

USER MANUAL

Synclavier V

ARTURIA[®]
YOUR EXPERIENCE • YOUR SOUND

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Product version: 2.0

Revision date: 10 October 2018

Table Of Contents

1. Introduction.....	4
1.1. What is Synclavier V?.....	4
1.2. History of the Original Instrument.....	5
1.3. Appearances in Popular Music and Sound Design.....	9
1.4. The Partial Timbre Method of Sound Design.....	10
1.5. What does Synclavier V add to the original?.....	11
1.6. Why would you read this manual?.....	11
2. Activation and Setup at first start.....	12
2.1. Register and Activate.....	12
2.2. Initial Setup.....	13
2.2.1. Audio and MIDI Settings (Windows OS).....	13
2.2.2. Audio and MIDI Settings (macOS).....	15
2.2.3. Using Synclavier V in Plug-in Mode.....	16
3. User Interface.....	17
3.1. The Virtual Keyboard.....	17
3.2. The Upper Toolbar.....	18
3.2.1. Save.....	18
3.2.2. Save As.....	19
3.2.3. Import... (Preset or Bank).....	20
3.2.4. Resize Window.....	21
3.2.5. Audio settings.....	21
3.2.6. About.....	21
3.2.7. Preset Browser Quick Look.....	22
3.2.8. Display mode buttons.....	23
3.2.9. MIDI Learn Mode.....	26
3.2.10. MIDI Controller Configs (Configurations).....	28
3.3. The Lower Toolbar.....	29
3.4. The Preset Browser.....	30
3.4.1. Searching Presets.....	30
3.4.2. Filtering Using Tags.....	32
3.4.3. The Preset Info Section.....	32
3.4.4. The Second Preset View.....	33
3.4.5. Playlists.....	34
4. Standard Panel Mode Controls.....	36
4.1. Timbre Settings.....	36
4.1.1. Timbre Volume.....	36
4.1.2. Timbre Pan.....	36
4.1.3. Timbre Transpose.....	36
4.1.4. Timbre Tuning.....	37
4.1.5. Timbre Voice Chorus.....	37
4.1.6. Timbre Chorus Fine.....	37
4.1.7. Timbre F.M. Modulation.....	38
4.1.8. Timbre Bit Depth.....	38
4.2. Amp Env Offset.....	39
4.2.1. Amp Attack.....	39
4.2.2. Amp Decay.....	39
4.2.3. Amp Release.....	39
4.3. Harm Env Offset.....	40
4.3.1. Harm Attack.....	40
4.3.2. Harm Decay.....	40
4.3.3. Harm Release.....	40
4.4. Repeat/Arpeggio.....	41
4.4.1. Repeat.....	41
4.4.2. Arpeggio.....	41
4.4.3. Sync.....	41
4.4.4. Rate.....	42
4.4.5. Pattern.....	43
4.5. Polyphonic Mode.....	44
4.5.1. Poly Normal.....	44
4.5.2. Poly Retrig.....	44

4.5.3. Mono Porta.....	44
4.5.4. Mono Re trig.....	45
4.6. Portamento.....	45
4.6.1. On.....	45
4.6.2. Log/Lin.....	45
4.6.3. Portamento Rate.....	45
4.7. Bend Wheel & Mod Wheel.....	46
5. Extended Panel Mode Controls.....	47
5.1. Partial Select.....	47
5.1.1. Partial Select 1-12.....	47
5.1.2. Partial Copy & Paste.....	48
5.1.3. Partial Solo.....	48
5.1.4. Partial Mute.....	48
5.2. Partial Settings.....	49
5.2.1. Partial Volume.....	49
5.2.2. Partial Pan.....	49
5.2.3. Partial Pitch Track.....	49
5.2.4. Partial Octave.....	49
5.2.5. Partial Transpose.....	49
5.2.6. Partial Tuning.....	49
5.2.7. Voice Chorus.....	50
5.2.8. Partial Chorus Fine.....	50
5.2.9. Partial F.M. Ratio.....	50
5.2.10. Partial F.M. Fine.....	51
5.2.11. Partial F.M. Amount.....	51
5.2.12. Partial Frame Speed.....	51
5.3. Amplitude Envelope.....	52
5.3.1. Amplitude Delay.....	52
5.3.2. Amplitude Attack.....	52
5.3.3. Amplitude Peak.....	52
5.3.4. Amplitude Decay.....	52
5.3.5. Amplitude Sustain.....	52
5.3.6. Amplitude Release.....	53
5.4. Harmonic Envelope.....	54
5.4.1. Harmonic Delay.....	54
5.4.2. Harmonic Attack.....	54
5.4.3. Harmonic Peak.....	54
5.4.4. Harmonic Decay.....	54
5.4.5. Harmonic Sustain.....	54
5.4.6. Harmonic Release.....	55
5.5. Vibrato.....	56
5.5.1. Vibrato Wave.....	56
5.5.2. Vibrato Sync.....	56
5.5.3. Vibrato Rate.....	56
5.5.4. Vibrato Carrier.....	56
5.5.5. Vibrato Link.....	57
5.5.6. Vibrato Modulator.....	57
5.5.7. Vibrato Attack.....	57
5.5.8. Vibrato Bias.....	57
5.5.9. Vibrato S-Curve.....	57
5.5.10. Vibrato Quantize.....	57
5.5.11. Vibrato Invert.....	57
5.6. Stereo.....	58
5.6.1. Stereo Wave.....	58
5.6.2. Stereo Sync.....	58
5.6.3. Stereo Rate.....	58
5.6.4. Stereo Depth.....	58
5.6.5. Stereo Attack.....	58
5.6.6. Stereo Phase.....	58
5.6.7. Stereo S-Curve.....	58
5.6.8. Stereo Alternate.....	59
5.6.9. Stereo Invert.....	59

6. Graphic Screen Mode Controls	60
6.1. ENGINE	60
6.1.1. Anatomy of a FRAME Event	61
6.1.2. A walkthrough.....	62
6.1.3. The Timeline Editor.....	63
6.1.4. Frames and the Timeline	64
6.1.5. The Frame Edit Menu.....	66
6.1.6. Timeline settings	71
6.1.7. The Harmonics Editor	73
6.1.8. Tools	75
6.1.9. Sample playback.....	77
6.1.10. Resynthesis.....	81
6.1.11. Conclusion: Timeline features, using them creatively.....	83
6.2. MIXER.....	84
6.2.1. VOLUME	85
6.2.2. PAN	85
6.2.3. TUNING	85
6.2.4. TRANSPOSE	86
6.2.5. OCTAVE	86
6.2.6. CHORUS.....	86
6.2.7. FINE (Chorus).....	87
6.2.8. FM MOD	87
6.2.9. FM RATIO	87
6.2.10. FINE (FM Ratio)	87
6.2.11. PITCH TRACK.....	88
6.2.12. Organizing your Partials	89
6.2.13. Chained Editing.....	90
6.3. ENV/LFOs (Envelopes and LFOs).....	91
6.3.1. Envelope global offset.....	92
6.3.2. The Amplitude Envelope Generator	94
6.3.3. The Harmonic Envelope Generator.....	96
6.3.4. ENV/LFO Vibrato.....	98
6.3.5. ENV/LFO Stereo.....	100
6.3.6. Chained editing and the ENV/LFO Tab	101
6.4. KEY DYNAMICS	102
6.4.1. Input Source Assign	102
6.4.2. Keyboard Zones.....	102
6.4.3. Key Range.....	103
6.4.4. Key Range Fade Up & Down.....	103
6.4.5. Chained editing and the KEYDYNAMICS Tab	103
6.5. MODS.....	104
6.5.1. Modulation Sources	106
6.5.2. Modulation Destinations	111
6.5.3. Chained editing and the MODS Tab.....	119
6.6. FX/MASTER	120
6.6.1. FX (Effects).....	120
6.6.2. System Parameters.....	124
6.6.3. Pitch settings.....	126
6.6.4. Scale adjustments	127
7. Software License Agreement.....	128

1. INTRODUCTION

Congratulations on purchasing Synclavier V! We are confident that it will give you many hours of synthesizing and playing unique sounds (or as we prefer to call them on the Synclavier V, Timbres).

1.1. What is Synclavier V?

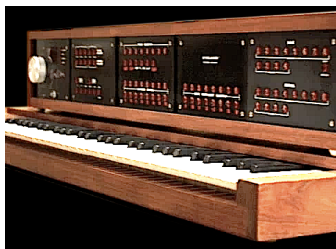
The Synclavier V is a software recreation of the Synclavier Digital Synthesizer, combining Additive, FM (Frequency Modulation) and Timbre Frame synthesis. In addition to bringing the authentic and instantly recognizable timbres of the Synclavier to your studio or stage, we have expanded some of the features and added some 21st-century features not available in the original Synclavier!

Developed by the original Synclavier software designer Cameron Jones, the DSP engine of Synclavier V authentically reproduces the sound of the FM 8-bit voice cards of the Synclavier right down to the noise floor! It runs both as a stand-alone instrument on Windows and macOS and as a plug-in in all major formats inside your DAW (Digital Audio Workstation). It has easy MIDI learn functionality for hands-on control of many of its parameters and in plug-in mode supports automation for greater creative control.

1.2. History of the Original Instrument

The original Synclavier® (pronounced “sin-cla-veer” by its creators) is a digital music synthesizer workstation. The brain is an ALE 16-bit minicomputer processor controlling 8-bit additive, FM (frequency modulation), and Timbre Frame synthesizer voices. The computer is connected to a separate organ type on/off 5-octave keyboard for live performance and recording into a 16-track “Memory Recorder” (a.k.a. sequencer).

A “green screen” monitor is also used to enter and edit sounds, music events and computer files, all stored on 5.25” floppy disks and later, hard disk drives.



Synclavier I Keyboard



Processor and Monitor

Creation of the Synclavier I began in 1972 at Dartmouth College in Hanover, New Hampshire, U.S.A., by Music Professor Jon Appleton and Thayer School of Engineering Professor Frederick J. Hooven. Sydney A. Alonso was a research associate at the engineering school and was assigned to the project in 1972 along with student programmer Cameron Jones.



Sydney A. Alonso and Cameron Jones with Jon Appleton performing on the Synclavier I

In 1976 Alonso and Jones formed a new company, New England Digital Corporation (N.E.D.) in Norwich, Vermont, U.S.A., producing and selling their first product, the ALE computer. But they had limited funds, which hindered them from reaching their full potential. In 1978 they were approached by Burbank & Company investment advisors. The ensuing negotiations finally yielded a substantial capital investment with the focus of expanding the computer division.



New England Digital Headquarters (White River Junction, Vermont, USA)

Brad Naples, a Berklee College of Music graduate with a degree in music composition, was living in Boston and saw a Channel 4 TV spot on Jon Appleton with the Synclavier, immediately saw the potential, and came knocking on N.E.D.'s door. He was soon hired as business manager and would later take the Synclavier II to the Audio Engineering Society (AES) convention. Being the first time anyone other than Alonso or Jones had sold anything for the company, Naples was promoted to Sales Manager and in 1982 became President.

Synthesist, sound designer, and composer Denny Jaeger convinced Alonso of the commercial potential for the musical instrument and with his major design contributions, development of the Synclavier II began.



Synclavier II Keyboard (ORK)



DEC VT-100/640 Monitor

Other features later added were monophonic **Sample-to-Disk** with 16-bit 50khz sampling rate, and many software updates including **Resynthesis**, a method of converting a sampled sound into Timbre Frames through additive synthesis. These Timbre Frames were chained together sort of like film frames, and could be edited. The **Music Printing Option** was one of the first and most advanced music printing editors, allowing note entry from the Memory Recorder or direct monitor screen entry, which the user could then print to either a dot-matrix printer, a laser printer, or output to a digital typesetting format.

N.E.D. introduced the Digital Guitar option to give guitarists a more familiar way to work with the Synclavier sounds and Memory Recorder (sequencer). The interface consisted of the Roland G-303 guitar, a custom controller that attached to the guitar, and a rack mount interface. Jazz guitarists Pat Metheny and John McLaughlin were early adopters.



Synclavier Guitar Interface



Synclavier Guitar Controller



Roland G-303 Guitar with Synclavier Controller

A larger 6-octave velocity- and pressure-sensitive keyboard, referred to as the “VPK”, was introduced in 1984 with a 32-track Memory Recorder, pitch bend and modulation wheels, and many more assignable buttons.



Velocity/Pressure Sensitive Keyboard (VPK)

In 1984 N.E.D. raised more capital and was able to develop the Polyphonic Sampling system, one of their largest hardware and software updates. The user could now playback multiple sampled sounds simultaneously directly from RAM (Random Access Memory) rather than a hard disk drive. The 2-foot tall rack grew into a mega tower named the PSMT (Polyphonic Sampling Memory Tower). A fully loaded system would have 32 sampling voices, 32 FM synthesizer voices, 32 megabytes of RAM, 32 multichannel outputs, Stereo 100khz sampling, an 8 in / 8 out MIDI module, a SMPTE reader/generator interface card, a Clock module, two 320MB hard drives, and a 5-1/4” 1.4mb floppy disk drive (which was needed to install software and boot up the whole system).

The Direct-to-Disk “option”, available in 4, 8 or 16 tracks, introduced 100khz recording to hard disk and connected to the Synclavier tower.

The later models included the 9600, which offered up to 96 sampling voices, 32 FM synthesizer voices, and 96 megabytes of RAM and 16 multichannel outputs.

All in all there were 16 different versions of the Synclavier. Below we list the more popular models:

Model	Specification
3200	32 sampling voices, 32mb RAM
6400	64 sampling voices, 64mb RAM
9600TS	Tapeless Studio (9600 plus Direct-to Disk)
PostPro	16 bit Stand-alone digital recording (4 to 16 voices)
PostPro SD (Sound Design)	Direct To Disk with Polyphonic Sampling voices



Synclavier II Processor with 5.25" Floppy



Synclavier 9600 TS (Tapeless Studio)

1.3. Appearances in Popular Music and Sound Design

One of the most recognizable sounds created from a Synclavier's FM synthesizer was the intro gong sound on Michael Jackson's "Beat It" on the Thriller album. You can find this sound, named "Phased Gong", in the presets for Synclavier V. The following is a partial list of Synclavier users, artists, sound designers and some of their credited works:

- Michael Jackson (*Thriller* & *Bad* albums)
- Christopher Currell (Michael Jackson's *Bad* album and tour)
- Pat Metheny (*Offramp*, *First Circle*, *Still Life (Talking)*, *Letter From Home* albums)
- Stevie Wonder (sampled Clair Huxtable and the kids on *The Cosby Show*)
- Sting (*Nothing Like the Sun* album)
- Nile Rogers (Duran Duran's *The Reflex*, B-52s' *Roam*, Madonna's *Like a Virgin* & *Material Girl* and David Bowie's *Let's Dance*.)
- Frank Zappa (*Francesco Zappa*, *Jazz From Hell*, *Frank Zappa Meets the Mothers of Prevention* albums)
- Alan Silvestri (*Cat's Eye*, *Clan of the Cave Bear*, *Flight of the Navigator*, & *Predator* scores)
- Mark Knopfler (*The Princess Bride* and *Last Exit to Brooklyn* scores: all Synclavier sounds except guitar)
- Mark Snow (*X-Files* TV series)
- Tony Banks (Genesis' *Genesis* & *Invisible Touch* albums and tours)
- Suzanne Ciani: sound designer
- Chick Corea (*Elektric Band* albums and tours)
- Jean-Luc Ponty (*Fables* & *Storytelling* albums)
- John McLaughlin (*Adventures in Radioland* & other Mahavishnu albums)
- Oscar Peterson
- Kashif
- *We Are The World* intro bells and fanfare (Kevin Maloney & Michael Omartian)
- Depeche Mode (*Construction Time Again*, *Some Great Reward*, & *Black Celebration* albums)
- Patrick Gleeson (*Apocalypse Now* score, *Knot's Landing* TV series)
- Michael Hoenig (*Xcept One* album, as guest artist on Wayne Shorter's *Atlantis* album)
- Trevor Horn (producer for Frankie Goes to Hollywood, Yes, Grace Jones)
- Mannheim Steamroller (most albums)
- Eddie Jobson (*Theme of Secrets* - 100% Synclavier)
- Mr. Mister (*I Wear the Face*, *Welcome to the Real World* albums)
- Pete Townshend (*All the Best Cowboys Have Chinese Eyes* and later albums)
- Men Without Hats (*Folk of the 80's Part III* album)
- Paul Simon, Shane Keister (*Ernest Goes to Camp* score)
- Peter Wolf (producer for Wang Chung)
- Jack Nitzsche (*Starman* score)
- Denny Jaeger (*The Hunger* score)
- Michel Rubini (*The Hunger*, *Manhunter*, & *Nemesis* scores, *The Hitchhiker* TV series)
- James Wolvinton (sound designer for most *Star Trek* series and films)
- Gary Rydstrom (*Jurassic Park* sound design)
- Ken Lauber (*Tales From the Darkside* TV series)
- Sean Callery (*24*, *Bones*, *Medium*, & *Elementary* TV series)

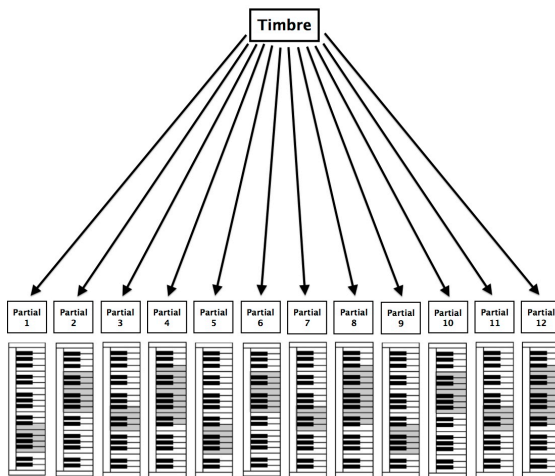
1.4. The Partial Timbre Method of Sound Design

The **Partial Timbre Method of Sound Design** was first described in US Patent [4,554,855](#). The intent of the Partial Timbre Method is to be able to design new complex musical sounds by easily creating and modifying acoustically identifiable subcomponents of the sound. The original Synclavier Digital Synthesizer used a custom button panel that gave the operator control over the soloing and design of each component when a note was performed; each subcomponent was referred to as a “**Partial Timbre**”.

The Synclavier V instrument implementation expands the number of **Partial Timbres** to 12, from the original total of 4 Partial Timbres.

Each Partial in Synclavier V has a 24-harmonic **carrier** waveform with phase control for each harmonic. These harmonics, in any combination, create a waveform that can be played and also viewed graphically. In addition, there is a 24-harmonic **modulator** waveform which is used via FM synthesis to modulate the **carrier** waveform. The FM carrier/modulator waveforms can be a single sine wave, sawtooth wave, square wave, triangle wave, or any 24-harmonic waveform of your own design.

Now, imagine chaining up to **one hundred** of these waveforms together to form a constantly evolving timbre. These **Timbre Frames** can have varying time lengths, crossfade times, and pitch and volumes. Just think about the infinite possibilities of 12 different continuously varying waveforms sounding at the same time! Add in some stereo placement and you’ll have a huge soundscape.



Partials Mapped to Keyboard

1.5. What does Synclavier V add to the original?

- Control of Bit Depth from 4-bit to 24-bit resolution (the original are 8-bit synthesizers)
- What could be better than the original Synclavier's 4 **Partial Timbres**? More Partial Timbres of course! Synclavier V has a total of 12 **Partial Timbres**.
- Sawtooth, Square and Triangle FM modulator waveforms in addition to the original single Sine wave. Plus, you can build your own modulator waveform using 24 harmonics, including phase control of each harmonic.
- Graphical Waveform Screen of each Partial and FM modulator.
- **Timbre Frames** are snapshots of a Carrier/Modulator pair status placed on a timeline. Each Timbre Frame has individual Pitch, Delay and Fade time settings. Synclavier V2 allows you create 100 Timbre Frames for each of the 12 Partials. Timbre Frames can be looped and synced to your DAW
- **Chained Editing** allows you to assign Partials as primary and secondary. Changes made to the primary Partial will instantaneously be copied to the secondary Partials.
- **Resynthesis**, a method of converting a sampled sound into a series of Timbre Frames using additive synthesis techniques.
- **Sample playback**: samples can be loaded in the carrier window and act as a carrier.
- A wide range of Modulation Sources and Destinations.
- Added Effects
 - Flanger
 - Phaser
 - Delay
 - Chorus
 - Delay
 - Reverb
 - Analog Delay

1.6. Why would you read this manual?

Reading manuals can be much more than familiarizing yourself with an instrument. Yes, it is great for learning, but it serves another purpose that is much less understood: creating the base for inspiration.

Inspiration can flourish when you have many little pieces of knowledge "online". Having many pieces of information available enables you to interconnect and crosslink them; it widens the scope of your creativity. It helps to look at the current state of your knowledge as something that needs to be maintained and expanded. Reading a manual again and again will cause a shift in what you absorb from it. You are in fact building a living model of the instrument in your brain.

Reading a manual the first time will help you to get acquainted with the parameters of an instrument; what does a knob do and how does it affect the sound or other parameters of the instrument? Second and third readings will give you a better understanding of the structure of an instrument/plugin. Beyond that, reading becomes a source of creative input that inspires you to think of new ways to use the instrument.

2. ACTIVATION AND SETUP AT FIRST START

2.1. Register and Activate

Synclavier V works on computers equipped with Windows 7 or 8 and macOS 10.7 or later. You can use the stand-alone version or use Synclavier V as an Audio Units, AAX, VST2 or VST3 instrument.



Once Synclavier V has been installed, the next step is to register the software. The registration process will require you to enter the serial number and the unlock code you received with the product.

In order to proceed, go to this web page and follow the instructions:

www.arturia.com/register



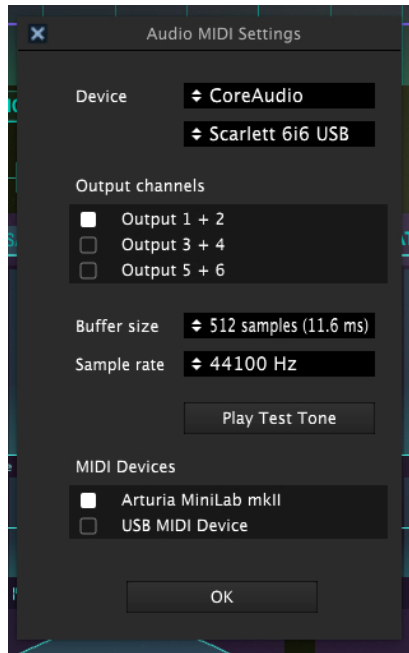
If you don't have an Arturia account yet, you will need to create one. The process is quick, but it does require that you can access your email address during the registration process.

Once you have acquired an Arturia account you will be able to register the product.

2.2. Initial Setup

2.2.1. Audio and MIDI Settings (Windows OS)

At the top left of the Synclavier V application is a drop-down menu. It contains various setup options. Initially you will need to go to the menu and choose the **Audio Settings** option to get sound and MIDI flowing in and out.



*Audio and MIDI settings window
(Windows OS)*

When you choose the **Audio Settings** option, you will see the **Audio MIDI Settings** window.

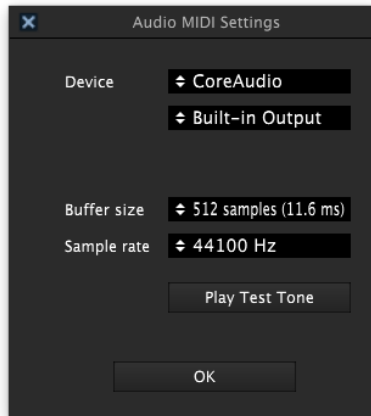
Starting from the top you have the following options:

- **Device** lets you select which audio driver you want use to route sound out of the instrument. This might be your computer's own driver like Windows Audio, or an ASIO driver. The name of your hardware interface may appear in this field.
- **Output Channels** lets you select which of the available outputs will be used to route audio out. If you only have two outputs, only two will appear as options. If you have more than two you can select a specific pair of outputs.
- **Buffer Size** lets you select the size of the audio buffer your computer uses to calculate sound. A smaller buffer means lower **latency** (delay) between pressing a key and hearing the note. A larger buffer means a lower CPU load as the computer has more time to think, but can result in a small **latency**. Find the optimum buffer size for your system. A fast, modern computer should easily be able to operate at a 256- or 128-sample buffer size without creating pops or clicks in the sound. If you are getting clicks, try raising the buffer a little. The **latency** is displayed in milliseconds on the right hand side of this menu.
- **Sample Rate** allows you set the sample rate at which audio is sent out of the instrument. The options here will depend on the capability of your audio interface hardware, though most computers' own hardware can operate at up to 48kHz which is perfectly adequate. Higher sample rates use more CPU power so unless you have a good reason to go up to 96kHz, then 44.1kHz or 48kHz are fine. The **Show Control Panel** button here will jump to the system control panel for whatever audio device is selected.
- **Play Test Tone** helps you troubleshoot audio issues by confirming that sound can be heard through the correct device.
- Your connected MIDI devices will appear in the **MIDI Devices** area. Click the check box to accept MIDI from the device you want to use to trigger the instrument. In stand-alone mode, Synclavier V listens for all MIDI channels so there's no need to specify a channel. You can specify more than one MIDI device at once.

