

TYRELL N6

Version 3.0 Revision 3898

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USER GUIDE

Version 1.1

U-HE - AMAZONA.DE

Table of Contents

Introduction	3
Disclaimer	3
Installation	3
Resources	3
Behind the Name	3
User Interface	4
Signal Flow	5
Preset Browser	5
Performance Control	7
The Control Bar	7
MIDI	9
Section Reference	11
Oscillator Modulation (<i>OSC MOD</i>)	11
Oscillators	15
Mixer	16
Filter	16
Miscellaneous (<i>MISC</i>)	19
Low Frequency Oscillators (<i>LFO 1 & 2</i>)	22
Matrix	24
Envelopes (<i>Env 1 – VCA & Env 2</i>)	26
Chorus	29
Modulation sources	31

Introduction

Disclaimer

While making the user guide for *Tyrell N6*, material from different sources has been used, namely, the user guide for *u-he's Hive* synth. The section about *Tyrell's* name was extracted from *Wikipedia*.

To a careful reader sentences from *Hive's* user guide, that have been adapted for the purpose of this user guide, should be apparent, even though they're not specifically marked. *Hive* and *Tyrell N6* are similar in many respects. The reason behind the usage of the sentences from these sources is not plagiarism or stealing but the provision of accurate information about the synthesizer that this guide is about.

Installation

Go to the [Amazona](#) webpage, scroll down until you see the Mac/PC/Linux download links for the latest version of the plugin (v3.0 Rev. 3898). After you've downloaded the compressed file, unzip it, run the .exe file and follow the onscreen installation instructions.

To uninstall, delete the plugin files and folders.

Resources

u-he online

For downloads, news articles and support, go to the [u-he website](#)

For heated debates about *u-he* products, go to the [u-he forum](#)

For friendship and informal news updates, go to *u-he's* [Facebook page](#)

For *u-he* presets (payware and free), go to [u-he preset library](#)

For video tutorials and more, go to *u-he's* [YouTube channel](#)

The Team

Peter Grandl, Mic Irmir – idea and concept

Urs Heckman & *u-he* – software development

Ryo Ishido, Marcus Steinlechner – GUI design

Stephen Gries – *Tyrell's* hardware design

Jan Dziock – user guide in German

Bojan Milivojević – user guide in English

Special thanks to Tibor Devai for making sure that this user guide was written in proper English.

Behind the Name

By naming it *Tyrell N6* (*Nexus 6*), the designers of the synth obviously wanted to pay homage to the film *Blade Runner*. For those of you that haven't had the chance to watch it, it's a famous 1982 neo-noir, cyberpunkish, science fiction film starring Harrison

Ford and featuring Vangelis as the film score composer and one of his most notable works on the closing credits of the film.

The film is about genetically engineered replicants (androids). The *Tyrell Corporation* is the fictional manufacturer of these replicants. The *Nexus* series replicants are virtually identical to an adult human but superior in strength, agility and have variable intelligence depending on the model. *Nexus 6* replicants also have a safety mechanism, namely a four year lifespan, to prevent them from developing empathic cognition and therefore immunity to a special test which is the only method of replicant detection.

(*Wikipedia*)

User Interface

Knobs, Sliders, Selectors

All knobs and sliders react consistently to **left-click & drag** and to **up/down mouse wheel scroll** by activating the primary function, while a **right-click** will always open the context menu whether the target is a knob, a slider or a selector.

Left-clicking on a selector shows that particular selector's menu. **Up/down mouse wheel scroll** while the mouse cursor is hovering over a selector scrolls through the selector's options.

The right-click context menu consists of several functions. They are: *Lock*, *MidiLearn*, *MidiUnLearn* and *MouseWheel is rastered*.

The *Lock* function guarantees that the value of a locked parameter will not change when navigating through presets. Locked parameter will have a padlock icon over it. You are still free to adjust the value of that parameter at any time.

The MIDI learn context menu consists of two options, *MidiLearn* and *MidiUnLearn*. After choosing the *MidiLearn* option, make a change to a desired MIDI continuous controller and the parameter will automatically be assigned to the selected function. If you wish to free up an assigned MIDI continuous controller, right-click on the function it's been assigned to and choose *MidiUnLearn*. Every function (knob, slider or selector) on the face of *Tyrell N6*, except for the *Matrix target* selectors, is MIDI-controllable and can be assigned to a different MIDI continuous controller. The assignments that you make for the various control elements of *Tyrell N6*, will be globally stored in a file in the *TyrellN6.data* plugin directory, so they can remain valid for the next time the host application is ran.

Set the *MouseWheel is rastered* option to "✓" if your mouse wheel is rastered (you can feel it clicking slightly as you roll the wheel), so that each little click increments the value in sensible steps.

To **fine tune** a parameter, hold down SHIFT before clicking on it. To **reset** a parameter to its default value, use a double-click.

GUI Size, Text Antialiasing and Gamma

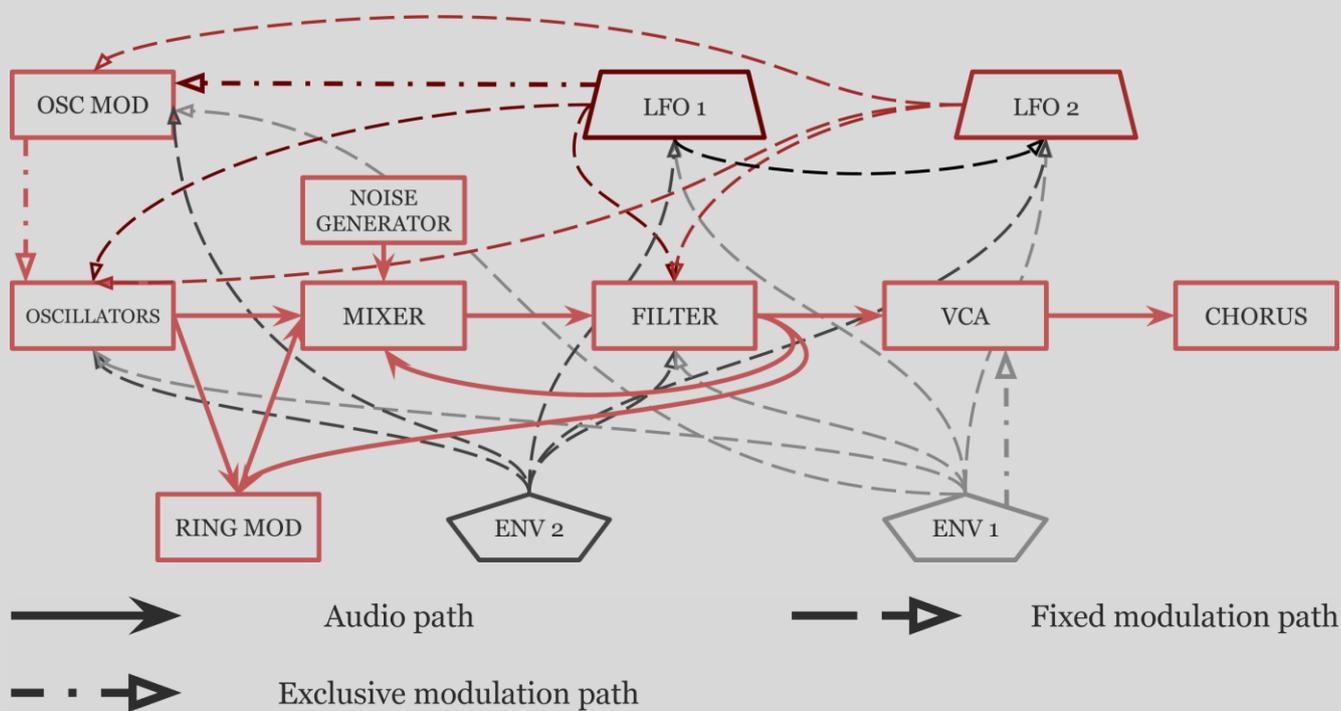
You can resize the GUI (Graphical User Interface) by right-clicking anywhere in the background and selecting an option from the list. The sizes go from 840 x 420 pixels (70%) to 2400 x 1200 pixels (200%).

Text Antialiasing switches the smoothing of labels and values on or off. Normally, it should be left on. Only in certain cases will switching it off improve readability.

Gamma determines how bright the GUI appears.

Signal Flow

Suffice it to say that there are many modulation possibilities even without the *Matrix*. A complete list of modulation possibilities can be found in a later [section](#).



The Preset Browser

Presets



You can load any preset in the current folder by clicking on the data display (where it says *init* on the picture above), or step through the presets by clicking on the arrow symbols on the right-hand side of the data display. *Tyrell N6* also includes a preset browser which can

be accessed by clicking on the *Presets* button, above the arrow symbols. Folders appear on the left, presets are selected in the centre (which is scrollable), and the information about each preset appears in the section to the right of the section where the presets are.

After choosing a preset, you can use the up/down cursors on your computer keyboard to go through the other presets. Alternatively, you can use the pair of arrows to the right of the data display.

If you can't see anything in the folders area (*see, BrontoScorpio, BumBumBias* etc.), click on the small square to the left of *Local*.

To exit the browser, click on the *Presets* button again.

Save

Make sure that the folder where you want to store your preset is selected, then click on the *Save* button underneath the *Presets* button and the arrow symbols.

Give your preset a suitable name and enter any other details you would like to appear in the information area.



Local

This root folder contains a number of presets copied from the various category folders to showcase *Tyrell's* capabilities. Here's the list of abbreviations you may find in the information section while trying the presets out:

MW – modulation wheel (MIDI CC #01)

BC – breath control (MIDI CC #02)

XP – expression pedal (MIDI CC #11)

AT – aftertouch (channel pressure)

PB – pitch bend

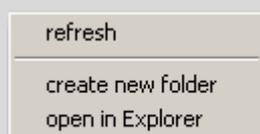
MIDI Programs

The main preset folder (*Local*) also contains a special folder called *MIDI Programs* – you can go through the presets in this folder using the MIDI Program Change messages. For further details, see [MIDI](#).

