J74 Venus6

A six voice poly-multi synthesizer for Ableton Live

User Manual

How to Install the J74 Venus6 devices

The J74 Venus6 pack includes the Venus6 *synthesizer* (an instrument device), the VenusSEQ *sequencer* (a MIDI device) and the VenusChorus *effect* (an audio device). The pack requires a Max for Live license to run (as in Ableton Live Suite) and it will run properly only in Ableton Live 10 or higher (older versions of Live, such as Live 9, are not supported).

Installation of the tool is extremely easy: unzip the download pack and copy the files to your computer hard drive, any place you like. To start it up, drop the plug-in (.amxd) you wish to use on a track in Ableton Live.

About Venus6 SQ and HQ versions (and CPU usage)

You will actually get *two* versions of J74 Venus6 synthesizer in the package: a **SQ** (standard quality) and a **HQ** (high quality) version. They are in all identical, apart from *internal oversampling rate*. The SQ version uses the standard sample rate as in the Ableton Live project. The HQ version uses *twice* the sample rate used by Ableton Live. This means that the anti-aliasing oscillators in Venus6 will reach higher in the frequency spectrum on the HQ version, for more "sparkle" at the high end, specially at lower project sample rates. This of course at the cost of roughly twice the CPU cycles.

Tip: So what version should you use? Here some recommendations:

At *high project sample rates* (such as 88.2KHz or above) use the SQ version. The difference between SQ and HQ versions is negligible at these rates (using the HQ version would end up in working at insane sample rates, for only your pet to hear the difference).

At *lower project sample rates* (such as 44.1KHz or 48KHz) it may make sense to use the HQ version, as the higher reach in frequency is audible. If CPU usage (working with the HQ version) is an issue on your system, you can use the SQ version during composition and swap to the HQ version only when you export (render) into a final audio or video. In this case just drop the HQ version "on the title bar" of the SQ plug-in (docked in the track) and the HQ version will replace the SQ version, keeping the same settings. As rendering is not a real-time task, even a low specs system can handle the extra CPU load of the HQ version while exporting audio (or video).

Note: A general technical note on the CPU usage. Venus6 does a few things which are CPU intensive – more on that later. It is also important to mention that Venus6 currently runs a *single threaded process*, meaning all its CPU cycles go to a single CPU thread (single threading is currently a global limitation of the Max for Live environment).

Big deal? No, this is in general not a big deal, as in complex projects Ableton Live will have many plug-ins and tasks which it can distribute across the various CPU cores, balancing things out. If you test Venus6 on an empty project, you may be concerned about the CPU meter in Live raising at each new voice being enabled. Bear in mind that this meter in Live only shows the *highest CPU thread*, not the average of CPU used by Live across all threads. So, once a project gets more components, Ableton Live will be able to distribute these processes to various CPU threads, so that things will eventually balance out. Actually a better view on the CPU usage of Venus6 is the one provided by your OS system, where averaging across multiple threading on the CPU is taken into account.

We will now go through an overview of the plug-in's explaining the thoughts behind their features (and their use).

Note: A description of each control available is provided on the *Quick View* PDF document as well as in the *built-in help window* of the plugin. Keep the Quick View PDF (or the help window of the plug-in) open while reading this document, as it would help localizing each control and getting the nuances of its use. As a reference when a parameter on the user interface is mentioned in this user manual it is put into square brackets, like "[SAW Level]" and you should be able to quickly find the same parameter name on the Quick View PDF and built-in plug-in help page.

Credits: The filter used for the voices in Venus6 is the (sweet) [sm.ladder~] filter, created by Pete Dowling & Matt Jackson of **Surreal Machines** (https://www.surrealmachines.com/) as part of their **smFilterPack** for Max. This filter has been used under their explicit permission (and much courtesy). May kudos to them for that!

J74 Venus6 (synthesizer) – An Overview

The J74 Venus6 plug-in is a six voice poly-multi synthesizer. It can be used as a *polyphonic* synthesizer (one timbre, six independent voices), as *six independent monophonic* synthesizers or a 6 voice stacked *monophonic* synthesizer. The structure of the voices (and of their sequencing lines) is to much extent modular and can be changed easily.

Voice routing modularity

As a matter of fact these voice modes are just some of the thinkable voice combinations. More variations are possible, as the routing capabilities are individually selectable through toggle switches (more on that later). The same applies to the six sequencers, bound to the voices, and to the modular clocking. This matrix-like approach to routing is one of the key elements of Venus6, aiming to achieve versatility.

Virtual Voice board uniqueness

A synthesizer is of course not only about structures and flexible routing, but most of all is about its "sound". And here some thinking has been put in. Venus6 uses at its basis anti-aliasing oscillators (saw, sine, square/pulse width modulation, plus noise), but with a *twist of uniqueness* to each voice, or better to each (virtual) voice board.

Let me explain what I mean by comparison. In many (basic) virtual analog synthesizers one virtual voice gets duplicated N times when doing polyphony. So, yes, every voice has its own independent envelopes and filters (for polyphony and articulation), but still it is the same code being re-triggered. The result is often too even to the ears, much like when hearing a sampled instrument. It lacks variation (test it: if you trigger the same note over and over again a literally *identical* tone will be produced each time). It may be what you seek, but in general is limiting.

