AUDIOSCIENCE

(BUILT FOR BROADCAST)

ASI6501
PCI SOUND CARD

1 DESCRIPTION

The ASI6501 is a professional PCI sound cards designed for use in multichannel sound systems.

Providing up to 8 stereo unbalanced play streams that are mixed to 8 stereo unbalanced outputs, the ASI6501 features AudioScience's unique "anything to anywhere" mixing and routing. The maximum analog output level is +18dBu.
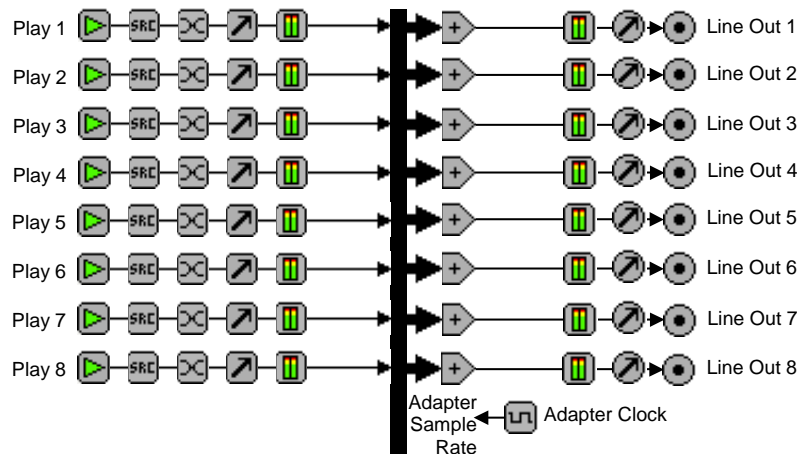
A choice of uncompressed PCM, MPEG layer 2, and MP3 is available for playback. All compression is handled by an on-board floating point DSP, allowing the host computer to focus on other tasks.

ASI6501 functionality includes TSX™ time scaling allows compression/expansion of any or all playback streams in real time with no change in pitch.

2 FEATURES

- 8 unbalanced analog streams of playback into 8 stereo unbalanced outputs with levels to +18dBu

- Formats include PCM, MPEG layer 2, and MP3 with sample rates to 96kHz

- TSX™ time scaling allows compression/expansion of play streams by up to +/-20% with no pitch shift

- SoundGuard™ transient voltage suppression on all I/O

- Short length PCI card format (6.6 inches/168mm)

- Up to 4 cards in one system

- Windows XP/Server 2003/7 and Linux software drivers available

ASI6501

Play 1 ... Line Out 1
Play 2 ... Line Out 2
Play 3 ... Line Out 3
Play 4 ... Line Out 4
Play 5 ... Line Out 5
Play 6 ... Line Out 6
Play 7 ... Line Out 7
Play 8 ... Line Out 8

Adapter Sample Rate — Adapter Clock

Key:
- Play Stream
- Sample Rate Converter
- Channel Mode
- Volume
- Meter
- Mixer
- Level
- Output
- Clock Source

3 SPECIFICATIONS

ANALOG OUTPUT	
Type	Unbalanced
Connector	Mini50 (SCSI-II type)
Input Impedance	10K ohms
A/D converter	24bit oversampling
Output Level	-6 to +18dBu unbalanced
D/A converter	24bit oversampling
Load Impedance	10K ohms
Dynamic Range [1]	105dB (record or play)
THD+N [1]	0.002% (record or play)
Frequency Response	20Hz to 20kHz +0/-0.2dB 20Hz to 40kHz +0/-3dB
Inter-channel Phase	<0.1 degrees (record or play)
Inter-channel Crosstalk	>110dB (record or play)
SAMPLE RATE CLOCK	
Internal (Adapter)	32, 44.1 48, 88.2 and 96kHz
SIGNAL PROCESSING	
DSP	Texas Instruments TMS320C6713@300MHz
Memory	8MB
Audio Formats	8 bit unsigned PCM 16 bit signed PCM 32 bit floating point PCM MPEG-1 Layer 2 MPEG-1 Layer 3(MP3) (MPEG Layer-3 audio coding technology licensed from Fraunhofer IIS and THOMSON multimedia)
BREAKOUT CABLES and BOBs **(NOT INCLUDED)**	
Analog	Dual BOB1024s CBL1102 CBL1006
GENERAL	
Bus	32bit Universal PCI. PCI-X compatible.
Dimensions	PCI short-length form factor (6.6 inches/168mm long).
Weight	8 oz (227g) max
Operating Temperature	0C to 70C
Power Requirements	+3.3V@1.5A, +12V@275mA
	[1] – Dynamic Range and THD+N measured using a +18dBu 1kHz sine wave sampled at 48kHz and A weighting filter.

