

Entity

for Windows VST and Mac VST/AU hosts

V1 Quick Guide

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Introduction

Welcome to Entity, a Virtual Instrument for Windows (VSTi) and OS X (VSTi and AU).

Entity is a semi-modular synthesizer, offering a selection of modules you can assemble in various ways to create a wide variety of configurations. With Entity you can combine traditional subtractive synthesis with physical modelling. The matrix gives you masterful control over shaping your sound, letting you connect modulation sources to destinations quickly and easily. To give your audio creations a final shine, you also get a flexible, great-sounding effects section.

About the Quick Guide

In this Quick Guide you'll find installation directions for Macintosh and Windows machines, as well as a brief introduction to Entity's user interface, its preset organizing and browsing system, and the audio and modulation signal flows. For detailed information on these and more topics, refer to the Entity User Manual.

System Requirements

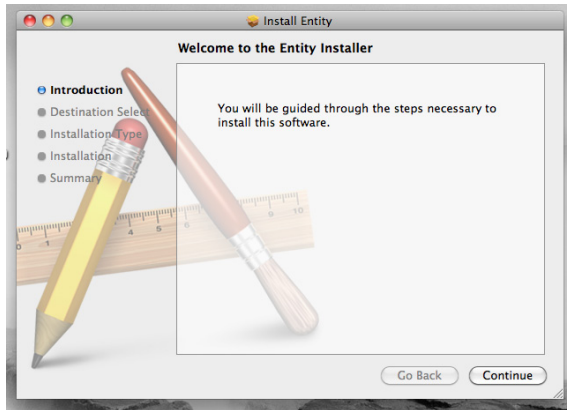
To run Entity with satisfactory performance, at a minimum your music-making computer must be equipped with:

- * a minimum of 1 Gigabyte of RAM,
- * a Core2 CPU,
- * OSX 10.5 (Macintosh) or Windows XP (PC), and
- * an AU (Macintosh) or VST (Mac or Windows) DAW host program in which to run the Entity plug-in.

Installation

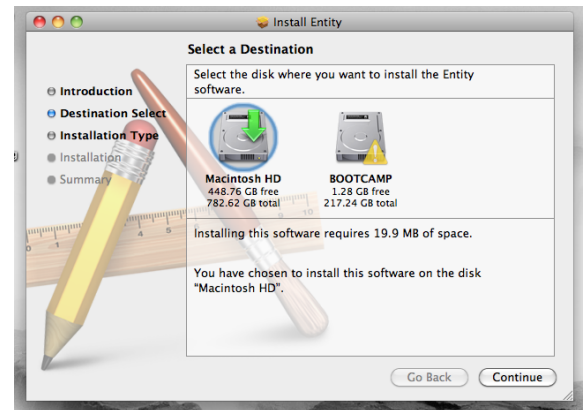
Macintosh

To install Entity on a Macintosh, click the installer's icon. The Welcome screen (⇨) will appear; click the Continue button to go to a screen



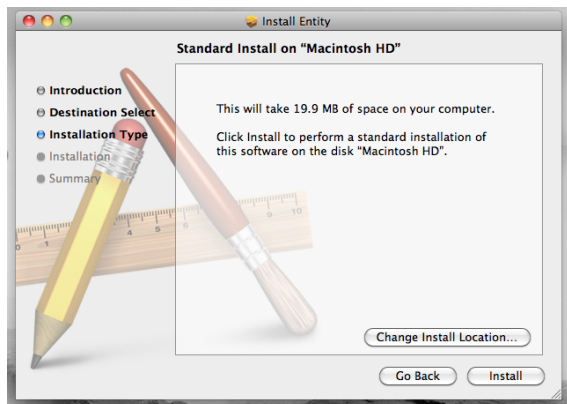
1

where you will select the drive where you want to install Entity (⇨). Choose a disk drive, then click Continue.



2

Another screen will appear (⇩) telling you how much disk space Entity will consume and letting you change the install location. Click the Install button to proceed, or another button to make adjustments before installation.



3

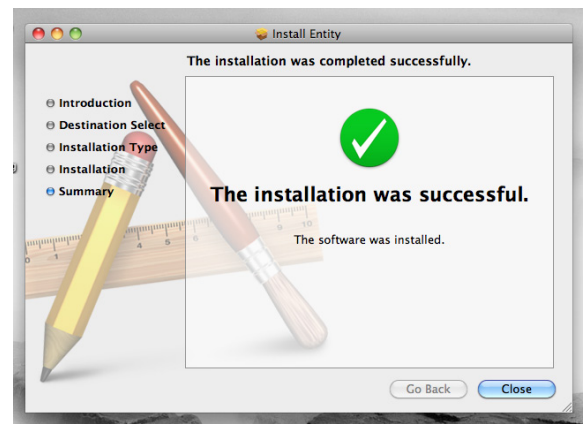
Before installation can take place, you must let OS X know the Entity installer is authorized to make changes to your system. To do this, enter your administrative password when the password dialog box (⇩) appears.