More advanced virtual synthesizers approach this issue by using *drifting*. Each time a voice is triggered some specific condition is applied on that voice instance so that it will "drift". This is the spice programmers add to their unique code and often it is what people find appealing to some acclaimed virtual instruments. This is definitively a much better approach, as it helps to add life to the instrument. But yet, being the happy owner of a few vintage hardware (poly) synthesizers, there is one thing which I often think when I play virtual synthesizers, even the high end ones: adding dynamics by randomness (= each voice gets some randomness, each time different) does work, but it is not the dynamics I get from my Japanese poly-synth from 1984. *That thing "rotates" triggering through its voices...*

That "rotation" was what I wanted. So I invested some time in understanding how to replicate that (including measuring tolerance between the voices of those synthesizers). I ended up with the following approach:

a. Six different *unique* virtual voice boards, which are border-line identical, but yet still slightly imprecise and different from each other. Just a tiny bit. So subtle that you would not notice hearing each voice alone.
b. A way for *rotating* through the voices, similar to what those vintage synthesizers did (owners of those machines will understand what I mean when I refer to POLY1 or POLY2 modes).
c. Use drifting but *bound to the voice uniqueness*. So, yes, I also used drifting, but within a *tolerance* unique to each voice (so it is a bit of randomness, but within the tolerance boundary unique to a given voice).

Drawbacks: this means Venus6 has a *limited* (6) number of (unique) voices, and *not* unlimited general-purpose voices. And also each voice has some unique code which is not re-usable and this makes it use a bit more CPU than a N-voice system would with 6 voices active.

Advantages: the dynamics of the sound. As you go through the polyphony, and voices are allocated, the sound gets "alive", imitating the same effect those vintage synthesizer have. Each time you play a new note, a different voice board is chosen (additional details on voice reuse and stealing later on) and that voice has its own little uniqueness. It produces the same timbre, yes, like it is supposed to do as a polyphonic synthesizer, but with just a bit of uniqueness. Spending a long time making this thing, I can promise that the result of that *uniqueness* applied to voice *rotation* is not a trick of the mind, it is real.

The User Interface

To access the floating window and user interface of Venus6, click on the Venus6 name/icon in the device docked in the Ableton Live track. The user interface of Venus6 is divided in *sections* and *pages (tabs)*. This may be a bit odd when you are new to it, but it should get easily familiar when start using it. The TOP and BOTTOM sections never change (if you change page). The remaining sections depend on the page you are in.
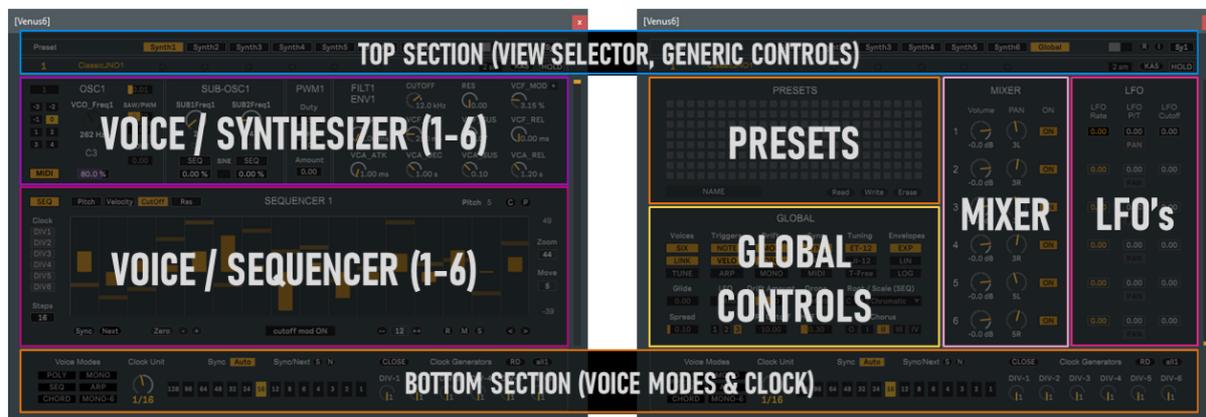
You can select the page from the TOP section using the [Page Selector]. This points you directly to the page dedicated to synthesizers and sequencers (1 to 6) and to a Global page for common settings, routing, mixing and presets. You can navigate by either clicking on a tab of the [Page Selector], by scrolling the scroll-bar on the right side of the device or using the [SysX] control in the TOP section / right end which moves you sequentially through the pages (and which is MIDI mappable, if you wish to use a controller for that).

TOP section
Besides navigation through the pages, the TOP section includes a few generic items such as quick preset selection (by number) and generic tools for [Output Level], [Bend Range], [HOLD] (for working with ARP turned on), [KAS] ("Kill All Sound", which can be used to kill all sound at any time - for instance if you did not release a MIDI note and removed MIDI input) and quick [R] Randomize Synthesizer and [I] Init Synthesizer action buttons.

