Going with the Grain

Ten granular-synthesis programs to slice and dice your sounds. | By Dennis Miller

Judging by the number of hits you get when you Google it—several hundred thousand—granular synthesis would appear to be a very hot topic. You can also measure its popularity by looking at the large number of programs that either are dedicated to granular synthesis or include it as a feature. Though it's not the best way to produce cutting lead lines or thumping bass parts, granular synthesis has a vast range of musical uses, including slowing down sounds without changing their pitch, adding reverb or other ambient qualities to a sound, and, of course, producing all manner of amorphous sonic textures.

Granular synthesis is a technique intended to create clouds or clusters of small sonic events called *grains* (see "A World in a Grain of Sound" in the November 1999 issue, available at emusician.com, for an introduction to granular synthesis). Grains are typically in the realm of 5 to 100 ms long and are created from either synthetic waveforms or samples. When clumped into massive groups, individual grains are virtually indistinguishable, but the overall impression can be like rain or falling rocks, or more rhythmic, even pitched sounds, perhaps with recognizable bits of a source sample popping through.

In this article, I'll cover representative programs from the world of granular synthesis. Many dozens of programs support the technique, and the ten chosen for this roundup are just examples of what you'll find if you go looking. I'll focus only on software, acknowledging that hardware-based systems such as the Symbolic Sound Kyma System are extremely capable in this area. There are also hundreds of Native Instruments Reaktor patches that employ granular synthesis, not to mention patches designed for Csound, James McCartney's Super Collider, Cycling '74 Max/MSP, and other programming environments, so be sure to check out their users forums if you own any of those programs.

FIG. 1: GrainMill offers a window for building multisegment envelopes to control any of its parameters. The envelopes can be saved and reused.

The programs I'll look at are Sinan Bökesoy's Stochos V6, CDP GrainMill 1.1, Karlheinz Essl's REplay PLAYer 3.2, Nicolas

Fournel's Granulator 1.1, Tom Gersic's Atomic Cloud 1.0, Nikola Jeremic's Organik 1.2, Christopher Keyes's Granular Cloud Generator 2003, LowNorth RTGS-X 2.4, Stefan Smulovitz's Kenaxis 2.2, and Jörg Stelkens's crusherX-Live 3.51. (See the sidebar "Manufacturer Contacts" for contact info on each program and the sidebar "Other Options" for a list of some granular apps that are not included in this article.) I won't go into detail on the sonic results each can produce, so be sure to check out the Web Clips and, where available, the demos for each program to get a sense of the sounds it can make.

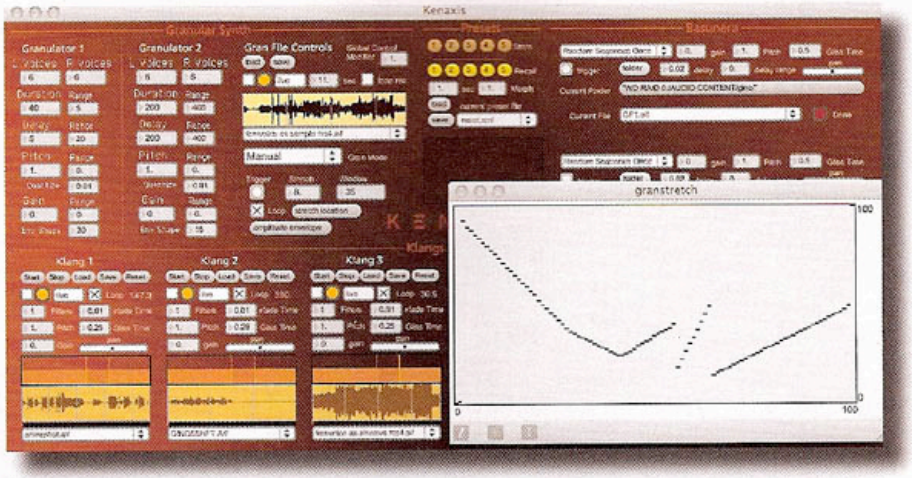

FIG. 2: Kenaxis has a very powerful and flexible system for controlling all aspects of sample granulation. Included is a two-dimensional graph (lower right) for drawing the sample's playback trajectory.

(Cut to Kenaxis)

(Granular-synthesis guru Barry Truax has noted that granulation typically destroys all sense of stereo separation in the original file.)

Stefan Smulovitz's Kenaxis 2.2 (Mac/Win, $145)

Tucked inside a very powerful looping and sampling interface are Kenaxis's two granulators, each of which uses the same sample but has the ability to process it in separate ways. For example, one might generate a high density of grains while moving backward through the source file at half speed, whereas the second plays back a version of the file stretched to several times its length but with the pitch intact (see **Web Clip 10**). You can use the Random File Impulse command to instruct Kenaxis to pick sample files randomly from a folder you designate, or drag-and-drop a new file manually onto the Granulator file window even while the program is playing back. Kenaxis supports only mono files (or the left channel of a stereo file) for granulation but outputs audio in stereo.

Kenaxis controls randomness in a variety of ways. You can set a range within which grain duration, delay, pitch, and loudness will be chosen randomly, and you can quantize the pitch range to limit values to fixed increments (only multiples of 0.33 times the original, for instance). Or you can use the GranRnd window to control grain parameters with a high degree of specificity. Like the KlangRnd window, which controls the playback of sample files, GranRnd uses a drunken walk model to set the probability of events occurring. Both windows include a tempo control that you can use to determine how often different parameter values are updated. You can also create interesting rhythmic patterns by using the Amplitude Envelope window to impose "amplitude sequences" on grains at specific tempos.

Kenaxis includes a delay with delay times up to 75 seconds and a filter that you can apply to any of its sound sources. It has an extensive manual and is easily the most configurable of this group—there's even a dedicated window for setting up the response of a joystick or Wacom tablet. In addition to the stereo version, a second version, called Kenaxis VBAP, allows surround output and up to eight channels, and includes a mixer for panning each of the program's sound generators independently.

Associate Editor Dennis Miller composes with music and images. Check out his work at www.dennismiller.neu.edu.