2.2.2. Audio and MIDI Settings (macOS)

At the top left of the Synclavier V application is a drop-down menu. It contains various setup options. Initially you will need to go to the menu and choose the **Audio Settings** option to get sound and MIDI flowing in and out.

When you choose the **Audio Settings** option, you will see the **Audio MIDI Settings** window.



Audio MIDI Settings Window (macOS)

Starting from the top you have the following options:

- **Device** lets you choose the audio driver you want to route sound out of the instrument. This will be either your Mac's own driver, **CoreAudio**, or another driver. If you are using another hardware interface it will appear in this field.
- **Output Channels** lets you select which of the available outputs will be used to route audio out. If you only have two outputs, only two will appear as options. If you have more than two you can select a specific pair of outputs.
- **Buffer Size** lets you select the size of the audio buffer your computer uses to calculate sound. A smaller buffer means lower **latency** (delay) between pressing a key and hearing the note. A larger buffer means a lower CPU load as the computer has more time to think, but can result in a small **latency**. Find the optimum buffer size for your system. A fast, modern computer should easily be able to operate at a 256- or 128-sample buffer size without creating pops or clicks in the sound. If you are getting clicks, try raising the buffer a little. The **latency** is displayed in milliseconds on the right hand side of this menu.
- **Sample Rate** allows you set the sample rate at which audio is sent out of the instrument. The options here will depend on the capability of your audio interface hardware, though most computers' own hardware can operate at up to 48kHz which is perfectly adequate. Higher sample rates use more CPU power so unless you have a good reason to go up to 96kHz, then 44.1kHz or 48kHz are fine. The **Show Control Panel** button here will jump to the system control panel for whatever audio device is selected.
- **Play Test Tone** helps you to troubleshoot audio issues by checking that sound can be heard through the correct device.
- Your connected MIDI devices will appear in the **MIDI Devices** area. Click the check box to accept MIDI from the device you want to use to trigger the instrument. In stand-alone mode, Synclavier V listens for all MIDI channels so there's no need to specify a channel. You can specify more than one MIDI device at once.

2.2.3. Using Synclavier V in Plug-in Mode

Synclavier V comes in VST2, VST3, AU and AAX plug-in formats for use in all major DAW software like Cubase, Logic, Pro Tools and so on. You load it as a plug-in instrument. Its interface and settings work in the same way as in stand-alone mode, with a couple of differences.

- The instrument will synchronize to your DAW's host tempo/bpm rate, when tempo is a factor. When you activate the Sync buttons on the front panel, VIBRATO rate, STEREO pan rate, and REPEAT/ARPEGGIO controls will synchronize to the DAW tempo/bpm.
- You can automate numerous parameters using your DAW's automation system.
- You can use more than one instance of Synclavier V in a DAW project. In stand-alone mode you can only use one instance.
- You can route Synclavier V's audio outputs more creatively inside your DAW using the DAW's own audio routing system.

3. USER INTERFACE

Synclavier V has many great features, and in this chapter we'll make sure you know what each one does. You will be amazed at how quickly Synclavier V provides you with sounds that are inspiring and perfect for all sorts of projects.

It's also really easy to work with: just a few tweaks here and there and suddenly you're in a new world of sound. That will always be the main focus of every Arturia product: unleashing your creativity while remaining easy to use.

3.1. The Virtual Keyboard



Virtual Keyboard

The **Virtual Keyboard** allows you to play a sound without the need for an external MIDI device. Simply click on a virtual key to hear the currently selected timbre. You can also drag the cursor across the keys to hear a glissando.

The Synclavier V can be velocity-sensitive from an external MIDI keyboard or other MIDI device, but one or more Partials must be assigned a velocity value on the [Mods Tab \[p.104\]](#) inside the [Graphic Screen Edit mode \[p.60\]](#).

3.2. The Upper Toolbar

The **Upper Toolbar** that runs along the top edge of the instrument provides access to many useful features. Let's look at them in detail. The first seven of these options can be found by clicking on the **Synclavier V** menu at the very top left hand corner of the instrument window.



Upper Toolbar

3.2.1. Save

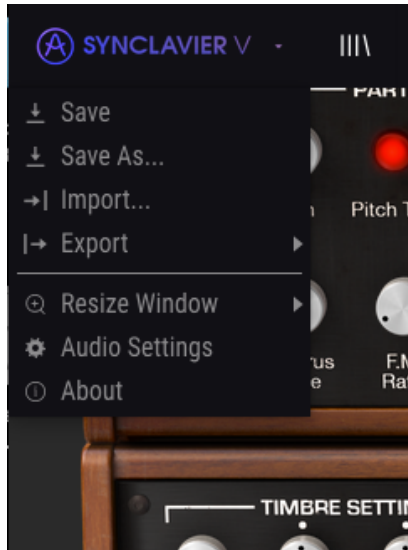
The first option lets you **Save** a preset timbre. If you have made a change to the timbre you are presented with a window to enter information about that timbre. You can **Name** the timbre, add an **Author** name, select a **Bank** and **Type** and select some **Styles** tags that describe the sound. This information can be read by the **Preset Browser** and is useful for searching presets later. You can also enter freeform text in the **Comments** field, which is handy for providing a more detailed description of your timbre.

Saving a sound in preset will save all its parameters including:

- Pitch-bend range
- Timbre normalise
- Noise floor
- Oversampling
- Bit Depth
- Octave Ratio
- Transpose settings
- Global tuning and the tuning settings of individual Partial

3.2.2. Save As...

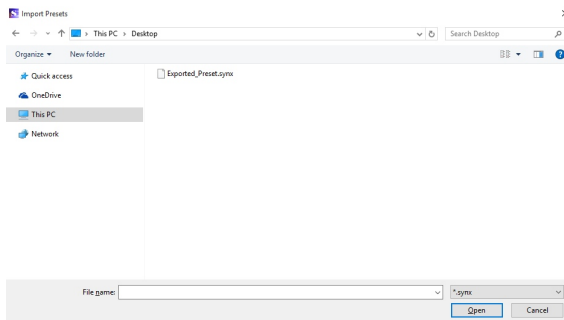
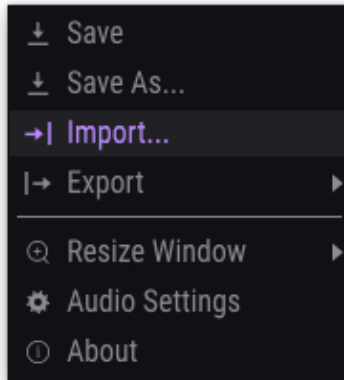
This works in the same way as the **Save** command, but lets you save a copy of the preset instead of saving over the original. It's useful for creating variations on patches but still keeping individual copies of each one.



Synclavier V Menu

3.2.3. Import... (Preset or Bank)

This command lets you import a Preset or Bank file. Presets and Banks are stored in the .synx format.



3.2.3.1. Export Preset...

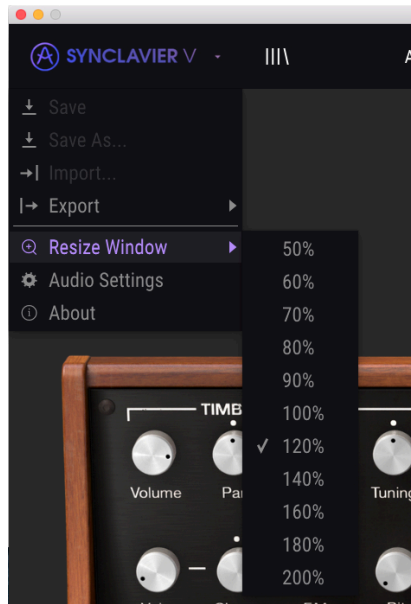
You can export any preset as a file using this command. Select the preset and click **Export Preset** and a popup window will ask you where you want to save it on your computer. Presets and Banks are stored in the .synx format.

3.2.3.2. Export Bank

This option is used to export the entire bank of sounds from the instrument. This is useful for backing up or sharing presets. From the **Synclavier V** drop-down menu, click **Export Bank** and a popup window will ask you where you want to save it on your computer.

3.2.4. Resize Window

Synclavier V's window can be resized from 50% to 200% of its original size without any negative visual artifacts. On a smaller screen such as a laptop you might want to reduce the interface size so it doesn't dominate the display. On a larger screen, or a second monitor, you can increase its size to get a better view of the controls. The controls all work the same at any zoom level but the smaller ones can be harder to see if you have shrunk the window down.



Resize Window

3.2.5. Audio settings

Here you manage the way the instrument transmits sound and receives MIDI. (See [Initial setup \[p.13\]](#) for full details.)

3.2.6. About

Here you can view the Synclavier V software version, and designer credits.

3.2.7. Preset Browser Quick Look



Presets can be viewed by clicking on the **Preset Browser** button **III** on the left side of the **Toolbar** (See [The Preset Browser \[p.30\]](#) for full details). The **All Types** name field and left & right arrows < > in the toolbar also are used for preset selection.

3.2.8. Display mode buttons

3.2.8.1. Standard Panel Mode

The **Standard Panel Mode** is a single panel of knobs and buttons above the Virtual Keyboard. TIMBRE SETTINGS, AMP ENV OFFSET, HARM ENV OFFSET, REPEAT/ARPEGGIO, POLYPHONIC MODE, AND PORTAMENTO sections control the overall parameters of the current timbre selected. All Partial Timbres are affected with these controls.

See [Standard panel mode controls \[p.36\]](#) for complete details on these controls.



Standard Panel Mode

3.2.8.2. Extended Panel Mode

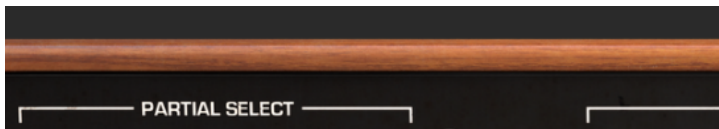
The **Extended Panel Mode** can be viewed by clicking on the icon with the two downward arrows at the top right of the **Upper Toolbar**. This lets you access the second panel of knobs and buttons which control each Partial Timbre individually or in combinations. Click the double downward arrow icon again and you will return to **Standard Panel Mode**.

See [Extended panel mode controls \[p.47\]](#) for more complete detail on these controls.



Extended Panel Mode

Switching between the standard and the extended hardware panel is easy; you can access the extended panel by clicking on the top edge of the standard panel. Clicking on the top edge of the extended panel folds it back again behind the standard panel.



Switching hardware panels

3.2.8.3. Graphic Screen Mode

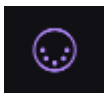
The **Graphic Screen Mode** section can be viewed by clicking on SCR icon at the top right of the toolbar. This lets you access the more advanced features of the instrument, such as the user waves, the envelopes, and the tuning of individual notes.

See [Graphic screen mode controls \[p.60\]](#) for complete detail on these controls.

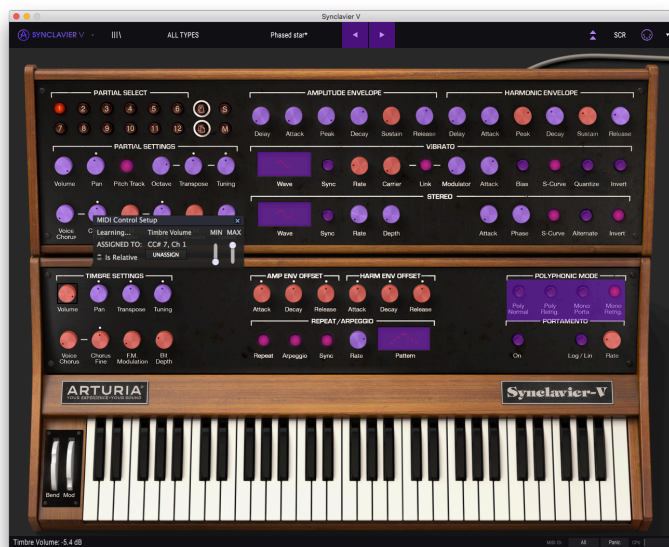


Graphic Screen Mode

3.2.9. MIDI Learn Mode



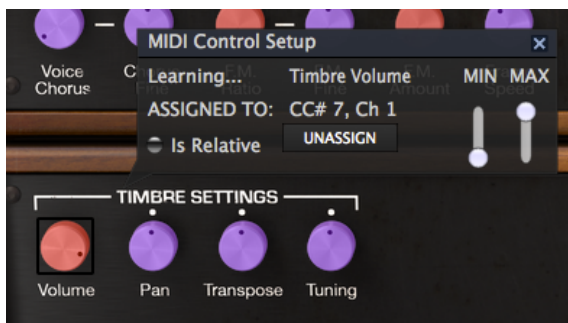
The MIDI plug icon at the right side of the upper toolbar places the instrument into **MIDI Learn Mode**. Parameters that can be assigned to MIDI controls will be shown in **Purple** and you can map physical MIDI dials, faders or pedals from your hardware units (like the Arturia **Beatstep** or **Keystep**) to specific destinations inside the instrument. A typical example might be to map a hardware MIDI expression pedal to the virtual Volume knob to control the overall volume of an organ or string timbre; or assign a button on a hardware controller to the **Portamento** select switch so you can turn **Portamento** on/off of a synth lead timbre.



MIDI Learn Mode

Clicking on a **Purple** knob or button will put that control into **Listening Mode**. Move a hardware dial, a fader, or push a hardware button and the target goes **Red** to show that a link has been made between the hardware control and the software parameter. To **un-assign** that parameter, right-click on the **Red** knob or parameter (2-finger click on a track pad or smart mouse) and it will return to **Purple**. As an alternative you can simply click on "UNASSIGN" on the mapping pop-up window.

There is a pop-up window called **MIDI Control Setup** that displays which two things are being linked and a button to un-assign the two from each other.



Timbre Volume knob selected and assigned

The **MIN** (minimum) and **MAX** (maximum) value slider is used to restrict the parameter change range to something other than 0%-100%. For example, you might want the instrument's Timbre Volume to be controllable via hardware from 30% to 90%. If you made this setting (Min set to 0.30 and Max set to 0.90), your physical dial would not alter the volume any lower than 30% or any higher than 90%, no matter how far you turned it. This is very useful for making sure you can't accidentally make the sound too quiet or too loud when performing.

To explain this, try these 5 use cases:

- Set **MIN** value to 0.0 and **MAX** value to 0.49 => the switch cannot be switched on because the 0.5 value can never be crossed. Set **MIN** value to 0.51 and **MAX** value to 1.0 => the switch cannot be switched off because the 0.5 value can never be crossed.
- Set **MIN** value to 0.0 and **MAX** value to 1.0 => the switch state changes when the fader crosses its central position.
- Set **MIN** value to 0.49 and **MAX** value to 1.0 => the switch state changes when the fader is very low.
- Set **MIN** value to 0.0 and **MAX** value to 0.51 => the switch state changes when the fader is very high.

The final option in this window is a button labeled "Is Relative". When you select **is Relative** here, the value that a controller (knob or slider) sends to change this parameter will be added or subtracted from the current value of the parameter. If you use an absolute controller, (an on/off switch a knob that sends fixed values) it will send a fixed value determined by the knob's position.

3.2.9.1. Reserved MIDI CC numbers

Certain MIDI Continuous Controller (MIDI CC) numbers are reserved and cannot be reassigned to other controls. These are:

- PitchBend
- Mod Wheel (CC #1)
- Expression (CC #11)
- AfterTouch
- Sustain On/Off (CC #64)
- All Notes Off (CC #123)
- All Sounds Off (CC #120)

All other MIDI CC numbers may be used to control any assignable parameter in Synclavier V.

3.2.10. MIDI Controller Configs (Configurations)

MIDI Controller Configs are accessed at the far right hand side of the **Upper Toolbar** just to the right of the MIDI Plug icon. It's a small down-facing arrow that opens a drop-down menu. **MIDI Controller Configs** allow you to manage different sets of MIDI maps that you may have set up for controlling the instrument's parameters from MIDI hardware. You can copy the current MIDI assignment setup or delete it, import a configuration file, or export the currently active one. This can be used as a quick way to set up different hardware MIDI keyboards or controllers with Synclavier V without having to build all the assignments from scratch each time you swap hardware.



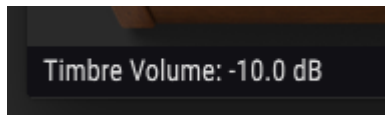
MIDI Controller Configuration

3.3. The Lower Toolbar

At the right hand side of the **Lower Toolbar** are 3 small items.

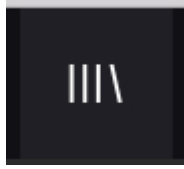
- The **MIDI channel** button is a drop-down menu that assigns the MIDI channel to which Synclavier V responds. The default shows the selection as **ALL**, but you can select any MIDI channel between 1-16.
- The **PANIC** button resets all MIDI signals in the event of stuck-on notes, and stops sounds that are being generated.
- The **CPU** meter is used to monitor the amount of processing power your computer uses to to run Synclavier V. If this meter approaches maximum, it is advisable to reduce the number of VSTs you are running simultaneously or the number or processes running on your system. If that does not solve the problem consider upgrading your system with more memory or a faster CPU.

At the left hand side of the **Lower Toolbar** you will see a readout showing the parameter value of the control you are modifying.

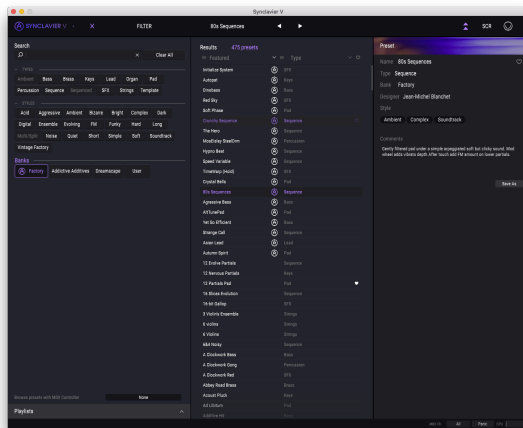


Lower Toolbar (left).

3.4. The Preset Browser



The **Preset Browser** is how you search, load and manage Timbres/Sounds in Synclavier V. It has a couple of different views but they all access the same banks of presets. **Click on the III icon** to access the search view.



Preset Browser

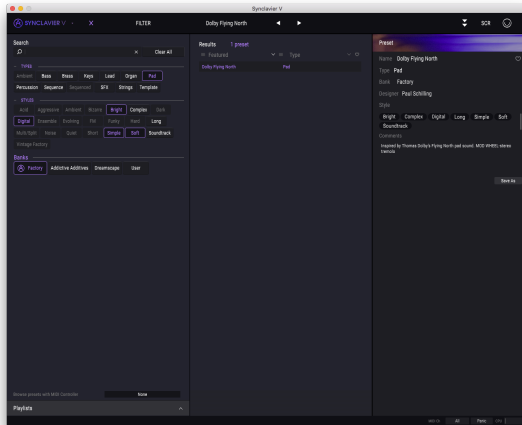
3.4.1. Searching Presets

3.4.2. Filtering Using Tags

You can also search using different tags. For example, by clicking on the **Lead** and **Organ** options in the **Types** field you can show only presets that match those tags. The tag fields can be shown or hidden by using the small down arrow buttons in their title fields. Results columns can be sorted by clicking the same arrow button in their own section.

You can use multiple search fields to perform narrower searches. So by entering a text search and also specifying **Types**, **Banks** and **Styles** options, you can see only the presets that match those exact criteria. Deselect any tag in any area to remove that criteria and widen the search without having to go back and start again. Using [Ctrl] + click (Windows) or [Cmd] + click* (Mac) will allow you to select multiple elements in the same area.

The second **Results** column can be switched to show **Type**, **Bank**, or **Designer**, tags depending on how you like to search. Click on its options menu button just next to its sort arrow.

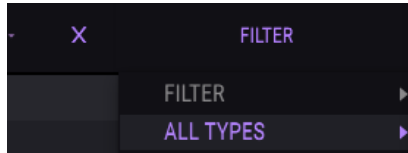


Preset Search by Tag

3.4.3. The Preset Info Section

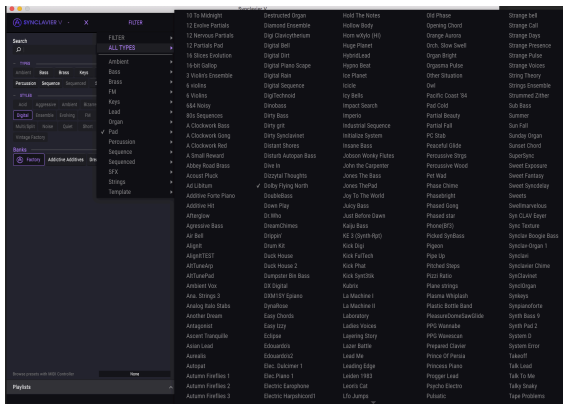
The **Preset Info** column on the right of the search field shows information about any preset. If you want to make changes to a factory preset such as changing its name, adding comments or tags, you have to re-save it as a user preset using the **Save As...** command in the main **Synclavier V Menu**. When you have done this, the Info section will gain Edit and Delete buttons that you can use to change the information stored inside the preset. Factory presets can't be overwritten.

3.4.4. The Second Preset View



The menu next to the Search menu shows you a different view. The default view is **ALL TYPES**. The first option in this menu is called **FILTER** and will hold a record of whatever you have previously searched for in the Search field. So if you searched for "sequences" in the main search area, sequencer related presets will appear here.

Selecting the **ALL TYPES** option in this column will provide a list of all patches. The Categories shown beneath group sounds are based on their Type, such as keys, pads, bass, and so on.



Preset Browser second view

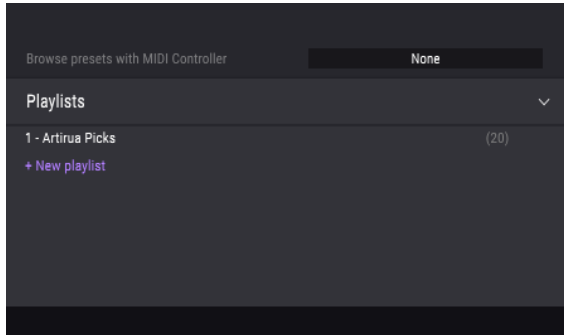
Clicking on the name field in the center of the Toolbar will show you a list of all available presets, which may change based on what you have entered in the **Search** field. So again if you have searched for "Jazz", this shortcut menu will only show you patches that match that tag. The left and right arrows in the **Toolbar** will cycle up and down either through the full preset list or the filtered list, depending on whether a search term has been used.

3.4.5. Playlists

In the lower left corner of the Preset Browser window is a feature titled Playlists. This is used to collect presets into different groups for different purposes, such as a set list for a particular performance or a batch of presets related to a particular studio project.

3.4.5.1. Add a playlist

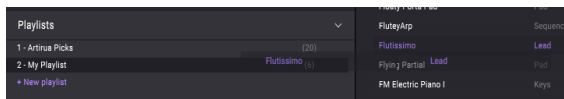
To create a playlist, click the plus sign at the bottom:



Give the playlist a name and it will appear in the Playlists menu. You can rename the playlist at any time; just click the pencil icon at the end of its row.

3.4.5.2. Add a preset

You can use all of the options in the Search window to locate the presets you want to have in your playlist. Once you have found the right preset, click and drag it onto the playlist name.



To view the contents of a playlist, click on the playlist name.

3.4.5.3. Re-order the presets

Presets may be reorganized within a playlist. For example, to move a preset from slot 2 to slot 4, drag and drop the preset to the desired location.

This will move the preset into the new location.

3.4.5.4. Remove a preset

To delete a preset from a playlist, click the X at the end of the preset row.

3.4.5.5. Delete a playlist

To delete a playlist, click the X directly to the right of the playlist name.

