

Sampler

## ByteNoise

### Sampler



The Propellerhead NN-19 sample player

The sampler is perhaps the most versatile musical instrument ever devised. It is the chameleon of sound synthesis. While it has no actual [sound](#) of its own, it does a very good job of imitating any other sound you can make, and mapping that sound to a musical keyboard.

The first musical instruments that existed solely to emulate other musical instruments were the Chamberlin and Mellotron. They were large, mechanical machines with keyboards. When you held down a key, a strip of audiotape would play back a prerecorded sound. Each key played a different tape, featuring the same instrument playing the appropriate note.

This allowed keyboard players in seventies rock bands to sound uncannily like they had some violinists or even a choir hidden behind the stage they were playing on, which is what many

people thought they were actually doing. Unfortunately, these ambitious machines were prone to breaking down, so the best way to listen to their distinctive sounds these days is to buy a sample CD of them, which can be played reliably on their modern counterpart: the digital sampler.

The digital sampler turns any sound fed into it into a series of numbers, and then turns those numbers back into the original sound again. This is exactly the same method that CD players use, known as pulse code modulation (or PCM for short). The main difference between the two devices is that while a CD player is content to merely play back the sound on a compact disc, a sampler can also record sounds via a microphone.

The other big difference is that a sampler has the ability to play a sound back at a different pitch. You can, for example, record the middle C of a piano and play it back slower or faster to make it sound like a B3 or C#4. However, you would soon notice that once you play the sample back at more than about half an octave from its original note, it starts to sound unrealistic. High notes will be tinny and too fast, whereas low notes will sound muddled and very slow, not at all like a real piano.

This is where key zones come in: a different sample can be used every few notes. If, for example, you sample the C and F# notes of every octave of a piano, the result won't be perfect, but it will at least sound OK. For less expressive instruments like electric organs, the result will sound very much like the real thing. The drawback of key zones is that several samples are required to capture the sound of just one instrument, taking more time and effort to actually sample and taking up more space in the sampler's memory. This drawback is outweighed by the benefit: a much more realistic reproduction of the original

instrument.

Modern samplers go even further than this, using two dimensional key zones: one dimension for the notes, and another for the dynamics (dynamics being a fancy term meaning "how hard you hit the key"). Sampling every note of a piano at various different dynamics provides a much more realistic emulation of that instrument (after all, its expressive dynamics are what make the piano more popular than its predecessor, the harpsichord), allowing the musician to play the sampler's keyboard in the same expressive way that she would play the original piano. However, recording every note of an instrument (or even one in every three or six) at several different volumes, then mapping the results into a sampler, can be a very tedious and time consuming process.

Even before samplers could record the dynamic range of an instrument, several companies had realised that many people using samplers would want someone else to do the actual tedious sampling for them. The result was the sample CD, a compact disc full of sounds that someone else had painstakingly recorded so that the musician didn't have to, usually available in the various native formats of the most popular models of sampler, with the key zones already mapped out. Retailing at a price much higher than albums, but significantly lower than the actual instruments they more or less captured the sound of, these became popular enough to warrant the existence of companies that do nothing but make them, and mail order retailers that do nothing but sell them.

These days, anyone into sampling has a lot of options. You can buy an old sampler that has such [low fidelity](#) that it has a unique character all of its own that colours any sound it plays back, or you can go to the other extreme and buy a new software

sampler which can effortlessly render a surprisingly good imitation of a grand piano in surround sound. Somewhere between the two extremes lies the CD quality Akai S1000, one of the most popular hardware samplers. Its format is still the main standard for sample CDs, even though many modern samplers - both hardware and software - have surpassed its limitations.

Another choice is whether to record an instrument yourself, or buy a sample CD. The latter is far easier, although the license will likely impose restrictions on how you can use the samples, and it can be expensive.

Instead, you could forget instruments altogether, choosing to record a quote from a film or a bar or two from someone else's [song](#). While paying royalties can eat into your profits, that didn't stop [Fatboy Slim](#) from building an entire career out of remixing and recycling other people's riffs and vocals. Public Enemy and [Pop Will Eat Itself](#) were experts at taking snippets of other people's music and films, putting them into a new context where they would complement their own original work. With his debut album *Endtroducing*, DJ Shadow even went as far as to make the whole record out of samples of other people's work.

Yet another option is to make your own original samples of things other than musical instruments. This is arguably the most important ability of the sampler: to turn any conceivable sound into a potential musical instrument. Binary's album *Brick Wall Music*, for example, is made exclusively out of the sounds of things lying around in his house. In the inlay card, he proudly proclaims "No musical instruments were used on these recordings. Sound sources come from everyday objects and found sounds manipulated digitally."

Although sampling can be a tedious, time consuming process, and it often offers a less than perfect reproduction of other instruments, the sampler truly is the most versatile musical instrument. It has also changed the sound of music, from every hip hop song that samples Michael Viner's Incredible Bongo Band's cover of The Shadows's Apache to every composer who uses a sampler to help him sketch out ideas for his latest classical composition.