Folders Context Menu

Right-clicking in the folder list opens the same context menu as in the picture below this text.

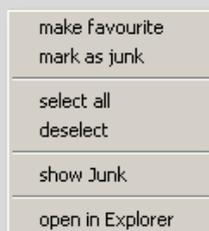
Select *refresh* whenever the contents of the browser need updating. This is always



necessary after its folders or presets have been altered from outside *Tyrell*.

Create new folder does exactly that – it creates a new folder inside the current one.

Open in Explorer opens a standard OS window so you can use your operating system's file functions to add, rename, move, copy or delete presets. Always remember to refresh afterwards!



Presets Context Menu

Right-clicking in the preset list opens the same context menu as in the picture to the left of this text.

The *make favourite* / *mark as junk* options are for marking individual presets you particularly like or dislike. Favourite presets appear with a small star next to their name. Junked

presets disappear but can be made visible again via *show Junk*. Of course you can “un-junk” and “un-favourite” marked presets.

The *open in Explorer* function opens an OS window so you can use on-board file functions to add, rename, move, copy or delete presets. Always remember to *refresh* afterwards!

Select, Drag & Drop

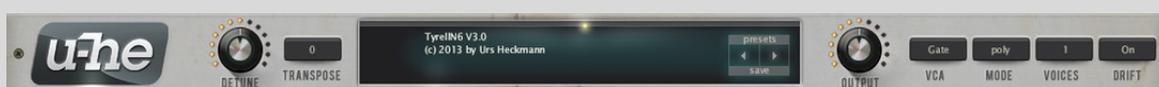
Files can be moved from one folder to another via drag & drop. You can select multiple files by using the SHIFT key on your computer or use the *select all* function in the presets context menu to highlight all the presets in the folder. To remove all the highlights, choose *deselect* from the presets context menu.

Performance Control

Tyrell N6 responds to the pitch bend (**PB**), modulation wheel (**MW**), breath (**BC**), expression (**XP**), pressure (**AT** = aftertouch), as well as the hold (sustain) MIDI messages. Most of the factory presets were specifically programmed for real-time performance using those controls.

The Control Bar

Along the top, on either side of the data display, *Tyrell's Control Bar* hosts a range of global parameters plus a few utility functions.



From left to right you will see the following...

The u-he Badge



Clicking on the *u-he* badge opens a popup menu containing links to the user guide (that is missing), to the *u-he* homepage, to the *u-he* user support forum as well as to *u-he's* presence on various social networks.

NOTE: Instead of directly opening the document, selecting *user guide* in the popup menu to the left opens the folder where the actual user guide should've been placed.

Detune (fine tune) and Transpose



Transpose changes the pitch of the current preset in semitones (+/- 24) while *Detune* does it in cents (+/- 50).

The *Detune* knob's second function is to detune unison voices against each other (*Voices (unison)* section).

Data display



The display has several functions, most of which have to do with presets...

It usually shows the name of the current preset. Clicking on the arrows on the right-hand side of the display navigates you through the presets. Clicking on the display itself lets you select a preset from the current directory (see *Preset Browser* above for a more flexible method). The *Presets* button opens up the *Preset Browser*. *Save* button starts the process of saving your preset.



While you are adjusting something in *Tyrell*, the data display shows the parameter's name and value. After a few seconds of inactivity, it will show the name of the current preset again.

Output



This is *Tyrell*'s main volume control.

Values higher than 100.00 can be used to boost inherently quiet signals to normal levels.

VCA



There are two ways to control the synth's VCA (Voltage Controlled Amplifier), namely *Gate* and *ADSR 1 (ENV 1 - VCA)*. If *Gate* is chosen, the volume of a note will instantaneously jump from mute to full volume upon playing a key and back

to mute upon releasing the key. If you choose *ADSR 1*, the volume will progress according to the shape of *ENV 1 - VCA*.

Mode (voice mode)

The *poly* mode option means normal polyphonic while *mono* and *legato* are monophonic modes with different envelope triggering.

In the *duo* (duophonic) mode, the oscillator 1 plays the lowest held note while the oscillator 2 plays the highest. Both oscillators will play the same note if only one note is being played. The highest and the lowest note have the priority in this voice mode.

There will be more on envelope triggering differences in the *Envelopes* section.

Voices (unison)

This selector determines how many voices will play in unison when a single key is pressed.

When adjusting the number of unison voices, bear in mind that *Tyrell*'s polyphony is set to 8 voices and can't be changed. For example, if the *Voices* selector is set to 2, you'll be able to play 4 notes simultaneously before you run out of polyphony and note-stealing occurs. The

less voices you utilize, the more CPU power you'll end up saving.

If the *Voices* selector is set to more than 1, than the *Detune* knob, instead of acting as a fine tune knob for the entire preset, assumes its second function which is detuning unison voices against each other in positive or negative directions.

Unison voices, by default, do not have stereo spread. However, there is a hidden parameter that can control it. It's called *VCA1: Pan*. The easiest way to find it is to scroll through the presets that come with *Tyrell* and find one that has this parameter chosen in one of the modulation target slots of the *Matrix* section (e.g. *TUC – Chemtrails*). Now, reset every parameter of the synth (double-click) except for that particular modulation slot. What you'll end up with is an initialized preset with the *VCA1: Pan* parameter available in the *Matrix* section. You can even save that state of the synth as a preset for future use.

In order to spread the unison voices, make sure that the number of voices is more than one, select *StackVoice* as a modulation source for *VCA1: Pan* and simply dial in the desired amount of stereo spread (see the *Matrix* section).

Drift

The *Drift* function introduces slight imperfections in tuning of the synth's oscillators in the form of a slow wavering, mimicking the behavior of vintage analog synths.

MIDI (Musical Instrument Digital Interface)

MIDI Controller Type Selection

Tyrell's MidiLearn/MidiUnLearn function has been explained in the *User Interface* section. Parameter's response to the change of the value of a MIDI CC can be set via the *MIDI Controllers* menu.



The menu to the left is the popup menu that's available when the synth's display is clicked using the right mouse button. It is almost identical to the left-click popup menu. The only difference between them is the addition of the *MIDI Controllers* sub-menu when the display is right-clicked.

If you are certain about the type of your MIDI controllers, you will be able to choose the correct option from the following:

- *Encoder 127* – unipolar encoder
- *Encoder 64* – bipolar encoder
- *Continuous7bit* – the most common type of CC
- *Continuous14bit* – the high resolution type of CC

Howere, if you're not sure what type the encoders on your MIDI control surface are, just leave it on *Continuous7bit*, which is the default option and the most common type of controller.

Parameter Behavior

A number of options in the *MIDI Controllers* sub-menu set the behavior of a parameter controlled by a MIDI controller. Thanks to the new revision of the plugin, all of the bugs associated with this ability have been dealt with.

Even though there are 8 different options to choose from, only 5 of them are actually worth mentioning:

- *normal* – the usual parameter behavior
- *integer* – MIDI controller will sweep through the parameter's entire range of whole number values
- *fine* – parameter's value will be changed in 0.01 steps (limited range)
- *octaves* – parameter's value will be changed in 12.00 steps (limited range)
- *semitones* – parameter's value will be changed in 0.1 steps (limited range)

MIDI Program and Bank Changes

If your MIDI control surface or DAW can send *MIDI Program/Bank Change* messages, you can use those messages to navigate through *Tyrell's* presets.

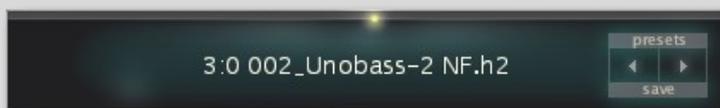
In the preset browser's *Local* folder there's the *MIDI Programs* sub-folder (see [MIDI Programs](#)) which is empty by default. It can contain presets of your choice that will be switchable via MIDI.

To load up the folder, simply drag & drop presets from inside the preset browser. The folder can contain up to 128 (0-127) presets. All 128 of them will be loaded into memory on the startup of the plugin. Bear in mind that the contents of the folder can be changed on the fly but the contents of the memory will be changed only upon the reinitialization of the plugin.

The presets are accessed via the *Program Change* messages in alphabetical order. If you want to change the order of the presets in the list, simply rename them like any other file using the *open in Explorer* option (see [Folders Context Menu](#)) and prefixing presets' names with *000*, *001*, *002*...

The *MIDI Programs* folder can contain up to 127 sub-folders of 128 presets each. To go back and forth between these folders, use *Bank Select* messages (CC#0). Bear in mind that the *MIDI Programs* folder is bank 0. If you're using banks, send *Bank Select* message before the *Program Change* message.

A drawback of using *Bank Select/Program Change* messages via a typical MIDI keyboard/control surface is that banks and programs have to be navigated through sequentially. For example, if you wanted to get to the preset 120 and the number of your current preset is 60, you would have to scroll through all the presets that are in between those two. The same applies when you're going down from a preset with a higher number to a preset with a lower number.



The picture on the left shows the format of what the display will read when the synth receives a *Bank Select* and/or a

Program Change message.

The first number from the left (*3*) denotes the selected bank, while the number to the right of it (*0*) denotes the selected preset within that particular bank. The rest is the preset's name complete with the file extension.

Section Reference

Oscillator Modulation (OSC MOD)



The oscillator modulation section (*OSC MOD*) consists of the following controls...

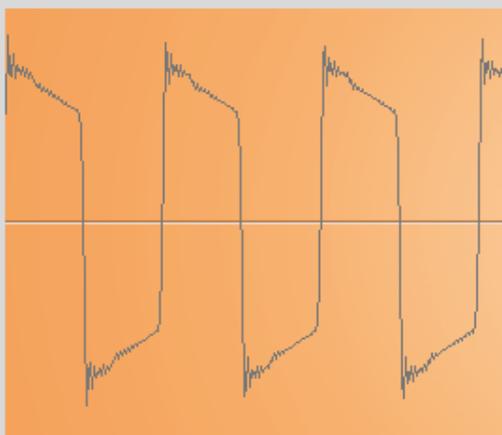
Vibrato (VIBR)

This slider sets the amount of vibrato (cyclic pitch modulation) for both oscillators, as well as for the sub-oscillator. It is “hardwired” to the *LFO 1*.

