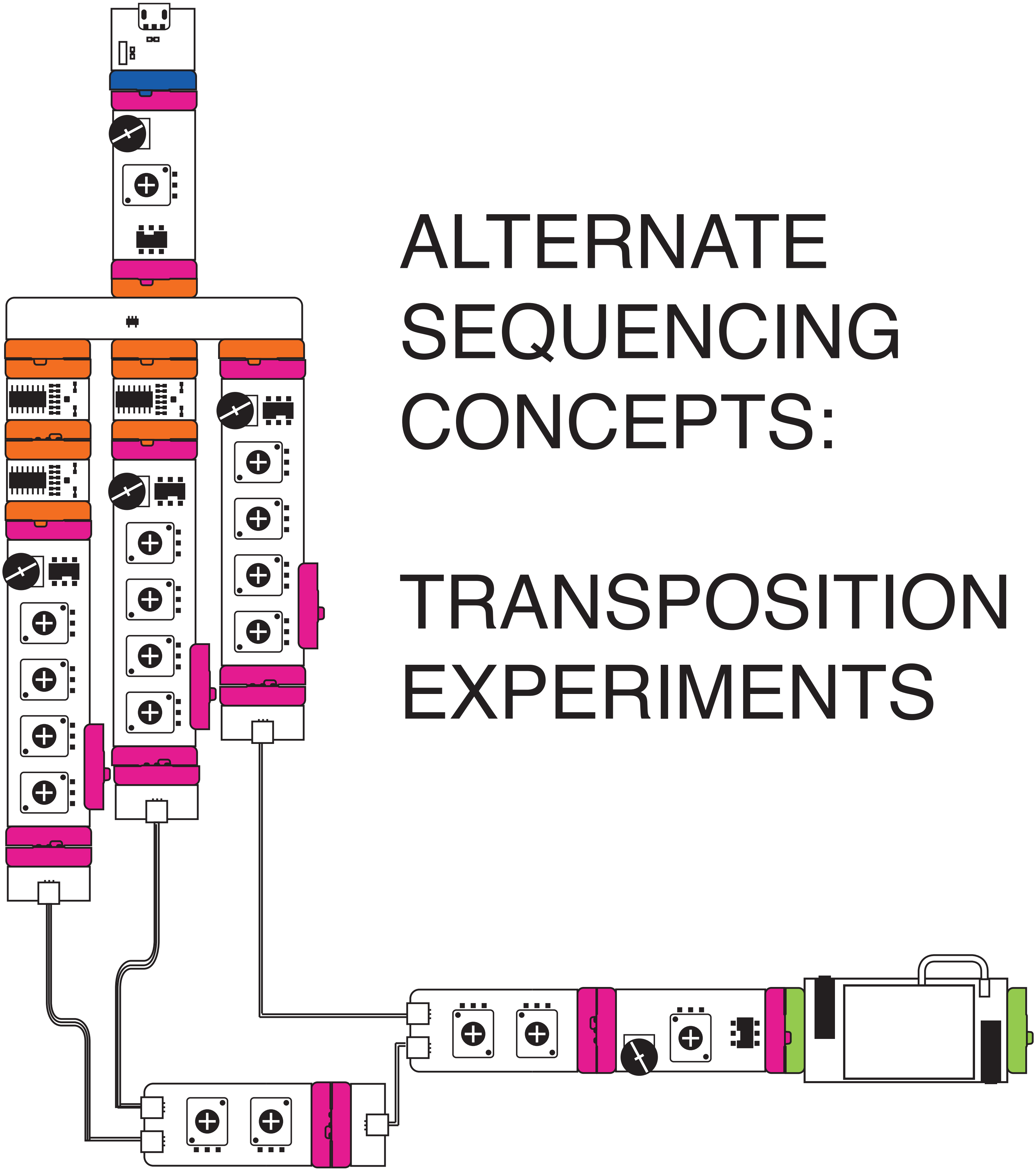
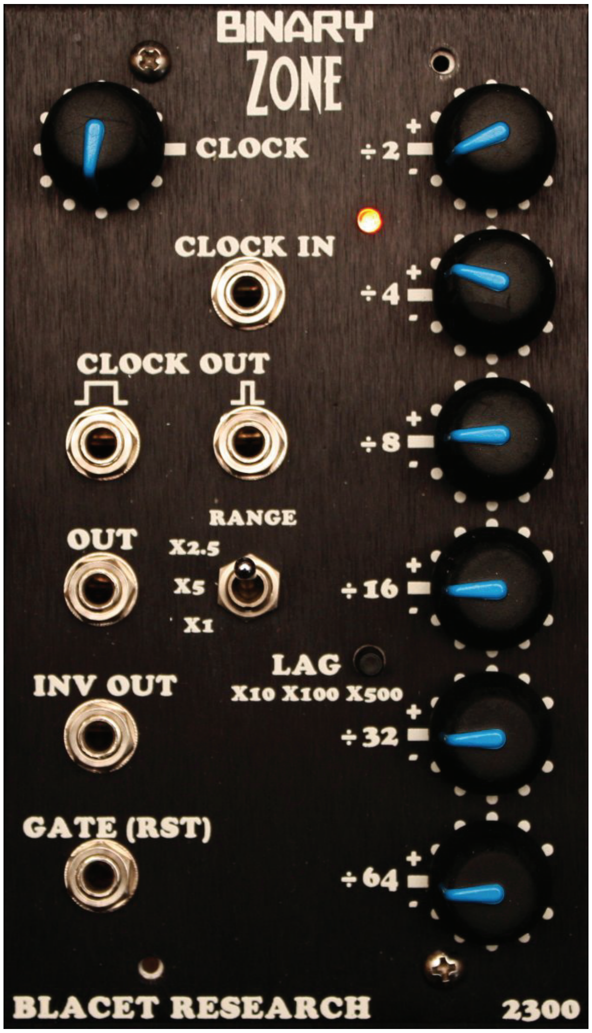


