

# Diwa



## Diwa User Guide

version 1.2 – Howard Scarr 2013

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# Introduction

## to get the most out of Diva, you will need a powerful computer

Diva is rather demanding in *divine* mode, but that's the price we pay to hear her wonderful voice in top form. If your computer stutters while trying out presets, switch the accuracy mode to *fast* or even *draft*. You will soon learn which one your system can handle. Monophonic presets without voice stacking should be no problem, even on older computers. If your computer is fairly new, try the *multi-threaded* option which distributes active voices across multiple CPU cores. You should generally render tracks to audio in the highest quality – to do this, set *OfflineAcc* to *best*.

This manual assumes that you know the basics of subtractive synthesis. If you have any queries or would like to join a lively discussion about Diva and/or other u-he products, feel free to post a message in our [forum](#).

## install / uninstall

Go to the [Diva page](#), grab the appropriate installer, double-click on the downloaded file and follow further instructions.

Diva is fully functional in demo mode except for an intermittent crackling that disappears as soon as the product is registered (by right-clicking on the patch name and selecting the first entry).

To uninstall, delete the plugin and all associated files from the following directories (these locations depend on the paths you chose during installation):

|                     |  |
|---------------------|--|
| Windows presets     | ...\\VstPlugins\\u-he\\Diva.data\\Presets\\Diva\\                  |
| Windows preferences | ...\\VstPlugins\\u-he\\Diva.data\\Support\\ (*.txt files)          |
| Windows themes      | ...\\VstPlugins\\u-he\\Diva.data\\Support\\Themes\\                |
| Mac presets         | MacHD/Library/Audio/Presets/u-he/Diva/                             |
| Mac presets (User)  | [you]/Library/Audio/Presets/u-he/Diva/                             |
| Mac preferences     | [you]/Library/Application Support/u-he/com.u-he.Diva... (*. files) |
| Mac resources       | MacHD/Library/Application Support/u-he/ (Diva/ and Themes/)        |

## online resources

For Diva support and other u-he products, go to the [u-he website](#)

For a lively discussion about u-he products, go to our [forum](#) at KVR

For video tutorials and more, go to our [youtube channel](#)

For thousands of u-he presets (commercial and free), go to the [patch library](#)

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## the u-he team

- Urs Heckmann (code, concept, design, discipline)
- Clemens Heppner (geek stuff, more code)
- Sascha Eversmeier (even more code, but different)
- Howard Scarr (sounds, words, videos, unused ideas)
- Fritz Hildebrandt (support, smiles, everything)

## special thanks

- Vadim Zavalishin and Andy Simper for their invaluable input about zero delay feedback filters
- Alexander Hacke and Hans Zimmer for lending us some of their analogue synthesizers
- The beta-testers and everybody who contributed presets (over 1200 using only the public beta!)
- Brian Rzycki for keeping [PatchLib](#) up and running
- Nathaniel Reeves of <http://nkurence.com/> for kindly polishing the Diva logo

# the spirit of analogue

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Diva captures the spirit of various analogue synthesizers by letting the user select from a variety of alternative modules. The oscillators, filters and envelopes closely model components found in some of the greatest monophonic and polyphonic synthesizers of yesteryear.

But what sets DIVA apart from other emulations is the sheer authenticity of the analogue sound. This comes at the cost of quite a high CPU-hit, but we think it was worth it: Diva is the first native software synth that applies methods from industrial circuit simulators (e.g. PSpice) in realtime. The behaviour of our zero-delay-feedback filters when pushed to the limit clearly demonstrates the advantages of this groundbreaking approach.

## about zero delay feedback filters

Most filters in old analogue synthesizers have one or more feedback paths. The input signal passes through a series of controlled resistors and condensers, and the output is fed back into the input (or to another point within the signal path). The classic Moog™ ladder filter has four simple lowpass filter stages and a resonance control that determines how much of the signal is fed back into the input. This feedback loop doesn't introduce any delay, feedback is practically instantaneous...

Digital models try to reproduce this behaviour by calculating the result of applying four simple lowpass filters to an input sample. Feedback means repeating the current calculation using the results of the previous one.

While real circuitry can process a signal within a few nanoseconds, digital models calculate per sample, adding about a million times as much latency to each iteration. The cumulative effect of feedback latency in digital emulations is very noticeable. Oversampling and higher sample rates help reduce the latency, but conventional digital filters always “smear” at high resonance levels.

Methods of addressing the latency problem have been available for many years, but such implementations either don't model the complex distortion inherent in real circuitry, or they aren't suitable for realtime processing. Common to all methods is that they **predict** output values and use that prediction in the current calculation.

Of course we can't see into the future either, but our routines are fast enough to deliver at least a few voices in realtime. We calculate the filter with a few test samples and look at the deviation between the prediction and the result, then we use that deviation to calculate a better prediction. The goal, of course, is to close the gap as quickly as possible!

Diva applies a classic trial-and-error principle but includes a rather intelligent way (or so we like to think) of learning from mistakes. As a rule of thumb, Diva's filters only need to be calculated once or twice in succession. However, it can take up to 15 cycles if e.g. the resonance is very high and the input is very complex e.g. includes noise.

## accuracy

Click on the **Main** button at the bottom of the window. To the right of the Master section are two selectors called **Accuracy** and **OfflineAcc**. In the current version of Diva these are global parameters i.e. they remain fixed across all presets, per loaded instance:

*draft*.....CPU-friendly, but FM will sound rough and resonance is primitive i.e. NOT zero delay!  
*fast*..... Fine for older computers and/or when you need more polyphony in acceptable quality  
*great*..... The best compromise between quality and polyphony on high-power computers  
*divine*..... Top-quality zero delay feedback filters... but can your computer handle it?

**OfflineAcc** only has two options – *same* or *best* (i.e. *divine* in the current version).

Some host applications may have problems rendering to audio at the selected accuracy, but the better ones include an “inform plug-ins of offline rendering status” or similar.

# loading presets

Click on the **Patches** button at the bottom of Diva's window. Select folders from the bottom left panel, then presets from the main area. The root (*Local*) directory contains a selection of presets from the subdirectories. A white square next to a folder name means that the folder is collapsed – click the square to expand it!



The folders numbered 1 through 7 contain a bunch of presets sorted according to category.

**TEMPLATES** contains a bunch of very basic patches you can load whenever you want to start from scratch while programming your own sounds.

**THIRD PARTY** contains several banks of presets sorted by sound designer, plus a special sub-directory called *TREASURE TROVE* – open this for hundreds more sounds!

The bottom righthand area of the Patches window contains patch information the sound-designer has stored with the preset, e.g. what the preset is best for, which controllers are used etc..

## MIDI Programs folder

*Local* also contains a special folder called *MIDI Programs*, which is initially empty. If you put a bunch of patches (up to 128) in there, they are **all** loaded (into a cache, for performance reasons) when the first instance of Diva starts. Important: changes take effect after restarting the host software: *MIDI Program* patches cannot be added, removed or renamed on the fly.

Individual patches are selected via MIDI program change messages. As they are accessed in alphabetical order, it is a good idea to put a number at the beginning of each name e.g. '000 rest-of-name' to '127 rest-of-name' or similar.

Banks: The MIDI Programs folder can contain up to 127 sub-folders (of 128 patches each), and these are switchable via MIDI bank select messages 1-127. The MIDI bank select message is CC#0 (Diva only interprets the MSB) – send this value, then a Program Change message.

## favourites, junk, reveal

Right-click in the *Presets* panel to open a context menu: You can classify the current selection as *Favourite* or *Junk*. Favourites are marked with a bright star. Junk will disappear immediately, but can be made visible (appears with a 'Stop' sign) by selecting *show Junk* in that same menu. "Reveal in..." highlights the clicked preset in Finder/Explorer.



