

# Controls

## CV inputs

Several knobs have CV inputs connected to them where you can alter values by patching in a CV. The value of the incoming CV is always added to the position of the knob. The range of expected input is between -5V and +5V.

## Delay

### 1. TAP button & input

Tap your speed of echo. You can finger tap a tempo here or use the input jack and patch in a gate that will determine the base length of the delay line. The button will blink in the given tempo. Press and hold TAP for longer than a second to stop using the tap tempo. The tap tempo is related to what Length you set.

### 2. DELAY button

Use this button to select one of three delay modes: Pingpong, Waveguide or Multitap.

### PINGPONG

Here your sound ping pongs from left to right in the stereo field. Pattern changes the length of the left and right delays in relation to each other, based on a length set for both delays by the Length.

### WAVEGUIDE

Imagine a pipe in which your sound is trapped and is bouncing back and forth. Pattern changes what is kept in the bounce. Length sets the length of the pipe. A shorter pipe makes the sound bounce faster and makes the pitch higher.

### MULTITAP

This mode gives you a smattering of delays. Three stereo taps of your original sound with predetermined length ratios. You can set the base Length yourself. Each tap has a different stereo position and level. Pattern acts as a tilt filter.

### 3. LENGTH knob & input

This sets the length of the delay line for all three modes. Either the base length for the delays (Pingpong and Multitap) or the length of the pipe (Waveguide). Ranging from super short on the left and about a second long all the way to the right. You can also control this by patching in a CV.

### 4. FEEDBACK knob & input

Here you can set how much of your output sound is fed back into the start and how much is allowed to decay. To the left is no feedback (maximum decay) and to the right is maximum feedback (almost no decay). You can also control this by patching in a CV.

### 5. PATTERN knob

Does something else in each delay mode. In Pingpong mode, you can sweep the knob fully to the left and one side of the delay will be very short indeed. When you sweep it to the right this flips over into the other side of the delay being really short. In Waveguide mode this knob changes what keeps bouncing; to the left you hear the low-end and to the right you hear the high-end of your sound. In Multitap mode this knob acts as a tilt filter; to the left the taps will become warmer and to the right taps will become colder.

### 6. FREEZE button & input

Press and hold to freeze the sound in either the delay and/or the tail. While holding down the freeze button you can select the delay and/or the tail to freeze by tapping their respective buttons. If you unselect the delay/tail their mode LEDs will go out and decay will set in. Freeze will remember your settings until you change them again. You can also use the input jack to hold a gate open and freeze your delay/tail. Whenever freeze is enabled the delay/tail is no longer responding to new input.

## Tail

### 7. TAIL button

Push the button to select between three modes: Dense, Float and Sparse.

### DENSE

A dense tail feels very full. This is the most diffuse of the tails and is bouncing back a cloud of sound. Chorality has the biggest effect on a dense tail; detuning and wiggling which adds more voices to the choir. Temperature acts as a tilt filter making the tail colder or warmer.

### FLOAT

Very ethereal. A smooth and natural decay of your sound. Together with a shimmering effect that is powered by a one octave pitch shifter this makes for a tail so light it seems to float. Chorality here is more subtle so it doesn't get in the way of the shimmering effect. In this mode Temperature is a balancing act between dampening and shimmering.

### SPARSE

Minimalistic granular. Imagine your audio as a piece of tape that is cut into pieces and their little bits of sound are played back in reverse or forwards and other orders. This mode also plays with the directionality of the stereo field which gives you the sensation of the tail moving around you. Chorality changes the probability of the pieces of tape being played. Temperature acts as a tilt filter making the tail colder or warmer. Length represents the timing of the pieces of tape being played so that a long length means the pieces are being played far apart while also decaying over time.

### 8. LENGTH knob & input

Sets the length of decay time for all three tail modes. Starting from supershort all the way to the left and to near infinite on the utmost right. You can also control this by patching in a CV. When in Waveguide mode the CV input translates to roughly 1V/Oct.

### 9. CHORALITY knob

This knob does different things in every mode of the tail. Chorality has the biggest effect on a dense tail; to the right it detunes and wiggles which adds more voices to the choir. On a floating tail chorality is more subtle so it doesn't get in the way of the shimmering effect. You can get more of this subtle chorality by turning the knob to the right and get less by turning it to the left. When the tail is sparse, the Chorality knob controls the probability of sounds being played. To the left you have a low probability of sounds and to the right you almost have a certainty.

