Cheatography

Subtractive Synthesizer Basics Cheat Sheet

by Bill Smith (Naenyn) via cheatography.com/21154/cs/3960/

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

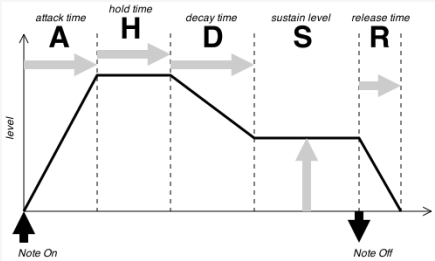
Filter Types

low-pass	cutoff controls brightness
	lower cutoff decreases volume
high-pass	cutoff controls bottom-endI
	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 echoes 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-r-unning
	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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