Voice/Synthesizer section (Pages 1-6)
Each of the six voices has its own *Voice page* and, at the upper part of the voice page, presents you the *synthesizer* section. This is divided in oscillator sub-sections (OSC, SUB1, SUB2, PWM) and a sub-section for filter and envelopes. Depending form the routing configuration voices 2 to 6 may be *linked* to voice-1. In this case the controls of voices 2 to 6 are *grayed out* and disconnected from their respective voice. This happens in the case of working in polyphonic and monophonic modes. If the voice mode has independent voice routing (see use of the [LINK] setting in the Global page), voice 2 to 6 controls are active and control their respective voice.

Voice/Sequencer section (Pages 1-6)
Each of the six voices has its own *sequencer* sub-section (lower part of the voice page) and presents you with the sequencer section for programming, controls, clock routing and editing.

BOTTOM Section
The BOTTOM section also remains unchanged while changing page and presents you controls for clocking (unit, division, sync) and voice modes macro selection (setting the necessary routing for poly-, mono-, arpeggio, etc).

Global Page
Finally the *Global page* which has four sub-sections: Preset editing, mixing (the output of each voice VCA gets here), per-voice LFO (to Cutoff and Panning/Tremolo), a sub-section for global settings which affect *routing*, *triggering*, *sync* and the *output stage* (a global High Pass Filter and a Stereo Chorus).

The Voice / Synthesizer section of the Voice page

The picture below shows the Voice / Synthesizer section of a Voice page (voice 1 in this example):

Oscillators (OSC, SUB-OSC, PWM)

The oscillator sub-sections offers identical controls (within their unique tolerance) for each voice (1-6 through the pages) and have the following *building blocks*:

- A SAW wave (anti-aliased) with its own [SAW Level] control
- A SQUARE/PWM (Pulse Width Modulation) (anti-aliased) with its own [PWM Level] control
- A PWM section, with dedicated [PWM Duty], LFO [PWM Rate] (in Hz) and LFO [PWM Amount] controls
- A [Noise Level] for adding white noise to the mix of the voice sources.
- A SUB1 with: Sub-Harmonic tuning ratio [Sub1Freq], as a division of the main oscillator frequency (applied to both SAW and SQUARE/PWM), and a dedicated [Sub1 Level]. SUB1 also includes a SINE wave with its own [SINE Level] control. The SINE wave is tuned by the [Sub1Freq] control as well. More on Sub-Harmonics later.
- A SUB2 with: Sub-Harmonic tuning ratio [Sub2Freq] as a division of the main oscillator frequency (applied to both SAW and SQUARE/PWM) and a dedicated [Sub2 Level].

Note: Per voice this gives 8 sources, 3x SAW (OSC, SUB1, SUB2) + 3x PWM (OSC, SUB1, SUB2) + 1x Noise + 1x SINE

On top of mixing and tuning the sources, the OSC/SUB sub-sections provide a few additional routing controls:

- A [MIDI] toggle which defines if MIDI input is used to set the pitch of the voice. It is enabled by default. If this is disabled, the voice can be tuned individually using its tuning [VCO Freq] control and ignores MIDI input.
- A [SEQ] toggle in the OSC section, which enables pitch modulation by sequencer.
- A [Transpose] selector for transposing the MIDI input in octaves (when [MIDI] is enabled on the voice).
- A [SEQ] toggle in the SUB1/2 section, one for each SUB oscillator. If enabled, the SUB [SEQ] allow the sequencer to modulate the [Sub1Freq] / [Sub2Freq] divisions (the division gets modulated, not the pitch).

Finally, in case one of the *monophonic* modes is selected, OSC1 gets two additional controls:

- A [Stack Voices] which defines how many OSC sections are stacked in monophonic mode
- A [Detune Voices] which define the progressive detuning of the stacked voices in relation to OSC1

Sub-Harmonics of the Sub-Oscillators

Sub-Harmonics are a flexible tool, more probably than what you may think of first hand. Traditionally sub-oscillators are tuned one octave or two octaves down from the main oscillator, so to always maintain the same pitch of the main oscillator, just on a lower register. That is, by the way, what SUB1 and SUB2 in Venus6 do by default.

But in Venus6 other sub-harmonic divisions are possible and will result in other harmonic intervals. So while 2, 4, 8 and 16 respectively give one, two, three and four octaves down, settings like 3, 6 and 9 give a fifth interval one, two and three intervals below the main pitch of the OSC. More complex intervals are given by other ratios.

You can play with this for *harmonies within* a single oscillator and for a *multiple-oscillator-per voice* effect.

Tip: a way of using the Sub-oscillators for a multiple oscillator effect is to promote one of the sub-oscillators as main oscillator (by either muting or lowering down the level of the main OSC). For instance use SUB1 as main tone, set it to a division of 2 or 4 (one or two octaves down, so that pitch is still matching MIDI or sequencing) and have SUB2 set to division 3, which is a fifth down or a fourth up compared to SUB1 (with division to 2 or 4). In either cases, you will have an interesting harmonic interval when playing chords of multiple voices (as fourths and fifths stack up nicely).

Also interesting is sequencing an oscillator *and* one (or both) of its sub-oscillators, by having their SUB1/SUB2 [SEQ] toggles enabled. This way a single sequencer pitch lane sequences *both* main oscillator *and* the sub-harmonic *division* of the sub-oscillator(s), creating *harmonies*: as the sub-oscillator pitch is affected by *both* main oscillator pitch and sub-harmonic division, this modulation has musicality due to the *integer relations* between the intervals.