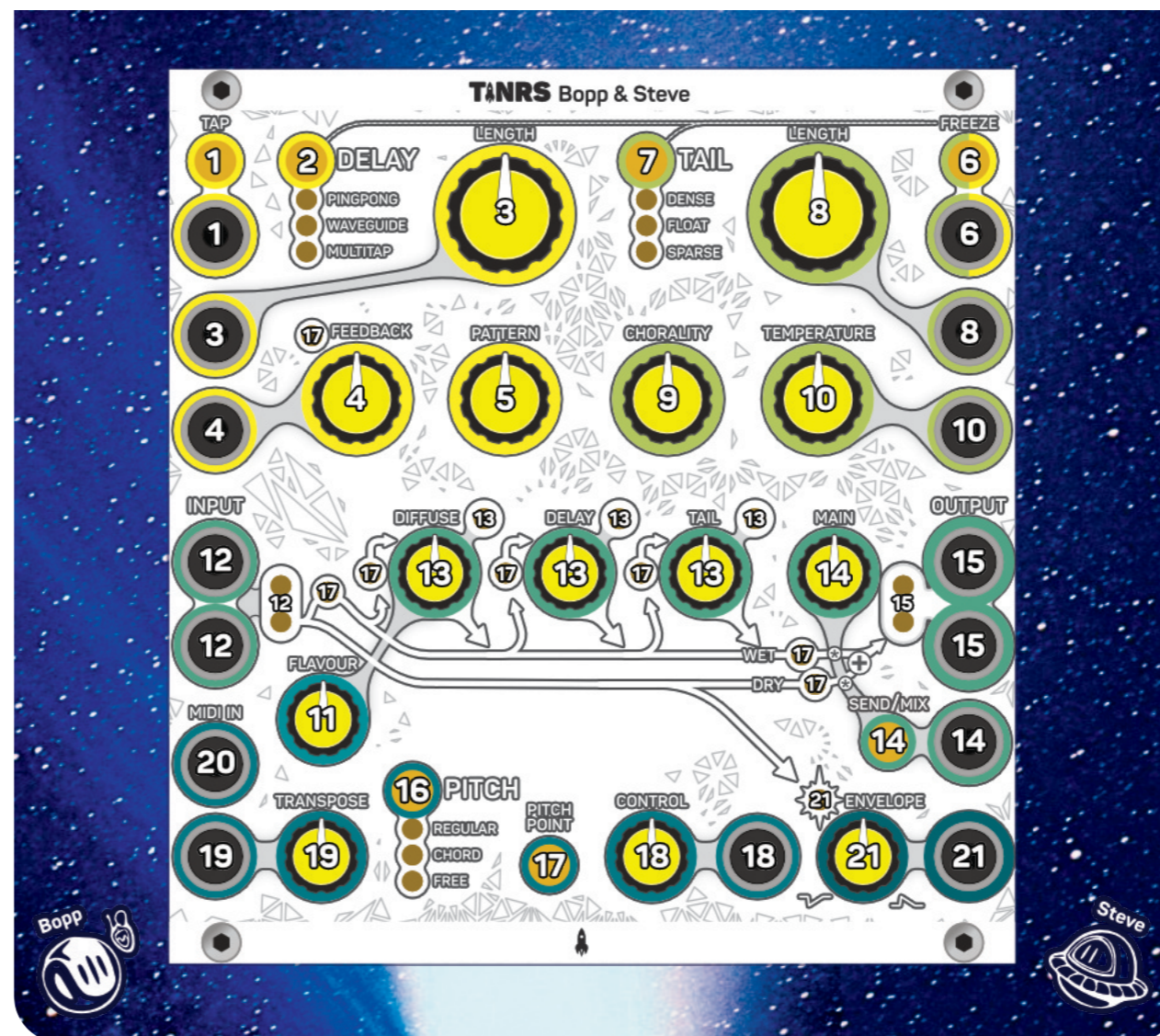
### 10. TEMPERATURE knob & input

This knob too does different things for different modes. On a dense and on a sparse tail the Temperature knob is a tilt filter, turning it to the left the tail will become warmer and to the right the tail will become colder. On a floating tail the Temperature knob allows you to balance between dampening on the left and shimmering on the right. You can also control this by patching in a CV.

