THE ART OF SYNTH SOLOING

Holistic Lead Synth Programming

PART 1

BY JERRY KOVARSKY

Scott Frankfurt in his studio.

THIS MONTH WE GET A WONDERFUL MASTER CLASS ON SOUND CREATION from one of the "secret weapons" that I and other veterans of the synth industry have employed over the years. Scott Frankfurt is an artist, engineer, sound designer and producer *par excellence*, who worked with me at Ensoniq for many years, later doing patch design and demos for Korg, E-mu, and Yamaha. He is currently the Vice President of Design at Spectrasonics, working closely with founder Eric Persing and the team developing their synths and sounds while running a world-class studio. [*In his spare time? —Ed.*] This month, we'll examine Scott's views on all the successful marks a lead synth solo sound needs to hit. Next month, we'll look at a specific application of these principles from a patch he designed for Omnisphere.

A lead synth sound needs to "cut through" the sonic space in which it's set. Keep in mind how focused the bandwidth of a lead guitar is. You don't want a frequency-bloated sound that masks everything, or worse, gets masked by everything else. It needs to play nicely with others. That said, there's room for a lot of diversity here. A smooth lead sound perfect for instrumental jazz is not going to work for hard progressive rock, for example.

It should include a satisfying attack characteristic that gives tactile feedback to the player. Percussive or not, the attack needs to be interesting in its own right (think about repeated short notes), and developing interest on the veloc-ity axis is crucial. In the case of a sample-based sound, try modulating the sample start time via velocity. For samples with a prominent attack transient, start the sample playing just after the attack portion for a softer attack, and then modulate the start point backwards via velocity so the harder you play, the attack portion gets used. For other samples, routing velocity to start point can add slight randomness to each attack, which sounds more interesting and less repetitive (see Figure 1).

The ear and brain make a decision about what a sound is and whether it's pleasing within about 500ms, so it's important to work some character into this crucial time period. In the case of a synthesis-based oscillator, an amplitude or pitch "bump" or "blip" using envelopes can add character to the attack period.

Another example of this would be to modulate an engine parameter (like a bit-crusher, waveshaper, small amount of FM, grain shifter, fast-rate pulse width modulation, or even bringing in another oscillator that provides a short transient) to get the attack to "speak," and then use velocity to control how much of this is heard. Anything you can employ to bring variance to the initial 40ms is desirable.

Related to the attack, legato/solo mode is typically desirable for leads. This gives the player more articulation options by letting intuitive legato playing technique determine envelope re-triggering.

The sustain segment must be compelling. Harmonic activity is important for sustain—this is where the *emotion* is. This sonic movement, even if it's subtle, enhances held notes, allowing them to "sing" for quite some time. Synth soloing is similar to singing from a phrasing point of view, so you should dial in slow but steady modulation of harmonics to create the same effect a good singer naturally employs, subtly varying the sustained tone.

The personality of a sound can come from a myriad of places, so start by listening to what the waveform is already telling you. Is it squawking a certain way? Then, try to dig that out or enhance it even further, maybe with a filter or effect, and lightly modulate that. Is it super fat already? If so, then perhaps thin it out slightly it over time. Is it really thin and edgy? Go in the other direction and introduce some fatness over time.
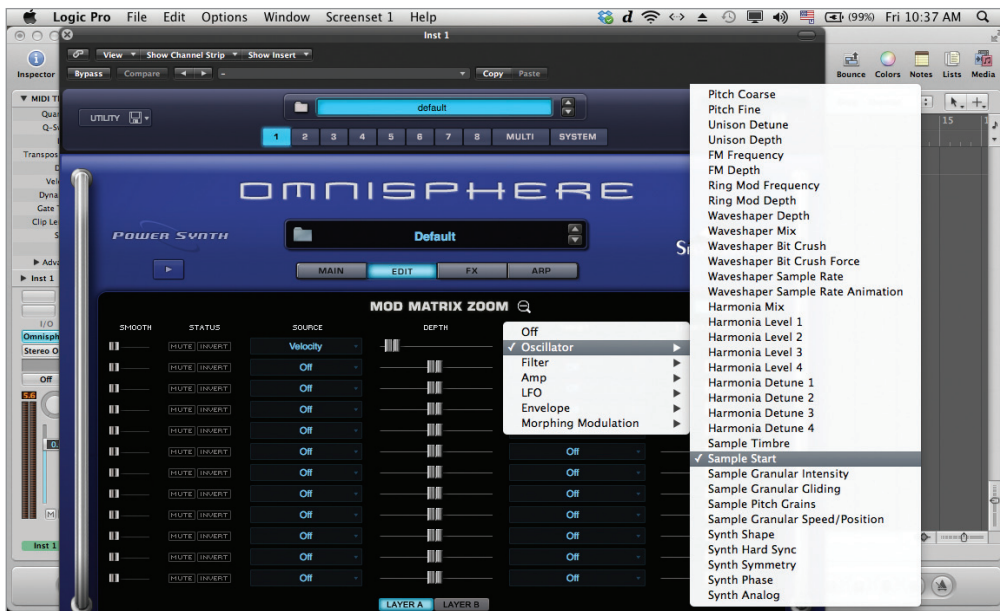
Fig. 1. Routing velocity to sample start time in Omnisphere.

