



Adobe® Audition® CC

CLASSROOM IN A BOOK®

The official training workbook from Adobe Systems



Adobe®
Audition® CC



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The official training workbook from Adobe Systems

Adobe® Audition® CC Classroom in a Book®

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WHERE ARE THE LESSON FILES?

Purchasing this Classroom in a Book gives you access to the lesson files that you'll need to complete the exercises in the book, as well as other content to help you learn more about Adobe software and use it with greater efficiency and ease. The diagram below represents the contents of the lesson files directory, which should help you locate the files you need. Please see the Getting Started section for full download instructions.



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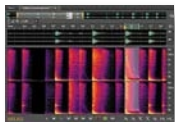
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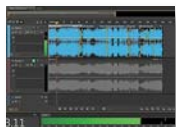
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GETTING STARTED

Adobe Audition CC is a professional audio application that combines advanced digital audio editing and multitrack recording in the same program. This unique approach integrates the two elements so that, for example, audio used in a multitrack project can be edited with great detail in the digital audio editor, and then be transferred back to the Multitrack Session. Mixdowns (mono, stereo, or surround) exported from the Multitrack Session are available automatically within the digital audio editor, where a variety of mastering tools are available to polish and “sweeten” the mix. The final mix can then be burned to a recordable CD, which is created according to the standard Red Book specification, uploaded to the SoundCloud file-sharing service, or converted into “web-friendly,” data-compressed formats like MP3 and FLAC. In addition, the Multitrack Editor has a video window that enables recording sound tracks and narration in Audition while previewing HD video.

Audition also integrates with Adobe Premiere Pro and After Effects via Adobe Dynamic Link. You can export mixes from Audition, but also, both Adobe Premiere Pro and After Effects will reflect edits you make in Audition as a project progresses. You can even open up a multitrack Audition project from within Adobe Premiere Pro and After Effects and edit individual tracks, and then incorporate those edits into your video project.

Audition is a cross-platform, 64-bit native application that runs equally well on Macintosh or Windows computers. Thanks to combining two programs within a single, integrated application, Audition has multiple uses, including restoring audio, multitrack recording for musicians, mastering, sound design, broadcast, video-game sound, narration and voice-overs, file format conversion, small-scale CD production, and even forensics. Fortunately, all of these features are available in a clean, easy-to-use, straightforward interface whose workflow has benefited from over a decade of continuous development and refinement.

The latest version, Audition CC, deepens the level of integration with Adobe Premiere Pro and After Effects for easy exchange of files and even complete sequences. This greatly simplifies the process of creating a sound track that reflects changes in the video due to editing. Significant editing enhancements, particularly with respect to audio restoration, as well as advanced metering for broadcast and other applications are also included. Audition’s second-generation

Automatic Speech Alignment process greatly simplifies ADR. Long-time Audition users will appreciate the many little extras that enhance workflow and audio quality, whereas those new to Audition will welcome its depth and flexibility.

About Classroom in a Book

Adobe Audition CC Classroom in a Book is part of the official training series for Adobe graphics, audio, and video publishing software developed with the support of Adobe product experts. The lessons are designed to let you learn at your own pace. If you're new to Adobe Audition, you'll learn the fundamental concepts and features needed to start mastering the program. And, if you've been using Adobe Audition for a while, you'll find that Classroom in a Book teaches basic to intermediate features, and includes tips and techniques for using the latest version of the application for a wide variety of projects.

Although each lesson focuses on providing step-by-step instructions to reach specific goals, there's room for exploration and experimentation. You can follow the book from start to finish, or do only the lessons that match your interests and needs. Each lesson offers an introduction that explains what you can expect to learn from a chapter and concludes with a review section summarizing what you've covered.

What's in this book

This edition covers many new features in Adobe Audition CC and how to apply them optimally in real-world situations. It addresses audio and music professionals who depend on Audition's tools to accomplish a variety of tasks, as well as videographers who want to become more involved in the process of creating, editing, and sweetening audio intended for video productions.

The book is organized into three parts. The introduction starts with how to get audio in and out of Audition on Mac and Windows platforms, and then progresses to an overview of the Audition Workspace—a collection of modules, each dedicated to specific tasks, that you can open, close, and rearrange, depending on the nature of the project, to optimize workflow and efficiency. The second part concentrates on digital audio editing in the Waveform Editor and covers such topics as editing, signal processing and effects, audio restoration, mastering, and sound design. To segue into the third part, it also covers recording and integration with the Multitrack Editor.

The final section covers the Multitrack Editor in detail, including editing, automation, creating music with sound libraries, and in-depth coverage of mixing.

Throughout the book, examples using digital audio clips created specifically for this book provide practical, hands-on experience that brings to life the theory presented in these pages. Even nonmusicians will learn how to create music using sound libraries and loops in conjunction with Audition's extensive toolset for sound creation and editing. You'll also learn how to do rough testing of your room acoustics prior to mixing, using the tools within Audition.

As you progress through the lessons, you'll also discover many time-saving features Audition offers, such as file conversion, automation, Multitrack and Waveform Editor integration, clip automation, time-stretching, and more. All of these functions can help you meet deadlines more easily than ever before—and that alone is a good reason to become familiar with Audition's workflow, capabilities, and user interface.

