

Synth Programming (pt IV)



part IV of our in-depth guide to synth programming

THE PREVIOUS three episodes of this synth programming series have introduced you to the basics and by now you should know what each part of a synth does to the sound and how the parts can be connected together. This month we'll be looking at some interesting combinations and patches and how to integrate your synth with other pieces of kit.

Let's start with those patches. Once you get out of the bargain basement, most synths have a modulation matrix which lets you connect bits to other bits. A lot of the time the mod matrix feature doesn't get used for much because it's quite hard to figure out how you're supposed to drive it. This is really a shame because you can really go overboard with this part of a synth and use it to make completely mad or, at the very least, some deeply interesting noises.

The job of the matrix is to let you connect the ins and the outs together. Once this has been done you can start to bring out the more interesting programming possibilities which your synth is capable of.

Examples? Well, how about the modulation section on the Pro-Five soft synth. All you've got here are two knobs and three switches. It may not look like much, but you can do a surprising amount here. The switches control what's affected by this section. Press the Freq A button and the frequency of the first oscillator will be modulated. PW A changes the pulsewidth (wave shape) of the oscillator. Filt changes the filter cutoff. And for the inputs, Filt Env is the filter envelope. Osc B is the second oscillator.

If you turn the switches off and set the knobs to zero, nothing happens. Now, if you press Freq A and turn up Filt env, the filter envelope will start controlling the pitch of oscillator A. Depending on the envelope settings, you'll get pitch swoops up and down or short Kraftwerk-style blips.

Press Freq A again to turn it off and then select PWA. Now, if you select the square wave output from oscillator A you will hear the waveshape changing as you hold down the note. This is great for spiky, retro simulations of an instrument called a Clavinet. If you turn off PWA and turn on Filt, you will be routing the filter envelope to the filter. There isn't much point in doing this because there's already a knob which does this.

If you turn the Filt Env knob to zero and turn up Osc B all will be revealed. Now the filter cutoff is being modulated by the oscillator. Depending on how it's set up, this will either give you a tearing, squelchy, buzzy effect or LFO-like filter sweeps. Not weird enough? Then press Freq A as well and you should get the FM effect we talked about in part III.

Modulation, ins and outs

Pro-Five's mod matrix is incredibly simple. More often than not you may find you've got a handful of possible ins and outs. Instead of being available on panel controls, you have to delve into the programming section to find them and then set them up, using some cryptic abbreviations on an LCD display.

Take the JV-1080, for instance. Here, there are actually two mod matrix pages. One is used solely to connect the two LFOs to different parts of a patch. The other is for more general purposes and includes LFOs and MIDI signals. The envelopes are hardwired to their destination and don't go through either matrix.

The JV-1080 uses a kind of dual-synth system, where you get two independent-ish synths under each note. If you look at the JV's LFO pages, under each column the number before the colon shows how much LFO signal gets sent to synth 1 and the number after it, how much is sent to synth 2. (If synth 2 isn't being used, you can ignore these latter numbers because they won't do anything.)

Some of the numbers may be negative - what's happening here is the LFO shape is getting turned upside-down as it goes through the matrix.

This is more useful than it sounds because it means you can have a positive signal sent to one synth and a

negative signal sent at the same time to another, which is a great way to make sounds more interesting.

Before we leave this subject to go on to other synth matrixes it is worth remembering that all the matrix does is connects things to other things. To control the speed and 'shape' of the effect you will need to know how to program the LFO settings.

Deeper and deeper

You'll find the same idea on a lot of other synths. Sometimes the ins and the outs are preset and you can't change them. Other times, you can select them however you want. The Waldorf Microwave, for example, has a completely open 16-way matrix spread across 16 editing pages.

To set this up, you select a source from the scrollable list, select an amount and select a destination. The big red wheel then lets you select another mod matrix page to set up one of the other 15 available connections. (The number you're working with appears in the top right.) With the settings above LFO1 wobbles the pitch, while with the settings below the oscillator pitch changes as the tempo gets faster, assuming you have some kind of sequencer or drum machine attached. Bizarre? Of course.

But all this fiddling doesn't end there, oh no. Those suffering from terminal nerdiness can get stuck into the Modifier subsection. Essentially, this is a kind of processing matrix which lets you combine modulation sources in a myriad of ways. There are two sources, which you can select from the usual list of suspects, such as envelopes and LFOs. The destination is fixed and the four outputs are labelled M1 to M4. You can select these as sources in the main matrix.

It's the bit in the middle which is interesting. Here you can combine the two sources by adding, subtracting, multiplying or dividing them. Or doing weirdo stuff like smoothing out any sudden jumps, doing Boolean operations like AND, NOT and NOR, choosing the maximum or minimum value, and so on. By mod matrix standards this is really extreme; it's hard to think of a sensible use for most of these options unless you're really into playing with them for their own sake.