Fig. 2. Delays with built-in filters.

Performance tools must be created for the player to interact with. Nothing is more satisfying to a soloist then reaching for the modulation wheel and hearing something awesome happen as it turns. An ideal scenario is where the initial patch sounds great, but this is only the tip of the iceberg. Performance controls (wheels, pedals, ribbons, and the like) should reveal the rest. In Spectrasonics Omnisphere, a great way to do this is to modulate the "Harmonia Depth" feature to reveal more voices tuned to various octaves, fifths, or other intervals. You can simulate this in any synth that has enough oscillators.

Frankfurt also likes to simultaneously modulate an effect so that the sound gets fuller harmonically, while also getting dirtier via sample rate modulation or distortion. Another trick is finding a key parameter that has two sonic sweet spots, and limiting a performance controller (slider, knob) to target those spots as modulation boundaries. Alternately, you could use two switches to offer dedicated variations on a modulation possibility.

The finish. A solo lead sound should get out of the way quickly when you let up off the keys, so a fast re-lease works great. This not only enhances playability but also makes room for the effects to speak. Here, Frankfurt prefers delay to reverb as it's more transparent and doesn't disappear as easily as reverb does. He'll even band-limit the delays to create more space if possible, by thinning out the delays. Omnisphere, and many cool plug-ins such as SoundToys Echo Boy and Delay Designer in Logic Pro, offer integrated high-pass or band-pass filters to achieve this (see Figure 2). Or you can put the delay effect on a send bus and insert the filter onto the return channel strip.

Release velocity. If available on your controller keyboard, try using release velocity to modulate envelope release time so that a fast key-up causes a fast release time; and a slow key up causes a slow one. Details like this increase playability.

Don't overdo the amplitude dynamics. Lead sounds are far more playable if the volume "hangs in there." The typical velocity-to-amp modulation is not as useful as modulations that alter the tone of the sound. So when programming synth lead patches, use minimal velocity control over the amp level or amp envelope. Instead, let velocity control the filter, oscillator modulation, effects, and such.

Make vibrato like an electric guitar's. Frankfurt prefers a triangle- or sine-wave vibrato that modulates in the positive phase only, with a maximum pitch depth of not more than a minor third. Years ago, he took a close look at Steve Lukather's guitar vibrato style on a pitch scope, since Lukather among the most recorded guitarists alive. The positive phase over a minor third at the furthest position of the wheel most emulates his natural bending of a fretted note (notwithstanding whammy bar technique of course, which can hit both positive and negative phases). If this was a violin sound, we would approach the vibrato differently, but for synthesizer lead sounds, electric-guitar style vibrato sounds great. ♪

For more about Scott Frankfurt, visit scottfrankfurtstudio.com.

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PART 2: CONCEPTS BECOME REALITY

BY JERRY KOVARSKY

LAST MONTH SOUND DESIGN MAESTRO SCOTT FRANKFURT SHARED HIS GENERAL concepts for lead synth sounds. This month we take a look at one of his sounds for Spectrasonics' powerful soft synth *Omnisphere* to see and hear how he puts these concepts into action—related by Scott in the first person. Check out the online audio examples for insight into each step of the sound design process, and to hear Scott playing the sound. Visit him online at scottfrankfurtstudio.com.

Modulating the Hardsync slider with velocity yielded a great sounding attack and variation for the sustain. I chose the range carefully so that the top velocity would be just as interesting as the lowest one.

The filter configuration was designed to further accentuate and focus the midrange harmonics. Bandpass and lowpass filters in parallel each provide a defined spectrum that blends nicely for an overall tone (see Figure 3). By setting them up in parallel I can blend in the amount of each filter along with the original tone for total flexibility. Note that I'm using a static set of resonance offsets (I'm not modulating the settings over time using an envelope). I'm going to get harmonic movement elsewhere: this setup is all about tone color.

The modulation wheel has a significant effect on the sound, even though the modulation range appears pretty humble (see Figure 4). That's one of the neat tricks afforded by this parallel filter setup; it is sweeping the filter cutoff for both filters, and the bandpass really 'speaks' nicely against the lowpass filter. Note that I left LFO-based vibrato out in this sound, since the concept was to really grind the midrange goodness from the mod wheel.

