2step

prerelease manual

march 2023

Introduction

(eventually things here)

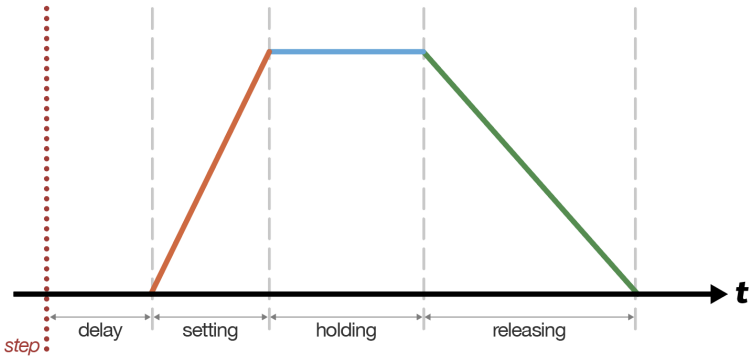
If you ever get ansty you can jump straight to the quick references at the end.

Envelopes Are Trigs and So Can You

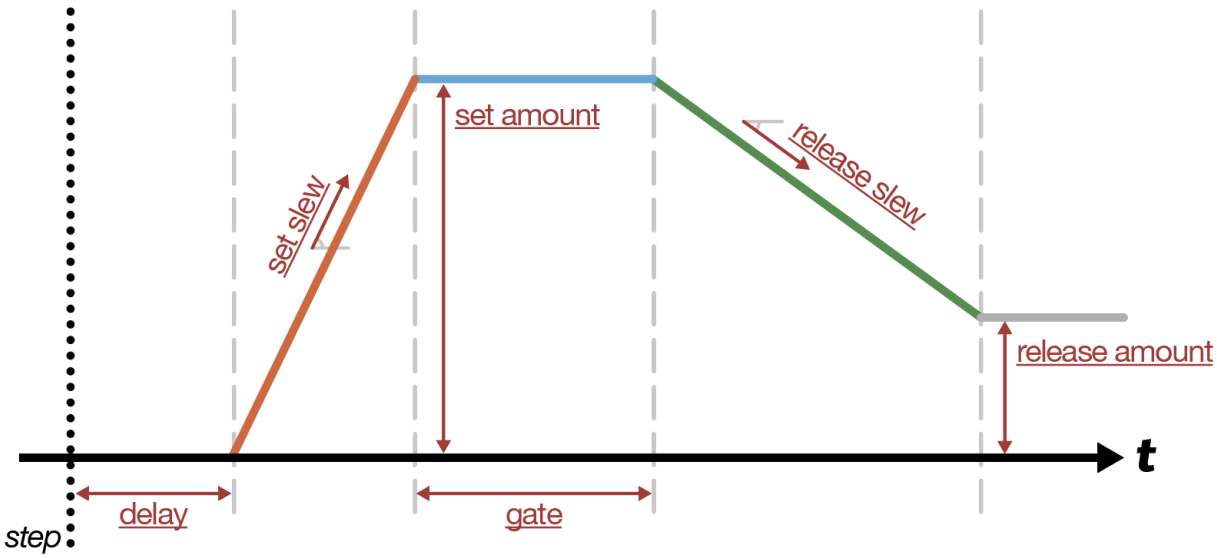
Gate, Slew, and Amount

Each of 2step's four output channels follows an envelope-like set of stages upon each *step input*. The shape of this envelope can be customized through various parameters. Here is a familiar image to start.

Much like a traditional ASR envelope, there is a setting phase while the signal rises. Once the signal is high enough, a hold phase keeps the value steady for some length of time, and then a releasing phase returns the signal to its baseline. In 2step, there is also an optional delay stage at the beginning of the sequence, making it a DASR envelope generator.

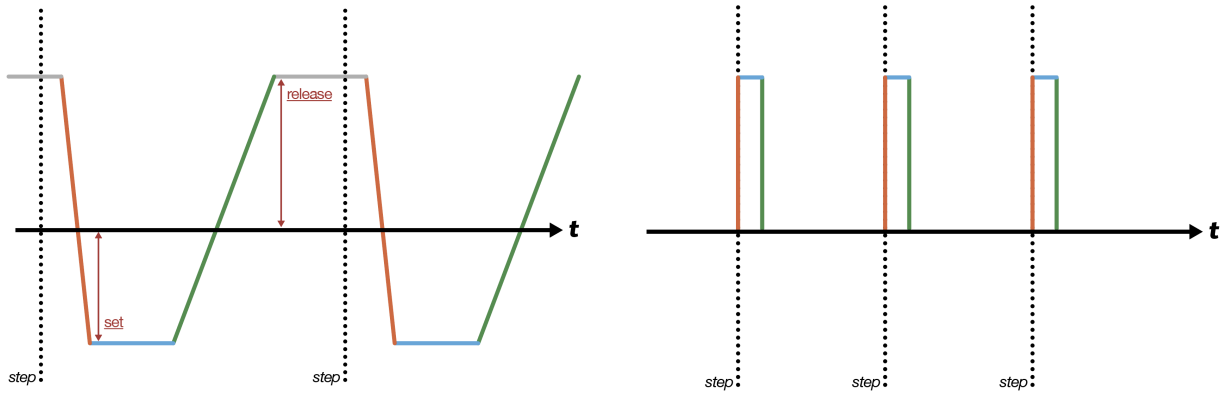


In 2step, we can go quite far using the different available parameters to customize the shape of this envelope.