## saving presets

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Select the folder where you want to put your sounds. The *User* folder is initially empty, and is therefore a good place to start – although it appears at the very bottom of the list!

Note: In recent versions of the MacOS Finder, the User folder (*~/Library/Audio/Presets/u-he/Diva*) is invisible, as is the enclosing Library folder. To make the Library folder visible, start the Utilities / Terminal application and type (or copy/paste) in the following, followed by ENTER:

```
chflags nohidden ~/Library
```

To save, click on the button at the top left. A window opens in which you can give your sound a name, enter your name (as author) and any details you wish to add: preset description, preset usage etc.. Then confirm by clicking on the *apply* button.

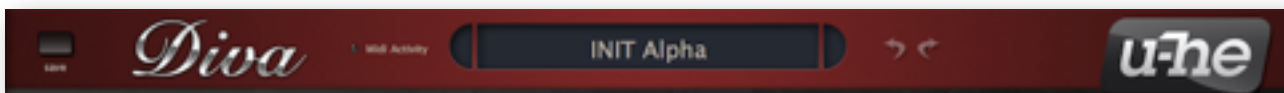
Right-click in the folders pane to create a new folder, refresh the list (necessary whenever folders or presets are added using Finder/Explorer) or highlight the clicked folder in Finder/Explorer.

## drag & drop functions

Drag presets into other folders to move them. Multiple selection is also possible: Shift+click selects a region, cmd+click (Mac) / ctrl+click (PC) selects/deselects individual presets.

## editing

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## data display

Primarily, the central display shows the name of the selected patch or the current value of any element being edited. Clicking on the areas either side of the display steps through patches. Clicking on the display opens a drop-down list containing all the patches in the current directory.

## undo/redo

The two arrow symbols call Diva's *undo* and *redo* functions, with an unlimited number of steps.

## GUI size

Right-click on any blank area in Diva to change the size. Note: At the time of writing, 8 sizes are available and the only 'skin' is the original. A custom skin editor with a very sophisticated scaling system (which should also make the labeling much clearer) is in development.

## knobs

Values are adjusted via the usual click-and-drag, often allowing finer resolution via the SHIFT key on your computer. Knobs can be reset to their default values via double-click, and remote-controlled / automated via right-click (the [MidiLearn](#) function).

Tip for wheel-mouse owners: 'mouseover' and roll the wheel to edit values.

## master volume

To change the overall level, click on the **Main** button at the bottom of Diva's window and adjust the large knob in the centre of the Master sub-panel.

## modification symbol

Wherever this symbol appears, it means that the neighbouring parameter is being modulated from within the [Modifications](#) panel.

# Upper Panels

While checking out the presets you must have noticed that the main modules can be swapped out. Simply click on the label at the bottom of each module, then select from the list. You don't have to click on the grey triangle – anywhere on the label will do.

Some smaller labels within each panel also have grey triangles. Click on these labels to replace default modulation sources. Selected sources other than the default appear as *Dymo™* tape – call us crazy, but we rather like the retro-look of sticky labels on custom-modified hardware!

## oscillators

Diva offers 4 different oscillator types: **Triple VCO** (morphing oscillators with FM, sync and filter feedback), **Dual VCO** (multi-wave oscillators with sync, PWM and cross mod), **DCO** (single two-wave oscillator with PWM and flexible sub-osc) and **Dual VCO Eco** (CPU-friendly, pulse width, ring modulation). All of these include a noise generator. Some of the parameters, although practically the same, have different names in different models. Perhaps unnecessary, but more “authentic”!

Note: the output levels of oscillators can have a significant effect on the tonal quality of the filters. The Dual VCO and DCO models, neither of which currently include volume controls, might include these in future versions. Either that, or the filters will include input gain controls (yet to be decided).

### TRIPLE VCO

The most complex and CPU-hungry oscillator model, Triple VCO stretches across two panels...



The **upper switches** on the left activate pitch (tune) modulation for each oscillator. To specify a modulation source other than the ENV2, click on the label and select from the list.



Example: *modulation wheel* is controlling oscillator 2 pitch only, as only the middle switch is active (indicated by the white dot).

**TUNE MOD** specifies the amount of pitch modulation. This knob is bipolar i.e. the amount of modulation can be either negative or positive. You won't hear any modulation if this is set to zero, as shown here!



Similarly, the **lower switches** activate waveform (shape) modulation – see WAVEFORM below. To specify a modulation source other than LFO2, click on the label and select from the list...



Example: *envelope 2* is modulating the waveforms of oscillators 1 and 2, but not oscillator 3.

**SHAPE MOD** specifies the amount of waveform modulation. This knob is also bipolar i.e. the amount of modulation can be negative.

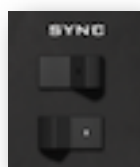


**FM 1->2/3** sets the amount that oscillator 1 frequency-modulates oscillators 2 and 3 (both equally). Frequency modulation is useful for complex, dissonant or even bell-like sounds.

Note: FM depth can be modulated in the [Modifications](#) panel.



The octave switches (**32' to 2'**) and **DETUNE** (oscillators 2 and 3 only) determine the oscillators' pitches. These controls are self-explanatory except for one special feature: The DETUNE knob acts like a 5-turn potentiometer that will also affect the octave switch: try turning it beyond 5 or -5 and see for yourself!



The **SYNC** switches enable hard-sync for oscillators 2 and 3 (they both synchronize to oscillator 1). The pitch of a synchronized oscillator should normally be higher than oscillator 1, or at least modulated upwards via TUNE MOD.

Tip: For the maximum range of sync sounds, set osc 1 to 32' and [Transpose](#) to 24.



Unlike in e.g. a Minimoog, the **WAVEFORM** controls are not switches, they are continuous – from ramp through triangle and sawtooth to square, followed by narrower pulse waves. For maximum PWM (pulse width modulation), set the waveform to 8.00 (25% pulse), switch on shape modulation (see above) for the oscillator and set the SHAPE MOD level to 10.00.



The **MIXER** panel contains volume controls for each oscillator as well as for the **NOISE** generator. Below the NOISE volume knob is a tone switch: **PINK** noise contains mostly low frequencies, while **WHITE** noise is full-range.

The **FEEDBACK** knob controls the amount of signal taken from after the main filter and fed back into the mixer – like Jan Hammer's trick of connecting the extra output on his Minimoog™ back into the audio input. Relatively low values of feedback cause a subtle bass boost, higher values can create subharmonics or even wild howling noises. Note that a natural side-effect of higher feedback is less obvious filter resonance, so you may have to compensate for this.

Although the mixer panel is an integral part of the Triple oscillator module, Feedback is also available for all the other oscillator types, as an alternative to high pass filtering – see [there](#).

Note: Feedback can be modulated in the [Modifications](#) panel.

## DUAL VCO

A simpler model than Triple VCO, but with the advantages of independent (split) pitch control as well as multiple waveforms within each oscillator...



The **two sliders** to the left control the width of pulse waves. **PW** sets the nominal width from very narrow through 50% to 100% (silence). The other adjusts the depth of pulse width modulation from the selected source (LFO2 by default), with zero in the centre. The switch below applies these settings to VCO1 only or to both oscillators.

The octave switches (**32' to 2'**) and **DETUNE** knob (oscillators 2 only) determine oscillator pitches. Again, DETUNE acts like a 5-turn potentiometer that will also affect the octave range.