4. STANDARD PANEL MODE CONTROLS

4.1. Timbre Settings

All of the TIMBRE SETTINGS controls are **global** and affect all of the Partials, but relative to the Partials' individual settings. For example, if the PAN in PARTIAL SETTINGS is panned hard right for one Partial, it will only have a range of hard right to center when setting the PAN in the TIMBRE SETTINGS section hard left.



Timbre Settings

4.1.1. Timbre Volume

The **Volume** knob is the overall loudness of the Timbre/Sound affecting all Partials. Its range is from 0.0db at full gain down to -50db (OFF) in increments of .1db.

4.1.2. Timbre Pan

The **Pan** knob globally moves the Partials' stereo positioning left/right. Setting the knob straight up is **center**. The range is from -63 (hard left) to +63 (hard right). After turning the knob left or right you can return to **center** position by double-clicking on the knob.

4.1.3. Timbre Transpose

The **Transpose** knob sets the pitch of your overall Timbre/Sound up or down in **semitone** increments. At the knob's center position there is **No Transposition**. You can view the semitone value in the **Lower Toolbar** at the lower left side while you are turning the knob or placing your cursor over the knob. Double-clicking the knob returns the knob to center or **No Transposition**. The range is from -24 to +24 semitones.

4.1.4. Timbre Tuning

The **Tuning** knob fine tunes the pitch of your overall Timbre/Sound up or down in individual **Cents** (100ths of a semitone). At the knob's center position there is no pitch change. The parameter value is displayed in **Cents** in the **Lower Toolbar** at the lower left. The range is from -125 to +125 Cents below and above the setting of the **Transpose** knob.

4.1.5. Timbre Voice Chorus

The **Voice Chorus** creates a duplicate voice of all of the Partial with a different pitch of your overall Timbre/Sound. At the knob's center position there is no added voice, a value of 1.000. You can view the Chorus value in the **Lower Toolbar** at the lower left side while you are turning the knob or by placing your cursor over the knob. The range is from 0.000 to 16.000 in steps of .100. Double-clicking on the knob returns the value to 1.000 or **NO Voice Chorus**.

Chorus Setting:	Relationship of added voice to fundamental frequency
0.500	One octave below
1.000	Unison (no added Voice Chorus)
1.500	Perfect fifth above
2.000	Second harmonic (one octave above)
3.000	Third harmonic (one octave plus a perfect fifth above)
4.000	Fourth harmonic (two octaves above)
5.000	Fifth harmonic (two octaves plus a major third above)
6.000	Sixth harmonic (two octaves plus a perfect fifth above)
7.000	Seventh harmonic (two octaves plus a minor seventh above)
8.000	Eighth harmonic (three octaves above)
9.000	Ninth harmonic (three octaves plus a major second above)
10.000	Tenth harmonic (three octaves plus a major third above)
11.000	Eleventh harmonic (three octaves plus an augmented fourth above)
12.000	Twelfth harmonic (three octaves plus a perfect fifth above)
13.000	Thirteenth harmonic (three octaves plus a perfect sixth above)
14.000	Fourteenth harmonic (three octaves plus a minor seventh above)
15.000	Fifteenth harmonic (three octaves plus a major seventh above)
16.000	Sixteenth harmonic (four octaves above)

4.1.6. Timbre Chorus Fine

The **Chorus Fine** knob is a more precise tuning adjustment of the **Voice Chorus**. Range is from -.100 to +.100 and the values are located between the **Voice Chorus** steps of .100. These values read out in the **Lower Toolbar** left side as well.

Double-clicking on the knob returns it to its center position 0.000.

4.1.7. Timbre F.M. Modulation

The **F.M. Modulation** knob controls the overall amount of F.M. modulation for all the Partials in the current Timbre. The parameter range is from 0.000 to 1.000.

Important: For this control to have ANY effect on the Timbre:

- There must be a **CARRIER** wave AND a **MODULATOR** wave assigned to one or more Partials under the ENGINE Tab (**Graphic Screen Mode**)
- The **F.M. Amount** control in **Partial Settings (Extended Panel Mode)** must be greater than 0.000
- The Modulation value in the Frame Editor for one or more Partials under the ENGINE Tab (**Graphic Screen Mode**) must be greater than 0.00.

4.1.8. Timbre Bit Depth

Bit Depth controls the digital resolution of the current timbre. The original Synclavier voices were 8-bit, but Synclavier V has added a range from 4-bit all the way up to 24-bit resolution in increments of 2. On the lower end you will hear a digital noise or aliasing adding a certain grittiness to the sound. As you increase the **Bit Depth** knob, the sound will sound "smoother" with no noise.

4.2. Amp Env Offset

All of the **AMP ENV OFFSET** controls are **global** and affect all of the Partials in the current Timbre, but relative to the Partials' individual settings. For example, if Partial 1 has a slow attack and Partial 2 has a fast attack, decreasing the value will only affect the attack of Partial 1.



4.2.1. Amp Attack

The **Attack** knob increases or decreases the Amplitude envelope ramp-up time for all Partials in the current Timbre. In other words, this knob will affect how long it takes for the sound of each Partial to climb to its maximum amplitude after a note-on event. The default is a value of 0.00 and the range is -1.00 to +1.00, which allows you to accelerate the onset of a sound with a slow attack or slow down the onset of a sound with a fast attack.

See also [AMPLITUDE ENVELOPE \[p.52\]](#) to learn how to set the **Attack** value for an individual Partial.

4.2.2. Amp Decay

The **Decay** knob increases or decreases values of all Partials' Decay within the current Timbre.

- When the Peak level is greater than 0.00, **Decay** controls how fast the sound ramps down from the **Peak** volume to the Sustain volume.
- When the Peak level is 0.00, **Decay** controls how fast the sound ramps up to the Sustain volume.
- The default is a value of 0.00 and the range is -1.00 to +1.00.

See also [AMPLITUDE ENVELOPE \[p.52\]](#) to learn how to set the **Decay** value for an individual Partial.

4.2.3. Amp Release

The **Release** knob increases or decreases the values of all Partials' Release in the current Timbre. Release is the time it takes for the sound to decay to zero after the key is released (i.e., the note-off event).

See also [AMPLITUDE ENVELOPE \[p.52\]](#) to learn how to set the **Release** value for an individual Partial.

4.3. Harm Env Offset

All of the **HARM ENV OFFSET** controls are **global** and affect all of the Partials in the current Timbre, but relative to the Partials' individual settings. For example, if Partial 1 has a slow harmonic (F.M.) attack and Partial 2 has a fast harmonic (F.M.) attack, decreasing the value will only affect the attack of Partial 1.

4.3.1. Harm Attack

The **Attack** knob increases or decreases the values of all the Partials' harmonic (F.M.) envelopes in the current Timbre. This will affect how long it takes for the harmonic (F.M.) envelope for each Partial to climb to its maximum level after a note-on event. The default is a value of 0.00 and the range is -1.00 to +1.00, which allows you to accelerate the harmonic evolution of a sound with a slow F.M. attack, or slow down the harmonic evolution of a sound with a quick F.M. attack.

See also [HARMONIC ENVELOPE \[p.54\]](#) to learn how to set the **Attack** value for an individual Partial.

4.3.2. Harm Decay

The **Decay** knob increases or decreases values of all the Partials' harmonic Decay within the current Timbre.

- When the Peak level is greater than 0.00, **Decay** controls how fast the harmonic envelope ramps down from the **Peak** volume to the harmonic Sustain level.
- When the Peak level is 0.00, **Decay** controls how fast the harmonic envelope ramps up to the harmonic Sustain level.
- The default is a value of 0.00 and the range is -1.00 to +1.00.

See also [HARMONIC ENVELOPE \[p.54\]](#) to learn how to set the **Decay** value for an individual Partial.

4.3.3. Harm Release

The **Release** knob increases or decreases values of all the Partials' harmonic (F.M.) Release in the current Timbre. Release is the time it takes for the harmonic content of the sound to decay to zero after the key is released (i.e., the note-off event).

See also [HARMONIC ENVELOPE \[p.54\]](#) to learn how to set the **Release** value for an individual Partial.

4.4. Repeat/Arpeggio

The **REPEAT/ARPEGGIO** section of Synclavier V is a **global** control affecting all of the Partials in your current Timbre.

4.4.1. Repeat

When the **Repeat** button is enabled, all of the notes being played on the keyboard will repeat while a key is being depressed. When multiple keys are depressed, any delay between notes will remain. The repeat rate can be adjusted with the **Rate** knob.

4.4.2. Arpeggio

When the **Arpeggio** button is enabled, any notes simultaneously performed on your keyboard will sound independently in an arpeggio pattern. If the **Repeat** button is also enabled, the held notes will continue to arpeggiate at the tempo set by the **Rate** knob.

4.4.3. Sync

When using Synclavier V as an instrument plug-in in your DAW project, the **Sync** button allows both the **Repeat** and **Arpeggio** functions to synchronize with the tempo of your DAW. The tempo is set by the **Rate** knob.

4.4.4. Rate

The **Rate** knob determines the speed of your repeating notes or arpeggios. When the **Sync** button is OFF the **Rate** value reads in Hz (Hertz, or cycles per second) in the **Lower Toolbar**. The range is 0.00 to 50.0Hz.

When the **Sync** button is ON the **Rate** value reads as Timbre BPM Multiplier in the **Lower Toolbar**.

When Synclavier V is used as an instrument plug-in in your DAW project and the **Sync** button is ON, the speed will synchronize to the tempo of your DAW. The **Rate** adjustment is a BPM Multiplier (Beats Per Minute). Values are:

BPM Multiplier value	Description
BPM/8	1/8 speed of your tempo
BPM/6	1/6 speed of your tempo
BPM/5	1/5 speed of your tempo
BPM/4	1/4 speed of your tempo
BPM/3	1/3 speed of your tempo
BPM/2	1/2 speed of your tempo
BPMx1	Exact speed of your tempo
BPMx2	2x speed of your tempo
BPMx3	3x speed of your tempo
BPMx4	4x speed of your tempo
BPMx5	5x speed of your tempo
BPMx6	6x speed of your tempo
BPMx8	8x speed of your tempo

4.4.5. Pattern

Pattern is a drop-down menu with 6 different arpeggio styles (top to bottom order):

1. Performance order: the notes will play in the order in which you perform them on the keyboard
2. Keyboard Up: Notes play from the lowest to the highest continuously
3. Keyboard Down: Notes play from the highest to the lowest continuously
4. Keyboard Up/Down (Repeat): Notes play up and then down, repeating the top and bottom notes
5. Keyboard Up/Down (No Repeat): Notes play up and then down, without repeating the top and bottom notes
6. Random: Notes play in a continuously random pattern



Arpeggiate Pattern Selector Window

4.5. Polyphonic Mode

The **POLYPHONIC MODE** section contains **global** functions that affect all Partials in the current Timbre.



4.5.1. Poly Normal

The **Poly Normal** mode provides for full polyphony. When a Note On event is received (from a keyboard or sequencer) a new voice is activated for the desired sound in all cases. Earlier notes of the same pitch that are in the Final **Decay** state are not affected; their decay continues without interruption. With very long final decay times this can lead to undesirable phase cancellations or overloading the audio output.

4.5.2. Poly Retrig.

Poly Retrig. mode also allows for full polyphony. However, if a Note On event is received that matches a note that is currently in the Final **Decay** state, the envelope generators for the matching note are retriggered. The **Poly Retrig.** mode is very natural for sounds with a long final decay such as bells or gongs. **Poly Retrig.** is the default polyphony mode.

4.5.3. Mono Porta

Mono Porta mode restricts the audio output to one note of the current Timbre at a time. The effect is a legato phrase similar to the tonguing and slurring technique of a wind or brass instrument. The monophonic settings are also useful for recreating the sounds of early analog and digital synthesizers that were monophonic by design.

In this mode, when a new note is played while an earlier note is being held, the previous note ends and the result is a "slur" to the new note. The envelope generators are NOT retriggered. Synthesists refer to this as "Single Triggering".

4.5.4. Mono Retrig.

Mono Retrig. mode also restricts the audio output to one note of the current Timbre at a time. When a new note is received while an earlier note is being held, the pitch of the earlier note is adjusted to match the new note and the envelope generators ARE retriggered. The effect is a more percussive sound from every note. Synthesists refer to this as "Multi-Trigging".

4.6. Portamento

PORTAMENTO is a global parameter affecting all Partials in the current Timbre. It makes the pitch "glide" between the notes you play, rather than changing the pitch instantly as soon as you hit one or more keys on your keyboard. The effect works on Polyphonic or Monophonic Timbres.

4.6.1. On

The **On** button turns the **PORTAMENTO** function ON or OFF.

4.6.2. Log/Lin

Log/Lin button switches between a Linear or a Logarithmic curve for the **PORTAMENTO** "glide" effect. OFF is Linear and ON is Logarithmic.

4.6.3. Portamento Rate

Rate knob controls the speed at which the sound glides from one pitch to the next. The range is from 0.0 milliseconds to 30 seconds.

4.7. Bend Wheel & Mod Wheel

The **BEND WHEEL** & **MOD WHEEL** are located on the left hand side of the Virtual Keyboard and can also be controlled from a MIDI keyboard or other MIDI controller.

The **BEND WHEEL** raises or lowers the pitch of your current Timbre up or down gradually. The default **Pitch bend Depth** is 2 semitones but can be increased or decreased, from 0 to 25 semitones, under the **FX/MASTER Tab** of the **Graphic Screen Mode**.

The **BEND WHEEL** is “spring loaded” and comes to rest in the center position. It can also be routed to control other Partial parameters in the MODS section of the **Graphic Screen Mode**.

The **MOD WHEEL** can also be routed to many Partial parameters. Not “spring loaded” like the **BEND WHEEL**, it operates like a slider and will not return to zero automatically. Its range is from 0.000 to 1.000. A common routing is to control vibrato depth.



Bend & Mod Wheels

5. EXTENDED PANEL MODE CONTROLS



The **Extended Panel Mode** can be viewed by clicking on the button showing two downward pointing arrows at the top right of the **Toolbar**. The controls are used to enter parameter settings for individual Partials or for any number of grouped Partials. Clicking on this button returns you to Standard Panel Mode.

5.1. Partial Select

The **PARTIAL SELECT** section is located at the top left of the **Extended Panel Mode**. There are 12 Partial buttons, a **Solo** button, a **Mute** button, a **Copy** button (with icon), and a **Paste** button (with icon).



Selecting Partials

5.1.1. Partial Select 1-12

At the top left of the **Extended Panel Mode** are the **PARTIAL SELECT 1-12 Red** buttons. While listening to any preset Timbre you will be hearing the combined sound of anywhere from 1 to 12 Partial timbres simultaneously.

To change any parameter setting for an individual Partial, click on that **PARTIAL SELECT** button number. While that Partial button is on (bright **Red**), any parameter you change on the **Extended Panel Mode** will affect **ONLY** that Partial.

To make changes to 2 or more Partials at a time, hold down the **[Shift]** key and click any range of Partial buttons from 1 to 12. For instance, if you want to select Partials 1 through 6, hold down the **[Shift]** key and click on buttons 1 and 6. If you'd rather just select only Partials 1, 4, and 6, hold down the **[Cmd]** key (**[Ctrl]** key for Windows users) and then click on buttons 1, 4 and 6. You will see the first **Red** button selected and the other selected Partial buttons will be lit slightly darker.

5.1.2. Partial Copy & Paste

To **Copy** all of the parameters of one Partial to another, select the Partial button number (1-12) you want to copy "**from**" and then click once on the top **copy icon** button. This copies the parameters to a clipboard. Then to paste those Partial parameters to another Partial, select the Partial button number (1-12) you would like to copy "**to**" and then click once on the bottom **paste icon** button. You have now copied one Partial's parameters to the other.



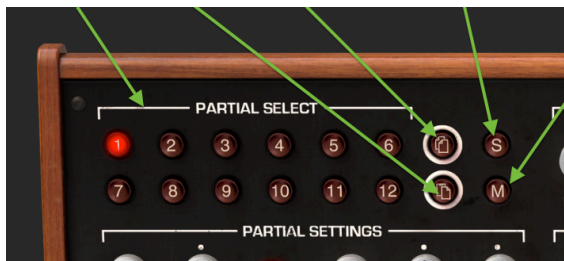
ⓘ: more extensive copy/paste options are available on the [ENGINE \[p.60\]](#) Tab (*Graphics Screen*).

5.1.3. Partial Solo

To **Solo** (isolate and listen to) an individual Partial, click on the **S** button just to the right of the **copy icon** button. When you play the keyboard, you will only hear the selected Partial.

5.1.4. Partial Mute

To **Mute** (turn off) one of the Partials, click on the **M** button just to the right of the **paste icon** button.



Solo and Mute options

5.2. Partial Settings

The PARTIAL SETTINGS section is located at the left of the Extended Panel Mode just below the PARTIAL SELECT section.

5.2.1. Partial Volume

The **Volume** knob is the overall loudness of the selected Partial or group of Partials. Its range is from 0.0db at full gain down to -50.0db (OFF) in .1dB increments.

5.2.2. Partial Pan

The **Pan** knob globally moves the stereo positioning of a selected Partial or group of Partials to the left or right. Setting the knob straight up is **center**. The range is from -63 (hard left) to +63 (hard right). After turning the knob left or right you can return to **center** position by double-clicking on the knob.

5.2.3. Partial Pitch Track

The **Pitch Track** button On/Off determines if the selected Partial or group of Partials will track the **Virtual Keyboard** or external MIDI keyboard/controller. When turned OFF, the pitch will be constant (A-440 by default) for any note depressed. It is also possible to adjust the constant pitch of any non-tracking Partials using the Octave, Transpose, and Tuning parameters (see below).

5.2.4. Partial Octave

The **Octave** knob controls the octave placement of the selected Partial or group of Partials. It can be set to 1 of 9 discrete values from 6.875 Hz to 1760 Hz. Double-clicking will return it to the default value of 440.0 Hz.

i: Values in the extreme low range can be useful for unusual sound effects. In some presets you will hear a digital aliasing effect at the default 8-bit **Bit Depth** setting. You can use this as a soundscaping tool.

5.2.5. Partial Transpose

The **Transpose** knob sets the pitch of the selected Partial or group of Partials up or down in **semitone** increments. At the knob's center position there is **No Transposition**. You can view the semitone value in the **Lower Toolbar** at the lower left side while you are turning the knob or placing your cursor over the knob. Double-clicking the knob returns the knob to center or **No Transposition**. The range is from -24 to +24 semitones.

5.2.6. Partial Tuning

The **Tuning** knob fine-tunes the pitch of selected Partial or group of Partials up or down in individual **Cents** (100ths of a semitone). At the knob's center position there is no pitch change. The parameter value is displayed in Cents in the **Lower Toolbar** at the lower left. Double-clicking the knob returns the knob to center or **0.00** Cents. The range is from -125 to +125 Cents below and above the setting of the **Transpose** knob.

5.2.7. Voice Chorus

The **Voice Chorus** knob creates a duplicate voice with a different pitch than the selected Partial or group of Partials. At the knob's center position there is no added voice, a value of 1.000. You can view the Chorus value in the **Lower Toolbar** at the lower left side while you are turning the knob or by placing your cursor over the knob. The range is from 0.000 to 16.000 in steps of .100. Double-clicking on the knob returns the value to 1.000 or **NO Voice Chorus**.

Chorus Setting:	Relationship of added voice to fundamental frequency
0.500	One octave below
1.000	Unison (no added Voice Chorus)
1.500	Perfect fifth above
2.000	Second harmonic (one octave above)
3.000	Third harmonic (one octave plus a perfect fifth above)
4.000	Fourth harmonic (two octaves above)
5.000	Fifth harmonic (two octaves plus a major third above)
6.000	Sixth harmonic (two octaves plus a perfect fifth above)
7.000	Seventh harmonic (two octaves plus a minor seventh above)
8.000	Eighth harmonic (three octaves above)
9.000	Ninth harmonic (three octaves plus a major second above)
10.000	Tenth harmonic (three octaves plus a major third above)
11.000	Eleventh harmonic (three octaves plus an augmented fourth above)
12.000	Twelfth harmonic (three octaves plus a perfect fifth above)
13.000	Thirteenth harmonic (three octaves plus a perfect sixth above)
14.000	Fourteenth harmonic (three octaves plus a minor seventh above)
15.000	Fifteenth harmonic (three octaves plus a major seventh above)
16.000	Sixteenth harmonic (four octaves above)

5.2.8. Partial Chorus Fine

The **Chorus Fine** knob is a more precise tuning adjustment of the **Voice Chorus** for the selected Partial or group of Partials. Range is from -.100 to +.100 in increments of .001. These values read out in the **Lower Toolbar** left side as well. Double-clicking on the knob returns it to its center position of 0.000.

5.2.9. Partial F.M. Ratio

The **F.M. Ratio** knob controls the ratio of the F.M. Modulator frequency to the F.M. Carrier frequency for the selected Partial or group of Partials. There must be a **CARRIER** wave AND a **MODULATOR** wave assigned to a Partial on the **ENGINE** page in **Graphic Screen Mode** for this control to have any effect on the Partial. The Range is from 0.000 to 16.000 in increments of .100.

5.2.10. Partial F.M. Fine

The **F.M. Fine** knob is a much smaller adjustment to the **F.M. Ratio** (ratio of the F.M. Modulator frequency to the F.M. Carrier frequency) for the selected Partial or group of Partials. There must be a **CARRIER** wave AND a **MODULATOR** wave assigned to a Partial on the ENGINE page in **Graphic Screen Mode** for this control to have any effect on the Partial. The Range is from -0.100 to +0.100 in very small increments of .001.

5.2.11. Partial F.M. Amount

The **F.M. Amount** knob controls the overall amount of F.M. modulation for the selected Partial or group of Partials. There must be a **CARRIER** wave AND a **MODULATOR** wave assigned to a Partial on the ENGINE page in **Graphic Screen Mode** for this control to have any effect on the timbre. The Range is from 0.000 to 1.000.

5.2.12. Partial Frame Speed

The **Frame Speed** knob increases or decreases the overall time that **Timbre Slice** Frames crossfade into one another for the selected Partial or group of Partials. Parameter range is from 0.00 to 2.50 in increments of .01. The default value is 1.00 which is the original **Frame Speed** of the **Timbre Slice** Timbre.



Partial Settings and Frame Speed

5.3. Amplitude Envelope

The **AMPLITUDE ENVELOPE** section is located at the top center section of the **Extended Panel Mode**. It controls the volume shape of the selected Partial or group of Partials from the first note-on event.

A simple comparison would be the Volume Envelope ADSR in an analog subtractive synthesizer.

5.3.1. Amplitude Delay

The **Delay** knob increases the time for the selected Partial or group of Partials to be heard after the initial note-on (key depression). The default value is 0 ms (milliseconds) and the range is 0 ms to 30.00 s (seconds) in 1 millisecond increments.

5.3.2. Amplitude Attack

The **Attack** knob adjusts how fast or slow the Timbre/Sound ramps UP in volume from the note-on (key depression) to the **Peak** setting for the selected Partial or group of Partials. The default is a value of 3 ms (milliseconds) and the range is 0 ms to 30.00 s (seconds).

The actual **Attack** time will vary depending on the **Peak** level. At the maximum **Peak** level of 100.0, the **Attack** time will be as read. As the **Peak** level is reduced, the **Attack** "time" will decrease, as it takes less time to reach the lower **Peak** level.

5.3.3. Amplitude Peak

The **Peak** knob adjusts the next volume level point in the Timbre/Sound after the initial **Attack** of the selected Partial or group of Partials. The level ranges from 0.00 to 100.0.

5.3.4. Amplitude Decay

The **Decay** knob adjusts how fast or slow the Timbre/Sound ramps DOWN in volume from the **Peak** setting to the **Sustain** level setting of the selected Partial or group of Partials. The default is a value of 3 ms (milliseconds) and the time range is from 0 ms to 30.00 s (seconds).

The actual **Decay** time will vary depending on the **Sustain** level. At the minimum **Sustain** level of 0.0, the **Decay** time will be as read. As the **Sustain** level is increased, the **Decay** "time" will decrease, as it takes less time to reach the higher **Sustain** level.

5.3.5. Amplitude Sustain

The **Sustain** knob adjusts the sound volume level after the **Decay** portion of the envelope. The level ranges from 0.00 to 100.0.

5.3.6. Amplitude Release

The **Release** knob adjusts the final decay time after the note-off (key release) for the selected Partial or group of Partials. The time range is from 0 ms (milliseconds) to 30.00 s (seconds).