4

When installation is complete a final screen (⇨) will notify you of the success (or, if there was a problem, failure) of the operation.

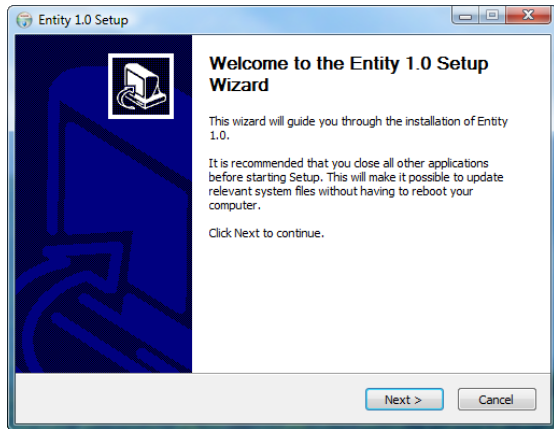
5



Congratulations! You're ready to make music!

Windows

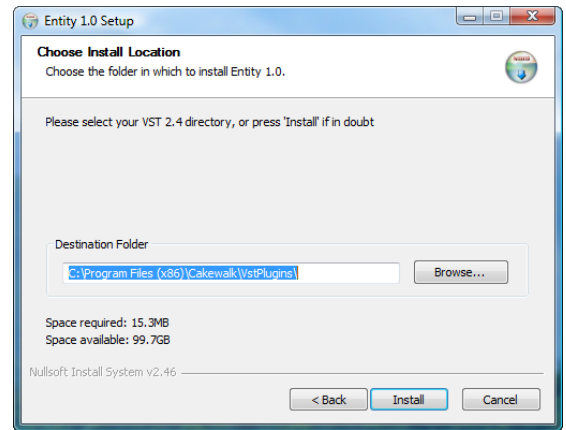
To install Entity on a Windows-based machine, click (or double-click, according to your mouse settings) the installer's icon. You'll see the Welcome screen (↓). Click the Next > button to proceed to the Install Location screen (↗).



1

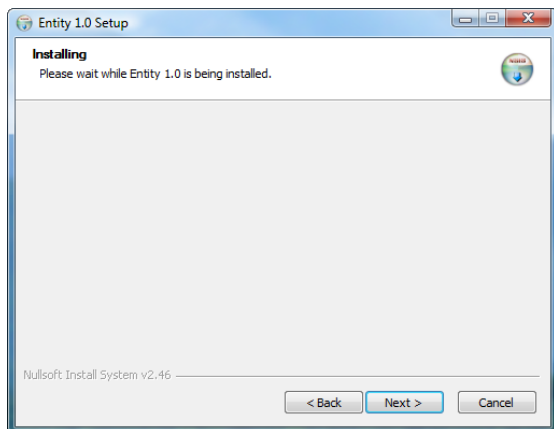
2

If the folder in which your DAW expects to find its plug-ins isn't shown in the Destination Folder box, click Browse and locate or create the folder where you want Entity to be installed. When you're done click the Install button.



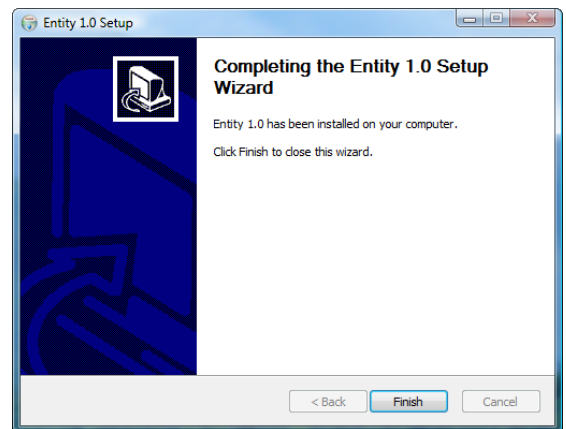
Installation is so quick you might not even see the progress screen (↻) flash past before the in-

staller's final screen (↗) appears to tell you the job is complete.



3

4



Congratulations! Entity is ready to plug and play.

Uninstalling Entity

Windows: To remove Entity from your machine, delete these files and folders:

- * <your VST plug-ins folder>\Entity.dll & Entity.acpi (Entityx64.dll & Entityx64.acpi on 64-bit)
- * Program Files\NUSofting\Entity\
- * <your documents folder>\NUSofting\Entity\

Macintosh: To remove Entity from your system, delete the following folders and their contents:

- * /Library/Application Support/NUSofting/Entity/
- * /Applications/NUSofting/Entity/
- * /Library/Audio/Plug-Ins/VST/Entity.vst
- * /Library/Audio/Plug-Ins/Components/Entity.component

Overview

Entity's interface is composed of a stack of modules, resembling a rack of gear but without the cables and power conditioners and dust, plus a group of master controls, an on-screen keyboard, and a browser for locating presets.