The central **SYNC** button synchronizes VCO2 to VCO1. When switched on, the pitch of VCO2 should be set higher than VCO1 (or at least modulated upwards). Tip: For the maximum “sync sweep” range, set VCO1 to 32' and [Transpose](#) to 24.

The 4-way switch (**1 / BOTH / 2 / SPLIT**) specifies pitch modulation targets for a pair of sources (ENV2 and LFO2 by default). To modulate VCO1 and VCO2 independently, select SPLIT here.

The two vertical rows of buttons select **waveforms**: Triangle, Saw, Pulse/PWM, Noise (VCO1 only) and Sine (VCO 2 only).

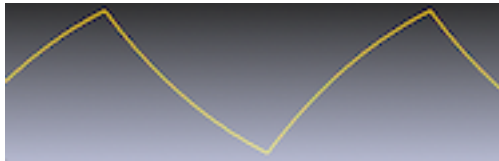


**CROSS MOD** (cross modulation) is similar to *FM 1->2/3* in the Triple VCO module (see the previous pages). The main difference here is that the cross-modulation amount can be modulated directly from within the oscillator panel.

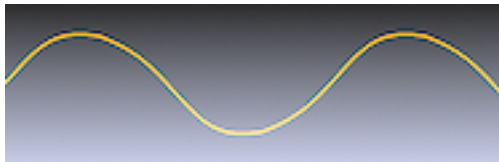
In this example, the amount of cross modulation is being (positively) controlled by the modulation wheel.

**MIX** balances the volumes of VCO1 and VCO2. Note: Because VCO1 includes a noise source, it made sense to allow MIX to be modulated via *Noise & Dual VCO Mix* in the [Modifications](#) panel. This means you can use e.g. an envelope or LFO to crossfade between the two VCOs.

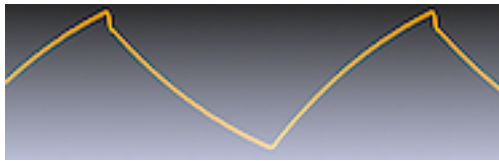
**SHAPE** gives you a choice of three Dual VCO “hardware revisions”. Although this switch affects the sound of all waveforms, it is most noticeable with triangles:



*ideal (sweetest triangle)*



*analog1 (looks like a sine, sounds like a triangle)*



*analog2 (triangle with a slight “tooth”, brighter)*

Note: These screenshots were made while playing the note C2. Like real analogue oscillators, however, the shapes of waves in Diva are not 100% the same at all pitches.



## DCO

This is a single oscillator model specializing in complex / bright waveforms with sub-oscillator.



The left half of this panel is the same as the Dual VCO but without the switches that pertain to VCO2. Without a second oscillator, cross-modulation is not possible, but this lack is tempered by the DCO's ability to add waveforms together.

The final waveform is the sum of three parts, **PULSE**, **SAWTOOTH** and **SUBOSCILLATOR**, each of which offers a choice of several different shapes. The result can be quite complex:



In the PULSE and SAWTOOTH selectors, the straight line means silence/off, and the 4th option from the top (in each case) reacts to pulse width settings:



*these two are the only waveforms that react to pulse width settings*

The SUB-OSCILLATOR offers six different waveforms, all based on pulse waves. The top four are all one octave below the main oscillator, the others are two octaves down.

Finally, to the right of the panel are sliders for the SUB and NOISE levels.

## DUAL VCO ECO

This model is fairly primitive because it emulates fairly primitive hardware. There is no PWM or FM here, but as its name suggest, ECO has the lowest CPU-hit. Also, it is the only oscillator model in Diva to include a ring modulator.

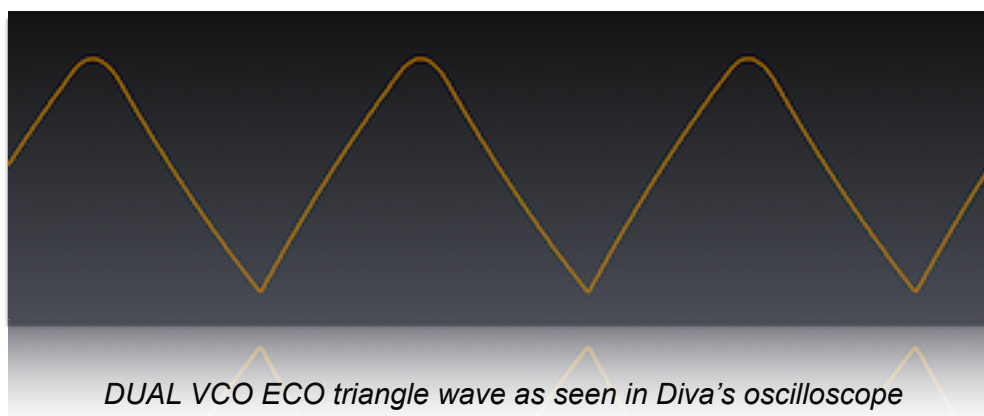


When switched to **RING**, the regular VCO2 output is replaced by ring modulation between the selected VCO1 wave and the VCO2 square wave.

Although the two oscillators can be tuned independently, both TUNE MOD sources (ENV2 and LFO2 by default) are applied to overall pitch.

Because VCO1 includes noise, its volume can be modulated via *Noise & Dual VCO Mix* in the [Modifications](#) panel.

One more thing: the shape of the triangle wave is rather interesting...





## high-pass filters / feedback

While the Triple VCO oscillator includes a mixer, the other oscillator models allow the central panel to be swapped. There is a choice of feedback (only), or one of three high-pass filter models...



*all four feedback / HPF panel options*

### FEEDBACK

The same as integrated into the TRIPLE VCO oscillator model (see [there](#)). The knob controls the amount of signal taken post-filter and fed back into the mixer. Effects range from mild bass boost to subharmonics / low-frequency howling.

### HPF | POST

Although located to the left of the main filter, this model is actually *after* the main filter in Diva's signal path. It doesn't affect the tone of the main filter by changing its input levels, but either boosts the bass (BOOST setting) or removes low frequencies from the (already) filtered signal.

### HPF | PRE

A high-pass filter *before* the main filter, with continuous frequency control. HPF | PRE can affect the tone of the main filter by sending it fewer low-frequencies to work with. Use this model e.g. to tame the output of the DCO oscillator, or to thin out a noise source etc..

### HPF | BITE

A complete high pass filter before the main filter, with cutoff modulation and resonance control. Unlike the similar-looking ECO oscillator, this is actually the *most* CPU-hungry option... so you can expect some powerful tonal shaping. Note: The resonance control is called PEAK here.

Two REV (revision) models are available, with different characteristics. But be warned – either of them can BITE!



# main filters

This is where a lot of Diva's magic happens. The current version offers four main filter models, each based on a classic hardware filter (or two): *Ladder*, *Cascade*, *Multimode* and *Bite*...

## VCF | LADDER



Classic 24dB per octave ladder filter based on the behaviour of a specific piece of monophonic hardware (the word on the street is that each unit that left the factory sounded at least slightly different – the one we borrowed is certainly special).

In addition to the original specifications, VCF | LADDER offers bipolar filter-FM from oscillator 1 plus a 12dB per octave (2-pole) option.

Either side of the *Cutoff* and *Emphasis* (resonance) controls is a pair of user-definable modulation sources (ENV 2 and LFO 2 by default) with amount knobs, plus a freely adjustable key follow control (KYBD).

Note: Emphasis (resonance) and FM amount can be modulated from the [Modifications](#) panel.

## VCF | CASCADE

A cleaner sounding filter than Ladder, CASCADE offers a very similar set of controls...



Purely in terms of features, the only difference between the Ladder model and CASCADE is the ROUGH / CLEAN switch. Apart from altering the overall tonal character, it has a noticeable effect on the amount of resonance at the top end of its range.

