

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 |

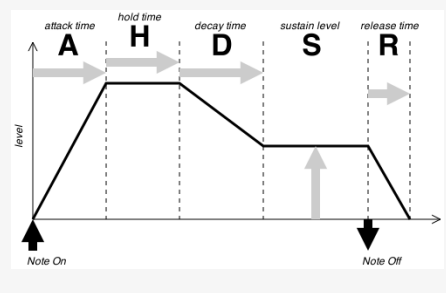
Filter Types

| | |
|-----------|---|
| 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 noticeable

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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