By turning modules on and off, adjusting the modules' controls, and routing signals from sources to destinations, you can build thousands of sounds, from "meat and potatoes" to the weird and exotic. To get the most out of Entity you'll want to understand how three kinds of signals flow through the modules: audio, trigger, and modulation.

Module Specifications

For most module types in Entity you get three slots which you can fill with modules. For instance, you can have up to three oscillators, each of which lets you choose from the following signal types.

- * Standard generators:
 - * Sine wave with waveshaping control
 - * Triangle wave (table-driven) with waveshaping control
 - * Triangle wave (syncable)
 - * Pulse wave (syncable) with waveshaping control
 - * Sawtooth wave (syncable)
 - * 10×Sine wave+selectable number of odd or even harmonics
- * Stacks with spreading control:
 - * SuperSaw
 - * MultiSaw 1
 - * MultiSaw 2
 - * MultiSaw 3
 - * Major stack
 - * Minor stack
- * Noise generators with downsampling:
 - * Noise
 - * Noise, HP with resonance control
 - * Noise, LP with resonance control
 - * Noise, BP with resonance control
- * Physical modelling (PM) generators, each with three parameters:
 - * Pick 1
 - * Pick 2
 - * Pick 3
 - * Pick 4
 - * Wind 1
 - * Wind 2

Likewise you have three filter slots, each of which can be filled with your choice of the following algorithms.

- * Low-Pass filters:
 - * 1-Pole (6 dB/oct)
 - * 2-Pole (12 dB/oct)
 - * 2×2-Pole Parallel
 - * 2×2-Pole Serial
- * High-Pass filters:
 - * 1-Pole (6 dB/oct)
 - * 2-Pole (12 dB/oct)
 - * 2×2-Pole Parallel
 - * 2×2-Pole Serial
- * Bandpass filters:
 - * 2-Pole (12 dB/oct)
 - * 2×2-Pole Parallel
 - * 2×2-Pole Serial
- * Other filter types:
 - * Drive+Low-Pass 2-Pole (pre- or post-drive)
 - * Comb (available for module #2)
 - * TB-303

Entity has three slots for Envelope Generator modules. Each generator comes with the following features.

- * 3×DAHDSR (Delay-Attack-Hold-Decay-Sustain-Release) with:
 - * repeat functions
 - * speed and gain keytracking
 - * curve type (speed) selection

One envelope generator is prerouted to the Amplitude contour, one to the Filters' cutoff frequency controls, and one is free for you to use however you like. You can apply the Amp and Filter envelopes to other parameters as well if you like.

- * Sine
- * Triangle
- * Sinoide
- * Sawtooth (up or down)
- * Sweep (up or down)
- * Square
- * Impulse
- * Smooth pulse, noise, or random

As you will have guessed, you get three syncable Low Frequency Oscillators. Each is predefined with its own set of five modulation destinations but you can add other routings freely using the Mod Matrix. You can choose from these waveforms for each LFO.

To all this add a flexible Arpeggiator; the Tube Amp, Limiter, Saturation built into the System panel, and your choice of any two of the following effects.

- * Chorus (mono, stereo, or vintage)
- * Echo (stereo with modulation)
- * Flanger
- * Phaser
- * Reverb
- * Compressor
- * EQ

Entity's user interface

Let's have a quick look at the main parts of Entity's graphical user interface, first the top portion and then what's beneath. Each part of the interface is covered in more detail in the User Manual.

Top bar: The top bar has several controls for managing MIDI mappings, a group of preset surfing controls and indicators, and buttons to bring up the About and Settings dialogs.



System panel: The System panel contains bar-graph indicators for MIDI in velocity on the left and audio out level on the right. Between are various controls that regulate global such parameters as polyphony, tuning, panning, output level, and more.

When the System panel's Expert view is showing (clicking the orange triangle toggles Expert view on and off), a second row of controls appears to give you more sophisticated sound sculpting capabilities.

Module List panel: Below the System panel is the Module List panel, with one button to represent each module slot in Entity's virtual rack. Each lit button corresponds to a panel which appears in the rack; if a button is unlit that module is absent. Click a button with your mouse to toggle it on and off.

When you switch an Oscillator, LFO, Envelope Generator, Mod Matrix, or Arpeggiator module off, it simply doesn't produce its output. Switching a Filter or Effect off replaces that module with a direct connection from its audio input to its audio output.

(Note: The colors in the block diagrams in the Entity documentation are meant to resemble those on the module list buttons when they're lit, to help you match the diagrams with what you see in your DAW's display.)

Rack: Under the list of modules come the modules themselves: a stack containing whichever modules are switched on, starting with Oscillators, then Filters, Envelopes, LFOs, Mod Matrix units, Effects, and the Arpeggiator. As you switch modules on and off, the rack display is updated dynamically so it always shows exactly which modules are in the circuit.



Keyboard: At the bottom of the rack is a simple on-screen keyboard. You can hide or show it by clicking the appropriate button in the Settings dialog box.