4 REVISIONS

Date	Description
07 June 2010	Final.

5 CONTENTS

6 BLOCK DIAGRAMS

6.1 8- or 16-Play Mode

ASI6501 – 8/16 Play Mode

NOTE: Available in 8-Play or 16-Play mode.

Key:
- Play Stream
- Sample Rate Converter
- Channel Mode
- Volume
- Meter
- Mixer
- Level
- Output
- Clock Source
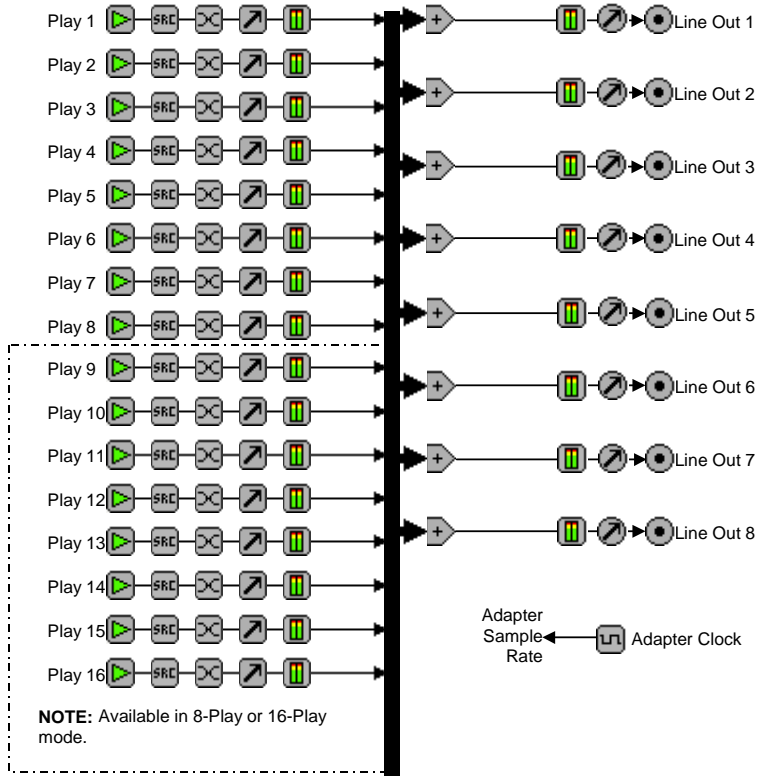
6.2 SSX2 Multichannel Mode

