
About the Sound Manager

Information on applying sounds to applications

Your application can use the **Sound Manager** to create, modify, and play sounds. The **Sound Manager** is a replacement for the older **Sound Driver**, which is documented in *Inside Macintosh*, Volume II. The **Sound Driver** is obsolete, and you should use the **Sound Manager** for all sound-related activity.

The **Sound Manager** was first released for all Macintosh computers as part of system software version 6.0 and has been significantly enhanced in later system software versions. System software versions 6.0.7 and later include an enhanced **Sound Manager** that provides routines for sound input, continuous play from disk, sound-channel mixing, and audio compression and expansion. There are no specific hardware requirements for running this enhanced version of the **Sound Manager**, except that the continuous play-from-disk routines and the ability to produce concurrent multiple channels of sampled sound are currently available only on machines equipped with the Apple Sound Chip (ASC). Also, you can use the sound input routines to record sounds only on machines equipped with a sound input device. Use the **Gestalt** function (described in **Compatibility Guidelines**) to determine whether the capabilities you need are present before attempting to use them.

You should know about the **Sound Manager** if you want your application to create or manipulate sounds. For example, your application might be specifically concerned with creating and storing sounds. Such applications include those that synthesize sound or speech, record and play back sampled sounds, and synchronize multimedia presentations. Other applications that use sound include those that provide voice mail and voice annotation capabilities for documents. For compatibility reasons, you should use the services provided by the **Sound Manager** rather than access the available audio hardware directly. This increases the likelihood that your application will run unmodified on future hardware or on alternate operating systems (such as A/UX). Moreover, by using the **Sound Manager**, your application can monitor and control the amount of processing time consumed by its sound-related activity, and hence coexist cooperatively with other open applications.

Even if your application is not specifically concerned with creating or playing sounds, you can often improve your application at very little programming expense by using the **Sound Manager** to integrate sound into its user interface. For example, you can play appropriate sounds to signal that some operation has completed or to alert the user that something exceptional (perhaps unexpected) has happened. If you use sound in this way, you should be aware that there may be cultural biases or preferences associated with certain sounds. Unless they are very large, therefore, you should store all application-specific sounds as resources, which can be easily modified for local regions. You should also make this sort of sound optional because there might be users who object to it or environments where it is inappropriate.

You should note in particular that the **SysBeep** procedure is now a **Sound Manager** routine. Hence, even if you are developing an application that does not employ any sound other than an occasional system alert sound, you need to be aware of certain situations that may prevent the sound from being heard by the user. If your applications use the **SysBeep** procedure, you should look at the discussion in **Producing an Alert Sound**; some sections of

Introduction to Sound may be helpful to you as well.

If you wish to create files containing sampled sounds (such as recorded speech or special effects), you may need to refer to the information on the Audio Interchange File Format (AIFF) and the Audio Interchange File Format extension for Compression (AIFF-C). You can find a partial specification of both of these file formats in **Sound Files**. A more complete description of the AIFF file format is available from APDA.

The **Sound Manager** is a collection of routines that your application can use to create sounds without a knowledge of or dependence on the actual sound-producing hardware available on any particular Macintosh computer. You can use the **Sound Manager** to

- play simple sequences of frequencies
- play sounds described by complex waveforms
- play digitally recorded or computed sampled sounds
- record sampled sounds
- mix and synchronize multiple channels of sound
- play a sound continuously from disk while other processing continues
- produce a sound to alert the user
- compress sound data to maximize the available disk storage space
- expand compressed sound data for playback in real time
- obtain information about existing sound channels
- monitor and limit the amount of CPU time consumed by sound-related activity

If you use the **Sound Manager** for all sound-related activity instead of accessing the sound-producing hardware directly, you can maximize the likelihood that your applications will run without modification on all current and future hardware configurations.

The **Sound Manager** provides a brief introduction to sound on Macintosh computers and then discusses

- sound synthesizers
- sound commands
- sound channels

A thorough understanding of these topics is essential to efficient use of the **Sound Manager** in your applications. The **Sound Manager** provides a preliminary discussion of the major features that are new to the enhanced **Sound Manager** provided with system software versions 6.0.7 and later, including

- mixing multiple channels of sampled sound
- compressing and expanding sound data
- playing sounds stored on disk while other applications execute
- recording sounds on Macintosh computers having appropriate sound input hardware
- obtaining status information about sound channels

The **Sound Manager** also describes sound resources and sound files, the two sound storage formats supported by the **Sound Manager**. Most applications do not need to know the details of these storage formats because the **Sound Manager** provides routines that allow you to read and create both sound resources and sound files. In most cases, your application should use those routines rather than create or parse sound resources or files directly.

Most applications are likely to need only a few of the many capabilities of the enhanced **Sound Manager**. If your application's use of sound falls into one or more of the following categories, you can proceed right to the indicated sections to find the information you need.

- **Controlling the system alert sound.** Your application can use the **Sound Manager** to play, disable, or enable the **system alert sound** selected by the user in the **Sound** control panel. The system alert sound is played whenever an application issues the **SysBeep** procedure. For more information about controlling the system alert sound, see **Producing an Alert Sound**.
- **Playing prerecorded sounds.** Your application can play back prerecorded sampled sounds by calling the **SndPlay** function. The sampled sound can contain speech, sound effects, or other sounds needed by your application. For more information on playing back prerecorded sounds, see **Playing 'snd' Resources**. If the sound you want to play back is too large to fit into RAM, you can play it by calling **SndStartFilePlay**. This routine should be used only with very large sounds because it consumes more processing time than **SndPlay**. For more information on playing sampled sounds from disk, see **Continuous Play From Disk**.
- **Compressing and expanding sounds.** If your application uses lots of sounds, you might want to compress those sounds to reduce the size of the data shipped with your application. The **Sound Manager** provides several routines to handle this compression of audio data. The real-time expansion and playback are handled automatically by the **Sound Manager** when you issue a request to play the sampled sound data. For more information on compressing and expanding sounds, see **Sound Compression and Expansion**.
- **Recording sounds.** Any Macintosh computer equipped with sound input hardware and an associated driver is able to record sounds (several Macintosh computers include these items as standard features). By using one of several recording routines, your application can record sounds to provide capabilities such as voice mail, voice annotation, speech recognition, and even overdubbing. For more

information on sound input, see [Sound Recording](#).

- **Mixing multiple channels of sound.** On Macintosh computers with sufficient processing capability, multiple channels of sampled sound can be played simultaneously. This means that your application can play several sampled sounds simultaneously, or that your application can play sampled sounds while other applications do so also. For more information on mixing multiple channels of sampled sound, see [Multiple Channels of Sound](#). Mixing can also include more than just simultaneous playback of sampled sounds. Certain audio characteristics can be altered in real time while a sound is playing. See [Manipulating a Sound That Is Playing](#) for more details.
- **Designing sound.** The [Sound Manager](#) has facilities for designing and controlling complex sounds. Your application can play a series of frequencies at specified durations in a manner that will be familiar to users. You can use custom waveforms to change the timbre of these sounds, and you can play them on multiple channels concurrently. Sounds can be speeded up or slowed down, made louder or less loud, or panned left, right, or center in real time. To understand the full power of the [Sound Manager](#), start by reading [Sound Synthesizers](#).