Strokes v3.13

www.congburn.co.uk/strokes

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Manual by Oli Warwick

Welcome to Strokes.

An all-in-one, cross-platform workstation for sequencing, sampling and synthesis.

The idea of this device
is to encourage free-
flow experimentation and
exploration of <u>rhythm</u>
and <u>modulation</u>.

The architecture behind Strokes is complex, but on the surface it's designed to be intuitive no matter what your experience level is. By setting up some sounds and turning the dials, anyone can create interesting and unique results. The sequencing and modulation are cross-patched, meaning the actions of one part impact on another - in this way, the Patterns all form part of the greater whole, moving in symbiosis to create cohesive results.

The first four Sequencer Channels can be set according to your wishes, while the other four behave in various ways according to those settings. Each Channel can be assigned one of 24 oscillators based on open-source code from a popular Eurorack module. Alternatively, they can each be assigned to samples of your choice with various sound design options, or the on-board sounds can be bypassed and you can use Strokes to control your own choice of hardware or software synths and drum machines.

There are probability options to add semi-random changes to the Sequencers, and on-board reverb and delay add effects processing to the sounds being generated. Various modulation options allow these sounds and effects to be changed in subtle or significant ways, always in response to the other rhythmic behaviour taking place in the Project.

Rather than relying on methodical programming of Patterns or computer-defined 'randomness', Strokes offers a way to create surprising music with an emphasis on fun. Nothing happens by accident, but you never quite know where a jam will take you. With the means to store Patterns and melodic information within a Project, one set up can produce different results every time.

Strokes can run as a VST3 or AU plug-in within all major DAW environments.

On iOS, Strokes can run as a standalone application or from within a host such as AUM.

■

OVERVIEW

The layout of Strokes may seem complicated to the uninitiated, so let's introduce exactly what you're looking at before we dive into each section in detail.

There are three main pages to the Strokes interface. Constant down the left hand side are the Pattern Select and Note Select - you can use these to store settings within a Project and recall them at any time during a jam. Stumble across a moment of magic and want to preserve it before heading further down the rabbit hole? That's what these are for. At the bottom, the small keyboard icon allows for MIDI note input from your preferred controller, for arpeggios and more.

The Sequencer page is where all the action takes place.

The top left section features four user-defined Sequencer Channels, where you set out your desired rhythmic Patterns and how they behave, in cyclical Euclidean or conventional Step mode style.

Beneath that is the Accent Channel, where you can define a Sequence to vary the velocity of the notes being triggered above and below. You can also apply swing, if that's your thing.

Next down is the Logic section, which offers another four Channels of sequencing generated in response to the Sequencer Patterns taking place in the first four Channels and the Accent Channel. The results are always different depending on what else is happening in the Project - a rich source of happy rhythmical accidents and, as our jams have shown us so far, great for hi-hats!

In the bottom right-hand corner is the Matrix - a grid of 16 dials which make up eight overlapping, analogue-style step Sequencers. Matrix can be connected to any of the sound parameters in Strokes, and the dials can be used to generate different values as the Sequences advance - what this means is that you can create melodic Patterns and shifts in sounds over time.

Next to the Matrix is the Scope - this shows you a graphic representation of the modulation taking place in your Project. Once you get used to how the modulation works in Strokes, this is useful for making more precise changes and tracking what is happening in the Project.

The Voice Modulation section allows you to assign the different parameters of each Voice on each Channel to the various modulation destinations. If you need the reverb send on your snare to go a little bit harder, this is where you can tweak it.

The four sliders dominate the Shares section - a probability device which is one of the most exciting parts of Strokes. Shares is different from most chance-based 'random' functions because it always responds to what's happening in the Project and changes accordingly.

Running down the right-hand side is the Weights section, made up of four envelope followers which form the other crucial means of modulation within Strokes. Each Sequencer Channel can be sent to these envelopes, and then the envelopes can be assigned to your parameters of choice.

Along the bottom, first you find the view selector which can switch between the Sequencer and Voices pages, two choices of split views and the Perform page. Next to that are the Import and Export options, where you can save and load your Project. Then there's a handy little information icon to bring ups dialog box featuring customisable tuning options, random settings generators for Matrix and Shares, demo Projects and links to external resources, such as the download link for Strokes' own set of custom sample kits.

Still with us? Good.

Now, let's look at the Voices page.

The bulk of the Voices page is split into eight identical boxes which form the sound sources for the eight Sequencer Channels.

In each Voice box you can select your source - either sampler, or one of the synth engines. Then you can alter your chosen sound in a variety of ways from Filtering to decay, reverb and delay and more besides. Each Voice box has a second page for more settings including melodic quantise.

Down the right hand side of the Voices page are the effects units - the ever-trusty Reverb and Delay. You can tweak the settings for these devices and send some of those settings out for modulation in the melee created by Matrix and Weights.

The Perform page is where you can work with Projects and Patterns with a view to creating a flowing live set. The core of the page is a crossfader section for blending between different Patterns from within one Project, and load in Patterns and Voices from another Project to allow smooth transitions when you want to take a performance in a different direction. You can blend individual Channels or a whole Project in one go.

There are three XY pads at the top of the page to adjust the modulation of the active Patterns. The left-hand side of the page gives you quick access to the melodic quantise settings for each Channel, which can be switched to a Sampler view if you want to quickly change sounds loaded into any Sampler engines you have loaded. Below that is the Matrix, available to tweak if you want to change the modulation values coming from the Matrix Sequencer.

On the right-hand side of the Perform page is a box which can switch between Effects, the modulation Scope or the Tuning settings for a Project. Below that, you can load up a different Project to weave into your performance, apply some compression and saturation with the Heat and Glue settings, adjust the Shares probability settings and the Weights offset amounts. This is a quick summary of all the controls available for you to rework your existing Patterns and Projects in an intuitive way, bringing an in-the-moment energy to a live set. ■

QUICK START WALKTHROUGH

Now you've seen the different parts of Strokes, let's have a go at getting some sound out of this thing.
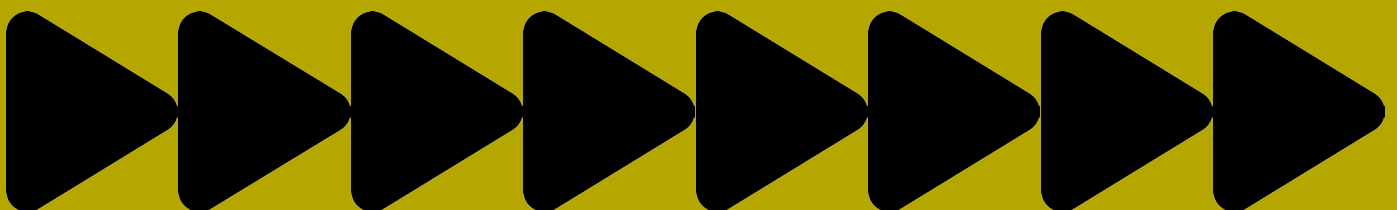
Before diving into the specific details of every parameter, Strokes is designed so you can play with it without needing to know exactly what is going on. This section of the manual assumes you've successfully loaded up Strokes on your platform of choice - for detailed guides to loading Strokes on different DAWs or standalone on iOS, please refer to the DAW part of the Appendix section at the back of the manual.

First off, hit play on your DAW (or on the Transport section in standalone) and head to the Strokes Sequencer page. On the first Sequencer Channel (top left), turn the fourth dial until some triggers start to appear on the Sequencer grid.

Now switch to the Voices page and select Analog from the drop down menu at the top of the CH-1 Voice box. You should start to hear a one-note bass tone pulsing out according to the rhythm you set in the Sequencer.

Next, set the root note for the Voice - this will be the lowest possible note the Voice can play. It makes sense to have this set at the default of C1. Then, on the far left look for CH-1 underneath the Note Select section and set your desired pitch.

Now have a play around with the Voice parameters - the Square and Saw synth settings will alter the tone in a noticeable way. On the amplitude envelope, perhaps you'd like to add a longer release on the end of the note. On the Filter section, try bringing down the Frequency and ramp up the Resonance for an acidic impulse. Set the Reverb and Delay percentages to your liking.

The Freq slider will control how much modulation is applied to the Voice's Frequency parameter. Keep it where it is and now head to the Sequencer page. Look at the Weights section and you'll see that CH-1's Weights A dial is set just before 3 o'clock. Head down to the Weights A Channel and turn the second from bottom dial - the Offset - anti-clockwise. You'll hear the frequency of your synth tone sweeping down in a satisfying fashion.

It's time to add some variation to this one-note melody. On the Voices page, click the A/B toggle just to the right of the CH-1 Voice drop-down menu and you'll see the little keyboard. As well as highlighting the current note in blue, you can use this to determine which other notes can be played. Click the keys you don't want to hear once we start modulating the pitch of the Sequence.

Now flip back to the Sequencer page. In the Voice Modulation section, you'll see we're looking at the CH-1 settings. The default setting for the top option is From: Matrix-1 to Pitch. Turn the Amt up to any number - 1.00 will give a one octave range. Head to the Matrix and turn some of the dials from the top two rows. You should start to hear some much-needed note variations in your Sequence.

How about making a dramatic key change next? Go back to the Note Select section on the far left and switch from Note 1 to Note 2. Now change the note setting for CH-1 from your original note to a new one. Click back and forth between Notes 1 and enjoy the alternating melodies.

Now head to the Pattern Select on the far left and choose Pattern B. Go and adjust some more settings - maybe add some more triggers to your Sequence, tweak the Weights A Offset, change the melody with the Matrix Sequencer, turn the Amt up to 1.00 for Detune in the Voice Modulation - the choice is yours. Switch between Patterns A and B and you'll get an idea for how you can progress different parts of a jam within Strokes. That's just a basic start - now add sounds to some more Channels and explore further.■

STROKES

IN FOCUS

Now we've worked out how to get some sound out of Strokes, it's time to look at each part in detail and understand how everything works.

First up, it's the Sequencers.

RHYTHMIC SEQUENCING

The four user-defined Sequencers at the
top left of Strokes are identical. Each one
can be set to Euclidean or Step mode.

In Euclidean mode, you simply dial in how
many strokes (note events) you would like
and they will be spread as evenly as possible
across the length of the Sequence.

In the Step mode, you can manually enter in strokes
wherever you want them in a classic x0x style.

The behaviour of each Sequencer Channel is
controlled by four dials, which are (from left to right):
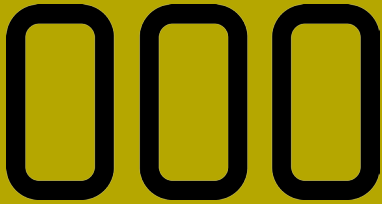
Length - determines how many steps will be in the Sequence.
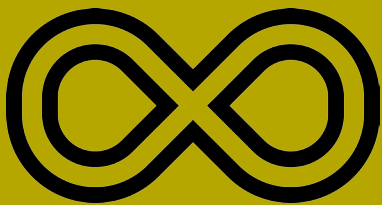
Loop - determines how many of the steps in the Sequence will be passed over by the play head before going back to the beginning.
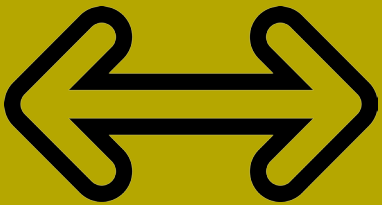
Shift - determines where the start point of the Sequence will be.

Strokes - in Euclidean mode, this determines how many strokes will occur in the Sequence.*

*This feature is disabled in Step

mode as you can choose your steps directly on the Sequence grid. Instead, Step mode offers a [+] button which functions like an MPC pad, allowing you to tap strokes into a moving Sequence live.

CH-1	Euclid	Step				>>	1/16	C2	INV
16	16	0	0			<<	1/8	C1	
						><	1/4	C0	ON

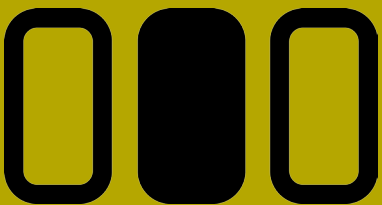| CH-2 | Euclid | Step | | | | >> | 1/16 | C2 | INV |
| 16 | 18 | 2 | 4 | | | << | 1/8 | C1 | |
| | | | | | | >< | 1/4 | C0 | ON |

CH-3	Euclid	Step				>>	1/16	D2	INV
16	11	3	4			<<	1/8	D1	
						><	1/4	D0	ON

CH-4	Euclid	Step				>>	1/16	D#2	INV
16	16	0	+			<<	1/8	D#1	
						><	1/4	D#0	ON

The Grid Display then shows you what is happening in that Sequence - how many steps, the location of the strokes and the movement of the Sequence. In Step mode, this is where you enter in your strokes.

After the grid display you can determine the direction of the Sequence to either run forwards (>>), backwards (<<) or palindromically (><). Next you can set the Clock Rate, which will advance the Sequence in 1/16th, 1/8th or 1/4th notes. Once you have a tangle of Channels running different Patterns, you'll be surprised at the impact switching these movements and rates will have on the whole jam.

Next you can shift the current root note of the Sequence up or down an Octave, which can be handy for a quick on-the-fly variation that doesn't derail the rhythmic behaviour of the jam.

Finally, each Sequencer Channel has INV and ON/OFF buttons.

INV inverts the entire Sequence, meaning all active steps become muted and vice versa. This can be a fun way to make a sparse Pattern very busy for a moment before taking the jam in a different direction, or quickly stripping back a hectic Sequence.

The ON/OFF toggle mutes and unmutes your Sequence, which is useful when recording a session and bringing parts in and out of the mix. When you've built up eight Channels of madness, it can sound really good to drop half of them out and focus on just a few of the sounds.