Tip: The latter works at its best if "Just Intonation" tuning [JI-12] is selected in the Global page. Just intonation keeps pitch intervals also on integer ratios and this fits well with sequencing divisions on the sub-oscillators.

Note: the [SEQ] toggles of the Sub-oscillators are *not* dependent on the [LINK] setting. They are always available.

Note: What has been described so far applies to all (6) voices. If the Venus6 synthesizer is in *polyphonic* or *monophonic* modes though, the controls of voices 2 to 6 are *linked* to the controls of voice-1 (controls of voices 2 to 6 are grayed out and disconnected). More details about voice macro's and global settings later in this manual.

Filters and Envelopes

The filter and envelope sub-section provides control for the Low Pass (LP) Ladder filter, the VCF envelope and the VCA stage envelope of each voice (1-6, through the pages). The following applies:

- Low Pass Ladder Filter [sm.ladder~]. The filter used for each voice of the Venus6 synthesizer is based on the [sm.ladder~] filter, created by Surreal Machines (https://www.surrealmachines.com/). This filter is used under explicit permission (and much courtesy) of Pete Dowling & Matt Jackson of Surreal Machines. The [sm.ladder~] filter gives an accurate emulation of the analog ladder filter design and can be controlled and modulated in real-time, directly through [Cutoff] and [Resonance] and, indirectly, through the [VCF Mod] amount, by the VCF ADSR envelope. Besides that also modulation by the voice LFO (see Global page, as described later on) and by the sequencer lanes for Cutoff and Resonance apply to the filter.

- VCF ADSR Envelope, wired to the Filter Cutoff. Through the [VCF Mod] amount this envelope can be used to shape the [sm.ladder~] filter cutoff for articulation (the VCF Envelope is triggered by notes or sequencing, depending on the routing in the Global page). The [VCF Mod] amount has both positive and negative polarity.

- VCA ADSR Envelope, wired to the internal VCA level. This can be used to shape the VCA level of the voice internal VCA stage for articulation (the VCA Envelope is triggered by notes or sequencing depending on the routing in the Global page).

- Besides the VCF and VCA envelopes, three additional modulation lanes are available through the *sequencer*:
  - The *Velocity* lane of the sequencer modulates the VCA level (in combination with the VCA ENV)
  - The *Cutoff* lane of the sequencer modulates the VCF Cutoff (in combination with the VCF ENV and LFO)
  - The *Resonance* lane of the sequencer modulates the VCF Resonance

The Voice / Sequencer section of the Voice page

Internal sequencing in Venus6 has been built as a *modulation* tool, with modular systems in mind. Each one of the individual lanes (Pitch, Velocity, Cutoff and Resonance) acts as a modulation source on top of MIDI input, MIDI velocity, Cutoff values and Resonance values respectively.

Below a picture showing the Voice / Sequencer section of the Voice page:
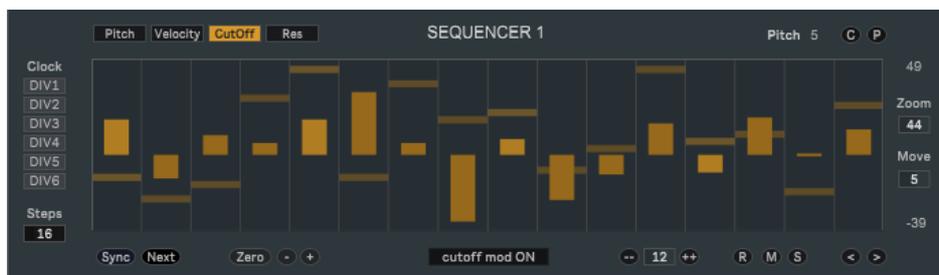
In the specific the following applies:

- The Pitch lane modulates the *pitch* (if the voice [MIDI] toggle in the oscillator sub-section is enabled, it modulates the input MIDI note pitch, otherwise it modulates the configured [VCO Freq] frequency value). It is a bipolar modulation with semitones as units and zero as default (no modulation). Examples: if you configure a pitch in the sequencer as {0} no pitch modulation is applied; if you set it to {12} the pitch is modulated to an octave higher; if you set it to {-2} two semitones below and so on.
- The Velocity lane modulates the synthesizer *VCA level* (in combination with the VCA ENV). If the [NOTE] trigger mode in the Global setting is disabled it also causes the sequencer to trigger the envelopes for values which higher than 0 (zero). A velocity of 0 (zero) mutes a step (no pitch modulation, no trigger). The modulation can be enabled or disabled using the [velocity mod ON/OFF] selector (by default it is enabled).
- The Cutoff lane modulates the synthesizer *VCF Cutoff* (in combination with the VCF ENV and LFO) in bipolar fashion. The [cutoff mod ON/OFF] selector (by default disabled) is used to send this modulation to the VCF.
- The Resonance lane modulates the synthesizer *VCF Resonance* in bipolar fashion. The [res mod ON/OFF] selector (by default disabled) is used to send this modulation to the VCF.