## Diffuse

### 11. FLAVOUR knob

A number of filters together create a smattering of diffused sounds from your input sound. Our diffuser is a series of all-pass filters and the Flavour knob sets ratios of the timing between them. The filters leave indirect bounces of sound that make a sound seem closer or further away. Swipe the Flavour knob from up close & personal on the left to more and more distant on the right.



## Line

### 12. INPUT inputs & LEDs

Here you start sending your sound through space. You could use these two inputs to create a left/right stereo field or you could use them for mid/side processing or something else entirely that is built with two inputs that connect to two outputs. The top input goes to the top output and the bottom to the bottom. Two little LEDs blink if audio is happening on the input.

### 13. DIFFUSE DELAY TAIL knobs & LEDs

These knobs are in order of what is happening on the Line. With each knob you can determine how much of each region you want to happen on your sound. Get all your effects to the right and swipe for less to the left. You can follow your audio by the LEDs blinking above the knobs.

### 14. MAIN knob & input & button

Combining the dry and the wet level. MAIN works differently depending on your SEND/MIX mode. In SEND mode (light on) turn the Main knob to the left to hear just your dry input sound and to the right to hear your input sound plus all the wet effects. When in MIX mode (light off) turn the Main knob to the left to just hear your dry input and to the right to crossfade into only the wet effects. When you press and hold the SEND/MIX button until it blinks you get a third mode where you always hear your dry input and all the wet effects. The Main knob now sets how much of your input sound is used. You can also control the Main by patching in a CV.

### 15. OUTPUT outputs & LEDs

The end of the line. This is where your sound comes back out of space for you to pick up. The top input goes to the top output and the bottom to the bottom. At the end of the line are two little LEDs that blink when audio is happening. This is a stereo output even if your input is mono.

## Pitch

### 16. PITCH button

We give you 3 stereo pitch shifters. You can choose how they receive their notes by selecting a different mode. Set your pitch mode to Regular, Chord or Free by pressing this button.

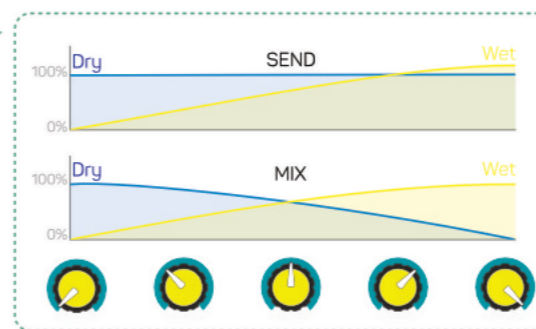
### REGULAR

This mode is a monophonic quantized pitch transposer. All pitch shifters are set to almost the same pitch and move close together. Your Control knob controls portamento.



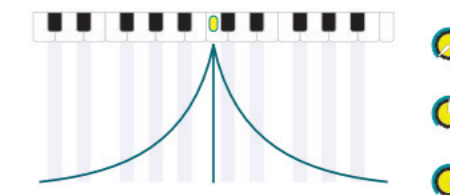
### CHORD

In Chord mode your pitch is shifted to a polyphonic chord that you can select with the Control knob. Each shifter gets assigned a different note from this chord.



## FREE

Free mode is a monophonic unquantized pitch transposer where Control determines detune. One pitch shifter is exactly on your transpose level, while the second one is an amount of notes up and the third is the same amount of notes down.



### 17. PITCH POINT button & LEDs

Determine the point on the line at which the pitch gets shifted. You can choose from 7 points; at the start of the line, into the diffuse, into the delay, in the feedback path of the delay, into the tail, at the end of the line or on the dry mix. By pressing this button you can move the pitch point around and the various LEDs show you where the pitch point is now.

### 18. CONTROL knob & input

The result of moving this knob depends on what Pitch mode you are in. In Regular pitch mode you get less portamento when you move it to the left and the entire note gliding when you turn it to the right. In Chord mode you select different chords by swiping the Control from left to right. This chord selection is relative to what note you are playing and to your Transpose settings. Unless you are receiving MIDI notes, in which case this will replace the chord entirely. We suggest you play around. In Free mode this knob lets you completely detune the pitch. With the Control knob in the most left position you start in tune and as you move the knob to the right it detunes until you land at an octave above and below in the most right position. In tune but different. You can also control this Control by patching in a CV.

### 19. TRANPOSE knob & input

Use this knob or input to transpose the centre of the pitch shifter up or down +/- 24 semitones aka 2 octaves. The Pitch button will blink at you when you hit -24, -12, 0, 12, or 24 semitones precisely. You can also control this by patching in a CV which will be roughly 1V/Oct.

