Keyboard Clinic #3

Programming The Oberheim Xpander

By Jim Aikin

WHEN IT WAS INTRODUCED IN late '84, the Oberheim Xpander caused quite a stir. It was one of the first keyboardless synthesizers designed specifically to be used with MIDI. Also, it offered computer control over more parameters than ever before. A lot more parameters. But getting your hands on the music hidden behind the Xpander's front panel isn't easy. For one thing, the factory presets simply don't do the instrument justice. Most of them are garden-variety piano/percussion/strings sounds that could be done just as well on other synthesizers. The real strengths of the Xpander lie elsewhere. For another thing, programming the Xpander means learning to think about sounds in a new way. Even after you've learned to get around on the front panel, certain tricks that will help your patches sound good, or lead you in entirely new directions, may never occur to you.

In researching this article, we polled several experts on Xpander programming. Each offered some tips that should open up new vistas for you. In what follows, we'll be assuming that you already own or have access to an Xpander (or its keyboard-equipped big brother, the Matrix-12), and are familiar with the basic method of programming. If you're still shaky on the fundamentals, take the time to go through your owner's manual—especially the sections on VCF/VCA, the LFOs, and the tracking generators. If you don't have an Xpander handy and would like to know more about how it works, you can look up our Keyboard Report on the unit, which ran in the Sept. '84 issue.

We'll also assume that you're already familiar with such functions as oscillator sync and pulse width modulation, which are found on many synthesizers. What follows is a grab-bag of ideas for patches that could only be executed on the Xpander, or perhaps on a good modular synth. We'll start by looking at single patches, and finish up with some tricks you may not have thought of for setting up multi patches.

Thanks to Ralph Goldheim, Jim Letts, John Melcher, Mike Papa, Marcus Ryle, and Bo Tomlyn for many of the ideas in this article.

Modulation Routings

VIRTUALLY ANYTHING on the Xpander can be modulated, including parameters like filter resonance and LFO speed, which are usually only controllable on patch-cord-based modular systems. Keeping track of what is modulating what can be tricky, however. The Matrix-12 has a special modulation page that lets you display this information in a lump. On the Xpander, you'll have to manually step through all the pages to see what is being routed where.

It's a good idea to clear modulation routings that you don't need. If you neglect to do this, you'll find yourself running up against the 20-routings-per-voice maximum. All modulation amounts range from -63 to +63, but when you are using a triangle-wave LFO as the source, there is no difference between positive and negative, as the LFO wave is AC: it goes both positive and negative during its cycle. The other LFO waves are also AC, by the way. The precise effect you get will depend on what you're modulating. And don't forget—if you're modulating more than one parameter from the same triangle LFO (envelope attack time and oscillator pitch, for example), the choice of positive or negative modulation may make a difference in the composite sound.

If you're trying to modulate a parameter and not getting the results you want, check the amplitude of the source, to make sure you're getting a signal. The LFOs and envelopes on the Xpander have their own output VCAs, and one of these have been set to zero. One exception to this design concept is that oscillator 2's triangle wave is always present at the input of the FM routing, no matter what the audio output level of the oscillator is, and no matter what waveform is selected.

Tracking Generators

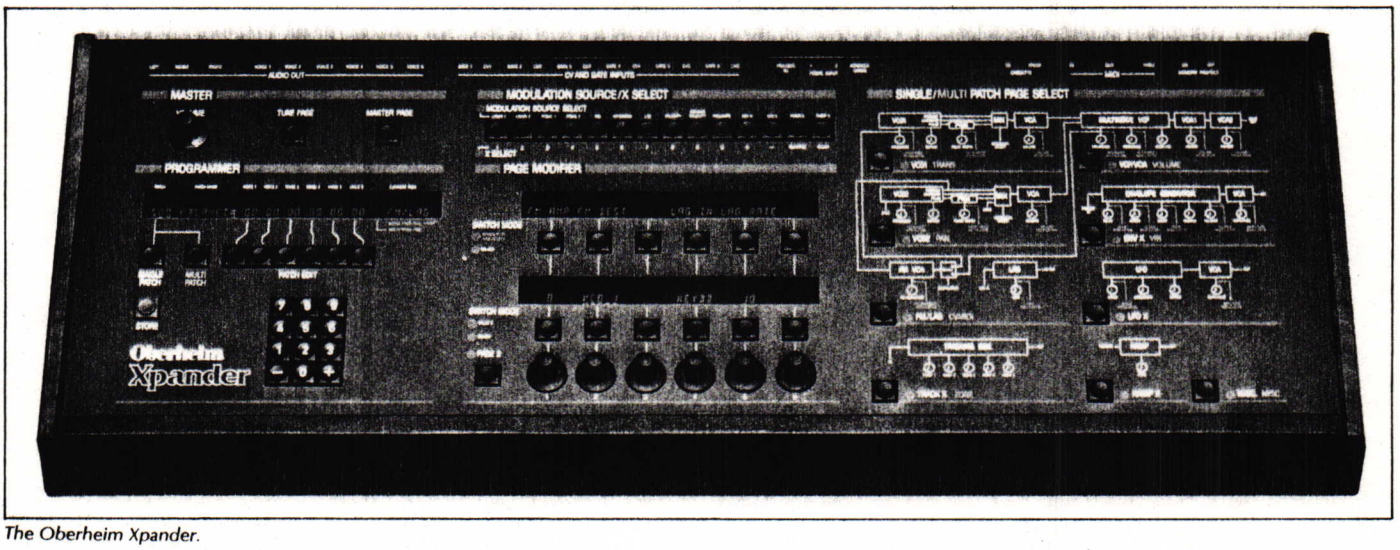
TRACKING GENERATORS are used to re-scale the input from a modulation source before applying it to a parameter. Given a linear input, a tracking generator creates a programmable contour at the output. The best way to get an understanding of how a tracking generator works is to select a simple linear input such as a ramp and use the tracker's output to modulate an oscillator's pitch. The ramp should be set to a higher (slower) value than 15 in order to hear the effect clearly. When the five points on the tracking generator are set to 0, 15, 31, 47, and 63, the generator should put out the same slope that is present at its input. (To reset to these values, press the buttons in the lower row one by one, and press "clear" in the "X Select" row after each one.)