ASI6501 – SSX2 Multichannel Mode

NOTE: When in 16-Play mode
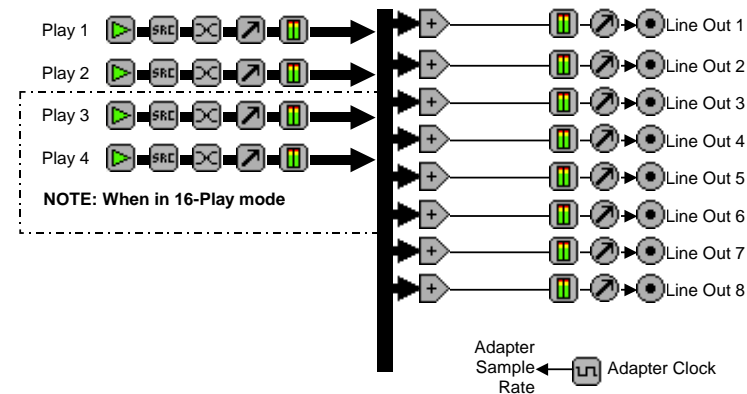
7 CONNECTORS

7.1 Mini 50pin – Analog

```
         1   26
         2   27
         3   28
         4   29
         5   30
         6   31
         7   32
         8   33
   GND   9   34  RO4+
   GND  10   35  LO4+
   GND  11   36  RO3+
   GND  12   37  LO3+
   GND  13   38  RO2+
   GND  14   39  LO2+
   GND  15   40  RO1+
   GND  16   41  LO1+        Analog Out
   GND  17   42  RO5+
   GND  18   43  LO5+
   GND  19   44  RO6+
   GND  20   45  LO6+
   GND  21   46  RO7+
   GND  22   47  LO7+
   GND  23   48  RO8+
   GND  24   49  LO8+
   GND  25   50  GND
```
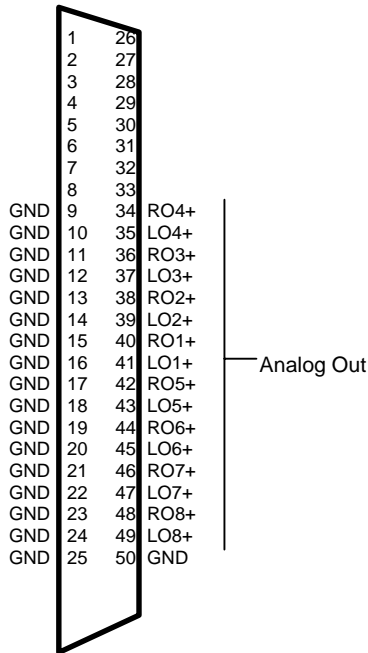
7.2 XLR - Unbalanced

The ASI6501 has unbalanced outputs. For operation with XLRs, connect the "-" and "shield" side of the XLR connector to ground. The "+" side becomes the signal.

8 CABLES

Dual BOB1024s are used with CBL1102 and CBL1006. The BOBs and cables are purchased separately. See section 2.2 of the following datasheet for set up information:
http://www.audioscience.com/internet/products/cables/datasheet_bob1024.pdf

9 HARDWARE INSTALLATION

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

9.1 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.
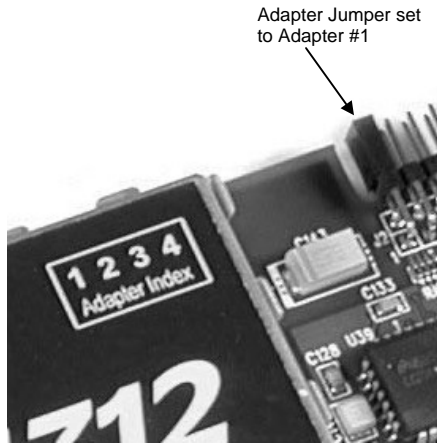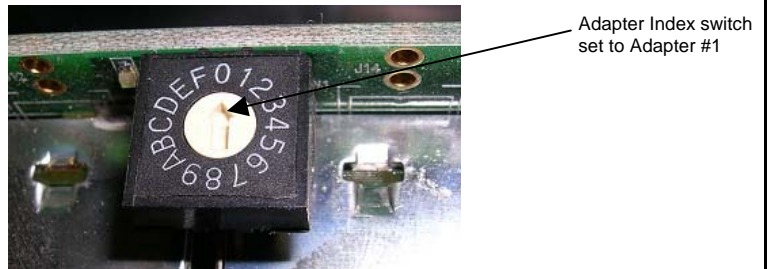
For ASI5000 and ASI6000 families, there is an adapter jumper that must be set. The left most position represents adapter index #1.

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.

Adapter Jumper set to Adapter #1

Adapter Index switch set to Adapter #1

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.

9.1.1   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 correctly 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. For example if you are installing two adapters, the first one would be set to adapter index #1 and the second to adapter index #2.

3.1. 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.

