



01 April 2010

# Windows 7 Audio Drivers

32-BIT AND 64-BIT

## 1 INTRODUCTION

The AudioScience Microsoft Windows™ 7 drivers enable multi-stream recording, reproduction, and mixing of PCM and compressed\* digital audio on a PC platform. The Microsoft multimedia Wave, DirectSound, and DirectShow APIs are fully supported. The driver utilizes large adapter buffers to provide high performance, glitch-free audio under all operating conditions.

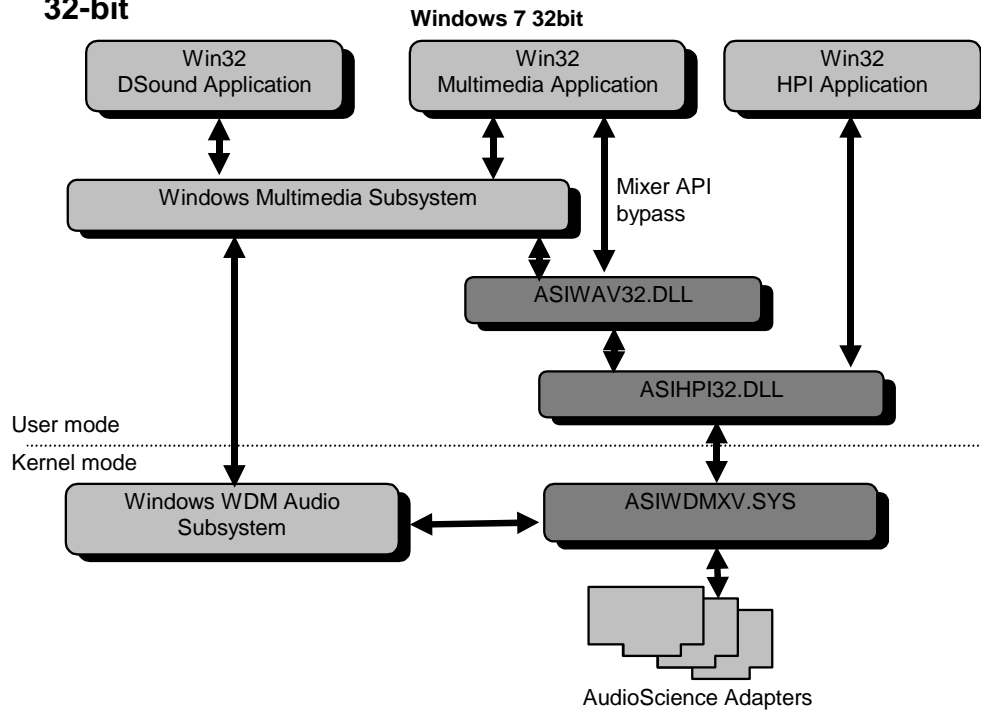
## 2 FEATURES

- Each adapter stream is presented as an independent render or capture device.
- Simultaneous record while play supported.
- All devices have independent sample rates and compression formats.
- Peak meter controls available in the mixer for monitoring audio.
- Volume controls available in the mixer.
- Level controls available in the mixer to adjust level/trim on analog inputs and outputs.
- Demo mixer application documents the mixer structure of every AudioScience adapter.
- Up to 16 Audio Science adapters per system.
- Fully compliant with Microsoft Wave (see 'Mixer Startup' below), DirectSound, and DirectShow APIs.
- All card functionality is surfaced to the API level.
- Drivers are freely available from the download section of the AudioScience website.