Tip: The Pitch lane can be constrained to a musical scale. This can be done by setting the [Root] and [Scale] parameters in the Global sub-section of the Global page.

Tip: The Pitch lane can be used in all sorts of ways. For instance, if the ARP setting in the Global page is enabled (or the ARP macro of the BOTTOM view selected), pitches are set back to zero, so to reflect MIDI input and the sequencer is used only for triggers. If you instead activate the CHORD macro, the Pitch lane is set for each voice on a different interval (0, +4, +7, +11, +14, +19) which in combination with [Root] and [Scale] global settings results in one MIDI note triggering all six voices on different harmonic intervals. The scale defines the chord set: so a *Major* scale defines Major chord extensions (Major, Major7, Major11, etc), a *Minor* scale Minor chord extensions (Minor, Minor7, Minor11, etc.) and so on. The Pitch lane (modulation) can be therefore used for all sorts of harmonic applications.

Tip: In the Pitch lane *double click* on a step to set its Velocity lane value to 0 (zero) and this way muting the step.

Tip: The Velocity lane can be used for creative arpeggio making. With the sequencer active (on a voice or on all voices) you can define which step is *active* by setting Velocity > 0 and *mute* others with Velocity = 0. In combination with *shifting* steps appropriately in the sequences you can create basically any arpeggio.

Each sequencer has also a set of other controls for triggering and editing:

- The [Clock-DIVx] toggles activate sequencer clocking. More about clocking in the next paragraph.
- [Steps] sets the number of steps in the sequence (ranging from 1 to 64), for each sequencer separately.
- [Sync] & [Next], perform manual sync to the bar counter in Live and next step jump.
- Editing commands like [Zero] (reset to 0), [+], [-] and a random/shuffle/sort functions [R/M/S] are available.
- Zooming is possible, with the [Zoom] for zooming in/out the range and [Move] for moving up/down the view.
- Copy [C], which copy all values from a sequencer to a buffer, and Paste [P] which pastes from the buffer into the sequencer are available. They work within the same page / sequencer *and* between pages (so you can copy values from let's say sequencer1 and paste them into sequencer5 and sequencer6)

Note: Disabling the [SEQ] toggle disconnects Pitch modulation and keeps Velocity, Cutoff and Resonance modulation active. You can deactivate each of the other modulations using the dedicated mod on/off switches. Actual *trigger-less* modulation for Cutoff and Resonance can be achieved by disabling the [velocity mod ON/OFF] switches.

Sequencers and Clock Modularity

Clock, clock divisions and clock routing to the sequencers are part of Venus6 modularity. You define the [Clock Unit] *globally* (in the BOTTOM section). This has only the effect of setting the internal clock in Venus6 and, if the global [Sync Mode] is set to SYNC, to synchronize it to Live tempo. But clock is not sent by default to the sequencers. You need to "route" the clock as explained next.

The "main clock" (the [Clock Unit]) is not sent directly to the sequencers, but to six independent *clock dividers* (DIV1 to DIV6). Each clock divider can then been configured with a custom *clock division* of the main clock (the clock division settings are located at the BOTTOM section, on the right side, as in the picture below).

The picture below highlights all clock related items: [Clock Unit] in yellow, clock dividers in orange, clock routing in red (plus pitch routing from the sequencer to the synthesizer voice in blue).

Any sequencer (1-6) can be step-triggered by *any* clock divider (1-6) by activating the necessary [Clock-DIVx] toggles (highlighted in red, in the picture above), at the individual sequencer level. Result: if a [Clock-DIVx] toggle is enabled, then the clock division from *that* divider is sent to *that* sequencer.

Note & Tip: OK, hold on.... *why bother with all this modularity and settings for just sending clock to the sequencers*? Well, this is why: in this way you can set each sequencer to a different clock division of the main clock and achieve *poly-rhythm* between the sequencer lines. Let's say you set DIV1 to 4, DIV2 to 3 and DIV3 to 5; then set Sequencer1 with [Clock-DIV1] = ON, Sequencer2 with [Clock-DIV2] = ON, Sequencer3 with [Clock-DIV3] = ON. Result: poly-rhythm with 4 against 3 against 5, for almost endless poly-rhythm combination fun.

Tip: Actually, you can push things even further: you can have *more-than-one* [Clock-DIVx] toggle open at the same sequencer and create *irregular* timing. Example: DIV1 set to 4, DIV2 set to 6, Sequencer1 with both [Clock-DIV1] & [Clock-DIV2] toggles open: clock will advance at irregular step intervals within a larger interval and repeat.

Note: you can always keep things simple, if you wish to, and have all DIVs set to 1 (the same as the main clock), then send this clock to all sequencer for the same clock (the same as the main clock). The [all1] button on the BOTTOM section sets all DIV dividers back to 1 is a shortcut to this. The [SEQ] macro (on the BOTTOM section) sets all sequencers to their own dedicated [Clock-DIVx] toggle as a default clock routing, in this fashion as well.

Tip: What about [Steps] numbers? You have the freedom to define the number of [Steps] for each sequencer as well the DIV [Clock Division] values and [Clock-DIVx] routing. So you can do any combination of *poly-metric & poly-rhythm* sequencing, combined.