Amplitude Envelope Controls

5.4. Harmonic Envelope

The **HARMONIC ENVELOPE** section is located at the top right section of the **Extended Panel Mode**. It controls the **F.M.** (Frequency Modulator) volume shape of the selected Partial or group of Partials from the first note-on (key depression).

A simple comparison would be the Filter Envelope ADSR in an analog subtractive synthesizer.

5.4.1. Harmonic Delay

The **Delay** knob increases the time it takes for the selected Partial or group of Partials' **F.M.** (Frequency Modulator) to be heard after the initial note-on (key depression). Any **AMPLITUDE Delay** value will add to the total **Delay** time for the **F.M.** to be heard after the initial note-on. The default delay value is 0 ms (milliseconds) and the range is 0 ms to 30.00 s (seconds) in 1 millisecond increments.

5.4.2. Harmonic Attack

The **Attack** knob adjusts how fast or slow the **F.M.** (Frequency Modulator) ramps UP in volume for the selected Partial or group of Partials from the note-on (key depression) to the **Peak** setting. The default is a value of 3 ms (milliseconds) and the range is 0 ms to 30.00 s (seconds).

5.4.3. Harmonic Peak

The **Peak** knob adjusts the next level point in the **F.M.** (Frequency Modulator) after the initial **Attack** of the selected Partial or group of Partials. The level ranges from 0.00 to 100.0.

5.4.4. Harmonic Decay

The **Decay** knob adjusts how fast or slow the **F.M.** (Frequency Modulator) ramps DOWN in volume from the **Peak** setting to the **Sustain** level setting of the selected Partial or group of Partials. The default is a value of 3 ms (milliseconds) and the time range is from 0 ms to 30.00 s (seconds).

5.4.5. Harmonic Sustain

The **Sustain** knob adjusts the **F.M.** (Frequency Modulator) level of the selected Partial or group of Partials after the **Decay** portion of the envelope. The level ranges from 0.00 to 100.0.

5.4.6. Harmonic Release

The **Release** knob adjusts the final decay time of the **F.M.** (Frequency Modulator) after the note-off (key release) for the selected Partial or group of Partials. The time range is from 0 ms (milliseconds) to 30.00 s (seconds).



Harmonic Envelope Controls

5.5. Vibrato

The **VIBRATO** section is located at the middle/center section of the **Extended Panel Mode**. It provides a wide range of vibrato effects similar to the LFO (Low Frequency Oscillator) of an analog synthesizer, and can be used to modulate the selected Partial or group of Partials. The pitch fluctuates equally above and below the pitch of the key played.

A sine wave vibrato of 5.00 to 6.00 Hertz is typically used to create the style of vibrato associated with vocalists, and traditional string and wind instruments. The other digital waveshapes are particularly useful for other musical and special effects.

5.5.1. Vibrato Wave

Wave is a drop-down menu to select the Shape of waveform modulator controlling the Vibrato effects. Choose from **Sine**, **Triangle**, **Ramp** (Sawtooth), **Inverted Ramp**, **Square**, and **Random** waves.



5.5.2. Vibrato Sync

When using Synclavier V as an instrument plug-in in your DAW project, the **Sync** button allows the **Vibrato** functions to synchronize with the tempo of your DAW. The tempo is set by the **Rate** knob.

5.5.3. Vibrato Rate

The **Rate** knob determines the speed of your **Vibrato**. When the **Sync** button is OFF the **Rate** value reads in Hz (Hertz, or cycles per second) in the **Lower Toolbar**. The range is 0.00Hz to 50.00Hz. Double-clicking on the knob returns the rate to the default value of 5.00Hz. When the **Sync** button is ON the **Rate** value reads as Vibrato BPM Multiplier in the **Lower Toolbar**.

5.5.4. Vibrato Carrier

The **Carrier** knob controls the Depth of the **Vibrato**. The pitch fluctuates equally above and below the pitch of the key played. The range is 0 semitones to 25 semitones.

5.5.5. Vibrato Link

The **Link** button allows the **Modulator** (F.M.) to be simultaneously affected by the Vibrato **Carrier** (depth of the Vibrato effect). When the **Link** button is ON you will notice the **Modulator** knob will match the position of the **Carrier** knob as you turn it. With the Link button OFF, you can get quite different vibrato effects by adjusting the knobs independently.

5.5.6. Vibrato Modulator

The **Modulator** knob controls the amount of F.M. modulation (Harmonic variation) or Depth affected by the Vibrato **Carrier**. The range is 0 semitones to 25 semitones. When the **Link** button is ON, the **Modulator** (depth) is connected to the Carrier (depth).

5.5.7. Vibrato Attack

The **Attack** knob adjusts the amount of delay before the **Vibrato** effect begins after the note-on. The range is 0 ms to 30.00 seconds.

5.5.8. Vibrato Bias

Normally when vibrato is added to a Partial Timbre, the pitch of each note fluctuates an equal amount above and below the pitch of the key played. When the **Bias** button is turned ON, the lowest point of pitch fluctuation is the pitch of the note played. The highest point is twice the number of semitones set for the vibrato **Depth**.

5.5.9. Vibrato S-Curve

When the **S-Curve** button is OFF and **Vibrato** begins, the attack ramps in a straight line (Linear) to the carrier and modulator depths. When the **S-Curve** button is turned ON, there is a more gentle start to the **Vibrato** attack.

5.5.10. Vibrato Quantize

The **Quantize** button steps the **Vibrato** curve to the nearest semitone. This feature is only useful with Vibrato depths greater than 1.00 semitone. This quantization function observes the current scale tuning parameters.

See [OCTAVE RATIO \[p.126\]](#) and [SCALE TUNING \[p.127\]](#) for related information.

5.5.11. Vibrato Invert

The **Invert** button changes the direction that the **Vibrato** wave starts. When the button is OFF the pitch rises first, above the original pitch. When the button is ON the pitch falls first, below the original pitch.



5.6. Stereo

The **STEREO** section is located at the middle/center section of the **Extended Panel Mode** just below the **Vibrato** section. These controls offer a wide variety of Left and Right placement (Panning) in the sound field as well as animated motion between Left and Right positions of the selected Partial or group of Partials.

Tremolo effects (Amplitude Modulation) are also available when the periodic modulator wave is “in phase” by setting the **Phase** control to 0° or 360°. When the **Phase** control is set to 0° or 360° the Left/Right position is not affected.

5.6.1. Stereo Wave

Wave is a drop-down menu to select the shape of waveform modulator controlling the **Stereo** and Tremolo effects. Choose from **Sine**, **Triangle** and **Square** waves.

5.6.2. Stereo Sync

When using Synclavier V as an instrument plug-in in your DAW project, the **Sync** button allows the **Stereo** functions to synchronize with the tempo of your DAW. The tempo is set by the **Rate** knob.

5.6.3. Stereo Rate

The **Rate** knob determines the speed of your **Stereo** panning effects and Tremolo non-panning effects. When the **Sync** button is OFF the **Rate** value reads in Hz (Hertz, or cycles per second) in the **Lower Toolbar**. The range is 0.00Hz to 50.0Hz. Double-clicking on the knob returns the rate to the default value of 5.00Hz. When the **Sync** button is ON the **Rate** value reads as Tremolo BPM Multiplier in the **Lower Toolbar**.

5.6.4. Stereo Depth

The **Depth** knob controls the width of the **Stereo** panning effects or the depth of the Tremolo effects. The range is 0.0% to 100% and displays at the left side of the **Lower Toolbar**.

5.6.5. Stereo Attack

The **Attack** knob adjusts the amount of delay before the **Stereo** effect begins after the note-on. The range is 0 ms to 30.00 seconds and is displayed at the left side of the **Lower Toolbar**.

5.6.6. Stereo Phase

The **Phase** knob defaults to 180°, which allows full Left/Right Stereo panning effects. Turning the knob full down to 0° or full up to 360° will allow Tremolo (Amplitude Modulation) effects with NO Left/Right Stereo panning. Other settings between 0° and 360° will display varying degrees of Left/Right panning depth.

5.6.7. Stereo S-Curve

When the **S-Curve** button is OFF and **Stereo** modulation effects begins, the attack ramps in a straight line (Linear) to the carrier and modulator depths. When the **S-Curve** button is turned ON, there is a more gentle start to the **Stereo** attack.

5.6.8. Stereo Alternate

The **Alternate** button turns on a function that alternates the starting side of a Left/Right Pan for every new MIDI note-on event. The **Depth** control sets the range of the Left/Right Pan for the **Alternate** effect.

5.6.9. Stereo Invert

The **Invert** button changes the direction that the **Wave** starts. When the button is OFF, the stereo position moves to the LEFT first, from the original stereo position. When the button is ON, the stereo position moves to the RIGHT first, from the original stereo position. If the **Alternate** button is ON, the Left/Right position of the sound is switched.

This function is useful to vary the Left/Right position of multiple Partial's occurring at the same note-on event.



6. GRAPHIC SCREEN MODE CONTROLS

SCR

The **Graphic Screen Mode** provides visual and spatial representation and manipulation of all control parameters for each and all Partials of the current Timbre/Sound including ENGINE, a MIXER, ENV/LFOs (Envelope and LFO control of the Partials), KEY DYNAMICS (the keyboard or velocity range of each Partial), and MODS (Controller routings).

To view the **Graphic Screen Mode** click on the **SCR** button at the top right of the **Toolbar**. Click the **SCR** button again to return to Standard Panel Mode or Extended Panel Mode.

Two (2) sections in **Standard Panel** and **Extended Panel Modes** have functions in common: ENV/LFOs and MIXER. The changes you make in one section will be reflected in the other section.

Five (5) additional sections have functions not available in Standard Panel or Extended Panel Modes: ENGINE, KEY DYNAMICS, MODS, and GLOBAL.



6.1. ENGINE

The ENGINE Tab is located at the top left of the **Graphic Screen Mode**.

The ENGINE Tab divides into three sections:

- The Timeline Editor in which you create and edit the position of the Frames of a Partial.
- The Frame Edit Menu in which you define the parameters of the selected Partial.
- The Harmonics Editor in which you create and edit the harmonics of the Carrier and Modulator.



The ENGINE section allows Graphic and Numeric parameter control for ONLY the selected Partial. This is where you can enter up to 24 Harmonic Coefficients (or choose a preset waveform) for both the Carrier and Modulator waves, and also create Frames. Each Frame, similar to a film frame, can contain its own set of harmonic coefficients for both the FM Carrier and FM Modulator waveforms, with individual phases for each harmonic coefficient.

Frames are then “chained” together and evolve over time. Beginning with the **BASIC PARTIAL**, a total of 100 Frames can be created.

6.1.1. Anatomy of a FRAME Event

Synclavier V creates sound in response to MIDI Note-On events. The 12 Partial Timbres occur simultaneously; each Partial Timbre is independent.

The precise point in time when the MIDI Note-On event is received establishes the precise timing for the entire note. Scientifically speaking, this point in time is referred to as Time T = 0.

At Time T = 0, Synclavier V begins by creating the **Delay** segment of the Volume Envelope (if any). During the **Delay** segment no audio is created for the Partial Timbre.

The creation of audible audio starts at the end of the **Delay** segment. Scientifically speaking, this point in time is referenced as Time T = D (where D is the Delay Time). At the end of the **Delay** segment is when Synclavier V begins the **Attack** segment.

Both Frame start and Index Envelope begin precisely at the start of the Volume Envelope attack. Of course, both functions can be delayed by setting their own **Delay** parameter appropriately.

The parameters associated with the first Frame, **FRAME 0**, are applied to the audio at the very start of the note (that is, at the end of the Volume Envelope **Delay** segment). After the **FRAME 0** Frame Delay Time the waveform will begin a **CROSSFADE** to the waveform associated with the next “enabled” FRAME, typically **FRAME 1**. Additionally, the volume, modulation or pitch will begin moving towards the setting associated with **FRAME 1**.

Each of the 12 Partials is available on the left-hand side of the screen. You can make changes to one Partial at a time.


- To select a Partial, click on the Partial (#1-12) you'd like to change. It will be highlighted in **light green**.
- To listen to a Partial individually, click on the small **S (Solo)** button just to the right of the Partial number.
- To turn off the sound of an individual Partial, click on the small **M (Mute)** button, to the right of the Partial number.

6.1.2. A walkthrough

When creating a sound from scratch in the GRAPHIC SCREEN section of the Synclavier V, you go through a series of necessary steps. Below an overview of the usual workflow. We'll assume you're in the ENGINE Tab of the GRAPHIC SCREEN section.

Please load the "Simple Sine" preset.

The first Partial is selected by default. In the Carrier and Modulator windows, you set the Amplitude of the harmonics in the Harmonics editor. The preferred way is to start on the left with the Carrier wave. When you press a key on the keyboard, you should hear a sound that gives you feedback about what you're doing.

 If you're not hearing anything check the audio settings in the top left SYNCLAVIER V menu. Is your controller listed there? Do hear a sound when you press the **Play Test Tone** button?

Now proceed to the Modulator wave window and add some Harmonics. Nothing is happening!! Why not?

This a key moment in your understanding of the Synclavier V; it creates its unique sounds using Modulation. The wave created in the Modulator window is used to modulate the wave in the Carrier window.

We've created some harmonics in the Modulator window but haven't told SYNCLAVIER V to modulate the Carrier wave with these Harmonics. For this we need to go to the MIXER Tab and set a modulation amount with the **FM Mod** dial. In addition you can change the **FM ratio** and fine tune it the the **Fine** knob. *In FM modulation the beauty is in the details, making small changes here can result in major timbre changes.*



6.1.3. The Timeline Editor


Next, direct your attention to the Timeline Editor in the top half of the screen. The Timeline is what makes the Synclavier V unique. It allows you to create a series of Frames that act much like the Frames in a movie. Each Frame can have a different harmonic content than the previous one. Each Frame can also have its own amplitude. When you trigger the Timeline by pressing a key on your keyboard or externally from a sequencer, the Timeline advances through the Frames and plays back the information contained in them.

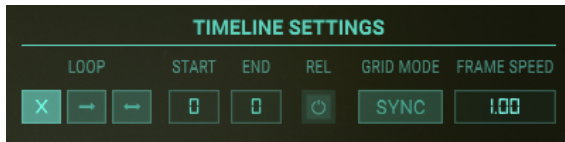
The first point of the Timeline is selected by default. In the Synclavier we refer to this point as a Frame. When creating a sound from scratch Synclavier automatically creates the first Frame of the first Partial. You can edit its properties in the Edit menu below it.

At this stage, you can add and edit more Frames to the Timeline.

The Ruler at the top the Timeline enables you to scroll left and right through the events on the Timeline. The automatic scroll feature triggers a horizontal scroll whenever you reach the end of the visible area of the Timeline, i.e. when dragging a Frame outside the visible range.

Double-clicking the ruler in the Timeline centers the Timeline on that specific point, leaving space after the last Frame. Click and drag vertically on the ruler to zoom in or out. To move along the timeline, click and drag left or right in the window.

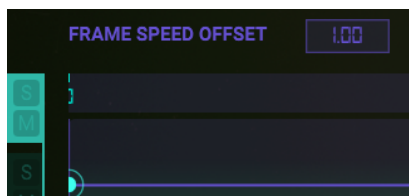
: The Timeline can sync to the tempo of your DAW. In this mode, it advances one position with each tick it receives from your DAW.



There's one more feature of the Timeline we haven't mentioned; when the Timeline is active, i.e. you've triggered it by pressing a key on a keyboard or with a MIDI event, the event cursor (a purple dot) will start moving on the timeline. Whenever it passes through a Frame, the parameters of that Frame and the changes that occur when going from one Frame to the next will be visible in the Timeline Editor and the Harmonics Editor.

6.1.3.1. Frame speed offset parameter addition

Each Partial has its timeline. There may be a situation where you want to increase the speed of a Partial's Timeline with respect to other Partials' Timelines. The Frame speed offset parameter enables you to offset the speed of individual Partials or grouped Partials. The range of change goes from 0.00 to 2.50 in increments of .01. The default value is 1.00 which is the original speed of the Frame.



6.1.4. Frames and the Timeline

6.1.4.1. Adding and Deleting Frames

To add a Frame on the Timeline of the current Partial, click anywhere on the horizontal purple timeline located just to the right of the Partial. You will place a small green circle on the timeline and can drag it to any location along the timeline. The number of the Frame will appear in the Frame Edit Menu. By clicking on a Frame, you access its configuration and make its parameters available for editing in the Frame Edit Menu.

Each Frame you create uses the harmonics of the nearest Frame to the right on the timeline or defaults to a single sine wave Carrier (1st Harmonic) and single sine wave Modulator (1st Harmonic) if there are no Frames to the right on the timeline. A total of 100 Frames can be created.

To delete a Frame from the Timeline, activate it and click the **Del** box in the top left of the Frame Edit Menu. This will remove the Frame from the Timeline. You can also right click on a Frame to delete it and right click and drag to delete multiple Frames.



6.1.4.2. Moving Frames


Moving a Frame in Unsynced mode:

- Dragging a Frame moves all Frames following it.
- **Shift-click and drag:** moves only the Frame you are dragging and leaves the others untouched. When you are using this method and a Frame lands on top of an existing one, a little 2 will appear above the Frame.

Moving a Frame in synced mode:

Moving a Frame point in synced mode is slightly different:

- **Click and drag** to move a single Frame to another point on the grid
- **Shift-click and drag:** moves selected Frame and all Frames that follow it according to their Timeline divisions.

 When you need to make very small adjustments in parameters in Synced or Unsynced mode hold down the **[Ctrl]** key to change the value of a parameter in very small increments.

6.1.4.3. Duplicating and Copying Frames:

- **[Alt] + click (Windows)/[Option] + click (macOS)** will duplicate a Frame and all of its parameters. While holding **[Alt]/[Option]** you can drag this new Frame to any location on the Timeline. A number indicates how many frames are present at that location. Release **[Alt]/[Option]** to position the Frame on the Timeline.
- To copy the properties of a Frame onto another existing Frame, select the source Frame and click the copy button. Frames that are a valid target start to blink. Paste the copy by clicking on a target Frame. Hold **Cmd / Ctrl** to copy the contents of a Frame to multiple target Frames.



There are situations in which you need to make very small adjustments in parameters. In those situations you can micro edit a parameter: hold down the **[Ctrl]** key to change the value of a parameter in very small increments.

6.1.4.4. Creative options

Pasting Frames is a powerful creative tool; it enables you to create fascinating rhythmic and timbral effects quickly.

Some ideas:

- Step 1: Create a series of new (placeholder) Frames.
- Step 2: Create a Frame with a short Fade time and another Frame with a long(er) Fade time.
- Step 3: Copy the Frame with the short Fade time and paste it several times in the placeholder Frames you created in the first step.
- Step 4: Now copy the Frame with the long(er) Fade time and paste it in between every other short Fade Frame, alternating or skipping several short Frames to create an interesting rhythmic effect. Similarly, you can add Frames with different transpose settings and copy them alternatingly in the Timeline.

6.1.5. The Frame Edit Menu

In the center of the screen, we have assembled all parameters you need to edit the Frames on the Timeline and the parameters of the current Partial in an Edit menu. Some of the parameters in this menu are new, such as the **Loop Settings**, **Grid Mode** and **Frame Speed**. More about these later.



The arrows next to the BASIC PARTIAL label allow you to move to the next or previous Frame quickly. Other items in this menu are old friends we are already familiar with: **Delay time**, **Fade time**, **Transpose**, **Volume** and **Modulation**. They haven't changed, except for the transpose option which now enables you to transpose a Partial in a much more refined way: in semitones and cents.

6.1.5.1. Edit an individual Frame



This menu section covers all the parameters that are specific to one Frame and one Frame only. When you click on a point in the Timeline, this menu displays the current values of the point.

To fine-tune the settings of a Frame double-click it. It doubles in size. The Frame is now in solo mode; you hear what it does in isolation.

6.1.5.2. The Frame Selector

The Frame Selector displays the currently active **Frame**. You can click and drag up/down in the Frame Selector to select a FRAME or click left and right arrows on the side of it to move to an adjacent Frame. The default is **BASIC PARTIAL** (FRAME 0).

6.1.5.3. Delay Time

Changes between two Frames take place in the Transition time between them. The **Delay** option enables you to postpone the moment where the transition starts. If for example, you've created a second Frame an octave higher than the first, and delay time of one second, it will take one second for the pitch rise to start.

There are two ways to edit the delay period; the first is to drag the value in the **Delay Time** parameter box up or down. The **Delay Time** is represented by a purple square on the timeline. The second is to select **Edit Delay** in the **Timeline Edit Tools** and drag the purple delay rectangle to another position. The range is from 0 MSECS (zero milliseconds) to 30.0SECS (30 seconds), in 1-millisecond increments.

Delay Time does NOT affect BASIC PARTIAL (FRAME 0). To delay the BASIC PARTIAL, switch over to the ENV/LFOs Tab and set a delay time in the AMPLITUDE ENVELOPE Delay in **Graphic Screen Mode**. Or, switch to the **Extended Panel Mode**, and set a delay time there.

6.1.5.4. Fade Time

The **Fade** parameter enables you to set the transition time between two Frames. A short distance between Frames results in an almost immediate Timbre or Pitch Transition. A longer distance results in a more gradual transition. In other words, the distance between the two Frames determines the Crossfade between the currently selected Frame and the previous Frame.

There are two ways to edit the Fade time; the first is to drag the value in the Fade Time parameter box up or down. The second is to select **Edit FADE** in the **Timeline Edit Tools** and drag the Fade to another position. The range is from 0MSECS (zero milliseconds) to 30.0SECS (30 seconds), in 1-millisecond increments.

The **BASIC PARTIAL (Frame 0)** is not affected.


6.1.5.5. Transpose and Tuning

The **Transpose** parameter box displays the Pitch Transposition for the currently selected **Frame**. Each FRAME over time can have its pitch offset in semitones. The default setting is NO TRANSPOSITION, and the range is ± 48 SEMITONES in 1 (one) SEMITONE steps.

You can also add a microtonal shift to the Frames, with or without using the semitone transposition parameter. Tuning is in cents.

Possible applications:


- Create a sequence of Frames in alternative (non-western) tunings.
- Create complex Monochord-like sequences by copying and pasting a group of Frames and adding microtonal deviations.

 In Twelve-tone equal temperament the octave is divided into 12 semitones of 100 cents each. In music theory cents are used to express small intervals. They make it possible to compare the sizes of intervals in different tuning systems.

6.1.5.6. Volume, Reset and Modulation

The **Volume** parameter box displays and sets the loudness level of the currently selected Frame. Click and drag up/down in the **Volume** box to increase/decrease the loudness level from 0.00 to 100 in .1 increments.

The value in the **Modulation** parameter box controls the amount of **FM CARRIER** waveform applied to the currently selected Frame. The range is 0.00 to 100 in increments of 1.00.

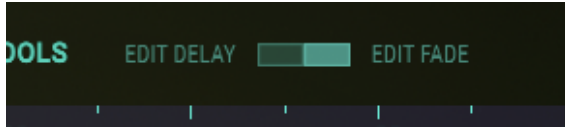
 In FM modulation small adjustments in parameters can drastically change a timbre. It's advisable to use micro editing here: hold down the **[Ctrl]** key to change the value of a parameter in smaller increments.

The **Reset** button is a quick shortcut to resetting the values of both **Volume** and **Modulation** to their default values.

 The **Reset** button resets the Volumes and Modulations of ALL Frames to 100!

6.1.5.7. Tutorial: Setting Delay and Fade time of a Frame

In whatever style you create music, keeping the listener interested is crucial. One way to achieve this is to create modulations, permutations in a sound. The **Delay** and **Fade** options of the Timeline are your starting point for these modulations.



Going from one Frame to the next you can introduce many timbral, amplitude and pitch changes to a sound. **Delay** and **Fade** expand your sound palette further: **Delay** delays the moment when the change (pitch, timbre, amplitude) takes effect, **Fade** determines the transition speed of a change between two Frames.

The easiest way to illustrate this is with a simple pitch modulation:

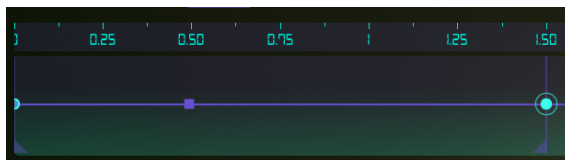
- Start with the "Simple Sine" preset.
- Go to the ENV/LFOs Tab and set the Release of the Amplitude Envelope to about 10.00; this ensures that we have a tone that sustains for a long time, so pitch changes are easy to hear.
- Click on the Timeline to create a second Frame at about 0.25 in the Timeline and raise the pitch of this second Frame from zero to +3 in the transpose box.



