

How Sound Cards Work

It's hard to imagine buying a computer without a sound card and speakers anymore. Sound on computers used to be more of a novelty than a necessity. The sounds that came out of your computer back then weren't anything to get excited about. How times have changed. A computer can now sound almost as good as a home stereo system. However, keep in mind that a sound card works very differently than your home or office stereo.

Sound cards process digital commands and turn those digits into analog sounds, but the sound card doesn't do this entirely on its own. There are several steps between the time a command for a sound is issued, and you actually hear it through your speakers. Let's step through the process.

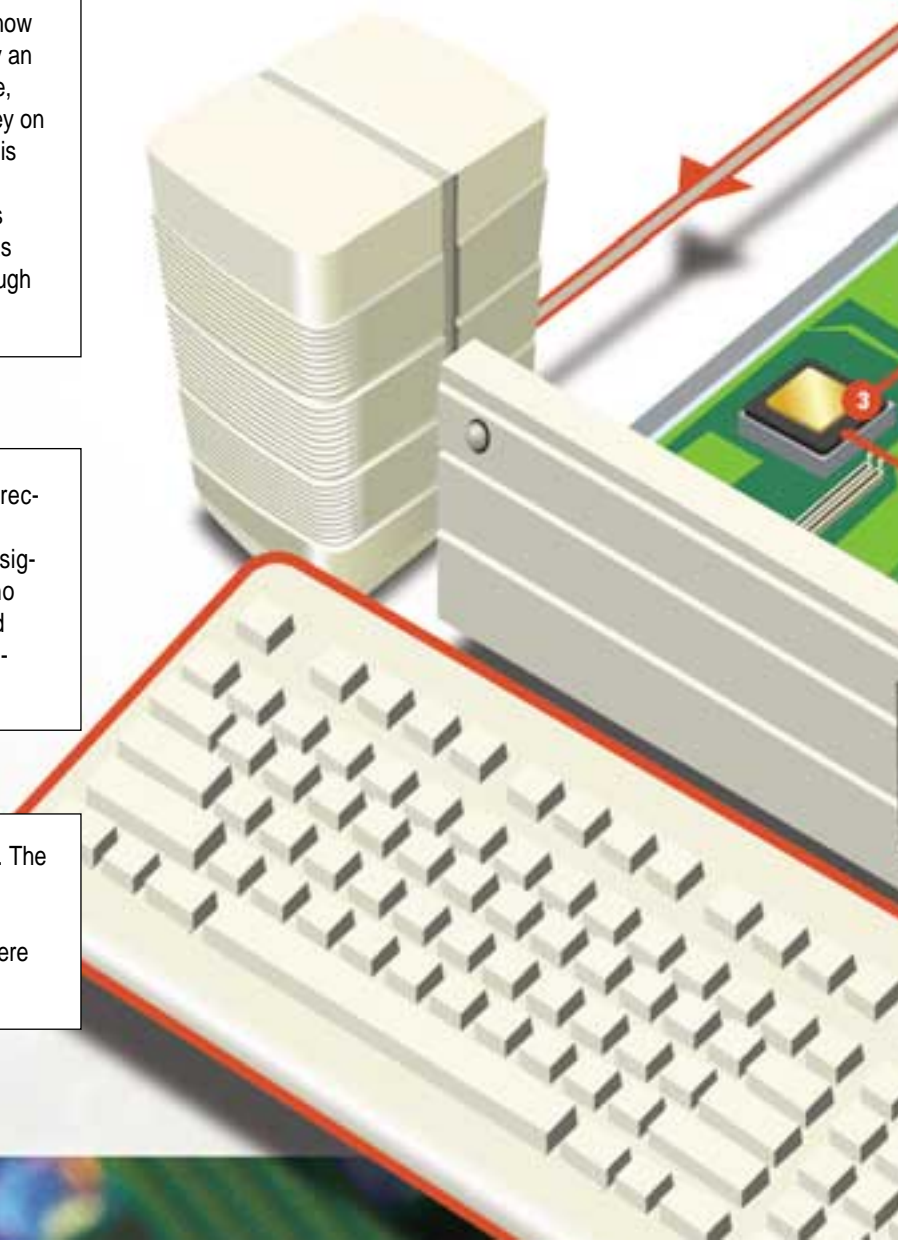
1 Before a computer can play a sound, it has to know that it needs to play a sound. This can be initiated by an event that occurs in software, or from an input device, such as a keyboard or joystick. When you press a key on your keyboard that initiates a sound, the information is sent to the computer. The request for a sound to be played is made through a set of software instructions called an API (application program interface), such as DirectSound or EAX. The API carries the signal through the computer.

2 The information reaches the processor, which recognizes that a sound needs to be played. Because most sound cards now have a built-in DSP (digital signal processor), the CPU (central processing unit) no longer has to process the information for the sound card. The sound card takes care of most of the processing tasks itself.

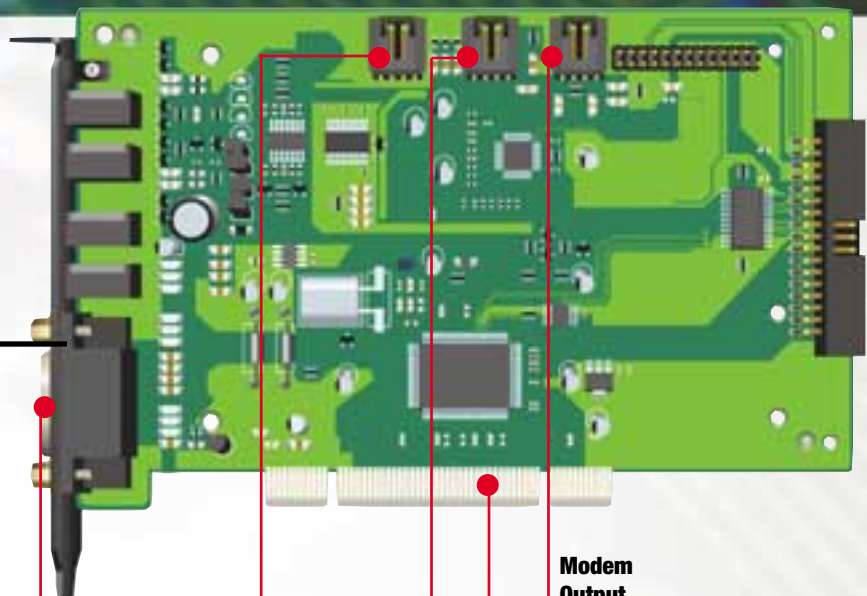
3 The processor sends the task to the sound card. The sound card processes the request for a sound to be played and determines exactly what sound is to be played. The request also includes information on where to find the sound.

4 The sounds are stored in the computer's system memory. The sound card finds the sound in system memory, and the sound is sent back to the sound card to be processed. The sound card applies all the necessary effects to the sound, such as 3-D audio and extra reverb. Sound cards usually have a polyphony of 32 or 64 voices, which lets them process and play several sounds at once.

5 When the sound card is done modifying the sound, it sends it out through the DAC (digital-to-analog converter) to the speakers or headphones for your listening pleasure.



This is an illustration of a PCI (Peripheral Component Interconnect) sound card, with the key components labeled. The components on individual sound cards will vary, but these are some of the more common ones.



Joystick/MIDI Input

CD-Audio input from CD-ROM drive

Modem Output

68-Pin PCI Connector

Auxiliary Output