ACCENT CHANNEL

Beneath the four Sequencer Channels, the Accent Channel has a very similar set up and allows you to add velocity variations to your Sequences.

The Accent Channel can also be set to Euclidean or Step mode, and the same Length, Loop, Shift and Strokes dials determine the behaviour of the Accent Sequence. Where there is no stroke in a Sequence step, note events on other Channels playing at the same time will trigger at a low velocity. When there is a stroke, all other note events will trigger at a high velocity. The Grid Display behaves in exactly the same way as the four Sequencer Channels.

The Accent Channel also features a Sync button, which resets all of Strokes' Sequencer Patterns to 0. This is useful when you start adjusting Sequence and loop lengths mid-jam, especially when moving away from conventional multiples of four beats / four bars, and want the Sequences to all start moving again from the same starting point.
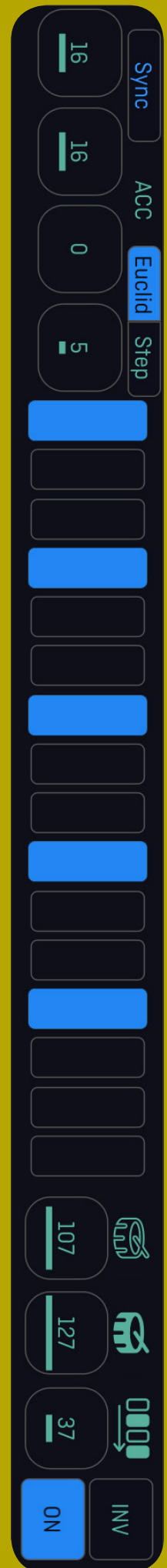
After the grid display, the Accent Channel features the controls for your velocities.

Moving left to right, the dark drum is where you set the level for your Low Velocity, while the light drum is where you set the High Velocity.

Try experimenting with dropping the low velocity all the way down to 0 and setting a few Accent strokes - notes in your other Sequencer Channels will now only trigger when an Accent note does. Additionally, there is a third setting for Swing which ranges from 0 to 100, depending on how funky you want your Sequence to get.
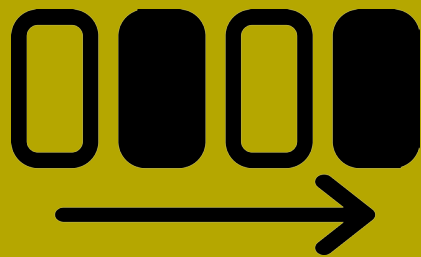
The Accent Channel also features INV and ON/OFF buttons which behave in the same way as the Sequencer Channels. When the Accent Channel is OFF, all notes on other Sequencer Channels trigger at the Low Velocity value.■

LOW VELOCITY

HIGH VELOCITY

SWING

LOGIC SEQUENCING

Sequencer Channels 5 to 8 are very different from Channels 1 to 4 - their behaviour is not controlled by direct user input. Instead, they use one of eight different logic modes to determine their 1/16 note triggers based on what else is happening in Channels 1 to 4. Essentially, there is a whole tangle of inputs, outputs and logic functions being repatched in the background behind these Channels which can produce wildly different results, and lucky for you, all this complexity has been boiled down to a single dial with eight settings.

The four dials in the Logic section correspond L-R to Channels 5 to 8, and each can be set from 1-8 for the desired logic mode. If you'd like to understand the exact behaviour of each mode, you can refer to the appendix section at the back of the manual, but for most users it works just as well to listen to the results and turn the dial until you find a rhythm you like. The results will be different all the time depending on the rest of the Project, but you can use the INV button and the Shares section to tweak how often the Sequencer fires if you want to exercise a little more control over the generated rhythms.
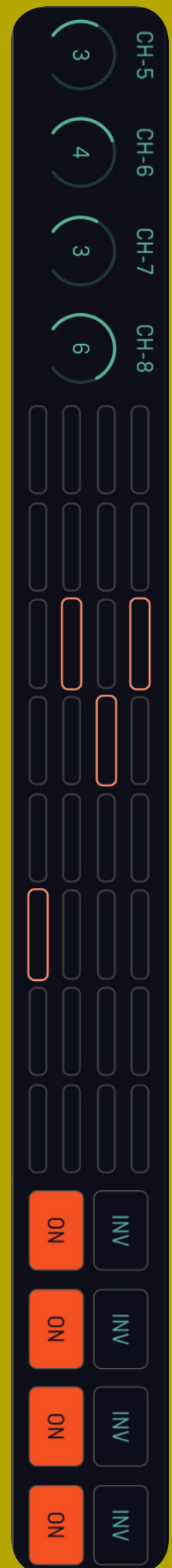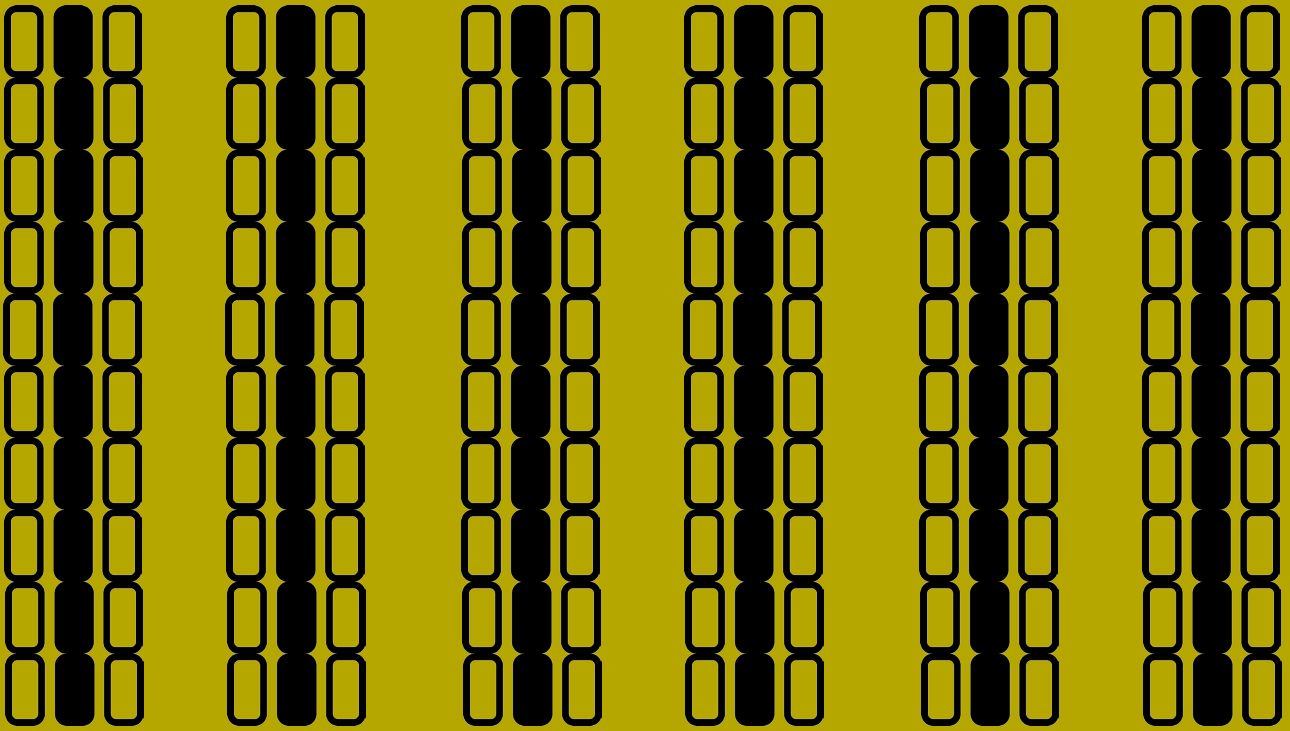
Alongside the dials is a 8 x 4 display grid
which shows you the behaviour of the Logic
Channels. A red indicator will light for each
Channel in the relevant Logic mode column
every time the trigger is activated.
Finally, you have another set of four INV and ON/
OFF buttons - one for each Logic Channel.■
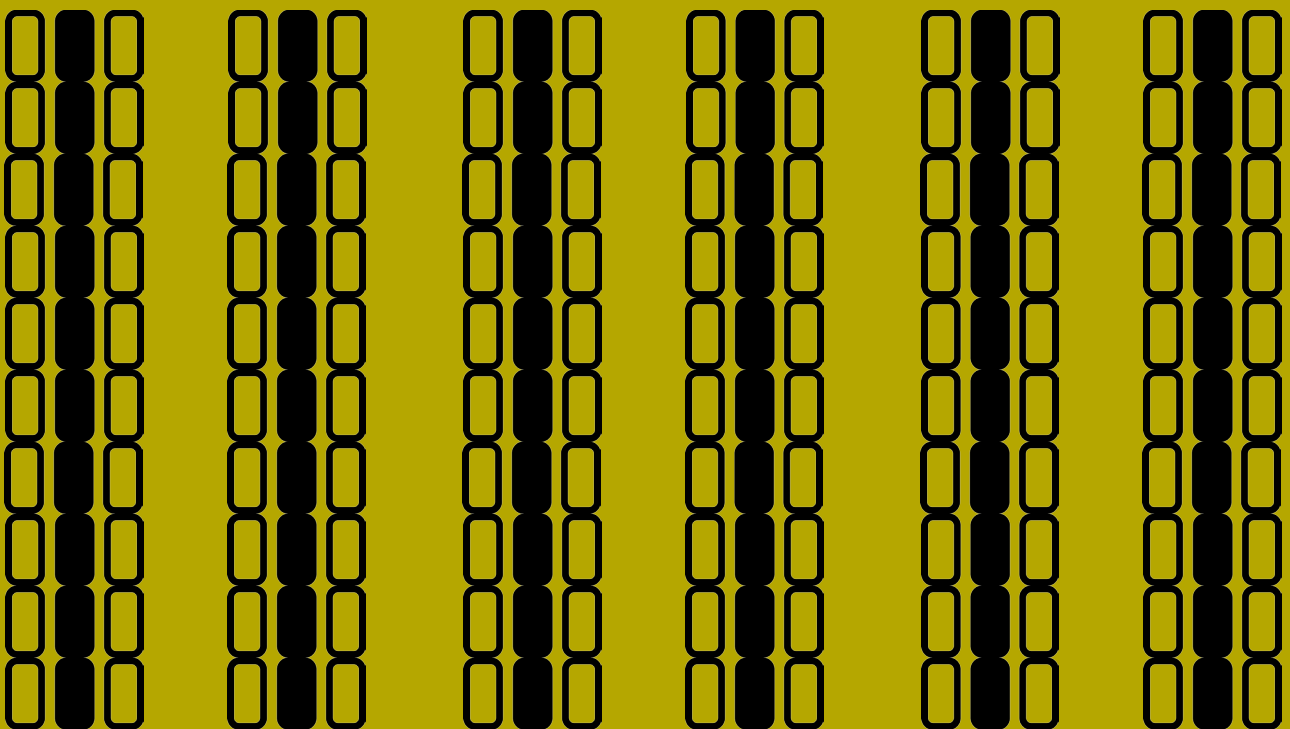
SOUND DESIGN

Now we're going to hop over to the Voices page and explore your sound design options in Strokes in detail.

Each of the eight Voice Boxes is identical and can be set to your desired Voice. Everything starts with the drop-down menu at the top of the box, where you can select a synth Voice or Sampler mode. First, let's load up a sample and see what you can do with it.

SAMPLER

CH-8   >   Sampler ∨   A/B

Kit_05_05_Glitch2.aif

Load

Root
C1

Gain
-18db

Freq
952hz

Res
1.50

LPF
BPF
HPF

Reverb
0%

Delay
0%

Freq   Decay   Reverb   Delay

Env   M-8   W-A   M-1

PAGE A

The first thing you want to do with the Sampler is, naturally, load a sample. Hit the Load button and browse to your preferred sound. For each instance of a Sampler, you can assign a different sample for each Pattern (A-E), meaning in one Channel you can have up to five different samples loaded which will change depending on which Pattern is currently playing. This is handy if you want to bring in different sounds for a different part of a Project.

If you're not sure where to start, you can download the Strokes Factory Samples by clicking the little [i] icon in the bottom right hand corner which will pull up a menu of links - hit the Download Factory Samples button and grab some high-grade sonic material to throw into your Projects.

Once your sample of choice is loaded up, you'll see the waveform displayed just under the drop-down menu. You'll also see a Start Point flag to determine where the sample will play from. Drag anywhere in the top half of the Waveform Window to set your Start Point. If you drag your cursor (or finger) around the bottom half of the Waveform Window you'll see a downwards flag, which determines the End Point for your sample. If you drag the Start Point forward and then pass the End Point back before the Start Point, your sample will play in reverse, which as everyone knows always sounds cool.

Underneath the Waveform Window, the first row of controls begins with two dials - Attack and Decay. The Attack envelope [left] controls how quickly your sample triggers after a note event from a Sequencer, and the Decay envelope [right] controls how long the sample will play for after the note event.

Next, you can set the Root note for your sample - the lowest note your sample can be played at. In Sampler mode, the Root note is your way of telling Strokes the pitch of the incoming sample. This is useful if, for example, you know your sine wave sample is playing at C3. You can set the Root note to C3 and then, when selecting another note for the Voice from the Note Selects, the sample will stay in key with the rest of the Voices. For more information about pitch and melody in Strokes, head here.

The fourth setting is Gain, which allows you to adjust the volume your sample will play at.

The next row down is the Filter section. On the left you can set the Frequency for the Filter, followed by Resonance. There are three modes for the Filter, Low Pass, Band Pass and High Pass, which can be selected on the right of the Filter section. Tweak this section to get the sound you want from your sample, and remember that ramping up the resonance can often produce cool harmonic overtones that respond well to frequency adjustments, but also opens the door to wild peaks and distortion. You'll know what works for you when you dial it in.