Edit/Browser tabs: On the left edge are two tabs that you can click to switch between Edit view, in which you can see the rack of modules, to Browser view, which replaces the rack with a grid of presets for your auditioning pleasure. Clicking the Preset Name display in the System panel also toggles between Edit and Browser views.

The Preset system

Preset organization

To help you organize your collection of presets and find what you want fast, Entity incorporates a preset browser, a built-in tagging system, and controls for “surfing” through presets.

Preset tagging

Each preset’s author can assign one Type tag and any number of Mode tags, chosen from pre-determined sets. These tags are available:

Type tags (one per preset)

| | | | |
|------|---------|---------|----------|
| All | Brass | Mallets | Ensemble |
| Bass | Strings | Drums | Hybrid |
| Lead | Winds | Plucked | Noise |
| Pad | Keys | Synth | Effects |

Mode tags (pick as many as are applicable)

| | | | |
|--------------|----------|---------------|-------------|
| Dark Sound | Techno | Glide | Legato |
| Bright Sound | Electro | Harmonics | Arpeggiator |
| Slow Attack | Psycho | Tremolo | |
| Fast Attack | Acoustic | Echo & Reverb | |
| Hard Sound | Ethno | Stacked | |
| Soft Sound | Detuned | Mono | |



The preset browser contains Mode and Type controls (↗) that let you filter the preset list by any combination of Mode and Type tags. Every time you change the Type or Modes selections, the full preset list will be narrowed down to those you’re interested in.

You can also search for presets by name by entering the search text into the Name Search box. Only presets whose names include the text you entered, and whose tags match the Type and Mode controls, will be displayed in the preset browser.