Prerequisites

Before you begin to use *Adobe Audition CC Classroom in a Book*, you should have a working knowledge of your computer and its operating system. Make sure that you know how to use the mouse and standard menus and commands, and also how to open, save, and close files. If you need to review these techniques, see the help files and other documentation included with your Microsoft® Windows® or Apple® Mac® OS X system. It's also highly recommended that you read over the introduction to the Audition manual that covers digital audio basics.

You'll also need the ability to get audio in and out of your computer. Virtually all computers include onboard audio capabilities (audio input for recording, and internal speakers or a headphone jack for monitoring), but be aware that these use consumer-grade components, and although adequate, will not showcase what Audition can do to the fullest extent. Professional and “prosumer” audio interfaces are available at very reasonable costs, and are recommended not just for doing the lessons in this book, but also for any future audio work involving computers.

Installing Adobe Audition

Before you begin using *Adobe Audition CC Classroom in a Book*, make sure that your computer is set up correctly and that it meets the necessary system requirements for software and hardware. You must subscribe to Adobe Creative Cloud to obtain Adobe Audition CC software, and then install it from Adobe Creative Cloud onto your hard disk. For system requirements and complete instructions on installing the software, visit www.adobe.com/support.

Audition is a very efficient program, and its 64-bit native operation takes full advantage of modern processors and memory handling. However, as with most audio and video programs, having sufficient RAM is essential for a smooth computing experience. Although Audition will run with 1 GB of RAM, for multitrack recording 2 GB is better, and 4 GB is preferable. The 64-bit versions of Mac OS X and Windows 7/8 have no practical limitation on how much RAM they can address, so 8 GB of RAM or more is highly recommended. For more information on system requirements, please go to www.adobe.com/products/audition/tech-specs.html.

Starting Adobe Audition

You start Audition the same way as you do most software applications.

- **To start Adobe Audition in Windows 7 (64-bit):** Choose Start > All Programs > Adobe Audition CC.
- **To start Adobe Audition in Windows 8 (64-bit):** Click or touch the Audition CC tile on the Start screen.
- **To start Adobe Audition in Mac OS X 10.7 or 10.8:** Open the Applications/Adobe Audition CC folder, and then double-click the Adobe Audition CC application icon.

Accessing the Classroom in a Book files

● **Note:** The Account page also contains one bonus lesson, Lesson 16, “Audio/Video Applications.” A PDF of this chapter is located in the Bonus Chapters folder listed under the Lesson & Update Files tab, and its lesson files are located in the Lessons folder.

In order to work through the projects in this book, you will need to download the lesson files from peachpit.com. You can download the files for individual lessons, or download them all in a single file. Although each lesson stands alone, some lessons use files from other lessons, so you’ll need to keep the entire collection of lesson assets on your computer as you work through the book.

To access the Classroom in a Book files:

- 1 On a Mac or Windows computer, go to www.peachpit.com/redeem and enter the code found at the back of your book.
- 2 If you do not have a Peachpit.com account, you will be prompted to create one.
- 3 The downloadable files will be listed on the Lesson & Update Files tab on your Account page.
- 4 Click the lesson file links to download them to your computer.

Restoring default preferences

The preferences files store information about panel and command settings. Each time you quit Adobe Audition CC, the positions of the panels and certain command settings are recorded in the respective preferences file. Any selections you make in the Preferences dialog box are also saved in the preferences file.

Many lessons recommend restoring a particular set of preferences so that what you see onscreen matches the images and instructions in this book. However, one of Audition's great features is the ease with which you can customize a workspace to your needs, so feel free to adopt whatever layout you like. Just be aware that your screen may not match the images in the book exactly.

Additional resources

Adobe Audition CC Classroom in a Book is not meant to replace documentation that comes with the program or to be a comprehensive reference for every feature. Only the commands and options used in the lessons are explained in this book. For comprehensive information about program features and tutorials, please refer to these resources:

Adobe Audition Help and Support: www.adobe.com/support/audition is where you can find and browse Help and Support content on adobe.com. Adobe Audition Help and Adobe Audition Support Center are accessible from Audition's Help menu.

Adobe Creative Cloud Learning: For inspiration, key techniques, cross-product workflows, and updates on new features, go to the Creative Cloud Learn page <https://helpx.adobe.com/creative-cloud/tutorials.html>. This is available only to Creative Cloud members.

Adobe Forums: forums.adobe.com lets you tap into peer-to-peer discussions, questions, and answers on Adobe products. The Audition forum is accessible from Audition's Help menu.

Adobe TV: tv.adobe.com is an online video resource for expert instruction and inspiration about Adobe products, including a How To channel to get you started with your product.

Adobe Design Center: www.adobe.com/designcenter offers thoughtful articles on design and design issues, a gallery showcasing the work of top-notch designers, tutorials, and more.

Resources for educators: www.adobe.com/education and <http://edex.adobe.com> offer a treasure trove of information for instructors who teach classes on Adobe software. Find solutions for education at all levels, including free curricula that use an integrated approach to teaching Adobe software and can be used to prepare for the Adobe Certified Associate exams.

Also check out these useful links:

Adobe Audition CC product home page: www.adobe.com/products/audition.

Adobe Labs: labs.adobe.com gives you access to early builds of cutting-edge technology, as well as forums where you can interact with the Adobe development teams building that technology and other like-minded members of the community.

Audition and social media

For the latest news and Audition-related events, follow Adobe Audition on Twitter at twitter.com/#!/Audition. The Twitter feed is also accessible from Audition's Help menu.