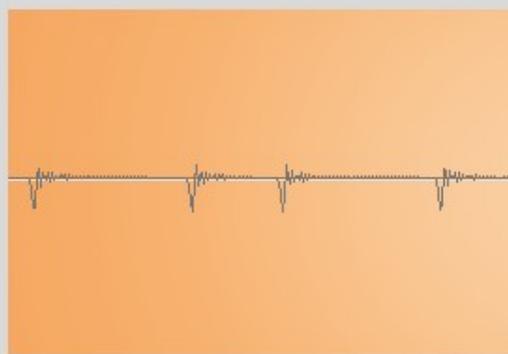
Pulse Width (PW)

This slider adjusts the pulse width of the pulse waves of both oscillators. It doesn't affect the pulse width of the sub-oscillator.

At its topmost position, the slider corresponds to a wave's duty cycle of 50%. At its bottommost position, it corresponds to a duty cycle of 100%.



Tyrell's pulse wave with a duty cycle of 50%



The same pulse wave with a duty cycle of 100%

Pulse Width Modulation Source (PWSRC)

The *PWSRC* selector lets you choose what will be the source of pulse width modulation. Clicking on it shows this popup menu:

- ✓ none
- ModWhl
- PitchW
- Breath
- Xpress
- Gate
- Velocity
- Pressure
- KeyFollow
- KeyFollow2
- Alternate
- Random
- StackVoice
- ADSR1
- ADSR2
- LFO1
- LFO2

Every modulation target on this synth has these modulators as available sources. More on modulation in later [sections](#).

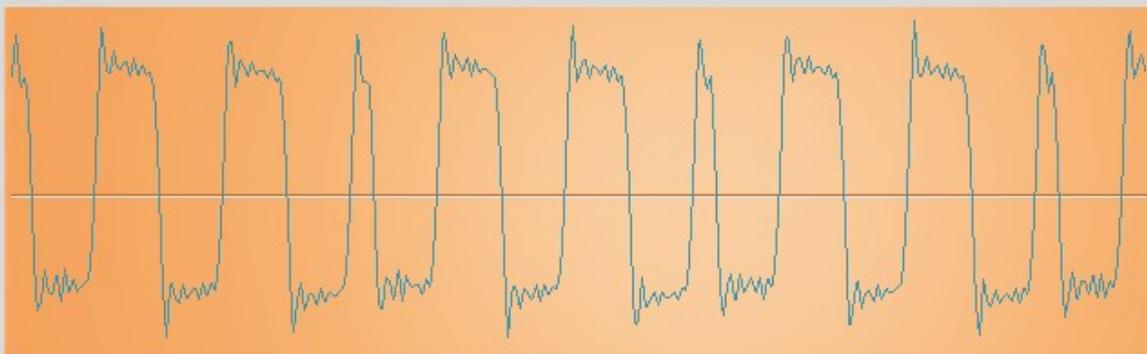
Pitchbend (PITCHB.)

Selects positive and negative pitchbend range in semitones. The range is from 0 to 24 semitones in both directions. Pitchbend is controlled via the pitchwheel on a MIDI keyboard or via a DAW.

Softsync

Oscillator sync is a feature that syncs the oscillators 1 and 2, making the oscillator 1 the master and the oscillator 2 the slave. Every time the master oscillator restarts its cycle, the slave oscillator's phase will reset regardless of its position. This technique ensures that the oscillators are technically playing at the same frequency but the irregular cycle of the slave oscillator often causes complex timbres and gives the impression of harmony.

Because of the complexity of the subject, only one version of oscillator sync will be covered in this manual and that's when the slave oscillator is higher in pitch than the master oscillator.



An example of the resulting (slave) pulse wave with a duty cycle of 50%

When the *Softsync* (range) knob is at 100.00, the sync feature becomes hardsync. It means that the two oscillators will sync together perfectly regardless of the phase difference between them and the tuning of the slave oscillator. The *Softsync* parameter has to have the value of at least 0.01 for the sync feature to become active.

At other positions, the matter becomes much more complex. The two oscillators will be synced (producing harmonic results) only if the phase difference between them is within the range specified by the *Softsync* knob.

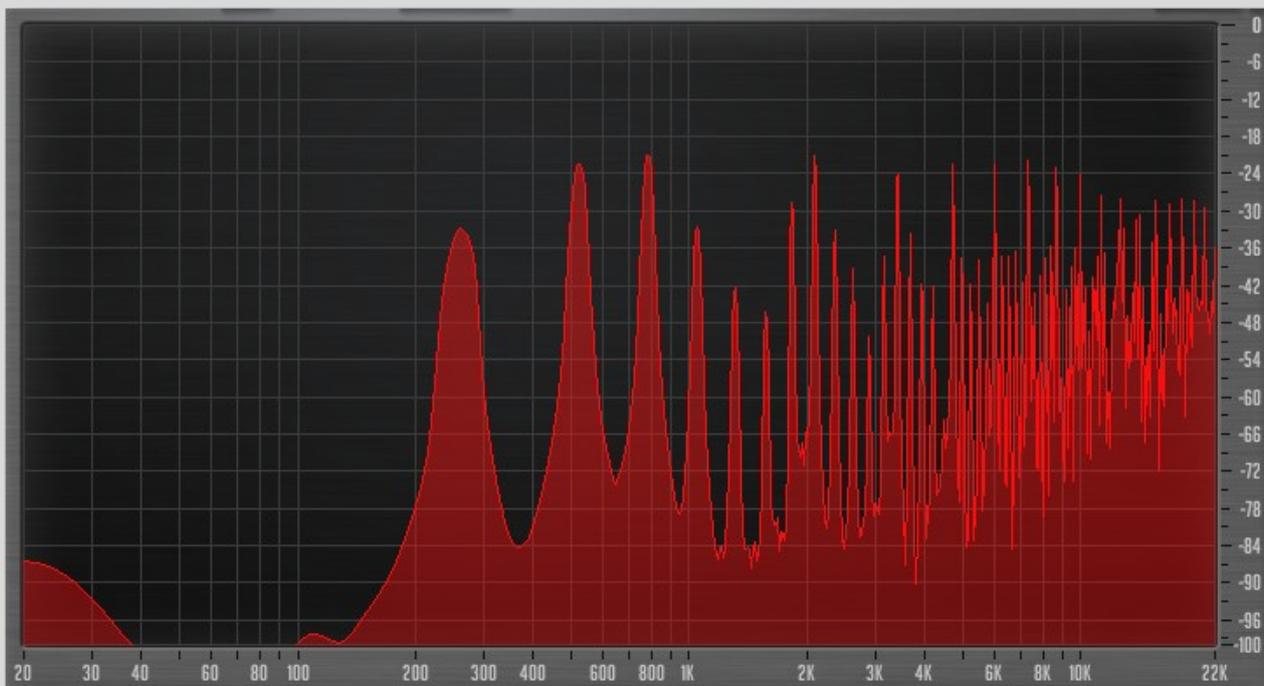
The *Softsync* range is closely connected to the tuning of the oscillator 2 (*Tune 2*). When the pitch of the slave is an integer of the master's pitch, the output wave of the slave oscillator is the same as its input wave. The *Softsync* range forms, in both positive and negative directions, around these integer pitches that correspond to these positions of the *Tune 2* knob:

- **0.00** – the oscillator 2 is in unison with the oscillator 1, i.e. $1 \times \text{freq. (oscillator 1)} = \text{freq. (oscillator 2)}$
- **12.00** – the pitch of the oscillator 2 is 12 semitones (an octave) higher than the pitch of the oscillator 1, i.e. $2 \times \text{freq. (oscillator 1)} = \text{freq. (oscillator 2)}$
- **19.00** – the oscillator 2 is an octave and a fifth higher than the oscillator 1, i.e. $3 \times \text{freq. (oscillator 1)} = \text{freq. (oscillator 2)}$

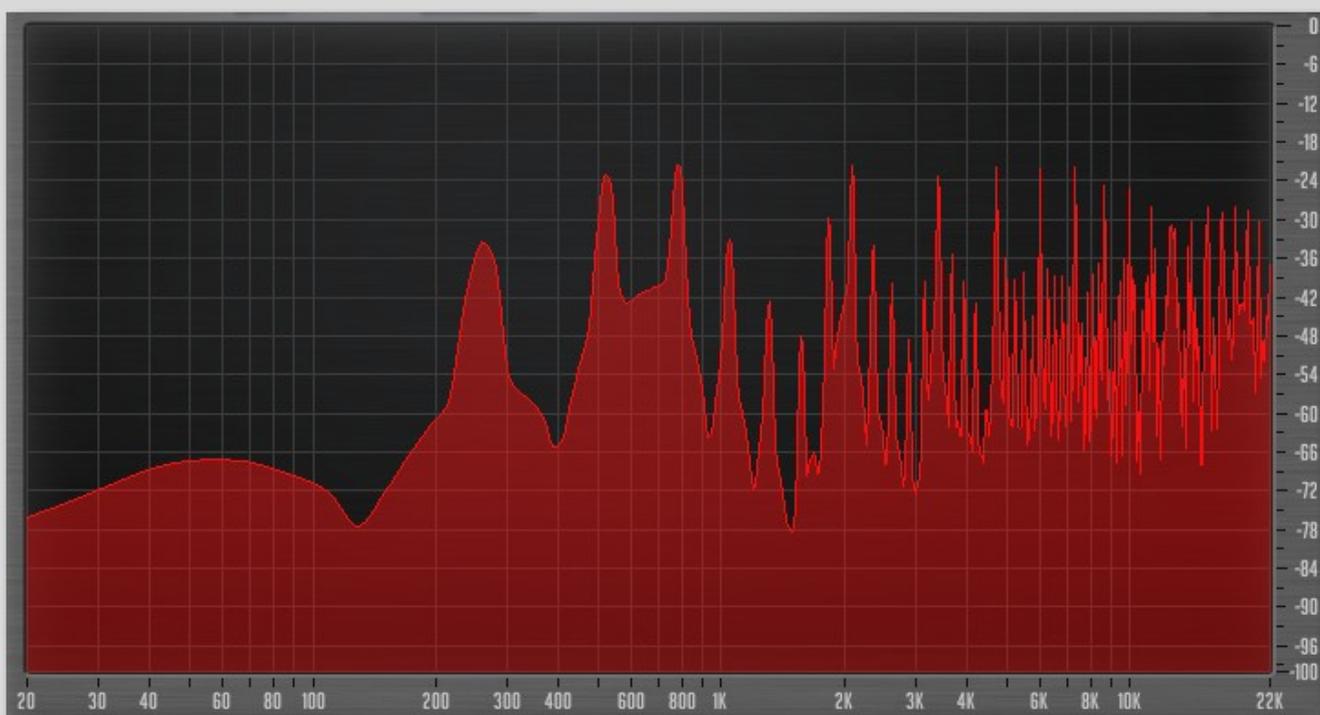
- **24.00** – the oscillator 2 is 2 octaves higher than the oscillator 1, i.e. $4 \times \text{freq.}$ ($\text{oscillator 1} = \text{freq.}$ (oscillator 2))

