# Introduction

RectangularThing is our full synthesizer voice based on 2 oscillators, 2 filters, 2 envelopes and 2 amplifiers.

Each oscillator also has a sub-oscillator. All the oscillator waveforms are mixed together in the central mixing area before being fed into the filter section and the amplifiers. The volume envelope drives 2 different amplifiers: one connected after the filter section to provide you with a filtered output, and the other one is connected before the filter section to provide you with raw output.
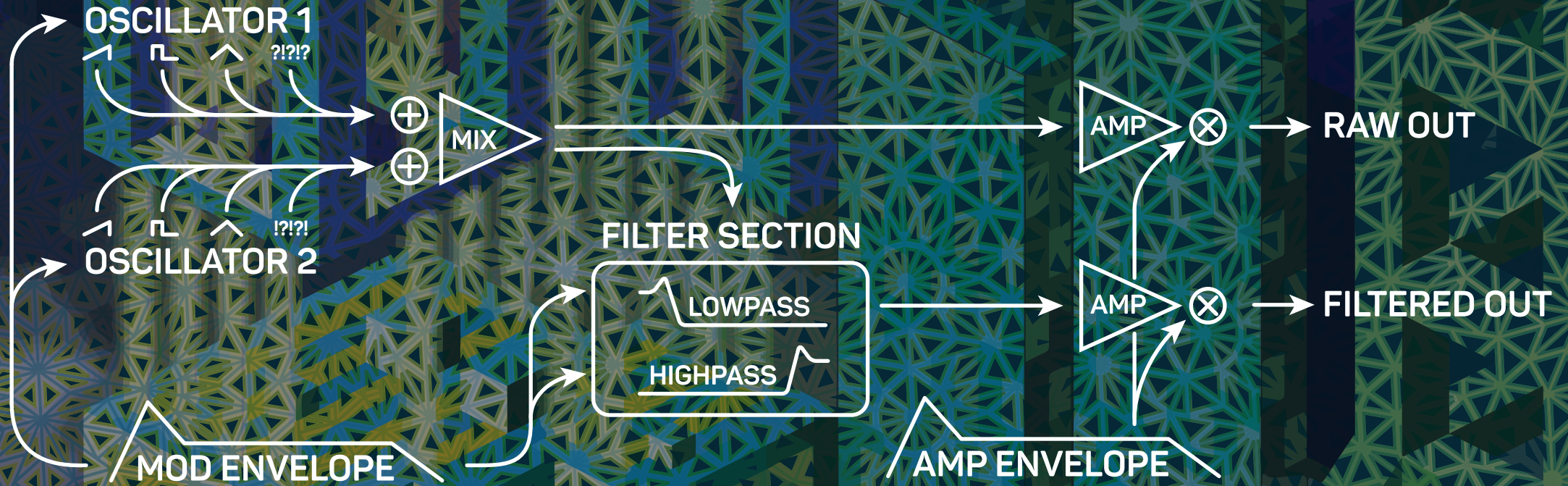


# Controls
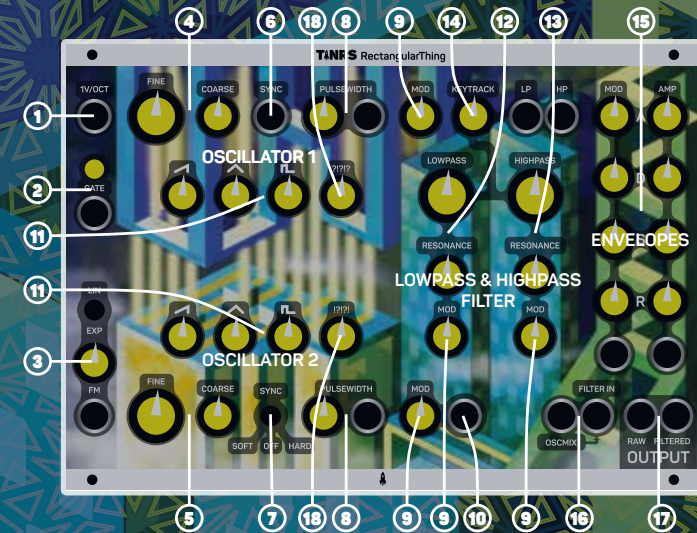
**① 1V/Oct**
This input controls the main pitch of the entire synthesizer voice.

**② Gate Button and Input**
Press this button or send a pulse to trigger the AMP and MOD envelopes

**③ External FM Input, Switch and Knob.**
FM works on both oscillators at the same time. You can use the toggle switch to choose between linear, exponential FM or leave it in the middle for no FM. Use the attenuverter knob to choose FM level - from maximum negative, through zero to maximum positive.

**④ Fine/Coarse Oscillator 1**
Use these knobs to set the base pitch for the synthesizer voice relative to the incoming 1V/Oct.

**⑤ Fine/Coarse Oscillator 2**
Use these knobs to tune Oscillator 2 relative to Oscillator 1

**⑥ Oscillator 1 Sync**
External hardsync input for Oscillator 1

**⑦ Oscillator 2 Sync Switch**
Oscillator 2 can be synced to Oscillator 1. Use the switch to select between soft, hard or no sync.

**⑧ Pulsewidth Knob & Input**
Pulsewidth setting for the pulse waveform.

**⑨ Modulation Attenuverter Knobs**
With these 4 knobs you can send the MOD envelope to the pitch of Oscillator 1 or 2, or the cutoff of the filters.

**⑩ Modulation Input for Oscillator 2**
You can use this input to replace the MOD envelope by a signal of your choice

**⑪ Waveform Mixers 1 and 2**
Both oscillator generates 4 different waveforms. You can use the volume knobs to mix them. Warning - they go to 11! Turning them all the way up might change the behaviour of the resonance in return for some overdrive.

**⑫ Lowpass Filter**
You know the drill.. Big cutoff knob.. resonance.. modulation envelope. Use the LP input to modulate cutoff.

**⑬ Highpass Filter**
Ditto. Can also be made to function as a subbass-boost! Use the HP input to modulate cutoff.

**⑭ Keytrack Attenuverter Knob**
Allows you to add the incoming 1V/Oct CV to the cutoff of both the Lowpass and the Highpass filter.

**⑮ Envelopes**
Classic ADSR envelopes. The MOD envelope is routed to the various modulation attenuverters. AMP is always routed to the output amplifiers. You can use both envelope outputs to drive other modules in your setup.

**⑯ Oscillator Mix Output and Filter Input**
The output from the mixer section (OSCMIX) is normalled into the filter input (FILTER IN). If you would like to filter external signals, you can plug them in here. If you would like the raw unprocessed oscillator audio - get it here.

**⑰ Main Outputs**
Filtered and non-filtered outputs. These outputs have the Amplitude Envelope applied to them.

**⑱ ?!?!? and !?!?! Knobs**
These Oscillator waveforms are suboscillator-variants. Use the jumpers on the back to select their function!

## Block Diagram

OSCILLATOR 1

?!?!?

OSCILLATOR 2

!?!?!

⊕
⊕
MIX

FILTER SECTION

LOWPASS

HIGHPASS

MOD ENVELOPE

AMP ⊗ → RAW OUT

AMP ⊗ → FILTERED OUT

AMP ENVELOPE

## Waveforms

| Saw | Pulse | Triangle | Suboscillator | Sawpulse | Rambler |