begun, or while playback is underway. The file is now ready to be played. To start playback press the **play button**. At this point the "**Time**" and "**Bytes**" fields report playback time and the number of bytes of the file that have been played. Once playback has started, the **stop** and **pause buttons** can be used to stop or pause the playback.

12.2.3.3 Using embedded sine wave generator

Manually typing in a filename of "~" and pressing play will cause a full-scale 1 kHz sine wave to be played at 48 kHz. The format of the filename string is: "~w, c,f,a,m,s,t".

w = waveform = SINE (default=SINE)
c = channels = 1..8 (default = 2)
f = frequency = 1000 for 1kHz (default=1000)
a = amplitude = -1 for -1dBFs (default=0dBFS, i.e. full scale)
m = channel mask = 10 for left only, 01 for right only, 11 for stereo etc (default=1 for all channels)
t = sample type = (PCM8,PCM16,PCM24,PCM32,FLOAT32), (default=FLOAT32)
s = sample rate = positive integer (default=48000) [validity depends on adapter]

Defaults can be used if the complete string is not specified, i.e.
"~" becomes "~wSINE,c2,f1000,a0,m11,s48000,tFLOAT32"
Any subset of the options may be specified, the remaining options will be set to the defaults. e.g. "~f500" = 500Hz stereo sine wave at 0dBFS, 48kHz sample rate.

12.2.3.4 Developer

12.2.3.4.1 Windows APIs

Wave – waveOutOpen(), waveOutWrite(), waveOutClose() etc.
HPI – Output stream functions documented here.
ASX – ASX Player control functions documented here.
DirectSound – TBD.

12.2.3.4.2 Linux APIs

HPI – TBD.

12.2.4 Recorder

The Recorder control supports recording of an audio file.

12.2.4.1 Interface

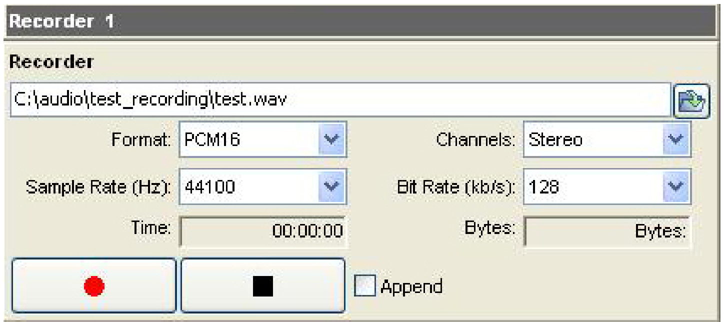


Figure 4. A recorder in ASIControl.

The first line of text contains the name given to the recorded file along with the location where it is to be saved. Below the filename is the file information, the record time and record bytes, the recorder control buttons and the file Append option.

12.2.4.2 How To Record a File

The first step in recording a file is to have audio coming into the adapter. This can be from a line-in or from one of the players in ASIControl. See appropriate sections in this datasheet to accomplish this. Next, the new file needs a name and place to be saved, or an existing audio file can be selected to be overwritten or appended to. Use the file icon button to navigate to the location to create the file and to give it a name, or to open a previously recorded file to overwrite or append to it. Next, from the dropdown arrows, select the number of "**Channels"**, the "**Sample Rate"**, the "**Format"**, and the "**Bitrate"** that the file should be recorded in.

Check the Append checkbox to save the audio to the end of an already existing file.

The file is now **ready** to be recorded. To start recording, press the record button. At this point the **"Time'** and "Bytes' fields report record time and the number of bytes of the file that have been recorded.

Once recording has started, the stop and pause buttons can be used to **stop or** pause the playback.

Developer
Windows APIs

Wave – use waveInOpen(), waveInStart() etc.
HPI – use HPI_InStreamxxx() functions.
ASX – use ASX_Recorder_xxx() functions.
DirectSound – **TBD.**

Linux **APIs**

HPI – use HPI_InStreamxxx() functions.
ASX – use ASX_Recorder_xxx() functions.
ALSA – TBD

12.2.5 Volume

The Volume control allows the audio signal's gain to be altered in the range of –100 to +20dB.

12.2.5.1 Interface

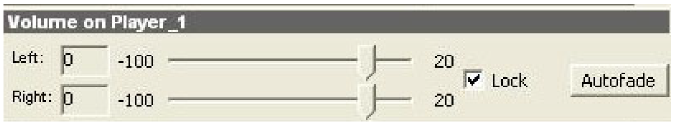


Figure 5. A Volume of a Player in ASIControl.

Left and **Right** display boxes:
Displays the gain settings that the slider bars are set to.

Slider Bars:
Click on the bar with the mouse and drag to desired gain. Once the bars are selected, the left and right arrow keys can also be used to change the settings.