After the Filter comes the Reverb and Delay options, which determine how much of your sample's signal is sent to Strokes' built-in effects. The value is determined in percentages, to work out how much echo chamber magic you want to bestow upon your sound.

At the bottom of the Sampler is the Modulation section, which determines how much certain parameters will be sent to Modulation destinations. The Freq (Filter frequency), Decay, Reverb and Delay can all be sent to your chosen Modulation destinations, which can be set in the Voice Modulation section. By default, they will be sent to different Weights and Matrix Channels to enter the modulation melee that Strokes is designed for.

Returning to the top of the Voice Box, you'll see the A/B button to the right of the drop-down menu. This toggle switch opens up a second page of parameters for each Voice. Many of the options on the B page are universal across all the Voices in Strokes. These include the Pitch Quantiser (more here), the Mute and Solo buttons to help focus when setting up your sounds for a jam, the Pitch Mod amount (again, see the melodic section), the Fine setting to fine tune the frequency your sound plays at and the Pan setting to control where your sound plays in the stereo field.

For the Sampler, the B page also offers four additional settings. The Start and End settings allow for more precise adjustment of the Start and End points of the sample, corresponding to the flags in the Waveform Window. The Bits and SRR settings allow some artful degradation of your sample for the crunch that we all love from those trusty, crusty old Akais and the like.

Bits is the Strokes take on a bit-crusher. As you dial from 0-100 the sample's bit-rate drops from 12-bit down to 7 bit and noise is added to the sample pre-crushing. As an added bonus, an auto-levelling system has been added which means the input gain is decreased and the output level is increased as you dial up towards 100, which recreates the gating effect also found when misusing gain staging recording samples into a 12-bit sampler.

Following on from that, the SRR setting
is classic sample rate reduction.

It's also worth noting this crushing takes place
before the Filter, so you can use the Filter to
accentuate the destruction or extra harmonics if
you so desire. All four of these additional settings
can also be sent out for modulation, and the sliders
beneath determine how much that happens.■
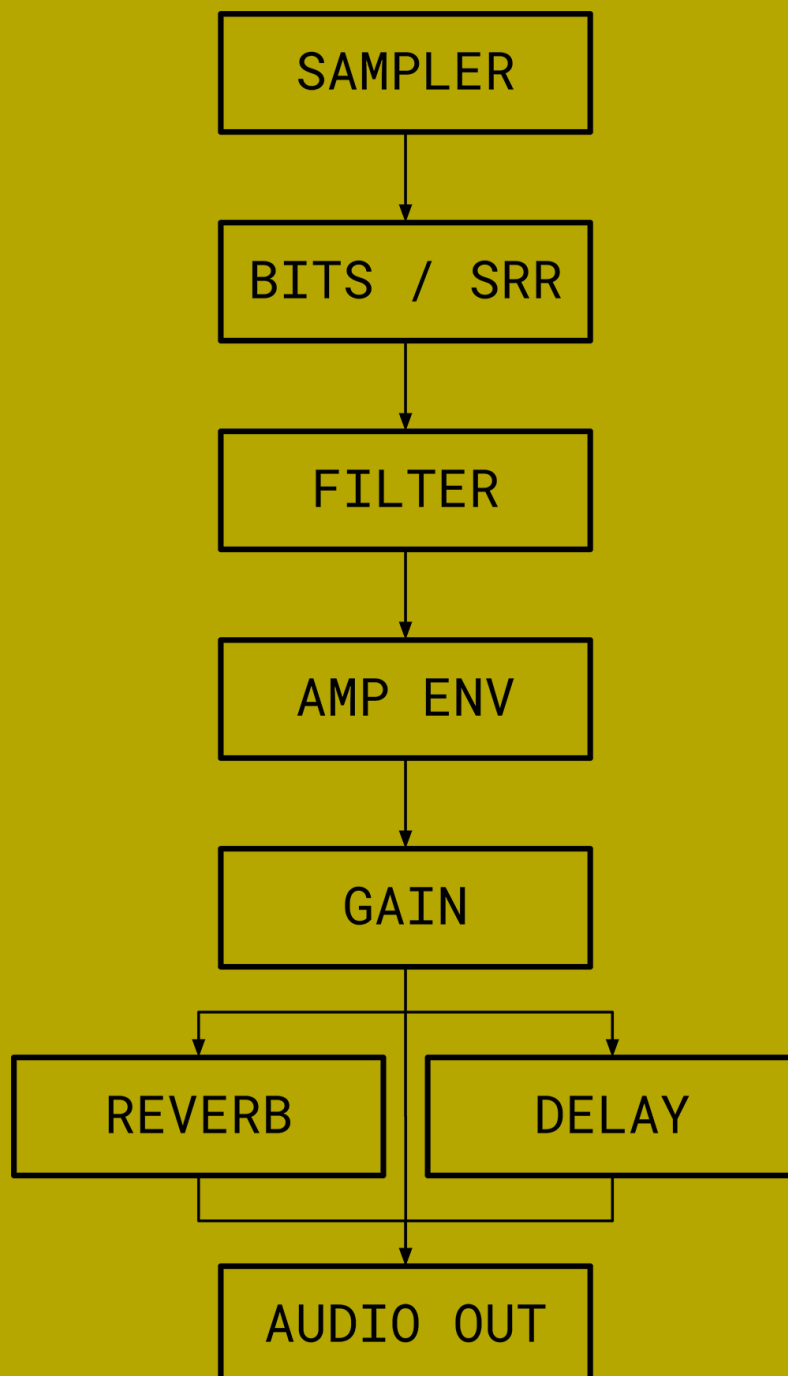
```
         ┌─────────────────┐
         │     SAMPLER     │
         └─────────────────┘
                  │
                  ▼
         ┌─────────────────┐
         │    BITS / SRR   │
         └─────────────────┘
                  │
                  ▼
         ┌─────────────────┐
         │     FILTER      │
         └─────────────────┘
                  │
                  ▼
         ┌─────────────────┐
         │    AMP ENV      │
         └─────────────────┘
                  │
                  ▼
         ┌─────────────────┐
         │      GAIN       │
         └─────────────────┘
          │       │       │
          ▼       │       ▼
   ┌───────────┐  │  ┌───────────┐
   │  REVERB   │  │  │   DELAY   │
   └───────────┘  │  └───────────┘
          │       │       │
          └───────┼───────┘
                  ▼
         ┌─────────────────┐
         │    AUDIO OUT    │
         └─────────────────┘
```

SYNTH VOICES

PAGE A

CH-1	>	FM	A/B

Ratio	Index	Fb	Blend
0.50	0.15	0.23	0.67

		Root	Gain
		C2	-10db

Freq	Res	LPF
281hz	1.43	BPF
		HPF

Reverb	Delay
0%	0%

Freq	Decay	Reverb	Delay
Env	M-1	W-B	M-2

PAGE B

CH-1	>	FM	A/B

Modulation	Mute	Solo

Pitch Mod (Oct)	Fine	Pan
2.20	0.00	R 12

0.50	0.15	0.23	0.67
Ratio	Index	Fb	Blend

Velo	W-B	Env	M-4

_34_

Further down the drop-down menu at the top of each Voice Box, you can select one of 24 different oscillators to provide sound. These oscillators are based on open-source designs ported from a popular Eurorack module, chosen for the simplicity of their control and how well they respond to modulation. We're not going to break down the exact nuances of each oscillator and their parameters here as we'd need a manual twice the size, but we recommend this cheat sheet to give you a handle on how to shape the sounds.

In Synth Voice mode, each Voice Box has the four parameter settings across the top, which change depending on which oscillator has been selected.

The next row down features identical features to the Sampler mode - Amplitude Attack and Decay envelopes, Root Note, Gain, Filter Frequency, Resonance and Filter Mode, Reverb and Delay settings, and modulation sends for Filter Frequency, Decay, Reverb and Delay. For Synth Voices, all the oscillators are tuned to C1 so there's no need to match the Root Note to the sound like you would with a Sampler.

```
┌─────────────┐   ┌──────────┐   ┌──────────┐   ┌──────────┐        ┌──────────┐
│ SYNTHESIZER │──▶│  FILTER  │──▶│ AMP ENV  │──▶│   GAIN   │   ┌───▶│  REVERB  │
└─────────────┘   └──────────┘   └──────────┘   └──────────┘   │    └──────────┘   ┌───────────┐
                                                               ├──────────────────▶│ AUDIO OUT │
                                                               │    ┌──────────┐   └───────────┘
                                                               └───▶│  DELAY   │
                                                                    └──────────┘
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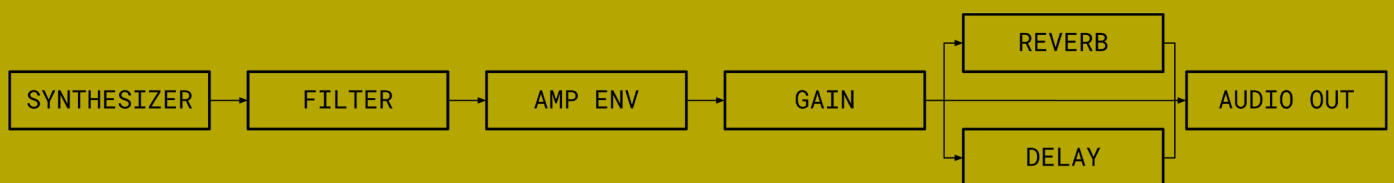
Likewise, the B page for the Synth Voices is also very similar in function to the Sampler mode B page.

The Quantiser, Modulation settings, Mute and Solo buttons, Pitch Modulation setting, Fine Tune and Pan are all identical. The only difference is that the four settings below these are the same Synth Voice parameters you see on the A page, with their corresponding modulation send faders below.

These are handy to slide up when you want to hear your synth Voices make drastic changes through the modulation magic taking place in the Project Sequences.

Fundamentally, these Voices have been designed so you don't need to have a deep background in sound design or synthesis to get creative with the shape of your music - with just a few parameters to get your head around, it won't take long until you're dialling in your own unique array of sounds to feed into Strokes' sequencing and modulation.

Harmonic	Inharmonic	v1.2 / v3.13
Analog	Swarm	Analog VCF
Waveshape	Noise	Phase
FM	Particle	FM Bank 1
Grain	String	FM Bank 2
Additive	Modal	FM Bank 3
Wavetable	Bass Drum	Wave Terrain
Chord	Snare Drum	String Machine
Speech	Hi Hat	Chiptune

ADDITIONAL VOICE FUNCTIONS

In some instances, you might want to duplicate a
Voice you have set up. You can select the Channel
button at the top of any Voice Box (e.g. CH-1) which
opens a small menu with the eight Channels in
yellow, and the five Patterns (A-E) in blue. Select
the Channel and Pattern you wish to copy from,
hit the Copy button and the chosen sound and
Pattern will start playing in your chosen Channel.

So, for example, if you have an Analog Voice
you like the sound of playing on Channel 2,
and you want to copy it to Channel 3, go to
the Channel 3 Voice box, select the CH-3
button, choose the yellow 2 and hit copy. All
the Voice parameters will be copied across,
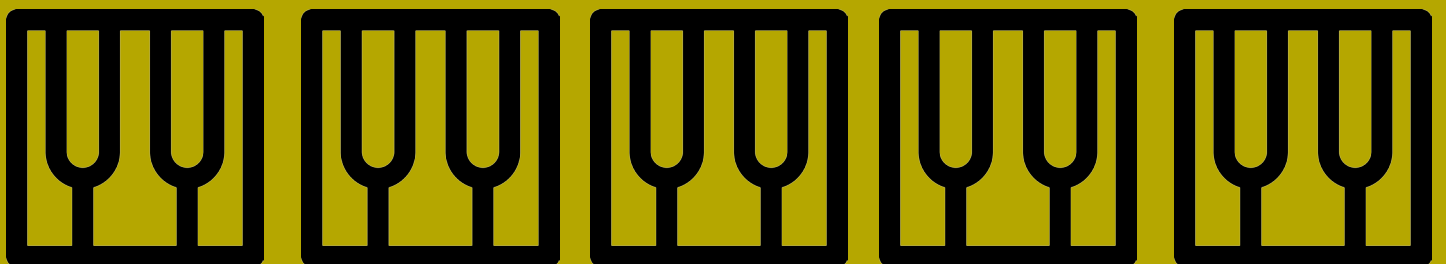as well as the steps of the selected Pattern.
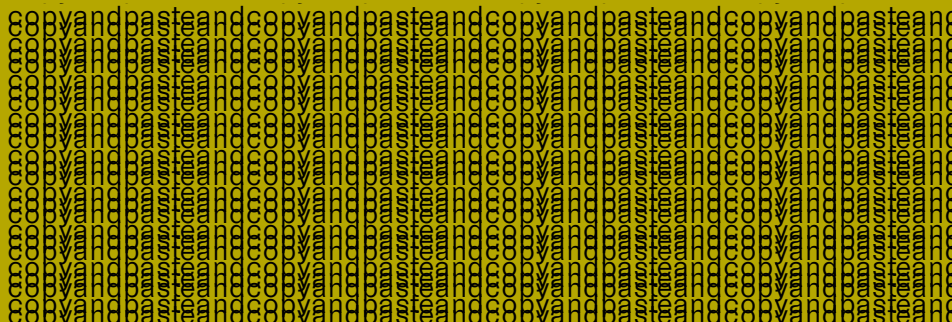
It's worth noting, if you copy a Voice and Pattern to one of the Logic Channels, the Pattern behaviour from the source will only be implemented if the Logic Mode for that Channel is set to 1. Otherwise, the copied Voice will behave according to the selected Logic Mode.

Also be aware if you have a sample loaded on a Channel and then copy another Voice in, you can revert back to that sample and it will still be loaded, but you may lose certain settings such as Start and End marker positions.
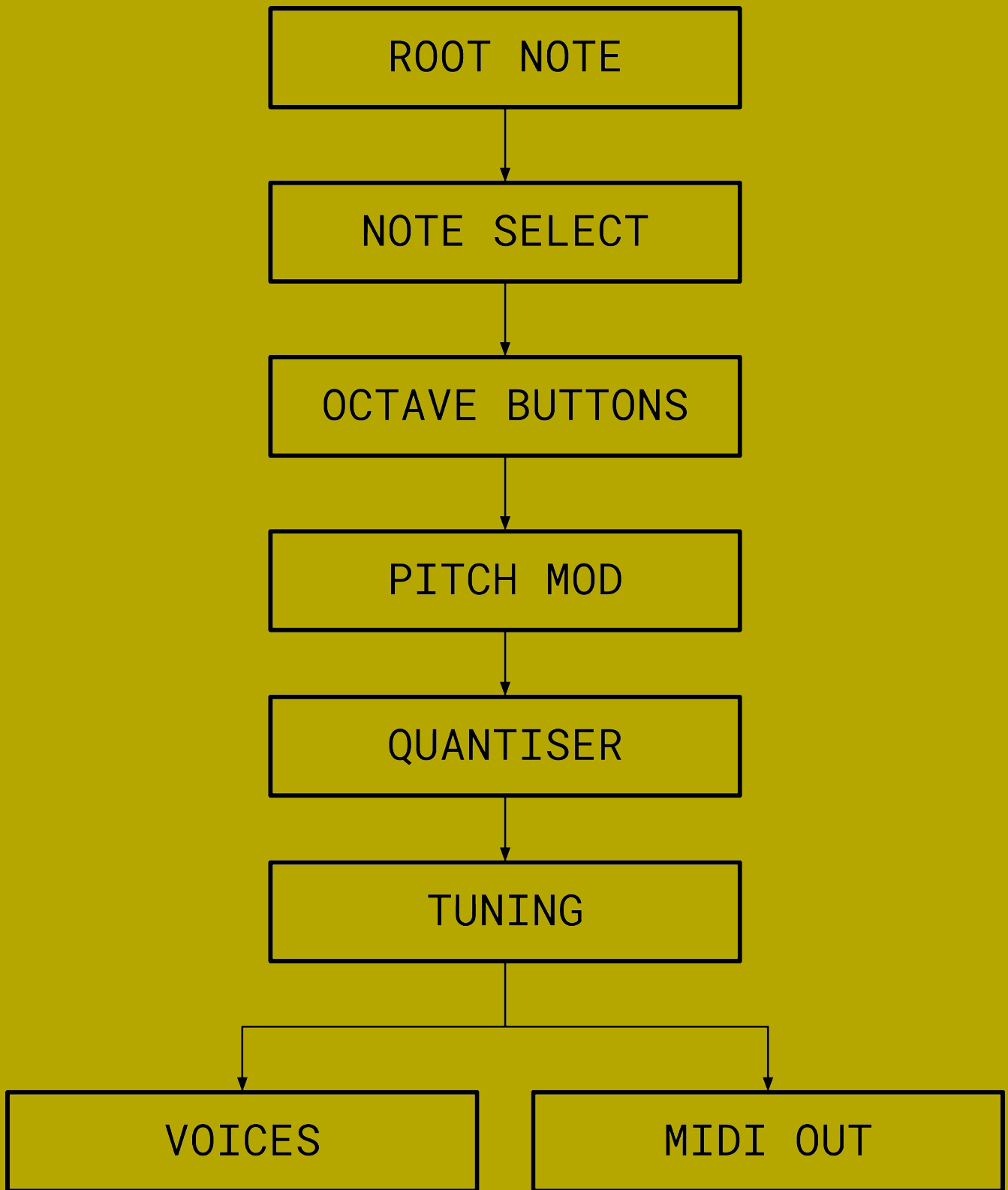
For another quick way to experiment with different Voices, there is a small arrow next to each Channel button which will cycle the selected Voice for a Channel to the next oscillator on the drop-down list - for example jumping from Grain to Additive. The original parameter settings you had set up on the Channel will be the same, it's just the sound source which will change.

PITCH SEQUENCING

Before we get onto other aspects of modulation in Strokes, it's helpful to breakdown how its pitch-oriented and melodic sequencing functions through the various stages that go into creating pitched signals within each Sequence.