3.2. For ASI5300, ASI6300, ASI8700, and ASI8900 families, rotate the rotary switch to indicate what position is required.

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.

10 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.

10.1 Drivers for Windows XP/Server 2003/Server 2008/7

The first step is what type of driver is needed for the adapter. There are two types of drivers for Windows: The WAVE driver and the WDM driver. Typically this will be decided by the application used with the AudioScience adapter. For any application that uses DirectSound, use the WDM driver.

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 products should select the second option with the "+Network Audio Driver." in the text.

10.1.1 WAVE Driver

Download the file named ASIWAVE_xxxxxx.EXE from www.audioscience.com and run it (_xxxxxx is the version number). After the EXE has run, reboot the 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).

10.1.2 WDM Driver

Download the file named ASIWDM_xxxxxx.EXE from www.audioscience.com and run it (_xxxxxx is the version number). After the EXE has run, reboot the 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).

10.1.3 Combo Driver

The Combo driver presents both Wave and WDM devices to the user. Download the file named ASICOMBOV_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).

10.1.4 ASIO

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

10.1.5 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 viewed as follows:

XP: The system event log is accessed from \Start\Control Panel\Administrative Tools\Event Viewer. The System view should be selected.

7: The system event log is accessed from \Start\Control Panel\System and Maintenance\Administrative Tools\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.

10.2 Drivers for Linux

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

10.3 Applications for Windows

AudioScience provides two application for adapter set-up and configuration: ASIControl and ASIMixer.

10.3.1 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.

The following list of controls are uniquely supported in ASIControl (as opposed to ASIMixer):
- ASI8700 tuner pre-emphasis
- ASI8900 tuner RBDS
- ASI8900 tuner FM stereo indication
- ASI8914 HD Radio PSD field
- ASI8914 HD Radio Digital status field
- ASI8914 HD Radio Digital program number selection

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

When started, ASIControl will look something like the following:
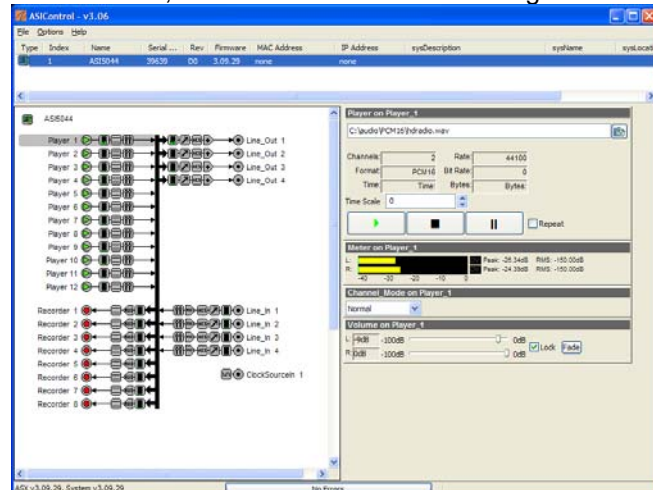
10.3.2 ASIMixer

ASIMixer is specific to the Wave and Combo drivers and is available from the AudioScience website. It uses the Wave/Mixer interface to control AudioScience adapters. Users of driver version 3.10 and later are encouraged to use ASIControl for manipulating adapter controls.

See the list of controls in the previous section that that are only available in ASIControl.

