# Chapter 2:
# What to Modulate And to Trigger

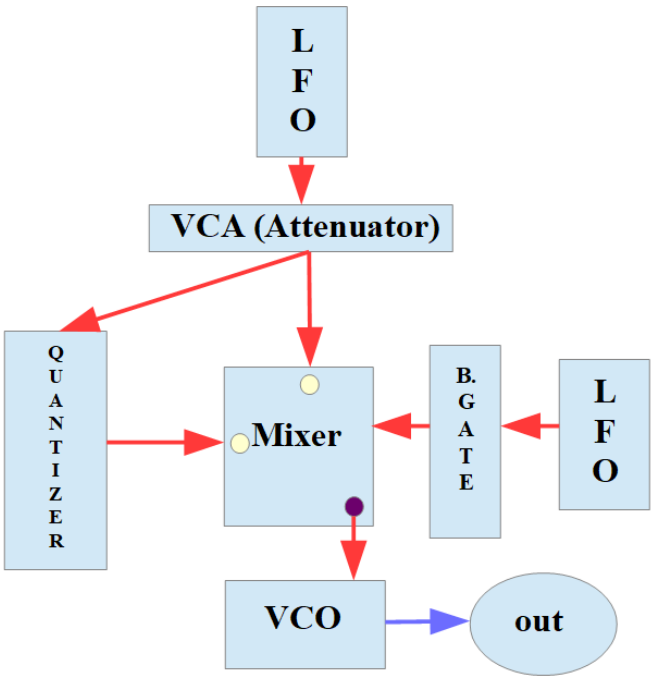
This chapter is more a systematic list of documented examples than a recipe of how to set up a complete patch. The aspects of setting up whole (finished) patches are dealt with in chapters 3 and 4. But making music (any kind and with any kind of "toys") needs a good knowledge of the instrument. And getting inspiration, getting ideas, realizing ideas etc. needs the experience  of what the instrument (and even only a certain part of it) is capable of.

I´m not going to write about modulators as modulating targets. This aspect is  dealt with in chapter 1, and I think I thrashed this matter out quite comprehensively.

One last remark before we start: it is inevitable that there will be thematic overlaps with the subjects of chapters 3 and 4 here and there in this chapter 2. Generative music is a complex matter, and quite often it is necessary to look at the same subject from different angles.

## Chapter 2.1:
## Pitch

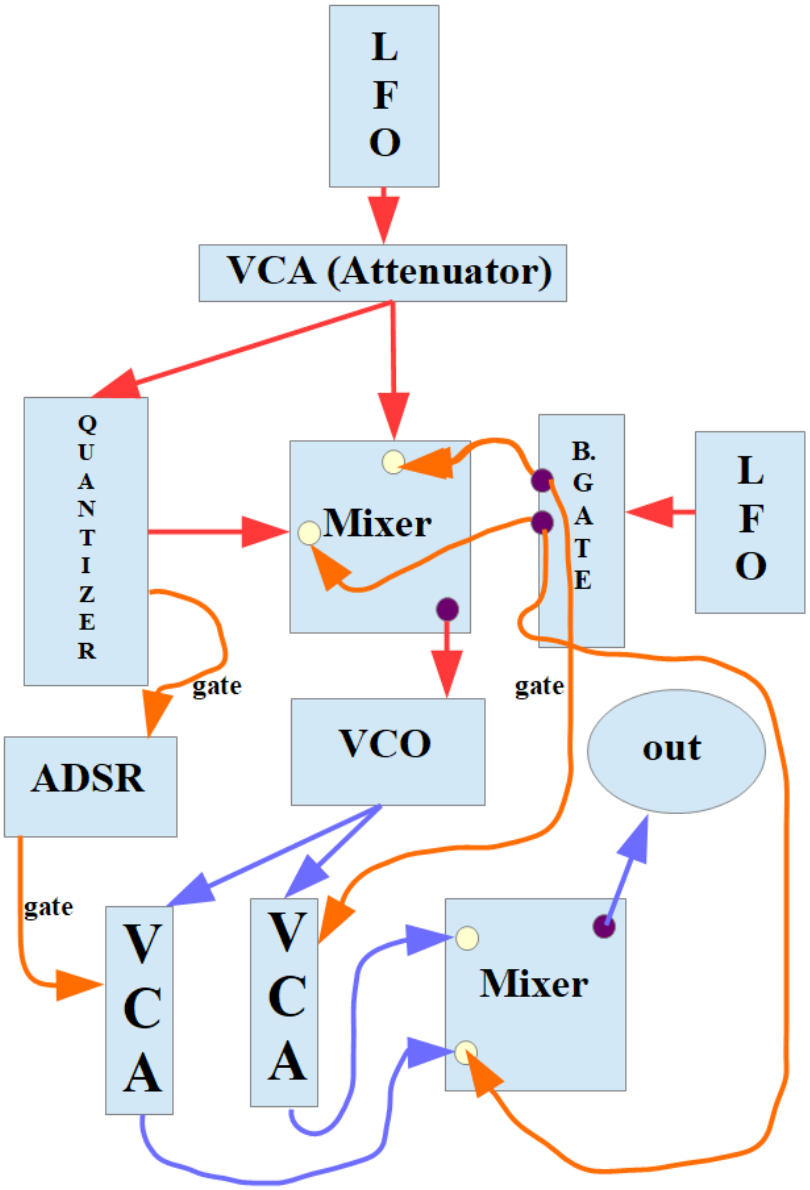
Of course we can modulate pitch, and simply patching and LFO or another modulation source in the 1V/Oct jack of a VCO can hardly be a matter of this book. But what about patching the modulation source through a quantizer to the VCO **and** not through a quantizer at the same time, and let a Bernoulli gate decide if we hear the quantized version or the other one,