MIDI me

To make life more interesting, most mod matrixes usually include more than just the LFOs and envelopes. Typically, you'll also get note number, velocity, modulation, aftertouch and all MIDI messages which are sent to the synth from outside.

It's kind of traditional in features like these to pretend MIDI doesn't exist. But this is a deeply strange attitude because once you add MIDI you can take your synth programming into whole new, previously unthought-of areas.

Here's the bottom line. In all but the very cheapest synths, you'll find a range of MIDI messages which are either hardwired or which you can also route through the mod matrix. For those who have just joined us, MIDI is the remote control system used on synths to control them remotely. If you use it to hook one synth to another, you can play the second synth remotely. Hit notes, change the sounds, make the pitch whoop up and down... all of that kind of thing. If you are using exactly the same synths you can even dump the sounds en masse from one to another. (But that's for another article).

MIDI is interesting, because you can do two things with it. First you can use the keyboard, buttons, wheels and sliders on a synth to shape a sound as you're playing. Second, you can use a computer (with some help from some sequencing software) to do the same.

Let's begin by looking at the first possibility. On most synths there's a wheel next to the keyboard called the modulation wheel. It's the one which doesn't spring back to the middle when you let it go. In most patches, the mod wheel is used to add vibrato (a kind of gentle pitch wobble which adds interest to the sound and makes it musical). Vibrato is actually a hangover from classical music days, where if you wobble your finger on (say) a violin's fingerboard you get a poignant quivery effect.

However, you don't necessarily need to use the wheel for vibrato. Using the modulation matrix, you can set it up to do whatever you like. In fact, on most synths you can create some incredibly complex effects with it. You can set things up so when you move the wheel lots of things change at once, for example, things like waveshape, filter cutoff, volume, LFO and rate. If a synth has effects, as often as not, you can control the effects in some way too.

Set up a patch where the LFO is wobbling the pitch in an extreme kind of way like one of those spacy sci-fi sound effects. Route the mod wheel to LFO rate. Now you can control the speed of the LFO from the keyboard.

If your synth has two filters, set up the mod wheel so when one sweeps upwards the other will sweep downward. Control chorus rate and depth from the mod wheel. With an organ sound and the right kind of chorus, this gives that instant cheesy retro Hammond organ effect.

Bend me, shape me

You can do similar things with the other wheel. This is called pitchbend and it - surprisingly - bends the pitch, it sounds like when you bend a string on a guitar. For starters, you can control the range of the bend from a few notes (which is standard) to extreme sweeps. But more than this, you can also route it to other parts of the synth. So, as the pitch changes, the quality of the sound will change too.

But you're not limited there. Aftertouch - the pressure you put on the keyboard - can also be used in a similar kind of way. The first ever preset in the Virus V3.0 which was called overture uses this to sweep the pitch of the second oscillator. It's an interesting effect but not particularly useful in practice.

For a lot of music, it's more creative to modify the sound so aftertouch can fade in the sub oscillator in order to give some extra bass welly. It's a much less gimmicky and more subtle effect which also carries more emotional impact than the original. You almost don't hear it; you simply hear the sound swell get bigger as you press down.

There are 128 different kinds of MIDI messages which you can use to create these kinds of effects. Typically only aftertouch, modulation and pitchbend will be playable direct from the keyboard. The others are hidden and you'll need a computer or possibly (if you have patience) a hardware sequencer to feed information through them to your synth.

When you do, it's like having a whole new synth to play with. Remember, normally it's just LFOs and envelopes which control the way a sound evolves over time. Once you add MIDI sequencing you've suddenly got, nearly, infinite control over what you can do.

MIDI confusion

This is where it can get confusing; in many synths, instead of connecting MIDI messages directly to the business end of things, they tend to get mapped through an extra stage of complication. Typically, you'll have something like two or more controller inputs. One, on the input side, which you set up so it will listen to whatever kinds of MIDI information you want. And on the output side, they're connected to whatever you want to change. The confusing bit is instead of being labelled aftertouch in or modulation in, as you'd expect, they're called controller 1 and controller 2.

Quite often when you return to a patch after you've programmed it, you can't remember how the hell you've set it up. If you want to get really anal you could keep a notebook or make electronic notes as you go. If not, well, it's not particularly hard to check.

I'm not going to give any examples here because this is stuff you need to play with to appreciate. So, it's time to say goodbye till next time, when we'll be back with the last part of the series, which explains how to include effects in your synth patches and how to take programming a few steps further than most people do. See you then.

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