ALTERNATE SEQUENCING CONCEPTS:

TRANSPOSITION EXPERIMENTS

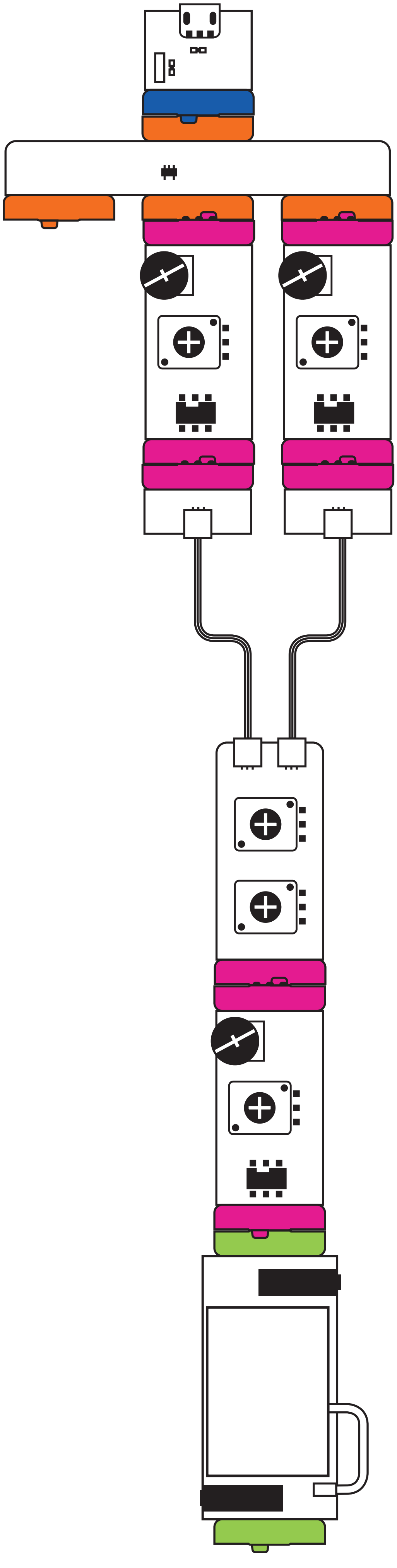


Experimenting with sequencing within the littleBits environment does not necessarily mean that we have to rely on the Micro Sequencer to create patterns!

Instead of focusing on that bit's 4-step loop, let's try employing scaled clock division as a control source.

The inspiration for patching in this fashion is a synthesizer module by Blacet Research called the Binary Zone, which works by taking an incoming clock source, dividing it several times and mixing various levels of these divisions to a common output, which is used as a sequential control signal.

