

# Getting Started with Electronic Percussion

## Part Three: Sound Generators

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In this series, we've taken a close look at input devices and trigger-to-MIDI converters. Input devices are the pads or triggers that sense when a surface is being struck, translate that impact into an electrical voltage, and then relay the message to a trigger-to-MIDI converter. The converter sees the voltage spike and creates MIDI data. The next step in the electronic music chain is the sound generator. Before getting into sound generators, it might be a good idea to discuss why sound generators are necessary.

The primary difference between electronic and acoustic percussion instruments is how the sound actually is produced. With acoustic instruments, some part of the instrument vibrates when it's played. When you play a drum, tambourine, tabla, or timpani, the heads vibrate to create the sound. With electronic percussion instruments, on the other hand, the sounds we hear are produced by the vibrations of a speaker. The sound generator is required to tell the speakers how to vibrate, and as a result of that, how to sound.

Sound generators come in many disguises. Quite often, they are incorporated into a single box which also contains some sort of input device. A keyboard synthesizer is a good example: The keys act as the input device, while all the internal hardware and software serves as the sound generator. Another example of this type of unit is a drum machine. The buttons on the front panel constitute the input device while the sound generator inside the drum machine fires the drum samples.

Sound generators also are offered as free-standing or rack-mounted units. These types of sound generators have no built-in input device and are controlled exclusively by MIDI messages sent from another machine. Examples of this type of sound generator are Roland's new R8-M (a rack-mount version of their R8 drum machine) and E-mu's Proteus.

Generally speaking, there are four main types of sound generators commonly in use in electronic percussion music systems: drum machines, samplers, synthesizers, and multi-timbral sound generators. How do you know which type of sound generator is best for you? It all depends on the type of sounds you want to come out of the speaker.

**Drum machines** typically have between 32 and 100 drum and percussion sounds permanently burned into their memory chips. Because these sounds are stored as samples (more about that in a few paragraphs), they are

highly accurate digital recordings of actual drum and percussion instruments.

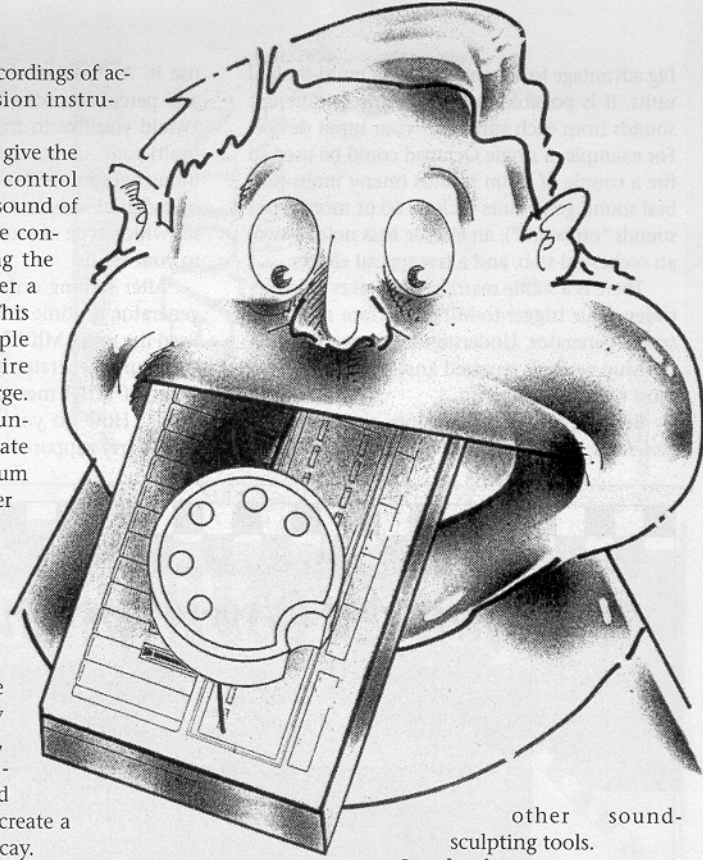
Most drum machines give the user a wide variety of control over shaping the actual sound of the sample. One of these controls may include tuning the sound of the drum over a wide range of pitches. This way, a single tom sample can sound like an entire rack of toms, small to large. In addition, extreme tunings can be used to create special effects—a bass drum tuned three octaves lower may make a good cannon. Some drum machines also will let you alter the volume of the sound, assign a stereo placement to the sound, change the timbre of the sample by passing it through a filter, play the sample backwards, or pass the sound through an envelope to create a slower attack or faster decay.