As you can see, you have control over not only the time length of the delay and gate phases, and the set slew and release slew slope angles of the envelope, but also the set amount the envelope needs to see before it'll go into its holding/gate phase, and the release amount the envelope will continue to slew towards until it's reached.

In most envelope generators, you can't select a release amount. The envelope always returns to zero. In 2step, if you mess with the given parameters enough you can generate all kinds of shapes:



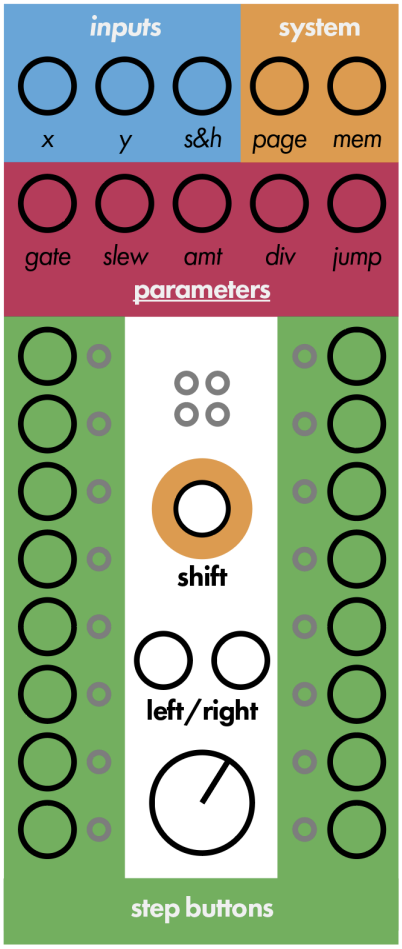
On the left, we show that you can generate envelopes that run into negative voltages, allowing for bipolar CV output. We also show that the set amount does not have to be bigger than the release amount, just like the release amount doesn't have to be zero like you'd usually find. (This is why we don't refer to "slew up", for example, but rather "set slew", as we may not be moving upwards at all but we are always slewing toward our set amount.)

On the right, you can see that if you set both slew rates to infinite, choose a set amount of +5V, a release amount of 0V, and a gate length of around 5-10ms, you get an envelope that looks a lot like a trig you might get from a more traditional sequencer. When you start a new patch in 2step, each channel is set up in this way to produce these trig-like envelopes.

Basic 2step Literacy

Let's look at the interface and make sense of how to use it before we dive into any more features.

The interface is divided into several sections.



The *input* buttons in the top left allow you to modulate parameter values through CV mappings.

The **system** buttons PAGE and MEM let you navigate through sequence pages, and to save/load patches.

The parameter buttons form a whole row on their own. You should recognize the terms gate, slew, and amt from the previous section. You can use these to change parameter values per channel or per step.

The SHIFT button in the middle performs many functions across 2step, but on its own it can be held to access the global tempo, transport controls, and settings.

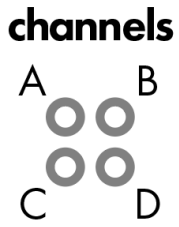
Above the SHIFT button are the four PAGE LIGHTS (not labeled). These help you orient yourself and navigate through pages of different kinds in 2step.

Like the SHIFT button, the LEFT and RIGHT buttons perform different functions in different contexts, but they are always used to indicate something to the left or to the right.

The STEP BUTTONS allow toggling and selection of steps and values. The KNOB can select values as well.

Idle Screen / Step Toggling / Sequence Length

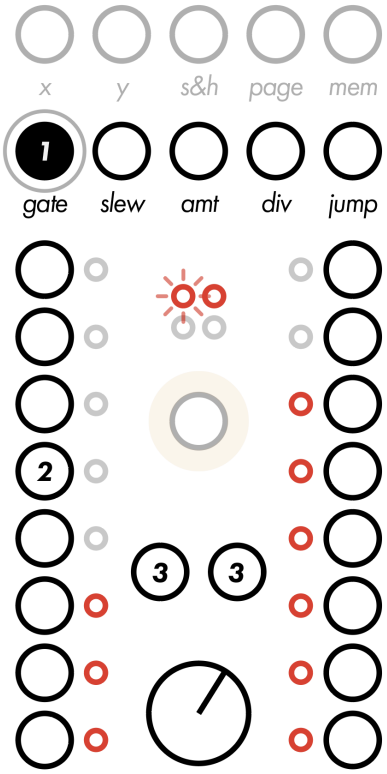
When 2step first loads up, the sequence length is 8 steps. In this case, you can see two channels at once: the left column of STEP buttons are the 8 steps of Channel A, while the right column corresponds with Channel B. You'll see also that two PAGE LIGHTS are lit: the first two, for Channels A and B. Press PAGE once, and the bottom two lights will indicate that you are now instead looking at Channels C and D.