### 20. MIDI IN input

When you connect anything to this MIDI input the pitch shifter will respond to the incoming notes and transpose them according to your settings. When in pitch mode Regular or Free it will keep responding to the last incoming note. When in Chord pitch mode it will respond to the ever-changing first three notes. Incoming MIDI clock is ignored and if you ever have a hanging MIDI note, you can reset the input by changing the pitch mode with the Pitch button.

## Envelope

### 21. ENVELOPE knob & LED & output

Here you receive a pre-processed volume envelope of your dry sound. You can provide yourself with a regular envelope or a ducked envelope. The starred LED lights when there is a signal on the output. Full brightness means 5 Volts, dimmed means less Volts and darkness means no Volts. When the knob is in the centre position there will be no signal on the output. Sweep the knob to the left and you move towards a ducked and sweep the knob to the right for a regular envelope. Full extension either way has a hold effect built in, releasing slower than your actual sound.



# BOPP & STEVE

## Deconstructed Reverb

manual

## Introduction

Hi there! We are very happy for you to meet Bopp & Steve. This is our deconstructed reverb that has 40+ delay lines going on with various tails and diffusers. This is our SPACE effect. A very cinematic stunt reverb. You can more easily distinguish a sound when it has a particular place in space. With Bopp & Steve you can very precisely choose the placement, treatment and pitching of your input sound. Time, space and pitch are all interlinked as ways to make your sound bigger or smaller.

## Origin

The heritage of Bopp & Steve starts with a reverb that Stijn has been working on since the 2000s. A version of it is in the Fenix IV Dual Delay as the Reverb mode with a "chunky shimmer and a phat detune". We further deconstructed the Early Reflections into two parts (Delay and Diffuse) and created three types of Tail (Dense, Float, Sparse). The Sparse tail is based on granular synthesis, which we explored earlier in our Brinta collaboration with Error Instruments. At Superbooth 2023 we presented our first prototype of Bopp & Steve.



## Deconstructed

We made a beautiful spacious reverb and then we pulled it apart. This is a reverb broken down into various musical building blocks. Taking things apart even further we gave the blocks knobs, CV inputs and choices for you to make. We want you to play with the things that live inside the blocks that build the reverb. You can reconstruct the blocks back together however you like. It's all modular.

## The Line

Two points of entry. As your sound moves through different regions you can add more or less of the delay, tail and diffuse effects. Little bright lights guide you to when and where your sound is and glow with the intensity of your regional effects. Other bright lights indicate where your pitch shift happens. Right before your sound reaches the end of the line, you can hold on or off all the effects at the same time. Resulting in a new version of your input sound. Let ourselves be changed as we move through time and space.

## Chorality

Choral music in general means two or more sources playing the same sound and because orchestral instruments (or voices in a choir) all create a minutely different sound they give the combination more body. Chorus on a synthesizer usually means a doubling or tripling of sound sources with a slight shift between them to mimic the effect of choral music.

Our Chorality adds time and space between sounds. We slightly stretch and squeeze the tail, de-tuning the original sound. We apply properties of a chorus effect to the reverb algorithm, interwoven with the tail diffuser. It's pretty good.



## Regions of Space

Bopp & Steve has six regions for you to explore. In true timey-wimey-wobbly-wobbly fashion they are interconnected and bleeding into each other because everything is everything.

### Delay

We start in the top left corner with making echos. This is the time between when a sound happens and when you hear it. Sound repeating itself can give it a rhythmic quality and this delay region gives you the opportunity to play with the rhythm of a repetition. Design your own spacetime.

### Tail

Delay is tightly followed by their Tail in the top right corner of the module. After a sound has bounced so many times, it has smoothed itself out (in 2 out of 3 modes). The tail region also gives you a sense of how big or small the space is around your sound.

### Line

The Line in the middle is where you can follow your input sound flying through space and specify many things along the way. This line represents your signal path through the module.

### Diffuse

The Diffuse region controls the early reflections or the shape of space. Going through different styles of early reflections you can continuously morph between symmetric and asymmetric space. You can make it elongated or brief, round or sharp and play with it to build your own structure of sound.