Lock:
When checked, locks the left and right channels to the same gain value. When unchecked, allows the left and right channels to have independent gains.

Autofade:
When pressed, automatically fades the volume to the opposite end of the scale.

12.2.5.2 Developer

12.2.5.2.1 Windows APIs

Wave/Mixer – MIXERCONTROL_CONTROLTYPE_VOLUME
This is a Windows standard volume control. Settings are in the range of 0 to 65535, where 0 completely mutes the output and 65535 is the maximum volume.
HPI – HPI_Volume APIs.
ASX – ASX_Volume APIs.
DirectSound – TBD.

12.2.5.2.2 Linux APIs

HPI –HPI_Volume APIs.
ASX –ASX_Volume APIs.
ALSA – TBD.

12.2.6 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.

12.2.6.1 Interface

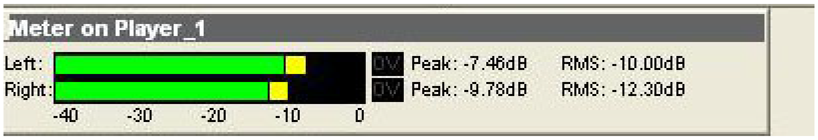


Figure 6. A stereo peak meter display. The RMS is the green bar and the peak is the yellow bar.

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.

12.2.6.2 Developer

12.2.6.2.1 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.

12.2.6.2.2 Linux APIs

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

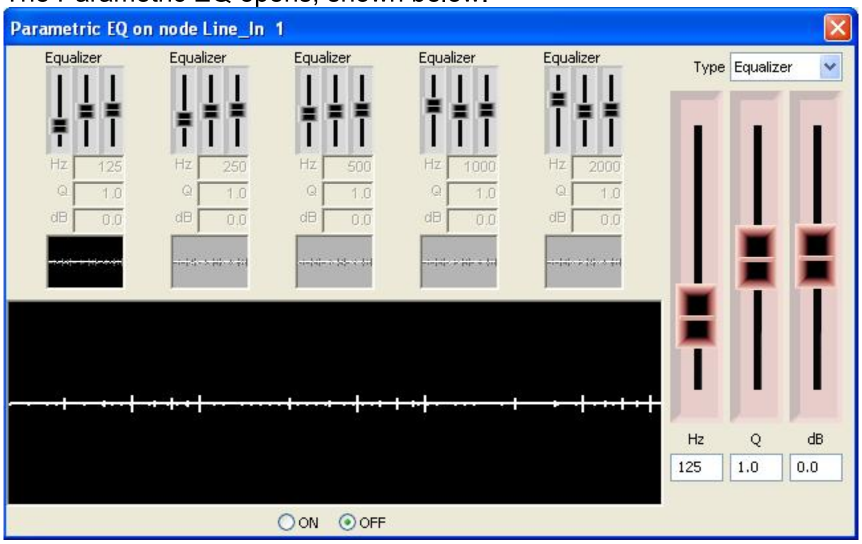
12.2.7 PARAMETRIC EQUALIZER

The AudioScience parametric equalizer is a 5 band parametric equalizer. It is located on the Line_In and AES/EBU_In nodes and may be used on both the Line In, AES/EBU In, and Microphone signals. Each of the equalizers 5 bands may be individually programmed with filter type (Bypass, Lowshelf, Highshelf, Equalizer, Lowpass, Highpass, Bandpass, and Bandstop), Q (sharpness), and center frequency.

12.2.7.1 Interface

The Parametric Equalizer is accessed from the ASIControl by clicking on either a Line_In or an AES/EBU_In in the left side of ASIControl then clicking on the “Show EQ” button on the right side of ASIControl.

The Parametric EQ opens, shown below.



The Parametric EQ as seen in ASIControl

The EQ window contains controls for setting the filter parameters of each of the 5 bands, with a graph showing the combined frequency response of the 5 bands.

Clicking on one of the bands highlights it and changes its small graph display black, as shown on the left band in above. Select the type of graph you want from the Type selection box in the upper right corner, and adjust levels by sliding the large sliders on the right. Click on the next equalizer and change its parameters as needed.

At the bottom of the ASI Parametric EQ pop up, click on the On radio button to activate it.

Each filter band has the following parameters:
Filter Type – The shape of the filter. Supported filter types are:

- Bypass – filter is turned off
- Low Shelf – EQ low shelf
- High Shelf – EQ high shelf
- Equalizer – EQ band (default)
- Low Pass – Standard low pass
- High Pass – Standard high pass
- Band Pass – Standard band pass
- Band Stop – Standard band stop/notch

Filter Hz (Freq) – The center frequency of the filter.
Filter Q – The sharpness of the filter. The higher the Q, the more selective the filter is.
Filter dB (Gain) – The gain of the filter at the center frequency.