Fig. 1. The overview look at the "Grinder Lead" patch in Omnisphere.

Grinder Lead

The concept for this patch was to create a contemporary lead that will cut through aggressive music, while being interesting and inspiring. Starting with a simple sine wave, I experimented with the Hardsync slider (see Figure 2) until I found an interesting set of midrange harmonics. I think of this spot as "headquarters" for this sound. In Omnisphere there's a secondary oscillator hidden in the background so you can instantly get sync sounds without having to arrange the modulation relationship. To achieve this with other synths set up sync, or cross-mod as needed. [*Read the September and October 2012 "Art of Synth Soloing" columns for more info on oscillator sync. –Ed.*]

Fig. 2. Omnisphere has dedicated hard sync as part of the oscillator.

Fig. 3. Two filter types are set up in parallel routing.
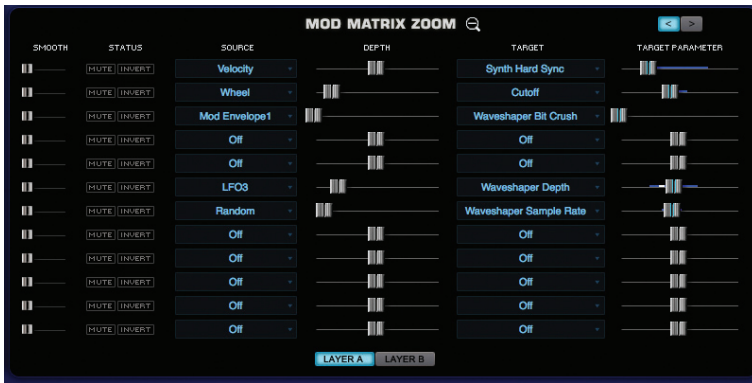

Fig. 4. The modulation matrix. Note that both filter, wave-shaping, and sample rate are being modulated to add movement and character to the sound.
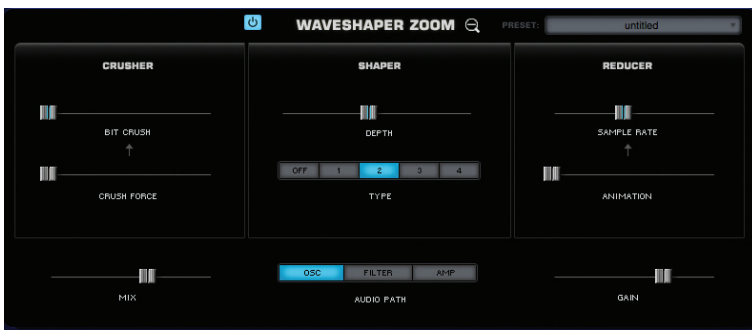

Fig. 5. The Waveshaper page is home to bit reduction (Crusher), wave-shaping (Shaper) and sample rate reduction (Reducer).

Fig. 6. Unison settings. Note the unique ability to offset the unison voices by octaves.

For the sustain portion of this patch, I'm gently shifting the harmonics over time using an LFO to modulate the wave-shaper depth. Adding in some randomization of the Sample Rate gives me a different color for every note played (see Figure 5). [*A wave-shaper is an audio effect that's is a form of distortion synthesis, modifying a waveform to produce additional sideband harmonics. It can be used subtly for tonal coloration, or more deeply to produce often aggressive and harsh tonalities. —Ed.*] If your synth doesn't offer a wave-shaper you can achieve the same varying harmonic function using parameters like saturation, distortion (in the synth engine, not an effect) or any per-voice tonal-coloring parameter your synth may offer.

To increase the overall power of the sound, I've got the Unison parameter beefing up the per-note voice count, set down an octave, with a moderate image spread (see Figure 6). You can modulate the Unison Detune for even more thickness, but I've learned that if you overdo unison tricks, you run the risk of making the sound too diffuse in context, making it less useful. I have to say, by this point I was delighted with the vibe of the patch!

Effects

I love that the "grind" of this patch is made from the synthesis engine itself and doesn't rely on a distortion effect. That's what gives it a unique character. I've employed some echo, but it's super-thin due to significant highpass filtering on the repetitions, a trick borrowed from the mixing world and discussed in last month's column. I want to hear the aural cue of the echo without cluttering the mid band. You can also achieve this thinning of the repeats via a filter or EQ on an effects return.

The Results

All of these "micro level" decisions add up to a sound that I love to play. It works well for aggressive melodic work, mono rhythmic riffs, has a laser-focused tone that won't bore you, and offers unique sonic expression capabilities from your modulation wheel. Look back to last month's column and see how it embodies all the tips I offered on creating a good lead sound. ♩

Audio examples

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