You can also find Adobe Audition on Facebook at www.facebook.com/Audition. This Facebook page is also accessible from Audition's Help menu.

Adobe certification

The Adobe training and certification programs are designed to help Adobe customers improve and promote their product-proficiency skills. There are four levels of certification:

- Adobe Certified Associate (ACA)
- Adobe Certified Expert (ACE)
- Adobe Certified Instructor (ACI)
- Adobe Authorized Training Center (AATC)

The Adobe Certified Associate (ACA) credential certifies that individuals have the entry-level skills to plan, design, build, and maintain effective communications using different forms of digital media.

The Adobe Certified Expert program is a way for expert users to upgrade their credentials. You can use Adobe certification as a catalyst for getting a raise, finding a job, or promoting your expertise.

If you are an ACE-level instructor, the Adobe Certified Instructor program takes your skills to the next level and gives you access to a wide range of Adobe resources.

Adobe Authorized Training Centers offer instructor-led courses and training on Adobe products, employing only Adobe Certified Instructors. A directory of AATCs is available at <http://training.adobe.com/training/partner-finder.html>.

For information on the Adobe Certified programs, visit <http://training.adobe.com/home.html>.

1

AUDIO INTERFACING

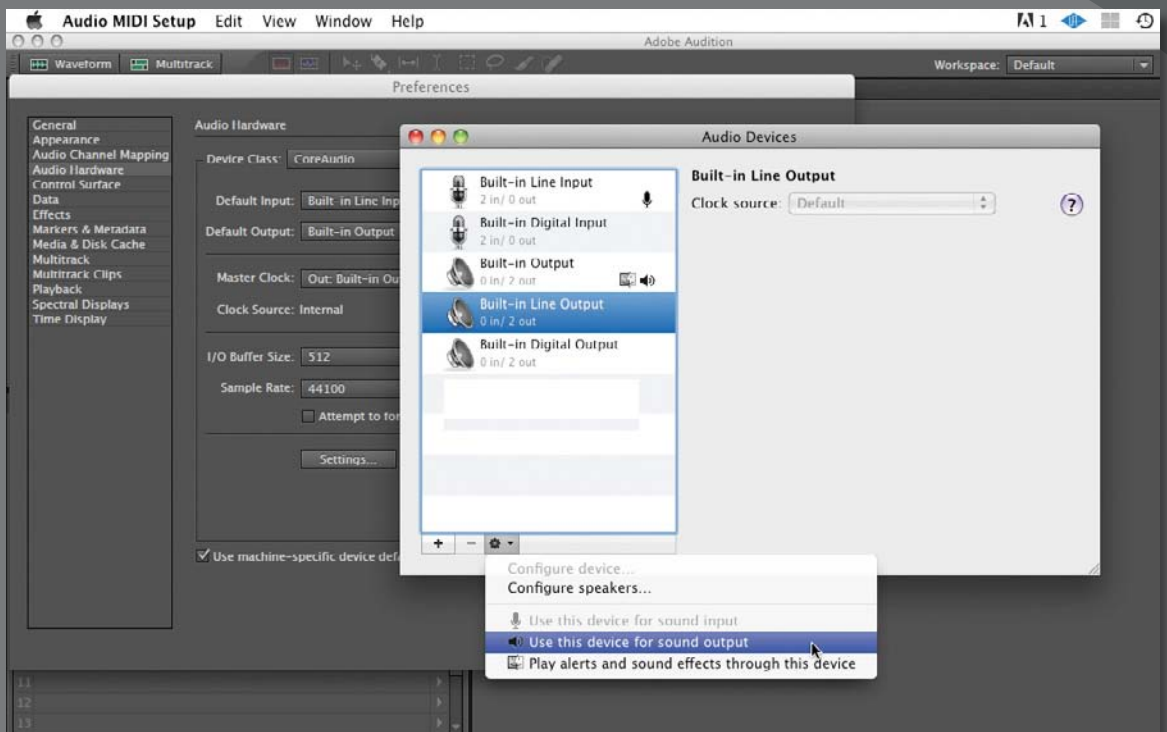
Lesson overview

In this lesson, you'll learn how to do the following:

- Configure a Macintosh computer's onboard audio for use with Audition
- Choose the appropriate sample rate for a project
- Set up the onboard audio on Windows computers for use with Audition
- Set up Windows audio interfacing for 64-bit versions of Windows 7 and Windows 8
- Configure Audition to work with Macintosh or Windows computers
- Test your configurations to make sure all connections are correct



This lesson will take about 45 minutes to complete. There are no audio lesson files because you'll be recording your own files to test the interface connections.



Before you can use Audition, you need to configure your Mac or Windows computer and audio system to work with the program.

Audio interface basics

● **Note:** If you have not already downloaded the project files for this lesson to your computer from your Account page, make sure to do so now. See “Getting Started” at the beginning of the book.

Recording audio into a computer requires converting audio signals into digital data that your computer and Audition can recognize. Similarly, playback requires converting that digital data back to analog audio so you can hear it. The device that performs these conversions is usually called a *sound card* when it's built into the computer or an *audio interface* if it's an external piece of hardware. Both include analog to digital (A/D) and digital to analog (D/A) converters. In addition, software *drivers* handle communications between your computer and audio hardware.

