

10 Ways to Exploit Synth and Sampler Oscillators

Once Again, We Ask the Question: Why Be Normal?

by Craig Anderton

Many synthesizers and samplers, whether hardware or software, combine digital sample-based oscillators with synthesis techniques like filtering and modulation. These synthesis options can turn on-board samples into larger-than-life acoustic timbres, impart expressiveness to static sounds, and create entirely new types of sounds—but only if you know how to do a little editing.

Don't believe the hype that editing a synth preset is difficult. All you really need to know is how to select parameters for adjustment, and how to change parameter values. Then, just play around: Vary some parameter values and listen to what happens. As you experiment, you'll build up a repertoire of techniques that produce sounds you like.

When it comes to using oscillators creatively, remember that just because a sample says "Piano" doesn't mean it can only make piano sounds. As with so many aspects of recording, doing something "wrong" can be extremely right. Such as . . .

1. BOMB THE BASS

Transpose bass samples up by two octaves or more, and their characters change completely: So far I've unearthed great dulcimer, zither, and clavinet sounds.

Furthermore, because transposing up shortens the attack time, bass samples can supply great attack transients for other samples that lack punch (although it may be necessary to add an amplitude envelope with a very short attack time so that you hear only the attack). Also, bass samples sometimes make very “meaty” keyboard sounds when layered with traditional keyboard samples.

2. THE VIRTUAL 12-STRING

Many keyboards include 12-string guitar samples, but these are often unsatisfying. As an alternative, layer three sets of guitar multisamples (**Fig. 1**). The first multisample becomes the “main” sample and extends over the full range of the keyboard. Transpose the second set of multisamples an octave higher, and remember that the top two strings of a 12-string are tuned in unison, not octaves. So, limit the range of the octave higher set of multisamples to A#3. Detune the third multisample set a bit compared to the primary sample, and limit its range to B3 on up. (You may want to fudge with the split point between octave and unison a bit, as a guitarist may play the doubled third string higher up on the neck.)

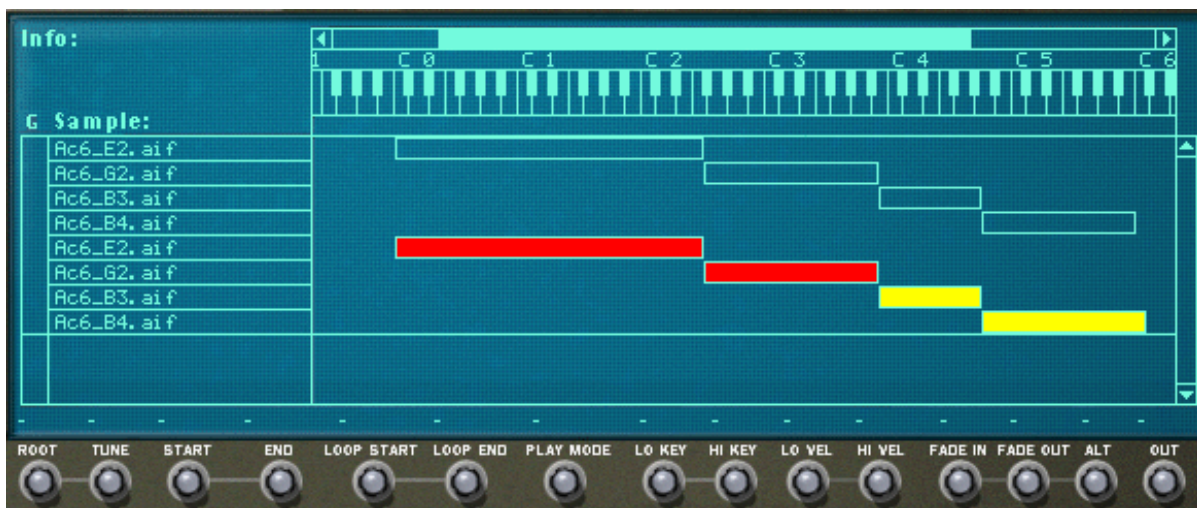


Fig. 1: A simple 12-string guitar patch in Reason’s NN-Xt sampler. The octave above samples are colored red for clarity, while the unison samples are colored yellow. (This example uses a limited number of samples to keep the artwork at a reasonable size.)

If you can delay the onset of the notes in the octave above and unison layers by around 20 to 35ms, the effect will be more realistic.