12.2.7.2 Developer

12.2.7.2.1 Windows APIs

Wave – Use the equalizer mixer control – see “AudioScience WavX Specification”
HPI – Use the HPI_ParametricEQ_XXXX APIs – see “AudioScience HPI Specification”

ASX – TBD

12.2.7.2.2 Linux APIs

HPI – TBD
ASX – TBD
ALSA – TBD

12.2.8 COMPANDOR

This unit contains a compressor/expander (Compandor), which is used to reduce or expand the dynamic range of the signal it acts on. It is located on the LineIn input and may be used on both the LineIn and Microphone signals.

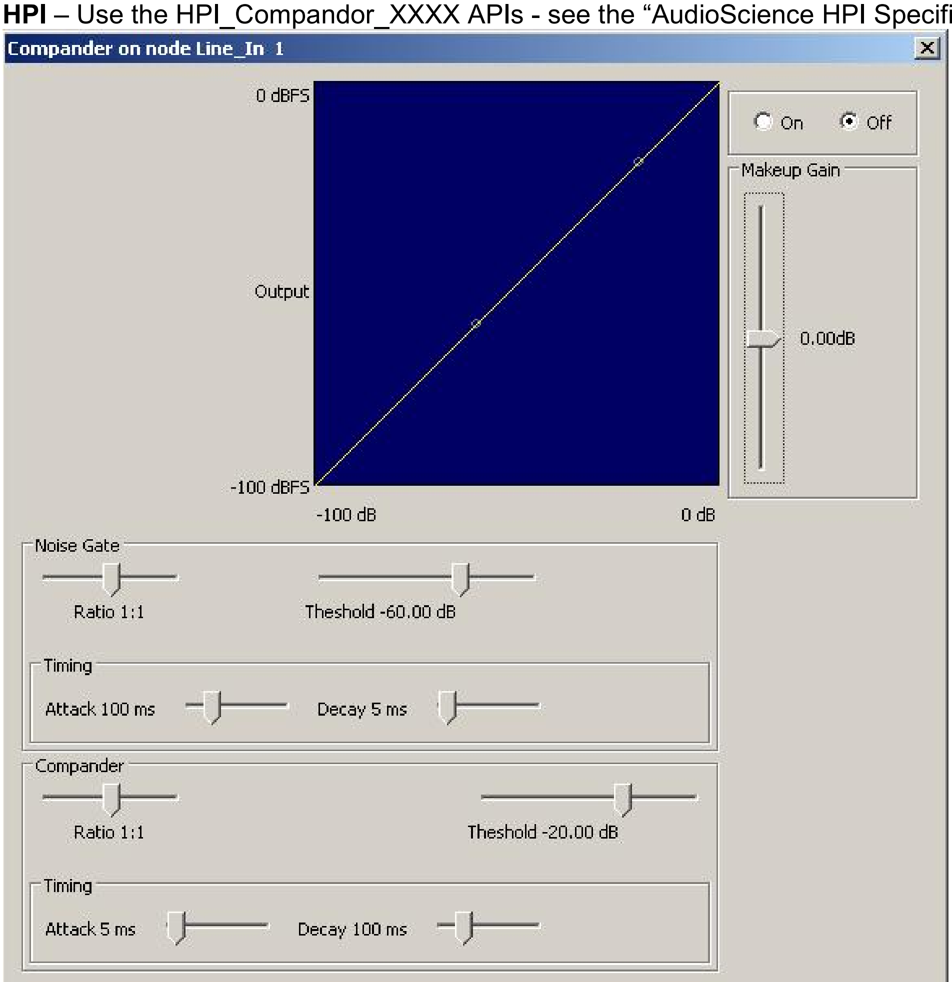
The compandor is accessed from the ASI Mixer by clicking on the "Compandor" button on the LineIn panel. The following parameters can be set:

Compression Threshold – the input signal level at which the compression starts
Compression Ratio – The ratio of the input signal level to the output signal level
Makeup Gain – additional gain applied the compressed/expanded signal
Attack – Attack time of compandor in milliseconds. Sets the time that the compressor takes to act
Decay – Decay time of compandor in milliseconds. Sets the time for the signal gain to return to normal after compression
Noise Gate –

12.2.8.1 Developer

12.2.8.1.1 Windows APIs

Wave – Use the compandor control – see the "AudioScience WavX Specification" (SPCWAVX.PDF)
HPI – Use the HPI_Compandor_XXXX APIs - see the "AudioScience HPI Specification" (SPCHPI.PDF)



13 Troubleshooting

For help with Dante Controller issues, check out this helpful guide from Audinate:

Troubleshooting Dante IP Address Configuration

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