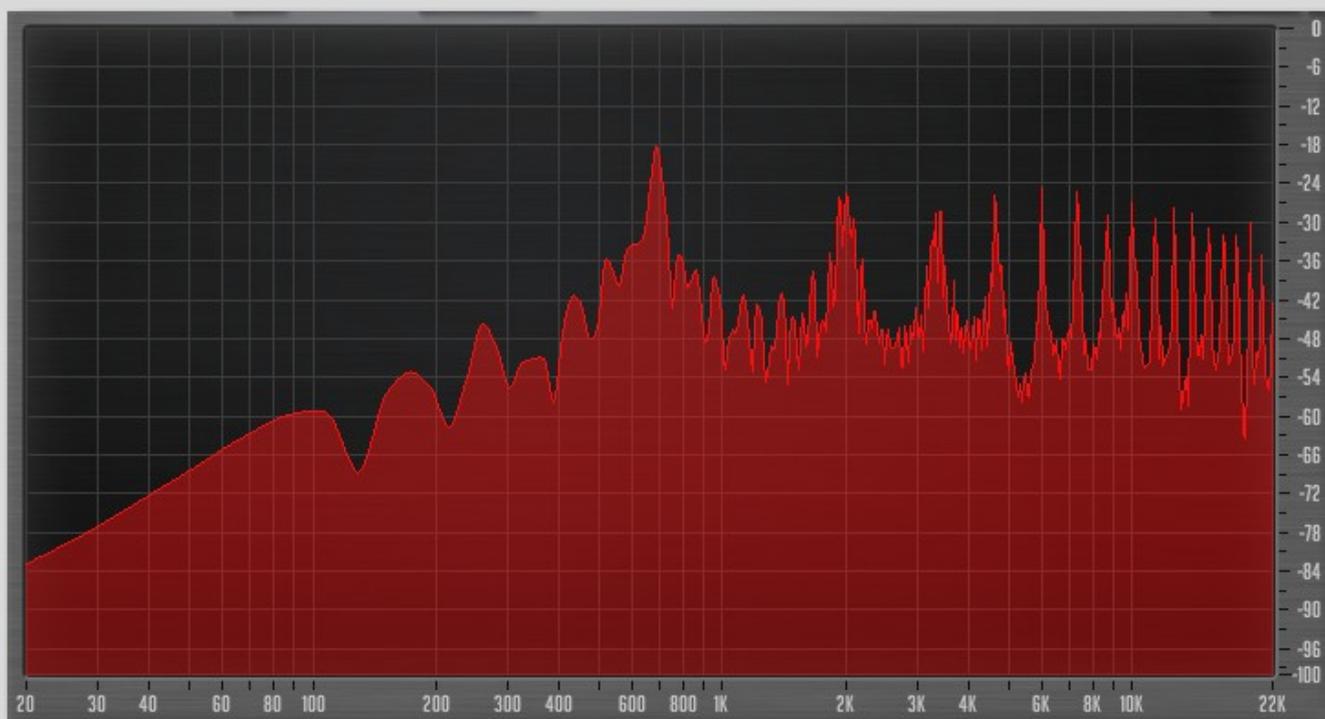
The higher the value of *Softsync*, the bigger that range will be and the bigger phase difference between the oscillators is tolerated, which means that they will end up in sync more frequently.

Pictures below are showing the harmonic content of the resulting slave square wave tuned to 16.20 semitones above the master in different *Softsync* knob positions.

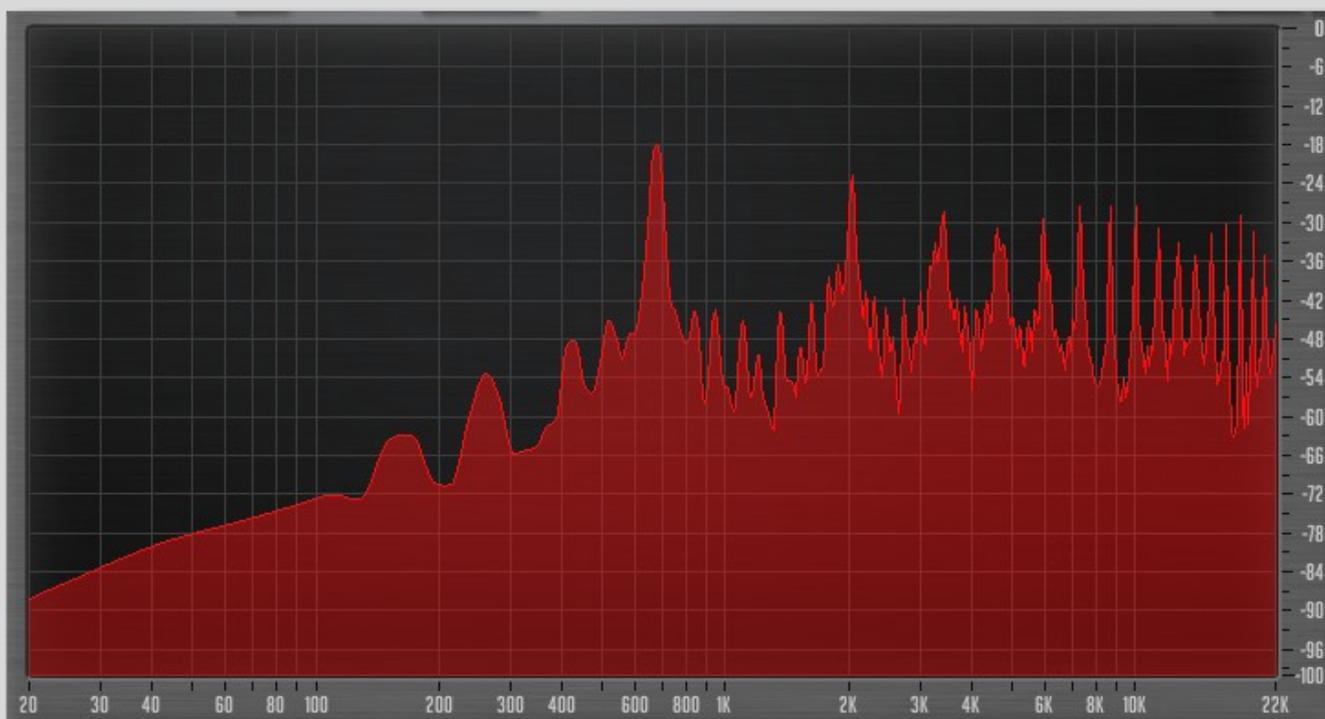


Softsync = 100.00 (above); *Softsync* = 90.00 (below)





Softsync = 50.00 (above); Softsync = 15.00 (below)



In the case of phase difference being out of range, as shown in the second, third and fourth picture above, different inharmonic overtones, depending on the position of the *Softsync* knob, will start to appear in the resulting wave taking it out of harmony with the master.

The best explanation is offered by the sound itself. Here are some audio examples of how a sync sweep sounds in various *Softsync* positions (click on the link to hear the audio files):

- *Softsync = 100 (hardsync)*
- *Softsync = 90*

- *Softsync* = 50
- *Softsync* = 15

Glide and Glide Offset (GLIDE OFST)

Glide aka portamento slurs the pitch of all oscillators between consecutive notes. The *Glide* knob sets the amount of time it takes for the pitch to slur from one note to the next. The time is always constant, regardless of the size of the played intervals.

The *Glide Ofst* knob offsets the glide time for the oscillator 2 in positive or negative directions. In other words, it makes the offset time longer or shorter relative to the time specified by the *Glide* knob.

Oscillators

Tyrell N6 has two oscillators as well as the sub-oscillator.



Wave Shapes (SHAPE 1 & SHAPE 2)

Tyrell N6's oscillators 1 and 2 have continuously variable waveforms (shapes). They are adjusted with the *Shape 1* and the *Shape 2* knobs respectively.

The *Shape 1* control offers four standard waveforms. Beginning with the leftmost, they are:

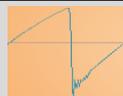
➤ Sine
(1.00)



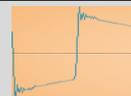
➤ Triangle
(2.00)



➤ Sawtooth
(3.00)



➤ Pulse
(4.00)



The oscillator 2 has only two waveforms controlled by the *Shape 2* control. They are the sawtooth and pulse waves.

The sub-oscillator is a stripped down version of the oscillator 1 with a frequency divided in half. It's a square wave, one octave lower in pitch than the oscillator 1.

NOTE: The symbol inscribed on the leftmost position of both shape controls can be a bit misleading. It bears visual resemblance to a triangle wave. In the case of the first oscillator, it's actually a sine wave and in the case of the second one, a sawtooth wave.