The Voice mode "macro's"

The BOTTOM section, as represented below, also provides a six-button *voice mode* macro (everything is "in sixes" in Venus6, if you have not noticed yet), for quick macro settings of a number of parameters in the plug-in. This way the synthesizer can quickly change identity (voice routing and handling of MIDI, triggers, sequencer and clocking).
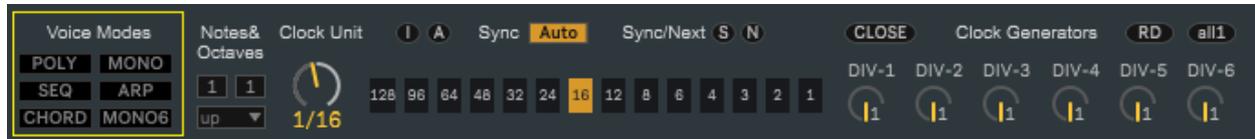
The following options are available:

- POLY: 6-voice polyphonic synthesizer, triggering each voice by MIDI input by allocating voices (see [Poly] modes further on), with each voice having its own filter and envelopes. Voices are *linked* to voice-1 controls.
- MONO: monophonic synthesizer with all 6 oscillators stacked up on voice 1 (with one filter and envelopes set).
- SEQ: voices are disconnected from MIDI input and the sequencer drives the pitch and the triggering. The voices are unlinked, so the individual controls on each voice page are active, for six independent monosynth's.
- ARP: a sequencer based mode, with MIDI input *clustered* and sent to the sequencer as referencing pitch for each voice (the pitch lanes are all set to zero). Use DIVs (clock divisions) and/or sequencer lane (velocity, mute, shifting) to create custom / poly-metric / poly-rhythmic sequences and arpeggio's.
- CHORD: turns [Sync Mode] to MIDI triggering, so that each time a note is played on the MIDI input, the clock sends a pulse. The sequences are set with pitch on intervals. The global [Root] and [Scale] settings in the global page can then be used to constrain intervals for chords. Triggers all voices, like in MONO modes.
- MONO-6: a variation of monophonic synthesizer setup with the voices (oscillators AND filter/envelopes) played in monophonic fashion but kept independent (6 filters and envelope sets). While by default (similar to MONO) voice controls are "linked" to voice 1, it supports [LINK] to be turned OFF so you can use and tune each voice independently, have different settings on filters, envelopes, intervals and so on. Use the mixer section in the Global page for mixing the output of the voices.

The arpeggio "macro's"

At the BOTTOM section (next to the voice modes) you can find a few additional macro controls useful for programming arpeggio's into the sequencers (as opposed to programming them by hand).

The following controls also apply:

- [Notes] is a macro which defines how many notes will be repeated if using the sequencer as an arpeggiator.
- [Octaves] is a macro which defines over how many octaves the arpeggio will be created in the sequencer.
- [ARPType] is a macro for the type of arpeggio.
- [A] (Apply) Apply the arpeggio programming on the sequencer based on [Notes] & [Octaves].
- [I] (Init) Restores the defaults on all sequencers.

Global Settings: voice routing, triggering, drift, sync, tuning and envelopes

The voice mode macro's set up values for various parameters in the global page as related to typical configurations. These individual parameters, though, have a specific purpose on their own. It is therefore good to know what each one does so that you can eventually create different combinations to fit your own experiments.

Voice settings - These parameters affect how voices are structured, linked and tuned in relation to each other.
- [SIX/ONE]: Defines if to send the oscillators to separate filters and envelopes or to sum them in a single voice.
- [LINK] Links the controls of all voices to voice-1. In a poly-synth setup all six voices run in parallel (with own filters and envelopes) but voices 2 to 6 have their controls *linked* to voice-1. With [LINK] set off, voices have their own independent controls active. The following voice parameters are excluded from linking: [SEQ] selectors for OSC and SUB-OSC1 and 2 and, if [TUNE] is turned on, the VCO factors of each voice.
- [TUNE] Defines if oscillators 2 to 6 are tuned separately (by MIDI or internal VCO Freq) or tuned as a factor (ration) of voice-1 VCO Freq (MIDI or internal). This is useful for monophonic detuning and for chord triggering.

Trigger settings - These settings affect how triggers are generated.
- [NOTE]: Defines if MIDI input triggers the envelopes. If set on, the synthesizer is playable from MIDI input, if not it responds only to triggers from the internal sequencers.
- [VELO]: Defines if MIDI input velocity is used or only the internal sequencer velocity is used (for the VCA level).
- [ARP]: Defines if MIDI input is *clustered* (e.g. taking care of input chords: sorted, in typical arpeggio fashion) or not (and notes are delivered as they arrive in input). Use [HOLD] to hold the input when ARP is turned on.

Drift (and mono) settings - These settings affect drifting and monophonic/polyphonic behavior.
- [MOD Drift]: Defines if voice drifting is applied to the envelopes of the voices, or not.
- [OSC Drift]: Defines if voice drifting is applied to the oscillators, or not.
- [MONO] Defines if monophonic re-triggering occurs in legato mode. Disables polyphony if set on.

