

Plinky

Plinky is an 8 voice polyphonic touch synthesiser that specialises in fragile, melancholic sounds.

Think of it as an 8 vertical stringed instrument, played by touching the 64 main pads, which are arranged in 8 vertical monophonic strips.

You can play Plinky straight away with those 64 main pads. The row of 8 'shift' keys (blue LEDs) along the bottom are used in conjunction with the main pads to select parameters, presets, sequencer patterns, and samples.

Plinky supports 4 external CV modulation sources, called A B X Y, each with its own LFO. A & B also have dedicated physical offset knobs, located either side of the screen.

Each of the 8 strings has:

- 4 sawtooth oscillators or sampler grains, detuned by the tiny movements of your finger.
- A white noise generator
- an ADSR envelope controlling...
- a resonant 2-pole low-pass gate
- a secondary Attack-Decay envelope with repeat.

Plinky also has global delay, reverb, high pass filter and saturation units along with a simple mixer, arpeggiator, sequencer and sampler.

I plan to add a compressor in a future update.



Changing the Sound

When you first switch it on, try pressing a few of the main pads. You should hear a supersaw type sound. Enjoy! Now let's add some delay. The bottom row of buttons, with blue LEDs, work as shift/mode buttons. Tap the bottom left button, the 'primary' parameter editing button, referred to as 1 (with a double-headed arrow icon) from here on. Its LED lights, and you are invited to select a parameter – one of the icon pads. Tap the (FX) pad, in the second column, in the middle. This is the send level to the delay unit. Slide your finger upwards on the leftmost column of pads to increase the amount of delay. To hear this, play notes using the 4 pads at the top which have no icon. 4 pads note can be a bit restrictive! So tap the bottom left shift key – 1 (with a double-headed arrow icon). Its LED should start flashing. That means you can still use the slider at left to adjust the send level more, but the remaining 56 pads are available to play notes. Play & tweak, then press 1 (with a double-headed arrow icon) a last time when you are ready to return to full 'play mode'. That's the basic workflow for creating patches in Plinky!

Adding Modulation

Let's use the physical knob at the top of Plinky to adjust overdrive. Tap 1 (with a double-headed arrow icon) again, then tap (with a double-headed arrow icon) (leftish below middle) to select overdrive. Instead of just turning it up with the leftmost slider, this time, first tap (with a double-headed arrow icon) in the right column to select 'modulation source A'. NOW turn it all the way up with the left slider, then tap top right (with a double-headed arrow icon) to return to 'base value', and 1 (with a double-headed arrow icon) twice to return to play mode. Now, the physical knob at the top left of Plinky will control overdrive. That's as complex as it gets! You now know everything you need to know to play, edit patches and modulate. Enjoy! Details follow.

Shift Keys

Working from the bottom of the panel with the row of shift keys: NB in the prototype, the first 2 shift keys are printed as 'A' and 'B' instead of '1' and '2', which is confusing because they have nothing to do with the A and B modulation sources/knobs. Oops. They should have been labelled 1 and 2, and I'll refer to them that way in this doc.

- Edit Mode** The first two shift buttons are the most important: they allow you to modify the sound. Why two? They map to two complete sets of parameters – primary on 1 (with a double-headed arrow icon) and secondary on 2 (with a double-headed arrow icon). Tap or hold either, then tap an icon pads to choose a parameter to edit. Once in edit mode, adjust the chosen parameter using the left most column of pads as a slider, or slide the finger on the icon up/down. Tap again (LED flashing) to make most of the main pads playable, leaving the left column as a slider. Tap again to return to play mode (LED off).
- Preset Mode** Tap or hold, then tap a main pad to select a preset (left 32 pads), pattern (middle 24), or sample (right 8). A long press on a sample pad will edit it; on other pads, it will copy the current preset / pattern to it. Press and hold (with a cross icon) to clear the last touched preset or pattern.
- Previous Button** Tap to jump to the previous step (sequencer paused) or first step (sequencer playing). Or, hold it then tap a main pad to jump to a step within the current loop, or to set a new loop start outside the current loop.
- Next Button** Tap to jump to the next step. Or, hold it then tap a main pad to set the end of the current loop.
- Clear Button** Tap or hold to clear stuff. Useful to mute recorded notes, live, while the sequencer is playing. If recording, this will permanently clear steps. In (with a double-headed arrow icon) mode, hold this after tapping a main pad to clear whole patterns or re-initialize presets.
- Play / Record Buttons** Tap to toggle playback & recording. Recording can be step based (when sequencer is paused) or realtime (when sequencer is playing).