CASCADE is an all-rounder. It is particularly good for big smooth pads without generating too much grunge when input signal levels are high.

The **12dB** per octave switch (click on the LED) effectively removes two of the poles, resulting in a brighter sound while still retaining the overall character.

## VCF I MULTIMODE

Featuring extra high-pass and band-pass options, the multimode model is based on the filter in yet another classic polyphonic synthesizer or two...



All controls except the sliding switch should already be familiar, assuming you have read about the other filter models above.

**LP4** is a 4-pole low pass model and **LP2** is the 2-pole alternative.

**HP** is a high-pass (removes low frequencies) and **BP** a band-pass (removes both high AND low frequencies i.e. allows only a band of frequencies around the cutoff point to pass through).

## VCF | BITE

Although VCF | BITE seems to have no distinguishing features compared with the other models, it actually sounds **very** different...



The tone is highly dependent on input signal levels, the selected revision (REV) and the value of PEAK i.e. resonance. Like the corresponding [high-pass](#) module, the lowpass BITE filter is a real character, able to deliver anything from solid 2-pole to screaming mayhem.

Tip: If you want to hear a lot of resonance ("Peak"), try low oscillator volumes! Even as little as 10% can be just right.

# envelopes

The righthand panel comprises two envelopes one above the other, each with its own model selector. Note that the curves of envelopes *within the same hardware synth* (i.e. those used for amplifiers vs those used for filters etc.) often differ. This important but often overlooked detail has also been carefully modeled in Diva...

## ADS

Simplified ADSR with shared decay and release times. The Release stage can be switched off so that even a long decay will stop as soon as the note is released.



This envelope was modeled on that same “specific piece of monophonic hardware” mentioned above, but adapted for polyphonic use.

Tip: Before switching RELEASE on in envelope 1, make sure that DECAY is set to a value suitable as a release time.

**VEL** (velocity) determines how much the envelope level is modulated (scaled) by MIDI velocity.

**KYBD** (keyboard follow) scales the attack, decay and release times according to the MIDI note number. This makes the envelope of high notes shorter and low notes longer.

## ANALOGUE

ADSR type modeled on the envelope of another famous but unnamed analogue synthesizer...



## DIGITAL

Digital ADSR type modeled on a later (and significantly cheaper) successor to the above. The DIGITAL envelope contains two extra buttons labeled **C** and **Q**:



**C** (curve) affects the overall curvature, giving the envelope more of an 'S' form...



*DIGITAL envelope without / with **C**urve switched on*

**Q** (quantize) gives you a slightly steppy sound (think e.g. Alpha Juno, Matrix 1000 envelopes).



# Lower Panels

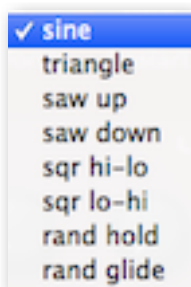
## LFOs

At the bottom left of all windows except *Patches*, you will see a pair of *low frequency oscillators*:



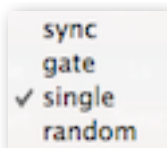
LFO 1 is also used as the direct source of vibrato, and LFO 2 is connected by default to several parameters in Diva's other modules (hence the labels in brackets).

The **Waveform** selector opens a list of all available LFO shapes:



*sine*  
*triangle*  
*saw up*  
*saw down*  
*sqr hi-lo* : a square wave that starts positive / high when *Phase* is at minimum  
*sqr lo-hi* : a square wave that starts negative / low when *Phase* is at minimum  
*rand hold* : a steppy random wave  
*rand glide* : a smooth random wave

The **Restart** selector has four options specifying when LFOs will be restarted:



*sync* never restarts – LFOs for all notes are in phase unless modulated apart  
*gate* restarts per note at the specified *Phase* (see below)  
*single* is similar to *sync*, but restarts at the next note after all notes are released  
*random* restarts at a random phase per note

- **Phase** adjusts where (within its cycle) the LFO waveform will be restarted
- **Delay** fades the LFO in, from immediate to about 20 seconds
- **Rate** offsets LFO speed (negatively or positively) from its nominal value
- **Rate Mod** controls the amount of rate modulation from a source specified in the neighbouring selector (*none* in the above image – try e.g. *ModWheel* or *KeyFollow* here)
- **Sync** is the rate/synchronization mode – 3 absolute times plus 24 synchronized to song tempo
- **Depth Mod** controls the amount of LFO level modulation from a source specified in the neighbouring selector (*ModWheel* in the above image). Tip: If the source is set to *none*, you can use the Depth Mod knob to reduce the LFO level.

## effects

At the bottom right of all windows except *Patches* you will see a pair of stereo EFFECTS. The upper selector specifies the kind of effect and the large LED to the left is an **on/off** switch.

The two effects are arranged in series. This means that you can even set up two reverbs, e.g. one for the early reflections and the other for the main reverb tail.

### chorus



- **Type** *Classic*, *Dramatic*, *Ensemble* are based on real hardware effects. The *Ensemble* type is especially rich – it can turn a raw VCO into a classic “string machine” sound.
- **Rate** is the modulation speed. Use low values for slow stereo effects.
- **Depth** is the modulation amount. Set to zero (with *Classic* or *Dramatic*) for static colouration.
- **Wet** is dry/wet mix. Subtle Chorus can add stereo width without making the sound too “washy”.

### phaser



- **Type** *Stoned* or *Flanged* – also based on real hardware effects. The *Flanged* type is more resonant, and is particularly interesting when applied to bright sounds.
- **Feedback** is the resonance amount control.
- **Sync** synchronizes the Phaser’s LFO to song tempo. See *Rate* below.
- **Stereo** width. Note that with the *Stoned* type, maximum stereo width is at +/- 25.00 (especially obvious if you turn *Feedback* up).
- **Rate** is the modulation speed. If *Sync* (see above) is on, the value is measured in beats i.e. quarters, so the rate actually gets slower as values increase. Example: For one cycle every 3 bars in 4/4 time, set this to 12.00 (3 times 4).
- **Phase** controls phase offset, from 0° to 360°.

## plate (reverb)



- **PreDelay** is a simple delay before the reverb starts. This is especially useful for retaining the closeness of the original signal.
- **Diffusion** adds a subtle chaos to the reverb, thus reducing metallic resonances.
- **Damp** causes higher frequencies to fade more quickly than low frequencies. Damping emulates the 'warming' effect of carpets, curtains, wood etc. in a room.
- **Decay** controls the time it takes for the reverb to fade out
- **Size** ranges from tiny bathroom to huge cathedral. Tip: It is well worth experimenting with all combinations of *Decay* and *Size*!
- **Dry / Wet** are level controls for the untreated and effect signals.

## delay



- **Left / Center / Right** delay times across the stereo field, always relative to host tempo (BPM). Integer values are exact semiquavers (quarter-beats), and *Center* defines the Feedback time. This configuration is unusual – it lets you set a repeat rate without hearing that particular “tap” (simply turn down *Center Vol* to zero).
- **Dry** is the level of the unprocessed signal.
- **Center Vol / Side Vol** are separate levels controls for the center tap and the stereo (L/R) taps.
- **Wow** emulates slow tape ‘wobble’, ranging from subtle/spacey to almost seasick.
- **Feedback** is the regeneration amount. 100.00 will give you an infinite loop if HP is set to minimum and LP to maximum... well worth trying out!
- **HP / LP** are cutoff controls for highpass and lowpass filters within the feedback path. Decrease LP for typical damping, increase HP to reduce the bass and mid frequencies.