As you move the values of the five points, you will be changing, in effect, the shape of the ramp. A setting of 63, 31, 0, 31, 63 will cause the output to fall and then rise again, all in the space of time it takes the original ramp to rise. A setting of 63, 63, 63, 63, 0 will invert the ramp, causing it to sustain for a while and then fall suddenly. Basically, the five points on the tracking generator determine what level (on a scale of 0 to 63) will be put out at 0%, 25%, 50%, 75%, and 100% of the input value.

Once you understand the tracking generator, you will find dozens of uses for it:

- With an input from the keyboard, it can be used to tailor various ranges of the keyboard in non-linear ways. For example, the brightness might increase steadily until the upper octave is reached, at which time the filter begins to close down again (something like 0, 20, 40, 60, 40). The same thing could be done to adjust envelope attack or decay, LFO amplitude, loudness, or any other parameter across the keyboard. Changing the pulse width in a subtle way from a tracker can be especially helpful for making certain ranges of the keyboard thinner or fuller. A piano patch might be made more realistic by stretch-tuning the outer octaves with a tracking generator. With a patch that calls for detuning between the two oscillators, a tracking generator can be used instead of the detune control to keep the amount of detuning from becoming too wide at the upper end of the keyboard.

By using the keyboard as an input for all three tracking generators, and using these to modulate various parameters, you could make a single patch that would



The Oberheim Xpander.

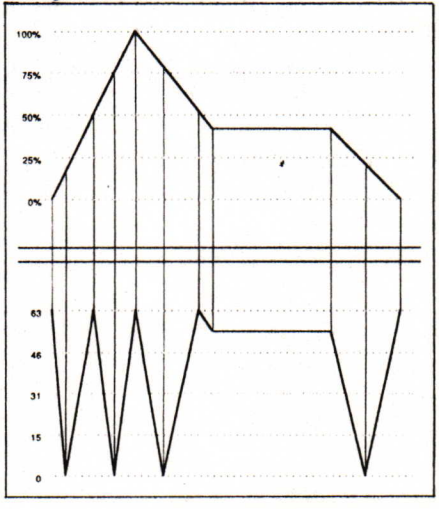
sound very different in different parts of the keyboard, almost as if it were in split mode.

- Tracking can be used to scale a keyboard's velocity sensitivity to your playing style: Instead of using velocity modulation directly, route the velocity into the tracking generator and use its output to modulate typical velocity-controlled parameters like filter cutoff and envelope decay. With a setting of 0, 0, 0, 63, 63, the tracker can become a velocity switch, activating an aspect of the sound, such as a pop on the attack, that only cues in at high velocities. If you need a key pressure switch, route pressure into a tracker and scale it to 0, 0, 0, 63, 63. (Try using the tracker to drive FM amplitude and filter resonance.) If you need an even sharper transition between the two sounds, feed the output of the first tracker into another one with the same setting, and use the second one to modulate the parameters.
- Use the pitch-bend wheel or lever as an input to two tracking generators. Set the first to 0, 0, 0, 31, 63 and the second to 63, 31, 0, 0, 0. With each tracker set to modulate a different parameter (LFO amplitude and filter cutoff, for example), your pitch-bend device has just become a dual controller; it will perform one function when pushed forward and another when pulled back. (Hint: Don't forget to turn off lever 1 on page 2 of the oscillators when doing this patch. Otherwise, the wheel will still be bending pitch as well.)
- Input one of the envelopes to a tracker, and drive the filter or a VCA from the tracker. Depending on the contour you put on the tracker, you can get many different envelope shapes. As the attack portion of the envelope rises, the tracking generator's output might fall, rise, fall, and rise again. The Multatak patch shown on page 56 uses a tracker to create an envelope like the one shown at right.
- Drive a tracking generator from an LFO triangle wave, and use the tracker to generate vibrato with unusual shapes. One idea would be to set four of the tracker's points to 31, with the fifth set to 0 for a brief dip. With the tracker modulating the frequency of the LFO at about -50, the dip can be made even briefer. Or use an LFO sawtooth as the input, with the tracker set to generate a bumpy rise or fall rather than a smooth one.