3. THE ODD COUPLE

Combining samples with traditional synth waveforms can create a much richer overall effect, as well as mask problems that may exist in the sample, such as obvious loops or split points. For example, mixing a sawtooth wave with a string section sample gives a richer overall sound (the sawtooth envelope should mimic the strings' amplitude envelope). Combining triangle waves with nylon string guitars and flutes also works well. And to turn a sax patch into a sax section, mix in some sawtooth wave set for a bit of an attack time, then detune it compared to the main sax.

Sometimes combining theoretically dissimilar samples works well too. For example, on one synth I felt the piano sample lacked a strong bottom end. Layering an acoustic bass sample way in the background, with a little bit of attack time so you didn't hear the characteristic acoustic bass attack, solved the problem. Sometimes adding a sine wave fundamental to a sound also increases the depth; this worked well with a Chapman Stick sample to increase the low end "boom." Try other "unexpected" combinations as well, such as mixing choir and bell samples together, or high-pitched white noise and choir.

4. FUN WITH INTERGALACTIC COSMIC EXPLOSIONS

Transpose percussion sounds (cymbals, drums, tambourines, shakers, etc.) way down—at least two octaves—for weird sound effects and digital noises. If this causes any quantization noise or grunge to the sound, you may want to keep it but if not, consider closing the lowpass filter down a bit to take out some of the high frequencies, where any artifacts will be most noticeable. For truly massive

thunder effects, spaceship sounds, and exploding galaxies (which are always tough to sample!), choose a complex waveform, transpose it down as far as it will go, and close the filter way down . . . then layer it with a similar sound.

5. GENTLEMEN, START YOUR SAMPLES

Changing the start point of a sample (a feature available on most synths and samplers) can radically affect the timbre and add dynamics. Move the start point further into the sample (Fig. 2) until you obtain the desired “minimum dynamics” sound, then tie the start point time to keyboard velocity so that more velocity moves the start point closer to the beginning of the sample (this usually requires negative modulation, but check your manual).

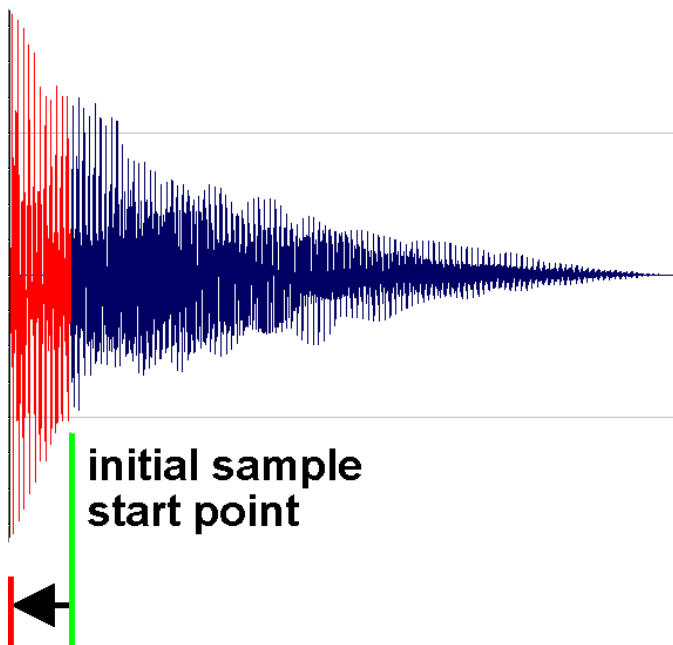


Fig. 2: The green line indicates the initial sample start point (minimum velocity). Hitting higher velocities moves the sample point further to the left, toward the beginning of the sample, so the sound picks up more of the attack. The red part of the waveform is the area affected by velocity.

This seems to work best with percussive sounds, as changing the start point dynamically can cause clicks that are obvious with sustained sounds, but blend in with percussion. An alternative is to use two versions of the same sample, with one sample's start time set into the sample and the other left alone; then use velocity switching to switch from the altered sample to the unaltered one as velocity increases.

6. DETUNING: WHO SAYS SUBTLE IS GOOD?

Detuning isn't just about subtle changes. When creating an unpitched sound such as drums or special effects, use two versions of the same sample for the two oscillators, but with their pitches offset by a few semitones to thicken the sound. You may need to apply a common envelope to both of them in case the transposition is extreme enough that one sample has a noticeably longer decay than the other one.