If you hold the PAGE button, you can change the global sequence length. When the sequence length is longer than 8 steps, only one PAGE LIGHT will light, and you see the steps of a single channel at a time.

If you patch an output from 2step somewhere, you can immediately get started sequencing just by pressing STEP buttons to toggle the corresponding step on and off.

Setting a Parameter



To set a parameter for a channel in 2step, first hold the parameter button you want to adjust. Let's start by adjusting the gate length. Hold the GATE button (1).

> *Holding buttons not your thing? Take a look at the System Settings for some accessibility options.*

Now if you look at the column of lights for each channel, you'll see the current gate length for Channels A and B. If you press a few STEP buttons (2), you'll see and hear the values change. This process lets you set any parameter value on any channel.

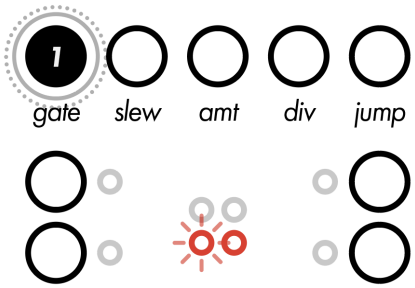
You can use the knob to edit the value as well. You can use the LEFT/RIGHT buttons (3) to select a channel to edit, or if you don't it locks on with the side you last edited using the STEP buttons. This way you can rough in a value and the use the knob to refine. The blinking PAGE LIGHT indicates the knob target, left or right. (For sequence lengths longer than 8, there is only one channel visible and one channel to edit.)

The amount parameter is bipolar: you can set output voltages from -8V to +8V. Because of this, and to retain finer control of the value, you only see the positive or negative half of the output range (-8~0, 0~+8) at a time. Negative values fill in from the top instead of the bottom of the column. To switch between positive and negative, double-tap on any STEP button or just use the knob.

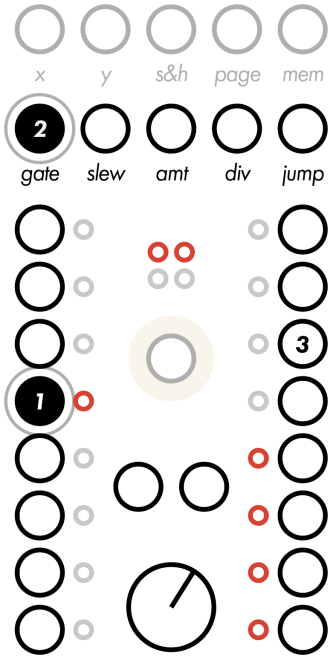
> *There are also accessibility settings available around double-tapping.*

If you play around a bit, or just look at the button labels, you'll notice that we're missing half of the parameters we've discussed so far. GATE edits the gate length, SLEW edits the set slew rate, and AMT edits the set amount voltage, but we're missing delay, release slew, and release amount. You can access these by double-tapping the parameter buttons as you go to hold them.

When you double-tap-hold GATE you get delay, double SLEW gets you release slew, and AMT is release amount. You can tell whether you're editing the main layer or this secondary layer of parameters by looking at the PAGE LIGHTS: the bottom row of lights will light up when you have double-tapped into this extra layer.



Setting a Parameter By Step



2step allows every parameter value to be customized for every step in the sequence. You can do this quickly by holding the step first, and then holding the parameter you would like to edit.

> *Any time you hold multiple buttons in a chain to enter some mode in 2step, you can let go of each one once you hold the next.*

Now, you'll see the step you've selected lit and pulsing. On the opposite side, you'll see the value assigned to that step. When a step does not have a value assigned to it, you'll see a dimmed reminder of the channel value. Press any STEP button alongside the value (3) to edit the value as usual, or use the knob.