What does that mean? Perhaps the simplist way to explain it is to patch something up!

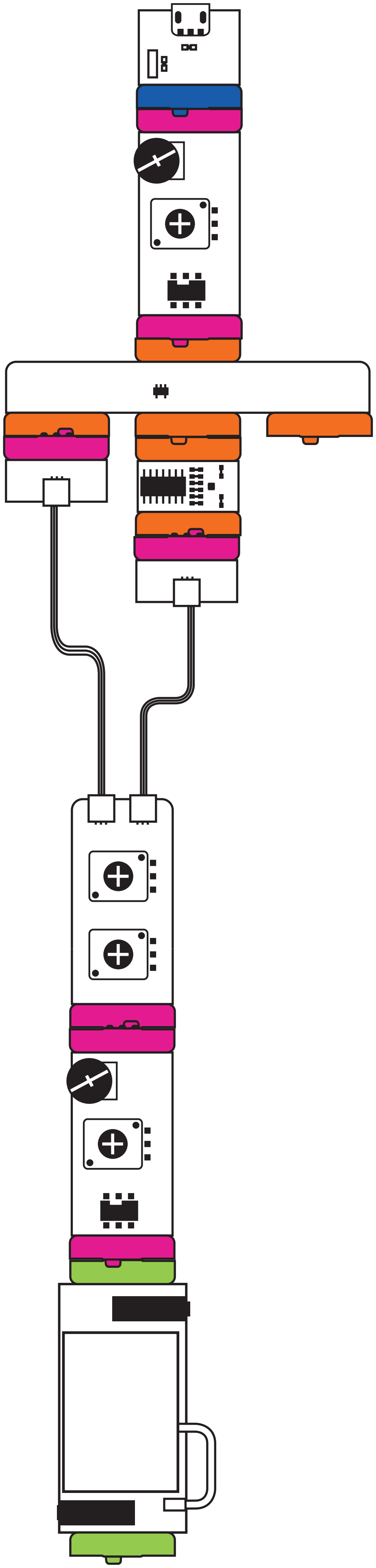


To begin, connect a Power module to either a Fork, Branch or Split.

Next, connect two Oscillators to the outputs. Set both to Square mode and their rates to sub-audio (close to fully counter-clockwise). These will make up our control source.

Using a Mix module, send the outputs of the Oscillators to the input of a third Oscillator. This one will be our tone source. Send its output to a Speaker.

Once the patch is complete, turn both Mix knobs to 0 and turn up the speaker's volume. Everything should be silent. Raise the level of Input 1 on Mix. The Oscillator's pitch will be rising and falling in an "on/off" pattern. Now raise Input 2 and listen to how the pattern changes in complexity-- the "on/off" of each control Oscillator is added through the Mix, with the resultant pitch pattern being a combination of the control Oscillator's rates and their Mix levels. Experiment by changing the pattern by altering the rates and levels.