VCAs

HAVING A SEPARATE VCA at the output of each oscillator lets you do several unusual things. Obviously, each oscillator could be given a separate tremolo from its own LFO. Or oscillator 2 could be set to a certain harmonic, with key velocity or pressure controlling the amplitude of this harmonic in the composite tone. The harmonic need not be an upper partial, by the way; it could just as easily be a sub-octave. By driving the pulse width of this oscillator from the same modulation source, you could make the sub-octave buzz and growl as it fades in.

With an input from an ADSR (top), a tracking generator can create a complex contour at its output (bottom). Settings are 63, 0, 63, 0, 63.



The two VCAs on the VCF/VCA page are hooked up in series, which means that sound will only pass through when they are both open. The advantage of this layout is that you can use one VCA for tremolo or other volume effects, while the remaining VCA is opened up by an envelope generator to gate the notes. Just for fun, though, try skipping the envelope. Open one VCA with an LFO triangle wave set to a speed of about 20, and the other VCA with an LFO (also a triangle) set to 58 or 59, as shown in the Drone patch on page 58.

Envelope Generators

THE ENVELOPES ON THE Xpander are DADSRs. The delay segment at the beginning is useful once in a while for cuing in some effect that you want to start after the note has begun. In addition, the various segments (except the sustain segment, which is a level setting rather than a time setting) can be modulated.

It's often a good idea to control envelope attack and/or decay from key velocity. The most usual patch would be to set attack to 10 or so, with a negative modulation from velocity to speed up the attack at high velocities. Decay could be set to about 30, with modulation of +20 or so and a moderate to low sustain level. Envelope decay and release can also be modulated from the keyboard, causing shorter envelopes in the treble than in the bass. And modulating envelope amplitude from velocity is an alternative to modulating filter cutoff or signal amplitude directly. Another typical application would be to modulate the release segment from a sustain pedal. If you use a voltage pedal rather than an on/off pedal, you'll have continuously variable release times. (If the travel of

MULTATAK

This is a vaguely brass-like patch with a multi-segment attack. Playing an entire tune on this patch might be much, because the attack has a strong character. For a few bars at a cadence or fadeout it could be ok because the resonance modulation accentuates the final rise of the filter.

O1: FREQ 0, DETUNE 0, PW 6, VOL 63, PAGE 2: KEYBD, PULSE, **PW MOD:** LFO1 +40.
O2: FREQ 12, DETUNE -7, PW 7, VOL 63, PAGE 2: KEYBD, PULSE, **PW MOD:** LFO1 +40.
F1: AMP 0, DEST VCF, **AMP MOD:** ENV3 +50.
MIX1: INPUT ENV1, 63, 0, 63, 0, 63.
F1: **VCA:** FREQ 93, RES 30, MODE 4 POLE LOW, VCA1 63, VCA2 0, PAGE 2: LEV1, **FREQ MOD:** MIX1 +48, **RES MOD:** ENV5 -42, **VCA2 MOD:** ENV2 +63.
ENV1: 0, 29, 25, 18, 47, 63, PAGE 2: RESET, FREERUN, MULTI.
ENV2: 0, 0, 26, 59, 40, 63, PAGE 2: RESET, MULTI, **RELEASE MOD:** ENV2 +16.
ENV3: 0, 0, 15, 0, 0, 63, PAGE 2: RESET, MULTI.
ENV5: 0, 0, 0, 63, 40, 63, PAGE 2: RESET, MULTI.
LFO1: SPEED 42, WAVE TRIANGLE, RETRIG OFF.
AMP 63, **SPEED MOD:** KEYBD +13.

the pedal isn't musically comfortable, route it through a tracking generator.)

Modulating release time from a slow ramp (ramp speed of 50-55) will allow you to have short notes cut off immediately, while long notes die away slowly. This is helpful for playing articulated solo lines if you don't have a sustain pedal hooked up. If you're into more exotic forms of keyboard response, you could modulate attack or release from a slow LFO, causing wide variations in envelope shape depending on when the note is struck in relation to the LFO's cycle.

The patch called Sqreleas (shown on page 60) illustrates the use of an envelope as a negative gate. Envelope 5 shuts down the output of LFO 5 until the key is released.

In working with the Xpander envelopes, don't forget the functions accessed by hitting the Page 2 button. "Reset" means that the envelope will start over every time you hit a key. (In single mode, the best way to hear the effect of envelope reset is to go to the master page and hit "zone" followed by "mode." From here you can set voice assignment to "reassign," which will cause the same voice to trigger every time you restrike a key.)

"Freerun" means that the envelope will go through its entire cycle even if you are no longer holding down the key. This is helpful for bell sounds, which call for a specific shape and invite you to strike the keyboard percussively. Freerun envelopes can also be used in live performance for long drone sounds that continue after you have strummed a chord and turned away to another keyboard. With all its envelope segments set to maximum values, the Xpander will take an inordinate amount of time to play a single note. When the segments are modulated by the envelope itself, the attack portion alone can be 10 minutes long!