## rotary

A realistic rotary cabinet i.e. Leslie™ emulation, with tube-like distortion.



- **Mix** is a dry/wet balance control
- **Out** attenuates or boosts the output level (whatever the *Mix* value)
- **Stereo** controls stereo width (you could call this “microphone separation”)
- **Balance** controls the relative volumes of the horn and bass speakers
- **Mode** (unlabeled) selects **Normal**, **SyncBass** or **NoBass**. In *Normal* mode, the horn and bass speakers rotate independently, in *SyncBass* mode they are phases-locked. *NoBass* mode switches the bass speaker off – you might have to reduce *Mix* a little to bring back the bass
- **Controller** determines which modulation source (mod wheel, breath, expression pedal or pressure) will be used to control the speed...
- **RiseTime** adds a variable lag to the selected controller
- **Slow** sets the *Slow* speed, with a range from about 10 seconds to 0.2 seconds (!)
- **Fast** sets the *Fast* speed, also with a range from about 10 seconds (!) to 0.2 seconds
- **Drive** is the amount of distortion. Note that distortion is also highly dependent upon the input level – if there is still too much distortion in the signal when *Drive* is set to minimum, turn down *Volume* in the *Amplifier & Pan* section, then turn up *Out* (see above).

# main

Selecting the **Main** button opens a set of three panels: TUNING, AMPLIFIER and MASTER...

## tuning



- **Vibrato** controls the amount that oscillators are pitch-modulated from LFO1 (remember that LFO levels also depend on the value of *Depth Mod*)
- **Glide** sets the basic portamento rate, **Glide2** is a bipolar offset applied to VCO2 (Dual VCOs and Triple VCO) as well as VCO3 (Triple VCO)
- **Range** is the portamento “strength”, a u-he speciality. Lower values shift the beginning of the slur closer to the target note – great for sloppy intonation effects!
- **GlideMode** has two options:
  - time*: however far apart notes are, the glide will take exactly the same amount of time
  - rate*: When notes are further apart, glide is proportionally slower
- **Fine** (fine tune) shifts the pitch over a range of +/- 1 semitone
- **Transpose** shifts the pitch in semitone steps over a range of +/- 24 semitones
- **Up** and **Down** set the pitch bend ranges, from 0 to 24 semitones
- **Microtuning**: Diva supports standard **.tun** microtuning. Hundreds of microtuning tables are available online, most of them free. Put all your **.tun** files into the following folder:
  - Win* ...\\Diva.data\\Tunefiles (specifically for Diva)
  - Mac* MacHD/Library/Application Support/u-he/Tunefiles/ (global for all u-he plugins)After loading a suitable tuning file, switch Microtuning on by clicking on the LED.

## amplifier & pan

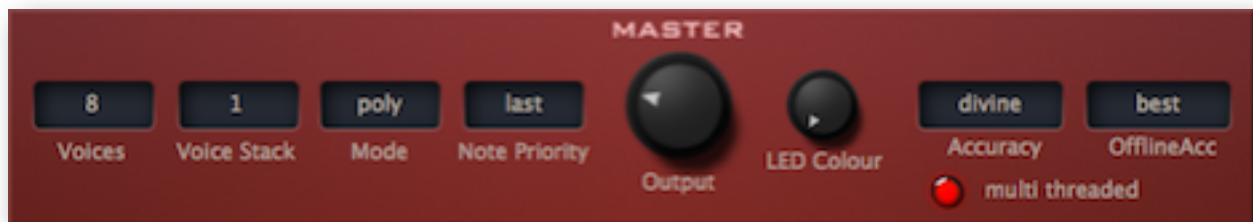


- **VCA** selection: either envelope 1 or a simple gate (freeing up Env1 for other purposes!)
- **Volume** is a bipolar gain control. Positive values can subtly overdrive the amplifier
- **Vol Mod** is for gain modulation (via the neighbouring modulation source)
- **Pan** (panorama) shifts the voice(s) towards the left or right channel
- **Pan Mod** modulates pan position. E.g. to pan stacked voices apart, use *StackIndex*



## master

This is perhaps the most important panel in Diva. **Accuracy** (for saving or “squandering” CPU power), voice polyphony and voice stacking, mono/poly modes, master output. Not forgetting the automation-capable **LED colour** knob!



- **Voices** sets the maximum number (2-12) of playable voices before note-stealing occurs. Mostly used to guard against audio glitches while running CPU-intensive patches. See also *Accuracy* and *multi-threading* below.
- **Voice Stack** sets the number of unison voices. Use the *StackIndex* modulation source and/or *stacked voice tuning* to offset stacked voices against each other.
- **Mode** has five options...
  - Poly*: standard polyphonic operation
  - Mono*: monophonic, each new note triggers the envelopes
  - Legato*: monophonic, doesn't retrigger until a space is left between consecutive notes
  - Duo*: duophonic, max. 2 notes, oscillator 2 follows the highest note (Note Priority is ignored)
  - Poly2*: a variant of Poly in which notes in their release stage are stolen before new voices
- **Note Priority** only applies to *Mono* and *Legato* modes. The options are...
  - last*: the most recent note is played (later, digitally controlled synthesizers)
  - lowest*: the lowest note (earliest and possibly best, most classic USA mono-synths)
  - highest*: the highest note (EMS plus most classic Japanese mono-synths)
- **Output** sets the final volume for a patch. As this control has no effect whatsoever on the tone, use *Output* in preference to amp *Volume* to balance levels between patches.
- **LED Colour** determines the colour of all indicator lights in Diva. Automatable...
- **Accuracy** is a VERY important global parameter, as it trades CPU-hit for realtime audio quality (especially resonance). See page 3 for details.
- **Offline Acc** is the accuracy used for offline audio rendering, and is also a global parameter
- **multi-threaded** causes Diva to distribute voices across multiple cores, which will usually allow more voices to be played simultaneously without overloading the CPU. To activate this feature, click on the LED.

Multi-threading works well on recent processors such as Intel i5 and i7, but please note that performance can even be *reduced* if your CPU is older. Also, this feature might interact with multi-threaded hosts in an unpredictable fashion (we haven't observed such problems so far).

*Important:* This option is not an adequate replacement for freezing tracks etc., its main purpose is to let users play as many voices as possible on a **single instance** of Diva. If your project includes several instances, make sure that as many as possible are *not* multi-threaded – certain combinations of hosts, drivers etc. are susceptible to drop outs / stalls when several instances are multi-threaded!



# modifications

Many synthusiasts enjoy experimenting with the more esoteric features of a synthesizer. Diva doesn't disappoint – click on the **Modifications** button to open the following panel:



The upper half includes options that aren't available in the main panels e.g. resonance modulation, plus a few that are only available in certain modules. The lower half contains a bunch of simple modulation processors with input selectors – see below for details.

## VCO

- **FM & Cross Mod Depth** lets you modulate the *FM amount* in the TRIPLE VCO (and perhaps future oscillator models) from the selected modulation source. Note that this feature mirrors the extra *Cross Mod* parameters in the DUAL OSC model.
- **Noise & Dual VCO Mix** lets you modulate the level of *Noise* (or the oscillator also responsible for noise) in all oscillator models, from the selected modulation source. For the *Triple VCO* and *DCO* models, this is easy because the noise generator is a separate audio source in both cases. In *Dual VCO* and *Eco* models, however, it modulates VCO1 level because noise is an integral part of VCO1. In the *Dual VCO* (not *Eco*) model, it does this by negatively modulating *Mix* – great for cross-fading between the two oscillators.

## filter

- **Resonance Mod** lets you modulate the *Resonance / Emphasis / Peak* parameter from the selected modulation source. There is no equivalent within the main oscillator panels.
- **Filter FM Mod** lets you modulate the amount of filter *FM* (OSC1) from the selected modulation source.