### Pitch

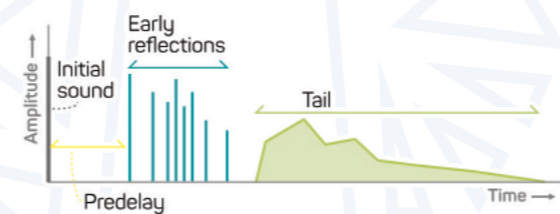
In the bottom left you can control the Pitch at various points. Tonality is another dimension that we can change in space and time to change our experience of sound. By adding more tonal space, you can create your own cosmic backing vocals.

### Envelope

This little region in the lower right corner observes a volume envelope from whatever you patch into the input and presents it as telemetry to be played with. An envelope tracker to do interesting things with.

## Reverb to Regions

This is an impulse response graph of a natural reverb:



The Initial sound is our Input sound. The Predelay is our Delay region where we already tweak, bounce and echo the sound before we first encounter it.

The Early Reflections is our Diffuse region. We can alter the internal micro rhythms of Early Reflections by changing the flavour of the space we are in.

The Tail is our Tail region. In a natural reverb chaotic reflections continue until they devolve into a background wash of noise. In our Tail region we can place walls, blankets and carpets to lessen the chaos or increase reflections.

Chorality introduces imperfect reproductions of our Delayed and Diffused sound to the Tail.

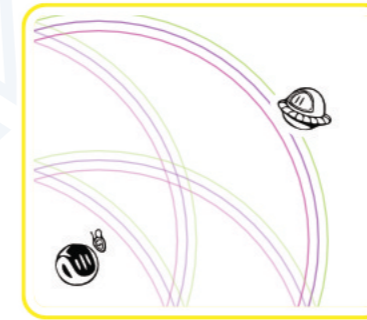
The Pitch region is a bonus option to alter the perceived pitch of our sound and can be set to happen anytime along the reverb.



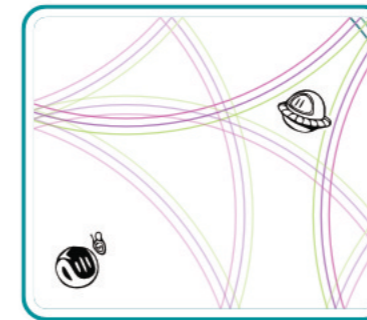
Bopp makes a sound.



The sound hits a wall. Steve still hears nothing. This is Predelay.



The first wave of sound hits Steve. Steve hears the Initial sound.



The sound waves bouncing off the wall now also hit Steve. These are the Early reflections.



More bounces are happening and hitting Steve. This is the Tail.

## Things to try

### Angelic choir

With the Pitch in Chord mode you set the Pitch Point into the Tail and the Tail itself in Float mode. Large and loveable.

### Tempo sync delays

You can provide a clock to the Tap input and set the Delay to Pingpong mode and the Tail to sparse to create additional rhythms.

### Make a polysynth

Give the Input a stable pitch oscillator. Set the Pitch in Chord mode and play polyphonic MIDI notes into the MIDI in. Set your Pitch point at the end of the line.

### Waveguide a gate

Set the Delay to Waveguide mode and open up the Feedback while holding Pattern in the middle. Play gates into the Input and note CVs into the Delay Length input. Flute appears.

### Gated Reverb

Patch the Envelope out to the Main input. Turn the Main knob all the way to the left and the Envelope knob three quarters to the right.

### Use Your Voice

Feed your microphone sound into the input and harmonize with yourself. Set the Pitch Point at the end of the Line and the Pitch Mode to Chord.

## Let us know

Please check out our website for more information, demo videos and various links. You can also get in touch with us here for any questions or feedback you may have and share your Boppings & Stevings [www.thisisnotrocketscience.nl](http://www.thisisnotrocketscience.nl)

## Installing the module

- Power down your system
- The red stripe on the power cable indicate minus 12 volt.
- Connect the included power cable between the back of the module and your power strip
- Screw the module into place
- Power up your system

## Credits

Design and programming by Stijn Haring-Kuipers  
Operations by Priscilla Haring-Kuipers  
Compute by Raspberry Pi (UK)  
PCB by: JLC-PCB (China)  
Frontpanel production by Repos (NL)  
Print work by De Regenboog Groep (NL)  
Extra artwork by Rogier van Etten (USA)  
Sanity checks and emotional support by our friends on the TiNRS and Plinky discord channels. Thank you!

All TiNRS products are proudly assembled, tested and calibrated at our antistatic kitchen table in Amsterdam, The Netherlands.