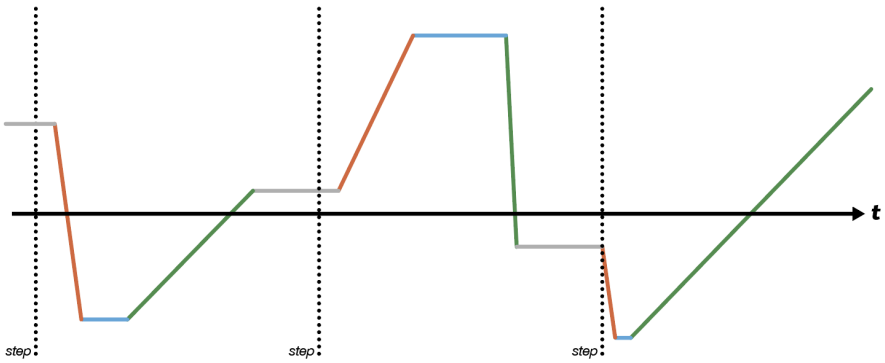
> *You can also enter by-step editing while editing channel parameters (only holding the parameter button first), by pressing the SHIFT button in the middle once. Once you start selecting some steps to edit, you end up in the same place.*

While editing parameters by step, you can select or deselect steps freely by pressing the STEP buttons not busy representing a value. Selected steps pulse brightly. Unassigned steps blink twice. Assigned steps show their value by the brightness of their light.

You can hold more than one STEP button (1) *before* holding the parameter button (2). This way you can even select steps from both columns. While in the by-step display, you can use the LEFT/RIGHT buttons to select which column shows steps for selection and which one shows the assigned value.

If multiple steps are selected and they have different assigned values, the value column shows the different assigned values as individually lit lights instead of a single bar.

With by-step editing of all the available parameters, you can now start dreaming in some really irregular shape sequences.



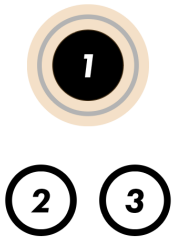
Unsetting a Parameter Value

In many cases but especially when dealing with by-step parameter assignments, it's useful to be able to clear a set value. This way, you can revert a step to following the channel parameter assignments. To do this, hold the MEM button while a parameter is loaded up. Here are the specific values that can be erased. Some of these features are discussed later.

Scenario	**Result**
Holding one or more STEPs on idle screen	Init the steps (erase all by-step assignments)
Holding LEFT/RIGHT on idle screen	Init all steps in that column
Editing a channel-wide CV mapping	Remove that mapping
Editing a channel-wide parameter value	Init that value to default
Editing any by-step mapping or value	Unassign that setting of the selected steps

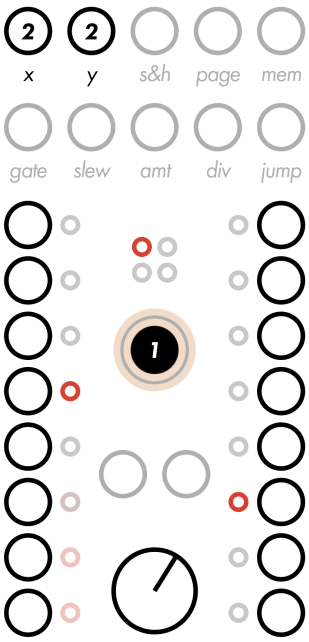
> *An animation shows you how much longer you have to hold MEM to perform the erase. Shortcut this or any other animated timer by pressing SHIFT once.*

Play/Pause, Reset, and Tempo



These basic functions are all accessed by holding the SHIFT button in the middle.

Once holding SHIFT (1), the LEFT button (2) will reset the sequencer, while the RIGHT button (3) will play/pause.



Also while holding SHIFT (1), you can see and change the current tempo. The three-digit tempo is encoded in the STEP lights: the tens digit in the left column and the ones in the right. The hundreds digit is shown as a shaded background region in the left column: at the bottom for 0, in the middle for 1, and at the top for 2.

So here, you see the tempo 053, or 53bpm. The unit first loads at 120bpm.

To edit the tempo, use the STEP buttons to edit each side, or use the knob to scrub the tempo directly. Double-tap on a left column STEP to change the hundreds digit. The knob can set tempos up to 255bpm, while the buttons can reach 299.

> *Of course, there are only STEP lights 1-8 on each side. The digits 0 and 9 are represented by a blinking 1 or 8, respectively. You can set 0 or 9 through the STEP buttons by double-tapping 1 or 8. This does mean that you have to use buttons 2-7 on the left if you want to rotate the hundred.*

BPM Multiplier

Of course, in most sequencers each step isn't a quarter note, it's a sixteenth typically. Even cranking the tempo, trying to get that kind of resolution at speed is tricky. To solve this, 2step supports a 1x, 2x, 4x, or 8x bpm multiplier. Press the X and Y buttons while holding SHIFT to switch between multiplier values smaller or greater. These buttons may seem a bit random for this purpose, but they'll make more sense once we explore this SHIFT menu a little deeper later while discussing settings (and LEFT/RIGHT are already used). the PAGE LIGHTS indicate your current multiplier, with x1 on the top-left and x8 at the bottom-right.

> *(Currently,) the multiplier has no effect if you patch your own step input in to control the tempo. It only works on the internal clock.*

Tap Tempo

While you're looking at the idle screen, you can tap on the SHIFT button to set the tempo. Four consecutive presses at 40bpm or greater, and the tempo will begin to track your presses. The most recent 4 taps are averaged. The limit is still 299bpm.