## feedback

**Feedback Mod** lets you modulate the amount of *Feedback* from the selected modulation source. This only applies if the oscillator model is *Triple VCO*, or *Feedback* is selected as the central module.

## modification symbol

This is not a button or knob, but simply a reminder that wherever the (M) symbol appears in other panels, the neighbouring parameter is currently being modulated in *this panel*.

## modulation processors

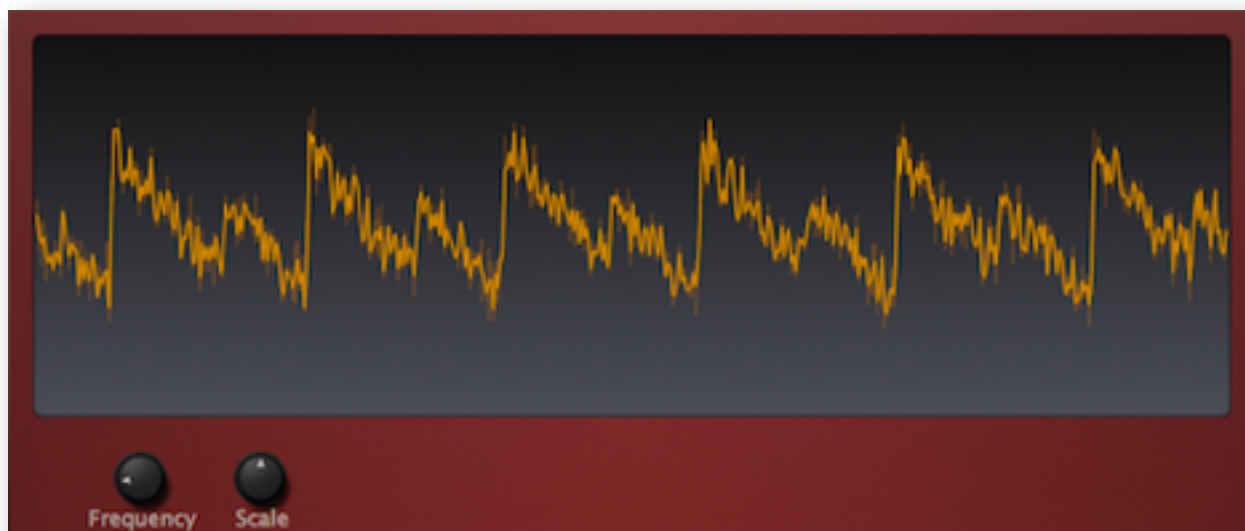
- **rectify** converts all negative values in a modulation source to positive values
- **invert** turns a modulation source upside-down, negative becomes positive and vice versa
- **quantize** creates discrete steps – the value is a division factor: the lowest value 2.00 means two steps if the input is unipolar (e.g. envelope), and four steps if it is bipolar (e.g. LFO)
- **lag** slows down abrupt changes in the source e.g. makes square waves more rounded
- **multiply** outputs the product of two modulation sources
- **add** outputs the sum of the modulation sources

There are several practical examples of how to use these functions in [Tips and Tricks](#).

## scope

---

Every synth needs an oscilloscope...



- **Frequency** controls horizontal resolution
- **Scale** controls vertical resolution

Note that the oscilloscope takes its signal from before the effects in Diva's signal path.

# trimmers

This panel is the most ‘esoteric’ part of Diva. As well as letting you detune voices (individual and/or stacked), a variable degree of **slop** can be applied to cutoff frequency, envelope times, pulse width and glide times. By popular demand, individual oscillators can now be reset to a definable phase...



- **LEDs 1-16** indicate which voices are currently being played.
- **VCO Voice Detune** lets you detune individual voices (per oscillator). Double-click to reset.
- **Voice Map Modulator** knobs specify values for the *VoiceMap* modulation source. Use this for any offsets you like, e.g. panning, cutoff, resonance
- **Max Detune** is a scaling factor for all VCO Voice Detune knobs. Keep low for “good tuning”!
- **Drift** is a slow wavering of the overall pitch. Keep values low for “good tuning”
- **Voices** mirrors the parameter in the Main / Master panel (see [there](#)).
- **Stack** defines the number of voices to be played in parallel (also mirrored in the Master panel)
- **Transient Mode** offers four options affecting how the first few milliseconds of new voices are handled in all voice modes except *Legato*. The effect is seldom obvious, but when attack times are set to minimum, choosing a different transient mode can make all the difference between *punchy* and *clicky*. Especially when set to the *osc reset* option (see *Reset Phase* below).
- **Bipolar Noise** is best left switched on. Included for reasons of compatibility with early presets!
- **Stacked Voice Tuning** sets the pitch of each stacked voice within a range of +/- 2 octaves
- **Reset Phase** only works if *Transient Mode* is set to *osc reset*. The 3 knobs set the phases at which the 3 oscillators will be reset every time a note is played. This feature is particularly useful for sounds in which the attacks need to be very consistent. Tip: the most percussive setting is seldom zero – you will need to experiment!
- **Cutoff Slop / Env Slop / PW Slop / Glide Slop** are similar to *VCO Voice Detune / Max Detune*, but apply to cutoff frequencies, envelope times, pulse widths and glide times respectively. These do not have individual knobs per voice, but an instantaneous *randomize* button (**rnd**) instead.

Note: The rows of detuners only have 8 knobs – patches with 12 or 16 voices reuse them.

# MIDI Control

## MidiLearn and MidiUnLearn

Diva can be remote-controlled / automated via MIDI messages from a hardware controller unit or from your sequencer program. Right-click any knob to open a menu containing *MidiLearn* and *MidiUnLearn*.

**Important:** Still undergoing a major redesign, the extra functionality described below should be considered 'beta'.

If you ever have problems with parameters magically resetting themselves, the usual reason is an *accidental MIDI learn*. Find the offending control, right-click and *MidiUnLearn* it.

## MIDI controllers

Diva's extended *MidiLearn* function lets you define how any parameter will react to MIDI CC (continuous controller) messages. Before you use *MidiLearn*, right-click on the data display and select the *MIDI Controllers* entry from the top of the list. The options are...

- **none** practically "MidiLearn Off", prevents accidental MIDI learns
- **normal** full range, standard
- **integer** whole numbers only
- **fine** between nearest integers, in 0.01 steps
- **octaves** 32' to 2' without changing fine tune
- **semitone** semitones/cents between octaves
- **fineSelected** the same as fine, but always controls the most recently selected element. Switch the mode to *fineSelected* and MidiLearn the knob/slider you would like to use as a general-purpose fine control. Note: It doesn't matter which of Diva's elements you right-click to do this.

The seven **page** options are not implemented yet, and should be ignored for now.

The last four options are used to specify the kind of hardware you are using. If in doubt, set this to the default *Continuous 7bit*.

- **Encoder 127** unipolar encoders
- **Encoder 64** bipolar encoders
- **Continuous 7bit** 7-bit MIDI CC (standard default)
- **Continuous 14bit** 14-bit MIDI CC

Note: MIDI remote control is channel sensitive. You can map up to 16 channels of any CC you like except *Modulation Wheel*, *Bank Select*, *Hold* or *All Notes Off*, for a grand total of over 1,900 mappable controllers!

# Tips and Tricks

Although Diva ships with a whole bunch of presets, she is meant to be tweaked – that's why the interface is festooned with all those controls! Here's a quick and easy tutorial to get you started.