Parameters

Plinky's parameters are arranged in somewhat logical horizontal rows. Remember to touch/hold 1 (👆) or 2 (👆) to enter parameter edit mode, then touch a pad with an icon to select that parameter. The left most column then becomes a dedicated slider, or you can slide the finger that's over the icon up and down. Pressing 1 (👆) or 2 (👆) again leaves the left slider active, allowing you to continue to tweak a single parameter while playing with the majority of the pads. Pressing 1 (👆) or 2 (👆) a third time returns to play mode, with all 64 pads available to play. This is the main workflow when making patches with Plinky.

The leftmost column of pads is a slider. The *rightmost* column of pads are **modulation sources**. We'll cover those later. The middle 6 columns are the parameters themselves. From top to bottom, they are:

Top Row Toggles The top row has a button (🔁) to toggle the arpeggiator, and another (🔇) to toggle latching of held notes. Press (✖) to clear the latch. The 4 buttons (🎵) with no icon play notes – they are available to audition the current sound, even when choosing or editing parameters with the other pads.

A/B Inputs (🔊) The next row controls the A & B CV inputs. Shift key 1 (👆) gives you parameters for input A and shift key 2 (👆) gives you parameters for input B. (🔊) is a scale – aka attenuverter, scaling the input voltage. (➕) lets you add on a constant voltage offset. There are also physical knobs at the top of Plinky that provide an additional offset to inputs A & B. Lastly, each input has a dedicated built in LFO that is added on top – so that these modulation sources can be useful even without any jacks plugged in. (📏) controls the depth of LFO, (📡) the frequency, (📐) its shape, and (📏) its symmetry – for example turning a triangle wave into a sharp ramp up (symmetry +100) or down (symmetry -100).

X/Y Inputs (🔊) These work just like the A/B inputs, except that they do not have dedicated offset knobs at the top of Plinky.

FX Controls (FX) Shift key 1 (👆) controls the delay unit; 2 (👆) controls the reverb. (🕒) sets the time of the effect; for delay, positive values are not tempo synced, negative values are locked to the clock. (🔊) controls a second stereo tap for the delay, giving a ping pong effect. Try musical ratios like 75% and 50%. For reverb, (🔊) dials in a shimmer tap. (📏) controls a tape wobble effect. (🔊) sets the delay's feedback level (unused for reverb). (🔊) and the pad below it, (🔊), are not really FX related. They control a secondary envelope I'll cover next.

Secondary Envelope As well as the main ADSR envelope, a secondary attack/decay looping envelope is available as a modulation source. For example, try it on pitch or noise level parameters to add a click or glissando at the start of each note. Just two pads, one above the other, control it. (🔊) sets the overall level, and for shift key 2 (👆) the looping decay (0=no repeat, 100=repeat forever, 50=decay to half each time it loops) (🔊) sets the speed of this envelope, with shift key 2 (👆) controlling its symmetry – from sharp attack / long to decay, thru symmetrical triangle, to long attack and sharp decay.

Pitch Controls For shift key 1 (👆): (🔊) sets octave, (🔊) sets global pitch (unquantized), (🔊) sets glide time between notes. (🔊) tunes each voice's oscillators a fixed interval apart. Try fifths (7 semitones), octaves (+ or -12) and so on. (🔊) isn't strictly pitch related – it sets the gate length. Reduce it below 100% to get staccato effects. (🔊) is part of the secondary envelope, above. For shift key 2 (👆), (🔊) allows you to transpose all the notes while staying in-scale (ie quantized transpose). (🔊) selects a scale. (🔊) controls the amount of microtonality vs quantization when your fingers move vertically between pads – a small amount is recommended to ensure that the 4 sawtooths are detuned relative to each other. (🔊) sets the interval between adjacent strings – typically a fifth. As before, (🔊) isn't really pitch – it controls PWM! At 0%, plinky plays 4 sawtooths. Above 0, it flips the phase of two of them,

causing interference that gives rise to square/pulse waves, whose duty cycle is controlled by this parameter.