Tunings and Tuning Modulation

Tune 2 is the knob that controls the tuning of the oscillator 2, a kind of control element that the oscillator 1 lacks. Its range is from 0 to +24 semitones in 1-cent increments.

Fine is the fine tune control for the oscillator 2 with the range of +/-50 cents in one-hundredth-of-a-cent increments.

The *T-MOD 1* and *T-MOD 2* knobs control the amount of oscillator tuning modulation for the oscillator 1 (including the sub-oscillator) and the oscillator 2, respectively. The modulator is set via the *Source 1* and *Source 2* selectors.

TIP: The *T-MOD 1* knob can act as a tune parameter for the oscillator 1, with a short release time, if its modulation source is set to *Gate*. The same goes for the sub-oscillator.

Mixer



The *Mixer* is very straight forward. It controls the volume of the six elements going through it and the amount of each going into the filter.

As *Tyrell* was designed to mimic the behaviour of analog synths, its *Mixer* augments that impression by allowing the user to overdrive the filter. The *Mixer*'s volume sliders go from -100.00 to $+25.00$. The overdrive starts gradually past the 0.00 point.

This is an example of how a sawtooth wave looks like on an oscilloscope at $+25.00$



The *Feedb.* slider (feedback) mixes the signal that already went through the filter back into the filter thus providing yet another level of sound distortion.

Filter



Tyrell Nexus 6 features a self-oscillating multimode filter with a unique *Mixspr* (mixspread) function.

Cutoff (CUT)

The *Cut* slider sets or sweeps the filter's cutoff frequency (the point where the roll-off starts). The frequencies above and/or below this point, depending on the filter's

mode, will be attenuated. The slider goes from 20Hz at its bottommost position (30.00) to 20kHz at its uppermost position (150.00).

Resonance (RES)

Resonance is the filter's internal feedback loop that emphasizes the cutoff frequency making those iconic filter sweeps possible.

Tyrell's filter can mimic another capability of analog filters and that is self-oscillation. Self-oscillation in a hardware filter occurs when a resonance control is set high enough that the internal feedback causes the filter circuitry to become a sine wave oscillator. On this synth, it gradually starts to happen around the *Resonance* slider's 80.00 mark, whether the sound is passing through the filter or not but only as long as the key is pressed.

VCF Mode, VCF Poles & Mixspread (MIXSPR)

The *Mixspr* control is probably the most unique feature on the entire synth. Its function is determined by what is set with the *VCF Mode* and *VCF Poles* selectors.

The *VCF Mode* selector lets you choose between the *LP/HP* (Lowpass/Highpass) and *BP* (Bandpass) modes with the lowpass being the filter that rolls off frequencies above the cutoff point, the highpass the one that rolls off frequencies below the cutoff point and the bandpass being, basically, a lowpass and a highpass filter together rolling off the frequencies above and below the cutoff point that is controlled by the *Cut* slider.

The filter in the *LP/HP* mode functions as a lowpass and a highpass filter that are wired in parallel with the *Mixspr* slider being the blend control between the two. In this case, the *Mixspr* slider in its uppermost position only lets through the sound from the highpass filter. In its bottommost position, on the other hand, it only lets through the sound from the lowpass filter. Everything in between is a blend of the sounds from both filters with the *Cut* control sweeping both cutoff frequencies.

NOTE: The *VCF Poles* parameter, in the above described case, is controlling the difference, or rather the distance between the highpass and the lowpass cutoff points and not the steepness of their roll-offs, as long as the *Mixspr* slider is not in its extreme positions. In other words, when the *Mixspr* slider has a value higher than 0.00 and lower than 100.00, by choosing the higher value *VCF poles* selector option, the only thing that will change is the distance between the filters' cutoff points. Take a look at the examples on the next [page](#).

Selecting the *BP* mode changes things quite a bit.

The *BP* mode in combination with the 12dB/Oct *VCF Poles* setting turns the filter into a bandpass filter with the cutoff slope of 12dB/Oct. In this case, the *Mixspr* control doesn't do anything.

The 24dB/Oct setting in combination with the *Mixspr* slider at its bottommost position, doesn't change the cutoff slopes of the bandpass filter to 24dB/Oct as one would expect. Rather, it raises the filter's output gain. If you start turning the *Mixspr* slider up, it introduces another bandpass filter with its cutoff point moving up the audio spectrum along with the *Mixspr* slider, while the cutoff point of the original bandpass filter, controlled by the *Cut* slider, remains static.

This is how it looks and sounds like with the *Cut* slider static and *Resonance* $\frac{3}{4}$ of the way up... ([click here](#))

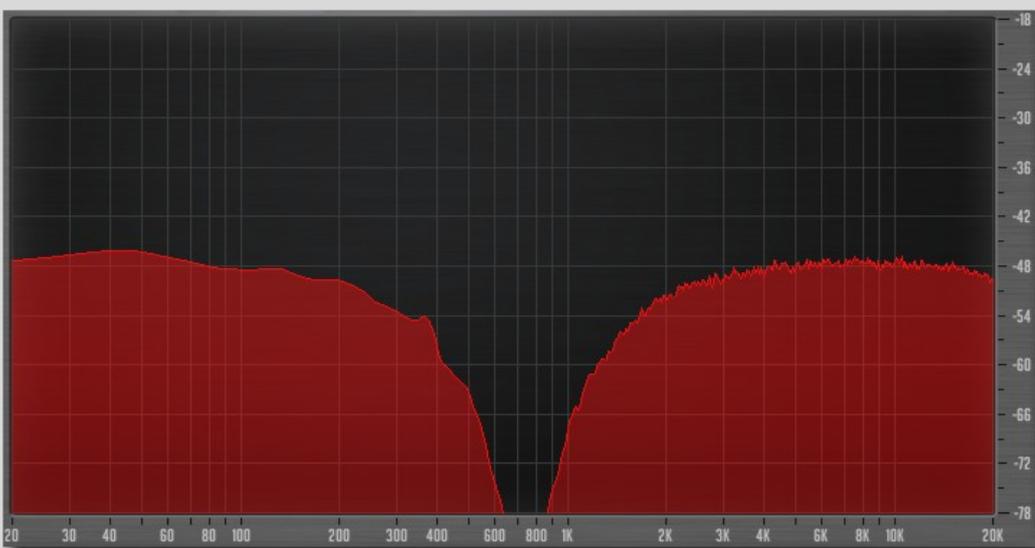
The 36dB/Oct setting on the *VCF Poles* selector only pushes the filter's output gain further up while the *Mixspr* slider is at its bottommost position. By turning the *Mixspr* slider up, a second and, this time, a third bandpass filter will appear, one moving up the spectrum and the other one down the spectrum, leaving the original filter in the middle, static.

[Click here](#) for the example.

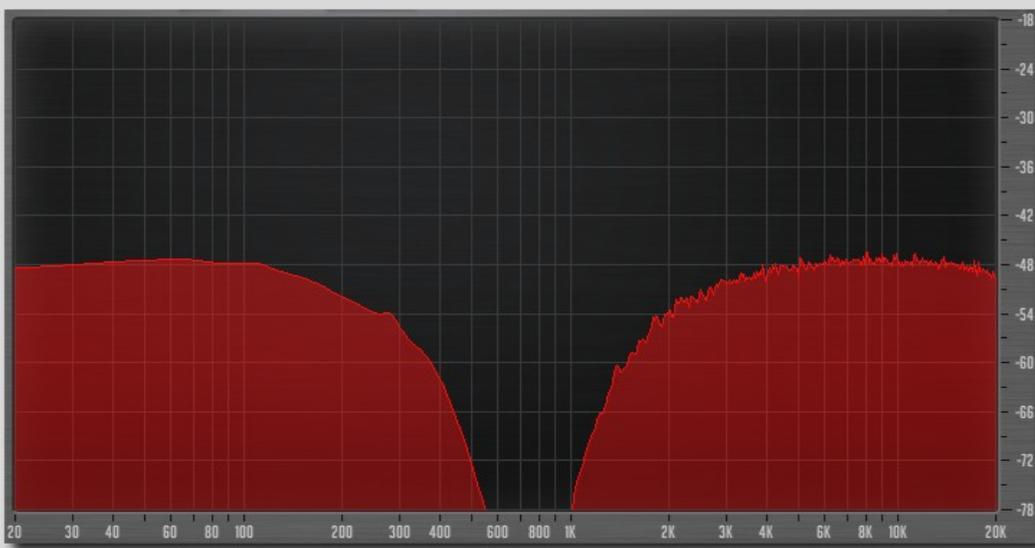
Mixspr = 50.00; VCF Poles = 12 db/Oct



Mixspr = 50.00; VCF Poles = 24 db/Oct



Mixspr = 50.00; VCF Poles = 36 db/Oct



Filter's Modulation Controls (MOD 1, Source 1, MOD 2, Source 2 & Keyfollow)

The filter's three groups of modulation controls consist of two knobs, *MOD 1* and *MOD 2*, two mod source selectors, *Source 1* and *Source 2* and the *Keyfollow* slider.

The *MOD 1* and *MOD 2* knobs set the extent of modulation in positive or negative directions, while clicking on the source selectors shows the modulation source list common to all mod selectors.

The *Keyfollow* modulation source can be used to modulate every changeable parameter of the synth. However, the *Keyfollow* slider in the *Filter* section is dedicated to the modulation of the filter's cutoff frequency. It is, basically, the means of modulating the filter's cutoff frequency per MIDI note. The pivot note, i.e. the note that corresponds to the actual position of the *Cut* slider and the note that the cutoff frequency modulation revolves around is C4 (the middle C). Notes higher than the pivot note modulate the cutoff frequency in the positive direction. In other words, the filter will "open" more the higher up the keyboard you go, while the notes lower than the pivot note do it in the negative direction. The extent of the modulation depends on how high the *Keyfollow* slider is set.