```
┌─────────────────────────┐
│        ROOT NOTE        │
└─────────────────────────┘
             │
             ▼
┌─────────────────────────┐
│       NOTE SELECT       │
└─────────────────────────┘
             │
             ▼
┌─────────────────────────┐
│     OCTAVE BUTTONS      │
└─────────────────────────┘
             │
             ▼
┌─────────────────────────┐
│        PITCH MOD        │
└─────────────────────────┘
             │
             ▼
┌─────────────────────────┐
│       QUANTISER         │
└─────────────────────────┘
             │
             ▼
┌─────────────────────────┐
│        TUNING           │
└─────────────────────────┘
             │
      ┌──────┴──────┐
      ▼             ▼
┌───────────┐  ┌───────────┐
│  VOICES   │  │ MIDI OUT  │
└───────────┘  └───────────┘
```

For each Voice, the setting of pitch begins with the Root Note, which is found next to the Amplitude Envelopes and Gain setting on the Voices page. The Root Note, as its name implies, sets the initial pitch of the incoming sample or oscillator . All other pitch information is built up from there, so it makes sense to set your Root Note low to allow for plenty of options once you start adding some pitch variations to a Sequence.
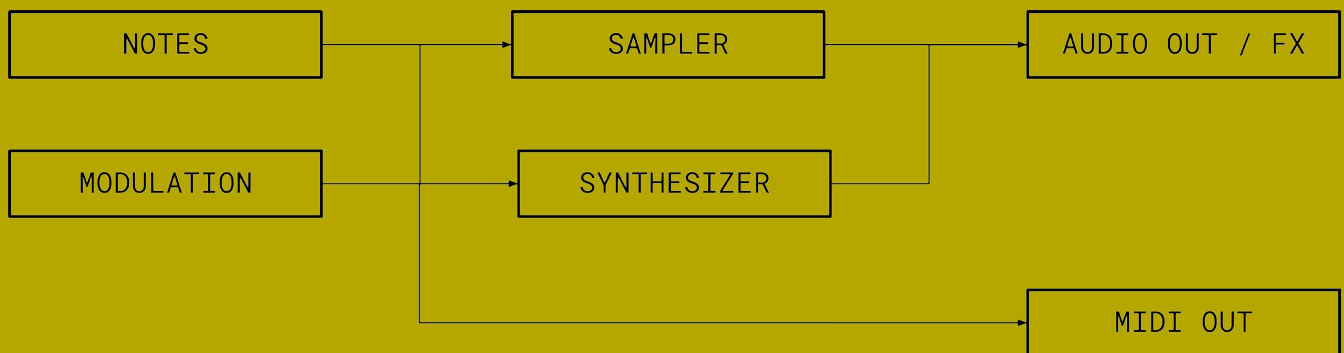
Following the Root Note, the pitch a Sequence on any Channel plays at is then set within the Note section on the far left of Strokes.

Once this is set, it's possible to add variation to the pitch of a Pattern using modulation. You can do this either using Weights, Matrix or Velocity, depending on how you want to control the pitch. The Pitch modulation for each Channel is set in the Voice Modulation section on the Sequencer page, or on the Modulation menu accessed through the Voices B page. If the Pitch modulation is set to be controlled by a Matrix Channel (Channel 1 defaults to Matrix-1 and so forth), the pitch of the Sequence will vary according to the settings of each dial on the corresponding Matrix Sequence as each step advances. In most cases it's a bit easier to get a handle on the melodic behaviour of a modulated Pattern using the Matrix as you can visualise the different values of the dials as higher or lower notes, but in Strokes nothing is off limits in terms of modulation.

If you want to experiment with using Weights to modulate pitch, you might get a handle on it thinking about each Channel adding up to the resulting pitch. Get a Project going with just one Channel set up with a Voice and set its Pitch to be modulated by Weights A. Add some strokes to each Channel, even though Channels 2-4 don't have any Voice. Set Channels 1-4 to 0.25 on their Weights A dials, and a higher note will sound. That combination of 4 x 0.25 adds up to 1.0 pitch. By varying the Weights A values for each Channel and moving the strokes on each Channel around, you're going to create variations in your melody depending on how it's making the envelope behave.

For greater control over the melodic results from pitch modulation, you can use the Quantise section to determine which notes can and can't be played. This is the keyboard graphic, accessed on the Voices page by opening the B page of the Voice you're working on. It displays a one-octave keyboard, and any note currently being played by a Sequence will flash blue when it triggers. To stop your Sequence from playing a certain note, simply click that note on the keyboard and it will turn black. Depending on the modulation signal, the next active note above or below will trigger instead. Once you've muted all the bum notes, you should be able to tweak the pitch modulation to your heart's desire and only hear the notes you want.■

MODULATION

```
┌─────────────────┐          ┌─────────────────┐          ┌─────────────────┐
│      NOTES       │────────► │     SAMPLER      │────────► │ AUDIO OUT / FX   │
└─────────────────┘          └─────────────────┘          └─────────────────┘

┌─────────────────┐          ┌─────────────────┐
│   MODULATION     │────────► │   SYNTHESIZER    │
└─────────────────┘          └─────────────────┘