"DADR" causes the envelope to go straight from its decay segment to its release segment, with a sustain time of zero. This is useful for piano and plucked-instrument sounds, which often drop sharply in volume after an initial peak, but then die away more slowly. Setting the DADR to a fairly fast decay rate with a long release will create the appropriate contour. Since you have five envelopes to play with, you may want to use one or two specifically for attack transients, outside of the normal VCF/VCA modulation setup. In this case a DADR envelope is more flexible.

If you've played with a Casio CZ synthesizer, you'll be aware of the idea of using a fast envelope on the pitch of the oscillator to create a percussive transient on the attack. This works well on the Xpander too, since there are plenty of envelopes available. Other parameters you may not have thought of enveloping include LFO rate and filter resonance. Enveloping the LFO rate will give you a number of possibilities, such as a vibrato that speeds up during the intense part of each note and then slows down during the release. Modulating resonance from an envelope can be very helpful for lowering the resonance while the filter is sweeping (to prevent that clichéd filter-sweep effect) and then raising the resonance when the filter envelope reaches its sustain level, to add a specific overtone color to the sound.

The Xpander's envelopes can be triggered not only from the keyboard but from its LFOs or from the external trigger input on the back panel. This triggering can be either gated (occurring only when a key is down) or continuous. When LFO triggering is gated, various tremolo effects can be achieved. When LFO triggers are ungated, the envelope will continue to fire until you select another patch. If you play the right pattern of notes on the keyboard, you can achieve a number of automatic accompaniment effects with this feature. You'll find that an automatic triggering patch is less monotonous when the LFO's speed is modulated from some other source, such as the keyboard or another LFO.

A standard automatic triggering patch would use the same LFO to trigger both the filter and VCA envelopes. More complex phase relationships can be created, however. Try using all five envelopes to drive various aspects of the sound, and trigger each from its own LFO. If you're into exotic drones, this one technique will keep you happy for weeks.

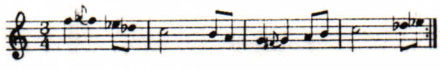
External triggering of envelopes can be used for synchro-sonic effects. For example, try dedicating an extra, unused envelope to opening up the filter cutoff frequency just slightly, and trigger this envelope externally. Now your patch will pulse in time to the drum machine or whatever is sending the trigger signal.

Quantized Modulation

YOU MAY WANT TO experiment with quantized modulation. This feature is accessed by tapping "quantize" on the "X Select" row. When oscillator pitch is the parameter being modulated, quantizing the modulation will cause the pitch to move in half-steps. This would most often be used for setting trills to equal-tempered intervals, but many other uses can be found with a little digging.

If the incoming signal (from an LFO, for example) is moving fast enough over a wide enough range, you'll still tend to hear a pitch sweep rather than steps, so you may have to play with the ranges and rates a bit. If you want larger steps, select the same modulation source several times, and quantize it each time.

Usually you would only select the same source several times to increase the modulation *range*, but when using quantized modulation you may want to reduce the range values while keeping several identical routings. For example, with a one-oscillator sustained sound, try this: Set LFO 1 to a speed of 14, and modulate the oscillator frequency (using quantized modulation) from LFO 1 four times, with depths of +56, +53, +52, and +50. You should hear a scale something like this:



Try changing the mod amounts and listen to what happens to the scale. Strike and hold different keys at different times to create canons.

If you'd like to practice the evenness of your keyboard technique, or maybe discover some new chord voicings, you can do something even more exotic with this type of quantization: Use key velocity to modulate oscillator pitch, and quantize the modulation. Now a single key will sound various different notes, depending on how hard you play.

Quantizing the modulation applied to other parameters will have other effects. Quantizing LFO speed, for example, will cause the LFO to run at one of a few specific rates. Generally, quantization is less obvious when applied to parameters other than pitch.

LFOs

THE LOW-FREQUENCY oscillators on the Xpander offer several options not found on conventional LFOs. These include frequency modulation, retriggering to sync with keystrokes, and sampling from other sources besides noise. But before we talk about these options, we might ask why anybody would ever need or want five LFOs per voice. Most synthesizers, after all, get by with one.

When it comes to fattening up a string

DRONE

This mellow drone patch will play happily by itself for hours. We like major and minor 9th chords, but oriented chords work well too. For a more continuous sound, try raising the levels of the output VCAs. Or, if you're running the sound through a delay line set to a long echo, lowering the VCAs might keep more articulation in the pattern. Modulating LFO1 speed from the keyboard means that low notes will be longer than high notes, and the modulation from LFO5 insures a continuously changing pattern.

LFO1: FREQ 12, DETUNE 0, VOL 63, PAGE 2: KEYBD, TRI.
LFO2: FREQ 0, DETUNE 0, VOL 63, PAGE 2: KEYBD, TRI, SAW.
LFO/VCA: FREQ 20, RES 30, MODE 2 POLE LOW, VCA1 25, VCA2 20, PAGE 2: KEYBD, FREQ MOD: LFO3 +45, VCA1 MOD: LFO2 +63, VCA2 MOD: LFO1 +63, KEYBD +30.
LFO1: SPEED 6, WAVE TRIANGLE, RETRIG 38, AMP 63, PAGE 2: RETRIG SINGLE, SPEED MOD: KEYBD +20, LFO5 +15.
LFO2: SPEED 56, WAVE TRIANGLE, RETRIG 0, AMP 63, PAGE 2: RETRIG SINGLE.
LFO3: SPEED 39, WAVE TRIANGLE, RETRIG OFF, AMP 63, SPEED MOD: LFO1 -43.
LFO5: SPEED 12, WAVE TRIANGLE, RETRIG OFF, AMP 63.