Volume / Envelope / Mix Controls The envelope controls under shift key 1 (👆) are fun to fine tune to get the most expression out of Plinky. (🔊) sets the sensitivity to pressure; low values mean that the low pass gate won't open completely, giving softer, sinewave tones instead of sawtooths. You can turn up (🔊) drive to compensate for any loss of volume; cranking (🔊) further gives strong, guitar-like intermodulation distortion especially when multiple strings are sounding. (🔊)(🔊)(🔊) control a classic ADSR envelope, which opens and closes the low pass gate.

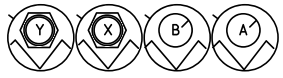
For shift key 2 (👆), you get mixer controls: (🔊) sets the input audio level; (🔊) sets the dry synth level (can be used to gain stage if, for example, an overdriven preset gets too loud). (🔊) controls how much of the input audio is sent to the FX units - +100 is all wet, -100 is all dry, 0 is a mix; (🔊) controls an overall wet/dry mix for the effect returns. (🔊) is the cutoff of a global highpass filter, which can be useful to 'thin out' the sound. (🔊) controls resonance of the lowpass gates, which makes Plinky sound more 'vocal' or 'acid', but can get really unruly and unstable since the cutoff is so tightly connected to variations of pressure in your fingers via the lowpass gate's ADSR envelope.

Arp / Seq Controls After enabling the arpeggiator (🔁) via the top row, this row controls the arpeggiator (shift key 1 (👆)) or sequencer (shift key 2 (👆)). (🔊) controls the order of notes; (🔊) is a clock divider. (🔊) sets the probability of a note playing – positive values pause, negative values skip. The rhythm it plays in is Euclidean by default; (🔊) sets the length of the Euclidean pattern. If it's 1 or 0, it switches to random probabilities. (🔊) sets the number of octaves for the arpeggiator, or the pattern index for the sequencer (allowing external control of which pattern is loaded into memory). (🔊) sets the tempo in BPM – tap repeatedly to set via tap-tempo; if an external 1/16th note clock is fed to the clock input jack, this will automatically update to reflect it. There is also a clock output jack to control other modules via Plinky's clock.

Sampler / Granular Controls Select a sample with (🔊) (you can also press (🔊) to enter preset mode and then tap one of the rightmost column pads, to change this parameter) scrub through the sample with (🔊), change the playback rate (speed & pitch, including reverse) with (🔊). Grain length is controlled with (🔊), while (🔊) creates time stretch effects, including reverse. 1 (👆) controls these parameters, while 2 (👆) adds jitter to them per grain. (🔊) is a system parameter – headphone volume on 1 (👆), pitch input quantization on 2 (👆).

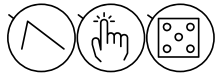
Modulation

The right-most column of pads can be tapped in edit mode to control a 100+ x 7 modulation matrix. Every parameter can be modulated by any amount of 7 different sources, which are from *bottom* to top:



The main jack/LFO/knob modulation sources. (I should have put these at the top to line up with the input jacks – I'll do that on the next prototype).

Let's try connecting mod source B – which includes the right knob at the top of plinky – to pitch. Press shift key 1 (⇧) to go into parameter edit mode, select (B) in the 5th row to select unquantized pitch, (C) in the right column to select mod source B, turn up the amount using the big slider (left column of pads), then twiddle the physical knob at the top of Plinky as you play on the 4 audition pads in the top row (the ones with no icon). Voila, you have connected modulation source B (which includes that knob) to pitch. Now press the top right pad (⇧) to return to 'base value' mode (otherwise you'll forget and go on editing 'modulation source B amount' next time you edit a parameter), and tap 1 (⇧) twice more (so its LED goes out) if you haven't already, to return to normal 'play' mode.