                                                            ┌─────────────────┐
                                                            │    MIDI OUT      │
                                                            └─────────────────┘
```

At the heart of Strokes' unique musical results is its modulation options. On a fundamental level, modulation means altering the movement of a signal to produce different results, so by sending signals through the Matrix or Weights sections, you're able to vary the sound of the signal and make these variations happen rhythmically.

Where things get complicated and interesting is that some of the modulation within Strokes is being applied to more than one element at the same time, so one dial on Matrix might be nudging the pitch on one Channel and sending another Channel to the delay each time it's triggered. All these elements can be defined by you while setting up a Project, so if you prefer a bit more control and less cross-modulating chaos you can absolutely have that, but part of the magic in Strokes is that everything impacts on everything else until you're turning dials and wild surprises are leaping out at you.

To understand exactly what's going on, we'll take a look at each section of modulation in detail.

WEIGHTS

Weights is made up of four envelope followers which can be applied to your desired parameters on each Channel.

On the Sequencer page you can see the four strips running top to bottom on the right hand side, with four dials for each Sequencer Channel, the Accent Channel and the grouped Logic Channels. These dials determine how big a trigger signal is sent to the four Weights envelopes - their default setting is at 12 o'clock, which sends no signal, and then they can be dialled clockwise or anti-clockwise for positive and negative trigger amounts respectively. The musical outcomes from these settings will vary depending on which parameter is being modulated, and how much it is being modulated by.

As you follow one of the Weights strips from top to bottom, the signal values from each Sequencer Channel are summed together (as shown by the downwards arrows), which will vary depending on which Sequences are firing notes when. If Sequencer Channels one to four all fire a note simultaneously, and they all have their Weights A dial turned to 5 o'clock, it will generate a bigger signal to hit the envelope below.

The envelopes are shaped by the next two dials down the Weights strip. Like the Amplitude envelopes on the Voices page, you can set the Rise and Fall for each envelope to decide how quickly the envelope affects a signal and how long it takes to stop affecting a signal. So if you have Channel 1's Weights A routed to the Reverb and you want the signal to reach the Reverb quickly and stay as long as possible for maximum spatial decay, you'll want the Rise set low and the Fall set high. For another example, you can create a ducking effect similar to side-chain Filtering by setting a Channel's Freq modulation to, say, Weights A, setting Weights A's Rise very high and its Fall very low, and then turning other Channel's Weights A dials to -1.0 so they make the envelope duck the Filter down low every time they trigger.

After the envelopes comes the Offset. This setting determines the static position of the modulation before the movement from the Channels and Rise and Fall have been added on top. Like the individual Weights Channel dials, the Offset can be either positive, neutral or negative. Once a Project is set up and you have your preferred routings for Weights envelopes, tweaking the Offsets in a jam can be a fun way to twist up a lot of sounds at once. The results may well surprise you.

nnnn

Lastly, each Weights strip has its own Delay dial, which allows you to hold off the firing of the envelope according to your desired setting. All the options are set to Synchronised timings so it will always stay in time with the overall Project. This can be useful for creating call and response movement between rhythm and modulation. ∎

uuuu

MATRIX

The other means of modulating signals in Strokes is Matrix, a 16 dial grid designed to mimic the layout and functionality of a classic analogue step Sequencer.

Matrix can be set to eight different Channels, CH1-4 and AC1-2 and XY1-2. These Channels overlap, starting with Channel 1 running horizontally across the top two rows of dials and Channel 2 across the bottom two, Channel 3 running vertically down the two left hand columns of dials and Channel 4 down the two right hand columns of dials. The AC and XY Channels move in less formal ways.

The steps for each of the Matrix Channels are advanced every time a note triggers on the corresponding Sequencer Channel, so if you have six Strokes happening on Sequencer Channel 1, Channel 1 on the Matrix will advance through the first six dials before going back to the start. The movement of the Matrix Channel will always mimic the movement of its corresponding Sequencer Channel, so if you send Sequencer Channel 1 backwards, Matrix Channel 1 will do the same.

The drop down menu at the bottom left of the Matrix section allows you to choose which Channel is being shown by the movement of the LED on Matrix, lighting every time a step is reached. As explained in the Pitch Modulation section, melody is one of the most obvious uses for the Matrix section, but it's also great for making quick, one-off changes to a Voice parameter or a snappy FX send. The fun part is that every Channel overlaps, so you get multiple results from one tweak of a dial. ■

SCOPE

While we're close by the Matrix, it makes sense to examine the Scope which is sat to the right of it. This display is designed to help you keep track of all the modulation taking place within your Strokes Project. As you start layering up more Channels and turning the dials, things can get pretty hairy and the Scope will show you exactly what's going on where.

The five coloured buttons underneath the Scope allow you to select which modulation behaviour is displayed. The orange button on the left (M) is for the Matrix, and will show you the movement of the Channel currently selected in Matrix. For example, if you have Matrix set to CH1 and a few dials turned up to different settings, you will see these steps rise and fall as an orange line on the Scope.

The other four coloured buttons (A-D) show you the different Weights envelopes. You can either have just one of these modulations displayed or any combination, although with all five going at once it'll be looking pretty busy on there. If you focus on one of these and start with a blank Project and a simple Sequence on one Channel initially, it will help you get a handle on how the Weights envelopes function.

Try this out...

1 Make sure your Weights A Channel sends are all set to 12 o'clock, with no Attack and some Decay, and the Offset at 12 o'clock and no Delay. Also make sure there are no other Strokes on any other Channels yet.

2 On the Scope, turn off all displays except Weights A (the red one). You should just see a flat red line displayed horizontally in the middle of the Scope.

3 On Sequencer Channel 1, add in some Strokes.

4 Turn Channel 1's Weights A dial down to about -0.40. You should start to see some teeth cutting into the red line on Scope in time with the Channel 1 Sequence.

5 Now add some Strokes to Channel 2. For now, the Scope should stay the same.

6 When you turn Channel 2's Weights A dial up to around 0.27, you should see some big new peaks appearing on the Scope in time with the Channel 2 Sequence. These peaks represent when and how the envelope is now triggering, and as you add more positive or negative amounts from the various Channels, whenever they trigger they will affect the Weights A envelope. As you will see, tweaking the Attack and Decay envelopes will also affect the shape displayed on the Scope.
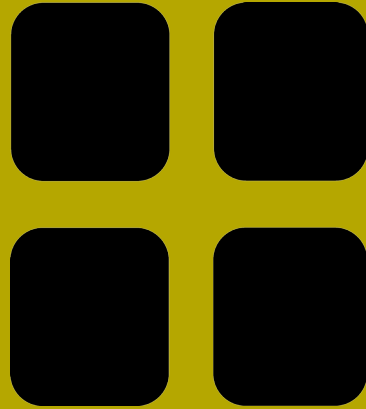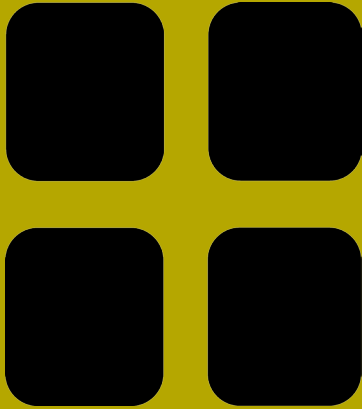
It might be that you have a very specific effect send you would like to hit at a certain time in a Project's overall Sequence, and with that effect routed to your Weight Strip of choice, the Scope can help you pin-point when the effect is going to trigger. ∎
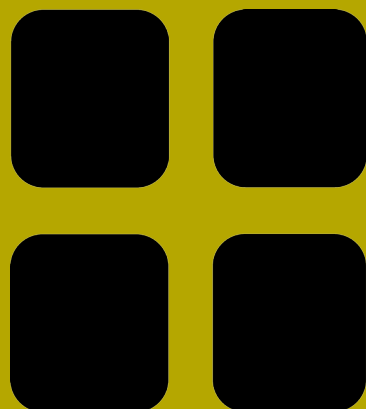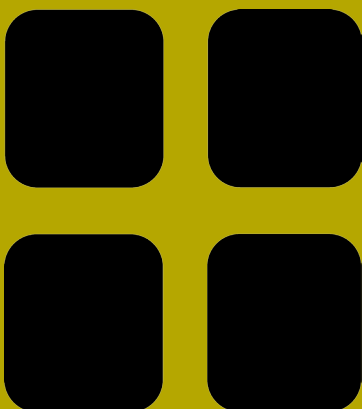
VOICE MODULATION

Once you're familiar with the layout of the Voices and the Modulation, the Voice Modulation box should be fairly self-explanatory. At the top of the box you can choose which Channel you are looking at, and alongside change the Voice source for quick access to a different sound mid-jam.

Below that are nine different possible parameters for the selected Channel's Voice which can be modulated. On the left with From you can choose the source of modulation from any of the Matrix Channels, Weights strips or the Accent Channel, which is listed in the drop-down menus as Velocity. On the right, with Amt (amount) you can choose how much the modulation will affect the signal.

CH-1 ⌄	FM ⌄

From	To	Amt
Matrix-CH1 ⌄	Pitch	2.20
AD Envelope ⌄	Freq	0.40
Matrix-CH1 ⌄	Decay	0.31
Weights-B ⌄	Reverb	0.00
Matrix-CH2 ⌄	Delay	0.30
Velocity ⌄	Ratio	0.00
Weights-B ⌄	Index	0.59
AD Envelope ⌄	Fb	0.25
Matrix-CH4 ⌄	Blend	0.00

VOICE MODULATION

The top five parameters stay the same for all Voices - Pitch, Freq(uency), Decay, Reverb and Delay. The bottom four will vary depending on which Voice you have selected, and the behaviour of the Amt settings will vary too. For Pitch, for example, every whole number up to a maximum of 4.00 represents an additional octave the pitch of the Sequence can shift. Frequency just goes up to 1.00 - think of it more like a percentage the Filter Frequency will be affected by.

As you get deeper into it, being able to route your modulation to your own liking will become a vital part of more focused, intentional creativity within Strokes, and tweaking those Amt settings can yield wild results just like dialling the other modulation parameters.

SHARES

Shares is another part of Strokes which is quite simply unique.

> In essence it's a probability module which allows you to dial back how many times Strokes in a Sequence actually play a sound.

That functionality is offered in other hardware and software in various ways, sometimes as a kind of 'randomiser' mode to give you quick variations on a Pattern without having to program it in. But Shares does more than that. The main part of the section is the four sliders which correspond to Channels 1 and 5, 2 and 6, 3 and 7 and 4 and 8 respectively.