Tuning settings - These settings affect how pitch tuning is quantized.
- [ET-12]: Use Equal Temperament for tuning intervals.
- [JI-12]: Use Just Intonation for tuning intervals (useful if Sub-harmonic intervals are sequenced).
- [Free Tuning]: Tune only using [VCO Freq], without quantization.

Envelope shape settings - These settings affect how envelope curves are shaped (over time).
- [EXP ENV] Use Exponential curves on envelopes
- [LIN ENV] Use Linear curves on envelopes
- [LOG ENV] Use Logarithmic curves on envelopes

Tip: You can use the [TUNE] setting, when activated, for various applications as it brings up the [Tune factor] for control of tuning of voices 2 to 6 in relation to voice 1. This is particularly useful in monophonic operation (like set up by the MONO and MONO-6 voice mode macro's), as it allows for individual tuning of the voices. For instance:

- You can use it for manually setting the detune factor of the voices in a monophonic setup (in alternative to the [Detune Voices] control of OSC1 which does it gradually as a macro).
- You can use the [Tune factor] for creating intervals (notice that this is *not* how CHORD mode works, as CHORD mode uses the sequencers for that, as it allows filtering based on a musical scale as defined by [Root] and [Scale] in the global section).
- You can use it for micro-tuning intervals if you fancy it (like indian or arabic tunings, using the right ratio's).

As a reference, in case of western tuning, the following table may be of help for creating intervals with [TUNE]:

Interval Name	Decimal ET-12	JI-12 ratio's	Decimal JI-12	Difference (ET-JI)
Unison (C)	1	1	1	0
Minor second (C#/Db)	1.059463	16/15	1.06666	−11.73
Major second (D)	1.122462	9/8	1125	−3.91
Minor third (D#/Eb)	1.189207	6/5	1.2	−15.64
Major third (E)	1.259921	5/4	1.25	+13.69
Perfect fourth (F)	1.334840	4/3	1.33333	+1.96
Tritone (F#/Gb)	1.414214	7/5	1.4	−17.49
Perfect fifth (G)	1.498307	3/2	1.5	−1.96
Minor sixth (G#/Ab)	1.587401	8/5	1.6	−13.69
Major sixth (A)	1.681793	5/3	1.66666	+15.64
Minor seventh (A#/Bb)	1.781797	16/9	1.77777	+3.91
Major seventh (B)	1.887749	15/8	1875	+11.73
Octave (C)	2	2/1	2	0

Tip: You can use the [LINK] setting, when deactivated, for non-standard applications. Like polyphony with various voices on slightly different settings; or in MONO-6, once [LINK] is disabled, for having the voices act as individual programmable oscillators (like in a 2 to 6 oscillator setup), every oscillator on selectable waveform, shape, tuning, etc.

Global Settings: Poly modes

The [Poly] selector defines how voice allocation is done when handling polyphony. [Poly] = 1 uses randomization and rotation, spreading voices as much as possible, but has *no memory* and may cut notes. [Poly] = 2 uses static assignment (with no rotation) and is therefore good for sequencing and arpeggios (due to the predefined note order to voice allocation). [Poly] = 3 (the default mode) uses rotation *and* memory, so it assures notes will complete their release stage (unless stealing applies), while still rotating voices as much as possible. [Poly] 3 should fit most situations, in particular when MIDI playing or external MIDI sequencing are involved.

Global Settings: The LFO's

Six separate LFO's are available and mapped to [PAN] and [Cutoff] of each voice, with independent [PAN LFO] and [Cutoff LFO] amounts. The rate of the LFO's is defined by the [Rate LFO] settings (in Hz). The[PAN/TRE] toggles switch the [PAN] LFO phase of the right channel to be in phase with the left channel (for tremolo). When [LINK] is ON, controls of LFO 2 to LFO 6 are linked to LFO 1 (while the LFO's themselves keep running independently).

Global Settings: The Mixer

The output of all voices (after the VCA stage) is sent to the Mixer, with per voice [Volume], [PAN] and [ON/OFF] toggle. The [Spread] macro can be used for spreading panning of the six voices (applies only if [SIX] is active).

Global Settings: Glide, LFO trig, Drift Amount, Drone, Root & Scale

The following global settings affect several features of all the synthesizer voices, globally:

- [Glide]: Define how pitch (VCO frequency) changes are applied. With Glide = 0ms, changes are immediate.
- [LFO TRIG]: Define if the voice LFO's (for PAN and Cutoff modulations) are restarted by voice triggering
- [Drift Amount] Define how much drifting is applied to MOD and OSC components
- [Drone] Add a drone component to the VCA envelopes (of all synthesizers), as a volume shift.
- [Root] and [Scale] define a musical scale constraint to the sequencer Pitch lanes (but not to MIDI input).

Tip: you can use the [Drone] function in poly or mono modes. In poly mode it can be used for cinematic landscapes (using the tuning of a chord and then doing playing on top of it). In a monophonic mode it can be used as a single tone drone. In both modes it can also be used as a kind of "freeze" effect. Please keep in mind that [Done] will open all six voices at the same time.

