HILDA

COMPLEX OSCILLATOR SECTION

The top-left section of the synth is reserved for the complex oscillator. This contains almost half the controls of the signal flow, so you can probably guess that this is the most important part of the instrument.

1. Waveform - morphs the primary oscillator shape from triangle, through square, to sawtooth to give access to different harmonics and timbres as a starting point

2. Frequency - (de)tune the primary oscillator relative to the current/last played note

3. Glide - set the time it takes the oscillator to slide from the last frequency to the next

4. Timbre - Skews the wave shape to change its base timbre. Works best in conjunction with the wavefolder

5. Wavefolder - the famous 'west-coast' waveshaper: it blows up the signal and folds its peaks around, adding a very musical bite to the signal. The effect is strongest when applied to triangle or sawtooth shapes

6. Slope modulation - this lets you apply the slope modulator to the wavefolder

7. LFO modulation - this lets you apply the LFO to the frequency that is sent to the suboscillator ratio. When set to 0 the frequency input into the suboscillator will be static. When > 0 the frequency will fluctuate around the center frequency

8. LFO modulation - applies the LFO to the wave shape selection to make it change harmonics over time

9. Ratio - determines the frequency ratio of the suboscillator in relation to the main oscillator. E.g. When set to 1, the frequency of the subosc will be the same as the main osc. When set to 0.5, the subosc will be exactly one octave lower than the main osc, etc. The ratio applies to the FM, the sub tone, and the cross-ring-mod

10. FM amount - uses the suboscillator to perform frequency modulation on the main oscillator, adding lots of harmonic sidebands to the sound

11. Suboscillator level - this determines how much of the suboscillator tone is mixed in with the main oscillator

12. Cross-ring-mod - this is a combination of a traditional ringmod and a cross modulation. It adds both harmonic and inharmonic sidebands to the signal

13. LFO + Slope mod section - this combines settings for slope mod and LFO mod and applies them to both the FM amount and Xring amount. The LFO and slope are first multiplied and then applied, so they always interact with each other

MIX & PRE-AMP SECTION

14. Noise level - sets the level of brown noise that's being mixed in with the oscillator signal. Brown noise has a spectral distribution that is more common in nature than white noise and is generally perceived as more pleasant

15. LFO modulation - applies the LFO to the noise level

16. External input balance - sets the balance between incoming external signals and the internal oscillator + noise levels. Note: this only works when Hilda is loaded as an Audio Unit Effect plugin. In instrument/standalone mode the external input will be silent

17. Mixer/amplifier - this mixes all inputs (oscillators, noise, external signal) together. Move it counter clockwise to give everything more headroom and get a cleaner signal. Move it beyond 12 o'clock and all signals will be squashed and saturated

18. Bent circuit - this sends the signal through a circuit-bent recorder, adding unpredictable wobble, distortion and detuning

FILTER SECTION

19. Filter type - sets the topology of the filter circuit. The filter is based on an old Oberheim design which lets its 4 poles be configured in unusual ways. There is also a 'bypass' mode which disables the filter

20. Cutoff frequency - effect differs for each selected filter type, but generally it sets the frequency where the filter magic happens

21. Filter drive - overdrives the internal feedback loop, adding bite to the filter's sound

22. Resonance - uses filter feedback to emphasise frequencies around the filter cutoff point

23. LFO + Slope mod section - combines (multiplies) the values of the LFO and slope modulators to dymically change the filter frequency. The current cutoff

setting determines the maximum: the cutoff will move between 0 and the cutoff dial's setting.

VCA & LOWPASS GATE SECTION
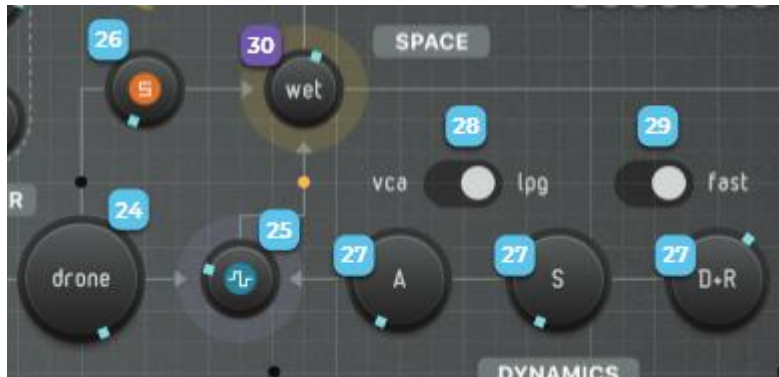
24. Drone level - determines how much of the signal is sent through the VCA/LPG section and how much is allowed to bypass it completely.
Sound that bypasses the VCA/LPG circuit can be heard without triggering a note (unless affected by the Slope Mod [26])

25. LFO mod - applies a tremolo effect on the output of the VCA/LPG circuit

26. Slope mod - allows a (user triggered) rhythmic effect to be applied to the signal that bypasses the VCA/LPG circuit.

27. VCA envelope settings - set the relative times and levels for the VCA or LPG circuits. Decay and release share one setting because they use the same circuitry in the internal 'hardware' design

28. VCA - LPG selector. This switches between a traditional VCA and a west-coast style Lowpass Gate. Read more about Lowpass Gates below

29. Fast mode - switches between short (fast) and long (slow) ADSR times

SPACE SECTION

This circuit is loosely based on an effect chip originally designed for cheap karaoke machines, but these days popular in DIY guitar pedals due to its lo-fi sound character. Its 1-bit oversampling design adds a nice bit of noisy character as echoes decay into aliased artifacts.

30. Wet/dry level - how much of the signal is sent through the fx

31. Delay time - the duration of the delay line (this is tempo synced)

32. Feedback - the amount of the delayed signal that gets fed back into the delay line.

33. Lowpass filter - a 6dB lowpass filter to reduce the noise and artifacts

34. Output gain level - the volume of the audio coming out of the plugin

MODULATION SOURCES

35. Slope attack/release - The slope is an envelope that is triggered every time a note is played. These dials set the upward and downward curves

36. Slope Cycle - when enabled the slope will retrigger itself indefinitely when it has completed its downward curve (in addition to note triggers)

37. LFO frequency - sets the speed of the LFO from very slow to audio rate

38. LFO mod - this modulates the LFO value with an additional sinewave

39. LFO shape - sets the type of LFO shape

40. Wow - this affects the stability of a dozen parts of the signal flow, causing fluctuations, subtle distortions and other things that make the sound a little bit less static

LIVE PADS (LIVE EFFECTS)

41. Bit stretcher - a formant-like lo-fi distortion

42. Flanger - the effect increases as you move further from the touchpoint

43. Time slowdown - this emulates a temporaray tape slowdown effect

44. Reverser - hold the touchpoint to record, release to play

45. Chopper/repeater - record a short soundslice and repeat it while holding and moving over the touchpoint