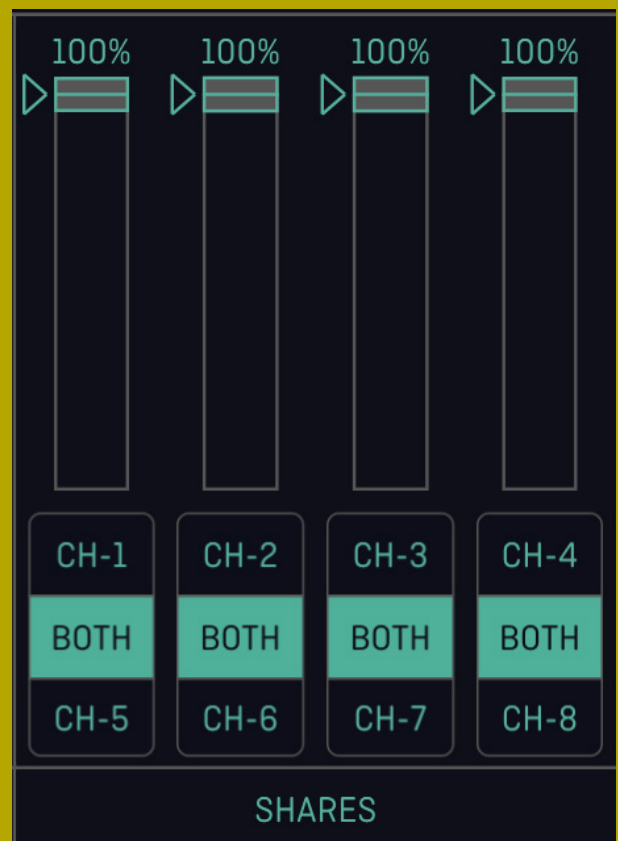
When you have your Sequences rolling, you'll see the little arrows (Current Share Amount) to the left of each slider hovering up and down at different heights depending on how busy your Sequence is. By default the sliders will all be set at the top and display 100%. When you want to introduce some drop-outs to your Pattern, simply move the slider down below the Current Share Amount and the percentage at the top will start to drop. Reach your desired percentage - for example that the notes on Channel 1 will trigger 70% of the time - and you'll hear the results. Each slider can be set, via its corresponding switch, to affect either Channel or both together.

How Shares is unique is in how it calculates its probability. Instead of applying a generic reduction algorithm, Shares constantly analyses the resulting note event behaviour of the Channel(s) and adjusts itself in response. This way, as the note events start to drop off, the Current Share Amount will change to maintain a constant balance as close as possible to the specified percentage. It's another way in which Strokes is built considering all the working parts as an interconnected whole, and Shares in particular becomes a valuable tool when jamming and needing to create space in the mix and slim down some busy Patterns. ■

EFFECTS
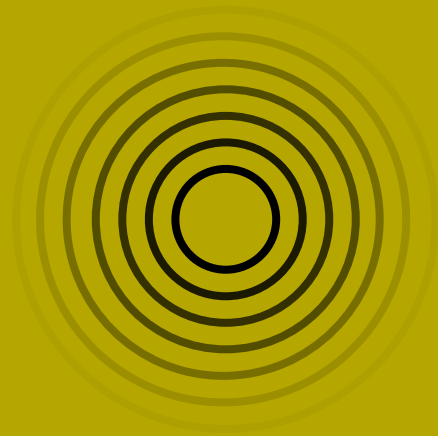
There are two built-
in effects for Strokes
which are intertwined
with the Voices and the
modulation possibilities.
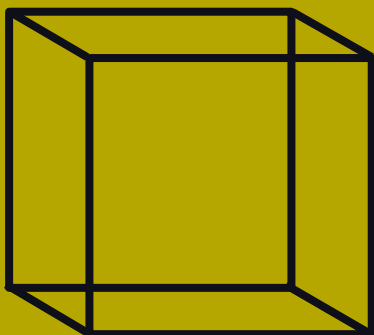
REVERB

The Reverb offers a stripped-down but flexible approach to spatial processing with just three simple parameters to tweak. The High-Pass Filter (HPF) allows you to cut any troublesome low-end frequencies which might muddy your mix. The cute blue cube icon above the HPF shows you how much of the frequency range you're putting on ice. You can also set the Size of the Reverb as a percentage, from modest impulses on the end of hits to big, booming decays. After that comes the Level, so you can control how loud the Reverb is in the mix.

The Reverb's HPF and Size can both be modulated - the sliders allow you to choose how much those parameters will be sent out for modulation, with the former patched to Weights A and the latter patched to Matrix Channel 5.

Reverb

HPF
2.31khz

Size
100%

Level
-3.74db

HPF   Size

W-A   M-5

DELAY

The Delay is a simple and effective echo unit which can be set to a variety of delay times from 1/128 to 1/1, all relevant to the clock tempo Strokes is running at. This way you don't have to worry about your Delay being in time with the rest of the music. You can also set the Feedback to choose how long the repetitions go on for, and lastly how loud the Delay will be.

The Delay's Time and Feedback can be modulated, too, using the sliders at the bottom of the device. These are patched to Weights B and Matrix Channel 6 respectively. The Delay Time in particular creates exciting, chaotic results when it goes out for modulation, creating pitch shifts and all kinds of rhythmic oddities as the feedback speeds up and slows down depending on what the modulation is doing. ■
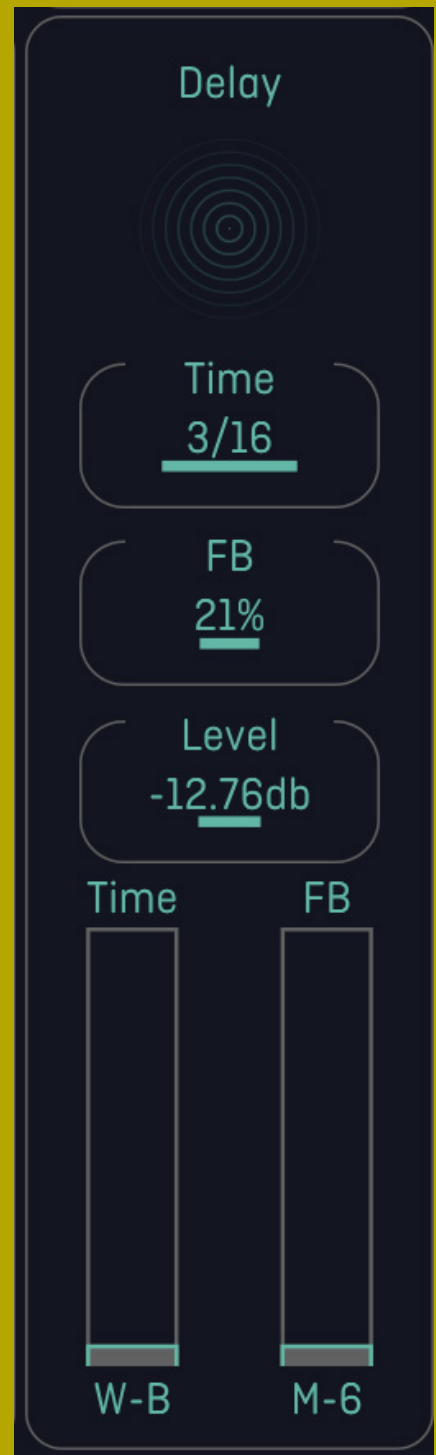
PERFORM

Strokes has been made with intuitive performance in mind, whether you're noodling around in the studio or up on the stage.

Past the sequencing and sound design pages, the Perform page has been designed with unique functions to encourage fluid movement between different Patterns and Projects, opening up new possibilities and helping live sets flow more naturally.

The first thing to understand about the Performance page is that the actions carried out in here do not alter the original Pattern settings in the current Strokes Project. This is why, when closing the Performance page and returning to the Sequencer, you can see the P slot blinking in the Pattern Select list on the left.

CROSSFADER SECTION
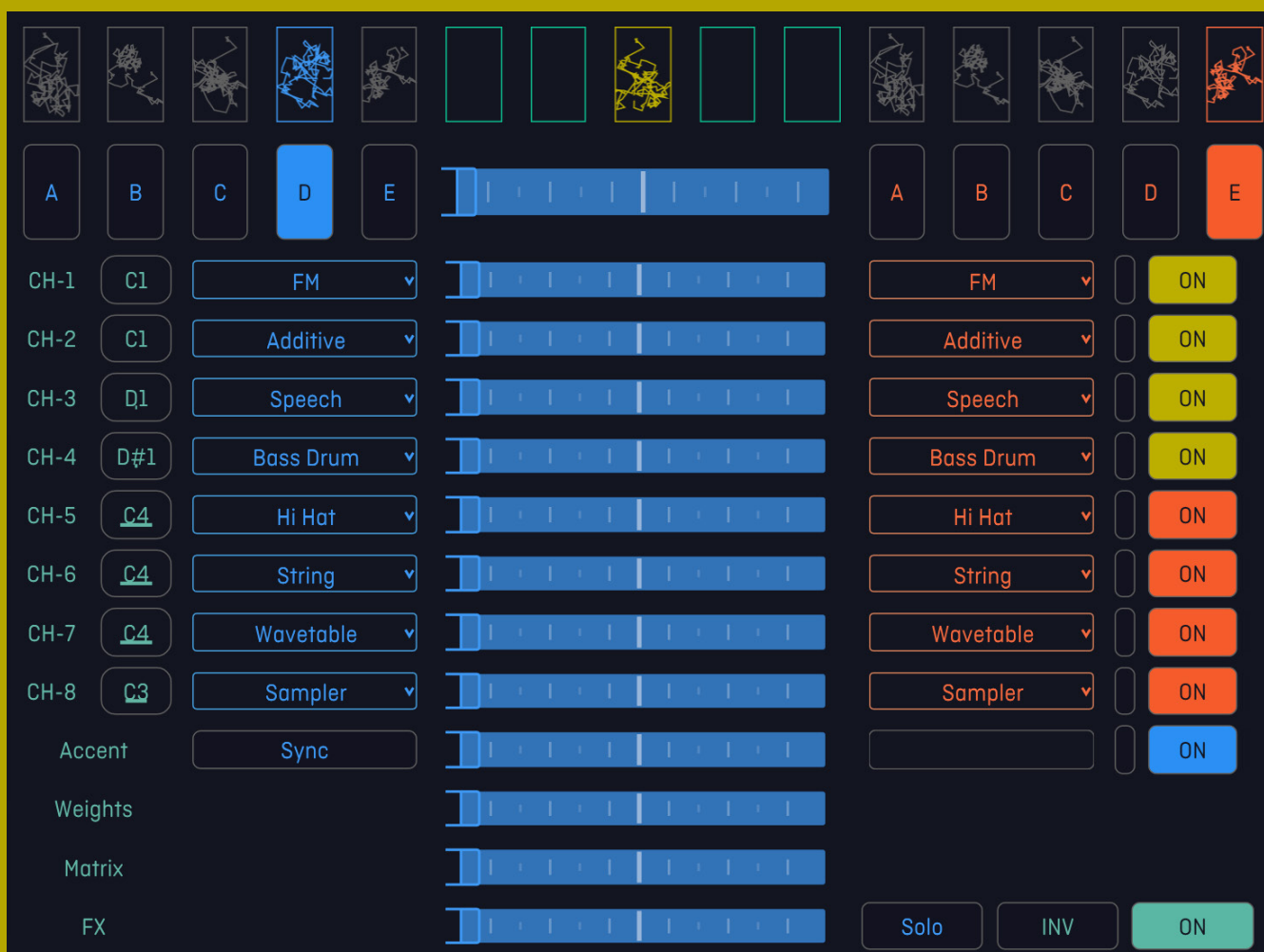
At the heart of the Perform page is the crossfader section, which is made up of one global crossfader and 12 separate crossfaders for individual Channels 1-8, the Accent Channel, Weights, Matrix and FX. The faders allow you to smoothly blend from one Pattern to another, whether you want to switch an individual part of a Pattern or the whole thing. It's worth noting this isn't a simple audio crossfade, but rather an interpolation of the different Pattern settings until they overlap and interact, which can have exciting, unpredictable sonic results.

On this page, the Patterns A-E are shown in the slots on the left and right of the global crossfader. The active Pattern for each side of the crossfader will be highlighted, blue on the left and red on the right. Each Pattern that is populated with Sequences and modulation has a corresponding drawing above it - a sort of visual representation of the specific settings of the Pattern. If a Pattern slot is empty, the relevant drawing box will be blank.

In a typical Project with five Pattern slots filled, when loading up the Performance page you will see all five drawing boxes filled on both sides. Meanwhile, in the middle above the crossfaders, you will see another five Pattern drawing boxes. Initially, only the middle one of those will be filled. The visual representation here is of the combined Patterns from the left and the right, depending on the position of the crossfaders. The empty slots either side of this middle 'combined' drawing box are available as storage - if you happen upon a blend of Patterns which creates something fresh you want to keep hold of, simply drag the yellow drawing from the middle box to one of the empty slots and it will be stored, shown as a green drawing. You can then drag this new combined Pattern to one of the slots on the left or right, to be recalled in your performance with the crossfader.

The Synth Voices for all the Channels can be changed on the Performance page via the corresponding drop-down menus to the left and right of the crossfader, as can the note values for each Channel. Each Channel can also be muted via the column of 'On' switches.

To the bottom-right of the crossfaders you can switch between Solo, Inv and On to change the 'On' switches to 'Solo' switches or 'Inv' switches.

Where the Accent Channel is listed, the Sync button is also available to restart all Channels Sequencers from 0, for when you've gone deep on the tweaking and things have slipped out of line a bit. On the right hand side of the Accent crossfader is a bar which shows the movement of the Pattern's loop, as a visual aid for you to lock on to where 0 is. When we're lost in polyrhythmic exploration, these kind of cues can help us work out where we're at.■

MIXING IN OTHER PROJECTS

An exciting aspect of the Performance page's crossfader functionality it the ability to load in other Strokes Projects and blend into them. You do this by hitting the Load A Project button on the right hand side and locating your chosen Project. Once loaded, that Project's Patterns will appear in the five Pattern Drawing slots above, ready to be dragged and dropped onto your desired slot on the left or right of the crossfader. In most cases, it makes sense to drag a new Project Pattern onto a side of the crossfader which is not currently audible, so you can then blend into it using the faders.

There are many possibilities for this, but if you were looking to build up a cohesive live set with multiple different Projects, it might be a useful practice to think about structuring your Voices consistently (e.g. kicks always on Channel 1) to give the smoothest results. There are no rules, however, and you can just as easily achieve interesting sonics from sharp contrasts. You'll find your own style with this functionality.

No External Project Loaded

Load A Project
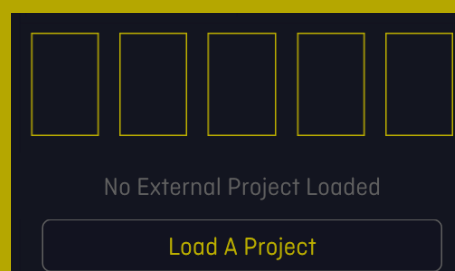
When loading another Project, you can also import the Note Select slots for that Project. These will display in the Note Select section underneath the crossfaders. The currently active Note Selects are on the left, and the imported Note Selects are on the right. The button with left and right arrows in between allows you to swap these Note Selects when the time is right - the idea is this can help with shifting between different keys depending on the Project.∎
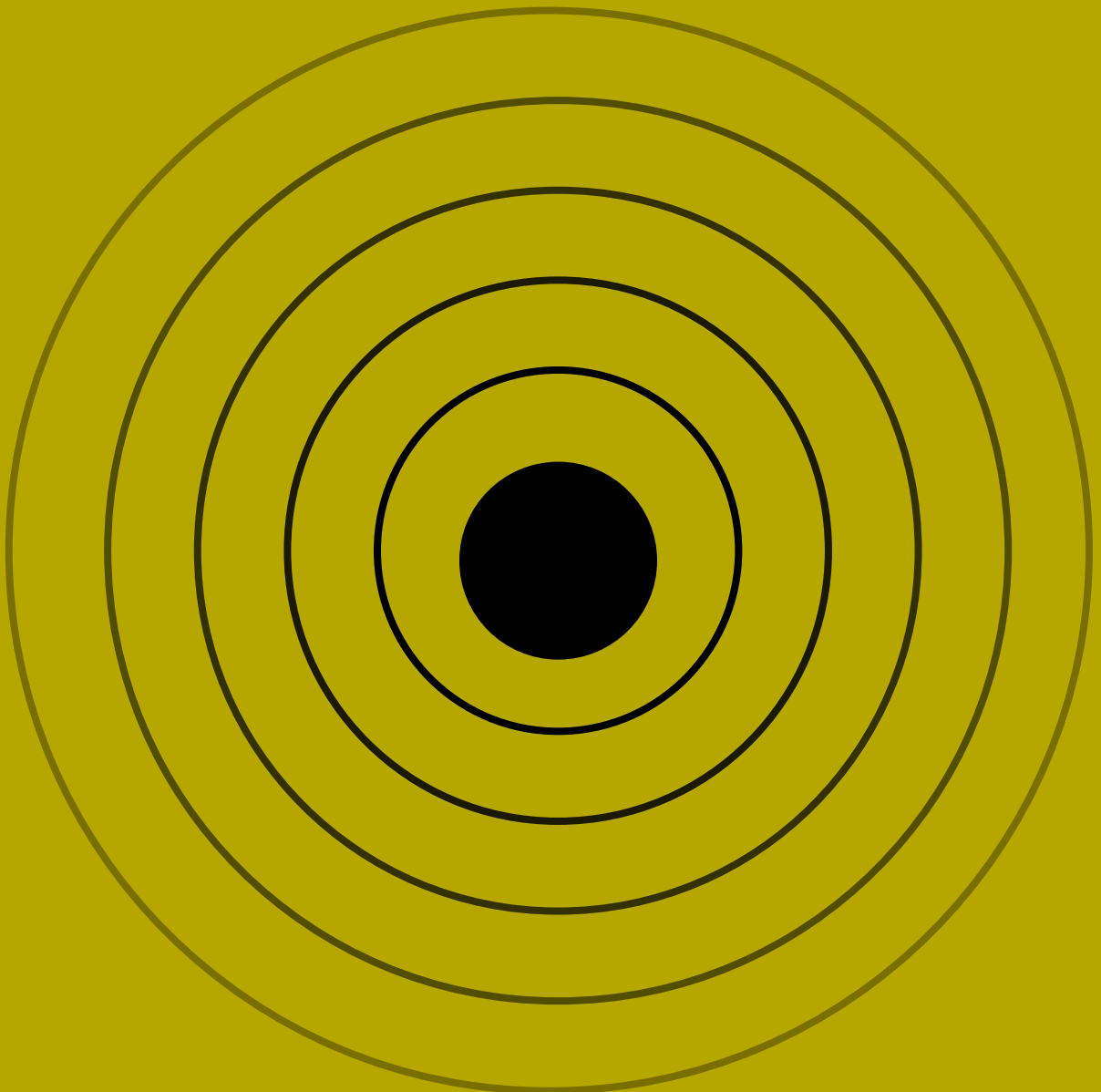
TRANSITION AND VARIATION TOOLS

At the top centre of the Performance page is a trio of tools designed for quick on the fly adjustments to the sound and behaviour of Strokes parameters.
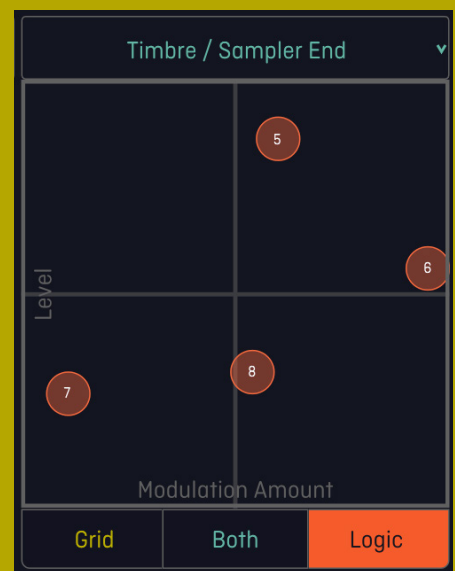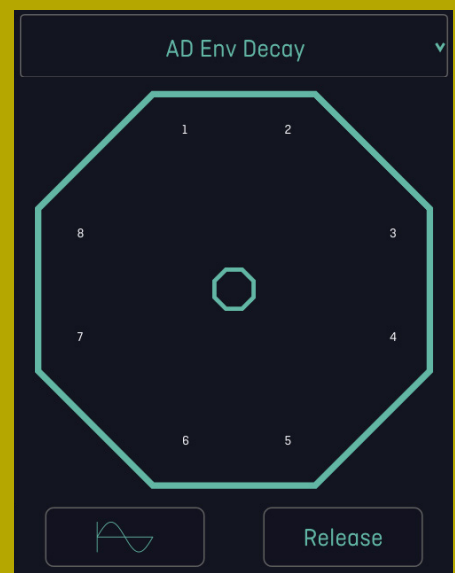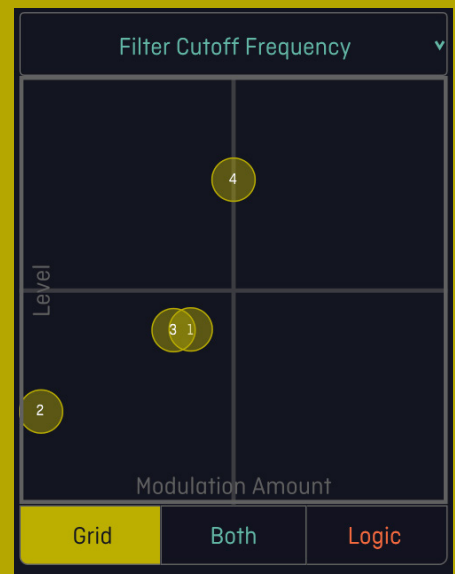
These are useful for all kinds of tweaks to the sound, whether you want to create a fill to break up the regularity of a Pattern or you want to create a dynamic shift in preparation for a transition to another Pattern or Project.

On the left and right are two node XY pads, which can be used to quickly adjust different modulation settings for a Project's Channels. You can choose which settings you want to manipulate via the drop-down menu, choosing from Filter Cutoff Frequency, AD Env Decay, Reverb Send Amount, Delay Send Amount, Harmonics / Sampler Start, Timbre / Sampler End, Morph / Sampler Bits, Blend / Sampler SSR or Volume / Pan. You can toggle displaying nodes for the Grid Channels 1-4, the Logic Channels 5-8 or both. Moving these nodes around will affect the relevant parameters, giving you a more hands-on way of shifting the sound design without having to dive into the Modulation menus. In between the node XY pads is an octagonal XY pad which can be set to alter similar settings to the node XY pads: Filter Cutoff Frequency, AD Env Decay, Reverb Send Amount, Delay Send Amount, Harmonics / Sampler Start, Timbre / Sampler End, Morph / Sampler Bits, or Blend / Sampler SSR. The difference with the behaviour of this XY pad is that the Channels are positioned around the edges of the octagon, and as you drag the central marker to any particular edge, the settings for the nearest Channels will be accentuated while the settings for the opposite Channels will be diminished.

