

Basic Waveforms

sine	purest; single harmonic
saw	edgy; buzzy, thin low-end
pulse	artificial sounding; heavier low-end
triangle	quiet; bigger, rounder low-end

Doubling & Transposing

Mix	determines balance between OSCs usually 50/50
Semi	one octave = 12 semitones fifth = 7 semitones

Waveforms usually set the same

For better bass, favor lower-pitched OSC (especially for triangle wave)

Sub Oscillator

Pulse	edgy weight
Triangle	big, round weight quieter than pulse often has attack transient; remove with increased attack env.

Filters

Mode	high pass, low pass, band pass
Cutoff	frequency that sound is attenuated
Resonance	provides volume boost at cutoff frequency

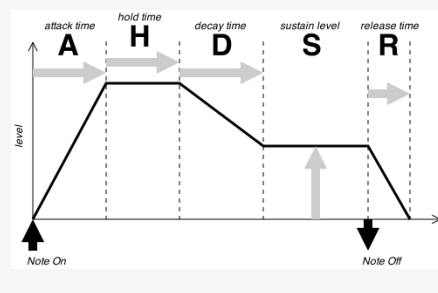
Filter Types

low-pass	cutoff controls brightness lower cutoff decreases volume
high-pass	cutoff controls bottom-end increase cutoff to make thinner, lighter sound
band-pass	cuts off highs and lows thinness of high-pass, roundness of low-pass at extreme settings, can sound like low-pass/high-pass

LFO

TODO - outline section 11

Envelope



Envelope Stages

attack	amount of time for control to change from initial to maximum
hold	amount of time control remains at maximum setting Not always present; ADSR, AHDSR
decay	amount of time for control to change from maximum to sustain short values can create attack transients
sustain	level of control after decay when key is held down
release	amount of time for control to change from sustain to initial

Common Envelope Targets

Amp	modulates synth's volume over time low/fast attack = string "swell"
LPF	Brightens -> Darkens fast value = "fat", "horn-like" attack Env. Amount controls how bright sound gets at end of attack
HPF	Cutoff = fullest state Env. Amount = thinnest state Sounds with more low-end seem closer
BPF	Cutoff = fullest/darkest Env. Amount = brightest/thinnest
If decay and release are equal, sound will be the same no matter how it is played	



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Common Envelope Targets (cont)

Set amp release > filter release or filter release will be inaudible

Delay

Mix	controls wetness of sound usually not set above 50/50 at 50/50, volume reduction will be noticable
Delay Time	determines how far apart the echos are apart typically expressed in rhythmic values
Delay Feedback	determines how many echos are created min = 1 echo, max = infinite echos
Delay Spread	spreads echos across stereo field 0 spread = delay down middle medium spread = dry middle & wet stereo extremes, rhythmically tight max spread = dry middle & wet, rhythmically-off stereo extremes

Typically set mix, then time, then feedback, then spread

Smearing and Pulsating

Two OSCs doubled & "fine" detuned in opposite directions

The farther they are detuned, the more pulsating there is

Fine control	expressed in cents; 1 semitone = 100 cents
OSC Start: ON	OSCs starts when key pressed pulsating always the same pointy attack transient
OSC Start: OFF	when off, OSCs are free-running softer, rounder attack transient pulsating changes with every keypress most obvious with 1-cent detune

When doubling, use same waveform and pulse width for both OSCs

For a slow flanging effect, detune 1 OSC only, by only 1 cent



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