Drum machines offer high-quality, realistic percussion sounds at affordable prices. Even drum machines in the \$300 to \$500 price range offer a wide range of sounds and sound editing options.

**Samplers** are the sound generators of choice for many drummers. While they are among the more expensive options, they also offer more flexibility and possibilities for expansion. Samplers are capable of creating and playing high-quality digital recordings of any sound on the planet. If, for example, you would like your trigger pad to fire the sound of your own acoustic snare drum, or your dog's bark, a sampler is the only way to go.

Drum machines and samplers are not the same thing. Even though a drum machine may be playing back sampled recordings of real drum sounds, the difference between playing back sampled sounds and recording your own sounds is vast. There are a couple of *sampling* drum machines on the market (E-mu's SP1200 and Akai's MPC60), but the majority of drum machines only play back their own internal samples and don't allow you to record your own.

Samplers usually offer even more control over the sound than drum machines. Tuning ranges, filters, envelopes, sound reversing, and stereo placement all are supported. In addition, most samplers will let you crossfade or switch between sounds based on the velocity of your stroke. Since samplers often are used by keyboard players, sounds can be looped, controlled by pitch wheels, LFOs (low frequency oscillators, often used for creating vibrato), continuous controllers, and an assortment of



other sound-sculpting tools.

**Synthesizers** are designed mainly to produce melodic timbres. A synth can offer the electronic percussionist everything from synthetic acoustic instrument timbres to wild special effects that can only be a product of synthesis techniques. Each manufacturer has a certain way of getting those chips and wires to produce sound. Casio's technique is called "Phase Modulation," Yamaha uses "Frequency Modulation," and Roland's method is called "Linear Algorithmic." You'll also find synths that use additive synthesis, subtractive synthesis, re-synthesis, and a spectrum of other techniques.

While the differences among these synthesis styles are too complicated to discuss in this article, they all do pretty much the same thing: They synthesize and create electronic sounds. Keep in mind, however, that each method of synthesis will sound slightly different. In other words, a flute timbre created by a Casio synth will not sound the same as a flute created by a Roland or Yamaha synth. One is not necessarily better than the other, they are simply different.

**Multi-timbral sound generators** are enjoying a big surge in popularity. Multi-timbral units get their name from their ability to listen to several MIDI channels at once and simultaneously play a different timbre on each channel. There are multi-timbral units that use synthesized sounds (Yamaha's FB01 or TX81Z), sampled sounds (E-mu's Proteus or Roland's U-20), and combinations of the two (Kawai's K4 or Korg's M1).

Since multi-timbral sound generators can listen to several MIDI channels at once, they offer a

big advantage to drummers. Using multi-timbral units, it is possible to trigger entirely different sounds from each surface of your input device. For example, a single Octapad could be used to fire a couple of drum sounds (many multi-timbral sound generators include 60 or more drum sounds "on board"), an electric bass note or two, an orchestral stab, and a few special effects.

There is a subtle marriage that takes place between your trigger-to-MIDI interface and your sound generator. Understanding how this relationship works is required knowledge to get the most out of your system.

Before making any decisions about a sound generator, figure out how you are planning to

use it. Are you most interested in firing drum and percussion sounds from your acoustic kit? Would you like to trigger bass lines from your multi-pad? Are you looking for special effects or industrial sounds? Would you like to make your own digital samples? Take a look at the chart to see which type of sound generator is best suited to your needs.

After settling on a particular type of sound generator, it's time to look at them individually. Read the unit's MIDI implementation chart. Will this sound generator respond to all the different types of MIDI messages that your controller sends? How do you like the sound? Is there third-party support for additional sounds? Does

this unit have all the features you're looking for? How easy is it to program? Is the manual clearly written? Answering these questions will make your selection easier.

After the sound generator receives a MIDI message and creates a sound, the signal passes through a cable to the audio system. Next time, we'll take a look at audio systems for the stage and the studio. Until then, keep those sounds generating! •

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## **Drummers On-Line**

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