Inferno Example

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To help you better understand how to efficiently build your own synths, we've included information on basic construction of the Inferno and Blue Synth synthesizers.

We'll start with the Inferno.

When you first double-click on the Inferno module, you should see an arrangement of modules as shown above. The module you want is called ‘Layout’. Double-clicking on this will get you to the innards of the Inferno synth:

It may look like a lot of modules, but, the Inferno Synth is actually a fairly simple design. Also, we have arranged the pads so that the graphical flow is easier to see. To do this, the standard convention of Inputs on the left and Outputs on the right was ignored, as otherwise the connections would be crossing at places where it would be hard to read, etc. By changing the location of the pads (connections) on certain modules, we tried to arrange the visual presentations of the Inferno and Blue Synth so that you could more easily see the signal flows of the layout. You can easily change these by using the 'Change Pad Orientation' icon in the Module Properties Design window, Pads drawer.

Now let's take a look at some of the sections of this synthesizer. We'll start with the oscillator/signal generating section:

The Inferno synth uses the Multi Mode Oscillator (MMOsc 6) for its main waveshape source, but there is also a "sub" oscillator, which is created by taking the Frequency control (sent from the MVC through the Pitch Mod block), routing it to a Frequency Multiplier (Freq Mult) and, by using a value of 8388607 as the multiplier, deriving a value one octave below to send to the Raw PWM oscillator. The Raw PWM oscillator generates a square wave when there is a value of zero or no input to the waveform (WF) pad, so this oscillator in the Inferno synth is only a square wave. However, you could easily attach a front panel control knob to the PW pad, and make it variable!

The outputs of these 2 oscillators are then fed into both a Mix2 mixer and a ring modulator. Those outputs are then sent to another Mix2 for final output to the next section. Notice that there is a standard control pot (blue), set at maximum value, attached to both of the mixers' C1 control inputs. This guarantees constant full level output of Input 1 for both mixers. The C2 pads are attached to knobs on the Inferno's front panel to vary the level of the ring modulator and the sub-osc.

There are also 2 LFOs in this picture, one for vibrato of both oscillators, the other for pulse width modulation of the MMOsc. They are the Tiny Sine (TS) LFOs (notice that they are the same module, but with different pad orientations, as explained above).

There are several Pitch Mod blocks one can use to route and control modulation signals; we used the Pitch Mod 3M R5 (PM3M R5), which provides 3 mod inputs, each with their own level control. It takes the Frequency signal from the MVC and modulates it exponentially by the signals coming in at M1, M2 and M3, sending out a combined frequency control signal for the oscillators. The Tiny Sine LFO to the left of the PM3M provides the oscillators' vibrato, and is controlled by the Pitch Mod section of the Inferno's front panel. The Pitch Mod Depth is attached to the TS LFO Gain input, but could have also been attached to the PM3M Level 1 (L1) control input. In this case, we are using L1 to receive MIDI Mod Wheel Control information to additionally control the LFO depth. The other TS LFO is routed through a Switch module (SSwitch), so that we can switch the control of the pulse width from LFO to Manual control (Input 1 of SSwitch is attached to the Width pot on the front panel).

Now let's take a look at the filter, shaping, and final output stages:

(The layout has been edited a little for this description; the Mix2

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Here the signal path flows in a very typical way, from the Mix2 through a Low Pass Filter (LP 4pole BR4), Overdrive Amp, LVA, Mixer 16, and finally, Chorus. The only items demanding special comment are the ADSRs and filter modulation.

There are 2 ADSRs (envelope generators) providing a ”shape” to the sound. The overall shape of the sound (Amplitude) is provided by the ADSR EG 5 attached to the Linear Volume Attenuator (LVA). This ADSR’s level is controlled by Velocity (Vel Amt is connected to the front panel Amplitude – Vel pot). It’s output is uni-polar, which is required by the LVA’s Volume input.
The other ADSR is a Pitch EG version (ADSR PEG 5), which means the envelope output is scaled around zero (bi-polar). It also has an inverted output. You want to use a Pitch EG when controlling the frequency of something, such as an oscillator, LFO, or Filter (Cutoff). In this case, both ADSR outputs are routed to a switch, then to another Pitch Mod block (PM 2C2 R5) which is connected to the filter’s frequency control pad for modulation.
The level of this ADSR PEG is controlled by both Velocity and the Env pot in the Filter section on the front panel. The ‘async multi poly’ module is needed to combine the 2 asynchronous signals (Velocity and the Env pot) for the ADSR Vel level control input. The Filter’s Cutoff is actually controlled by a pot connected to the C1 pad of the Pitch Mod block.