patch, the more LFOs the better. Select the triangle wave on all five LFOs, and set them to different slow speeds (24, 28, 32, 36, and 40, for example). Use the first two for a very slight pitch shift of the two oscillators, two more for pulse width modulation of the same two oscillators, and the last for a slight contouring of the filter cutoff frequency. In combination with other string elements (oscillator detuning, smooth envelopes, not too much envelope modulation of the filter), the LFOs will give you a composite waveform that rolls smoothly. Add a little reverb and you're in business.

We've already mentioned that modulating LFO speed from an envelope is a great way to add shape to vibrato. Using modulation from the keyboard (or a tracking generator whose input is the keyboard) allows you to affect vibrato speed as a function of keyboard range. You might use this to slow down the vibrato a bit on low notes. Modulating vibrato speed and/or depth slightly from velocity can be a good idea; playing harder will produce faster vibrato, or more of it. Key pressure and the modulation wheel are also obvious sources of modulation for these parameters.

Going to an extreme, you might use an envelope to leave an LFO turned off until the key is released (envelope attack 0, sustain 63, release 0, LFO amplitude 63, LFO amplitude modulated by the same envelope three times: -63, -63, -63). This could be used to introduce a trill on the release segment, for example, as in the Sqreleas patch (page 60).

The noise waveform of the LFO doesn't actually produce audio-frequency noise, but rather a rapidly shifting low-frequency noise that will cause the pitch of an oscillator (if that's what you're modulating) to dither. For a really gritty electronic tone, select a pulse wave and modulate pulse width from this noise.

From page 2 of the LFO, you can switch its internal lag processor on and off. This will change the character of the noise in a subtle way. The lag processor is also useful for smoothing out the sharp edges of sawtooth and square waves. This will reduce the abrupt popping when these waves are used to modulate things like pulse width and filter cutoff.

The sampling "waveform" can be used for creating staircase shapes. Try modulating oscillator pitch with LFO 1, set LFO 1 to sample, and select LFO 2 as the sample source. Go to LFO 2 and make sure its frequency is different from that of LFO 1. (If both frequencies are the same, you'll be sampling the same point in the waveform every time.) Now try various waveshapes on LFO 2 to see what happens.

This is one of many patches where you may find it helpful to turn on the retrigger option on page 2 of the LFO. Once this is done, the "retrig" parameter on page 1 sets the point in the waveform to which the LFO will reset each time the voice sees a new keystroke. To see how this works, select a sawtooth wave and turn the retrig knob while playing new notes. For sound effect patches where several LFOs are modulating different things, setting the retrigs properly can be crucial for getting the right rhythm or shape at the keystroke. A version of this idea is illustrated in the Wasp patch on page 60. Try shifting the retrigger values of LFOs 1 and 2, and see what happens to the rhythm.

The Xpander's external trigger input can be used to sync the LFOs to a drum machine. (The owner's manual explains how to toggle between voltage triggers and switch triggers.) Whenever the LFO gets a trigger from the rear-panel jack, it will reset to the programmed point in its cycle. Set the LFO speed to a slightly longer (slower) cycle than the beat you will be syncing to. If its cycle is too short, it will start a new cycle early and then have to hiccough when it sees the trigger.

FM & Lag

LIKE A NUMBER OF other analog synthesizers, the Xpander allows you to modulate either the frequency of oscillator 1 or the filter cutoff frequency from osc 2's triangle wave. This modulation is not affected by the waveform setting(s) chosen for osc 2's audio output; for some FM patches, turning osc 2 off entirely can be the best approach. Other things to try include tuning osc 2 to various intervals relative to osc 1, switching osc 2 sync on and off, and assigning an LFO to sweep osc 2 pitch for a chorusing effect. For attack transients, try sweeping the pitch of osc 2 rapidly from a ramp or envelope while FMing osc 1 with it.

Because the Xpander has analog oscillators, its FM doesn't always have the pitch stability of digital FM. You may find that an FM patch that produces a smooth, clear tone in the center of the keyboard starts beating when played at the upper or lower end. If this persists after you tune the instrument, try adjusting the detune control for osc 2, or decide what range of the keyboard you will be playing the patch in and fine-tune that range for optimum results. When trying out FM sounds, remember that osc 1 (the carrier) can be set to different waveforms.

The amount of FM can be controlled from various sources. Obviously, an envelope or even a ramp can be used to add some FM 'bite' to an attack. If you need this only in a certain register, or need more in one register than another, control the amplitude (or attack and decay rate) of the envelope from a tracking generator. For realistic solo string patches, FM on the attack will simulate the sound of a bow setting the string in motion. Here the amplitude of the FM envelope would typically be controlled by key velocity.