This chapter concentrates on a computer's onboard audio capabilities, because the same concepts translate to more sophisticated (and higher-performance) audio interfaces. Note that there are many brands and models of audio interfaces, making universally applicable lessons impossible. As a result, multiple sidebars in this chapter explain audio interface characteristics to provide important background information.

Several lessons in this chapter are divided into versions for Macintosh and Windows computers. You won't need to read the Windows-specific lessons if you use a Mac, and vice versa. However, all users should read the sidebars, because they cover information that's applicable to both platforms.

To make the best use of the lessons in this chapter, you'll need the following:

- An audio source, such as a portable music player (iPod, iPhone, Android, CD, etc.) with a 1/8-inch minijack output, or other device with a suitable adapter to provide a 1/8-inch minijack output. Laptops may also have an internal microphone you can use; however, using a line-level device is recommended, and the lessons will reference that type of input. You can also use USB microphones that plug directly into a computer's USB port; however, note that they may introduce significant latency, as described later in this chapter, when used as class-compliant devices with Windows computers.
- Patch cable with a male-to-male 1/8-inch plug to connect the audio source to your computer's audio input jack.
- Your computer's internal speakers for monitoring or earbuds/headphones with a 1/8-inch stereo plug suitable for plugging into your computer's stereo output. You can also patch the output to a monitoring system if you have suitable cables.

Common audio interface connectors

The following are the most common input and output connectors found in computers and audio interfaces:

- **XLR jack.** This is compatible with microphones and other balanced-line signals. Balanced lines use three conductors, which can be designed to minimize hum and noise pickup when they are carrying low-level signals.
- **1/4-inch phone jack.** This is common with musical instruments and most pro audio gear. The jack can handle balanced or unbalanced lines; balanced line inputs can handle unbalanced lines as well. Headphone jacks also use 1/4-inch phone jacks.
- **Combo jacks.** A fairly recent introduction, a combo jack can accept either an XLR or 1/4-inch phone plug.
- **RCA phono jack.** A mainstay of consumer audio gear, RCA jacks are also found in some DJ audio interfaces and video equipment.
- **1/8-inch minijack.** This is common for onboard computer audio, but rare for external interfaces except when included to interface with MP3 players and similar consumer devices. The 1/8-inch minijacks sometimes provide headphone outputs as well.
- **S/PDIF (Sony/Philips Digital Interconnect Format).** This consumer digital interface typically uses RCA phono jacks but can also use an optical connector and (very rarely) XLR.
- **AES/EBU (Audio Engineering Society/European Broadcast Union).** This is a professional-level digital interface that uses XLR connectors.
- **ADAT (Alesis Digital Audio Tape) optical.** This optical connector carries eight channels of digital audio. It's used most commonly with interfaces for expanding the interface's inputs; for example, if you have an interface that lacks sufficient mic inputs but has an ADAT input, eight-channel mic preamps are available that send their outputs to an ADAT connector. This allows for easily adding eight mic inputs to an existing interface.

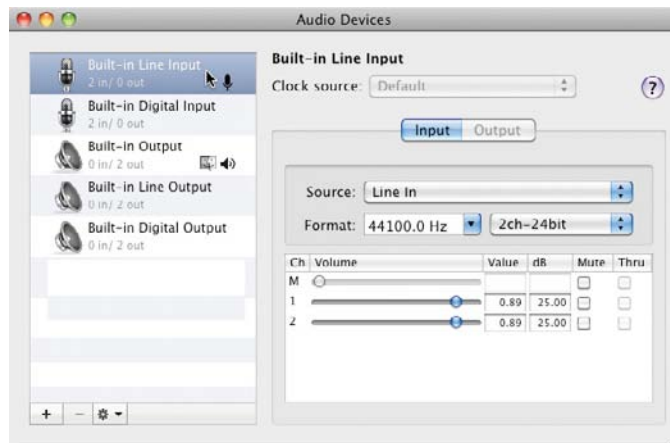
Mac OS X audio setup

This lesson describes how to configure Audition to work with the Macintosh's inputs and outputs. Audition Creative Cloud supports Mac OS X 10.7 and 10.8 (Lion and Mountain Lion, respectively).

- 1 Connect the audio source to the Mac's 1/8-inch line input jack via the 1/8-inch patch cord. If you're not using internal speakers, plug the earbuds/headphones or monitoring system input into the Mac's line-level output or headphones jack.
- 2 Open Audition and choose Audition > Preferences > Audio Hardware.

● **Note:** Audition can run under Mac OS X 10.6.8 but is not supported and requires you to disable DLMS support. Choose Preferences > Media and Disk Cache, and then deselect Enable DLMS Format Support.

- 3 Don't change the Device Class or Master Clock preferences, because they will default correctly. The Default Input drop-down menu lists all available audio inputs. Choose Built-In Line Input.
- 4 The Default Output drop-down menu lists all available audio outputs. If you're using the built-in speaker, choose Built-In Output; for the line-level output, choose Built-In Line Output.
- 5 I/O Buffer Size determines the system latency. (See the sidebar "About latency [computer-based delay] for more information.) Low values result in less delay through the system, whereas higher values increase stability. A value of 512 samples is a good compromise.
- 6 In the Sample Rate drop-down menu, choose 44100, which is the standard for CDs. The Sample Rate drop-down menu lists all available sample rates. For most Macs, the choices are 44100, 48000, 88200, and 96000kHz. (In theory, higher sample rates improve fidelity, but the difference is subtle at best.) Windows computers and external audio interfaces generally offer a wider choice of sample rates.
- 7 Click Settings to open the Mac OS Audio/MIDI Setup dialog box, and then click Built-in Line Input.