11 OPERATION USING ASICONTROL

Using ASIControl, the ASI6501 will look like so:
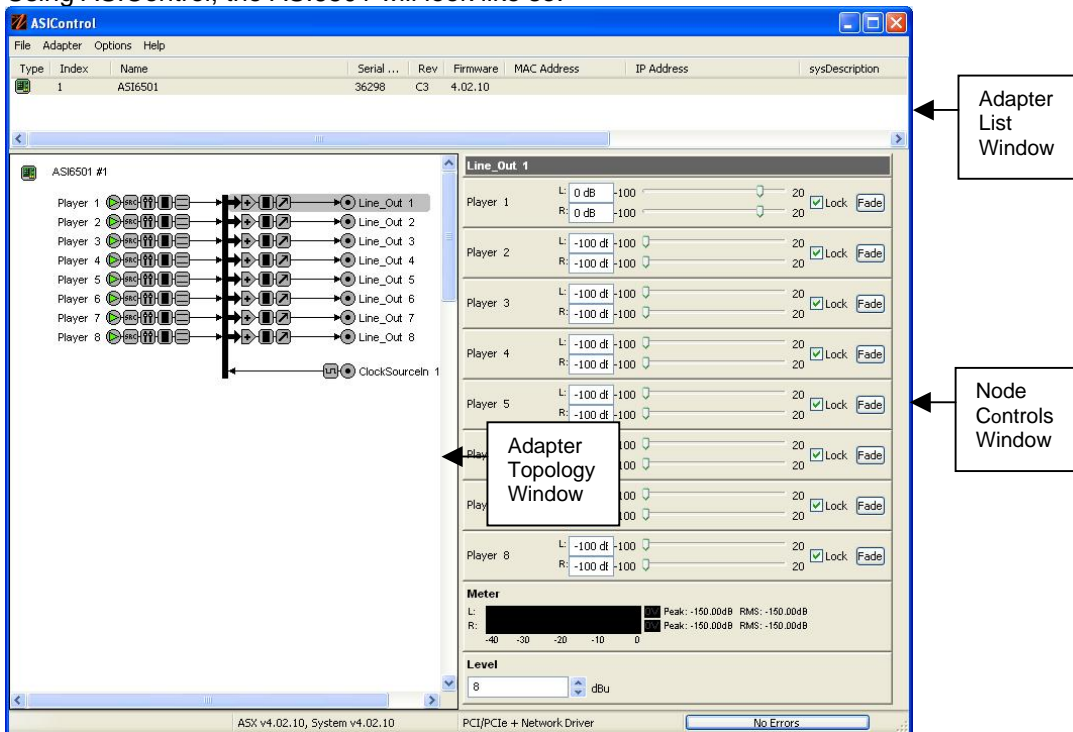
11.1 User Interface

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.

11.1.1 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 the network portion of the driver is installed (by selecting "Install Standard + Networked Audio Driver" after running the driver installer) and "Local PCI(e) + Networked adapters" is selected from ASIControl's Options→Configure adapter interface, then AudioScience and other third 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 CobraNet devices this is calculated from the unit's MAC address. Third party CobraNet devices are listed last as they have no AudioScience index.

11.1.2 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	Recorder
Line Out	Tuner
AES/EBU In	Clock Source In
AES/EBU Out	CobraNet In
Player	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 of the topology window. Clicking on this will show adapter-specific controls and properties on the right hand side.

11.1.3 Node Controls Window

The right hand side of ASIControl shows the controls associated with the selected node in 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.

11.2 CONTROLS

For further information on controls common to all AudioScience adapters and how to operate ASIControl, please see the ASIControl manual, available from www.audioscience.com and also installed by the driver.

Below is a list of controls in ASIControl specific to this adapter.

11.3 Adapter Information

This control displays information about the installed adapter or ASI2416.
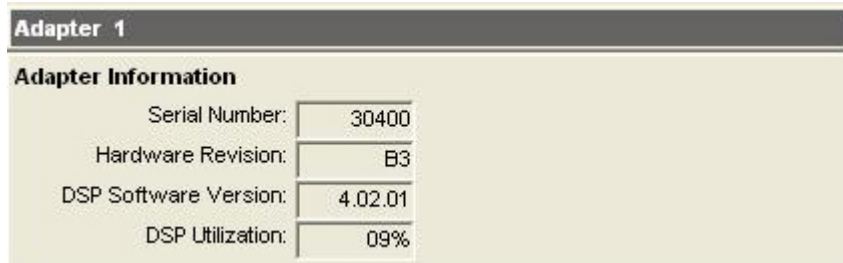
11.3.1 Interface

Adapter 1	
Adapter Information	
Serial Number:	30400
Hardware Revision:	B3
DSP Software Version:	4.02.01
DSP Utilization:	09%

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%.