Secondary envelope, Pressure and Random (sample & hold) respectively. Try routing secondary envelope to the noise amount (M) in the bottom row (under shift key 2 (⇧)) to get a 'snap' at the start of notes. (S) is fun because any/every parameter can be individually 'humanised' with a small amount of randomness on each trigger. Positive amounts of (E) modulation give uniform positive offsets; negative amounts give bipolar variations.



Press this top right pad to return to editing the 'base value', rather than modulation sources. It's easy to forget to press this after setting up some fancy modulation; next time you edit a parameter, you'll wonder why you can't hear the change. It's because you're dialling in some fancy modulation source, instead of setting the parameter directly. (⇧) is your friend!

Jack Inputs and Outputs

The 8 jack inputs, at left, from top to bottom provide:

- modulation (A, B, X, Y) with -5v to 5v range
- a pitch input for transposition via a V/oct input in -2v to 5v range (with quantization controlled by the (A) secondary parameter)
- an analogue gate that scales the openness of all low pass gates (0-5v)
- a 1/16th note clock input
- an audio input that is mixed with the synth output as well as being sent to the FX units.

The 8 jack outputs, on the right, from top to bottom provide:

- 1/16th note clock out (>5v), (so that plinky can clock other devices)
- Trigger (>5v pulse on every new note)
- pitch hi (1v/oct) of the rightmost note that is playing, respecting the arpeggiator, -1v to 5v
- analogue gate, being the maximum level of all 8 ADSR envelopes
- pitch lo (1v/oct) of the leftmost note that is playing, ignoring the arpeggiator. -1v to 5v - useful as it is usually the bass note
- analogue pressure, being the maximum of all finger pressures detected, ignoring any envelope
- stereo audio out. The lower (left) output can be used as a mono output when nothing is plugged into the right output.

Sampling

Plinky lets you record 8 samples, each split into 8 'slices', corresponding to the 8 columns (strings). Once recorded, the bottom row of parameters control the granular playback of your samples.

To record or edit a sample, press (P) to go into preset mode, then press and hold one of the 8 rightmost pads. Now press and hold (C) to record a new sample. Use knob A to adjust the recording level. Press (C) or (D) to 'arm'. Plinky will start recording when it hears audio, or tap (C)/(D) again to start recording silence.

If you want to set the 8 slice points while recording, tap any of the main pad buttons at the start of each slice. If not, Plinky will cut the sample into 8 equal length slices. You can edit the split points later. Press (C)/(D) any time to stop recording.

When recording is finished, to audition the slices, press and hold the main pad buttons along the top row. If you slide your finger up and down, it adjusts the start point of each slice.

There are two options associated with samples, controlled by the usual 2 parameter shift keys (⇧)(⇧): Tape/Pitch mode and Loop mode.

Press 2 (⇧) to cycle loop mode between 'play slice', 'loop slice', 'play all', 'loop all'.

Press 1 (⇧) to toggle between Tape mode and Pitch mode.

Tape mode lays out the sample slices across all 64 pads, top to bottom then left to right, allowing you to quickly play from any point within the sample by pressing the appropriate pad. The pitch of playback is only affected by the 'sample rate' parameter.

In **Pitch mode**, each slice is assigned a base pitch, visible like 'C#3' in the OLED display. You can set this reference pitch for each slice, by sliding your finger in the lower half of the main pad area. Now when you perform notes in plinky, it has set up a multisample key-split and chooses the closest pitched slice to the desired note. Be careful of octaves to be sure to use all your slices. If multiple slices have the same pitch, they will be round-robin.

Press (X) to leave sample edit mode.

Calibration

When first booted up, Plinky goes into calibration mode. On subsequent boots, to enter calibration mode, twist either or both of the knobs during power up. Knob A triggers touch calibration, which may be necessary if you move Plinky to a different case, especially one with metal objects near by. Knob B triggers CV 1v/octave pitch calibration, for which you need a multimeter or calibrated oscillator. Calibration instructions are shown on the screen.

Thanks

To everyone in the world. Enjoy Plinky!