It is important to understand that to change the delay and fade properties of a Frame you work with the Frame that follows it.

- Make sure that the **Edit FADE** button in the top right corner is highlighted. This ensures that when we drag the second Frame to a new position, we change the Fade time and not the Delay time.
- Drag the second Frame to position 1.0 on Timeline; you should hear a change in the time it takes for the pitch to rise three semitones.

To introduce a delay, we'll have to click on the **Edit Delay** button in the top right corner. Now drag the second Frame to point 1.5 on the Timeline. Observe the purple rectangle appearing at the Frame; this is the delay indicator. Dragging the second Frame to 1.5 causes the delay indicator to move to 0.50 on the Timeline. When you now press a key, you'll notice that the pitch remains stable for half a second and then rises on point 0.50.



You can further edit the point where the pitch transition takes effect in two ways:

- Drag the purple delay indicator to the right. This shifts the moment the delay takes effect and moves the second Frame (and all Frames that follow it) to a later point in time.
- Alternatively, shift and drag the purple decay indicator to the right. This shifts the moment the delay takes effect but has no effect on the second Frame or Frames that follow it.

Deleting a delay indicator is a simple matter of right-clicking it.



The maximum value you can set with "Fade" and "Delay" is 30 seconds.

6.1.6. Timeline settings

6.1.6.1. Loops

With version 2 of Synclavier V, we introduce the option to create loops between two Frames. The ability to loop between Frames can be your starting point for many fascinating sound experiments.

You create a loop in the Timeline menu by setting a start Frame and an end Frame; either by dragging the purple handlers in the Timeline, by typing a number in the parameter box, or by clicking on the start parameter in the parameter box and dragging the cursor up or down. Repeat this with the end parameter. It is not possible to place the end Frame before the start Frame.



Keep an eye on the Timeline: it displays start and end Frame with little flags, which disappear when you set the loop to the "off" position.

i **J**: It may help to zoom out on the Timeline, before defining a start- and end Frame. This ensures that you have a complete overview of all Frames present in the Timeline.

By default, LOOP is off. The other two settings enable you to loop forward or bi-directional.

The release button determines whether the loop cycles indefinitely between loop start- and loop end point or continues beyond the loop end point in the release stage of the envelope.

i **J**: The power of the loop option reveals itself to a much greater extent when you combine the loops in two or more Partials.

Some ideas:

- When combining loops in two or more Partials, shift some of them forward in time and run some of them bi-directional.
- Transpose some Frames or Partials to create parallel harmonies.
- Omit Frames or add Frames in some loops to create rhythmic or tonal accents.

6.1.6.2. Tempo Sync

Being able to synchronise Frame positions to a grid that is tied to the BPM host is an essential composition tool. When SYNC is active the Frame playback locks to the main the clock of your DAW. With each trigger it receives from the tempo clock of your DAW, the Timeline advances one step. Syncing enables you to create sequences in Synclavier V that can run parallel to sequences on your DAW. This can be particularly useful when you use Synclavier V to add an evolving timbre to tracks in your DAW.



The SYNC button (de)activates tempo synced mode. When in synced mode, lines appear on the grid to show the positions of the beat divisions. When moving a point, it is constrained to grid positions. Placing points between division lines is possible. The allowed positions, in this case, are the ones that would appear on the next zoom level. Frame positions stay the same when switching back and forth if the BPM of the host remains constant.

Last but not least: the FRAME SPEED setting. The Frame Speed parameter allows you to set the speed of the Timeline of this particular Partial. It's a local control; it differs from the **Frame Speed Offset** parameter which acts on all Timelines simultaneously.



Note: Parameters displayed in purple such as the Frame Speed Offset in the top left of this screen are global they will affect all Partials.

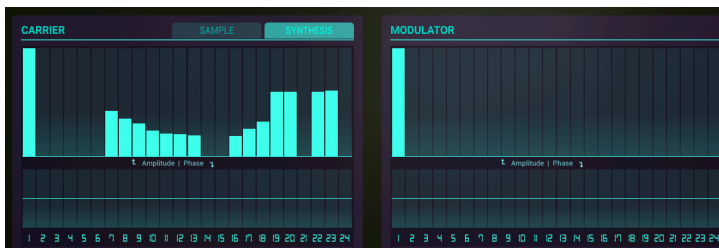
6.1.7. The Harmonics Editor

6.1.7.1. CARRIER & MODULATOR

To create or modify a waveform, the **CARRIER & MODULATOR** windows allow entry and modifying of the 24 harmonic coefficients using vertical **light green** columns. You may also choose a preset waveform for each **Carrier** and **Modulator**.

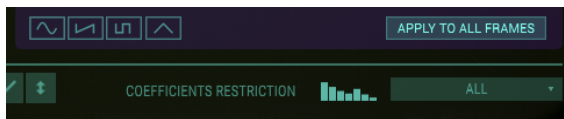
Adding Harmonics (Carrier)

Select the Partial on the left side of the Graphic Screen. In the **FRAME SELECTION** rectangle box the **BASIC PARTIAL** is **FRAME 0** (zero). If there are additional Frames in your selected preset Timbre, click-dragging up/down in the **FRAME SELECTION** box will scroll through them. (For more on creating and modifying additional FRAMES, see [Adding and Deleting Frames \[p.64\]](#).)



To add Harmonics, click on any of the Long vertical green columns in the **Carrier** window. Click/dragging the green column **VERTICALLY** changes the volume level of the chosen Harmonic. If you click and drag in a sweeping motion **HORIZONTALLY**, multiple Harmonics can be added or modified at once. Double-click on a column to reset its value. A little experimentation and you will quickly catch on.

The **COEFFICIENTS RESTRICTION** menu at the bottom of the page is a drop-down menu allowing you to choose a Coefficients Restriction option when editing the 24 Harmonics.

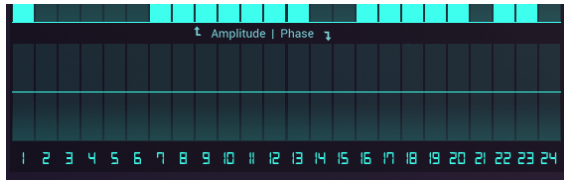


You can limit the harmonics being edited to either **ALL**, **ODD**, **EVEN**, **OCTAVES**, or **FIFTHS**.

As you add Harmonics you will see the corresponding **Carrier** Waveform you are designing directly under the Harmonics columns and Phase controls.

Changing Phase of Harmonics (Carrier)

To change the Phase of the Harmonics, click on any of the shorter vertical green columns directly under the longer Harmonics columns of the **Carrier**. Clicking and dragging the shorter green column **UP** shifts the Phase of the chosen Harmonic up to $+180^\circ$, while clicking and dragging it **DOWN** will shift its Phase as much as -179° .



If you click and drag in a sweeping motion HORIZONTALLY, the Phase of multiple Harmonics can be modified at once. Again, a little experimentation and you will quickly catch on.

Selecting a Preset Waveform (Carrier)

There are 4 (four) Preset Waveforms from which you may choose: **Sine**, **Ramp** (Sawtooth), **Square**, and **Triangle**. The **Carrier** Preset Waveforms are located below the waveform display. When you choose one of these Preset Waveforms, you will see the appropriate Harmonics change automatically. After you have chosen a Preset Waveform, you may also modify it, using the Harmonics columns and Phase columns.

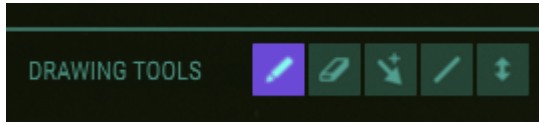
To apply the harmonics currently present in the Carrier to all Frames on the timeline click on the "APPLY TO ALL FRAMES" button.

Adding Harmonics (Modulator)

Adding Harmonics in the MODULATOR window is identical to adding Harmonics in the **Carrier** window.

6.1.8. Tools

To speed up the harmonics editing process use the **Edit Tools** below the waveform display. These Tools are a selection of buttons that help in entering harmonics in the **Carrier**, **Modulator**, and **Phase** editors.



6.1.8.1. Pencil Tool (default)



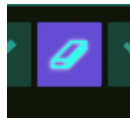
When the **Pencil** tool is selected, you can use your cursor to draw Harmonics volume or Phase data across the Harmonics in a **non-linear** fashion. You can also use your cursor to edit the data in a single column. Click on an empty Harmonic column in the **Carrier** or **Modulator** window, and you add that Harmonic. Click and hold, and you can raise or lower the Harmonic volume level.

6.1.8.2. Line Tool



The **Line** tool allows you to click and drag your cursor, drawing in a **straight line** across the Harmonics or Phase windows. Values will be entered or adjusted automatically. Click and drag left to right, and when you have reached your highest Harmonic, keep your finger pressed down and then slide the "end of the line" up and down. This will illustrate the ability of a line to be drawn in a positive or negative direction.

6.1.8.3. Eraser Tool



The **Eraser** tool is used to zero out individual Harmonics or an entire group of Harmonics from the **Carrier** or **Modulator** window. To erase only one Harmonic, click on that Harmonic column. To erase a range of Harmonics, click the first Harmonic you want to erase and swipe the cursor to the right. Alternatively, you could tap the last Harmonic you want to erase and swipe to the left.

6.1.8.4. Offset Tool



Select the **Offset** tool to adjust all of the values of the selected **Carrier** or **Modulator** Harmonics and Phases proportionately. You will be able to move them up/down with your cursor.

6.1.8.5. Multi Tool



Selecting this button will allow you to switch between tools using **[Shift]** and click, **[Alt]** and click, or right-click.

- **[Shift] and click** to select the Line tool
- **[Alt] and click** (Mac & Windows users) to select the Offset tool
- **Right-click** to select the Eraser tool


6.1.9. Sample playback

With version 2 of Synclavier V we introduce Sample Playback. Samples can be loaded in the Carrier window and act as a carrier. Once loaded in the Carrier an additional option becomes available: resynthesis. So for the carrier, two modes are available: Synthesis and Sample. Samples can play in the Carrier only. The resynthesis analysis, however, can be sent to the Carrier, the Modulator, or both.

The Sample Browser

To load a sample, click on the Sample tab in the Carrier window. Choose a sample from the list or click on the folder icon to open a directory on your system where you store your samples. In a DAW environment, you can drag a sample straight from the sample library to the sample edit window.

By default, the sample browser displays the samples it finds at location /Library/Arturia/Samples (macOS) or C:\ProgramData\Arturia\Samples\SynclavierV\User on the PC. Knowing this location, you could add your samples there, provided that they match the criteria for the sample player.

 The File Browser remembers the last location you have opened.



Clicking on the headers of a column sorts the samples by name, bank or duration. Click on the header of the loop column to sort the looped samples. Use the search bar to find a specific sample.

Once the sample has loaded, trash and "import to collection" icons appear that you can use to delete the sample from or add it to the Synclavier V library. Clicking on the trash icon also clears the sample edit buffer.



The sample player accepts samples in wave format, with a maximum length of 30 seconds.

Clicking on a sample selects it and previews it. Double-clicking the sample loads it in the carrier/sample editor. When selected, the sample plays in preview mode. Double-clicking on a sample exits sample browse mode and loads the sample in the carrier window.

The Sample Editor

Once loaded, the sample will playback in the Carrier each time the Timeline is triggered. From this moment on you can modulate the sample by adding Frames in the Timeline. All modulation options in the **Frame Editor** and the **Timeline Settings** menu are available at this time.

To loop a section of the sound, click **Loop** and move the green markers to a new position in the sample edit window. The sample cycles between the markers as long as the AMP envelope on the ENV/LFO Tab is in the decay stage, and continues to its end when the AMP envelope reaches the release stage. When the release button is active, the loop stays within the loop markers forever.

Use the purple flags on either side to trim excess parts from the sample. This may be a good idea if you want to isolate a part of your source sample with interesting harmonic content.



Drag the time ruler up or down to have additional control over the location where you want to place the markers.

The Loop controls of the sample editor determine which part of the sample will loop and how the loop responds to triggers:

- Loop Start: defines the loop start position.
- Loop End: defines the loop end position.
- The Loop button activates or deactivates the loop.
- The Release button determines whether the loop cycles indefinitely between loop start- and loop end point or continues beyond the loop end point in the release stage of the envelope.



To create the perfect loop, zoom in sample start- or end point and drag the ruler down. A close-up view of the wave of the sample enables you to find a zero-crossing point for the sample start- or end point. If you place a marker precisely on the point where the wave crosses the line from positive to negative (or the other way around) you make sure that there are no sound artifacts audible in the loop.

The Trim controls of the sample editor determine which part of the sample is audible. They are listed below:

- Start: defines the sample start position
- End: defines the sample end position
- Alias filter: removes sound artifacts from a sample. It can take the rough edges from a sample. It is disabled by default.

The Tune controls allow you to tune the sample and set its pitch reference point:

- **Key:** defines the reference key used to define the zero reference point for transposition. When playing different notes on the keyboard, the samples re-pitch accordingly. Double-clicking the zero reference key plays the sample at its original pitch
- **Tuning:** offset in cents to the reference pitch
- **Autotune:** Autotune analyses the sample and sets the KEY and TUNING parameters automatically.

i 🎵: A quote from Cameron Jones, the original designer of the Synclavier may help to understand how this works: 'The MIDI key of a Partial and it's Tuning Offset are set as the result of the Pitch detection following Autotune, Lets say the original sample was a recording of a piano middle A that was exactly in tune. The key parameter would then be set to A5 and the offset is 0. If you manually changed the key parameter to A6 that would tell the Synclavier V engine to to play the sample at it intrinsic rate when you played A6. So , if you continue to play A5 on the keyboard while manually adjustic the parameter up to A6, you hear the pitch going down.'

- **Analysis position:** the analysis occurs at a specific position in the sound file which is defined by this control.

When you switch to Analysis Mode by clicking on one of the analysis buttons on the bottom menu, a copy of the sample appears in the Timeline window. From here you can edit the Timeline and expand the number of Frames and use the standard edit options that are available in the menu, such as transpose, fade and delay.

The sample is now an integral part of the Partial and as such you can modulate it as you would typically modulate a carrier wave.

i 🎵: To hear the sample in more detail, solo the Frame that contains the sample by double-clicking it and lower the Timeline playback speed by changing the Frame speed in the **Timeline Settings** menu.




Note: When saving a preset containing samples, the samples are saved with the preset and are added to the library when the preset is loaded or imported.

6.1.10. Resynthesis

As of version 2, Synclavier V is capable of Resynthesis. Resynthesis is a process in which an existing sound is analysed and artificially recreated based on the spectral characteristics of the original sound.

The Spectral Resynthesis option of Synclavier V2 analyses the frequency spectrum of a sample and artificially creates a new sound based on the spectral characteristics of the sampled sound. The sample is "translated" into many Frames that recreate the audio characteristics of the original sound. Resynthesis is a very complicated process as sounds contain many harmonics, each with a particular amplitude and phase.

Synclavier V2 is uniquely suited to recreating sounds as it is capable of creating a multitude of Frames, each with its envelope and phase characteristics. An accurate resynthesis requires many Frames. To allow for this the number of Frames has grown from 50 to 100.

 It's important to understand that the resynthesis process of the Synclavier V2 only recreates the harmonic content of a sample. It does not recreate the envelope of the original sample. If for example, you've resynthesized a bowed string instrument with a slow attack, you have to go to the ENV/LFOs Tab to recreate the envelope of the bowed instrument by adjusting the AMP and Harmonic envelope. While doing so, you might stumble on some exciting new sounds.

The first steps of the resynthesis process are identical to the steps described in the Sample editing Paragraphs. In the example below, we resynthesize a sample of a 12-string acoustic guitar.

To start the resynthesis process on the ENGINE Tab:

- Click on the sample tab of the Carrier wave. A browser opens and displays the samples available for resynthesis. (for more details about the browser please refer to the [Sample browser \[p.77\]](#))
- Select the 12-string guitar sample by double-clicking it.

The sample opens in a new window that enables you to edit the sample and prepare it for the resynthesis process. The steps involved are the same as preparing a sample for playback, but we repeat this information here to help you memorize the workflow:



To loop a section of the sound, click 'loop' and move the green markers to a new position in the sample edit window. The sample cycles between the markers as long as the AMP envelope on the ENV/LFO Tab is in the decay stage and continue when the AMP envelope reaches the release stage. When the release button is active, the loop stays within the loop markers forever.

Use the purple flags on either side to trim excess parts from the sample, or to limit the area that will be resynthesized. This may be a good idea if you want to isolate a part of your source sample with interesting harmonic content.

i 🎵 Drag the time ruler up or down to have additional control over the location where you want to place the markers.

The **Alias Filter** removes artefacts from the sound.

Now press **Autotune** to let Synclavier determine the center frequency of the sample. The position parameter determines which point in the sample is used to analyse the center frequency. The frequency content in natural sounds may vary over time, so moving this marker can make all the difference.

Press the **Carrier** button in the "ANALYSE TO" menu. The Sample edit menu disappears to be replaced with the ANALYSIS menu, and a preview of the analysed sound appears in the Timeline. The resynthesis tool automatically places markers on points. By default, the CARRIER is selected.

When finished click the "SEND RESULTS" button to finalise the resynthesis process. To view the harmonics created by the resynthesis process in the CARRIER window switch to the SYNTHESIS Tab.

The sample is now converted to a series of Frames with matching harmonic amplitudes in the Timeline of the Partial. All standard edit options such as delaying a Frame, re-tuning, fading and looping can now be applied to the resynthesized sound.

6.1.11. Conclusion: Timeline features, using them creatively

The creative options available on the ENGINE Tab are staggering! You could try some of the following suggestions:

Create a loop in a Timeline between two Frames, copy the Timeline to another Partial and:

- shift the loop in this second Partial left or right
- define a (slightly) longer or shorter loop. By doing so, you create fascinating polyrhythmic effects
- extend this idea by assigning different Frame speeds to each Timeline copy
- use a forward loop in the first Partial and a bi-directional loop in the second
- experiment with mixing Frame loops with a different volume setting in each loop
- group Partials that loop between the same Frames together. Use the twelve available Partials to create three or four groups and map these groups to the keyboard
- resynthesize a sample, create unique versions of these results in new Frames by removing or adding harmonics, and loop these variations.

6.2. MIXER

The MIXER Tab is the second Tab of the **Graphic Screen Mode**.

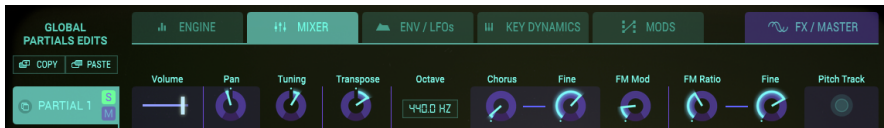
The MIXER allows you to view and edit many of the Partials' functions that are also accessible in **Standard Panel Mode** and **Extended Panel Mode**.



Each of 12 Partials is available on the left-hand side of the Screen. You can make changes to one Partial at a time or multiple Partials.



- To select a Partial, click on the Partial number you'd like to change. It will be highlighted in **light green**.
- To select multiple Partials in succession, hold **[Shift]** and click on the first Partial you'd like to change. Then click on the last Partial you'd like to change in the succession. The first Partial will be highlighted in **light green** and the successive Partials will be highlighted in a slightly **darker green**. Any changes to the Graphic will now affect all of the selected Partials. More about this in the Chained Editing section below.
- To select multiple Partials one by one, hold **[Cmd]** (**[Ctrl]** for Windows users) and click on each of the Partials you'd like to change. The first Partial will be highlighted in **light green** and the next selected Partials will be highlighted in a slightly **darker green**. Any changes to the Graphic will now affect all of the selected Partials. To go back to a single Partial, click on one Partial only, NOT holding down either **[Shift]** or **[Cmd]** or **[Ctrl]** for Windows users).
- To listen to a Partial individually, click on the small **S (Solo)** button just to the right of the Partial number.
- To turn off the sound of an individual Partial, click on the small **M (Mute)** button, just to the right of the Partial number.



6.2.1. VOLUME

The **VOLUME** left/right slider is the overall loudness of the Partial or selected group of Partials. Its range is from 0db at full gain (slider full right) to OFF (slider full left) in .1dB increments.

6.2.2. PAN

The **PAN** knob globally moves the selected Partial or group of Partials' stereo positioning left/right. Setting the knob straight up is **center**. The range is from -63 (hard left) to +63 (hard right). After turning the knob left or right you can return to the center position by double-clicking on the knob.

6.2.3. TUNING

The **TUNING** knob fine-tunes the pitch of the selected Partial or group of Partials up or down in individual **Cents** (100ths of a semitone). At the knob's center position there is no pitch change. The parameter value is displayed in Cents in the **Lower Toolbar** at the lower left. Double-clicking the knob returns the knob to center or **0.00** Cents. The range is from -125 to +125 Cents below and above the setting of the **Transpose** knob.

6.2.4. TRANSPOSE

The **TRANSPOSE** knob sets the pitch of the selected Partial or group of Partials up or down in **semitone** increments. At the knob's center position there is **No Transposition**. You can view the semitone value in the **Lower Toolbar** at the lower left side while you are turning the knob or placing your cursor over the knob. Double-clicking the knob returns the knob to centre or **No Transposition**. The range is from -24 to +24 semitones.

6.2.5. OCTAVE

The **OCTAVE** setting window controls the octave placement of the A-440 Hz (MIDI key #69) of the selected Partial or group of Partials. Click/Drag in the window Up/Down to Increase/Decrease the setting. It can be set to 1 of 9 discrete values from 6.875 Hz to 1760 Hz. Double-clicking will return it to the default value of 440.0 Hz.

6.2.6. CHORUS

The **CHORUS** knob creates a duplicate voice with a different pitch than the selected Partial or group of Partials. At the knob's centre position there is no added voice, a value of 1.000. You can view the Chorus value in the **Lower Toolbar** at the lower left side while you are turning the knob or by placing your cursor over the knob. The range is from 0.000 to 16.000 in steps of .100. Double-clicking on the knob returns the value to 1.000 or **NO CHORUS**.

Chorus Setting:	Relationship of added voice to fundamental frequency
0.500	One octave below
1.000	Unison (no added Voice Chorus)
1.500	Perfect fifth above
2.000	Second harmonic (one octave above)
3.000	Third harmonic (one octave plus a perfect fifth above)
4.000	Fourth harmonic (two octaves above)
5.000	Fifth harmonic (two octaves plus a major third above)
6.000	Sixth harmonic (two octaves plus a perfect fifth above)
7.000	Seventh harmonic (two octaves plus a minor seventh above)
8.000	Eighth harmonic (three octaves above)
9.000	Ninth harmonic (three octaves plus a major second above)
10.000	Tenth harmonic (three octaves plus a major third above)
11.000	Eleventh harmonic (three octaves plus an augmented fourth above)
12.000	Twelfth harmonic (three octaves plus a perfect fifth above)
13.000	Thirteenth harmonic (three octaves plus a perfect sixth above)
14.000	Fourteenth harmonic (three octaves plus a minor seventh above)
15.000	Fifteenth harmonic (three octaves plus a major seventh above)
16.000	Sixteenth harmonic (four octaves above)

6.2.7. FINE (Chorus)

The **FINE** knob is a much smaller tuning adjustment of the **CHORUS** for the selected Partial or group of Partials. Range is from -.100 to +.100 in increments of .001. These values are displayed on the left side of the **Lower Toolbar** as well. Double-clicking on the knob returns it to the default value of 0.000.

6.2.8. FM MOD

The **FM MOD** knob controls the overall amount of FM modulation for the selected Partial or group of Partials. There must be a **CARRIER** wave AND a **MODULATOR** wave assigned to a Partial on the ENGINE Tab in **Graphic Screen Mode** for this control to have any effect on the timbre. The Range is from 0.000 to 1.000.

6.2.9. FM RATIO

The **FM RATIO** knob controls the ratio of the FM Modulator frequency to the FM Carrier frequency for the selected Partial or group of Partials. There must be a **CARRIER** wave AND a **MODULATOR** wave assigned to a Partial on the ENGINE Tab in **Graphic Screen Mode** for this control to have any effect on the Partial. The Range is from 0.000 to 16.000 in increments of .100.

6.2.10. FINE (FM Ratio)

The **FM Fine** knob allows a more precise adjustment to the **FM Ratio** for the selected Partial or group of Partials. There must be a **CARRIER** wave AND a **MODULATOR** wave assigned to a Partial on the ENGINE Tab in **Graphic Screen Mode** for this control to have any effect on the Partial. The Range is from -0.100 to +0.100 in increments of .001.

