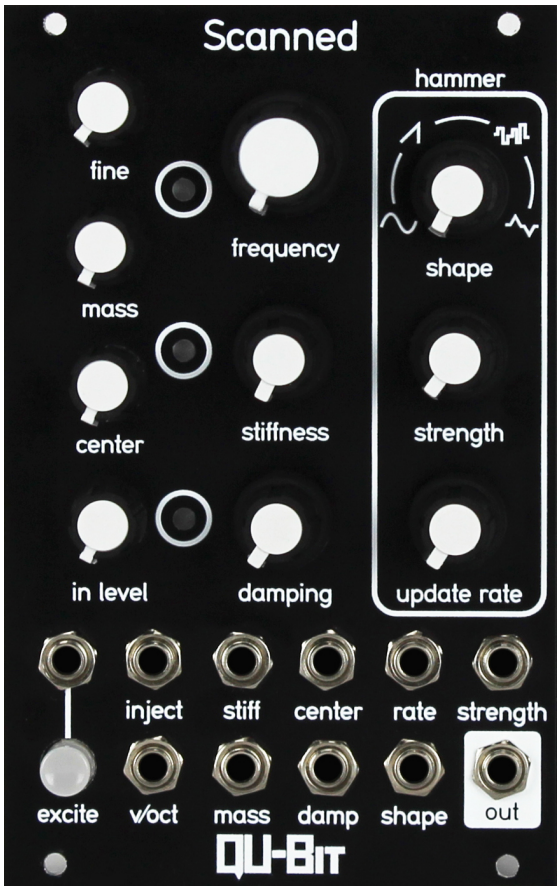
Scanned


Scanned
hammer
fine
frequency
shape
mass
center
stiffness
strength
in level
damping
update rate
inject
stiff
center
rate
strength
excite
v/oct
mass
damp
shape
out
QU-Bit

Contents

Description

Scanned is an organic wavetable oscillator. It uses an unexplored technique known as Scanned Synthesis to animate wavetables that are created in real-time. This synthesis method was conceived by the father of computer music, Max Matthews, as the next paradigm in digital oscillators, and until now, has never been implemented on hardware.

The wavetables are dynamically generated from a set of “objects” tied together on a virtual string. These objects have physical properties including Mass, Stiffness, and Damping which affect the way that the string moves through space and time. Unlike physical modeling, however, this algorithm is a means of creating new electronic sounds, not replicating acoustic instruments. To animate the waveform, the objects are morphed into the currently selected hammer shape and then released. This excitation of the sound generates evolving timbral landscapes that contain harmonic movement without external modulation. The hammer section also determines whether Scanned is a free-running oscillator, or a triggered sound source, allowing it to function as a complete voice without additional filters or VCAs.

- First hardware implementation of Scanned Synthesis
- Organic wavetable generation and animations
- Can be a free-running oscillator or triggered voice
- Inject input allows external audio or CV sources to excite the string
- Evolving timbral landscapes without external modulation
- Four hammer shapes with interpolation
- Aluminum front panel

Specifications

Depth: 22mm

Width: 16 HP

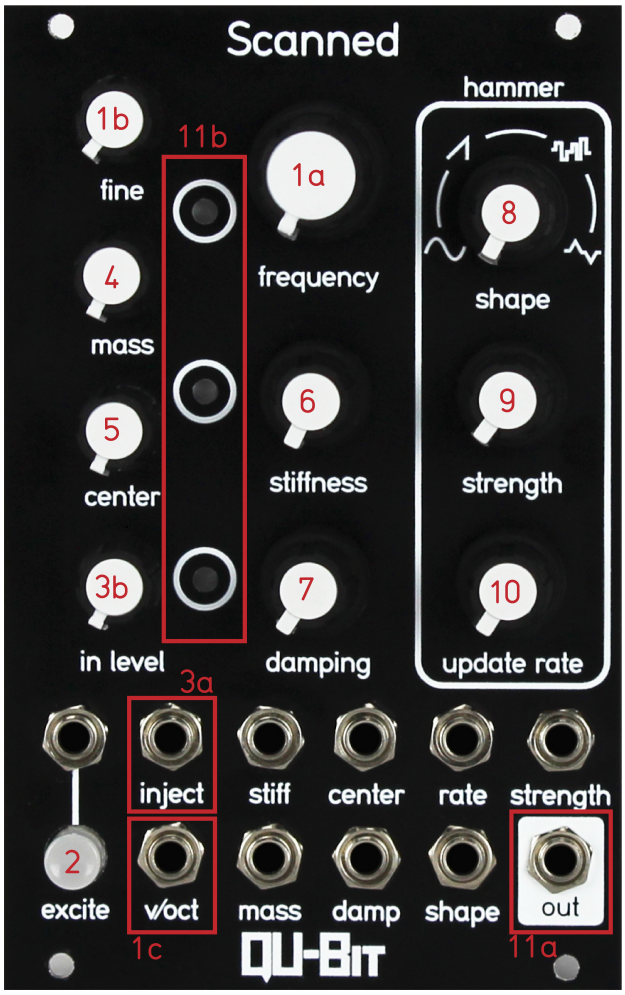
Current Consumption:

- +12V: 100mA
- -12V: 13mA

Installation

To install, locate 16 HP of space in your Eurorack case and confirm the positive 12 volts and negative 12 volts sides of the power distribution lines. Plug the connector into the power distribution board of your case, keeping in mind that the red band corresponds to negative 12 volts. In most systems, the negative 12 volt supply line is at the bottom. The power cable should be connected to the Synapse with the red band facing the bottom of the module

Marked Diagram



1a. Frequency

Sets the fundamental frequency of the scanner.

1b. Fine

Fine tune control for frequency +/- 7 semitones.

1c. V/Oct

1V/Octave input for controlling the frequency of the scanner.

CV Range: -1V to +6V

2. Excite

Trigger Input.

Excites the waveform, moving all objects in the model to the position of the current hammer shape.

3a. Inject

Applies an audio input excitation to the generated waveform.

Acts simlilar to an envelope follower, and exhibits interesting spectral behavior.

3b. In Level

Attenuator for Inject input.

Limits the amount of injection to the waveform.

4. Mass

Scalar for the overall Mass of each of the objects in the waveform.

When set to its minimum, all objects will weigh as much as possible, creating short percussive sounds, and a more subtle evolution in tones.

When set to its maximum, all objects will weigh as little as possible, creating highly volatile motion in the waveform.

CV Range: ±5V - Added to knob position

5. Center

Scalar for the overall force toward the zero-point.

When set to its minimum, the waveform will have less gravity toward the center of the waveform. This will have a slowing effect on the evolution of the waveform being generated.

When set to its maximum, the waveform will have a lot of gravity toward the center of the waveform. This will cause rapid changes in the waveforms harmonic content by pulling parts of the waveform toward the center.

CV Range: ±5V - Added to knob position

6. Stiffness

Scalar for the amount of force applied to the connections between objects.

In this model of Scanned synthesis, all of the objects are connected in a string pattern. Each object is connected to two neighbors (except for the first and last which are only connected to one other object).

When set to its minimum, the strength of each connection will be minimized, causing less dramatic cross-object interaction.

When set to its maximum, the movements of each object will strongly affect those next to it. This has a great effect on both the frequency and amplitude spectrum, allowing for the generation of metallic timbres.

CV Range: ±5V - Added to knob position

7. Damping

Damping controls the amount of negative energy applied to the waveform.

When set to its minimum, sounds will decay quickly (dependent on the position of other controls).

When set to its maximum, sounds will never decay, and may grow louder and louder, depending on other knob positions.

CV Range: ±5V - Added to knob position

8. Shape

Controls the shape of the hammer used to excite the waveform.

Blends smoothly between Sine, Saw, Noise, and Dual Pulse waveforms.

CV Range: ±5V - Added to knob position

9. Strength

Applies the hammer's shape to the waveform being generated. By applying a constant force, a steady waveform can be created from the currently selected hammer shape.

CV Range: ±5V - Added to knob position

10. Update Rate

Adjusts the frequency at which the synthesis engine updates the waveform.

Has a very strong effect on all controls.

CV Range: ±5V - Added to knob position

11a. Output

Audio Output

11b. Output LEDs

LEDs display the positive, average, and negative amplitude of the waveform from top to bottom.

This provides a visual representation of the audio output signal.

Color is set by Hammer shape.

Blue reflects the Sine shape.

Purple reflects the Saw shape.

Green reflects the Noise shape.

Red reflects the Dual Pulse shape.