Sequence Navigation and Manipulation

Div, Mul, Jump, and Stride

Now that we've discussed the key shape parameters and how to apply them, we can turn our attention to the other two parameter buttons: DIV and JUMP. The four parameters these buttons cover are: div, mul, jump, and stride.

div is fairly straightforward: the next step will not trigger until div *step*s have fired off. So if div is set to 4 for a whole channel, then the channel will effectively advance a step every 4 *step*s.

> *An extended parameter range is available for all of these navigation parameters. In the case of div, the upper range are multiples of 2 starting at 16. The highest value in this upper range, rather than being 2048, is simply infinite.*
>
> *As usual, to access this extra range through the STEP buttons, double-tap. You'll see the shaded background region toggle to the bottom or top to indicate normal or extended values, respectively.*

jump and stride then affect which step we navigate to when a *step* does occur. stride determines how many steps forward to increment when advancing a step. Normally this is 1. Double-tap-hold JUMP to reach stride. If a jump value is set, the stride is ignored, and the channel will always advance to the step indicated by the jump value. When jump is not set, the value display will sparkle.

> *This is how you can achieve irregular pattern lengths: create a jump back to the start of the sequence on the last step of your pattern.*

The secondary parameter on the DIV button is mul. Rather than multiplying the clock exactly, this is 2step's ratchet feature. When the releasing stage is complete, 2step will look at the mul value and repeat the envelope until it has played mul times. There are additional parameters available to govern the delay before a repeat occurs, as well as to skew that delay as repeats continue, but those are advanced features we'll cover much later.

CV Inputs and Mapping

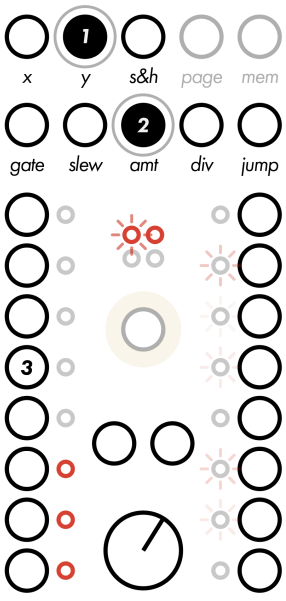
2step supports 2 CV inputs *x* and *y*, both of which read values -8V to +8V. It additionally provides an internal *sample & hold* modulation source which can be used to quickly add randomness to any parameter.

Input Monitoring

To start, you can hold either the X or Y buttons. With either of these buttons held, the STEP lights display a meter of the input signal, *x* on left and *y* on right. You may be surprised to find them moving without patcheding in. In 2step, output A is normalled to *in x*, and output B is normalled to *in y*. This is to enable easier monitoring of your settings, and to encourage self-patching.

Setting a Mapping

To map an input to a parameter, first hold the input button, then the parameter button.



Here we have held Y followed by AMT, so we are mapping **from** *in y* **to** set amount. If we hold Y and double-tap-hold AMT, we map into release amount instead.

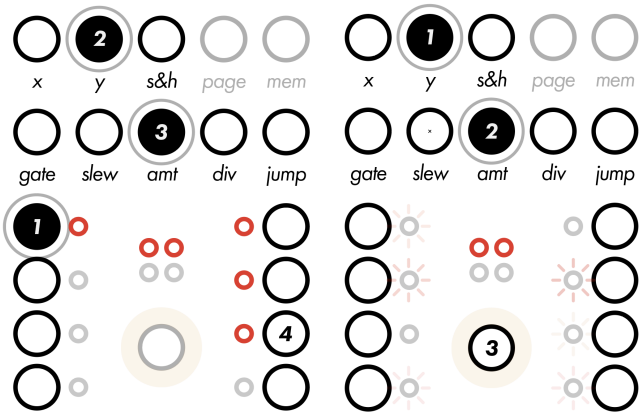
In the example shown, the right column is sparkling. This means there is no assignment from *in y* to set amount for that channel right now. The left column shows an active mapping, with about a third of the *in y* value summing into the release amount parameter for Channel A.

> *Like amount parameters, all CV mappings are bipolar. You only see the negative or positive range at once, and you can toggle between them using a double-tap on a STEP button or using the knob.*

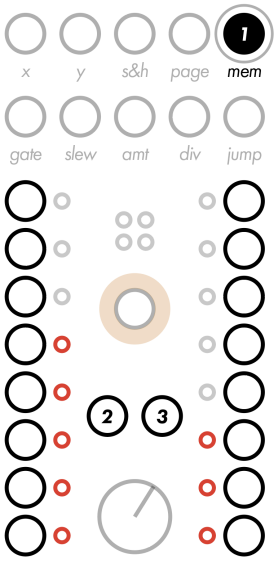
To unmap a CV mapping, hold MEM as described in [Unsetting a Parameter] above. Hold LEFT or RIGHT to isolate one channel to unmap.