The polarity of the modulation coming from the octagonal XY pad can be set to either bipolar or unipolar modes via the graph button on the bottom left of the device. Bipolar works well on parameters such as decay or Filter cutoff, where increasing the effect on one will simultaneously reduce the effect on others. For example, if you're going to ramp up the decay level on one Channel, you might not want all the other Channels to be ringing out for longer at the same time. Unipolar works well for reverb and delay, where you want to create an overall, momentary swell of sound in the Project. The device is set by default to Release, via the button on the bottom right, which means when you let go of the marker, it will return to the centre and the settings will return to their previous state. This Release mode can be toggled to Hold, which means the marker will remain where you leave it for a longer, sustained effect.

The whole purpose of the octagonal pad is to give you a playful, intuitive way of quickly throwing in some sonic fluctuations without altering the settings in any permanent way.

SATURATION (HEAT) AND COMPRESSION (GLUE)

Bearing in mind the idea of the Perform page aiming Strokes at live performance, it made sense to offer a simple solution for boosting the overall sound of a Project on its way out of Strokes to any kind of amplification. There are two settings for this purpose located on the right hand side just below Load A Project - Heat and Glue.

Heat is a simple dose of saturation and Glue is a compressor, both applied to the main stereo out from Strokes to give the sound a bit of warmth, a gentle squeeze or catch any wild peaks before you upset the sound tech. Using these settings comes down to personal preference and experience - maximising them will give quite extreme results, while being more measured will have a subtle effect which might be more desirable.■
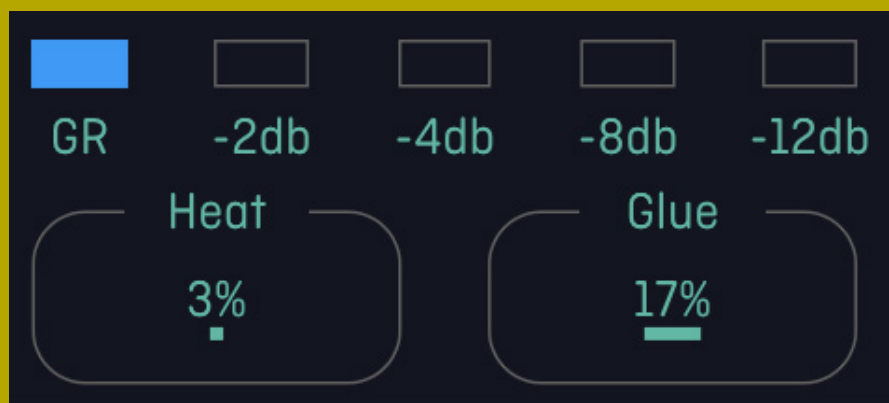
ALSO ON THE PERFORM PAGE

The rest of the Performance page is filled up with some of the Strokes elements which are

most useful to access for variations during a performance. You can still access the Matrix Sequencer on the bottom left, while above that you can toggle between a Tuning display for all the melodic quantisers for each Channel or a Samples display which will allow you to view and load samples on each Channel.

On the right hand side, the top box can be toggled between an FX display to adjust your Reverb and Delay settings, the Modulation scope for keeping track of the modulation taking place in the Project. Below the Heat and Glue buttons you can access Shares to adjust the probability of note events quickly, and also adjust the Offset dials for the four Weights envelopes. These are some of the settings which can achieve noticeable changes quickly and easily within the flow of a session, which is why they have a place on the Performance page. ∎

THE INFORMATION BOX

If you open up the Information dialog box located in the bottom right of Strokes, you'll see additional options and features to help customise your music-making experience.

TUNING

The tuning of the keyboard component in Strokes is set to 12TET (12-tone equal temperament) by default. As more artists and instrument designers are recognising the creative potential and cultural value of music which doesn't conform to this Westernised standard, Strokes offers the chance to create your own custom microtonal tunings or load others in from elsewhere. Following the layout of the keyboard component, you can set the 12 notes to different values (ratios) which all relate back to C. There's a lot to understand about tuning, not least with regards to cents and ratios, so you might want to do some further reading around the topic.

A Strokes Project stores tuning information which will be recalled whenever you load the Project. If you load a new Project, the last tuning present you selected is carried over, so if you wanted to take a break from a previous tuning system you will need to select a new one. Any scala files loaded into Strokes are saved within the plugin / app, so it doesn't matter if you lose the original .scl file.

Click on the information (i) button in the bottom right-hand corner to bring up the Information dialog box. The left-hand column of this box is where you can change the tuning for your Project. The drop down menu at the top gives you a list of preset tunings to choose from, as well as any additional tunings you have saved or loaded in. The arrows allow you to cycle through and audition different tunings on the Project while it's playing.

The main tuning box allows you to set an overall Octave as a value in relation to C as the Root note. The individual notes are listed below this, with a value next to each note which can be set to two decimal places as a multiple of the Root note. Simply click and drag on the value you want to change. If you click and drag on C, which is set to 1/1, it will cycle through the different notes of the tuning system to shift the values accordingly.

If you have created a custom tuning, the box beneath the tuning gives you space to name and save it as a preset. Otherwise, you will see a button which says Import Scala File. Click this button and navigate to any scala files you have stored, or alternatively you can drag and drop scala files straight onto the tuning box to apply a tuning.

EXPLORATION AND UNDERSTANDING

It's hard to talk about tuning without bringing to light the Western dominance of 12TET and the complex implications it has for cultures around the world.

While everyone is free to experiment with tuning whichever way they choose, we suggest you'll get much more from the practice by working to understand more about certain tunings - specifically those that have come from other cultures around the world.

Kyam Allami has been doing some fantastic work in this regard, creating tools such as fantastic, free web app Leimma which allows you to explore existing tuning systems in relation to their cultural origin, with additional information and the ability to preview different systems. We'd also recommend this conversation between Peter Kirn at CDM and Allami about the many issues around tuning practice.

More than anything, browsing around the frankly dizzying amount of scala files scattered around on the internet without any context is a passionless, frustrating task. If you want to learn more about scala before you start diving in, head to the site of the developers Huygens Fokker. For now, here's a little background on the preset tuning systems included as standard within Strokes.

12-TET (Twelve-Tone Equal Temperament)

12-TET is the ubiquitous standard tuning for Western music. The "TET" in "12-TET" stands for "equal temperament." So, "12-TET" is short for "12-tone equal temperament."

In equal temperament tuning systems, the octave is divided into a specific number of equal parts or steps. In the case of 12-TET, the octave is divided into 12 equal parts, each of which is a semitone (or half step) apart. This system allows for the consistent and standardized tuning of Western musical instruments, enabling them to sound in tune across all keys.

The equal temperament system is a compromise that slightly alters the pure intervals found in just intonation (which is based on simple whole number ratios) to allow for the ease of modulation and playing in different keys. Despite these slight alterations, 12-TET has become the dominant tuning system in Western music due to its versatility and practicality.

12-JI (12-Tone Just Intonation)

12-Tone Just Intonation, often abbreviated as 12-JI, represents a tuning system that is fundamentally different from 12-Tone Equal Temperament (12-TET). In 12-JI, the octave is also divided into 12 distinct pitches, but the way these pitches are derived and tuned is based on simple whole number ratios, creating pure and harmonically resonant intervals.

Listen : La Monte Young's "The Well-Tuned Piano"
https://lamonteyoung.bandcamp.com/album/the-well-tuned-piano-in-the-magenta-lights-87-v-10-6-43-00-pm-87-v-11-1-07-45-am-nyc

Pythagoras

Derived from Pythagorean tuning, the Pythagorean scale is a musical scale based on the pure perfect fifths and octaves. Pythagoras, an ancient Greek philosopher and mathematician, is often credited with its development. In Pythagorean tuning, each note is derived by stacking perfect fifths, tuned in the ratio 3:2. However, there is a catch in this system. When you stack twelve perfect fifths and reduce them all into a single octave, you do not end up with a perfect octave; instead, you get a slightly sharp note. This discrepancy is known as the Pythagorean comma.

Listen : Kyrie I, sung by the Hilliard ensemble in Pythagorean
https://www.kylegann.com/AoL4-Pythagorean.html

Werkmeister

Crafted by Andreas Werkmeister, a German organist from the 18th century, this system aimed to make keyboard instruments more flexible while maintaining the essence of just intervals. Werckmeister's temperaments are meant to make more keys usable and to reduce the dissonance in the tuning of keyboards, especially organs and harpsichords. He published several different temperaments, the most famous of which is probably Werckmeister III which is included here.

Kirnberger

The Kirnberger scale is a musical tuning system that was developed by Johann Philipp Kirnberger, another 18th-century German musician who was a student of Bach. There are several different Kirnberger scales, but the most well-known and widely used is the Kirnberger III which is included here. The Kirnberger III scale is known for its pure major thirds, which sound very consonant and stable. This is in contrast to the slightly sharper major thirds of the equal temperament system, which can sound slightly dissonant in comparison.

Listen : Kali Malone - Pipe
Inversions (for Kirnberger III)
https://kalimalone.bandcamp.com/track/
pipe-inversions-for-kirnberger-iii

Ionian

The Ionian scale, also known as the major
scale, is one of the most commonly used
scales in Western music. It's a diatonic scale,
meaning it consists of seven notes and it
is known for its bright, happy sound.

Listen : Boards Of Canada - Dayvan Cowboy
https://www.youtube.com/
watch?v=A2zKARkpDW4

Aeolian

The Aeolian scale, also known as the natural minor scale, is another commonly used scale in Western music. It too is a diatonic (7 pitch) scale, and it creates a sound that is often described as somber, melancholic, or contemplative.

Listen : Jammin' Sam Miller / David Wise - Aquatic Ambience (Donkey Kong Country 2)
https://shop.mentalgroove.ch/track/aquatic-ambience-2

Dorian

The Dorian mode is the second mode of the diatonic major scale, meaning that it is created by starting on the second note of a major (Ionain) scale. Each mode has a unique Pattern of intervals, giving it a distinct sound and feel - this adds an extra layer to the idea that "major = happy, minor = sad". You can think of each mode as a slightly tweaked version of the typical major/minor scale. Here the minor sixth interval is changed to a major sixth interval, effectively making an intensely sad sounding scale, slightly happier. Try this on your next medieval RPG soundtrack, or if your synths reside in a dungeon.

