SETUP

The following exercises are designed to cement the concepts outlined in this lesson through exploration and listening. While of course we use Moog synthesizers such as the Messenger or Minimoog Model D in the lesson, these exercises are universal, and you can use any synthesizer you choose for them. For these exercises, all you need is a synthesizer with:

- A low frequency oscillator (LFO)

Grab your synthesizer, plug it into a power source, and connect it to some kind of monitoring source. You can use headphones if need be, but acoustic projection from a speaker into the air in a room and finally to your ears is preferable. The most important thing is to make sure you are in a comfortable environment. Take some deep breaths and slow down the world outside. Take all the time you like for these exercises. If a bolt of inspiration strikes in the process, follow it wherever it leads.

5.1 Simple Vibrato

Create a simple vibrato – use the LFO of your synthesizer set to a sine or triangle wave to modulate the pitch of the oscillators. Pitch modulation can be handled many different ways on a synthesizer – you may need to use a switch or button to assign the LFO to the pitch, and depth may be controlled via a knob, slider, or modulation wheel. Explore how your synthesizer handles modulation routing.

5.2 Vibrato Perception

How is the depth of vibrato controlled on your synthesizer? Is it through the modulation wheel, or through a different knob or slider? Starting with no modulation, increase the modulation just a tiny bit until you can just barely perceive a vibrato.

5.3 Wild Pitch

Now push the modulation depth as high as it can go. Can you tell how many octaves the pitch is now swinging through? Change the LFO waveform to a square to hear discrete jumps between the maximum and minimum values. Turn up the LFO rate until the vibrato becomes a blur.... more on this in Lesson 6.

5.4 Simple Tremolo

Create a simple tremolo – use the LFO of your synthesizer set to a sine or triangle wave to modulate the amplitude of the synthesizer. While setting up a vibrato is relatively straightforward on most synthesizers, tremolo can sometimes be less immediately apparent (or even impossible!). Use this exercise to get to know the modulation routing possibilities in your synthesizer and learn its limitations.

5.5 Offsets and Modulation

Let's develop some intuition for just what exactly modulation is doing. Play a sound and set the filter cutoff to 50%. Set your LFO to modulate the filter cutoff and begin to increase the modulation amount. Notice that as you move the filter cutoff knob you are setting an offset and that by turning the modulation amount up the LFO is essentially moving the filter cutoff knob up and down for you.

5.6 Adding Modulations

Does your synthesizer have multiple LFOs? Or maybe some way to mix different modulation sources together? Try routing two different LFOs at two different rates to the same destination (filter cutoff, for example) and observe the complex modulation that arises.

5.7 Observing Chance

Does your synthesizer have some sort of random source? Sometimes an LFO has a "random" or "S+H" setting which generates a new random value with each LFO cycle. Or maybe, like on the Moog Messenger, there is a KB S+H which generates a random voltage with every key press. Try using this randomness to modulate the pitch of your synthesizer to get a stream of random pitches.

5.8 Embracing Chance

Think about randomness and chance operations, such as the sample and hold. What parameters of your synthesizer could you modulate with randomness? Which do you think would be interesting?