As with parameters, you can set a different CV mapping amount for each step in the sequence. Just like parameters, you can either hold the STEP button(s) first that you want to edit, or you can press the SHIFT button once while editing channel CV mappings to get into step editing mode.

Remember that once you hold the next button in any input combo, you can let go of the previous one.



Memory Functions



Undo and Redo

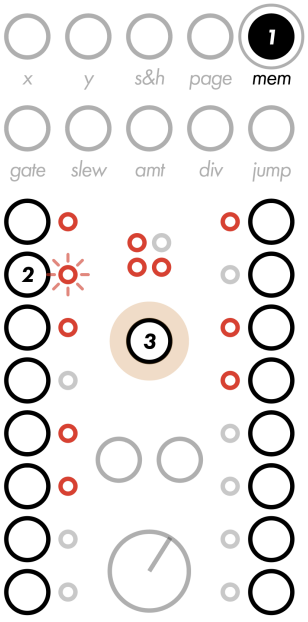
2step offers a 64-entry undo/redo buffer.

To undo a change you have made, hold MEM (1) and press LEFT (2) to undo, or RIGHT (3) to redo. Once you press LEFT or RIGHT, the display will change to show you the entries left in the undo and redo stacks. You can press a lit STEP button to undo or redo all the way to that entry.

In this example you can still undo 5 times or redo 3 times.

2step tries to merge frequent edits to the same value (particularly when using the knob) so undo actions aren't overwhelmed and remain somewhat predictable.

Loading a Patch



There are 16 slots for saving and loading patches.

To load a patch, first hold MEM to see your current save slots. The PAGE LIGHTS display a loading upward animation. Occupied slots are lit. The currently loaded patch blinks.

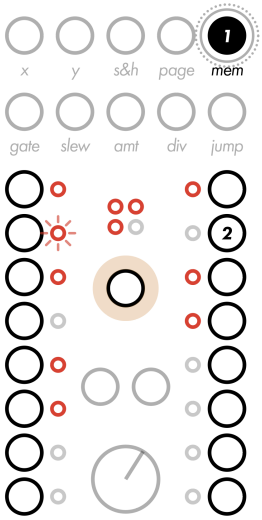
Press the STEP button (2) of any slot to load it. The STEP lights will count down to the start of Channel A's sequence, at which point the patch will be loaded. To cancel the load, press the same STEP button again in this time.

To load the patch sooner, press SHIFT (3) to hasten.

Pressing SHIFT once will cause the patch to load upon the next Channel A *step*. Pressing SHIFT again will load the patch immediately.

> *By default, 2step will load the saved patch on step 1, to match the sync at the top of the sequence. It will preserve each channel's current step number across the load when loading the patch if you force it to load any sooner. You can change these behaviors, including an option to force the saved time and step to load with the patch, in the [Channel Settings].*

Saving a Patch



To save the current system state as a patch, double-tap-hold MEM. The PAGE LIGHTS will display a saving downward animation.

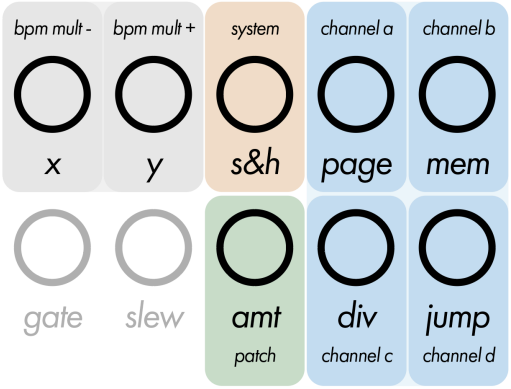
As with patch loading, occupied slots will be lit, while the currently loaded patch (if any) will blink.

To save, just press any STEP button. If there is already data in that slot, it will be overwritten.

> *Saved data can be transferred to and from a computer over USB, using a utility available on the 2step webpage.*

Settings

There are a variety of settings available in 2step. System settings generally focus on interactivity and accessibility options, and apply across the whole system no matter what patch is loaded. Channel settings change the behavior of each individual channel, and are saved along with the patch.