Listen : Fief - II
https://fief.bandcamp.com/album/ii
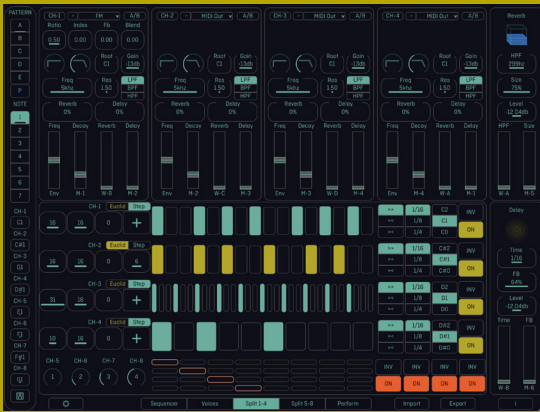
THEME

CLASSIC
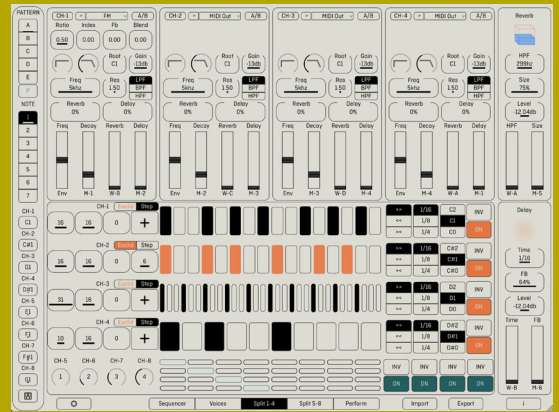
ALT

At the top right of the Information box, you can choose from a few different Themes which will adjust the colour of the Strokes environment, depending on your preference or visual needs.

CONTRAST
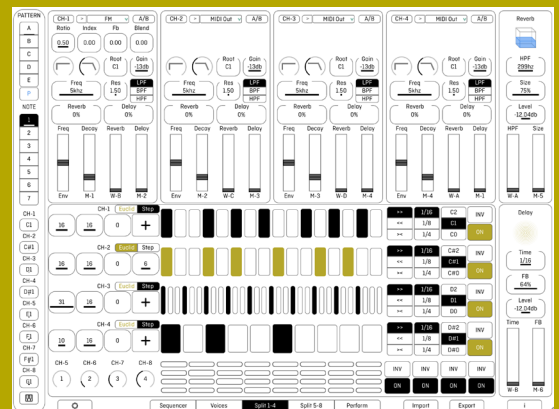
LIGHT

RANDOM MODULATION

Below the Theme options are two sliders for randomising the settings on Matrix and Weights. If you're experimenting with sounds and sequencing and you want to quickly see what happens with entirely different modulation values, hit the dice icon and slide the fader from left to right. You'll hear a smooth blend into a new, randomly generated state for Matrix (top fader) or Weights (bottom fader).

> The fader means you can roll the dice without risking losing what you had already set up yourself, for a risk-free experimental process.

Be aware, when you close the dialog box your Matrix and Weights setting will be saved wherever you leave the faders while experimenting with random settings.
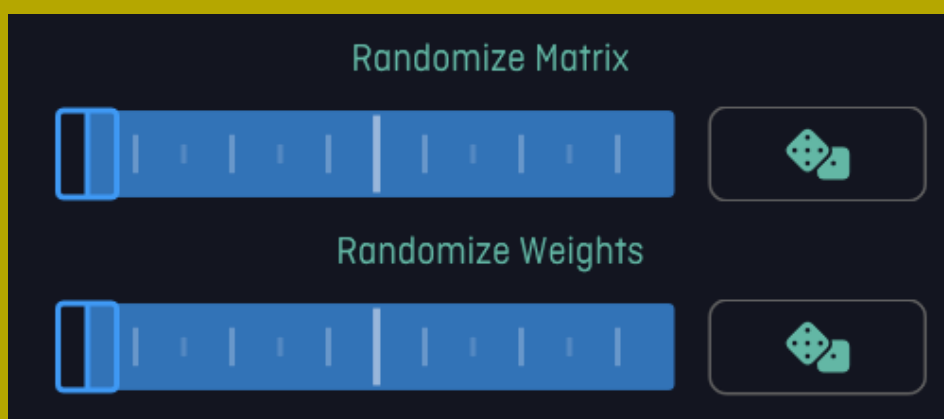
ALSO IN THE INFO BOX

The Information box also features links to a few useful tools, including a PDF copy of this manual you're reading right now, a video tutorial guiding you through all aspects of Strokes, the Factory Samples to get you started with high-quality sounds straight away, and two Demo Projects which show you possible ways of having Strokes set up.

ORGANISING PROJECTS

In the interests of being able to build up meaningful Projects and develop ideas from initial jams into considered pieces of music, Strokes features tools to store your Patterns and be able to recall particular moments in an instant.

This can be useful for performance, but also for simply leaving a breadcrumb trail behind you as you continue tweaking your way deeper into a Project.

PATTERNS

The Patterns section on the far left of Strokes features five possible states (A-E) you can store within a Project, to be recalled instantly whenever you want to jump back (or forwards). A Pattern stores all the information in a Project, from Sequences and notes to modulation settings, all Voice and effect settings. You can change whatever you like and instantly hop back.

One way Patterns can be used while exploring a Project is to remember to click to the next empty Pattern Slot whenever the Project is sounding particularly good - that way the winning state will be stored in the Pattern Slot before and you can continue exploring and seeing where you end up. Equally, once you have a set of sounds you like and you want to structure a track, you can use the Pattern Slots to define distinct passages and use them to help you perform the track as you record it.■

NOTES

NOTE

1
2
3
4
5
6
7

CH-1
C1
CH-2
C1
CH-3
D1
CH-4
D#1
CH-5
C4
CH-6
C4
CH-7
C4
CH-8
C3

Below the Pattern Slots, Notes is made up of seven different possible Slots (1-7) which will store the fundamental pitch for each of the eight Channels. This allows you to build melodic progressions in your Project and action musical changes to multiple Channels at once. Key changes are an emotive subject, but with Notes you can go as big or as subtle as you like.■
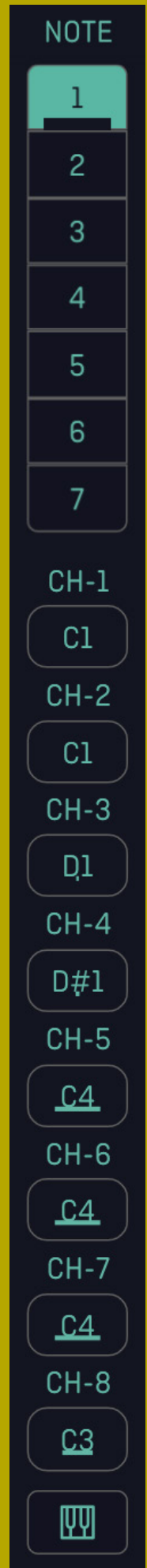
IMPORTING AND EXPORTING

Look at the very bottom of Strokes and you'll see Import and Export options which allow you to save your work and recall it whenever you like. A major intention behind this is to encourage cross-platform use of Strokes, so you can start a Project on your iPad, export it to iCloud and import it into your desktop DAW for further work.■

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LOGIC MODES

Each Channel has eight selectable logic modes. Each logic mode is a combination of two input Channels, and a logic operation (AND, XOR, NOR).

The outcomes of all eight logic modes across Channels 5-8 are displayed simultaneously in the grid. The four horizontal rows correspond to the four Channels. The eight vertical columns correspond to eight logic modes. The selected logic mode is highlighted by a white overlay in the grid.

By moving the logic selector through the eight different logic modes we cycle through eight different arrangements of inputs and logic operations. Let's break down the eight modes relating to Channel 5.

Channel 5 Logic Modes			
Value	Input A	Input B	Mode
1	CH1	CH2	AND
2	CH1	CH2	XOR
3	CH1	CH2	NOR
4	CH1	CH2*	AND
5	CH1	Accent	AND
6	CH1	Accent	NOR
7	CH1	Accent**	AND
8	CH1	Accent***	AND

* Input B (CH2) toggles between 1 & 0 with each trigger
** Input B (Accent) toggles between 1 & 0 with each trigger
*** Input B (Accent) toggles between 1 & 0 every four triggers.

The subsequent Channels have identical logic modes except their inputs are incremented.

Channel 6 Logic Modes			
Value	Input A	Input B	Mode
1	CH2	CH3	AND
5	CH2	Accent	AND

By inverting the Channel we invert the outcome of each logic operation giving us access to NAND, NOR and XOR, effectively allowing 16 different logic modes.

1 - AND
Triggers every 16th note where CH1 and CH2 are both active

2 - XOR
Triggers every 16th note where only one of CH1 and CH2 is active

3 - NOR
Triggers every 16th note when CH1 and CH2 are inactive

4 - AND (/2)
In this mode, every time a trigger occurs in Input B we toggle between 0 and 1. This functions like a clock divider where Input B is divided by 2. Input A is then compared against the toggled state.

5 - AND
Triggers when CH1 and an accent both occur.

6 - NOR
Triggers when neither CH1 or an accent occur.

7 - AND (/2)
In this mode, every time an accent occurs we toggle between 0 and 1. This functions like a clock divider where Input B is divided by 2. Input A is then compared against the toggled state.
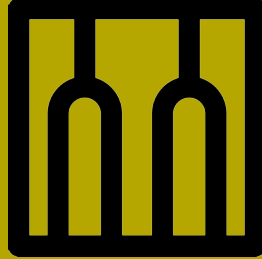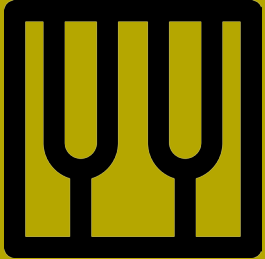
8 - AND (/4)
This mode is identical to the previous mode, except we divide the signal again, requiring four triggers on the accent Channel to toggle the state.

BEYOND STROKES

As well as being a self-contained environment, Strokes is also ready to connect with other music-making tools to broaden its sonic possibilities through a variety of inputs and outputs.

NOTE LEARN
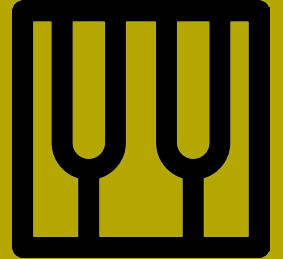
In the bottom left hand corner beneath the Note section, the small keyboard icon activates Strokes' Note Learn function. This allows you to input MIDI note information from a keyboard or Sequencer to alter the Pitch of a Channel. Any MIDI note you send will be assigned to the selected Channel, and then Strokes will jump to the next Channel ready to receive another note. If you input a chord, this can, in essence, turn Strokes into a polyrhythmic, multi-Voice arpeggiator.■
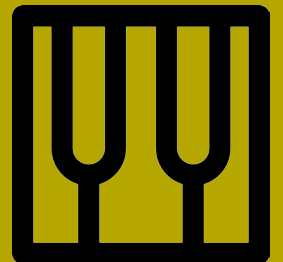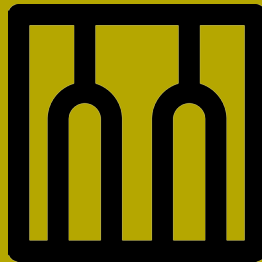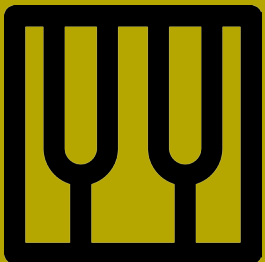
TRIGGERING EXTERNAL MIDI AND HARDWARE

Before its own Voice options were added, Strokes was originally built to control other MIDI devices. All MIDI information from Strokes can be sent to your preferred destination, including all Sequences and modulation. The details of how this is set up and the creative possibilities will vary depending on which DAW you are using Strokes in, or if you are using Strokes as a standalone iOS app. With the right tools (such as a MIDI to CV converter) Strokes can also be sent out to modular and analogue hardware.

For more detail on how to set Strokes up with specific DAWs, please refer to the Appendix at the back of the manual.
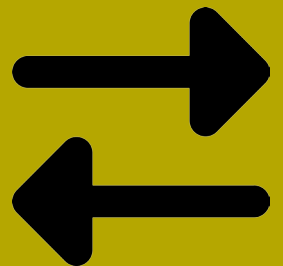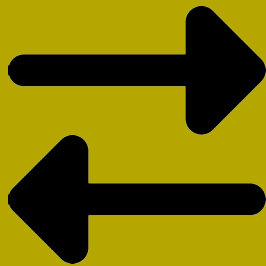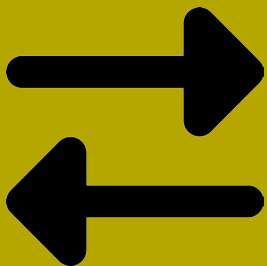
MIDI CONTROLLERS

Given the performance, jam-oriented nature of Strokes, its potential as an expressive instrument becomes greater with more hands-on control as opposed to single-operation mouse click input. All the functions can of course be mapped to your preferred MIDI controller.

There are a lot of possible configurations for MIDI mapping depending on the specific requirements of your Project, but it can be helpful to avoid over-complicating your set up and focus on mapping a few of the key controls that will bring the biggest results. If you're after a suggestion, we'd recommend the following:

- Four sliders or faders to control Shares
- Four sliders or dials for the Weights Envelope Offsets
- Two sliders for the low and high Velocity settings on the Accent Channel
- 16 dials for Matrix
- MIDI note buttons / inputs for Pattern and Note changes

Dial-based controllers such as the [MIDI Fighter](#) are ideal for Matrix, while a simple fader array such as the [Slate and Ash 16n Faderbank](#) will cover the other above recommendations with a couple of faders spare. While this set up wouldn't give you hands-on control over sequencing, once your Project is set up, it will give ample scope for exploration and variation.

For users of Android-based tablets fawning over the iOS crowd enjoying their touch-screen Strokes experience, you can always try the wholly malleable TouchOSC controller app, which allows you to build a custom controller of your own that can integrate very nicely with Strokes, at the very least breaking you away from one-click jams. Fortunately, if you are limited to a mouse, Strokes is the kind of device which can generate so much movement in the music it won't hold you back from creating wonderful music.■

After all, limitations often breed the best results.

RECORDING YOUR JAM

Of course you're going to want to capture some of the magic you conjure within Strokes to relive and share with the world. Within a DAW, Strokes will output a stereo signal as standard, but it is also possible to output all eight individual Channels as well as the Reverb and Delay Channels. This means you can multi-track Strokes and record it into a DAW for detailed mixing and editing, or send the separate Channels out to an external mixer if you have the right audio interface and outboard setup.

The main thing is to have fun - the longer you spend in Strokes, the further it will take you, so make sure you are hitting record because there's nothing more annoying than realising you've been killing it for the last 10 minutes only for all that sonic brilliance to be lost in the ether.

Happy jamming!