7. THE REVENGE OF HARRY PARTCH

Microtonal scales (17-tone, 21-tone, exotic even-tempered scales) are good for experimental music, but they're also useful for special effects. After all, car crashes are seldom even-tempered, and you may want a somewhat more "stretched" sound—either higher or lower—than what the sample provides. To get these kinds of scales (or even a 1-tone scale where all notes on the keyboard play at the same pitch), assign note position (keyboard) as an oscillator modulation source. Adjusting the degree of modulation can "stretch" or "compress" the keyboard so that an octave takes up more or less keys than the usual 12. Note that you may need to adjust the tuning so that the "base" key of a scale falls where you want it.

8. CROSSING OVER

Use waveform crossfading to cover up samples with iffy loops. For example, one keyboard had a very realistic flute sound, but the manufacturer assumed you'd be playing the flute in its "normal" range, so the highest sample was looped and stretched to the top of the keyboard. This flute sound actually was very useable in the upper ranges, except that past a certain point the loop became overly short and "tinny." So, I used the flute sample for one oscillator and a triangle wave for the other, and faded out the flute as it hit the looped portion, while fading in the triangle wave (Fig. 3).

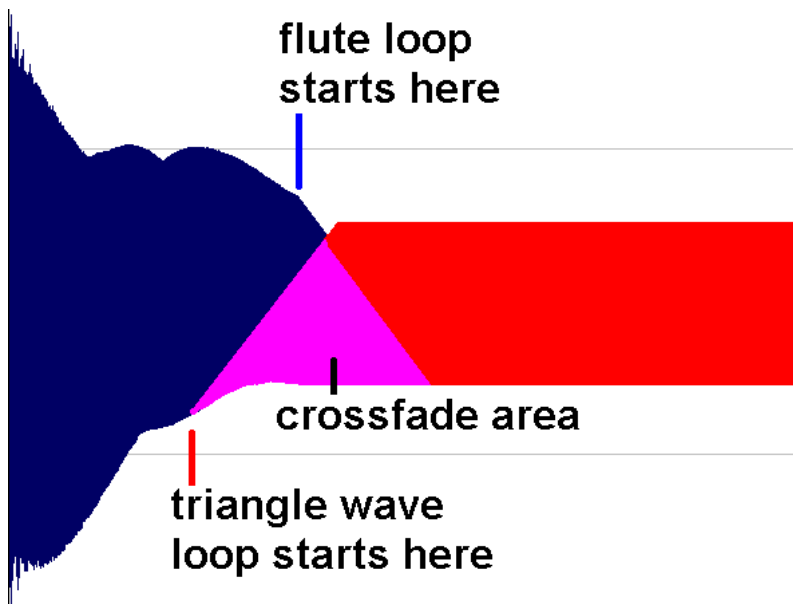


Fig. 3: As the natural flute loop fades out, a looped triangle wave fades in to provide a smoother looped sound for the decay.

The flute sample gave the attack and the triangle wave, a smooth and consistent post-attack sound. Similar techniques work well for brass, but you'll probably want to crossfade with a sawtooth wave or other complex waveform.

9. BETTER LIVING THROUGH LAYERING

Try layering two samples, and assigning velocity control to the secondary sample's amplitude so that hitting the keys harder brings in the second sample. This can be very effective in creating more complex sounds. One option for the second sample is to bring in a detuned version, so that playing harder brings in a chorusing effect; or, you use variations on the same basic sound (e.g., nylon and steel string guitars) so that velocity "morphs" through the two sounds.

10. TAKE THE LEAD WITH GUITAR "FEEDBACK"

With lead guitar patches, tune one lead sample an octave higher than the other lead sample and tie both sample levels to keyboard pressure. However, set the initial volume of the main sample to maximum level, with pressure adding negative modulation that lowers the level; the octave-higher sample should start at minimum level, with pressure adding positive modulation that increases the level. Pressing down on the key during a sustaining note brings in the octave higher "feedback" sound and fades out the fundamental.

For a variation on this theme, have pressure introduce vibrato and perhaps bend pitch up a half-tone at maximum pressure. Also experiment with other waveforms and pitches for the octave-higher sound; a sine wave tuned an octave and a fifth above the fundamental gives a very convincing "feedback" effect.



Craig Anderton is Editor in Chief of Harmony Central and Executive Editor of Electronic Musician magazine. He has played on, mixed, or produced over 20 major label releases (as well as mastered over a hundred tracks for various musicians), and written over a thousand articles for magazines like Guitar Player, Keyboard, Sound on Sound (UK), and Sound + Recording (Germany). He has also lectured on technology and the arts in 38 states, 10 countries, and three languages.