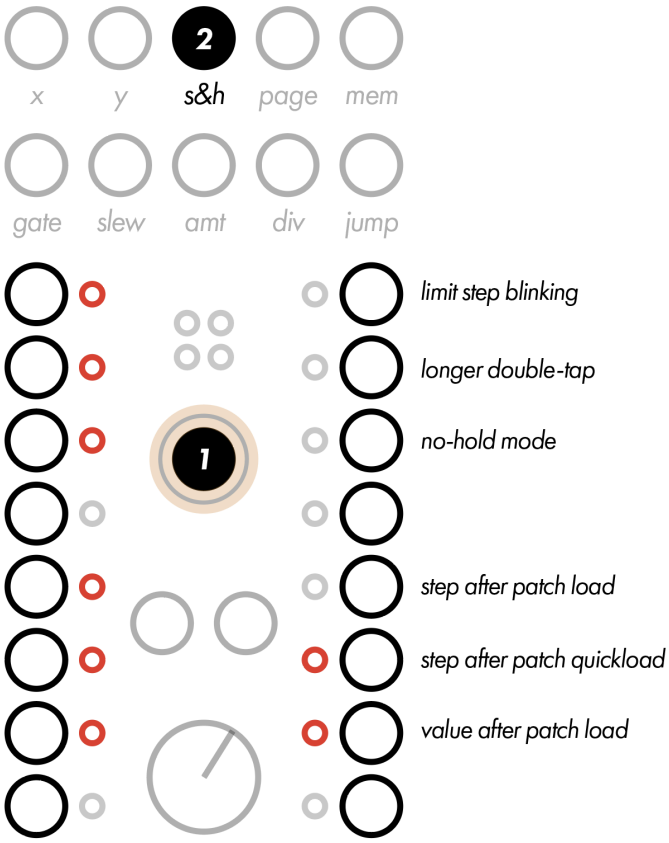
Settings are accessed by holding SHIFT, then pressing one of the upper rows of buttons. Here we show again the BPM multiplier adjust buttons, which we already discussed.

The main driver of this button layout is the four output channel settings buttons. Directly below the corresponding four jacks, each button will edit the corresponding output channel. In the middle, then, we have room for System (above) and Patch (below) level settings.

To access any of these settings pages, press the button while SHIFT is held. Alternatively, you can hold the settings button you want and let go of SHIFT.

System Settings

System Settings are saved immediately to system memory. They are loaded on system startup, and persist across loaded patches. To access them, hold SHIFT (1) and press S&H (2). You can continue to hold either of these buttons to remain in System Settings.



Settings values are presented as left/right toggles across STEP button rows. In general, left means off while right means on. Some settings have three values. In this case both lights glow for the middle option.

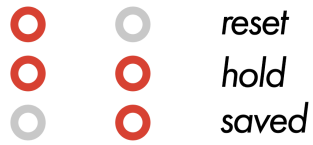
The available system settings:

Limit step blinking eliminates the blink indicating the current step upon each *step* input. With this on, the blinking only occurs on the idle screen.

Longer double-tap lengthens the time window in which pressing the same button twice counts as a double-tap.

No-hold mode eliminates the need to hold or double-tap across the entire interface. In this mode, you can replace the phrase “hold” anywhere else in this manual with a simple press, and “double-tap-hold” can be done just by pressing the same button a second time. Typically, pressing the same holdable button a third time will exit the mode you entered.

Any time a button needs to be double-tapped, you can press the button twice in any length of time to accomplish the same result in no-hold mode.



Step after patch load determines which step each channel starts at when a patch is loaded and you allow it the time to count down and load at the top of the sequence. By default, this is set to **reset**, which will set all channels to step 1. The **hold** option preserves the current step of each channel instead as the new patch data is loaded in. The **saved** option respects whatever state the patch was saved in no matter what.

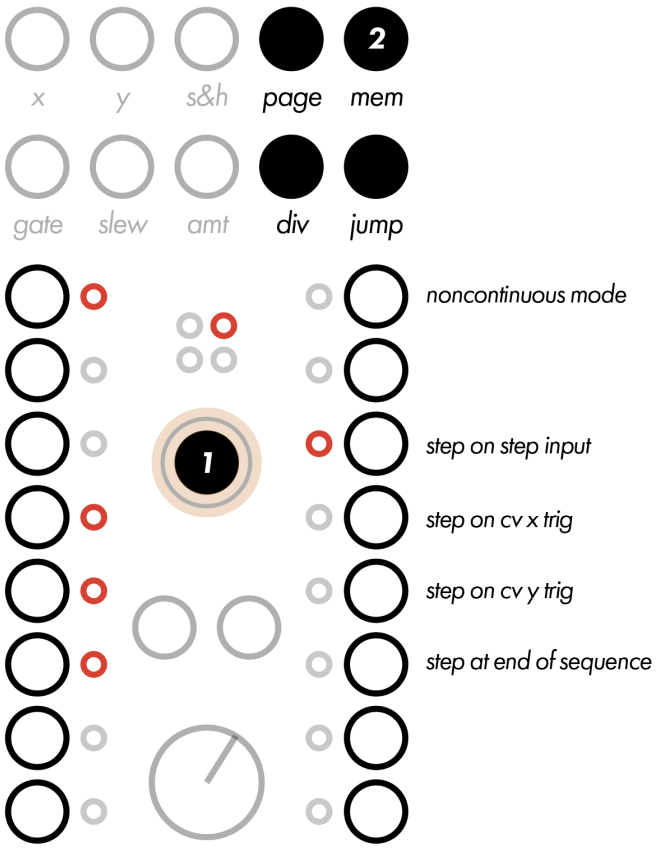
Step after patch quickload is the same, but applies when SHIFT is used either once or twice to hasten the load. The default value here is **hold**.