NOTE: The pivot note (C4) for the filter's *Keyfollow* mod source is actually different than the pivot note for the *Keyfollow* source used for modulating other parameters which is E3.

Miscellaneous (MISC)



The *MISC* section consists of a noise generator and a ring modulator, both of them routed through the *Mixer*.

Noise Generator

The *Noise Generator* has a single control, a knob that blends different types of noises.

At its leftmost position (1.00), it's white noise while at its rightmost (3.00), it's red or brownian noise. Halfway between the two (2.00), the noise becomes pink. The noise generated is mixed with other audio sources via its dedicated volume slider in the *Mixer* section.

Visually, on a frequency analyzer, white noise is characterized by a flat spectrum of all frequencies between 20Hz and 20kHz. To an average human ear, however, this type of noise seems to be dominated by high-frequency content rather than low.

Red noise, on the other hand, is characterized, visually as well as aurally, by much warmer, bottom-heavier tone than white noise.

Pink noise to a human ear has the same apparent loudness at all frequencies. Visually, it has more lower-frequency content than white noise but less than red noise.



White noise (above); red noise (below)





Pink noise

Ring Modulator

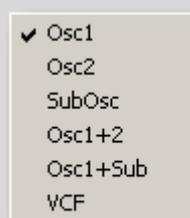
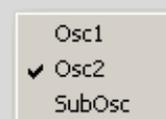
A ring modulator is a device that multiplies the two signals sent to it, outputting the sum and difference of their frequencies. Ideally, there should be no frequencies of the input waves present in the output wave, only their sum and difference.

Ring modulation is a form of amplitude modulation. The result of it is a wave, harmonically very rich, whose harmonics, depending on the relationship between the frequencies of the two waves being multiplied, may or may not be harmonically related.

The two signals are generally called a modulator and a carrier. The modulator is the source of ring modulation while the carrier represents the destination. In the case of *Tyrell N6*, they are called *Ring Mod* (the carrier) and *Input Src* (the modulator). The output of the *Ring Modulator* is mixed back with other audio sources in the *Mixer* section.

NOTE: The oscillators are not sacrificed for the purpose of ring modulation. They can still be used as sound sources on their own even when the ring modulator is being used.

Here are the lists of available modulators and carriers...

*Ring Mod* selector menu*Input Src* selector menu

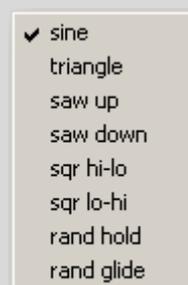
Low Frequency Oscillators (LFO 1 & LFO 2)



Tyrell's LFO (Low Frequency Oscillator) section features two identical LFOs that are used as modulation sources. *LFO 1* is “hardwired” to the vibrato function.

Each LFO features a number of selectors and sliders and they are:

Waveform (unmarked)



The topmost selector that selects a waveform for the particular LFO. It has a dropdown menu with available waveforms.

The first two waves are regular *sine* and *triangle* waves.

The *saw up* is an ascending, while the *saw down* is a descending sawtooth wave.

The *sqr hi-lo* is a square wave that starts in its high (positive) state.

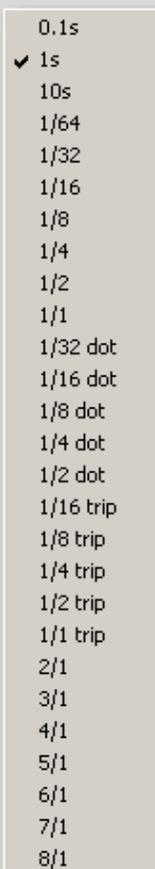
The *sqr lo-hi* is a square wave that's 180° out of phase with the *sqr hi-lo* wave. In other words, the *sqr lo-hi* waveform starts in its low

(negative) state.

The last two waveforms do not have a particular cyclical shape. Their amplitudes consist of values randomly chosen by the synth with a defined maximum. That is why they are called random waveforms.

An LFO with *rand* (random) *hold* selected uses the sample and hold method to modulate its target. It samples a random value within a range determined by a specific modulation amount controller (e.g., the *Vibr* slider) for a particular modulation target and holds that value for the amount of time specified by the LFO's *Rate* knob.

The only difference between *rand hold* and *rand glide* is that an LFO with *rand glide* selected, instead of holding, smoothly glides between randomly sampled values.



Sync

The *Sync* selector offers non-synchronized times (scale factors) measured in seconds (*0.1s*, *1s*, *10s*) as well as a long list of values synchronized to the DAW's tempo, that includes dotted times (50% longer notes) and triplets (3 notes in the space of 2).

Rate

It shifts LFO's speed in a positive or a negative direction relative to the value set by *Sync*. LFO's highest frequency, when the *0.1s* scale factor is selected, is well in the audio range, $\approx 150\text{Hz}$. Its lowest frequency with the *10s* scale factor is $\approx 0.007\text{Hz}$. LFO's *Rate* can be pushed beyond these frequencies using the *Rate Mod* knob with a modulation source like *Gate*.

A value selected by the *Sync* selector corresponds to the center position of the *Rate* knob. Positive and negative integer *Rate* values further divide (positive *Rate* values) or multiply (negative *Rate* values) a synchronized time set by the *Sync* selector.

For example, if *Sync* is set to $\frac{1}{4}$, $+1.00$ on the *Rate* knob would mean that the LFO will oscillate as if *Sync* was set to $\frac{1}{8}$, i.e. twice as fast. On the other hand, if the *Rate* knob was set to -1.00 , the LFO would oscillate as if the *Sync* knob was set to $\frac{1}{2}$, i.e. the LFO's frequency will be halved.

Delay

This parameter's name is a bit misleading. *Delay* doesn't introduce a delay into an LFO's phase. It rather fades in the LFO's amplitude. The

Delay feature simply fades in the amplitudes of the *sine*, *triangle*, *saw up* and *saw down* waveforms.

With square like waveforms (*sqr hi-lo*, *sqr lo-hi* and *rand hold*) it introduces a glide between the initial amplitudes as well as a fade-in of those amplitudes and all that only during the "delay" period.

With *rand glide*, the *Delay* function simply fades-in the LFO's amplitude.

Phase

It lets you specify at which point of its cycle the LFO's waveform will start, i.e. it determines its phase.

While the *Phase* knob is at its leftmost position (*0.00*), there's no phase shift and the waveform will start at the zero point. If you turn the knob all the way to the right (*100.00*), there will be a 360° phase shift. In other words, the phase will be identical to the phase at the knob's leftmost position. At the knob's middle position (*50.00*), the shift of the LFO's phase will be 180° , meaning that the polarity of the waveform will be inverted.



Restart

Selects a rule to reset the LFO phase...

Sync – LFOs of all voices are synchronized to the host DAW, so they all adopt the same phase. The phases of LFOs can still be modulated apart per voice by a polyphonic mod source such as *Velocity*, *KeyFollow* or *Random* via the *Matrix*.

Gate – Each note played restarts the LFO for each voice independently. Restarted LFOs will adopt the phase set by the *Phase* knob.

Single – Like *Sync*, all voices share the same LFO, which is restarted at the next MIDI note after all previous notes have been released.

Random – Notes restart the LFO for each voice independently at a random phase, ignoring the value of *Phase*.

Rate Mod

Rate Mod consists of two controls, the *Rate Mod* knob and the modulation *Source* selector, used for modulating LFO's *Rate*.

The *Rate Mod* knob sets the intensity as well as the polarity of the modulation. When at its center, there's no modulation.

Clicking on the modulation *Source* selector shows the list of available modulation sources. NOTE: *LFO 2* can be used to modulate *LFO 1* only via the *Matrix*.

Depth Mod

It is an LFO amplitude control, i.e. it can turn down the amount (depth) of modulation, and it works rather counter intuitively.

When the *Depth Mod* knob is at its leftmost position (0.00), LFO's amplitudes are at their maximum. Turning the knob to the right turns the amplitudes down progressively. At the knob's rightmost position (100.00), there's no modulation at all because the LFO's amplitudes are equal to zero.

Accompanying the *Depth Mod* knob, there's a modulation *Source* selector. Again, *LFO 1* cannot be modulated by *LFO 2* using this modulation source selector.

When using a modulation *Source* to modulate LFO's amplitude, the position of the *Depth Mod* knob will actually determine the minimum amount of modulation applied by the *Source* while the maximum always remains the same.

Matrix

Matrix further augments *Tyrell's* modulation possibilities. It consists of two not so clearly defined sub-sections, the *XS – Mod OSC 1* sub-section and below that, the actual modulation matrix sub-section.



modulation is turned off.

XS – Mod OSC 1

It's also called cross modulation. Using the *Depth* knob to define the amount of modulation applied and via a selectable modulation source (the *Via* selector), a targeted parameter (*Dest*) will be modulated by the oscillator 1. Therefore, the oscillator 1 becomes a modulator like the LFOs. The most important differences between modulating a target using an LFO and a regular oscillator intended for sound generation is that the regular oscillator modulates the target at the frequencies that are in the audio range and it can be an audio source at the same time.

Depth sets the amount of modulation applied by the oscillator 1. At its leftmost position, the

Via is the selector that determines which modulation source will be used to modulate the depth of cross modulation. When the *Via* selector is clicked, the common modulation source list appears. If you, for instance, select *Velocity* as your *Via* modulation source, then the current position of the *Depth* knob (only if it's higher than *0.00*) will correspond to the *Velocity* value of *127* (or *128* depending on your DAW) while the *Velocity* value of *0* (or *1*) will correspond to no cross modulation (*Depth* = *0*).

Dest (destination) selects a target for cross modulation. There are three possible cross modulation destinations:

1. *OSC 2 FM*
2. *OSC 2 PWM*
3. *Filter FM*

OSC 2 FM stands for frequency modulation of the oscillator 2 by the oscillator 1.

OSC 2 PWM selects the pulse width of the oscillator 2's pulse wave as a modulation target for the oscillator 1.