6.2.11. PITCH TRACK

The **PITCH TRACK** button determines if the selected Partial or group of Partials will track the **Virtual Keyboard** or external MIDI keyboard/controller.

When turned **ON** (bright **green**), the pitch tracks the notes on the keyboard. When turned **OFF**, the pitch will be constant (A-440, or MIDI note #69) with any note depressed. The Tuning, Transpose, and Octave parameters can be used to adjust the pitch of non-tracking Partials.

The **Global Master Control** menu enables you to control **Volume, Pan, Tuning, Transpose Chorus** and **FM modulation** amounts of all Partials simultaneously. Changes you make here are added or subtracted from the current status of each Partial.




For example, turning the **Master Pan Control** to the left causes the Pan position of all Partials to shift to the left. Values in the menu can be positive and negative. Positive values are added to the current values of the Partials, negative values are subtracted. Changing the setting here does not affect the settings of the Partials themselves; the original values are retained.

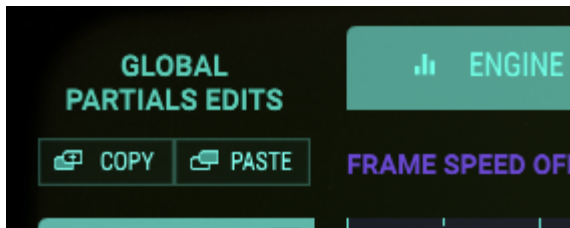
i: All parameters on this page can be controlled from your DAW. The **Master Controls** are maybe the most obvious choice to control externally; they allow you to create complex Pan, Pitch and FM modulation changes in all Partials simultaneously! To control these parameters from your DAW create an automation lane for the corresponding parameter. Please refer to the documentation of your DAW for details on how to create automation lanes.

6.2.12. Organizing your Partials

Every Synclavier V2 preset is built by combining and mixing a maximum of twelve Partials. Why twelve and not eleven or thirteen? Twelve is a magic number in music because it can be divided many ways: 3 times 4, 4 times 3, 6 times 2 and of course all other subdivisions that add up to a total of twelve.

Here on the MIXER Tab, the magic of twelve allows you to create flexible Partial groupings. If we divide the twelve Partials into four groups of three, each subgroup could, for example, have its own rhythm, timbre, or pitch. Alternatively, a subgroup could have common rhythmic properties but different pitch fluctuations. If you intend to use the Partials to maximum effect, it's a good idea to program them with these subdivisions in mind. The global copy/paste options on the MIXER Tab allow you to do just that.


 You can use the same magic of twelve to group partials in the [KEY DYNAMICS \[p.102\]](#) Tab. There you can assign groups of Partials to a range of MIDI notes/Keyboard area.



The **Copy Partial** and **Paste Partial** buttons enable you to duplicate and group Partials. They copy/paste all parameters of a Partial, unlike the copy/paste buttons on the other Tabs that copy only the parameters visible on that Tab to another Partial.

To copy consecutive Partials; select the first Partial of the range and [Shift] + click the last Partial of the range you want to copy. Click on the copy button and paste at allowed locations.

To Copy selected Partials; [Ctrl] + click (Windows)/ [Cmd] + click (macOS) to select the Partials you want to copy. Click on the copy button and paste at allowed locations.

 These extended copy/paste options are available on all Tabs, with the exception of the FX/MASTER Tab

6.2.13. Chained Editing

Chained editing is a unique feature introduced with version 2 of SYNCLAVIER 5. It enables you to change specific parameters in a selected group of Partials.

Let's try and see how this works in the MIXER Tab:

Select Partial 1.

We'll call this Partial the primary Partial for reasons explained later.

Now hold **[Cmd]** (MacOS) or **[Alt]** (Windows) and select a number of secondary Partials. For the sake of this example let's select Partials 3, 5 and 7.

Make a change in the Pan settings of primary Partial, in this case, Partial one and notice how this change is reflected in Partials 3, 5 and 7.

This will work for any parameter of the primary Partial. Halve the Octave settings in the primary Partial and observe how the secondary Partials follow. Changes you make in secondary Partial will not cause changes in other secondary Partial. It's the reason we make the distinction between primary and secondary Partials.

Any Partial can be selected as primary Partial. The Partial you select first will turn light green to show its primary status.

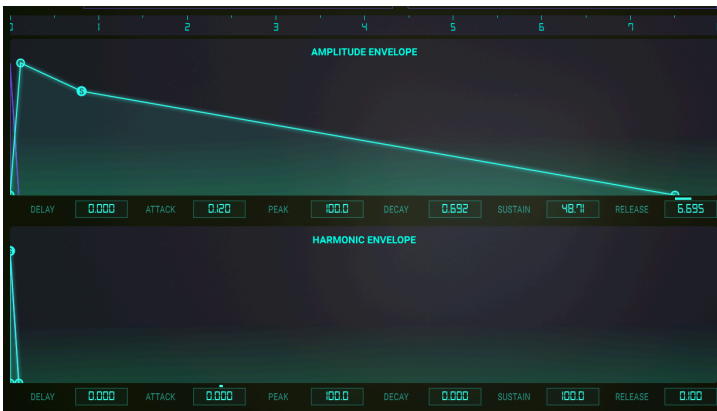
Chained editing is available in the MIXER Tab, the ENV/LFOs Tab, the KEY DYNAMICS Tab and the MODS Tab.

6.3. ENV/LFOs (Envelopes and LFOs)

The ENV/LFOs Tab is the third tab of the **Graphic Screen Mode**. There are four sections on this Tab:

- global offset controls
- two Envelope Generators; the first to control the Amplitude (volume) of a Partial and the second to control the Harmonic content of a Partial
- a Vibrato LFO
- a Stereo image LFO

The Amplitude- and Harmonic Envelopes on this Tab enable you to edit the volume and the harmonic envelope of the currently selected Partial or of grouped Partials. In the lower half of the screen, you'll find controls that allow you to set the properties of the Vibrato and Stereo LFOs.



To change a parameter, click on one of the Graphic's four tiny green circles on the light green line, and drag them forward and back in time, or up and down in volume, and visually see the shape change of your Partial Timbre(s). While you are adjusting your Envelope visually, the parameter's numerical value is displayed in a small rectangle box directly below the Graphic Screen. You may also click on the value in the rectangle box and drag it up or down.

To make changes in an envelope, click on a point and drag it left or right. The points following it will automatically adjust themselves. [Shift] and click to move a point without moving the other points.

While editing the envelope, the display will adapt itself automatically: it scrolls and zooms in/out to match your edit action.

This intelligent behaviour can also be found in the ruler; a double-click on the ruler in the top line resets the view area.

To **zoom IN** on an envelope click and drag **DOWN** in the ruler. To **zoom OUT** (increase the viewing range) click and drag **UP**. To move along the timeline, click and drag left or right on the ruler. The smallest window range is .450 (450 milliseconds). The largest window range is 120 seconds.



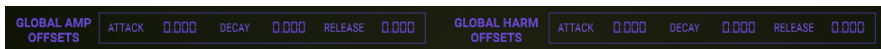
As you play your Partial Timbre from an external MIDI keyboard, controller or sequencer, you will notice a small purple circle follow the Amplitude and Harmonic Envelopes as they evolve.

Each of the 12 Partials is available on the left-hand side of the display. You can make changes to one Partial at a time or to multiple Partials.

- To edit the Envelopes of a Partial, click on the Partial number you'd like to change. It will be highlighted in **light green**.
- To select multiple Partials in succession, hold [Shift], and click on the first Partial you'd like to change. Then click on the last Partial you want to change. The first Partial will be highlighted in **light green**, and the successive Partials will be highlighted in a **slightly darker green**. Any changes to the Graphic will now affect all selected Partials.
- To select multiple Partials one by one, hold **[Cmd] ([Ctrl]** for Windows users) and click on each of the Partials you'd like to change. The first Partial will be highlighted in **light green** and the next selected Partials will be highlighted in a **slightly darker green**. Any changes to the Graphic will now affect all chosen Partials. To go back to a single Partial, release the **[Shift]** or **[Cmd/Ctrl]** keys and click on the desired Partial.
- To listen to a Partial individually, click on the small **S (Solo)** button just to the right of the Partial number. To mute the sound of an individual Partial, click on the small **M (Mute)** button, just to the right of the Partial number.

6.3.1. Envelope global offset

The **Global Offsets** in the top menu are a copy of the AMP(litude) ENV and HARM(onic) ENV dials on the main hardware screen. They are your gateway to exciting ways to control all parameters of the Amplitude and Harmonic Envelopes. Changes you make here add to or subtract from the current status of each Partial. For example, lowering the Attack time in this menu makes the attacks of all Partials sharper. Values in the menu can be positive and negative. Positive values are added to the envelope stages, negative values are subtracted.



At any time you can see what the Global offset adds to the AMP or Harmonic Envelope: a small horizontal line above the parameter indicates the level of the global offset.



♪: All envelope parameters on this Tab can be controlled from your DAW! Click on the MIDI icon in the top right corner, or initiate automation from your DAW by creating an automation lane for the corresponding parameter. You can use this form of automation to create complex and dynamic changes in the Harmonic- and AMP envelopes of all Partials simultaneously! Please refer to the documentation of your DAW to for information about creating automation lanes.

6.3.2. The Amplitude Envelope Generator

6.3.2.1. Delay (AMPLITUDE)

The **Delay** function has an important musical function: it delays the start time for the selected Partial or group of Partials. The default value is 0 ms (milliseconds), and the range of delay is from 0 ms to 30.00 s (seconds) in 1-millisecond increments.

To change the **Delay** time of the current Partial or group of Partials, click and drag on the first small **light green** square on the **light green** straight line most likely very near the 0 (Zero) line just above the **Delay** numerical parameter rectangle box located just to the right of **Partial 6**. You can also click and drag the **Delay** numerical value up/down to increase/decrease the value.

6.3.2.2. Attack (AMPLITUDE)

The **Attack** function sets the slope with which the AMP Envelope will respond to an external trigger, either from a keyboard of a DAW. A low setting will result in an almost immediate rise to the Peak level. A high setting will result in a slow rise to the **Peak** setting for the selected Partial or group of Partials. The default is a value of 3 ms (milliseconds), and the range is 0 ms to 30.00 s (seconds).

The actual **Attack** "time" will vary depending on the **Peak** level. At the maximum **Peak** level of 100.0, the **Attack** time will be as read. As the **Peak** level is reduced, the **Attack** "time" will decrease, as it takes less time to reach the lower **Peak** level.

To change the **Attack** time of the current Partial or group of Partials, click and drag left or right on the second small light green square on the **light green** straight line. You can also increase/decrease the value by click-dragging the **Attack** numerical value box located just to the right of the **Delay** numerical value box.

6.3.2.3. Peak (AMPLITUDE)

The **Peak** function adjusts the next volume level point after the initial **Attack** of the selected Partial or group of Partials. The level ranges from 0.00 to 100.0.

To change the **Peak** volume level of the current Partial or group of Partials, click and drag up/down on the second small **light green** square on the **light green** straight line. (This is the same square used to change the **Attack**.) You can also click and drag, up/down, the **Peak** numerical parameter rectangle box located just to the right of the **Attack** numerical value box.

6.3.2.4. Decay (AMPLITUDE)

The **Decay** function adjusts how fast or slow the volume level ramps DOWN in volume from the **Peak** setting to the **Sustain** level setting of the selected Partial or group of Partials. The default is a value of 0 ms (milliseconds), and the range is 0 ms to 30.00 s (seconds).

The actual **Decay** time will vary depending on the **Sustain** level. At the minimum **Sustain** level of 0.0, the **Decay** time will be as read. As the **Sustain** level is increased, the **Decay** "time" will decrease, as it takes less time to reach the **higher** Sustain level.

To change the **Decay** time of the current Partial or group of Partials, click and drag left/right on the third small **light green** square on the **light green** straight line. You can also click and drag left/right the **Decay** numerical parameter rectangle box located just to the right of the **Peak** numerical value box.

6.3.2.5. Sustain (AMPLITUDE)

The **Sustain** function adjusts volume level after the **Decay** portion of the envelope. The level ranges from 0.00 to 100.0.

To change the **Sustain** volume level of the current Partial or group of Partials, click and drag up/down on the third small **light green** square on the **light green** straight line on the Graphic after the **Peak** square. You can also click and drag, up/down, the **Sustain** numerical value rectangle box located just to the right of the **Decay** numerical value box.

6.3.2.6. Release (AMPLITUDE)

The **Release** function adjusts the final decay time to the end of the Timbre/Sound after the note-off (key release) for the selected Partial or group of Partials. The time range is from 0 ms (milliseconds) to 30.00 s (seconds).

To change the **Release** time of the current Partial or group of Partials, click and drag left/right on the fourth small light green square on the **light green** straight line after the **Peak** square. You can also click and drag, left/right, the **Release** numerical value rectangle box located just to the right of the **Decay** numerical value box.



Amplitude Envelope

6.3.3. The Harmonic Envelope Generator

The Harmonic Envelope enables you to shape the harmonic content of your sound. It determines how the Harmonics of the Carrier will modulate the Harmonics of the Modulator. By changing the Delay, Attack, Peak, Decay, Sustain and Release setting of this Envelope you specify what sort Frequency Modulation will take place.

6.3.3.1. Delay (HARMONIC)

The **Delay** knob enables you to postpone the attack of the Harmonic envelope. The Attack start the actual FM modulation and will cause the selected Partial or group of Partials' **FM** (Frequency Modulation) to be heard after the initial note-on (key depression).

The default value is 0 msec (milliseconds), and the range is 0 ms to 30.00 s (seconds) in 1-millisecond increments.

To change the FM **Delay** start time of the current Partial or group of Partials, click and drag on the first small **light green** square on the **light green** straight line most likely very near the 0 (Zero) line just above the **Delay** numerical value rectangle box located just to the right of **Partial 6**. You can also click and drag this **Delay** numerical value up/down to increase/decrease the value.

6.3.3.2. Attack (HARMONIC)

The **Attack** function adjusts how fast or slow the FM Modulation ramps UP in level from the note-on (key depression) to the **Peak** setting for the selected Partial or group of Partials. The default is a value of 3 ms (milliseconds), and the range is 0 ms to 30.00 s (seconds).

To change the FM **Attack** time of the current Partial, click and drag left/right on the second small **light green** square on the **light green** straight line. You can also increase/decrease the value by click and dragging the **Attack** numerical value box located just to the right of the **Delay** numerical value box.

6.3.3.3. Peak (HARMONIC)

The **Peak** function adjusts the next FM Modulation level point after the initial FM **Attack** of the selected Partial or group of Partials. The level ranges from 0.00 to 100.0.

To change the FM **Peak** time of the current Partial or group of Partials, click and drag up/down on the second small **light green** square on the **light green** straight line. (This is the same square used to change the FM **Attack**.) You can also click and drag, up/down, the **Peak** numerical parameter rectangle box located just to the right of the **Attack** numerical value box.

6.3.3.4. Decay (HARMONIC)

The **Decay** function adjusts how fast or slow the FM Modulator ramps DOWN in level from the FM **Peak** setting to the FM **Sustain** level setting of the selected Partial or group of Partials. The default is a value of 0 ms (milliseconds) and the time range is from 0 ms to 30.00 s (seconds).

To change the FM **Decay** time of the current Partial or group of Partials, click and drag left/right on the third small **light green** square on the **light green** straight line. You can also click and drag left/right the **Decay** numerical parameter rectangle box located just to the right of the **Peak** numerical value box.

6.3.3.5. Sustain (HARMONIC)

The **Sustain** function adjusts FM level after the FM **Decay** portion of the envelope. The level ranges from 0.00 to 100.0.

To change the FM **Sustain** level of the current Partial or group of Partials, click and drag up/down on the third small light green square on the **light green** straight line on the Graphic after the **Peak** square. You can also click and drag, UP/DOWN, the **Sustain** numerical value rectangle box located just to the right of the **Decay** numerical value box.

6.3.3.6. Release (HARMONIC)

The **Release** function adjusts the FM final decay time to the end of the Timbre/Sound after the note-off (key release) for the selected Partial or group of Partials. The time range is from 0 ms (milliseconds) to 30.00 s (seconds).

To change the **Release** time of the current Partial or group of Partials, click and drag left/right on the fourth small light green square on the **light green** straight line after the **Peak** square. You can also click and drag, left/right, the **Release** numerical value rectangle box located just to the right of the **Decay** numerical value box.



Harmonic Envelope

6.3.4. ENV/LFO Vibrato

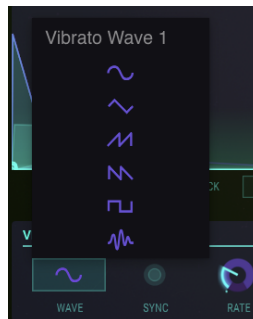
The **VIBRATO** section is located in the lower half of the ENV/LFO Tab. The Controls are identical to the VIBRATO control in the EXTENDED section of Synclavier V. These controls provide a wide range of vibrato effects, similar to the LFO (Low-Frequency Oscillator) of an analog synthesiser, which will modulate the selected Partial or group of Partials. The pitch fluctuates equally above and below the pitch of the key played.



A sine wave vibrato of 5.00 to 6.00 Hertz is typically used to create the style of vibrato associated with vocalists, and traditional string and wind instruments. The other digital waveshapes are particularly useful for other musical and special effects.

6.3.4.1. Wave

Wave is a drop-down menu to select the Shape of the waveform modulator controlling the Vibrato effects. Choose from **Sine**, **Triangle**, **Ramp** (Sawtooth), **Inverted Ramp**, **Square**, and **Random** waves.



6.3.4.2. Sync

When using Synclavier V as an instrument plug-in in your DAW project, the **Sync** button allows the **Vibrato** functions to synchronise with the tempo of your DAW. The **Rate** knob sets the tempo.

6.3.4.3. Rate

The **Rate** knob determines the speed of your **Vibrato**. When the **Sync** button is OFF the **Rate** value is displayed in the Lower Toolbar in Hz (Hertz, or cycles per second). The range is 0.00Hz to 50.0Hz. Double-clicking on the knob returns the rate to the default value of 5.00Hz. When the **Sync** button is ON the **Rate** value reads as Vibrato BPM Multiplier also in the **Lower Toolbar**.

6.3.4.4. Carrier

The **Carrier** knob controls the Depth of the **Vibrato**. The pitch fluctuates equally above and below the pitch of the key played. The range is 0 semitones to 25 semitones.

6.3.4.5. Link

The **Link** button allows the **Modulator** (FM) to be simultaneously affected by the **Vibrato Carrier** (depth of the **Vibrato** effect). When the **Link** button is ON the **Modulator** knob will match the position of the **Carrier** knob as you turn one or the other. With the **Link** button OFF, you can get entirely different vibrato effects by adjusting the knobs independently.

6.3.4.6. Modulator

The **Modulator** knob controls the amount of FM modulation (Harmonic variation) or Depth affected by the **Vibrato Carrier**. The range is 0 semitones to 25 semitones. When the **Link** button is ON, the **Modulator** depth follows that of the **Carrier** depth, and vice-versa.

6.3.4.7. Attack

The **Attack** knob adjusts the amount of delay before the **Vibrato** effect begins after the note-on. The range is 0 ms (milliseconds) to 30 seconds.

6.3.4.8. Bias

Usually, when vibrato is added to a Partial Timbre, the pitch of each note fluctuates an equal amount above and below the pitch of the key played. When the **Bias** button is turned ON, the lowest point of pitch fluctuation is the pitch of the note played. The highest point is twice the number of semitones set for the vibrato **Depth**.

6.3.4.9. S-Curve

When the **S-Curve** button is OFF, and **Vibrato** begins, the attack ramps in a straight line (Linear) to the carrier and modulator depths. When the **S-curve** button is turned ON, there is a more gentle start to the **Vibrato** attack.

6.3.4.10. Quantize

The **Quantize** button steps the **Vibrato** curve to the nearest semitone. This feature is only useful with large **Vibrato** depths greater than 1.00 semitone. This quantisation function observes the current scale tuning parameters.

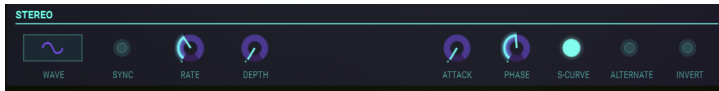
(See Section [Octave ratio \[p.126\]](#) and [Scale tuning \[p.127\]](#))

6.3.4.11. Invert

The **Invert** button changes the direction that the **Vibrato** wave starts. When the button is OFF, the pitch rises first, above the original pitch. When the button is ON, the pitch falls first, below the original pitch.

6.3.5. ENV/LFO Stereo

The STEREO section is located in the lower half of the ENV/LFO Tab. The controls are identical to the STEREO controls in the EXTENDED section of Synclavier V. These controls offer a wide variety of Left and Right placement (Panning) in the sound field as well as animated motion between Left and Right positions of the selected Partial or group of Partials.



Tremolo effects (Amplitude Modulation) are also available when the periodic modulator wave is “in phase” by setting the **Phase** control to 0° or 360°. When the **Phase** control is set to 0° or 360° the Left/Right position is not affected.

6.3.5.1. Wave

Wave is a drop-down menu to select the shape of the waveform modulator controlling the **Stereo** and Tremolo effects.



Choose from **Sine**, **Triangle** and **Square** waves.

6.3.5.2. Sync

When using Synclavier V as an instrument plug-in in your DAW project, the **Sync** button allows the **Stereo** functions to synchronise with the tempo of your DAW. The **Rate** knob sets the tempo.

6.3.5.3. Rate

The **Rate** knob determines the speed of your **Stereo** panning effects and Tremolo non-panning effects. When the **Sync** button is OFF the **Rate** value is displayed in Hz (Hertz, or cycles per second) in the **Lower Toolbar**. The range is 0.00Hz to 50.0Hz. Double-clicking on the knob returns the rate to the default value of 5.00Hz. When the **Sync** button is ON the **Rate** the value in the lower toolbar is the **Tremolo BPM Multiplier**.

6.3.5.4. Depth

The **Depth** knob controls the width of the **Stereo** panning effects or the depth of the Tremolo effects. The range is 0.0% to 100% and displays at the left side of the **Lower Toolbar**.

6.3.5.5. Attack

The **Attack** knob adjusts the amount of delay before the **Stereo** effect begins after the note-on. The range is 0 ms (milliseconds) to 30 seconds and is displayed at the left side of the **Lower Toolbar**.

6.3.5.6. Phase

The **Phase** knob defaults to 180° which allows full Left/Right Stereo panning effects. Turning the knob down to 0° or full up to 360° creates Tremolo effects (Amplitude Modulation) with NO Left/Right Stereo Panning. Other settings between 0° and 360° will have varying degrees of Left/Right panning depth.

6.3.5.7. S-Curve

When the **S-Curve** button is OFF and **Stereo** modulation effects begin, the attack ramps in a straight line (Linear) to the carrier and modulator depths. When the **S-curve** button is turned ON, there is a more gentle start to the **Stereo** attack.

6.3.5.8. Alternate

The **Alternate** button turns on a function that alternates the starting side of a Left/Right Pan for every new MIDI note-on event. The **Depth** control sets the range of the Left/Right Pan for the **Alternate** effect.

6.3.5.9. Invert

The **Invert** button changes the direction that the **Wave** starts. When the button is OFF, the stereo position moves to the left first, from the original stereo position. When the button is ON, the stereo position moves to the right first, from the original stereo position. If the **Alternate** button is ON, the Left/Right position of the sound is reversed.

This function is useful to vary the Left/Right position of multiple Partials occurring at the same note-on event.

6.3.6. Chained editing and the ENV/LFO Tab

In the ENV/LFOs Tab Chained editing enables you to change the envelope settings of selected Partials simultaneously. Select any Partial as the primary Partial, hold **[Cmd]** (MacOS) or **[Alt]** (Windows) to select a number of secondary Partials. All changes you make in the primary envelope, either the Amplitude Envelope or the Harmonic Envelope will be copied instantaneously to the secondary Partials.

Note: Mousing over a Partial shows the current status of an envelope and helps you to decide which Partials to select as secondary Partials.

Here again every change you make in the primary Partial will be reflected in the secondary Partials, including changes you make to the Vibrato/LFO and Stereo Imaging settings.

You could use this feature creatively by first selecting the even Partials, make some changes and then selecting the odd Partials to create a contrast.

6.4. KEY DYNAMICS

On the KEY DYNAMICS Tab you'll find the tools needed to define keyboard layers and splits zones for individual Partials.