## programming 101

1. Click on the *Patches* button at the bottom of the window, select the TEMPLATES folder and load the preset called **INIT June-60**. Now click on the *Scope* button – this opens the main edit panel AND Diva's oscilloscope.
2. Play a fairly low note (you do have a MIDI keyboard attached, right?). The shape you can see in Diva's oscilloscope is moving in time with the *tone* of what you are hearing...
3. Find the Transpose knob in the lefthand (DCO) panel, and change it to 16' (was 8'). The oscillator is now an octave lower (play that keyboard).
4. To the left of the Transpose knob are two sliders. Double-click on the one labelled LFO2. The value of that slider (which controls pulse width modulation depth) is reset to the centre and the sound has become static. Move the leftmost slider up and down while playing a low note. Watch how the shape changes, then leave it at minimum.
5. What you hear (and see) is a 50-50 mixture of 50% PULSE (i.e. square) and SAWTOOTH. Click on the first SAWTOOTH option (the straight line i.e. silence) to isolate the pulse wave. Try the different HPF values, then leave it at 0.
6. Double-click on the PW slider (resets it to 50 i.e. 25% pulse) and take the other slider (pulse width modulation depth from LFO2) up to maximum. Go to the bottom left of the window, change LFO2's Waveform to *saw up* and change Sync to 1/4. Keep playing that keyboard!
7. Go to the VCF panel and try the CUTOFF and RESONANCE sliders. Then double-click on both to reset them. Still in the filter panel, take the second cutoff modulation knob (currently labelled LFO 2) down to about -30.00. You now have a rhythmic sound that will cycle through the notes in a chord if you play them at different times. Try adjusting DETUNE...
8. Activate the two effects (Chorus and Delay) at the bottom right of the window by clicking on the small round buttons (they will light up). If you like, experiment with the effects parameters for a while, especially the Delay controls. Add some NOISE from the DCO panel!
9. Go back to LFO 2, click on the lower righthand button and select *ModWheel* (or *default*). Turn up the Depth Mod knob to maximum. Now the level of LFO 2 is controlled via the modulation wheel/stick on your keyboard. Turn Depth Mod down to minimum again so that the modulation wheel has no effect.
10. Swap the oscillator type: Click on the DCO label and select DUAL VCO. Click both Sawtooth icons to switch them off, and activate both pulse waves instead. Turn MIX to the centre. Click on the NO MOD label and select LFO 2 instead. Change the value of that knob to -20. Similarly, replace the VCF CASCADE with VCF BITE. Experiment with the filter controls until you get a nicely grungy, resonant pulsating sound (note that REV 2 sounds fuller).



## bite me!

The *BITE* models are based on relatively cheap but (as I only recently began to realize) very characterful Japanese hardware – perhaps BITE stands for “Big In The East”?

Let’s take a closer look at a preset that uses the BITE highpass filter:

1. Load POLY SYNTH / **HS Ecobite Clav** and play that sound for a while. Use your pitchbender.
2. One thing you should notice is that the HPF cutoff has *glide* while the oscillator pitch doesn’t. This is because HPF cutoff is modulated by *KYBD2* (keyboard follow 2) with *Glide2* set to 32.
3. Go to the Main page and change the HPF to e.g. *POST*. The sound has lost all its bite – so the main ladder filter has little to do with the character of this patch. Change the HPF back to *BITE*.
4. You could make this sound ‘honk’ a bit more by switching the VCF to 12dB mode. Try that...
5. Still not gritty enough? Select *Rotary* in Effect 1 and switch it on. Set *Drive* to maximum and turn the *Balance* way down.

## bass boost

The BITE highpass can also be used to boost bass frequencies – see the preset *HS Model K12*. Note that most of the bite in that preset does come from the ladder filter (in 12dB mode).

## twin effects

Diva’s two effects are arranged in series, and they offer the same options... which means you can even use the same type of effect in both slots:

### twin reverb

1. Load PERCUSSIVE / MK FX Zapper (if it works with sharp percussion, it works with anything!)
2. Turn Effect 2 *Wet* up to 50 and Decay to minimum. Compare by switching Effect 2 off and on. Try adjusting the *Size* parameter slightly, but leave it somewhere between 15 and 35.
3. Select *Plate* in Effect 1 and switch it on. Take Effect 1 *Wet* to about 15.

Note that the first effect in the signal chain is responsible for the tail and the second is for the early reflections – a richer sound than the more obvious “early reflections first”, as long as the tail’s *PreDelay* is very fast.

### twin rotary

1. Load TEMPLATES / INIT Alpha
2. Take envelope 1 **Sustain** to zero and adjust the decay until you get your preferred organ-type click (even 0 works). Turn **Sustain** back up to 50 and **Release** to zero.
3. Set up the effects to look exactly like this image:

Effect 1 is responsible for removing some high frequencies (via *Balance*) as well as for the strong distortion (via *Drive*). Effect 2 is a typical stereo Rotary – push your modulation wheel up while performing.

This patch can be greatly improved by applying vibrato, using different waves, adding SUB etc..





## stereo without effects

Diva's signal is basically mono (with pan) until processed by effects. However, **stacked voices** can be panned apart – try this:

1. Load TEMPLATES / INIT Alpha. Go to the Trimmers panel and set *Stack* to 2. Turn the second (from the left) *stacked voice tuning* knob up to 4.00 – a major third interval. Play your keyboard and watch the voice activity LEDs light up in pairs. Note that you can only play 3 note chords before voice-stealing occurs (for 8-note polyphony, set *Voices* to 16 if your computer can handle it).
2. Open the Main panel, click on the box next to Pan Mod and select *StackIndex*. Slowly turn Pan Mod to maximum and hear how this pans the two notes apart.
3. *StackIndex* doesn't have to be used in such a static way. For instance, we can multiply it with an LFO: Go to the Modifications page, select *LFO2* and *StackIndex* as the two multiplication factors. Go back to the Main panel and replace the Pan Mod modulation (currently *StackIndex*) source with *Multiply*.
4. Also try modulating cutoff with Multiply instead of LFO2. Your VCF and Amp panels would then look something like this (see image).



## LFO as ramp generator

If you don't need both LFOs for cyclic modulation, you can use one of them as a ramp generator (a simple envelope). In the end, it's all about the LFO's *Delay* parameter:

1. Load TEMPLATES / INIT Jupe-6 and turn MIX up to 50.
2. Turn VCO2 pitch modulation (the knob below VCO1 octave range, labelled *LFO2*) up to exactly 1.00. The pitch of VCO2 now wanders in a drunken stupor around the nominal pitch. Change the LFO2 waveform to *sqr hi-lo*. VCO2 now jumps a semitone above and below.
3. Turn LFO2 *Rate* down to minimum and set VCO2 detune to exactly -1.00. Everything is now back in tune. Finally, turn LFO2 *Delay* to about 20 – yes, it's all about the *Delay* parameter!

Of course it would have been easier to use envelope 2, but it's good to have that envelope free for cutoff duties. On the other hand, we could have used LFO2 for cutoff and envelope 2 for VCO2 pitch instead. Hmm... that would have been easier (envelopes are unipolar), and perhaps more interesting (full-spec ADSR instead of ramp).

## voice map tricks

Looking through the presets in Diva, the *voice map* modulator isn't used very often. Perhaps all the other 'slop' parameters are enough to get by, but to surgically 'detune' any modulation target you like over a wide range, you need those knobs...