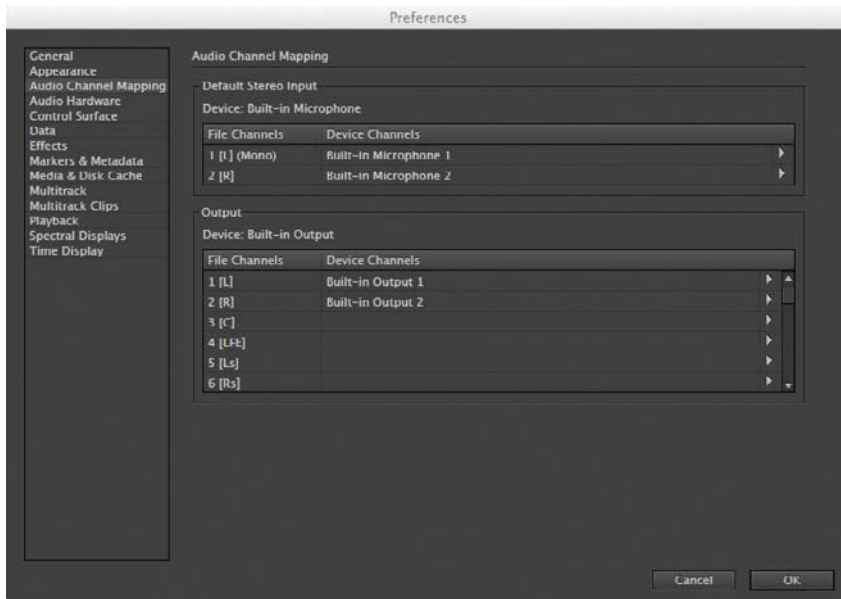


● **Note:** Compared to the Mac's Sound setup under System Preferences, the Audio/MIDI Setup accessed by clicking Audition's Settings > Audio Hardware) offers additional level controls, the option to mute inputs, and the ability to click on any input or output and examine its characteristics.

The settings will mimic what you set in Preferences (e.g., if you selected a 44.1kHz sample rate, this will appear as the sample rate in the Format field).

- 8 In the other Format field, choose 2-channel, 24-bit, which specifies Bit Resolution. All Mac OS X audio-related parameters are now set.
- 9 Close the Audio Devices dialog box, and click OK in Audition's Preferences dialog box.

- 10** Choose Audition > Preferences > Audio Channel Mapping to correlate Audition's channels to the hardware inputs and outputs. For example, Audition's 1(L) channel will be mapped to Built-in Output 1. Click OK to close this dialog box.



Note: The mapped defaults seldom need to be changed; however, you can remap if (for example) you were given a file in which the right and left channels were accidentally reversed: Map Audition's 1(L) channel to the Built-in Output 2, which connects to the physical right output.

The next sections relate to the Windows setup, so proceed to the section “Testing inputs and outputs with Audition (Mac or Windows)”

About latency (computer-based delay)

Latency occurs in the conversion process from analog to digital and digital to analog, as well as in the computer: Even the most powerful processor can do only so many millions of calculations per second and sometimes can't keep up. As a result, the computer stores some of the incoming audio in a *buffer*, which is like a savings account for your audio input signal. When the computer is so busy elsewhere that it misses handling some incoming audio, it makes a “withdrawal” from the buffer instead.

The larger the buffer (measured in samples or milliseconds), the less likely the computer will run out of audio data when it's needed. But a large buffer also means that the input signal is being diverted for a longer period of time before being processed by the computer. As a result, if you listen to the audio coming out of the computer, it will be delayed compared to the input. For example, if you're monitoring your vocals, what you hear in your headphones will be delayed compared to what you're singing, and this can be distracting. Reducing the Sample Buffer value minimizes delay at the expense of system stability (you may hear clicking or popping at low latencies).

Bit resolution

Bit resolution expresses the accuracy with which the analog-to-digital converter measures the input signal. A good analogy is the relationship between pixels and image resolution: The more pixels in images of the same size, the more detail you'll see in the picture.

CDs use 16-bit resolution, which means that audio voltages are defined with an accuracy of approximately 1 part in 65,536. A resolution of 20- or 24-bit provides a higher level of accuracy, but as with higher sample rates, higher bit resolution requires more storage: A 24-bit file is 50 percent larger than a 16-bit file if both are at the same sample rate. Unlike higher sample rates, few dispute that 24-bit recording sounds better than 16-bit recording.

Recording at 44.1kHz with 24-bit resolution is a common trade-off among storage space, ease of use, and fidelity.

Windows setup

Unlike newer Macs, Windows systems typically have several drivers: legacy drivers (primarily MME and DirectSound) for backward compatibility and higher-performance drivers (WDM/KS, which is different from yet another driver type called WDM). However, for Windows music applications, the most popular high-performance audio driver is ASIO (Advanced Stream Input/Output), created by software developer Steinberg. Virtually all professional audio interfaces include ASIO drivers, and many include WDM/KS drivers.