6.4.1. Input Source Assign

Keyboard zones can act as modulation sources by assigning them to a target in the modulation matrix on the MODS Tab. The controls on the KEY DYNAMICS Tab allow you to determine how you control the volume of your Partial. You do this by selecting one of the three **Input Sources** (Keyboard, Velocity, or the Mod Wheel) and clicking on the **"Assign to Volume"** button to activate volume control. Activating **"Assign to Volume"** will make Keyboard zones available as a modulation source.



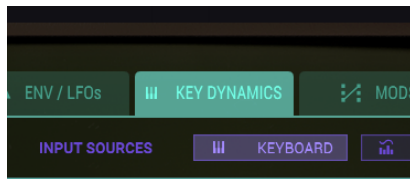
The source you have assigned to Volume affects all Partials simultaneously, i.e. it is not possible to assign Keyboard for Partial 3 and **Velocity** for Partial 4.

The selection you make here changes the value of the feedback you receive in the ruler at the bottom of the page. When you select **Velocity** or Mod wheel as the source, their corresponding values display on the ruler. (O - 127)

 If you do not want to control the volume of the keyboard zones with an external controller deactivate the **"Assign to Volume"** button.

6.4.2. Keyboard Zones

A Keyboard Zone is a range of keys (MIDI notes) assigned to a Partial or a group of Partials. For example, if you assign all keys in the range C1 to C2 to Partial 2 the timeline of Partial 2 will only trigger when keys in this range are played or triggered externally. As you change the upper or lower zone limits of a Partial, a key on the keyboard at the bottom of the screen will turn purple to indicate which key has been selected as the zone limit for the selected Partial's Timbre.

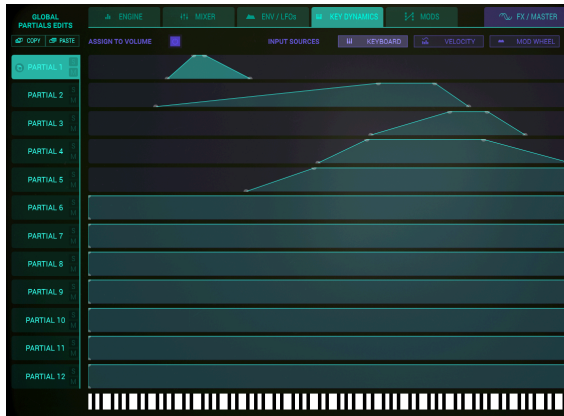


6.4.3. Key Range

Next to each Partial, there is a bar that has two vertical **light green** lines that correspond to the starting and ending keys (or MIDI note numbers) that will respond to the Virtual Keyboard, an external MIDI keyboard or controller, or notes played from a sequencer.

To establish a **STARTING** key of a selected Partial or set of Partials, click on the leftmost vertical green line towards the bottom (the little **HAND** icon will pop up) and drag it left or right to the **ENDING** key you choose. As you drag the bar/line, you will see the keyboard at the bottom illuminate in purple.

To establish an **ENDING** key of a selected Partial or set of Partials, click on the rightmost vertical green line towards the bottom and drag it left or right to the ending key you choose. As you drag the bar/line, you will see the corresponding key on the keyboard at the bottom illuminate in purple.



Key Dynamics for Partial #1-5

6.4.4. Key Range Fade Up & Down

The **Key Range Fade Up & Down** is a gradual volume shift over a number of keys, which allows crossfading between sounds on different Partials. The volume of each Partial can start at a low volume and increase/decrease as you play up/down the keyboard.

To determine a **Fade Up** range for a selected Partial or set of grouped Partials, click on the leftmost vertical green line towards the **TOP** (the little **HAND** icon will pop up) and drag it right to the key you choose to end the **Fade Up**. The vertical line will become diagonal as you drag it. You will also see the corresponding key on the keyboard at the bottom illuminate in purple.

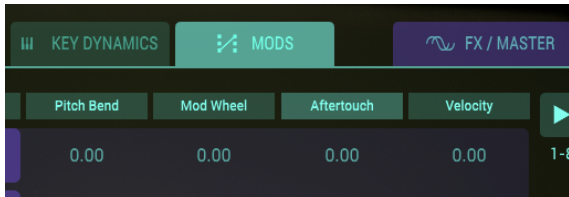
To determine a **Fade Down** range for a selected Partial or set of Partials, click on the rightmost vertical green line towards the **top** and drag it left to the key you choose to begin the **Fade Down**. The vertical line will become diagonal as you drag it. You will also see the corresponding key on the keyboard at the bottom illuminate in purple.

6.4.5. Chained editing and the KEYDYNAMICS Tab

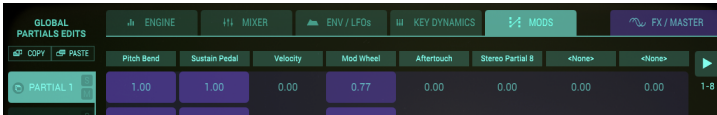
In the **KEYDYNAMICS** Tab chained editing enables you to define similar behaviour for selected Partials quickly. Select a primary Partial as the master and secondary Partials as the target that needs to mimic the behaviour of the primary Partial.

6.5. MODS

The MODS Tab is the fifth tab on the **Graphic Panel Screen**, just to the right of the KEY DYNAMICS Tab. The MODS section provides extensive source and destination **modulator** routings not available in **Standard Panel** or **Extended Panel Modes**. Routings are assignable to the selected Partial or group of Partials.



MODS TAB



MODS Controls

Below the MODS Tab at the top of a series of "columns" are **16** drop-down menus in two groups, **1-8** and **9-16**. To select between **1-8** or **9-16** there is a **green arrow** at the far top right of the screen.

Each drop-down menu is a **MOD SOURCE** assignment. There are 8 Source controllers and 30 Destination parameters that can be assigned.

Modulation Sources can be connected to destinations in a number of ways: you could assign each of 8 Mod Source controllers to 2 Mod Destinations each. Another possibility would be to assign only one Mod Source to 16 different **MOD DESTINATIONS** simultaneously.

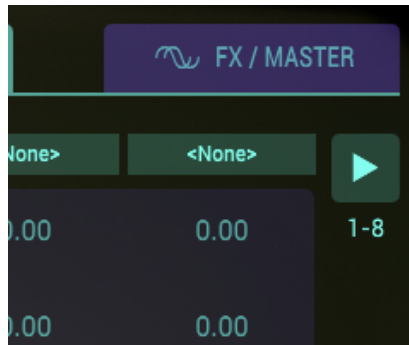
i If KEYDYNAMICS is not available as a modulation source please go to the KEYDYNAMICS Tab and enable "Assign to Volume". If you do not want to control the volume of the keyboard zones with an external controller deactivate the "Assign to Volume" button. Deactivating it will also allow you to use the full potential of the keydynamics as a mod source in the modulations panel with other destinations.

Each Mod Source uses one slider (per Partial) to adjust the amount of the controller sent to the **MOD DESTINATION**. The range is from -1.00 to +1.00.



All parameter buttons in the selection grid are colour sensitive. To set a modulation amount in a field on the grid click-drag up or down. The colour in the field will change and give you instant feedback about the value of a parameter. The colour depth is an indication of the level of modulation. Because all forms of modulation can be either positive or negative, the colours can range from light blue at maximum positive modulation (1.00), to a neutral dark blue (0.00), and back up again to a light blue at maximum negative modulation (-1.00).

The Modulation Tab consists of two parts each with eight modulation routings. By default Synclavier V shows the first eight routings; to see the next group of eight, click on the triangle in the top right corner.



In the example below we'll limit ourselves to the first eight routings. The top row lists eight sources, the bottom row eight destinations. The sustain pedal links to the Harmonic Envelope Attack on the bottom row. The vertical row in between the two lists the effect of this modulation routing on the Partial. The first value is -1.00 which translates as: with the sustain pedal fully depressed the attack of the Harmonic envelope rises to maximum instantly. The value in the second row is zero, consequently pressing the sustain pedal down has no effect. The horizontal row of the MODS grid thus allows you set the impact of the sixteen routings on each Partial.

Modulation settings you've created for one Partial can be copied to another Partial, i.e. to copy the modulation settings of Partial 3 to Partial 4, click on the copy icon of Partial 3 and paste the values to Partial 4. This action also copy/pastes the values in slots 9-16 to Partial 4. All standard single or multiple copy/paste actions are allowed. Copy/paste actions can only be initiated on a Partial that is selected.

6.5.1. Modulation Sources

6.5.1.1. PITCH BEND

The **PITCH BEND** wheel can be assigned to 1 (or as many as 16) of the 30 Mod Destinations. In other words, the **PITCH BEND** wheel is not just for **TUNING**, but **TUNING** is the default.

To assign a Mod Source to be **PITCH BEND**, click on any one of the 16 Mod Source drop-down menus at the TOP of the column and select **PITCH BEND**.

To adjust the RANGE assigned to the DESTINATION, click and drag the slider of the Partial or group of Partials.

To assign **PITCH** to a MOD DESTINATION, click on any one of the 16 MOD DESTINATION drop-down menus at the bottom of the column and select any of 30 Mod Destinations.

By default, MOD SOURCE **PITCH BEND** is assigned to MOD DESTINATION **TUNING**.

Important Note: The maximum range of **PITCH BEND TUNING** is set on the FX/MASTER Tab. The slider range from full right (1.00) to center position will reduce the **TUNING** range set by the **PITCH BEND** on the FX/MASTER Tab. The slider range from CENTER position to full left (-1.00) will increase the TUNING range set by the **PITCH BEND** on the FX/MASTER Tab, but the direction of the pitch change will be reversed.

6.5.1.2. SUSTAIN (Sustain Pedal)

The **SUSTAIN** pedal can be assigned to 1 (or as many as 16) of the 30 Mod Destinations.

To assign the **SUSTAIN Pedal** to be a Mod Source, click on any one of the 16 Mod Source drop-down menus at the TOP of the column and select **SUSTAIN**.

To adjust the amount to be sent to the DESTINATION, click and drag the slider of the Partial or group of Partials.

To assign the **SUSTAIN** pedal to a **MOD DESTINATION**, click on any one of the 16 Mod destination drop-down menus at the bottom of the column and select any of 30 Mod Destinations.

6.5.1.3. VELOCITY

VELOCITY can be assigned to 1 (or as many as 16) of the 30 Mod Destinations.

To assign **VELOCITY** to be a Mod Source, click on any one of the 16 Mod Source drop-down menus at the TOP of the column and select **VELOCITY**.

To adjust the amount to be sent to the DESTINATION, click and drag the slider of the Partial or group of Partials.

To assign **VELOCITY** to a **MOD DESTINATION**, click on any one of the 16 Mod destination drop-down menus at the bottom of the column and select any of 30 Mod Destinations.

6.5.1.4. MODWHEEL

The **MODWHEEL** can be assigned to 1 (or as many as 16) of the 30 Mod Destinations.

To assign the **MODWHEEL** to be a Mod Source, click on any one of the 16 Mod Source drop-down menus at the TOP of the column and select **MODWHEEL**.

To adjust the amount to be sent to the DESTINATION, click and drag the slider of the Partial or group of Partials.

To assign the **MODWHEEL** to a **MOD DESTINATION**, click on any one of the 16 Mod destination drop-down menus at the bottom of the column and select any of 30 Mod Destinations.

6.5.1.5. AFTERTOUCH

AFTERTOUCH can be assigned to 1 (or as many as 16) of the 30 Mod Destinations.

To assign **AFTERTOUCH** to be a Mod Source, click on any one of the 16 Mod Source drop-down menus at the TOP of the column and select **AFTERTOUCH**.

To adjust the amount to be sent to the DESTINATION, click and drag the slider of the Partial or group of Partials.

To assign **AFTERTOUCH** to a **MOD DESTINATION**, click on any one of the 16 Mod destination drop-down menus at the bottom of the column and select any of 30 Mod Destinations.

6.5.1.6. EXPR (Expression Pedal)

EXPR (Expression Pedal) can be assigned to 1 (or as many as 16) of the 30 Mod Destinations.

To assign a Mod Source to be **EXPR (Expression Pedal)**, click on any one of the 16 Mod Source drop-down menus at the TOP of the column and select **EXPR (Expression Pedal)**.

To adjust the amount to be sent to the DESTINATION, click and drag the slider of the Partial or group of Partials.

To assign **EXPR (Expression Pedal)** to a **MOD DESTINATION**, click on any one of the 16 Mod destination drop-down menus at the bottom of the column and select any of 30 Mod Destinations.

6.5.1.7. RELEASE (Release Velocity)

RELEASE (Release Velocity) can be assigned to 1 (or as many as 16) of the 30 Mod Destinations.

To assign a Mod Source to be **RELEASE (Release Velocity)**, click on any one of the 16 Mod Source drop-down menus at the TOP of the column and select **RELEASE (Release Velocity)**.

To adjust the amount to be sent to the DESTINATION, click and drag the slider of the Partial or group of Partials.

To assign **RELEASE (Release Velocity)** to a **MOD DESTINATION**, click on any one of the 16 Mod destination drop-down menus at the bottom of the column and select any of 30 Mod Destinations.

6.5.1.8. KEY DYNAMICS

KEY Dynamics can be assigned to 1 (or as many as 16) of the 30 Mod Destinations.

Before creating an assignment it is good practice to select an input source in the **Input Sources Menu** at the top of KEY DYNAMICS Tab. The effect of the modulation will depend on the source you select here (Keyboard, Velocity or Modwheel).

To assign a Mod Source to be **KEYBOARD (Keyboard Envelope)**, click on any one of the 16 Mod Source drop-down menus at the TOP of the column and select **KEYBOARD (Keyboard Envelope)**.

To adjust the amount to be sent to the DESTINATION, click and drag the slider of the Partial or group of Partials.

To assign the **KEYBOARD (Keyboard Envelope)** to a **MOD DESTINATION**, click on any one of the 16 Mod destination drop-down menus at the bottom of the column and select any of 30 Mod Destinations.

6.5.1.9. Parallel Modulation Routings

The last four Modulation sources are unusual in that they can be assigned on a per-Partial basis but also in parallel mode. When choosing SELF as a modulation option Synclavier V2 will automatically create in-Partial modulation routings.

To take the Harmonic envelope as an example:

You can choose the Harmonic Envelope of the second Partial and select SELF as modulation option. This creates a parallel modulation link between all Partials:

- Select Harmonic Envelope as the modulation source and select SELF in the menu strip
- Select FM amount as the destination

Synclavier V2 will now automatically create parallel modulating routings for all Partials:

- The Harmonic Envelope of Partial 1 modulates the FM amount of Partial 1
- The Harmonic Envelope of Partial 2 modulates the FM amount of Partial 2
- The Harmonic Envelope of Partial 3 modulates the FM amount of Partial 3

Another way to create parallel routings is to select a Partial as modulation source:

- Select Harmonic Envelope as the modulation source and select 4 in the menu strip and FM amount as the destination.

In this situation, the harmonic envelope of partial 4 controls all partial FM amounts :

- The Harmonic Envelope of Partial 4 modulates the FM amount of Partial 1
- The Harmonic Envelope of Partial 4 modulates the FM amount of Partial 2
- The Harmonic Envelope of Partial 4 modulates the FM amount of Partial 3 and so on...

Etc..

This parallel modulation option is available for Vibrato LFO, Stereo LFO, AMP Envelope and Harmonic Envelope.

VIBRATO LFO

VIBRATO LFO can be assigned to 1 (or as many as 16) of the 30 Mod Destinations.

To assign **VIBRATO LFO** to be a Mod Source, click on any one of the 16 Mod Source drop-down menus at the TOP of the column and select **VIBRATO LFO**.

To adjust the amount to be sent to the DESTINATION, click and drag the slider of the Partial or group of Partials.

To assign **VIBRATO LFO** to a **MOD DESTINATION**, click on any one of the 16 Mod destination drop-down menus at the bottom of the column and select any of 30 Mod Destinations.

If you want to apply Vibrato LFO modulation to several destinations, create parallel modulation routings as explained in the [Parallel Modulation Routings \[p.109\]](#) section.

STEREO LFO

STEREO LFO can be assigned to 1 (or as many as 16) of the 30 Mod Destinations.

To assign a Mod Source to be **STEREO LFO**, click on any one of the 16 Mod Source drop-down menus at the TOP of the column and select **STEREO LFO**.

To adjust the amount to be sent to the DESTINATION, click and drag the slider of the Partial or group of Partials.

To assign **STEREO LFO** to a **MOD DESTINATION**, click on any one of the 16 Mod destination drop-down menus at the bottom of the column and select any of 30 Mod Destinations.

If you want to apply Stereo LFO modulation to several destinations, create parallel modulation routings as explained in the [Parallel Modulation Routings \[p.109\]](#) section.

AMP ENVELOPE (Amplitude Envelope)

AMP ENVELOPE can be assigned to 1 (or as many as 16) of the 30 Mod Destinations.

To assign the **AMP ENVELOPE** to be a Mod Source, click on any one of the 16 Mod Source drop-down menus at the TOP of the column and select **AMP ENVELOPE**.

To adjust the amount to be sent to the DESTINATION, click and drag the slider of the Partial or group of Partials.

To assign **AMP ENVELOPE** to a **MOD DESTINATION**, click on any one of the 16 Mod destination drop-down menus at the bottom of the column and select any of 30 Mod Destinations.

If you want to apply AMP Envelope modulation to several destinations, create parallel modulation routings as explained in the [Parallel Modulation Routings \[p.109\]](#) section.

HARM ENVELOPE (Harmonic Envelope)

HARM ENVELOPE can be assigned to 1 (or as many as 16) of the 30 Mod Destinations.

To assign the **HARM ENVELOPE** to be a Mod Source, click on any one of the 16 Mod Source drop-down menus at the TOP of the column and select **HARM ENVELOPE**.

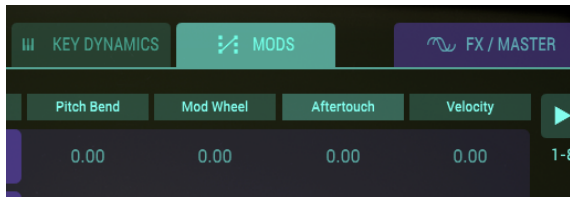
To adjust the amount to be sent to the DESTINATION, click and drag the slider of the Partial or group of Partials.

To assign **HARM ENVELOPE** to a **MOD DESTINATION**, click on any one of the 16 Mod destination drop-down menus at the bottom of the column and select any of 30 Mod Destinations.

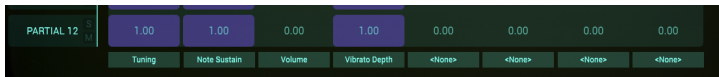
If you want to apply Harmonic Envelope modulation to several destinations, create parallel modulation routings as explained in the [Parallel Modulation Routings \[p.109\]](#) section

6.5.2. Modulation Destinations

The MODS (Destinations) section provides extensive destination modulator routings not available in **Standard Panel** or **Extended Panel Modes**. Routings are assignable to the selected Partial or group of Partials.



MODS TAB



MODS Controls

Below the MODS Tab at the bottom of a series of columns are 16 drop-down menus in two groups, **1-8** and **9-16**. To select between **1-8** or **9-16** there is a **green arrow** at the far top right of the screen.

There are 30 MOD DESTINATIONS.



MODS Destinations

6.5.2.1. Volume

VOLUME is the overall loudness of the Partial or group of Partials selected.

To assign a **MOD DESTINATION** to the **VOLUME** of a Partial or group of Partials, click on any one of the 16 Mod destination drop-down menus at the bottom of the column and select **VOLUME**.

To adjust the amount to be sent to that DESTINATION, click and drag the slider of the Partial or group of Partials.

6.5.2.2. Pan

PAN moves the stereo position of the selected Partial or group of Partials to the left or right.

To assign a **MOD DESTINATION** to the **PAN** position of a Partial or group of Partials, click on any one of the 16 Mod destination drop-down menus at the bottom of the column and select **PAN**.

To adjust the amount to be sent to that DESTINATION, click and drag the slider of the Partial or group of Partials.

6.5.2.3. Tuning

TUNING fine-tunes the pitch of selected Partial or group of Partials up or down in individual **Cents** (100ths of a semitone).

To assign a **MOD DESTINATION** to the **TUNING** of a Partial or group of Partials, click on any one of the 16 Mod destination drop-down menus at the bottom of the column and select **TUNING**.

To adjust the amount to be sent to that DESTINATION, click and drag the slider of the Partial or group of Partials.

6.5.2.4. Chorus

CHORUS creates a duplicate voice with a different pitch than the selected Partial or group of Partials.

To assign a **MOD DESTINATION** to the **CHORUS** setting of a Partial or group of Partials, click on any one of the 16 Mod destination drop-down menus at the bottom of the column and select **CHORUS**.

To adjust the amount to be sent to that DESTINATION, click and drag the slider of the Partial or group of Partials.

6.5.2.5. FM Ratio

FM Ratio controls the ratio of the FM Modulator frequency to the FM Carrier frequency for the selected Partial or group of Partials. There must be a **CARRIER** wave AND a **MODULATOR** wave assigned to a Partial on the ENGINE Tab in **Graphic Screen Mode** for this control to have any effect on the Partial.

To assign a **MOD DESTINATION** to the **FM RATIO** of a Partial or group of Partials, click on any one of the 16 Mod destination drop-down menus at the bottom of the column and select **FM RATIO**.

To adjust the amount to be sent to that DESTINATION, click and drag the slider of the Partial or group of Partials.

6.5.2.6. FM Amount

FM AMOUNT controls the overall amount of FM modulation for the selected Partial or group of Partials. There must be a **CARRIER** wave AND a **MODULATOR** wave assigned to a Partial on the ENGINE Tab in **Graphic Screen Mode** for this control to have any effect on the timbre.

To assign a **MOD DESTINATION** to the **FM AMOUNT** of a Partial or group of Partials, click on any one of the 16 Mod destination drop-down menus at the bottom of the column and select **FM AMOUNT**.

To adjust the amount to be sent to that DESTINATION, click and drag the slider of the Partial or group of Partials.

6.5.2.7. Frame Speed

FRAME SPEED increases or decreases the overall time that Frames crossfade into one another for the selected Partial or group of Partials.

To assign a **MOD DESTINATION** to the **FRAME SPEED** of a Partial or group of Partials, click on any one of the 16 Mod destination drop-down menus at the bottom of the column and select **FRAME SPEED**.

To adjust the amount to be sent to that DESTINATION, click and drag the slider of the Partial or group of Partials.

6.5.2.8. Frame Tuning

FRAME TUNING increases or decreases the overall Pitch offset for the **Timbre Slice** Frames of the selected Partial or group of Partials.

To assign a **MOD DESTINATION** to the **FRAME TUNING** of a Partial or group of Partials, click on any one of the 16 Mod destination drop-down menus at the bottom of the column and select **FRAME TUNING**.

To adjust the amount to be sent to that DESTINATION, click and drag the slider of the Partial or group of Partials.

6.5.2.9. Portamento Rate

PORTAMENTO is a global parameter affecting all Partials in the current Timbre. It makes the pitch "glide" between the notes you play, rather than changing the pitch instantly as soon as you hit another key or keys on your keyboard. The effect works on Polyphonic or Monophonic Timbres.

PORTAMENTO RATE controls the speed at which the sound glides from one pitch to the next.

To assign a **MOD DESTINATION** to the **PORTAMENTO RATE** of a Partial or group of Partials, click on any one of the 16 Mod destination drop-down menus at the bottom of the column and select **PORTAMENTO RATE**.

To adjust the amount to be sent to that DESTINATION, click and drag the slider of the Partial or group of Partials.

6.5.2.10. Repeat/Arp Rate (Repeat/Arpeggiate)

REPEAT/ARP RATE is a global parameter affecting all Partials in the current Timbre. **REPEAT/ARP RATE** determines the speed of your repeating notes or arpeggios.

To assign a **MOD DESTINATION** to the **REPEAT/ARP RATE** of a Partial or group of Partials, click on any one of the 16 Mod destination drop-down menus at the bottom of the column and select **REPEAT/ARP RATE**.

To adjust the amount to be sent to that **DESTINATION**, click and drag the slider of the Partial or group of Partials.

6.5.2.11. Note Sustain

NOTE SUSTAIN holds the MIDI Note-on event ON for the selected Partial or group of Partials.

To assign a **MOD DESTINATION** to the **NOTE SUSTAIN** of a Partial or group of Partials, click on any one of the 16 Mod destination drop-down menus at the bottom of the column and select **NOTE SUSTAIN**.

(The most common Mod Source for this destination would be **SUSTAIN PEDAL**.)