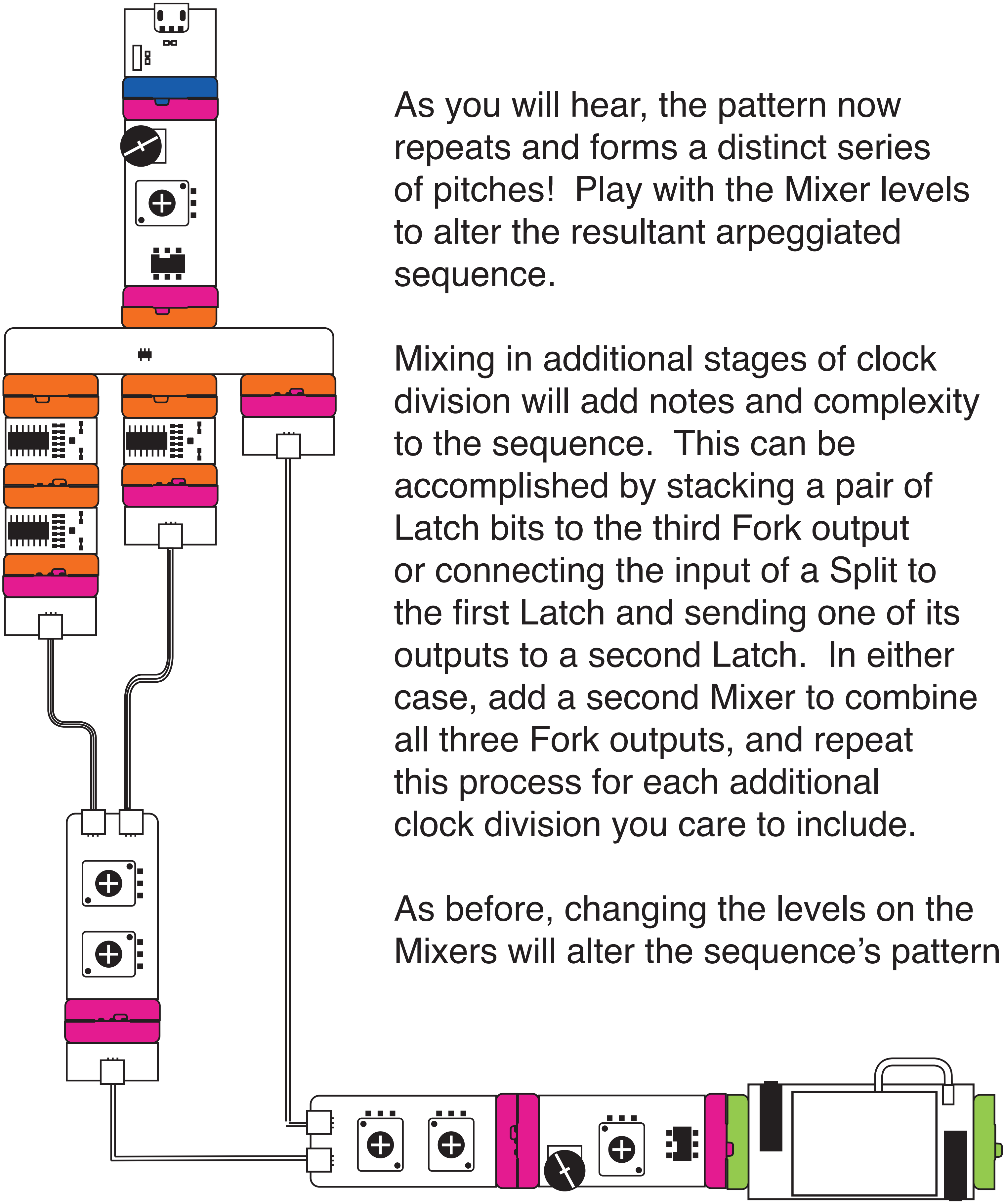
One thing you will notice straight away is how difficult it is to get the pattern to repeat! This is due to the fact that the two Oscillators' rates are unrelated.

A solution is to patch together a clock divider circuit, similar to the one used in the Binary Zone, and to mix its rhythmically related outputs.

If you are unfamiliar with clock division either within the littleBits environment or in general, I would recommend downloading and reading my tutorial on the subject from the littleBits Projects page, which describes the process in detail and offers several options for accomplishing the effect.

For the purposes of this document, I will breeze past that lesson and instead get right down to creating the patch.

Connect a Power module to an Oscillator, set to Square and sub-audio. Patch this to a Fork, and connect a Latch to the center output. Connect the Inputs from a Mixer to the Latch and to the bottom Fork output, and use this to control an Oscillator (connected to a speaker).



As you will hear, the pattern now repeats and forms a distinct series of pitches! Play with the Mixer levels to alter the resultant arpeggiated sequence.