Unfortunately, ASIO is not part of the Windows operating system, so for these lessons you'll use the MME (Multimedia Extensions) protocol. It has relatively high latency but is stable and predictable. Experienced computer users can download the general-purpose ASIO driver ASIO4ALL, which is available free of charge from www.asio4all.com. It is the de facto ASIO driver for laptop owners who want to use ASIO with internal sound chips. Although you'll use MME for now, with a professional audio interface, use the ASIO or WDM/KS drivers provided with it, or as an alternative, ASIO4ALL.

► **Tip:** If there's a microphone input and you're not using it, make sure it's not selected (or its fader is down) to prevent it from contributing any noise.

- 1 Windows motherboards typically have mic and 1/8-inch line inputs. Connect the audio source to the computer's 1/8-inch line input jack via the 1/8-inch patch cord.
- 2 If you're not using internal speakers, plug the earbuds/headphones or monitoring system input into the computer's line-level output.

Audition on the Mac vs. Windows

Using a program on the Mac versus using it on Windows was once a hot topic, but over time, the operating systems and associated hardware have become more alike. When you open Audition, for all practical purposes, it operates identically on both platforms.

Each platform has strengths and limitations. The Mac handles audio transparently, avoiding the multiple drivers found with Windows. However, independent benchmarks show that all other factors being equal, Windows 7 can apply more power to audio projects than OS X. Realistically, though, with today's computers the situation is analogous to saying that a car capable of going 270 mph is more powerful than a car that tops out at 250 mph—yet you probably won't drive over 90 mph anyway.

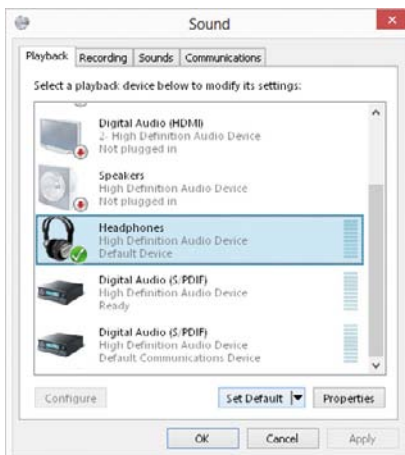
Ultimately, if there are Mac-only or Windows-only programs that are essential for what you do, that will tend to dictate which platform is best. The reality is that both platforms have pretty much reached parity, and either will run Audition equally well.

Windows 7 and 8 assignments

This lesson describes how to configure Audition to work with a typical Windows 7 or 8 machine's inputs and outputs. Audition supports 64-bit versions of Windows 7 and 8, but does not support any version of Windows XP.

- 1 In Windows 7, choose Start > Control Panel, and then in the Control panel double-click the Sound icon. With Windows 8, press the Windows key+X, choose Control Panel, and click the Sound icon.
- 2 Click the Playback tab. Click either Speakers or Headphones, depending on what you have plugged into the computer's output jack. After clicking the appropriate choice, click the Set Default button to make this your default audio output.

► **Tip:** Click the Sound Playback dialog box's Properties. In the dialog box that appears, click the Levels tab, adjust the volume and balance, and also mute the output.



► **Tip:** Click the Sound Recording dialog box's Properties. In the dialog box that appears, click the Levels tab, adjust the volume and balance, and also mute the input.

- 3 Click the Sound dialog box's Recording tab.
- 4 Click Line In, and then click Set Default. Click the Sounds tab, and for Sound Scheme, choose No Sounds. It's distracting to hear system sounds while you're working with audio. Click OK.



Audition settings for Windows audio

Now that the computer has been configured properly for the audio inputs and outputs, you need to configure settings in Audition as well.

- 1 Open Audition, and choose Edit > Preferences > Audio Hardware.
- 2 From the Device Class drop-down menu, choose MME.
- 3 From the Default Input drop-down menu, choose the default input device (Line In) you specified previously; from the Default Output drop-down menu, choose the default output device (Speaker or Headphones) you specified previously. Do not change the Master Clock preference.
- 4 Choose a latency value of 200ms, which is a “safe” value for most computers. Latency determines the delay audio experiences as it passes through the computer. Low values result in less delay through the system, whereas high values increase stability.
- 5 In the Sample Rate drop-down menu, choose 44100 (in theory, higher sample rates improve fidelity, although few people can hear a difference). The Sample Rate menu lists all available sample rates. Most Windows internal audio chips offer a wide variety of sample rates, often from 6000Hz to 192000Hz. External audio interfaces typically offer fewer options that are intended for professional audio and video projects. After selecting the Sample Rate, click OK.
- 6 Choose Edit > Preferences > Audio Channel Mapping to correlate Audition's channels to the hardware inputs and outputs. For example, Audition's 1(L) channel will be mapped to Line 1. Click OK to close this dialog box.

Common sample rates

Different sample rates are typically used for different applications. This list contains the most common sample rates used for pro audio:

- **32,000 (32kHz).** Typically used for digital broadcast and satellite transmissions.
- **44,100 (44.1kHz).** The sample rate for CDs and most consumer digital audio.
- **48,000 (48kHz).** The most common sample rate used in broadcast video.
- **88,200 (88.2kHz).** Some engineers claim this sounds better than 44.1kHz but is rarely used.
- **96,000 (96kHz).** Sometimes used in DVDs and other high-end audio recording processes.
- **176,400 and 192,000 (176.4 and 192kHz).** These ultra-high sample rates generate much larger files and stress your computer more, yet offer no significant audio advantage.