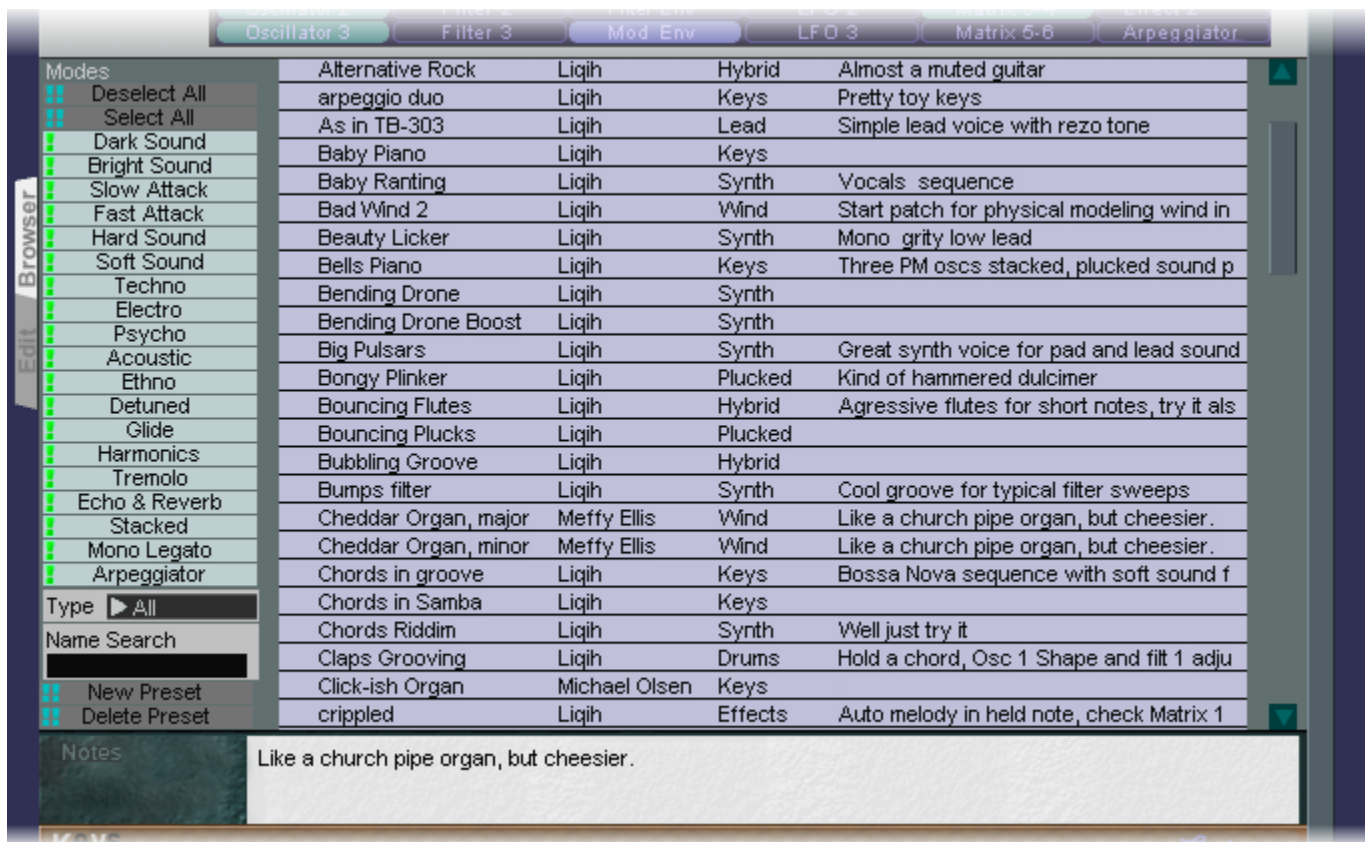
Preset surfing controls

The middle of the System panel contains controls for “surfing” through all presets that match the filtering criteria you’ve set. If you’ve deselected any items in the browser’s Mode tags list (↑), meaning the preset list is being filtered by Modes, then the green exclamation mark will light up in the System panel. Whichever Type is chosen in the drop-down selector below the Modes will be displayed in the System panel; any choice other than All means the preset list is being filtered by Type.

To the right of the Mode and Type indicators you’ll find the Surf buttons and the Preset name box. Click the <<< button to select the previous preset or the >>> button to select the next preset in the filtered list. As you do, the browser’s highlight bar will move to the selected preset, its name will appear in the System panel’s Preset name box, and of course you can audition the preset’s sound by playing some notes on the onscreen keyboard or your MIDI controller.

Preset Browser

The most visible part of Entity's preset system is the browser. When it's shown, the preset browser replaces the rack of modules — everything below the Module List and above the on-screen keyboard is covered by the Mode and Type selection controls shown on the previous page, plus a grid showing preset information in four columns: Preset Name, Author, Type, and Notes.



To audition a preset click its row in the browser. Its name will appear in Entity's top bar, and the rack will show the modules and settings that are stored as parts of the preset. Play your MIDI keyboard or other controller, or use the on-screen keyboard if it's showing.

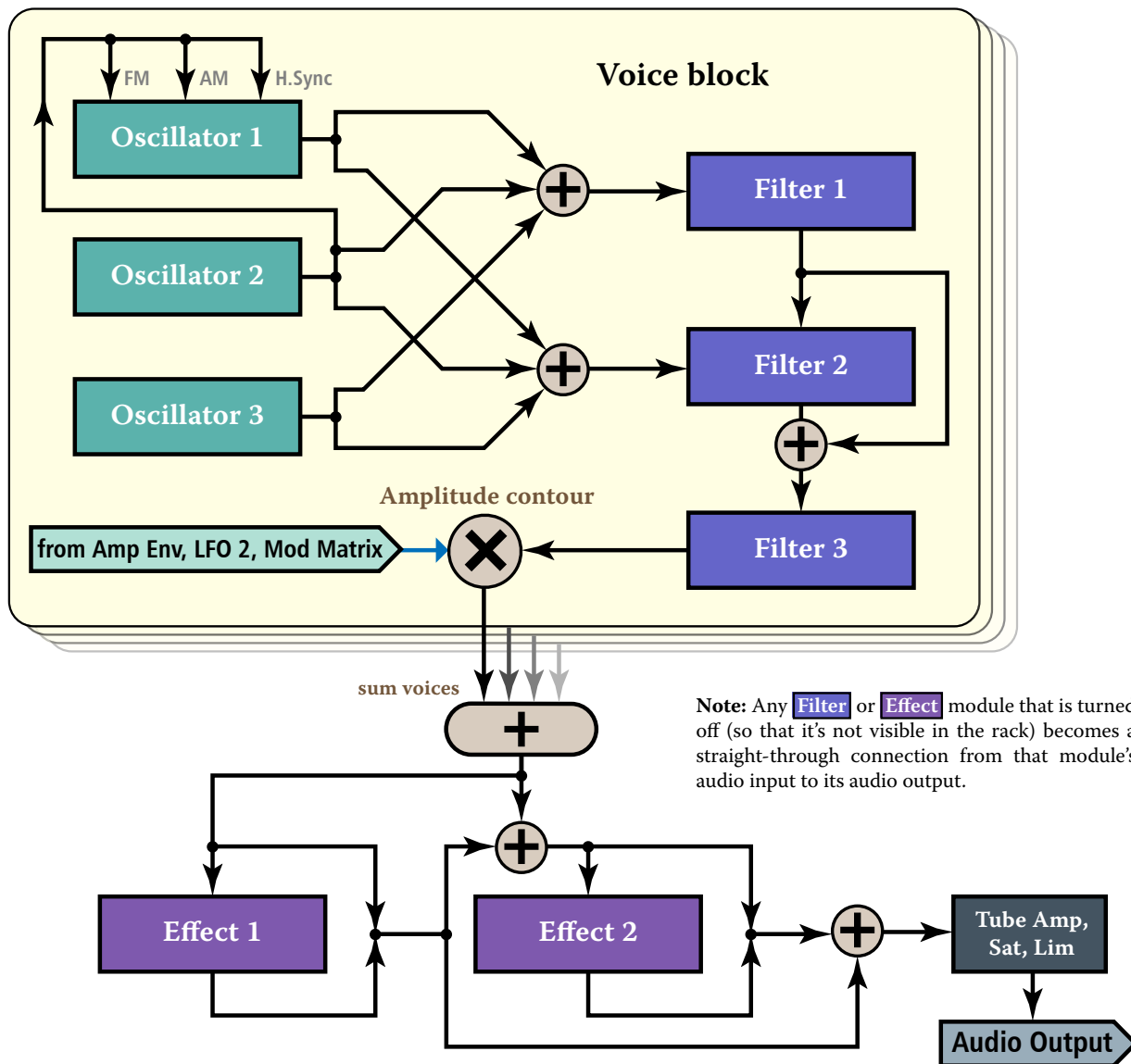
As you change the Type tag, select or deselect Modes tags, or perform a name search in the controls on the left side of the browser, the grid on the right will update to show only presets that match the Type and at least one of the selected Modes. If you're searching by name, the list will show just presets that contain the text you type into the Name Search box as well as matching the selected Type and Modes.