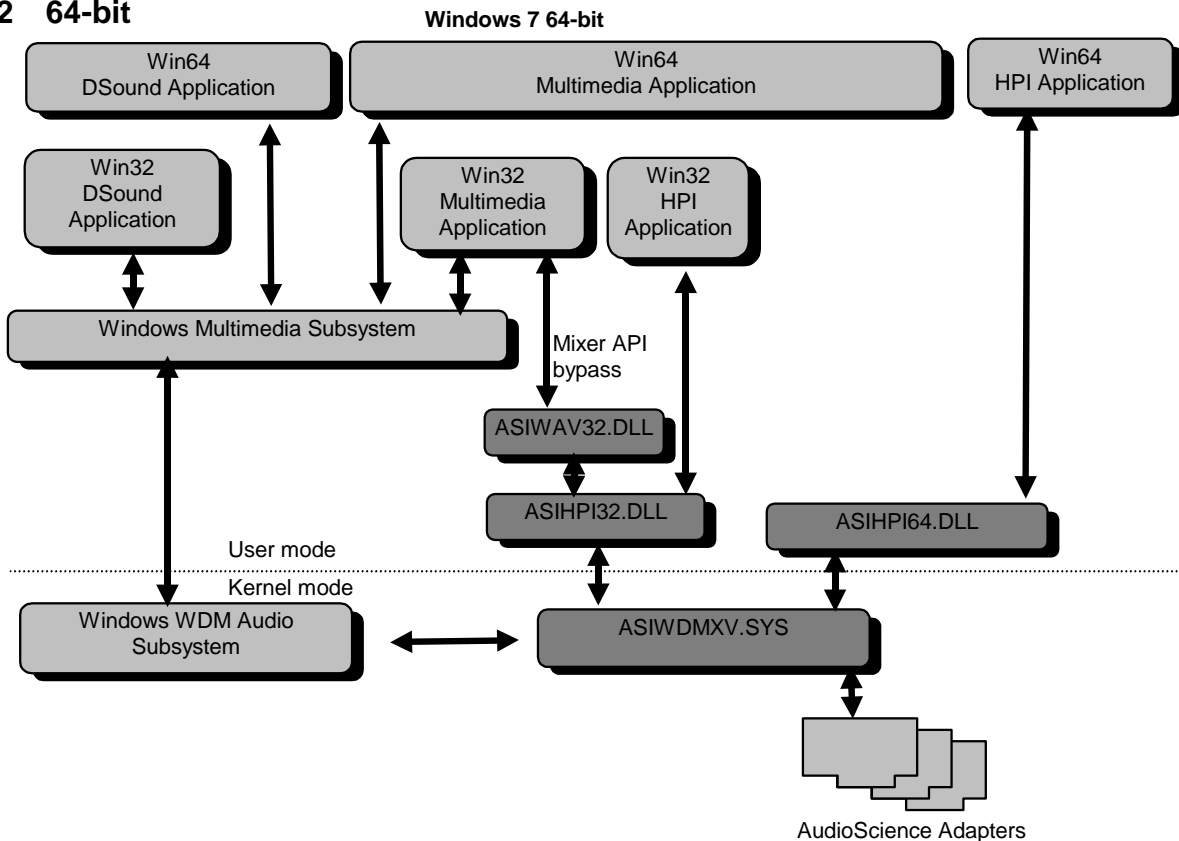
\* Hardware encoding or decoding of compressed formats available only through HPI or ASX for 64-bit applications.

### 3 Block Diagrams

#### 3.1 32-bit



#### 3.2 64-bit



## 4 CHANGES FROM WINDOWS 2000/XP WAVE DRIVER

### 4.1 Mixer Startup (32-bit only)

Windows 7 no longer supports mixer API access to user mode drivers so the ASI driver implements a mixer API bypass that hooks the mixer system calls for the ASI mixer devices and handles them directly. The hooks are installed when the first multimedia system call is made.

If the first call to the Windows Multimedia subsystem is mixerGetNumDevs(), it should be preceded by a dummy call to waveOutGetNumDevs() in order to enable the AudioScience mixer additions. If an application calls waveOutXXXX() or waveInXXXX() before a call to mixerGetNumDevs() is made, then no application changes are required.

### 4.2 Start Device Failure Log

The recording of device startup errors has moved from C:\ASIWDM\_StartDeviceFailureLog.txt to the system event log. The event log is viewed as follows:

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.

### 4.3 Device ordering has changed

The ordering of Wave and WDM devices exposed by the Wave interface and WDM devices exposed by the DirectSound/DirectShow interfaces are arbitrary and can change when the user changes the preferred audio device selection. This is a function of the 7 operating system and cannot be controlled or fixed by the AudioScience driver. Applications that need to save device selections must use the device name and not its index.