● **Note:** The mapped defaults for channel mapping seldom need to be changed. However, you can remap if (for example) you were given a file in which the right and left channels were accidentally reversed: Map Audition's 1(L) channel to the Built-in Output 2, which connects to the physical right output.

Testing inputs and outputs with Audition (Mac or Windows)

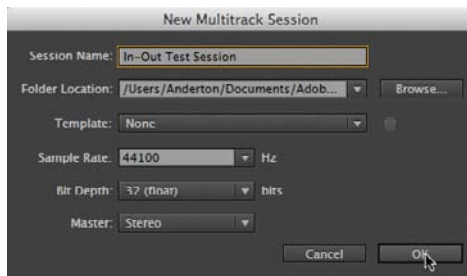
Because you already specified default inputs and outputs in the previous lessons, Audition will default to using these for recording and playback. Now you'll test these connections to ensure that the inputs and outputs are set up properly.

- 1 Choose File > New > Audio File to create a new file in the Waveform Editor. A dialog box appears.

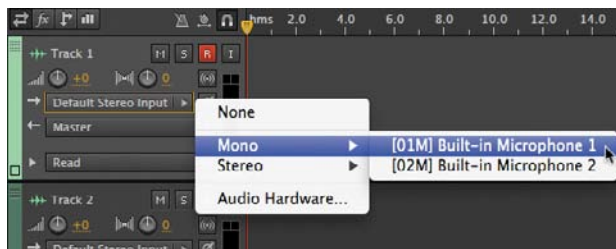


- 2 Name the file. The sample rate should default to the value you selected in Preferences.
- 3 Choose the number of channels. Their inputs will default to what you specified in Preferences. If you choose Mono, only the first channel of the input channel pair will be recorded.
- 4 The bit depth represents the project's internal bit depth, not the bit resolution of your interface's converters. This resolution will be used to calculate changes in volume, effects, and the like, so choose the highest resolution, which is 32 (float).

- 5 Click OK to close the dialog box.
- 6 Click the Transport Record button, and then start playback from your audio source. If all connections are defined and all levels are set properly, you'll see a waveform being drawn in the Waveform Editor window. Record several seconds of audio.
- 7 Click the Move Playhead to Previous button in the Transport, or drag the playhead (also called the *current time indicator [CTI]*) back to the beginning of the file. Click Play, and you should hear what you recorded in your chosen output device (internal speakers, earbuds, headphones, or monitoring system). Click the Transport Stop button to end playback.
- 8 Now test recording and playback in the Multitrack Editor. Choose File > New > Multitrack session. A dialog box appears.



- 9 Name the file. For template, choose None. The sample rate should default to the value you selected in Preferences.
- 10 As with the Waveform Editor, choose the highest resolution of 32 (float), and then choose the number of output channels (Stereo) for the Master Track.
- 11 Click OK to close the dialog box.
- 12 Arm a track by clicking the R (Record) button. Start playing your audio source; the channel's meter should indicate a signal. Note that the input will connect automatically to the default input; however, if you click the input field's right arrow, you can choose just one input for mono tracks or you can open the hardware section under Preferences if you have a multi-input audio interface and want to choose an input other than the default.



- 13 Click the Transport Record button. If all connections are defined and all levels are set properly, you'll see a waveform being drawn in the Multitrack Editor window. Record several seconds of audio.
- 14 Click the Transport Move Playhead to Previous button, or drag the playhead back to the beginning of the file. Click Play, and you should hear what you recorded in your chosen output device (internal speakers, earbuds, headphones, or monitoring system). Click the Transport Stop button to end playback.

Using external interfaces

It's not possible to present an exercise in this lesson, because there is no way to know which interface you're using. However, keep the following in mind when you're using external interfaces:

- Professional interfaces usually have capabilities beyond those offered by internal audio I/O and therefore have their own control panels for routing signals, controlling levels, and the like.
- Interfaces often have more than one set of stereo inputs and outputs. When you're choosing default inputs and outputs, you'll have a much wider selection compared to using a computer's internal sound capabilities.
- With interfaces that provide various connections (USB, FireWire, Thunderbolt, etc.), try them all on extended sessions to determine if one option works better than the other.
- Windows USB interfaces can be *class-compliant*, meaning they don't need custom drivers. However, always use the custom ASIO or WDM drivers provided with an interface for maximum functionality and minimum latency.
- With Windows computers, never use drivers called "emulated," such as "ASIO (emulated)." These result in the worst performance of all possible drivers.
- Some interfaces include a feature called zero-latency monitoring. This means the input can be mixed directly to the output, and the mixing is typically controlled by using an applet that appears onscreen to bypass any latency caused by going through the computer.
- With ASIO interfaces, Audition will default to monopolizing any sound capabilities. To access the ASIO interface in other applications that are running, choose Preferences > Audio Hardware, and select the "Release ASIO driver in background" check box in the dialog box. Giving the other application the focus will allow it use the ASIO interface, unless Audition is recording.