At the bottom left are buttons that let you create a new preset or delete the selected one. Enough said.

If you've chosen to have Notes visible in the browser (you can change this in the Settings dialog) then at the bottom of the browser will be a large box displaying performance tips, whatever notes the preset's author thought might be useful or informative, or perhaps a forgotten shopping list if the author was careless.

Audio signal flow

This diagram shows how audio signals, represented by heavy black lines, are routed within Entity. The modulation signal for amplitude contour is shown as a blue line. (For a more detailed version of this diagram, see the Audio Signal Flow chapter in the User Manual.)



Oscillators

The audio signal is generated by the oscillators. Each oscillator has two buttons controlling whether its output will be routed to Filter 1, Filter 2, or both. Audio passed through all actuated Filter 1 buttons is summed together, then sent to Filter 1's audio input; and likewise for Filter 2.

In addition, Oscillator 2's output is routed back into three internal inputs of Oscillator 1: FM In and AM In, each of which has a level knob so you can adjust how strong the FM and/or AM effects are, and Hard Sync, which you can switch on and off using the HSync button on Oscillator 1.

(In standard FM synthesis terminology Osc2, the source of the modulating signal, acts as the "modulator" and Osc1, the destination which is being modulated in amplitude and/or frequency, as the "carrier" for FM and AM.)

Filters

The filter chain can be configured in several ways by adjusting the Filt 2 and Filt 3 knobs on Filters 1 and 2. You can control how much of Filter 1's output is routed into Filter 2 and how much to Filter 3 by adjusting the Filt 2 and Filt 3 knobs on Filter 1's panel. Likewise, Filter 2 has a Filt 3 knob to adjust how much of its output gets sent to Filter 3.

Note that if any filter module is switched off, so it doesn't appear in the rack, it is replaced by a straight-through audio connection — in this case the Filt 2 and Filt 3 controls are bypassed as well.

Amplitude contour

After passing through the filters, the resulting audio signal has the amplitude (volume) contour applied. Typically this is generated by the Amp Envelope module; it may have an LFO applied as well, for a tremolo effect. Using the Modulation Matrix, any other modulation source can also affect the amplitude. All modulation sources routed to the amp contour will be summed together before being applied.

Voices

If Entity's retriggering mode is set to Poly, there will be one block of oscillators and filters per voice playing, up to the polyphony limit (which is set using the Voices knob on the System panel). The audio signals for all voices are summed just after the amplitude contour is applied to each voice, then the audio signal is passed to the effects chain.

Effects

The last stage in the audio signal path is the effects, including up to two user-selectable modules and three fixed units. First the incoming audio goes through the Effect modules. Like the filters, if an Effect module is turned off and so absent from the rack, the signal is routed straight through from that module's input to its output.

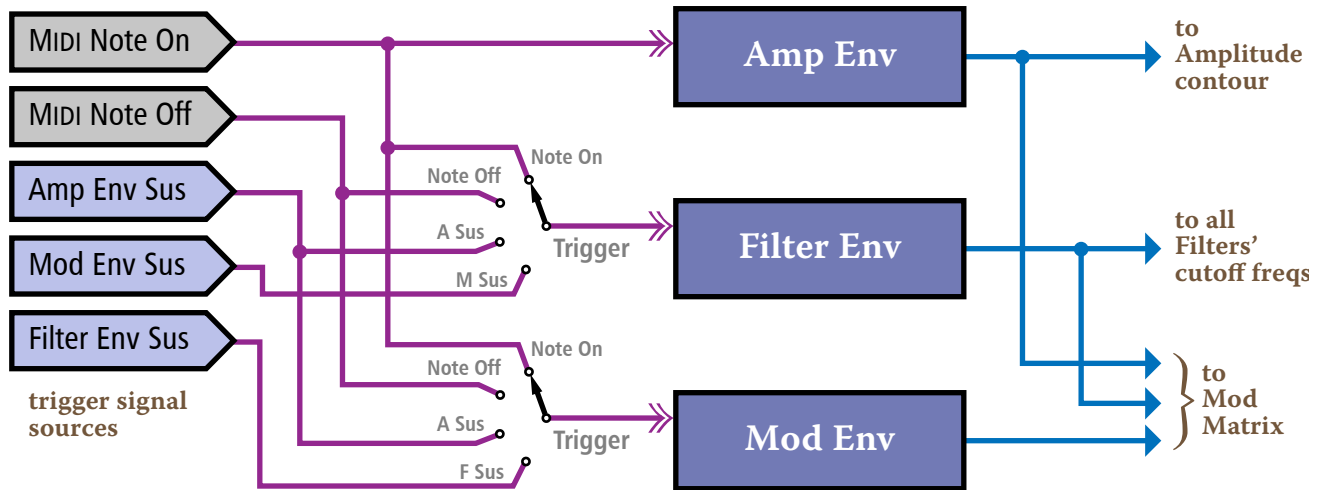
By adjusting the mix controls you can balance how strongly each Effects module alters the incoming audio signal, from subtle to "in your face." The FX2 Send control lets you pass the signal through from Effect 1 to Effect 2 — serial routing. Whether or not you use the send, the outputs of Effect 1 and Effect 2 are summed together.