11.4 Adapter Mode

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

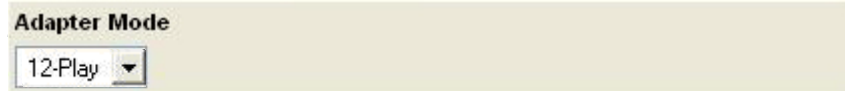### 11.4.1 Interface

Adapter Mode

12-Play ▼

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 ASI6501 supports three adapter modes: 8-Play, 16-Play, and Mono.

11.4.1.1 8-Play

This mode supports 8 unbalanced play streams with full mixing capabilities to 8 unbalanced outputs.

11.4.1.2 16-Play

This mode supports 16 unbalanced play streams with full mixing capabilities to 16 unbalanced outputs.

11.4.1.3 Mono

This mode supports 16 mono unbalanced play streams with full mixing capabilities to 16 mono unbalanced outputs. The image to the right shows what the ASI6501 looks like in ASIControl when changed to Mono mode.
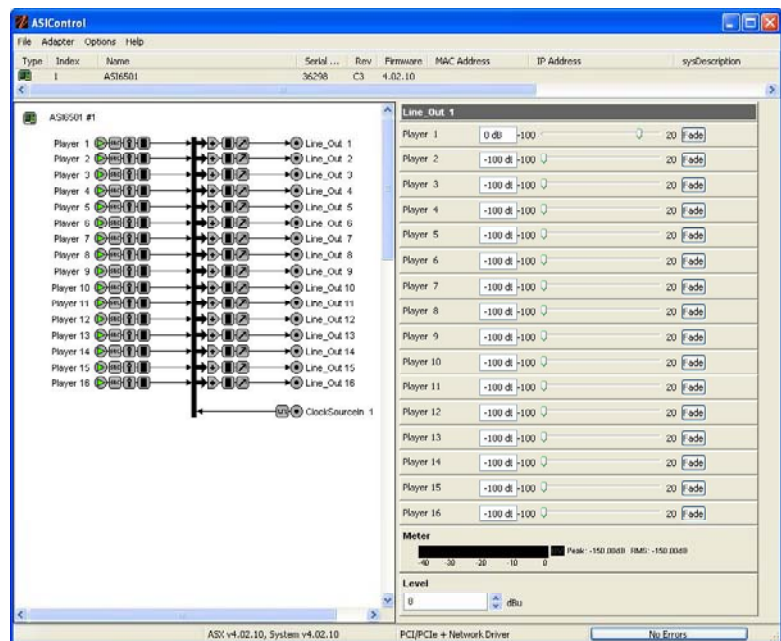
11.5 SSX2 Mode

The AudioScience Surround Sound eXtension v2 (SSX2) mode control changes the players/recorders of an adapter to be able to play/record multichannel files of 2, 4, 6, or 8 channels. All ASI6000-series adapters support SSX2. This control is available in the right pane of ASIControl after clicking on the adapter's name in the left pane of ASIControl. Implementing SSX2 mode is slightly different depending on what driver version is installed with the AudioScience adapter.

Note that in ASIControl, the Player volumes cannot be unlocked to move the left and right channels independently when an adapter is in SSX2 mode.

11.5.1 Interface

SSX2 Mode

OFF ▼

Figure 3. SSX2 Mode seen in right side of ASIControl.

Selecting "On" using the dropdown arrow changes the SSX2 Mode setting. A reboot is necessary after changing the mode setting. The mode setting is saved to the adapter's EEPROM. After rebooting, one multichannel play or record stream will be created for each 4 play or record streams on the adapter.

SSX2 Mode and Adapter Mode can be used in conjunction with each other. Set the required Adapter Mode, set SSX2 Mode to On, then reboot. For example, an ASI6518 set to "16-Play" in Adapter Mode and "On" in SSX2 Mode, the ASI6518 will show 4 multichannel players after reboot. An ASI6518 set to "8-Play" in Adapter Mode and "On" in SSX2 to on will show 2 multichannel players after reboot.

<end>