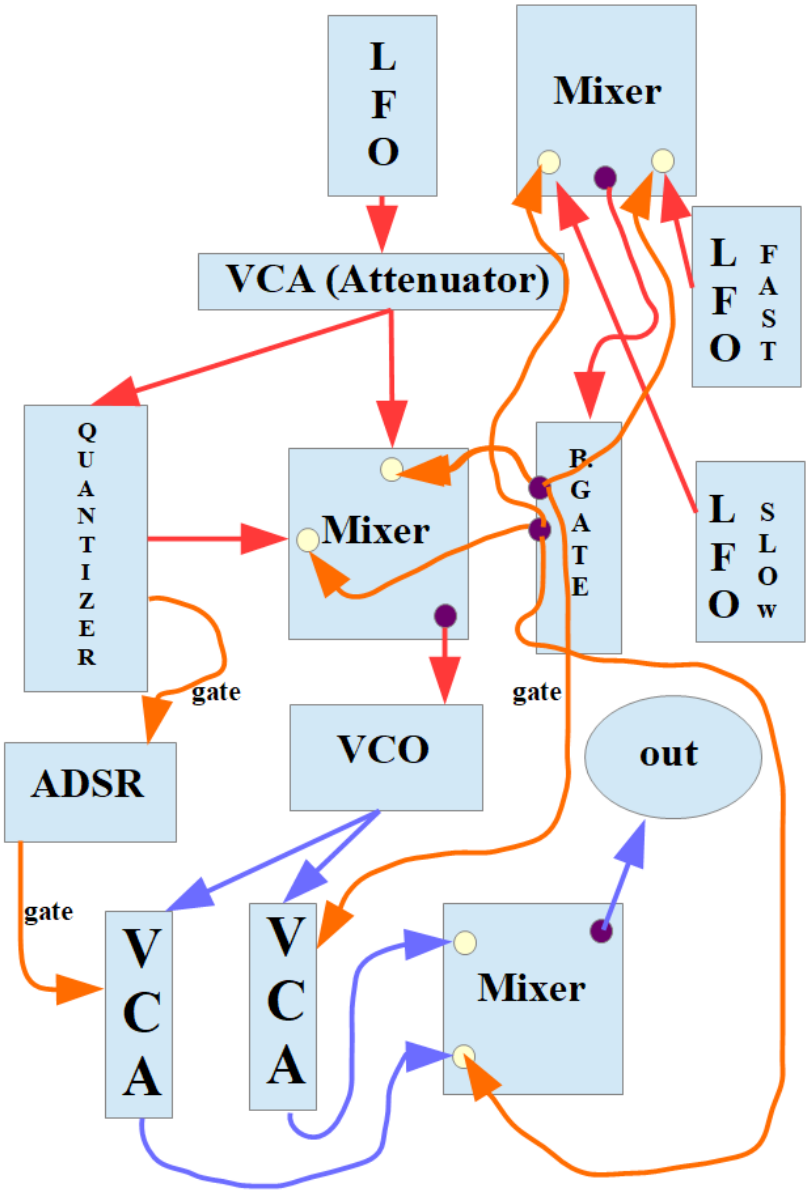
which is not quantized to a certain scale.