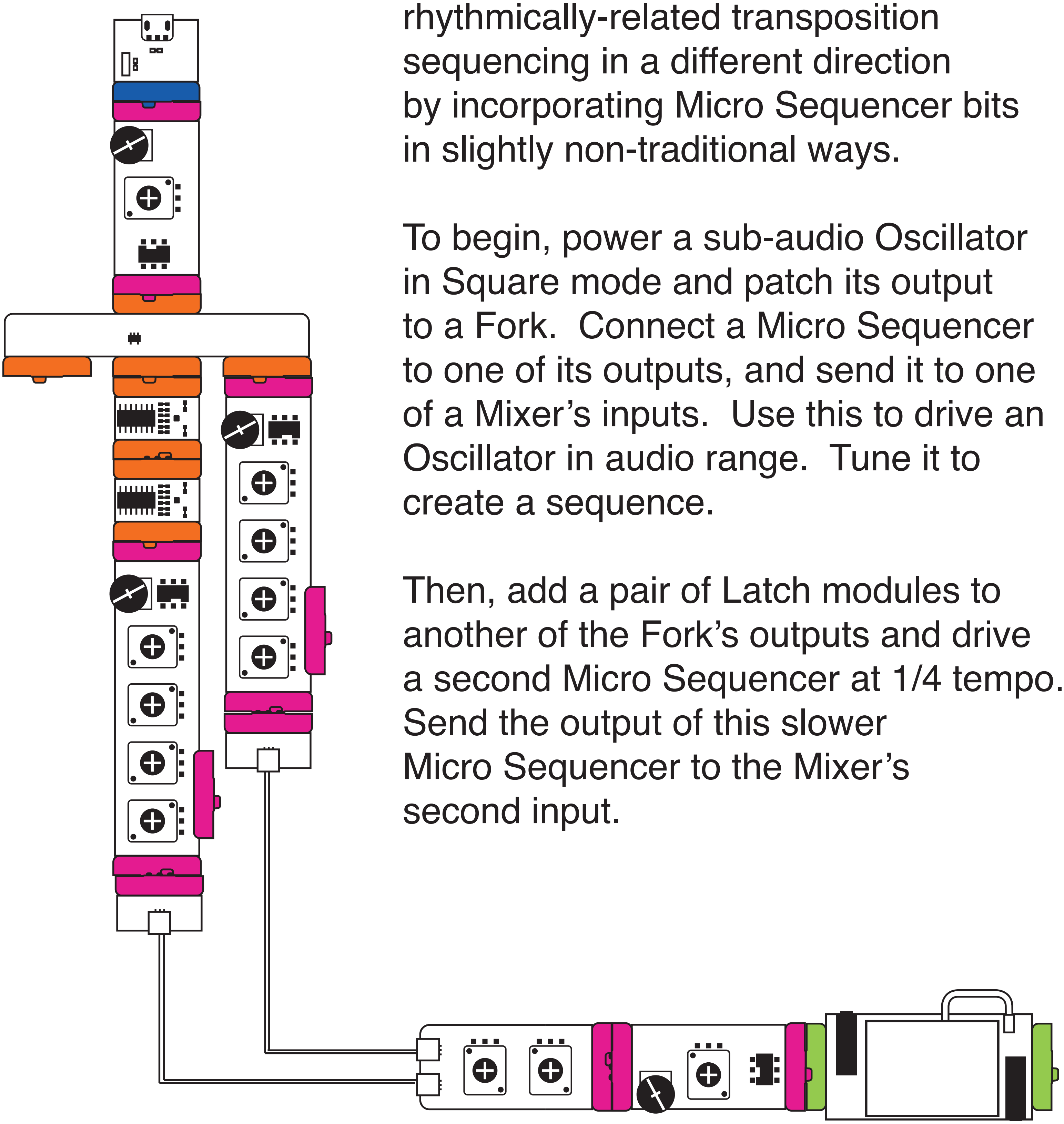
Mixing in additional stages of clock division will add notes and complexity to the sequence. This can be accomplished by stacking a pair of Latch bits to the third Fork output or connecting the input of a Split to the first Latch and sending one of its outputs to a second Latch. In either case, add a second Mixer to combine all three Fork outputs, and repeat this process for each additional clock division you care to include.