A typical listing of devices created with waveOutGetDevCaps() follows, with an ASI6114 as adapter 1 and an ASI5044 as adapter 2:

```
WaveOut 0 - 2 - ASI6114 /01 WDM Out (AudioS.
WaveOut 1 - 1 - ASI6114 /1 Wave Out.
WaveOut 2 - 1 - ASI6114 /2 Wave Out.
WaveOut 3 - 1 - ASI6114 /3 Wave Out.
WaveOut 4 - 1 - ASI6114 /4 Wave Out.
WaveOut 5 - 2 - ASI5044 /5 Wave Out.
WaveOut 6 - 2 - ASI5044 /6 Wave Out.
WaveOut 7 - 2 - ASI5044 /7 Wave Out.
WaveOut 8 - 2 - ASI5044 /8 Wave Out.
WaveOut 9 - 2 - ASI5044 /9 Wave Out.
WaveOut 10 - 2 - ASI5044 /10 Wave Out.
WaveOut 11 - 2 - ASI5044 /11 Wave Out.
WaveOut 12 - 2 - ASI5044 /12 Wave Out.
WaveOut 13 - 2 - ASI5044 /13 Wave Out.
WaveOut 14 - 2 - ASI5044 /14 Wave Out.
WaveOut 15 - 2 - ASI5044 /15 Wave Out.
WaveOut 16 - 2 - ASI5044 /16 Wave Out.
WaveOut 17 - 1 - ASI6114 /04 WDM Out (AudioS.
WaveOut 18 - 2 - ASI5044 /09 WDM Out (AudioS.
WaveOut 19 - 1 - ASI6114 /01 WDM Out (AudioS.
WaveOut 20 - 2 - ASI5044 /08 WDM Out (AudioS.
WaveOut 21 - 2 - ASI5044 /05 WDM Out (AudioS.
WaveOut 22 - 2 - ASI5044 /06 WDM Out (AudioS.
WaveOut 23 - 2 - ASI5044 /12 WDM Out (AudioS.
WaveOut 24 - 2 - ASI5044 /04 WDM Out (AudioS.
WaveOut 25 - 2 - ASI5044 /03 WDM Out (AudioS.
WaveOut 26 - 2 - ASI5044 /11 WDM Out (AudioS.
WaveOut 27 - 1 - ASI6114 /03 WDM Out (AudioS.
WaveOut 28 - 2 - ASI5044 /10 WDM Out (AudioS.
WaveOut 29 - 1 - ASI6114 /02 WDM Out (AudioS.
WaveOut 30 - 2 - ASI5044 /07 WDM Out (AudioS.
WaveOut 31 - 2 - ASI5044 /02 WDM Out (AudioS.
```

The direct sound listing (with GUIDs removed) for the same adapters is:

```
{0.0.0.00000000}, {<GUID>} - 2 - ASI5044 /01 WDM Out (AudioScience ASI5000 - WDM/Wave Combo V3.05.08) {<GUID>}
{0.0.0.00000000}, {<GUID>} - 1 - ASI6114 /04 WDM Out (AudioScience ASI6000/ASI6100 - WDM/Wave Combo V3.05.08) {<GUID>}
{0.0.0.00000000}, {<GUID>} - 2 - ASI5044 /09 WDM Out (AudioScience ASI5000 - WDM/Wave Combo V3.05.08) {<GUID>}
{0.0.0.00000000}, {<GUID>} - 1 - ASI6114 /01 WDM Out (AudioScience ASI6000/ASI6100 - WDM/Wave Combo V3.05.08) {<GUID>}
{0.0.0.00000000}, {<GUID>} - 2 - ASI5044 /08 WDM Out (AudioScience ASI5000 - WDM/Wave Combo V3.05.08) {<GUID>}
{0.0.0.00000000}, {<GUID>} - 2 - ASI5044 /05 WDM Out (AudioScience ASI5000 - WDM/Wave Combo V3.05.08) {<GUID>}
{0.0.0.00000000}, {<GUID>} - 2 - ASI5044 /06 WDM Out (AudioScience ASI5000 - WDM/Wave Combo V3.05.08) {<GUID>}
{0.0.0.00000000}, {<GUID>} - 2 - ASI5044 /12 WDM Out (AudioScience ASI5000 - WDM/Wave Combo V3.05.08) {<GUID>}
{0.0.0.00000000}, {<GUID>} - 2 - ASI5044 /04 WDM Out (AudioScience ASI5000 - WDM/Wave Combo V3.05.08) {<GUID>}
{0.0.0.00000000}, {<GUID>} - 2 - ASI5044 /03 WDM Out (AudioScience ASI5000 - WDM/Wave Combo V3.05.08) {<GUID>}
{0.0.0.00000000}, {<GUID>} - 2 - ASI5044 /11 WDM Out (AudioScience ASI5000 - WDM/Wave Combo V3.05.08) {<GUID>}
{0.0.0.00000000}, {<GUID>} - 1 - ASI6114 /03 WDM Out (AudioScience ASI6000/ASI6100 - WDM/Wave Combo V3.05.08) {<GUID>}
{0.0.0.00000000}, {<GUID>} - 2 - ASI5044 /10 WDM Out (AudioScience ASI5000 - WDM/Wave Combo V3.05.08) {<GUID>}
{0.0.0.00000000}, {<GUID>} - 1 - ASI6114 /02 WDM Out (AudioScience ASI6000/ASI6100 - WDM/Wave Combo V3.05.08) {<GUID>}
{0.0.0.00000000}, {<GUID>} - 2 - ASI5044 /07 WDM Out (AudioScience ASI5000 - WDM/Wave Combo V3.05.08) {<GUID>}
{0.0.0.00000000}, {<GUID>} - 2 - ASI5044 /02 WDM Out (AudioScience ASI5000 - WDM/Wave Combo V3.05.08) {<GUID>}
```