The most obvious use of the lag processor is for portamento (glide) between notes. This application is discussed in the owner's manual. Here are a couple of other possibilities:

One of the factory patches uses a footswitch as the input to the lag processor, and uses the lag output to modulate LFO speed and amplitude. Pressing the pedal then becomes equivalent to turning on a rotating speaker: the speaker takes a while to crank itself up to speed. By using the same pedal to modulate lag rate, you can make the speaker slow down more slowly than it speeds up, just the way a physical rotating speaker does.

Another option would be to input a square-wave LFO to the lag processor and control the lag rate from a second, slower, LFO. When the lag output is applied to oscillator pitch, you'll get a trill that smooths out into vibrato, then squares up into a trill again. Or control lag rate with a ramp, so that the trill blossoms smoothly from zero to its full value.

Multi-Mode Filter

DYNAMICALLY CONTROLLED multimode filters like those on the Xpander are found on very few non-modular synthesizers. Because the 4-pole lowpass setting sounds so familiar, you will doubtless prefer it for many sounds. Learning to use the other options will require some experimentation. When you switch to a different filter mode, try tweaking the cutoff frequency and resonance controls as well; they will have a major impact on the sound.

For example, the 2-pole lowpass filter has a shallower cutoff slope than the 4-pole. Thus it allows more high harmonics to pass when the cutoff frequency is set to the same level. It can sound either brighter or softer, depending on the waveform and other parameters. If you want a brighter

SQRELEAS

As long as you hold notes down with this patch, y'll sound like a normal synthesizer patch. When ı et go, however, an octave trill kicks in. The trill ws down as the note dies away. Since the square-ve LFO is retriggered by keystrokes, playing notes ether will insure that the trills are in sync. Arpeggios the upper register work well too. Also note the ıck transient created by envelope 4, which is both ating FM and sweeping oscillator 1's frequency.

O1: FREQ 0, DETUNE 0, VOL 63. **PAGE 2:** KEYBD, LEV1, TRI, SAW. **FREQ MOD:** LFO5 +63, LFO5 +58, ENV4 +60.
O2: FREQ 0, DETUNE +12, VOL 63. **PAGE 2:** KEYBD, LEV1, TRI, SAW. **FREQ MOD:** LFO5 +62, LFO5 +60.
ı: AMP 0, DEST VCO1, **AMP MOD:** ENV4 +63.
F/VCA: FREQ 34, RES 17, MODE 4 POLE LOW, VCA1 63, VCA2 0. **PAGE 2:** KEYBD, LEV1. **FREQ MOD:** ENV1 +60. **RES MOD:** LFO5 +51. **VCA1 MOD:** KEYBD -40. **VCA2 MOD:** ENV2 +63.
V1: 0, 0, 30, 26, 48, 63. **PAGE 2:** MULTI.
V2: 0, 22, 26, 63, 46, 63. **PAGE 2:** MULTI. **ATTACK MOD:** KEYBD -63. **RELEASE MOD:** KEYBD -14.
V3: 0, 0, 0, 63, 53, 63. **PAGE 2:** RESET, FREERUN, MULTI.
V4: 0, 4, 13, 0, 0, 63. **PAGE 2:** RESET, FREERUN, MULTI. **DECAY MOD:** KEYBD -58.
V5: 0, 0, 0, 63, 0, 63. **PAGE 2:** SINGLE.
O5: SPEED 40, WAVE SQUARE, RETRIG 0, AMP 63. **PAGE 2:** RETRIG SINGLE. **SPEED MOD:** ENV3 +21. **AMP MOD:** ENV5 -63, ENV5 -10.

sound but find that raising the cutoff frequency doesn't get you what you're looking for, try switching to a filter with fewer poles. You'll find 2-pole and 3-pole lowpass filtering good for string orchestra sounds. A highpass filter can be used for vaguely harpsichord-like patches and other brittle sounds. When using a highpass filter you'll sometimes want to invert the filter envelope, so that the filter will let more of the low harmonics through on the attack and die away to a high-frequency release.

A notch filter lets the frequencies on both sides of its center frequency pass through. Because of this, it generally produces a bright, buzzy sound. The upper harmonics can easily be pulled back with an equalizer. The combination filters (high plus low, notch plus low, and phase plus low) have less pronounced high-frequency content. Try sweeping the center frequency of a notch filter with an LFO rather than with an envelope. A slow LFO will give a rolling character to the harmonic spectrum, while a faster LFO gives an effect vaguely like a rotating speaker.

Multi Patches

THE XPANDER'S MULTI PATCH system allows a great many performance setups to be accessed quickly and easily. Many of these will be standard split and layer combinations, in which three voices are assigned to each of two zones and the zones either adjoin side to side (a split) or overlap (a layer). When the Xpander is used as part of a multi-keyboard setup, however, some of the multi patches can be assigned to do more unusual things.

