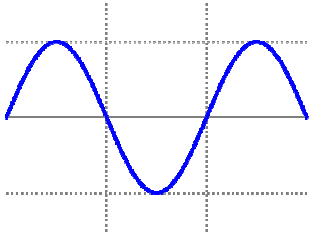


What are Digital and Analog Sound and Which is Better?

Any sound can be visualized as a wave:



Analog recording turns the wave into vibrations of a needle or changes in a magnetic field. These changes are recorded in some kind of malleable medium, such as vinyl, wax, or the magnetic dipoles coating a thin film of tape. When that medium is passed through a player, the changes are converted back into an approximation of the original sound.

The advantages of analog recording include, theoretically:

- Complete representation of a sound in its recording

The disadvantages of analog recording include:

- Difficulty or impossibility of editing without loss or degradation of the recording
- Degradation of recording quality over multiple playbacks (as few as three or four in some media)
- Fragile physical media subject to cracks, warping, stretching, etc.

Analog Recording Media were the only choice between 1877 and 1982. They included:

- phonographs (of many shapes and sizes)
- player pianos
- magnetic tape (reel-to-reel, 8-track, cassette)

After 1982, many commercial analog recordings were digital recordings put onto analog media.

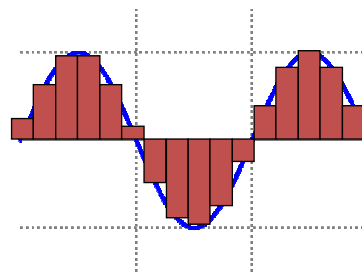
So which is better?

In theory, a perfect analog recording would have greater *fidelity* or *quality* than a digital recording of the same sound. **Analog sound is more precise** than digital sound.

In practice, however, the ease of editing and copying, and the less-fragile nature of digital recordings means that they often sound better than analog recordings, and listeners have come to expect digital-quality sound from even their analog recordings. Without the best equipment, preservation of media, and conditions, analog loses to digital. **Digital sound is more accurate** than analog sound.

Analog and **digital** recording are the two ways of converting this wave into a physical or medium that can be stored for later playback, and sometimes copied and edited. The alternative is that a sound is lost, presumably forever.

Digital recording takes a sound and measures its volume rapidly at regular intervals, storing those measurements as numbers (digits). The wave form above becomes, and the heights of all the blocks are stored as an ordered string of numbers:



This is not practical or even possible without a computer, but the standard is to take 44,100 volume measurements *every second*. When these numbers are converted back into bursts of sound, a good approximation of the original sound can be heard.

Advantages of digital recording include:

- The recording can be intact as long as the string of numbers is intact.

- A string of numbers can be fed into a computer...

- So it can be easily copied, edited and manipulated

Disadvantages of digital recording include:

- An enormous amount of information is summarized rather than truly preserved.

Digital Recording Media have been preferred since the introduction of the compact disc in 1983, although some listeners and musicians express a preference for analog media, particularly vinyl records.