#### 4.4 WDM as well as Wave devices are exposed

The devices accessible through the Wave interface include a Wave and a WDM device for each stream. It is recommended to select the Wave versions of the devices when using the Wave interface. Only the WDM versions are accessible through the DirectSound/DirectShow interfaces and available to be selected as the preferred audio device.

#### 4.5 Hibernate should be disabled

The power saving mode “Hibernate” should be disabled since it puts the AudioScience audio adapter into a non-recoverable state. Look in “\Start\Control Panel\System and Maintenance\Power options” and make sure that the time to put the computer to sleep is set to “never”.

#### 4.6 Editing ASIDRV.INI requires administrator privileges

Under 7, files in the C:\Windows system can only be updated using administrator privileges. The easiest way to do this is to click on Start and begin to type “command” in the “Start Search” box. Right click on the “Command Prompt” from the list above and select “Run as Administrator”. Then, at the command prompt, type “notepad \Windows\asidrv.ini” and make the edits that you wish to make.

Alternately, you could modify the permissions on the ASIDRV.INI file to allow all users to write to the file, that way you won’t need administrator privilege every time you edit the file.

#### 4.7 SSX multi-channel under 7

The current implementation supports only a single multi-channel device. This is because 7 requires an interface pin called “Speaker” in order to support multi-channel. However, this is a protected pin name and AudioScience cannot overwrite it in a manner that would allow the application to distinguish between 2 multi-channel devices on a single adapter. To date Microsoft has not proposed any solution or workaround for this dilemma.

## 5 64-BIT AUDIOSCIENCE DRIVER NOTES

### 5.1 *Future.... 64-bitWAVE applications under 64-bit 7*

*The way in which 7 loads 64-bit drivers forces AudioScience to provide custom linkage to the audio sub system. Where developers would previously link to winmm.dll, they should instead link to asiwinmm64.lib. This will facilitate the addition of AudioScience mixer devices in the mixer device list.*

*Source code for asiwinmm.lib is distributed with asiwinmm.lib.*

*asiwinmm.lib IS NOT dependent on an AudioScience driver being present to operate correctly. Its role is to check for asiwav64.dll being present on the system, and if it is, it adds the correct ASI interfaces. wave and mixer interfaces from other manufacturers are preserved.*

### 5.2 64-bit applications using the DirectSound/DirectShow interfaces under 64-bit 7

64-bit DirectSound/DirectShow applications under 64-bit 7 are supported.

### 5.3 64-bit applications using the HPI interface under 64-bit 7

64-bit applications that use the AudioScience HPI interface should be recompiled and linked against asihpi64.lib. No source code changes are required.

### 5.4 64-bit applications using the ASX interface under 64-bit 7

64-bit applications that use the AudioScience ASX interface should be recompiled and linked against asx64.lib. No source code changes are required.

### 5.5 32-bit WAVE applications under 64-bit 7

There are no changes required to support 32-bit applications under 64-bit 7. Any application that works correctly under 32-bit 7 will work without modification under 64-bit 7.

### 5.6 32-bit applications using the HPI interface under 64-bit 7

There are no changes required to run 32-bit applications that use the AudioScience HPI interface. Any application that works correctly under 32-bit 7 will work without modification under 64-bit 7.

### 5.7 32-bit applications using the ASX interface under 64-bit 7

There are no changes required to run 32-bit applications that use the AudioScience ASX interface. Any application that works correctly under 32-bit 7 will work without modification under 64-bit 7.

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