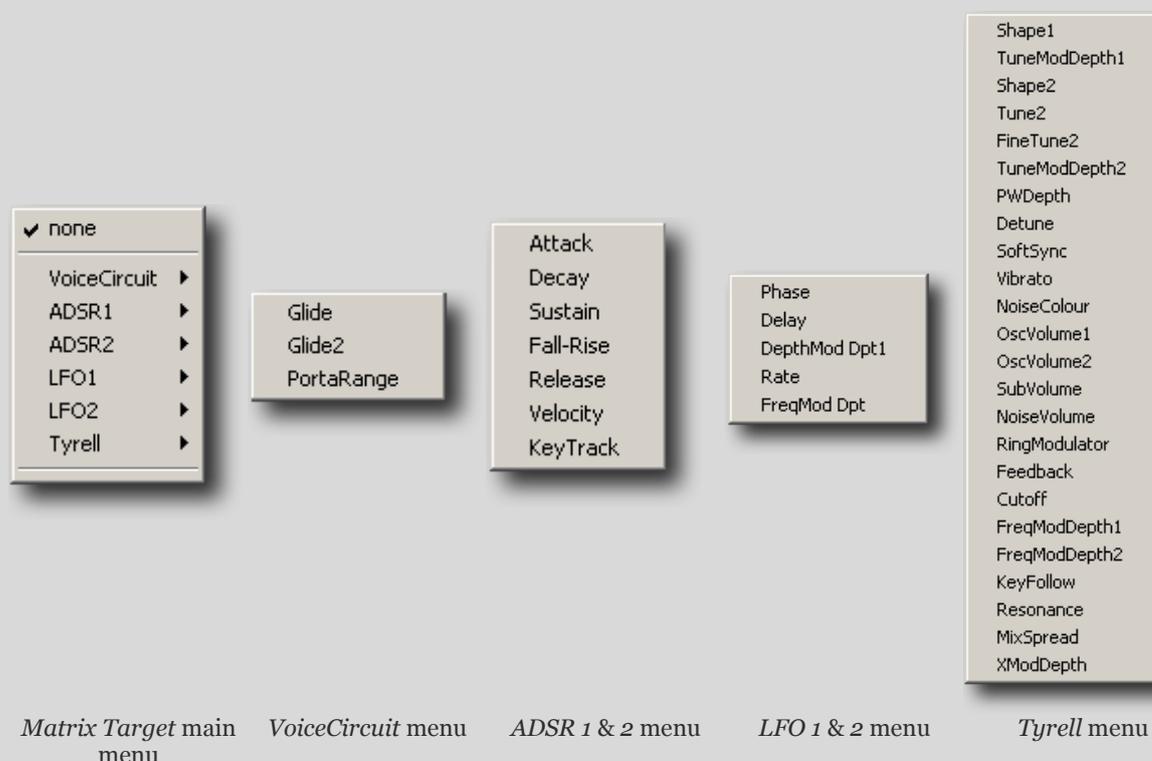
Filter FM turns the filter's cutoff (*Cut*) into a modulation target for the oscillator 1.

The results of these cross modulations are quite different compared to the results of modulating the same targets using an LFO mainly because the oscillator 1 has a much higher frequency. The rate of modulation is equal to the pitch of the oscillator 1.

Modulation Matrix

It offers a modulation solution for almost every parameter that is controlled by a knob or slider on the face of the synth, including the *Chorus* section's knobs (Rev. 3898). The *Matrix* knobs are excluded. Modulating a parameter that is controlled by a selector also isn't possible.

These are the available modulation targets (right-click on the *Matrix target* selector)...



NOTE: In order to have *ADSR 1* and *ADSR 2*, as well as *LFO 1* and *LFO 2*, available in the *Matrix Target* main menu, they all have to be selected at least once by any of the synth's

modulation source selectors.

New in the Rev. 3898 of the synth is the ability to choose the modulation target by left-clicking and dragging the target cursor to the desired modulation target.

The modulation matrix consists of two horizontal groups of controls. For the lack of the official term, I'll name them *Matrix 1* and *Matrix 2*. Each group has a *Matrix Target* selector and two modulation amount knobs with the accompanying modulation source selectors underneath. Two parameters can be modulated separately and simultaneously.

The *Matrix Target* selectors determine which parameter will be a modulation target.

Knobs on the left-hand side of the *Matrix* section, marked with the number 1 on the page 23, set the amount of modulation of the target selected by the *Matrix Target* selector, each for its own *Matrix* group. The source of modulation is determined by a selector sitting beneath each knob.

Knobs to the right, marked with the number 2, set the amount of modulation of a modulator. These knobs also have a modulation source selector underneath.

Envelopes (Env 1 – VCA & Env 2)

The last two modulation sections on the face of *Tyrell N6* are the envelope generators. These envelopes are 4-stage envelopes with some additional controls and they act as modulation sources.



ENV 1 – VCA is labeled *VCA* because it is hardwired to the Voltage Controlled Amplifier and it's the envelope for controlling the volume of the synth. However, it can be used to modulate other parameters as well.

These are the envelope controls...

Attack (A), Decay (D), Sustain (S), Release (R)

These four sliders are the envelopes' four main controls for shaping the volume progression of a sound and/or the progression of parameter's modulation.

Attack (A) – the time it takes for a parameter to go from a defined minimum level to a defined maximum level after a note is played. The minimum level is defined by the position of parameter's level knob or slider. The maximum level is defined by the value of the parameter's dedicated modulation amount knob, e.g. *MOD 1*, *MOD 2*, *Rate MOD*...

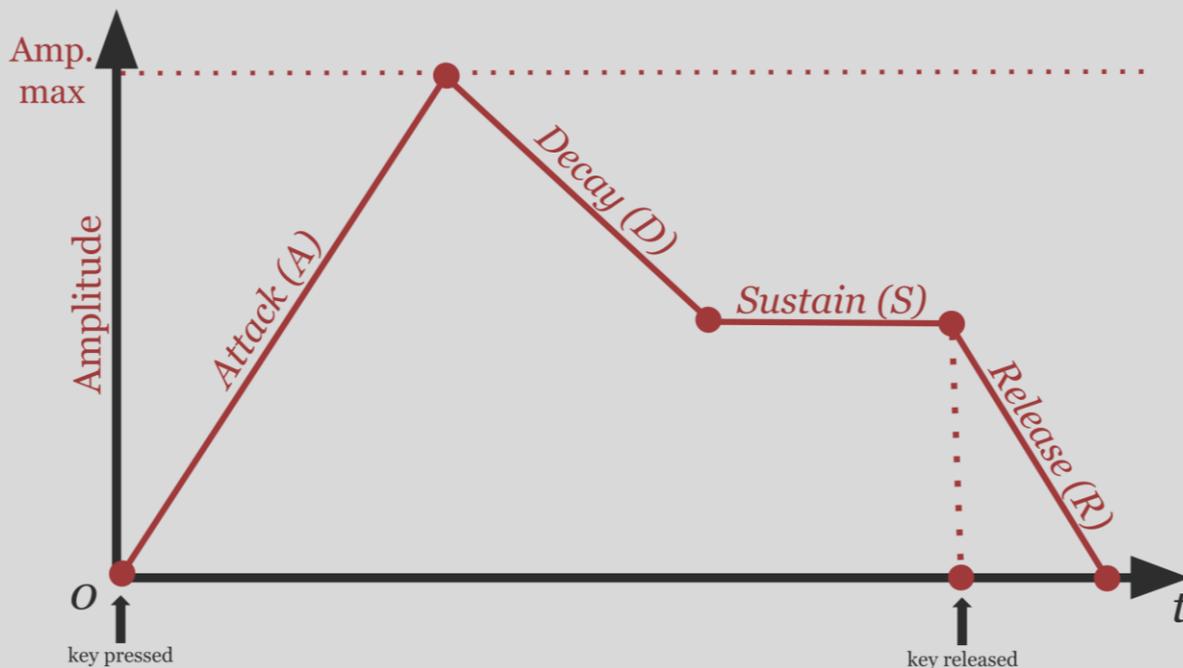
Decay (D) – the time it takes for the parameter to reach the *Sustain (S)* level after the *Attack* stage. NOTE: If the *Sustain* is at maximum, there will be no *Decay* stage, no matter which position the *Decay* slider is at.

Sustain (S) – the level of volume or modulation an envelope will hold after the *Decay* stage

for as long as the note is being held, i.e. for as long as the gate is open but only if the *FallRise* knob is at its center position.

Release (R) – the time it takes for the parameter to return to the pre-*Attack* level after the note is released.

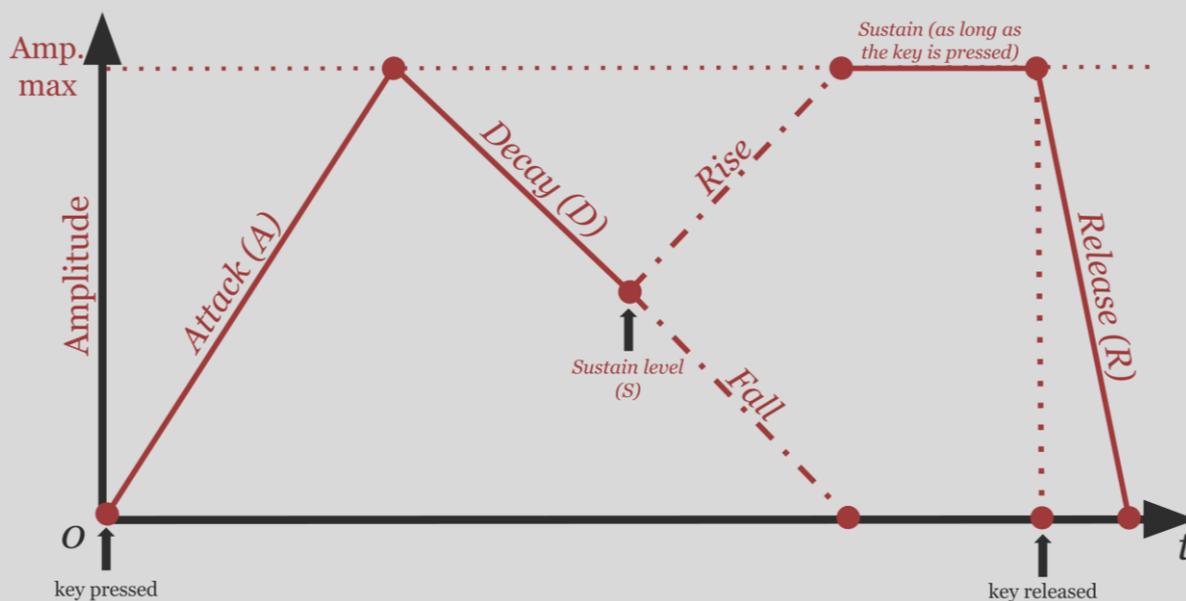
Schematic of Tyrell's ADSR envelope (*FallRise=0*)



FallRise

This function radically changes the behavior of an envelope's *Sustain*. It can turn an envelope into a quasi 5-stage envelope. What happens to the amplitude of a parameter modulated by an envelope when it reaches the *Sustain* level (*S*) is determined by the value of the envelope's *FallRise* knob.