### chord inversions

1. Load TEMPLATES / INIT Jupe-8 and go to the Trimmers page
2. Set the *Voice Map Modulator* knobs to -100 0 100 0 -100 0 100 0
3. Use VoiceMap to modulate oscillator pitch, amount = 12.00 (or 7.00 if you like Jazz)
4. Switch the Effects on, adjust filter settings to taste etc. and play simple triads

### cutoff offset

1. Load TEMPLATES / INIT Minipoly, go to the Trimmers page and change the *Voices* parameter to 4. Double-click on Cutoff and turn the resonance up to about 80.
2. Replace the second cutoff modulator (currently LFO2) with *VoiceMap* and turn it up to about 50.
3. Adjust the first four *Voice Map Modulator* knobs to taste while repeatedly playing the same note.

## dual oscillator crossfade

Only one of the oscillator models in Diva has a balance (MIX) control instead of individual oscillator levels – the **DUAL VCO**. In the Modifications page, modulate *Noise & Dual VCO Mix* to crossfade between the two oscillators.

## modulation processor tricks

Mastery of the modulation processors in the Modifications page is the key to making seemingly impossible sounds in Diva, and a fantastic playground for experimentation. A few examples:

### quantize

1. Load TEMPLATES / INIT Mongrel-2, turn envelope 1 **Sustain** up to maximum.
2. In the oscillator, turn the lower of the two TUNE MOD knobs up to maximum. You should hear a cheap “alarm siren” sound caused by LFO2.
3. Open the Modifications page and specify *LFO2* as input for the QUANTIZE processor. In the oscillator panel, replace that LFO2 modulation with *Quantize*. Change the LFO2 Sync to 1/2.
4. Specify *Quantize* as input for the LAG processor, go to the oscillator and replace *Quantize* with *Lag*. Turn the Lag time up to about 22.
5. Experiment with different LFO2 waveforms, Sync and Quantize values.

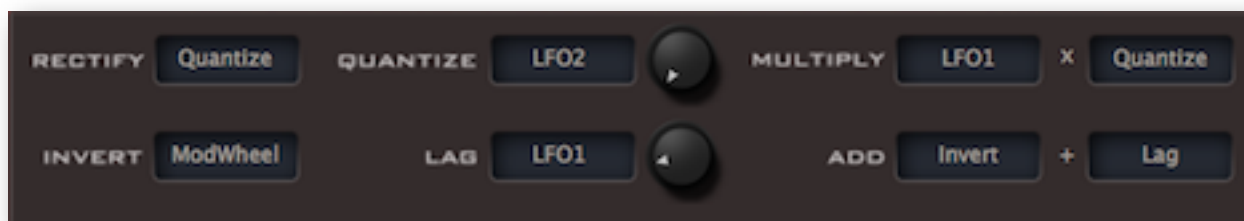
### rectify

Here are a few examples of what you can do with the rectifier – try them out!

- Double the speed of a triangle or sine LFO
- Change a saw LFO into a triangle
- Change a square into a constant (DC)
- Make your pitchbender unipolar

### all processors

Load *HS All Processors* from the *Local* folder, and open the Modifications page. This patch uses all of the modulation processors, but it's still fairly easy follow:



- LFO1 > **Lag** > feedback modulation
- LFO1 > Lag > **Add** with **Inverted** Mod Wheel > cutoff modulation
- LFO2 > **Quantize** > shape modulation of VCO1, cutoff modulation
- LFO2 > Quantize > **Rectify** > pitch modulation of VCO1
- LFO2 > Quantize > **Multiply** with LFO1 > resonance, filter FM

# Troubleshooting

Diva has proved herself to be very stable – you shouldn't have any problems running her in any of the popular host applications – as long as your system is powerful enough!

## intermittent crackling sound?

That's Diva's (one and only) demo restriction. To purchase a license, go [here](#) and click on the shopping cart symbol. If you already own a license, right-click on Diva's data display and select "enter registration code".

## CPU overload?

Diva is *very* demanding, especially in divine mode. You will need quite a powerful computer. If your system only delivers one or two voices before the CPU starts complaining, there are still a few things you can do without upgrading your hardware:

1. Lower the *Accuracy* setting (in the Main/Master panel)
2. Lower the polyphony and/or switch the *Mode* (Main/Master) to Poly2, then resave the preset.
3. If you have e.g. a quad-core computer, try activating the *multi-threaded* option (Main/Master). Multi-threaded is not an adequate replacement for freezing tracks etc., its main purpose is to let users play *one instance* of Diva with as many voices as possible. If a project consists of many instances of Diva, please check that as few as possible are multi-threaded. In certain combinations of hosts, drivers etc., *multi-threaded* can even cause drop outs and stalls.
4. Use Diva as a purely monophonic synth! Many classics were "only" monophonic...

## out of tune?

First of all, you have good ears! Diva emulates classic analogue hardware, and many of the presets (including some of the template files) have been programmed to sound very similar to wobbly old synthesizers. Some people actually like that...

However, the amount of *slop* is optional: Go to the *Trimmers* page and turn down *Max Detune* as well as *Drift* before saving a sound. Then read all about the [Trimmers](#).

## other problems?

If you're really stuck, you should make use of our [support page](#).

You could also help us improve Diva by sending us a log file. To set this up, create a new text file and save it immediately as *Diva* to your desktop. Rename the file to ***Diva.log***. Once the problem occurs, quit your host app and send a copy of *Diva.log* to [support@u-he.com](mailto:support@u-he.com) together with a short explanation of the problem. Please also state your operating system and host application. Thanks in advance!



# List of Modulation Sources

The available modulation sources are divided into two **alphabetical** lists. The upper half is for MIDI data, envelopes and LFOs. The lower half is for simple math functions and stack/voice indices etc.:

|                   |  |
|-------------------|--|
| <b>default</b>    | a modulation source chosen to suit each target... but often “none”.  |
| <b>Breath</b>     | breath controller, MIDI CC #02   |
| <b>Env1</b>       | envelope 1 (amp envelope)  |
| <b>Env2</b>       | envelope 2 (modulation envelope)   |
| <b>Expression</b> | expression pedal, MIDI CC #11  |
| <b>Gate</b>       | MIDI gate i.e. whenever a note is being played   |
| <b>KeyFollow</b>  | MIDI note pivoting around E2, including any Glide  |
| <b>KeyFollow2</b> | Ditto, but includes Glide2 offset  |
| <b>LFO1</b>       | Diva’s vibrato LFO   |
| <b>LFO2</b>       | Diva’s mod LFO   |
| <b>ModWheel</b>   | modulation wheel, MIDI CC #01  |
| <b>PitchWheel</b> | MIDI pitch controller (wheel, stick, ribbon... depending on the hardware)  |
| <b>Pressure</b>   | channel or key pressure (mono or poly <i>aftertouch</i> ), whichever is received first   |
| <b>Velocity</b>   | MIDI velocity  |
| <b>Add</b>        | adds two mod sources together  |
| <b>Alternate</b>  | flip-flop per note/voice i.e. two alternating (extreme) values   |
| <b>Invert</b>     | inverts the mod source – negative to positive and vice versa   |
| <b>Lag</b>        | slows down changes in the mod source, makes e.g. square waves rounded  |
| <b>Multiply</b>   | multiplies two mod sources together e.g. LFO2 x modulation wheel   |
| <b>Quantize</b>   | creates discrete steps – the value is a division factor (try 2.00, 4.00, 8.00...)  |
| <b>Random</b>     | random value per played MIDI note  |
| <b>Rectify</b>    | converts any negative values within a modulation source to positive values   |
| <b>StackIndex</b> | voice number – use for e.g. Pan. For detuning, use the <i>stacked voice tuners</i> note: values created by <i>StackIndex</i> are evenly spread between +1 and -1 |
| <b>VoiceMap</b>   | the 8 general-purpose offsets defined at the bottom of the <i>Trimmers</i> panel   |
| <b>none</b>       | nothing!   |

*The End*