The result will be a melody in a certain scale with some “foreign” notes here and there, which don´t belong to this scale (nor to any other scale except for microtonal ones sometimes). The preset “pitchmod_1.vcv” shows the patch according to the graphic above.

If I want the notes generated by the LFO-VCA-Quantizer chain to be shaped by an envelope (e.g. in case I wanted plucked notes), but the the other pitches, which are not quantized, shall go unshaped, I simply add two VCAs, one of which being modulated by an envelope, the other by the Bernoulli gate (the output for the non-quantized pitches). The gate for the envelope I take from the quantizer. I plug the VCAs into two different channels of a mixer, and let the channel of the quantized notes switch on and off the Bernoulli gate (the other output).
The following graphic shows this patch, and the preset “pitchmod_2.vcv” lets you mess around with it.
The video behind the following link explains and demonstrates both – pitchmod_1 and pitchmod_2.
**https://youtu.be/FnXhEjeMGIM**


LFO
VCA (Attenuator)
QUANTIZER
Mixer
B. GATE
LFO
gate
gate
ADSR
VCO
out
gate
VCA
VCA
Mixer

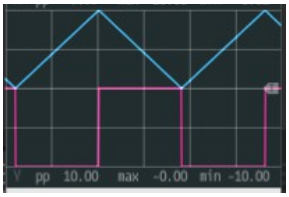
If we want e.g. the non-quantized pitch glitches to be shorter than the quantized melody, we can introduce a third functional group to the patch: a second clock LFO for the Bernoulli gate and a CV mixer. The second clock LGO runs at a higher frequency, its square wave cycle is shorter therefore. The “old” slower running LFO shall be patched to channel 1 of the added mixer, and the faster “new” clock LFO shall be patched to mixer channel 2. The output of the Bernoulli gate, which opens the doors for the pitch glitch is patched to the CV input of channel 2 (the faster LFO), and the output of the Bernoulli gate, which opens the doors for the quantized melody is patched to the CV input of channel 1 (the slower LFO). Always when the Bernoulli gate tosses a coin and opens its “quantized-melody output” it stays in that state for quite a time, because the next clock impulse doesn´t come before the end of the (long) cycle of our “old” clock LFO. But when the coin toss falls to the other output (the glitchy one), it tosses the next coin quite fast, because the next clock signal comes fast (from the “new” and faster LFO).
The following graphic and the preset “pitchmod_3.vcv” and the video behind the following link show this.
**https://youtu.be/voTu-vYSFnY**