Schematic of Tyrell's ADSR envelope with *FallRise* engaged



The *FallRise* knob goes from -100.00 to $+100.00$. When centered, the *FallRise* parameter is disengaged. When in its positive range, from $+0.01$ to $+100.00$, the amplitude of the parameter that's being modulated, after it reaches the *Sustain* level, will start to *Rise* until it reaches the envelope's maximum and hold it for as long as the key is pressed. The opposite will happen if the *FallRise* parameter is in its negative range, from -0.01 to -100.00 . The amplitude will start to *Fall* until it reaches the envelope's minimum and hold it for as long as the key is pressed.

The *Rise* and *Fall* times are determined by the value of the *FallRise* knob. The higher the knob's positive value is, the shorter the *Rise* time will be. The opposite is true for the *Fall* times. The higher the negative value is, the shorter the *Fall* time will be.

NOTE: If *Sustain* is already at maximum, turning the *FallRise* knob up won't change anything. There will be no *Rise*. The same is true for *Fall*, if you try to turn the knob down while *Sustain* is already at minimum.

Trigger (unmarked)

It's the top-left selector that sets what will trigger an envelope. *ENV 1 – VCA* has four *Trigger* options available, while *ENV 2* has five. The options are: *Gate*, *Single* (*ENV 2* only), *Loop*, *LFO 1* and *LFO 2*. How an envelope reacts is also determined by the *Mode* (voice mode) the synth is in.

Gate – The term is borrowed from older analog designs that used this method for triggering notes using voltage.

Gate (trigger) + *poly* (voice mode) – the envelope will be triggered whenever a key is pressed. The *Release* stage begins when the note is released.

Gate + *mono* – the envelope exhibits the same triggering behavior as in the *Gate* + *poly* mode, except in the cases when the *Attack* and *Release* times are higher than 0.00 and played notes overlap due to the length of the *Release* time. In those cases, a new envelope will be triggered for every new note but it will start its run at the point where the envelope of the previous note left off, even during legato playing.

Gate + *legato* – the difference between the *legato* and *mono* voice modes in terms of envelope triggering can be heard only during legato playing (playing a note with the previous one still depressed). In the *legato* mode, an envelope will be triggered only for the first note in the sequence of notes that have been played legato, i.e. all other consecutive notes will share the envelope of the first one.

Gate + *duo* – The *duo* mode has no envelope triggering differences compared to the *mono* mode while single notes are being played. On the other hand, it exhibits the same envelope triggering behavior as the *legato* mode while 2 notes are being played.

Single (*ENV 2* only)

Single + *poly* – a new envelope will be triggered for every note played in a non-legato manner regardless of the *ENV 2 Release* time. If the notes are played in a legato manner, they will share the same envelope until all the notes from that particular legato sequence have been released.

Single + *mono* / *legato* / *duo* – The envelope 2 triggering behavior will be the same as in the *Gate* + *legato* mode.

Loop – the trigger mode in which an envelope will continuously run through its stages in a loop, for as long as a key is pressed. The *FallRise* stage can also be a part of a loop.

NOTE: If the *Sustain* slider is at its minimum or when the *FallRise* knob has a negative value, the *Release* stage will be skipped while an envelope is looping. However, the *Release*

stage won't be skipped if the held note is released in the middle of the envelope's run (loop). If the *Sustain* slider is at its maximum, the *Decay* stage will be skipped during looping.

Loop + poly – an envelope will be triggered for each note played. Therefore, each note's envelope will have a loop whose starting point is relative to the starting point of each note.

Loop + mono / legato / duo – the same as in the *Gate + mono / legato / duo* modes respectively, except the fact that an envelope would loop continuously if a note is being held.

LFO 1 & LFO 2 – an envelope will be retriggered in time with each new cycle of the *LFO 1* or *LFO 2* regardless of which stage an envelope is at.

When an LFO is used to trigger an envelope, different triggering patterns can be achieved just by modulating the *Phase* knob of the particular LFO.

LFO 1 or LFO 2 + poly / mono / legato / duo – in all of these modes an envelope will exhibit the same retriggering behavior.

NOTE: In the Rev. 3898 of the synth the unpredictable buggy behavior of this envelope triggering mode has been fixed.

Velo (velocity)

This parameter determines how strongly the envelope's output level is affected (modulated) by MIDI velocity.

In the case of *ENV 1 – VCA*, the *Velo* knob always sets how much the incoming MIDI velocity data affects the output of the VCA. The bigger the value of the knob is, the bigger the difference between softer keystrokes and harder keystrokes will be in terms of the actual output volume or the amount of modulation of a parameter.

If the envelope 1 is modulating additional parameters, the amount of modulation of those parameters will also be affected by the setting of the *Velo* knob.

Keytrk (keytrack)

This parameter, unfortunately, hasn't been revised in the new revision of the plugin. It is still mislabeled. According to the current label, its function should be to scale the *Attack*, *Decay*, *FallRise* and *Release* times according to the MIDI note number. What it actually does is that it scales those times according to the MIDI velocity value.

The *Keytrk* knob has positive and negative ranges. The parameter is disengaged when the knob is in its center position.

When the knob is in the positive range, the higher the velocity value is, the longer the envelope times will be. The exact opposite happens when *Keytrk* is in the negative range. The higher the MIDI velocity value is, the shorter the envelope times will be.

Chorus

Chorus effect occurs when individual sounds with approximately the same timbre and very similar pitch converge and are perceived as one. Similar effect can be reproduced by playing both oscillators while one is slightly out of tune with the other. Along the bottommost edge of its user interface, *Tyrell N6* has a dedicated *Chorus* section for this type of effects.

Tyrell's chorus is a stereo chorus and, like most other choruses, it produces its effect by

splitting (copying) the incoming signal into several signals, delaying the copied signals by a small amount ($\approx 20\text{-}50\text{ms}$) and modulating that delay amount with a dedicated LFO.



On/Off (unmarked)

The leftmost control of the *Chorus* section is the convenient on/off switch. By including this switch, the designers of the synth allowed the user to quickly and elegantly compare sounds with and without the chorus over them.

Type

Just like in *Diva* and *Hive*, there are three types of choruses available, *Classic*, *Dramatic* and *Ensemble*. Each type is a multi voice chorus based on a particular hardware unit.

Classic and *Dramatic* are two variations of the same chorus algorithm with *Dramatic* being the type with more apparent detuning.

Ensemble's characteristics make it similar to the chorus effects used in string machines.

Rate

Tyrell's chorus has its own LFO and the *Rate* knob controls its frequency.

LFO's job is to modulate the delay between the original signal and the delayed (copied) signals, as well as to modulate the delays between the copied signals themselves, in order to create the pitch difference between them. The higher the LFO's frequency is, the bigger the perceived pitch difference between the signals will be and vice versa.

Depth

The *Depth* knob controls the LFO's amplitude, i.e. the amount of modulation of the delay between the original signal and the copied signals. The bigger the LFO's amplitude is, the bigger the pitch difference between the two signals will be.

Wet

The last control parameter in the *Chorus* section is the *Wet* knob. It controls the volume mix between the modulated ("wet") signal and the unaffected ("dry") signal.

The *Wet* knob goes from 0.00 to 100.00 . When the knob is at its leftmost position (0.00), only the "dry" signal will be heard. When at its rightmost position (100.00), only the "wet" signal will be heard. Turning the knob to the 50 mark mixes the two signals equally. All the other knob positions make the different blends of the two signals, introducing more stereo spread the higher up the value of the *Wet* knob goes.

Modulation Sources



The modulation sources list is common to all modulation source selectors. By selecting *none*, the modulation of a parameter will be disengaged no matter which position the modulation amount knob for that particular parameter is at.

MIDI Modulation Sources

ModWhl – modulation wheel, MIDI CC #01

PitchW – pitch wheel

Breath – breath controller, MIDI CC #02

Xpress – expression pedal, MIDI CC #11

Gate – whenever a note is played, the modulated parameter will instantaneously jump from its initial level to the level specified by its modulation amount knob, hold that level for as long as the played note is being held and return back to the initial level when the note is released with a short release time.

Velocity – MIDI velocity

Pressure – channel or key pressure (aftertouch)

KeyFollow – modulation per MIDI note with *Glide*; the pivot note is E3

KeyFollow 2 – modulation per MIDI note with *Glide Ofst*

Other Modulation Sources

Alternate – alternating between two opposite values (e.g. *100.00* and *-100.00*) with each note played

Random – each played note will have a random value of the modulated parameter that's between the set maximum and its opposite value representing the minimum

StackVoice – works in conjunction with the *Voices* selector but only if the number of unison voices is more than 1; modulated parameter will have different amount of modulation for each unison voice

LFO 1 & *LFO 2* – the parameter will be modulated by the LFO 1 or the LFO 2

ADSR 1 & *ADSR 2* – the parameter will be modulated by one of the synth's envelopes

The End