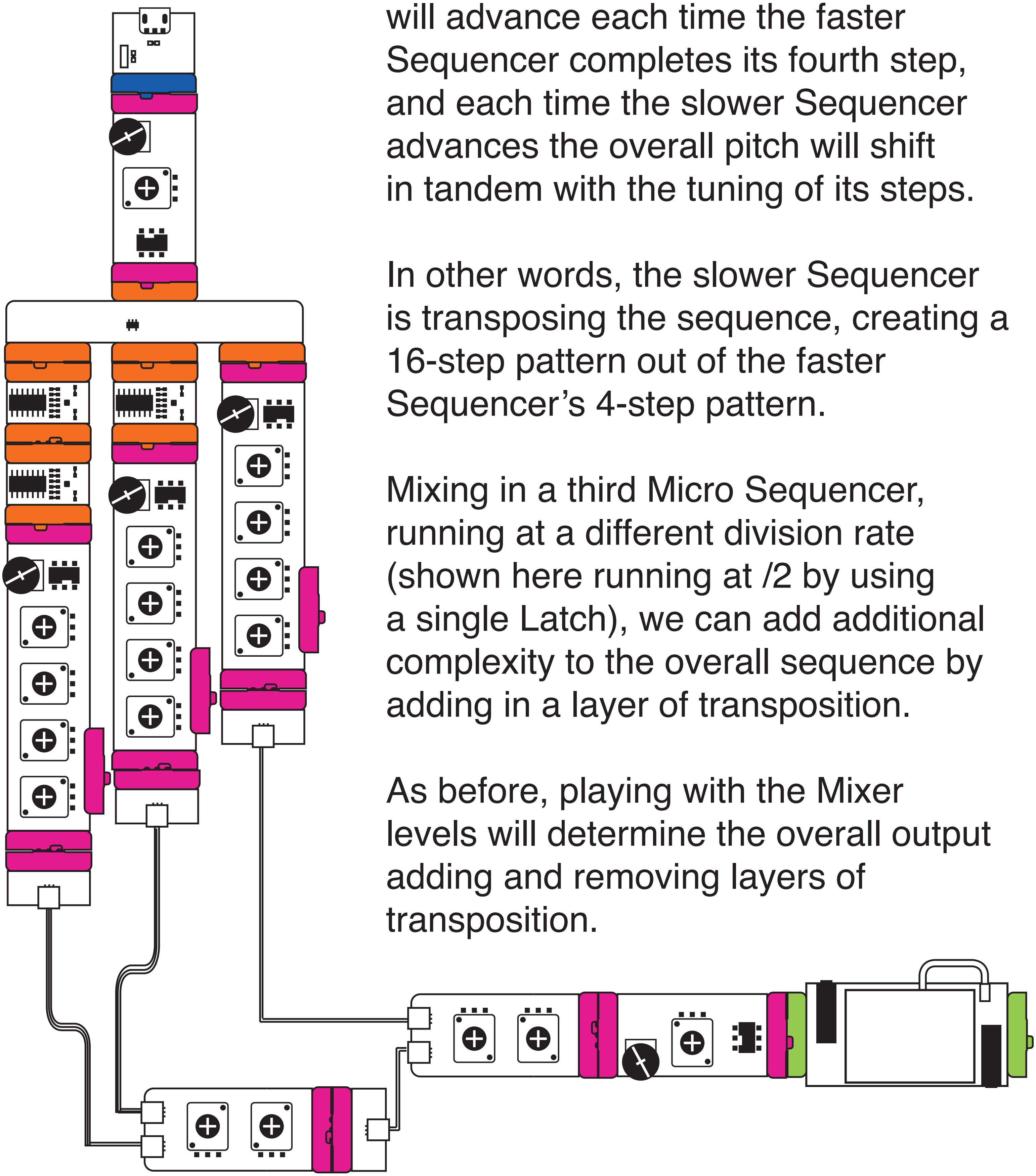
As before, changing the levels on the Mixers will alter the sequence's pattern.

We can push this concept of stacked, rhythmically-related transposition sequencing in a different direction by incorporating Micro Sequencer bits in slightly non-traditional ways.

To begin, power a sub-audio Oscillator in Square mode and patch its output to a Fork. Connect a Micro Sequencer to one of its outputs, and send it to one of a Mixer's inputs. Use this to drive an Oscillator in audio range. Tune it to create a sequence.

Then, add a pair of Latch modules to another of the Fork's outputs and drive a second Micro Sequencer at 1/4 tempo. Send the output of this slower Micro Sequencer to the Mixer's second input.





As you will hear, the slower Sequencer will advance each time the faster Sequencer completes its fourth step, and each time the slower Sequencer advances the overall pitch will shift in tandem with the tuning of its steps.

In other words, the slower Sequencer is transposing the sequence, creating a 16-step pattern out of the faster Sequencer's 4-step pattern.

Mixing in a third Micro Sequencer, running at a different division rate (shown here running at /2 by using a single Latch), we can add additional complexity to the overall sequence by adding in a layer of transposition.

As before, playing with the Mixer levels will determine the overall output adding and removing layers of transposition.