- By making one of the zones one key wide and assigning a single voice to this zone, you can create a situation where a certain patch will come in only on a particular note, such as a pedal tone in the left hand or the high note that climaxes a solo.
- When doing conventional two-voice layering, try using a lowpass filter for one of the voices and a highpass or bandpass for the other. The lowpass voice will have the body needed by the attack portion of the sound, so reduce its VCA volume with an envelope after the attack in order to let the higher overtones of the other voice be heard clearly.
- You can assign six different patches to a single zone in unison mode, creating a monstrous multi-layered sound. By using the transpose page of the multi patch, you can bring all six sounds into the right range, or stack them into a chord. The volume page is indispensable for balancing the elements of the composite sound.
- Even more interesting is to assign several different patches to a single zone in reset mode. Make voice 1 a bass sound, voices 2, 3, and 4 a chord-type sound, and voices 5 and 6 a bright lead sound. Because reset mode always uses the lowest available voice when a new key is played, you can hit and hold a bass note and play three-note chords above (or below) it. When you're holding both a bass note and a full chord, the two lead voices will become available. These can just as easily play notes below the bass or in between the notes of the chord. In effect, this setup gives your keyboard a floating split point. You just have to be careful to hold all the notes of your chords.

In assigning transpositions for this multi, try transposing the chord voices up an octave or two relative to the bass voice. This way, you can play both bass and chords with one hand, and they will sound well separated.

- Another idea is to assign six different patches to a single zone using rotate mode, and play arpeggio patterns of five or seven notes. Each new note you play will have its own timbre, and each repetition of a given note will have a new timbre as the voice assignments shift across the arpeggio. Phase relationships of great beauty and complexity can be achieved with this setup. Again, the transpose and volume pages are essential for getting a balanced effect.
- By giving different voice assignment modes to various overlapping zones, you can get complex doublings of musical lines. You'll have to do some practicing to learn how to take advantage of some of the combinations. For example, let's say you've assigned voice 1 to zone 1 on the left half of the keyboard, to double the bass notes of your chords, while the rest of the voices are assigned to zone 2 across the whole keyboard. Your first impulse might be to put zone 1 in unison low mode, so it will double the bottom notes. You'll find, however, that in uni-low mode, whenever you lift the lowest note this voice will jump up to the next lowest note that is still being played. By choosing reset mode, you can get the voice to stay on whatever pitch it was playing until it sees a new key-down event. On the other hand, reset mode will prevent the voice from moving to a new note until you've lifted the key it is currently sounding, which may not always be what you want. You'll have to choose an assignment mode based on what kind of musical part you're playing.
- The Xpander doesn't directly allow dynamically controlled panning of voices but there is a way around this. Create two single patches that are identical except that one of them is raised in volume by some controller, such as key pressure or an LFO, while the other is reduced in volume by the same controller. Make the modulation extreme enough that one of the voices is silent when the controller is full on, while the other is silent when it is full off.

Now set up your multi like this: Give three voices the first patch, and assign them to zone 1. Give the other three voices the second patch, and assign these to zone 2. Using the pan page, pan the voices in zone 1 hard left and the voices in zone 2 hard right. Overlap your zones as for a normal layered patch. Now your pressure, LFO, or whatever, will raise the volume of the voices in the left channel while it is simultaneously lowering the volume of the voices in the right channel. (If you use an LFO for this, it must be retriggered by the keystroke in order for the LFOs in the two voices to be synced.)

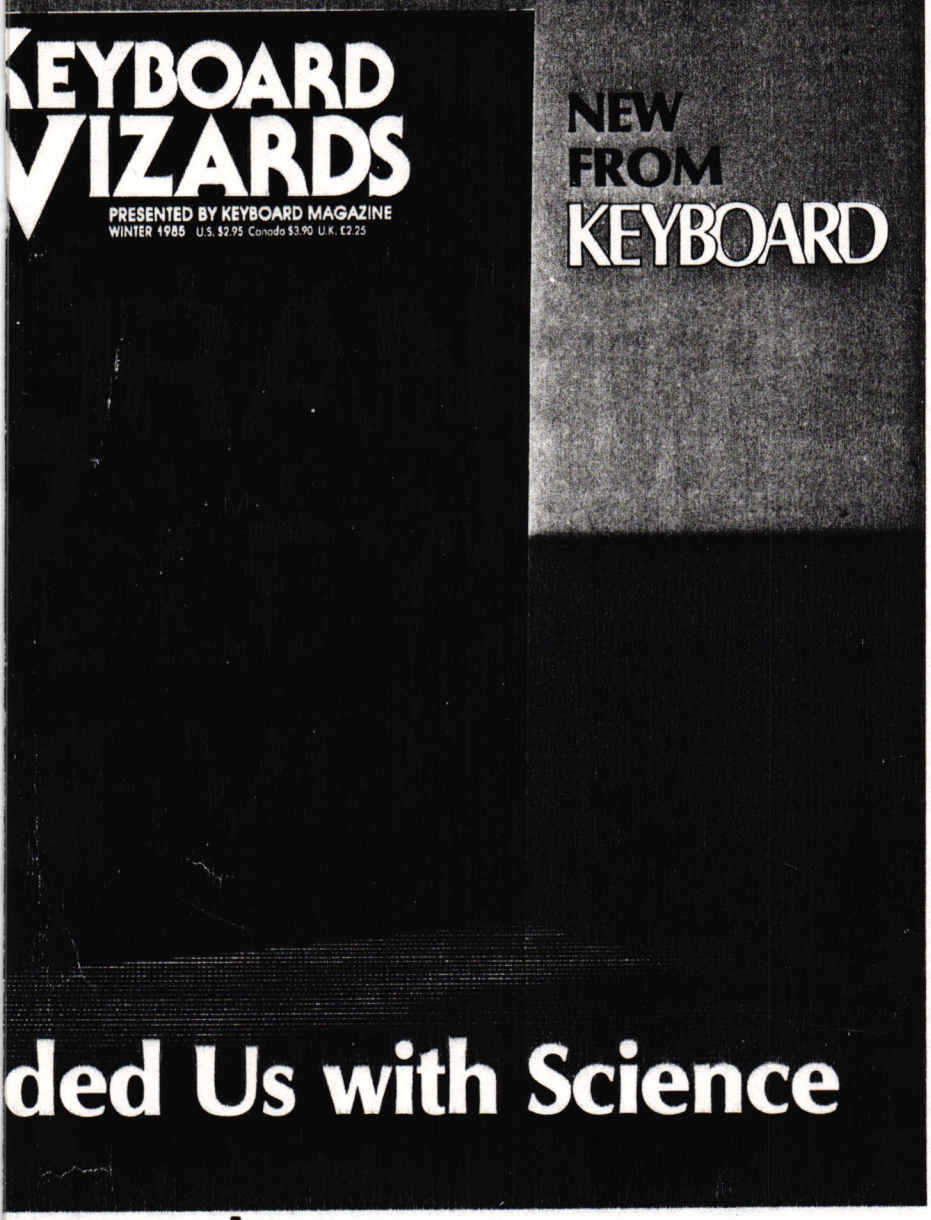
- When programming the single patches for a multi patch, you can toggle the response to pitch-bend and to the global