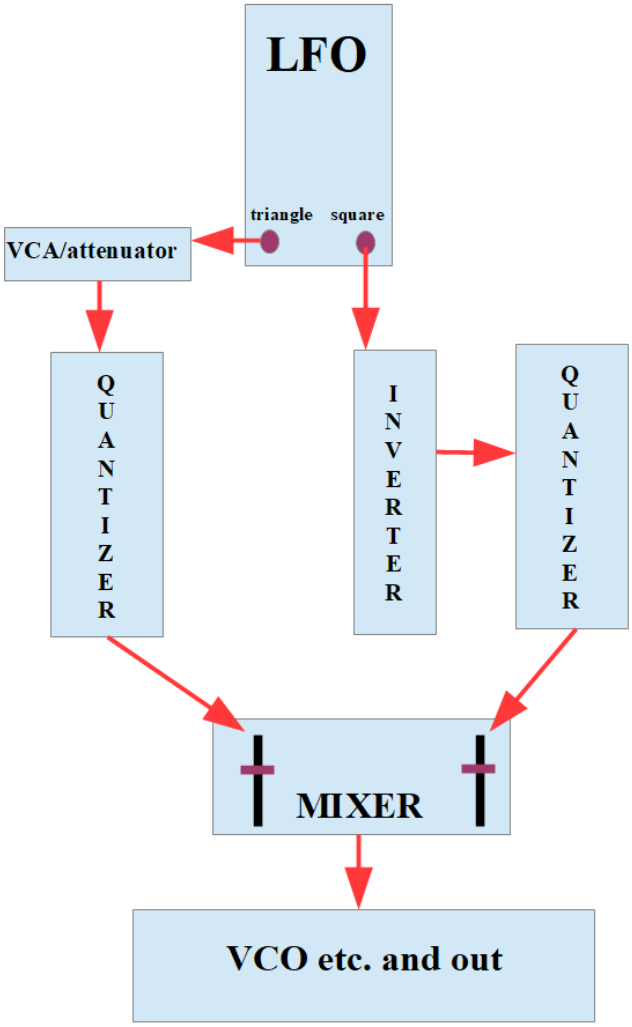



Of course we can use patches like this to switch between different (regular) melody lines and a lot more. But let´s look at another way to deal with pitch and melody now.

I use the triangle output and the square wave output of one and the same LFO to feed 2 quantizers with CV. The square wave cv is patched through an inverter module before I patch it into the second quantizer.
The output of both quantizers are patched into a mixer, and the mixer outputs the combined signal into a VCO.
Always when the triangle wave sends an increasing CV the square wave is at high level, and the inverter sends a zero-level CV cancelling out the triangle wave. We get silence. But always when the triangle wave sends decreasing CV, the square wave is at low level, the inverter sends high

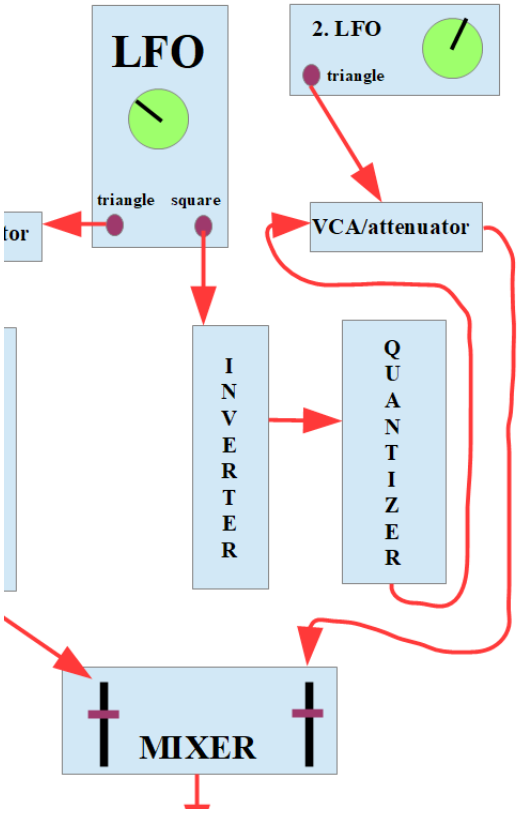
level CV, and we hear the increasing part of the sequence.




The following graphic shows the patch, the preset “opposite.vcv” represents it, and the video behind the next link demonstrates it together with some variations.

Let´s patch some more interesting variations based on this patch now. Patching a VCA (attenuator) between the right quantizer and the mixer input, and modulating this VCA with a second LFO at a higher frequency than the first LFO leads to short wa-wa effects during the rising phase of the sequence (see preset “opposite_2.vcv”).




There are legions of variations imaginable, so only one more: introducing a second VCO, which gets its 1V/Oct CV directly from the first (left) quantizer, and sending the sound of one of the VCOs through a reverb and splitting the stereo channels between both VCOs leads to a quite interesting counter action between the two pitch developments (preset “opposite_3.vcv”).
https://youtu.be/8_ElDmOzBkA

… to be continued