Note: The [Drift Amount], as well as the [MOD Drift] & [OSC Drift] toggles, define the amount and type of drifting of the voices in relation to their "tolerance". If all drift controls are disabled this largely dampens the tolerance effect across the voices, making them sound much more even, but does not eliminate the tolerance effect completely.

Global Settings: HPF

A global HPF (high pass single filter) is routed after the mixer. You can control the [HPF cutoff] and [HPF resonance].

Global Settings: Chorus

Well, this was unavoidable. Venus6 used as reference the sound of Japanese poly-synths of the 80's so a chorus is the natural way to close the signal chain, when you target that sound. This chorus has five different preset settings:

- O (OFF) for no Chorus (chorus bypassed, dry output)
- I (1) for a mild stereo chorus (using independent LFO's for L and R, for a stereo ensemble effect)
- II (2) for a wide stereo chorus (using independent LFO's for L and R, for a stereo ensemble effect)
- III (3) for a mild mono chorus with inverted R/LFO phase (common on Japanese poly's of the 80s)
- IV (4) for a wide mono chorus with inverted R/LFO phase (common on Japanese poly's of the 80s)

Note: The chorus of those poly's of the 80s has indeed been the inspiration for settings [III] and [IV]. They replicate the "phase trick" used on those synths (having the same LFO applied to both L and R channels, but with phase inverted, therefore saving components). This effect fools the human brain as it appears as true stereo imaging, while actually L and R are still related. Settings [I] and [II] are a real stereo versions of respectively [III] and [IV], with similar average amounts, delay lines and rates but with independent LFO's for the L and R channels (values for L and R being slightly different from each other). Settings [I] and [II] are respectively wider than [III] and [IV] and introduce more pitch phasing (which translates in an ensemble effect).

Global Settings: Presets

Venus6 has its own preset functionality. This covers all Voice and Global settings and most of the the TOP and BOTTOM section settings. Certain parameters of the latter sections (like [Clock Unit], [Bend Range], [Output Level]) are intentionally excluded from the preset system, so to keep these features independent from preset changes.

Here how presets work:

- **SHIFT + CLICK** on a slot to create a new preset (or replace an existing one)
- **CLICK** on a slot to recall a stored preset
- **SHIFT + {ALT|OPTION} + CLICK** on a slot to delete a stored preset
- Presets banks can be exported using the [**Write**] operation.
- Presets banks can be imported back using the [**Read**] operation.
- All presets from the current bank can be erased (locally) using the [**Erase**] operation.
- On the TOP section you can also find a MIDI mappable [**preset Number**] for recalling presets

Important: the file extension for preset files MUST be ".maxpresets" in order for the files to be readable.

Note: the complete state of the device (every parameter) is saved with the Ableton Live project, independently from presets. This also applies to parameters not part of the preset feature.

VenusSEQ (MIDI sequencer)

VenusSEQ is a MIDI plug-in. This MIDI device is in essence the internal sequencer of Venus6 transformed into a 6 line polyphonic MIDI sequencer. VenusSEQ can be used with any instrument, VST/AU or MIDI external in Ableton Live and can be quite useful, if you consider the nature and flexibility of its clock modularity and the possibility of easily creating poly-rhythmic and/or poly-metric phrases (as described throughout this manual for Venus6).

All sequencing controls of Venus6 are also available to VenusSEQ. There are a few add-on's though, as described next.

Note: VenusSEQ , in the place of the internal filter modulation routes, has six modulation lanes for *external parameters:* each sequencer, besides pitch, velocity and duration, has a modulation lane for an external parameter. This can be used to sequence *any* parameter in Live (or on a plug-in hosted in Live), as long as this parameter is MIDI mappable.

The following specific parameters apply to modulation in VenusSEQ:

- [Map/Define Mapping] Activate to select a parameter in Ableton Live for modulation (one modulation slot per sequencer). When "yellow" the device expects you to click on the parameter in Live to be mapped. After that the parameter name is shown and the button turns black. Use the [Release Mapping] to release the mapping.
- [Min] Define the minimum value for the modulation in % of the parameter range.
- [Max] Define the maximum value for the modulation in % of the parameter range.
- [Release Mapping] Releases a previously made mapping, the slots becomes free.

The following controls apply to VenusSEQ in regards to arpeggio macro's (slightly differences compared to Venus6):

- [Init] Restores the default number of steps (16) as well as pitch and velocity values.
- [Stop] Close all DIVx gates, on all sequences, effectively stopping all output and sequencer clock.
- [Notes] is a macro which defines how many notes will be repeated if using the sequencer as an arpeggiator.
- [Octaves] is a macro which defines over how many octaves the arpeggio will be created in the sequencer.
- [ARPType] is a macro for the type of arpeggio.
- [Apply] Apply the arpeggio programming on the sequencer based on [Notes] & [Octaves].

To use VenusSEQ just drop it on a MIDI track. Note that Ableton Live transport needs to be running for the clock to run.

VenusChorus (Audio Effect)

A little add-on to the pack is the VenusChorus audio effect device. This audio plug-in offers the same chorus effect as used in Venus6, as a separate audio effect, for use anywhere in Ableton Live. The device has only one control, the [Chorus] preset type selector, with the same presets as used in Venus6.

Questions?

If you still have questions or issues, please send an email to: info [at] fabriziopoce.com