The output of the Effects modules goes through the System panel's effects. On the System panel you can select whether to go through the Limiter first, then the Tube Amp, or vice versa. Whichever way you arrange the Limiter and Tube Amp, the output of that sub-chain goes into the Saturation unit.

At last the Saturation's output is sent to Entity's audio output, where your host software gets to "hear" the result.

Modulation signal flow

The diagram below shows how triggers and modulation signals are routed. This is the default configuration, without using the Modulation Matrix. Purple lines represent trigger signals that cause the envelope generators to begin their cycles, while blue lines represent the flow of modulation signals produced by envelope generators; in other words, the envelopes themselves.



Amp Envelope

The Amp Envelope has two fixed routings — first, its output always controls the amplitude (volume) contour. Using the Mod Matrix you can route the Amp Envelope’s output to other destinations as well, but the volume contour routing cannot be disconnected except by turning the Amp Envelope module entirely off. With the Amp Envelope module switched off (not visible in the rack) you get a simple gated effect, in which the sound simply switches on and off as a key is pressed and released.

Second, the Amp Envelope is always triggered by MIDI Note On events. The Filter and Mod Envelope generators have drop-down selectors that let you choose what triggers them.

Filter Envelope

By default the Filter Envelope’s output is routed into all three filters, where it controls the filters’ cut-off frequencies. If you want, the Mod Matrix lets you route any envelope’s output to other modulation destinations too. Using the Env Source drop-down you may also choose to have the Amp Envelope or Mod Envelope control any filter module’s cutoff instead of the Filter Envelope.

Unlike the Amp Envelope’s fixed trigger routing, the Filter and Mod Envelopes’ trigger sources can be chosen using the modules’ Trigger drop-down selectors. Your choices are MIDI Note On, MIDI Note Off, A Sus, and M Sus (for the Filter Envelope) or F Sus (for the Mod Envelope).

The “Sus” triggers occur when the corresponding envelope reaches the end of its decay stage and begins its sustain stage. This lets you arrange a two- or three-step chain reaction in which each envelope starts the next one running. A Sus triggers when the Amp Envelope reaches its sustain stage, M Sus when the Mod Envelope reaches sustain, and F Sus when the Filter Envelope reaches sustain.

Mod Envelope

Other than its trigger initially being set to Note On, the Mod Envelope has no default routing. To use it you must connect its output to a modulation destination using the Mod Matrix.

Low Frequency Oscillators

Though they can be set to repeat, envelopes typically define a one-shot note with a beginning, a sustained portion while the key is held down, and an ending. To produce a modulation signal that continues to vary in a cycle as time passes, you'll usually employ one or more LFOs.

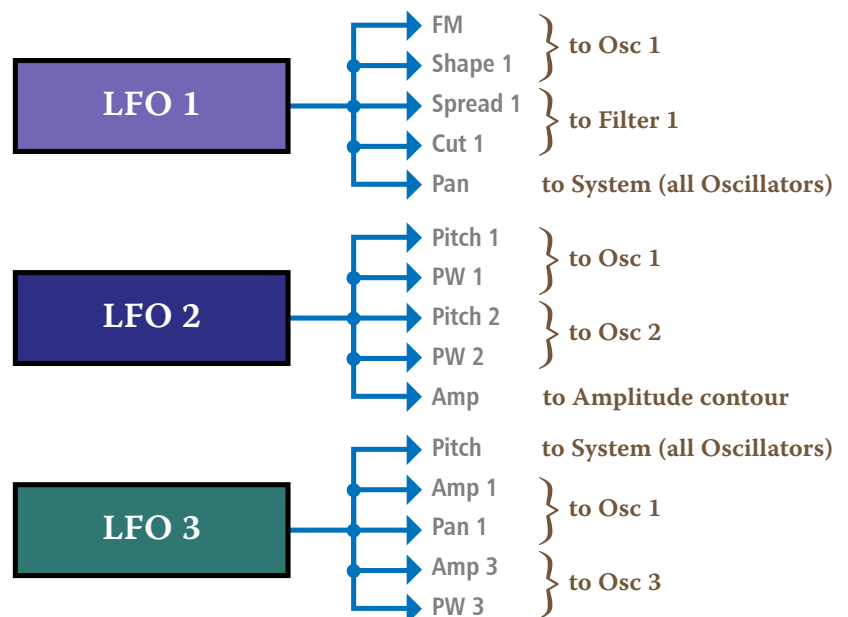
You can pick from a dozen waveforms for each LFO, with control over how much smoothing is applied to the output waveform. The LFO can be set to start at full strength immediately when a note is played, or to fade in over a length of time you determine.

