

## Analog Audio vs Digital Audio

### **What is *analog audio*?**

Analog audio involves a physical process to produce or reproduce a sound. Singing, plucking a guitar string, hitting a drum, blowing into a flute, recording with a microphone, recording onto cassette tape, running sounds through a mixer or amplifier, playing sounds through speakers; these are all examples of analog audio.

Vinyl LPs are also analog. If you look VERY closely at the groove on an LP, you'll see a side-to-side squiggle that changes as the music changes. Sometimes the squiggle is very busy (a loud and bright part of the song) or very gentle (a quiet or dark part of the song).

Many engineers and musicians are drawn to analog technology in the studio and on stage. You'll hear them say that analog sounds are 'warm' or 'fat' or 'smooth' or 'rich'. There are technical reasons why this is so.

One reason is that analog technology tends to round off the sharp edges of waveforms. Bright, high frequency sounds get softened a little during analog processes.

Another reason is that analog technology tends to gently distort the sound. This seems like it might be a bad thing, but it can actually sound quite good, if it's used with care.

One drawback to analog audio is that it can increase noise levels in the music. Circuits, cables, and media (tape) all make a little noise.

### **What is *digital audio*?**

For several decades now, we've used computers to record and play sounds. A computer works with numbers, bits and bytes; it has no direct connection to the physical properties of sound. During a recording, the computer **samples** the analog sound and converts it into numbers (ADC, Analog-Digital-Conversion). Later, during playback, the computer converts the numbers back into analog sound (DAC, Digital-Analog-Conversion).

When digital audio first came on the scene, a lot of engineers and musicians complained that it sounded harsh, or brittle. But at the same time, they noticed that digital audio doesn't suffer from the noise problems that analog audio may have. They also realized that, because digital audio is just a big string of numbers, it should be fairly easy to transfer those numbers from one place to another, or to manipulate those numbers to create new sounds.

These days, you'll find both analog and digital technology in any recording studio. They can work very well together.

Here's a chart that shows some of the advantages and disadvantages of analog and digital audio.

	<b>Advantages</b>	<b>Disadvantages</b>
<b>Analog</b>	warm sound; hands-on technology; fairly easy to fix if broken; longevity (a 100-year old piano can still be used & repaired);	noisy; expensive; can be big and bulky; needs regular maintenance;
<b>Digital</b>	easy to manipulate sounds; relatively inexpensive; free of analog noise; portable and compact;	prone to crashing; less of a feeling of 'hands-on'; can sound brittle or harsh; obsolescence (you have to upgrade computers & software regularly);