Click/dragging the slider of the Partial or group of Partials right to the positive side will set the **NOTE SUSTAIN ON**.

6.5.2.12. Stereo: Rate

STEREO: RATE determines the speed of your Stereo panning effects and Tremolo non-panning effects for the selected Partial or group of Partials.

To assign a **MOD DESTINATION** to the **STEREO: RATE** of a Partial or group of Partials, click on any one of the 16 Mod destination drop-down menus at the bottom of the column and select **STEREO: RATE**.

To adjust the amount to be sent to that **DESTINATION**, click and drag the slider of the Partial or group of Partials.

6.5.2.13. Stereo: Depth

STEREO: DEPTH controls the width of the **Stereo** panning effects or the depth of the Tremolo effects.

To assign a **MOD DESTINATION** to the **STEREO: DEPTH** of a Partial or group of Partials, click on any one of the 16 Mod destination drop-down menus at the bottom of the column and select **STEREO: DEPTH**.

To adjust the amount to be sent to that **DESTINATION**, click and drag the slider of the Partial or group of Partials.

6.5.2.14. Stereo: Attack

STEREO: ATTACK adjusts the amount of delay before the **Stereo** effect begins after the note-on.

To assign a **MOD DESTINATION** to the **STEREO: ATTACK** of a Partial or group of Partials, click on any one of the 16 Mod destination drop-down menus at the bottom of the column and select **STEREO: ATTACK**.

To adjust the amount to be sent to that DESTINATION, click and drag the slider of the Partial or group of Partials.

6.5.2.15. Stereo: Phase

STEREO: PHASE defaults to 180°, which allows full Left/Right Stereo panning effects. Turning the knob full down to 0° or full up to 360° will allow Tremolo effects (Amplitude Modulation) with NO Left/Right Stereo Panning.

Other settings between 0° and 360° will cause varying degrees of Left/Right panning depth.

To assign a **MOD DESTINATION** to the **STEREO: PHASE** of a Partial or group of Partials, click on any one of the 16 Mod destination drop-down menus at the bottom of the column and select **STEREO: PHASE**.

To adjust the amount to be sent to that DESTINATION, click and drag the slider of the Partial or group of Partials.

6.5.2.16. Vibrato: Rate

VIBRATO: RATE determines the speed of your **Modulator**. The **Rate** is in Hz (Hertz, or cycles per second). The range is 0.00Hz to 50.0Hz.

To assign a **MOD DESTINATION** to the **VIBRATO: RATE** of a Partial or group of Partials, click on any one of the 16 Mod destination drop-down menus at the bottom of the column and select **VIBRATO: RATE**.

To adjust the amount to be sent to that DESTINATION, click and drag the slider of the Partial or group of Partials.

6.5.2.17. Vibrato: Depth

VIBRATO: DEPTH controls the level of the **Carrier** creating Vibrato. The pitch fluctuates equally above and below the pitch of the key played. The range is 0 semitones to 25 semitones.

To assign a **MOD DESTINATION** to the **VIBRATO: DEPTH** of a Partial or group of Partials, click on any one of the 16 Mod destination drop-down menus at the bottom of the column and select **VIBRATO: DEPTH**.

To adjust the amount to be sent to that DESTINATION, click and drag the slider of the Partial or group of Partials.

6.5.2.18. Vibrato: Attack

VIBRATO: ATTACK adjusts the amount of delay before the **Vibrato** effect begins after the note-on. The range is 0 ms (milliseconds) to 30 seconds.

To assign a **MOD DESTINATION** to the **VIBRATO: ATTACK** of a Partial or group of Partials, click on any one of the 16 Mod destination drop-down menus at the bottom of the column and select **VIBRATO: ATTACK**.

To adjust the amount to be sent to that **DESTINATION**, click and drag the slider of the Partial or group of Partials.

6.5.2.19. Harmonic: Delay

HARMONIC: DELAY increases the time for the selected Partial or group of Partials' **FM** (Frequency Modulator) to be heard after the initial note-on. The default value is 0 ms (milliseconds), and the range is 0 ms to 30.00 s (seconds) in 1-millisecond increments.

To assign a **MOD DESTINATION** to the **HARMONIC: DELAY** of a Partial or group of Partials, click on any one of the 16 Mod destination drop-down menus at the bottom of the column and select **HARMONIC: DELAY**.

To adjust the amount to be sent to that **DESTINATION**, click and drag the slider of the Partial or group of Partials.

6.5.2.20. Harmonic: Attack

HARMONIC: ATTACK adjusts how fast or slow the **FM** (Frequency Modulator) ramps UP the volume of the selected Partial or group of Partials from the note-on to the **Peak** setting. The default is a value of 3 ms (milliseconds), and the range is 0 ms to 30.00 s (seconds).

To assign a **MOD DESTINATION** to the **HARMONIC: ATTACK** of a Partial or group of Partials, click on any one of the 16 Mod destination drop-down menus at the bottom of the column and select **HARMONIC: ATTACK**.

To adjust the amount to be sent to that **DESTINATION**, click and drag the slider of the Partial or group of Partials.

6.5.2.21. Harmonic: Decay

HARMONIC: DECAY adjusts how fast or slow the **FM** (Frequency Modulator) ramps DOWN in volume from the **Peak** setting to the **Sustain** level setting of the selected Partial or group of Partials. The default is a value of 3 ms (milliseconds) and the time range is from 0 ms to 30.00 s (seconds).

To assign a **MOD DESTINATION** to the **HARMONIC: DECAY** of a Partial or group of Partials, click on any one of the 16 Mod destination drop-down menus at the bottom of the column and select **HARMONIC: DECAY**.

To adjust the amount to be sent to that **DESTINATION**, click and drag the slider of the Partial or group of Partials.

6.5.2.22. Harmonic: Sustain

HARMONIC: SUSTAIN adjusts the **FM** (Frequency Modulator) level of the selected Partial or group of Partials after the **Decay** part of the envelope. The level ranges from 0.00 to 100.0.

To assign a **MOD DESTINATION** to the **HARMONIC: SUSTAIN** of a Partial or group of Partials, click on any one of the 16 Mod destination drop-down menus at the bottom of the column and select **HARMONIC: SUSTAIN**.

To adjust the amount to be sent to that **DESTINATION**, click and drag the slider of the Partial or group of Partials.

6.5.2.23. Harmonic: Release

HARMONIC: RELEASE adjusts the final decay time of the **FM** (Frequency Modulator) after the note-off (key release) for the selected Partial or group of Partials. The time range is from 0 ms (milliseconds) to 30.00 s (seconds).

To assign a **MOD DESTINATION** to the **HARMONIC: RELEASE** of a Partial or group of Partials, click on any one of the 16 Mod destination drop-down menus at the bottom of the column and select **HARMONIC: RELEASE**.

To adjust the amount to be sent to that **DESTINATION**, click and drag the slider of the Partial or group of Partials.

6.5.2.24. Harmonic: Peak

HARMONIC: PEAK adjusts the next level point in the **FM** (Frequency Modulator) after the initial **Attack** of the selected Partial or group of Partials. The level ranges from 0.00 to 100.0.

To assign a **MOD DESTINATION** to the **HARMONIC: PEAK** of a Partial or group of Partials, click on any one of the 16 Mod destination drop-down menus at the bottom of the column and select **HARMONIC: PEAK**.

To adjust the amount to be sent to that **DESTINATION**, click and drag the slider of the Partial or group of Partials.

6.5.2.25. Amplitude: Delay

AMPLITUDE: DELAY increases the time for the selected Partial or group of Partials to be heard after the initial note-on. The default value is 0 msec (milliseconds), and the range is 0 MSec to 30.0 Secs (seconds) in 1-millisecond increments.

To assign a **MOD DESTINATION** to the **AMPLITUDE: DELAY** of a Partial or group of Partials, click on any one of the 16 Mod destination drop-down menus at the bottom of the column and select **AMPLITUDE: DELAY**.

To adjust the amount to be sent to that **DESTINATION**, click and drag the slider of the Partial or group of Partials.

6.5.2.26. Amplitude: Attack

AMPLITUDE: ATTACK adjusts how fast or slow the Timbre/Sound ramps UP in volume from the note-on to the **Peak** setting for the selected Partial or group of Partials. The default is a value of 3 ms (milliseconds), and the range is 0 ms to 30.00 s (seconds).

To assign a **MOD DESTINATION** to the **AMPLITUDE: ATTACK** of a Partial or group of Partials, click on any one of the 16 Mod destination drop-down menus at the bottom of the column and select **AMPLITUDE: ATTACK**.

To adjust the amount to be sent to that DESTINATION, click and drag the slider of the Partial or group of Partials.

6.5.2.27. Amplitude: Decay

AMPLITUDE: DECAY adjusts how fast or slow the Timbre/Sound ramps DOWN in volume from the **Peak** setting to the **Sustain** level setting of the selected Partial or group of Partials. The default is a value of 3 ms (milliseconds) and the time range is from 0 ms to 30.00 s (seconds).

To assign a **MOD DESTINATION** to the **AMPLITUDE: DECAY** of a Partial or group of Partials, click on any one of the 16 Mod destination drop-down menus at the bottom of the column and select **AMPLITUDE: DECAY**.

To adjust the amount to be sent to that DESTINATION, click and drag the slider of the Partial or group of Partials.

6.5.2.28. Amplitude: Sustain

AMPLITUDE: SUSTAIN adjusts the sound volume level after the **Decay** part of the envelope. The level ranges from 0.00 to 100.0.

To assign a **MOD DESTINATION** to the **AMPLITUDE: SUSTAIN** of a Partial or group of Partials, click on any one of the 16 Mod destination drop-down menus at the bottom of the column and select **AMPLITUDE: SUSTAIN**.

To adjust the amount to be sent to that DESTINATION, click and drag the slider of the Partial or group of Partials.

6.5.2.29. Amplitude: Release

AMPLITUDE: RELEASE adjusts the final decay time after the note-off (key release) for the selected Partial or group of Partials. The time range is from 0 ms (milliseconds) to 30.00 s (seconds)

To assign a **MOD DESTINATION** to the **AMPLITUDE: RELEASE** of a Partial or group of Partials, click on any one of the 16 Mod destination drop-down menus at the bottom of the column and select **AMPLITUDE: RELEASE**.

To adjust the amount to be sent to that DESTINATION, click and drag the slider of the Partial or group of Partials.

6.5.2.30. Amplitude: Peak

AMPLITUDE: PEAK adjusts the next volume level point in the Timbre/Sound after the initial **Attack** of the selected Partial or group of Partials. The level ranges from 0.00 to 100.0.

To assign a **MOD DESTINATION** to the **AMPLITUDE: PEAK** of a Partial or group of Partials, click on any one of the 16 Mod destination drop-down menus at the bottom of the column and select **AMPLITUDE: PEAK**.

To adjust the amount to be sent to that DESTINATION, click and drag the slider of the Partial or group of Partials.

6.5.3. Chained editing and the MODS Tab

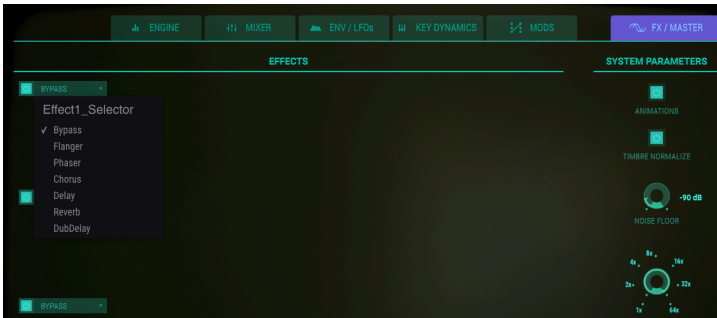
In the MODS Tab chained editing is a great time saver as it enables you to experiment with different modulation settings. Select any Partial as the primary Partial, hold **[Cmd]** (MacOS) or **[Alt]** (Windows) to select some secondary Partials in which you want to change the modulation settings. All modulations changes you make in the primary envelope will be copied instantaneously to the secondary Partials. This is true for both the modulation settings on the first page (1-8) and on the second page (9-16).

6.6. FX/MASTER

The last Tab of the Graphic Panel Screen gives you access to the effects and the global system parameters such as timbre noise floor, oversampling and bit depth. Also, it allows you to define a number of pitch-related parameters.

6.6.1. FX (Effects)

The purple **FX / MASTER Tab** is located at the top right side of the **Graphic Screen Mode**. The **FX** section contains three channels with six different **FX** each, and all three channels are simultaneously available. These are **Global** effects for the current Timbre (all Partials affected) and their parameters are not available in the **Standard Panel** or **Extended Panel Modes**. **FX** can be saved with the Timbre/Sound.



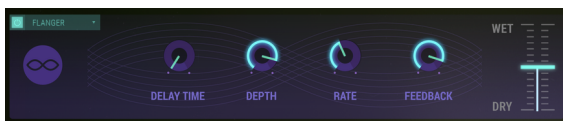
FX TAB

The three channels of **FX** are located on the left side of the **FX** screen. Each channel has an on/off button with the default selection as ON, but in **BYPASS** mode (no effect). To select an **FX** type, click on the drop-down menu just to the right of the ON/OFF button.

6.6.1.1. Flanger

The **Flanger** effect works by mixing two identical signals, with one signal delayed by a small and gradually changing time period. This produces a swept "comb filter" effect. The controls are:

- **DELAY TIME** Sets the amount of time offset applied to the affected signal
- **DEPTH** Sets modulation amount
- **RATE** Sets modulation speed
- **FEEDBACK** Sets positive or negative resonance
- **WET/DRY Mix** Sets how much effect is added to the input signal



Flanger

6.6.1.2. Phaser

The **Phaser** effect is the psychedelic swooshing sound that became popular in the 1960s and 70s, and it adds a sense of movement and swirling to your music. The effect filters your audio signal by creating a series of peaks and troughs in the frequency spectrum, which are then modulated over time.

There are two stages for the effect. The controls for each STAGE are:

- **SINE/NOISE** Sets modulation waveform
- **RATE** Sets the speed of the sweep
- **FEEDBACK** Sets the phaser resonance
- **DEPTH** Sets the amount/richness of the effect
- **SYNC** links the rate of the sweep to the DAW speed
- **DUAL MODE** splits the phaser into two separate phasers
- **WET/DRY Mix** Sets how much effect is added to the input signal

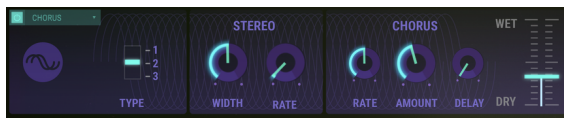


Phaser

6.6.1.3. Chorus

The **Chorus** effect works by adding a second voice to the signal and modulating the timing of that voice. The result is a harmonically richer sound that adds a sense of movement. The controls are:

- **TYPE** Switch selects 1 of 3 chorus types
- **STEREO WIDTH** Sets spread of the stereo field
- **STEREO RATE** Sets speed of stereo panning
- **CHORUS RATE** Sets modulation rate
- **CHORUS AMOUNT** Sets depth of the effect
- **DELAY** Sets amount of time offset applied to the affected signal
- **WET/DRY Mix** Sets how much effect is added to the input signal



Chorus

6.6.1.4. Delay

The **Delay** effect creates an exact duplicate echo or repeating echo of the original Timbre/Sound. The controls are:

- **SYNC** links the delay time to the DAW speed
- **DELAY TIME** (Channel 1/Left) Sets time to the first echo
- **DELAY TIME** (Channel 2/Right) Sets time to the first echo
- **LINK** links the settings of the two delay lines
- **FEEDBACK** (Channel 1/Left) Sets amount of repeating echoes
- **FEEDBACK** (Channel 2/Right) Sets amount of repeating echoes
- **PING PONG** Sets alternating stereo repeats
- **DAMPING** (Decaying filter) : Control the decay slope of stereo repeats
- **WET/DRY Mix** Sets how much effect is added to the input signal

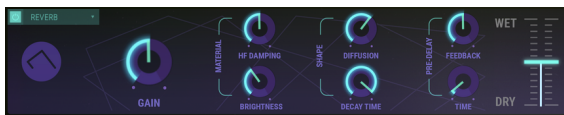


Delay

6.6.1.5. Reverb

The **Reverb** effect is the persistence of a sound after its source has stopped, caused by multiple reflections (echoes) of the sound within a closed space. The controls are:

- **GAIN (input level)** Sets the volume of the source Timbre/Sound
- **MATERIAL** mimics the effect of reflection areas
- **HF DAMPING** Sets the amount of high-frequency reduction of reverb
- **BRIGHTNESS** Sets high-frequency level of reverb
- **SHAPE** defines the way echoes spread in a space
- **DIFFUSION** Sets density of reflections
- **DECAY TIME** Sets the time for reverb tail to reach 0 (zero) gain
- **PRE-DELAY** sets the onset time for the first reflections to start
- **FEEDBACK** Sets positive and negative resonance
- **TIME** Sets time offset before reverb begins after the input signal
- **WET/DRY Mix Slider** Sets how much effect is added to the input signal

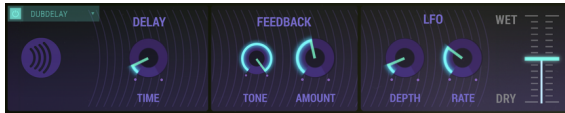


Reverb

6.6.1.6. Dub Delay

The **Dub Delay** effect, a model of an Analog Delay, creates an echo or repeating echo of the original Timbre/Sound. The sound of this effect is closer to the sound of a tape echo than a Digital Delay, and the fidelity decays gradually with each repeat. The controls are:

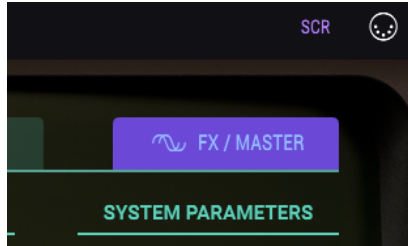
- **DELAY TIME** Sets time to the first echo
- **FEEDBACK TONE** Sets high frequency reduction for repeats
- **FEEDBACK AMOUNT** Sets number of echo repeats
- **LFO DEPTH** Sets amount of pitch modulation of the echoes
- **LFO RATE** Sets speed of pitch modulation of the echoes
- **WET/DRY Mix Slider** Sets how much effect is added to the input signal



Dub Delay

6.6.2. System Parameters

SETTINGS are **Global** for the current Timbre (all Partials affected) and are not available in the **Standard Panel** or **Extended Panel Modes**. They are saved when saving a user preset.



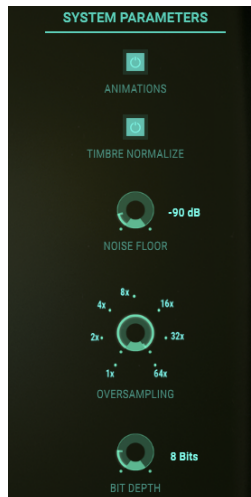
FX/MASTER TAB

6.6.2.1. Animations

The **ANIMATIONS** button turns ON/OFF the animation effect while switching between **Standard Panel Mode**, **Extended Panel Mode** and **Graphic Screen Mode**. The default is setting is ON.

6.6.2.2. Timbre normalize

The **TIMBRE NORMALIZE** button is located in the SYSTEM PARAMETERS section under the FX/MASTER Tab and adjusts the current Timbre to avoid clipping as new Partial Timbres are added to the Timbre. When Timbre Normalize is ON, the volume of the Timbre is reduced if the sum of the Partials would produce a volume level higher than unity gain (0.0 dB). You may wish to turn off **TIMBRE NORMALIZE** for specific mixing applications.



System Parameters

6.6.2.3. Noise floor

The **NOISE FLOOR** knob is located in the SYSTEM PARAMETERS section under the **SETTINGS** Tab and increases or decreases the steady-state noise floor even when there is no Timbre/Sound being produced. This steady-state noise floor recreates the original Synclavier FM synthesiser hardware. It adds a lovely ambience to the sounds at the default level of -90dB. The noise setting can be set to levels from OFF to -20dB and is adjustable in 1dB increments.

For the technically inclined: The noise floor of Synclavier V is modelled as a filtered pink-noise source with a very low-level white-noise component. The left and right outputs are shaped independently as well.

6.6.2.4. Oversampling

OVERSAMPLING provides an additional level of interpolation between the waveform samples exactly like an oversampling D/A converter.

The **OVERSAMPLING** knob is located in the SYSTEM PARAMETERS section under the **SETTINGS** Tab and has range settings of 1X, 2X, 4X, 8X, 16X, 32X, and 64X oversampling. The default setting is 4X.

6.6.2.5. Bit depth

The **BIT DEPTH** knob is located in the SYSTEM PARAMETERS section under the **SETTINGS** Tab and controls the numerical precision that is used for the creation of digital audio. Small bit depths (such as 4 or 6 bits) produce an interesting distortion effect similar to a guitar effects processor. The original Synclavier FM hardware had an internal precision of 8 bits. Larger bit depths eliminate the quantisation distortion that is perceived in the smaller bit depths. The **BIT DEPTH** setting ranges from 4 to 24 bits in 2-bit increments. The **BIT DEPTH** is applied to all Timbres and Partial Timbres whose custom **BIT DEPTH** setting in **Standard Panel Mode** is "**Default**".

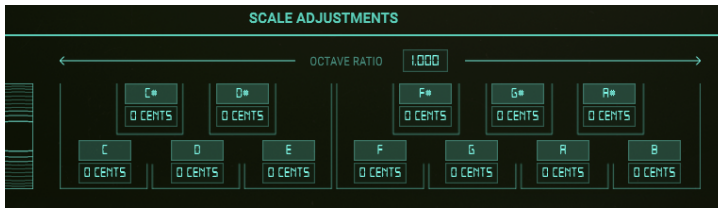
6.6.3. Pitch settings

6.6.3.1. Octave ratio

Typically a modern day keyboard produces pitches in a 12-semitone Western scale over a one-octave range. The **OCTAVE RATIO** knob is located in the SCALE ADJUSTMENT Section under the FX/MASTER Tab and controls the pitch spacing between keys of the keyboard.

- An **OCTAVE RATIO** of 1.000 provides the default 12-tone Western scale tuning.
- An **OCTAVE RATIO** of .500 provides quarter-tone steps for each half step on the keyboard. One octave on the keyboard now covers 1/2 (one half) of an octave.
- An **OCTAVE RATIO** of 2.000 provides whole-tone steps. One octave on the keyboard now covers two octaves.
- An **OCTAVE RATIO** of 3.000 provides three semitones (or minor third steps), so each half step of change on the keyboard outlines the intervals of a diminished chord. One octave on the keyboard now covers three octaves.
- An **OCTAVE RATIO** maximum of 4.000 provides four semitones (or major third steps), so each half step of change on the keyboard outlines the intervals of an augmented chord. One octave on the keyboard now covers four octaves.
- An **OCTAVE RATIO** minimum of 0.000 tunes each key to Middle A (A-440Hz).

Additional non-standard tunings are possible between whole number values in .100 step increments.



Scale Adjustments

6.6.3.2. Pitch bend range

The **PITCH BEND RANGE** sets the range that the Bend Wheel raises or lowers the pitch of your current Timbre. The default **Pitch bend Depth** is 2 semitones but can be increased or decreased, from 0 semitones to ± 25 semitones.

Pitch bend range is a global parameter that enables you to set upper and lower limits to the movements of the pitch wheel. It is expressed in halftones; if you set it to two the maximum upward pitch movement is a whole tone up or down. Setting it to twelve allows you to bend the pitch up or down twelve semi-tones, an octave.

The **Pitch Bend** controller slider under the MODS Tab in **Graphic Screen Mode** can also reduce the overall range of individual Partial in addition to **inverting** the pitch bend direction. This can give each Partial pitch bend a different semitone range and varying pitch directions.



6.6.4. Scale adjustments

The **SCALE TUNING** is located in the SCALE ADJUSTMENTS section under the **FX/MASTER** Tab. The **SCALE TUNING (FINE TUNE)** knobs (**C**, **C#**, **D**, **D#**, **E**, **F**, **F#**, **G**, **G#**, **A**, **A#**, and **B**) adjust the pitch of each note of the 12-tone scale independently, ± 125 cents above and below the default tuning. To **FINE TUNE** the pitch of a note, click on a **SCALE TUNING** knob and drag it up/down to increase or decrease the pitch. Double-clicking on the knob returns the function to its default value of **0 CENTS**.

The **KEY TRANSPOSE** function raises or lowers any key of the scale in single **semitone** steps. Click and drag up/down on any of the letters below the knobs to raise/lower the pitch of that key. Double-click the note name field to reset that key to its default value.

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