Value after patch load is again similar to the previous two options, but instead applies to the voltage value each channel is at. The default value is **hold**. This option applies whether the load is hastened with SHIFT or not.

Channel Settings

Channel Settings have a similar interface to the System Settings, with each row representing one option. Channel Settings, on the other hand, are persisted along with the patch data.

To enter Channel Settings, hold SHIFT and press any of the right four buttons, corresponding physically to the four output jacks above. You can continue to hold either SHIFT or the settings button to remain in this mode. The selected channel's PAGE LIGHT will glow.



Noncontinuous mode makes a channel reset its voltage value to the release amount of the previously active step each time a new step becomes active. Normally, the value is preserved, which allows for unique and organic behavior as a slew may not complete before the next step triggers. However, this is unorthodox and it is counterproductive if the goal is to produce predictable envelopes and shapes. Turn this option on if that's what you need from a channel.

The next four options, **Step on step input**, **on cv x trig**, **on cv y trig**, and **at end of sequence** allow a channel to advance on an input other than the global *step* input. You can choose either of *in x* or *in y* to read those inputs as trigs for this purpose. You can enable **at end of sequence** to automatically advance a step when the channel completes its entire envelope as well as all requested mul repeats. This lets a channel run free. You can, in fact, enable and disable any combination of these step inputs per channel.

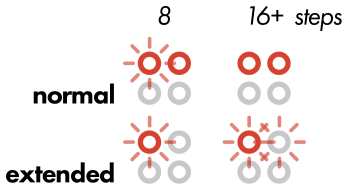
Extended Parameters

As previously mentioned, there are additional parameters not yet described. We have saved discussion of these for the end to avoid overwhelming new users. There are currently five extended parameters.

To access these parameters, hold any parameter button and double-tap PAGE. This is an esoteric combination, but these are advanced features. When you do this, you switch the GATE, SLEW, and AMT buttons over to the extended set of parameters instead of their usual.

The DIV and JUMP buttons remain unaffected. Repeat the combination to return to the normal parameter set.

You can tell you're editing extended parameters by looking at the PAGE LIGHT indication while editing a parameter. When in extended mode, only the blinking knob edit indication lights up. With a longer sequence length, the PAGE LIGHTS alternate left and right.



Like normal parameters, you can tell if you're editing secondary extended parameters because the bottom PAGE LIGHTS will light instead of the top.

On the GATE button, which normally deals with timing, you will now find the mul delay and mul skew parameters. These both apply only when the main mul parameter is creating repeats. The mul delay setting controls how long after the release phase is complete the envelope will repeat. The mul skew parameter, which is bipolar, adds or subtracts a constant amount to the delay amount with each repetition.

On the SLEW button, you'll find yet more slew parameters: set slew curve and release slew curve. This allows you to curve the slew slope to into a logarithmic decay toward the target value. The larger the parameter value, the more curved the slope will be. Changing the slew curve will not affect the slew timelength.

On the AMT button, you'll find only one parameter: chance. This allows you to lower the probability any step will actually activate down from its usual 100% certainty. If a step loses its dice roll, it behaves as if you had disabled it by toggling it off in idle mode.

Patch Ideas

<Unique ways to combine the above features; looping or random envelopes, LFO tables, etc>

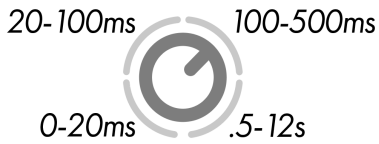
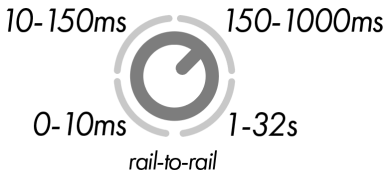
Quick Reference

Modes and Interaction Graphs

Describe the interface but with only graphics, arrows, and quick text bubbles

Parameter Tables

	GATE	SLEW	AMT	DIV	JUMP
Normal	Gate time	Set Slew	Set Amount	Div	Jump
Secondary	Delay time	Rel Slew	Rel Amount	Mul/Repeat	Stride
Extended	Repeat Delay	Set Slew Curve	Chance	Div	Jump
Secondary	Repeat Skew	Rel Slew Curve	—	Mul/Repeat	Stride

Time Gate length Delay time Repeat delay		
Slew Set Slew Rel Slew		
Amount Set Amount Release Amount	-8V to +8V	
Count Div Mul/Repeat	*Normal Range* 1, 2, 3, 4, 6, 7, 8	*Extended Range* 16, 32, 64, 128, 256, 512, 1024, inf
Step Jump Stride	1, 2, 3, ... for each step	*Negative CV input* Wraps back down from sequence length