Each LFO's frequency can be set to a fixed value using the Rate control, or it can be synchronized with the host's tempo — the LFO frequency in Hz equals the host tempo in beats per second (= BPM ÷ 60) multiplied by a user-selectable Rate Factor of $\frac{1}{32}$, $\frac{1}{16}$, $\frac{1}{8}$, $\frac{1}{4}$, $\frac{1}{2}$, 1, 2, 3, 4, 6, or 8. You can also determine the phase of each LFO with respect to the others.

LFO routing

The five knobs on each LFO are assigned to predefined routings so you don't have to use any of your six Mod Matrix units to achieve common sound design tasks. To modulate any or all of a LFO's five predefined destinations, set the corresponding control or controls on the LFO to any value other than 0.

LFO 1 is predefined to modulate your choice of Osc 1's FM and Shape, Filter 1's Cutoff and Spread, and the system Pan setting. LFO 2's predefined routings include Osc 1's Pitch and Pulse Width, Osc 2's Pitch and Pulse Width, and global Amplitude. LFO 3 is pre-routed to the system Pitch control (which goes to all oscillators), Osc 1's Pan and Amplitude, and Osc 3's Amplitude and Pulse Width.



If the parameter you want to modulate isn't in any of the predefined routings, you can route the LFOs' outputs nearly anywhere using the Modulation Matrix. That's the subject of the next section.

Modulation Matrix

To achieve routings that haven't been predefined, use the Mod Matrix. Each unit in the Modulation Matrix can connect one signal source to one or two destinations. The available sources and destinations are identical for each of the six matrix units. Here are the sources of modulation signals:

- * Amp Env module output
- * Filter Env module output
- * Mod Env module output
- * LFO 1, LFO 2, or LFO 3 module output
- * MIDI Pitch Bend
- * MIDI Mod Wheel
- * MIDI Aftertouch
- * MIDI Note Pitch
- * MIDI Note Velocity
- * MIDI Note On event
- * Random generator

And these are the modules (*) and the destinations (*) to which you can route modulation signals:

- * LFO 1, LFO 2, or LFO 3
 - * Rate
 - * Amount
- * Oscillator 1, Oscillator 2, or Oscillator 3
 - * FM (Osc 1 only)
 - * AM (Osc 1 only)
 - * Pitch Left or Pitch Right
 - * Amplitude Left or Amplitude Right
 - * Noise Sample Rate (Osc 1 and Osc 2 only)
 - * Shape
 - * Pick Time, Tone, or Brightness
 - * Wind Turbulence, Vibrato, or Pressure
 - * Pulse Width
 - * Pan
 - * Amplitude
 - * Pitch
- * Filter 1, Filter 2, or Filter 3
 - * Resonance
 - * Cutoff 1 or Cutoff 2
 - * Drive
 - * Filter 2 Send (Filter 1 only)
 - * Out Level (Filter 1 and Filter 2 only)
 - * Spread
- * System
 - * FX Send 1 or FX Send 2
 - * Pan
 - * Amplitude
 - * Pitch

To use a Mod Matrix unit, first add a module to your rack using the Module List. Scroll to the module, then choose the source and destination for your modulation. Each half of the two-unit mod matrix module has a Source drop-down selector and two Destination drop-downs, Dest A and Dest B.

For each Destination selected, the corresponding Dest A or Dest B level knob will be enabled; knobs corresponding to Destinations of "Off" will be grayed out. The higher the setting, the stronger the modulation signal will be sent to that destination, up to a maximum of 100%. This lets you control multiple modulation destinations with the same signal, but with a more dramatic effect on some modulated parameters than others.

What next?

Now that you've been introduced to Entity's modules, and you know how to find your way around the preset system, why not go on a first date?

The best way to learn is by doing — so if you haven't already done, open your host program and start a new project featuring Entity. Listen to the factory presets and figure out how they work. Keep your ear open for timbres and techniques you'd like to use in your music, or in your own sound designs. Take Entity out to your favorite club, then share döner kebabı and late-night laughs as the two of you discover how much you have in common!

... But that might be getting too far ahead. For now, just play around and see what happens.

Enjoy!