Continued on page 147

WASP

This aggressive patch illustrates the use of retriggering LFOs to create a rhythm. It seems to work best with octaves in both hands. Because envelope 2 release is modulating itself, the sound stops suddenly a little more than four patterns after you let go of the keys. A more gradual fadeout might be musically useful. Try changing the retrigger point of LFO1 and see how the rhythm is affected.

VCO1: FREQ 0, DETUNE 0, VOL 63. **PAGE 2:** KEYBD, LEV1, TRI, SAW.
VCO2: FREQ 8, DETUNE 0, VOL 63. **PAGE 2:** KEYBD, LEV1, SYNC, TRI. **FREQ MOD:** LFO1 +63, LFO1 +63.
FM: AMP 63, DEST VCO1.
VCF/VCA: FREQ 87, RES 39, MODE 2 POLE LOW, VCA1 63, VCA2 0. **PAGE 2:** LEV1. **FREQ MOD:** ENV1 +52, LFO2 -35, KEYBD +44. **RES MOD:** LFO2 +41, ENV1 -10. **VCA1 MOD:** KEYBD -36. **VCA2 MOD:** ENV2 +63.
ENV1: 0, 0, 50, 41, 17, 63. **PAGE 2:** SINGLE.
ENV2: 0, 0, 0, 63, 7, 63. **RELEASE MOD:** ENV2 +58, ENV2 +33. **PAGE 2:** SINGLE.
LFO1: SPEED 28, WAVE TRIANGLE, RETRIG 48, AMP 63. **PAGE 2:** RETRIG SINGLE.
LFO2: SPEED 40, WAVE TRIANGLE, RETRIG 0, AMP 63. **PAGE 2:** RETRIG SINGLE.



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KW05

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XPANDER
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vibrato LFO on or off in each individual patch. This lets you program vibrato into a multi while confining its effect to selected voices, or pitch-bend some of the voices but not others.

- Since each voice in a multi can be assigned to its own MIDI channel, the Xpander can double lines from several different keyboards at a time. And if voice 6 is playing a bass line, for example, it can easily be sent to its own direct audio output rather than to the stereo mix, allowing it to be processed or EQed differently.
- Try making a multi out of six virtually identical patches—but increase the envelope delay slightly in each patch. Then spread the six across the stereo field, and play in unison mode. This will cause the Xpander to sound as if it is running through a stereo delay line. (Use the multi patch volume page to give the echoes a descending volume pattern.)

Editing Multi Patches

WHEN SETTING UP and editing multis, remember that more than one of the singles can be active at a time. Just hit three of the buttons, or all six, and the patch numbers will be underlined. This allows you not only to change several patch numbers from the keypad simultaneously, but also to edit any parameter—even if the patches you have selected for simultaneous edit are different, and have different settings for a particular parameter. Turn one knob, and all the patches will change.

Another point that may cause you some confusion at first is this: You've been working on a multi that uses, say, patch 22. You switch to single mode, call up patch 22, edit it, and store the edit. When you switch back to multi mode, the multi will still have the old version of patch 22 in its buffer. In order to get the new version loaded, you must switch to some other multi and back again.

You can start building a multi with the same patch in all six voices and edit them separately. When you're satisfied, store them in six numbered locations that you don't mind overwriting.

Conclusions

AS WITH ANY SYNTHESIZER, there are things the Xpander won't do. It does some things, such as multiple LFO sounds, extremely well, and other things, such as punchy percussive attacks, not quite so well. No matter what you're using it for, though, it will do dozens or hundreds of things you probably haven't thought of yet. If you've got an Xpander in your setup, don't let it gather dust while you stampede off into sampling and digital synthesis. Once you learn to program it, it will add a unique dimension to your music. ■