Audio interface/computer connections

There are several ways external audio interfaces communicate with a computer:

- **USB.** USB 2.0 can stream up to dozens of audio channels over a single cable that connects between the interface and a computer's USB port. As of this writing there are no USB 3.0 audio interfaces, although virtually all USB 2.0 interfaces are compatible with USB 3.0. USB 1.1 interfaces are also available for less-demanding applications and can typically stream six channels of audio, making them suitable for surround. Class-compliant interfaces are plug and play, but most professional interfaces use specialized drivers to improve speed and efficiency.
- **FireWire.** Like USB, FireWire also connects the interface to your computer with a cable, although the connector configuration is different than USB. Although still common, FireWire has been eclipsed somewhat by USB for several reasons: Many laptops no longer include FireWire ports, most audio interfaces require specific FireWire chip sets, and the performance advantage FireWire once offered was more relevant when computers weren't as powerful. Some audio interfaces include FireWire and USB 2.0. Note that there are two common FireWire speeds—FireWire 400 and FireWire 800 (which has roughly twice the bandwidth of FireWire 400).
- **PCIe card.** This plugs directly into a computer's motherboard, so it provides the most direct pathway to a computer. However, this option is less common because USB and FireWire offer more convenience—you don't need to physically open the computer to install the card—with virtually no performance decrease.
- **ExpressCard.** This is suitable for plugging into laptops that have ExpressCard slots but again is ceding its role to USB or FireWire interfaces.
- **Thunderbolt.** This relatively recent interface protocol, which carries data over a cable, is becoming more common; it's the only option, other than USB 3.0, on any newer Mac. Although few Thunderbolt-compatible interfaces are available as of this writing, Thunderbolt provides PCIe-type performance and compatibility with existing audio interfaces, as well as with dedicated Thunderbolt interfaces.

Review questions

- 1 What are the most popular driver protocols for Mac and Windows?
- 2 What is an unavoidable, negative by-product of working with computer-based audio?
- 3 How can you minimize latency?
- 4 What are the advantages and disadvantages of high sample rates and high bit resolutions?
- 5 Although many external audio interfaces include ASIO drivers, the Windows operating system does not. How can you use ASIO with laptop sound chips?

Review answers

- 1 Core Audio for the Mac and ASIO for Windows are the most popular driver protocols.
- 2 System latency causes a time delay between the output and what's being recorded at the input.
- 3 Change the number of sample buffers to alter latency. Using the smallest number possible, consistent with the audio not producing clicks or pops, provides minimum latency.
- 4 High sample rates and bit resolutions have the potential to deliver better audio quality but create larger audio files and stress the computer more than lower rates and resolutions.
- 5 The free driver software, ASIO4ALL, provides ASIO drivers for sound hardware that was not designed for ASIO compatibility.

2 THE AUDITION ENVIRONMENT

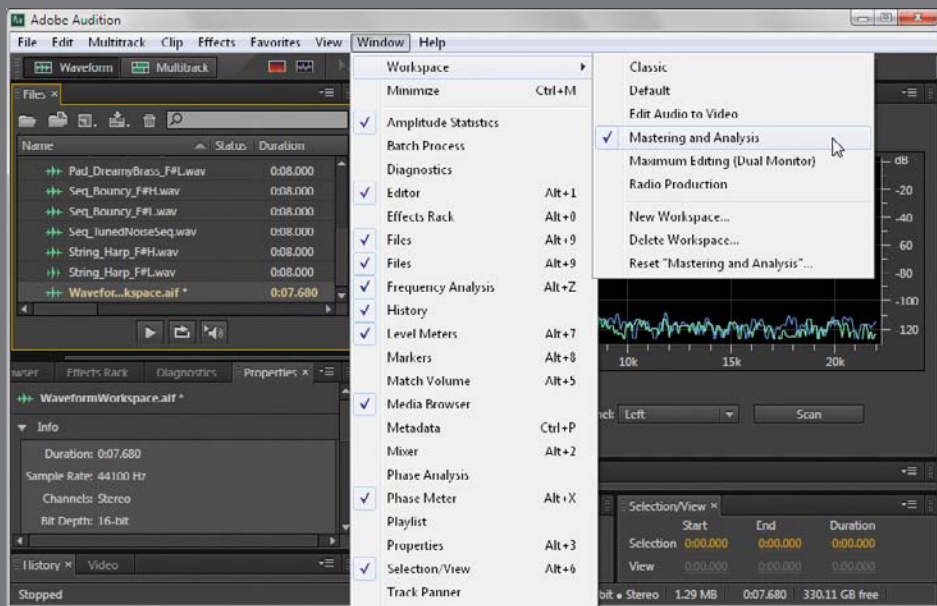
Lesson overview

In this lesson, you'll learn how to do the following:

- Create custom workspaces for particular workflows
- Arrange panels and frames for optimum workflow
- Use the Media Browser to find files on your computer
- Listen to files before loading them using the Media Browser's Playback Preview function
- Create shortcuts to frequently used folders
- Navigate to specific sections of a file in the Waveform Editor or a Session in the Multitrack Editor
- Use markers to create points you can jump to immediately in the Waveform Editor or a Session in the Multitrack Editor
- Use zooming to focus in on particular sections in the Waveform or Multitrack Editor



This lesson will take about 60 minutes to complete. Download the project files for this lesson from the Lesson & Update Files tab on your Account page at www.peachpit.com and store them on your computer in a convenient location, as described in the Getting Started section of this book. Your Accounts page is also where you'll find any updates to the chapters or to the lesson files. Look on the Lesson & Update Files tab to access the most current content.



You can create custom workspaces with particular selections of windows and window arrangements, as well as choose various ways to navigate through Audition's Waveform Editor and Multitrack Editor.