# Braids Renaissance

Braids Renaissance is an alternate firmware for the (discontinued) Mutable Instruments Braids eurorack module.

## Overview

Braids Renaissance adds the following algorithms to Braids:

- Software Automated Mouth, also known as SAM. The classic robotic text-to-speech engine originally written for the Commodore 64.
- Five new diatonic chord algorithms.
- Five new “chord stack” algorithms.
- NVRT setting, when enabled, reverses the encoder rotation. This improves functionality on DIY Braids modules that were build with an encoder with inverted signalling.

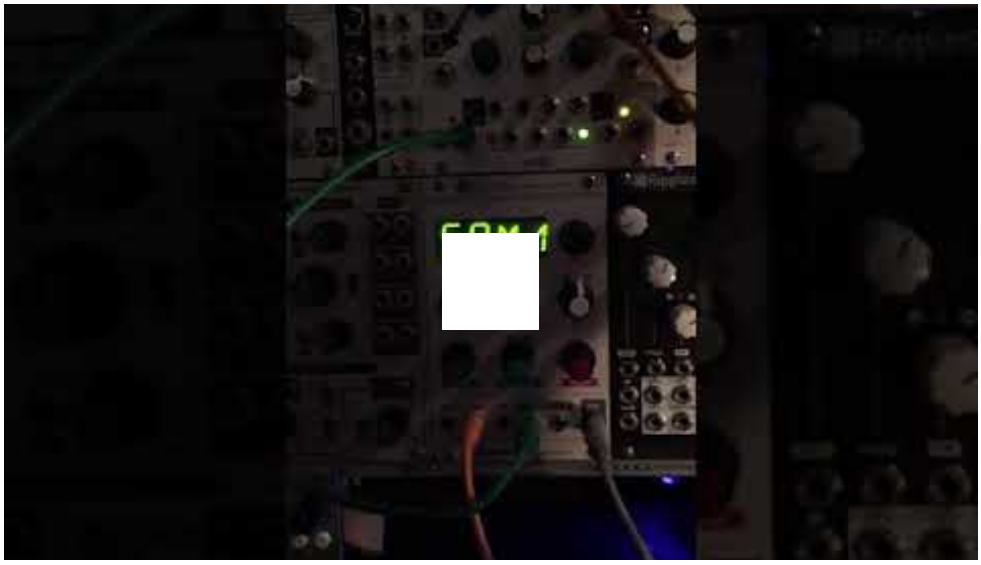
The following features have been removed from Braids 1.9

- Text editor
- ???? easter egg algorithm (morse code generator)
- QPSK algorithm
- The original WTx4 algorithm has been replaced by a more featureful WTCH algorithm (see below)

## Demos

### SAM

This video shows the typical sounds coming from the SAM algorithm.



### Chord Stacks

This audio sample demonstrates typical sounds from the 6x algorithms.

## Subscribe

Also please consider following me on YouTube for future updates.

# Download

This firmware is in BETA, and no warranty is implied by me or by the original vendor of the hardware. Use at your own risk! Please read the disclaimer section at the bottom of this page.

The latest release is 0.4.

To install, download and unzip the firmware WAV file and follow the Braids firmware update procedure from the Braids manual.

To uninstall Braids Renaissance, use the same procedure to upload the original Braids firmware.

You can find the Braids Renaissance code here.

# New Algorithms

## SAM1, SAM2

There are two SAM entries in the oscillator model list, named SAM1 and SAM2. Each of these SAM models contain 16 different words.

SAM is configured to work similarly to a granular sampler. By changing Timbre, you “scrub” through the word selected by Color. With Timbre at 0 position, SAM is playing the first grain of the current word. With Timbre fully clockwise, SAM is playing the last grain of the current word. The speed of an envelope can control how fast SAM says the word, independent of the pitch.

If you send SAM a trigger it will automatically play the word, starting from the current grain, at the “natural” speed of the word. In this situation, the pitch input controls both the speed and pitch of the output.

Color switches between the 16 words in the current SAM patch. The SAM oscillator models differ only by their words.

## Chord Modes

Braids Renaissance adds a total of 10 new chord algorithms.

### \ \CH, -_CH, /\CH, SICH, WTCH

With the quantizer disabled, these modes play the same chords as the original paraphonic WTx4 algorithm, where the Color parameter blends between 16 different chords. But when quantizer is enabled with one of the diatonic modes (dorian, aeolian, etc), the chords will stay in key, picking the correct major or minor chord and extensions based on the configured quantizer mode and root note. For example if the quantizer is set to C Dorian, sending a D value into the V/oct input will result in a minor triad. Color parameter still controls the chord extension but is also picked correctly based on the scale determined by the quantizer.

### \ \x6, -_x6, /\x6, SIx6, WTx6

6 oscillators starting at the 1v/oct input, spaced evenly across the currently selected quantize scale. Color controls the number of scale steps between oscillators. When the Braids quantizer is turned off, the oscillators are evenly spaced by semitones (controlled by Color).

### Timbre parameter

The Timbre parameter morphs the sound differently depending on the chord waveform.

For saw algorithms (**\ \CH, \ \x6**), each note is actually 2 saw waves, and Timbre controls the detuning between the 2 saw waves.

For square algorithms (**-_CH, -_x6**), Timbre controls the pulse width of the square wave.

For triangle and sine algorithms (**/\CH, /\x6**, SICH, SIx6), Timbre controls the amount of wavefolding to apply to each oscillator before summing.

For wavetable algorithms (**WTCH, WTx6**), Timbre morphs between a small set of wavetable entries. This is the same wavetable list as the original WTx4 mode.

# Other Features

Near the end of the settings list is a new feature, **NVRT**. If you enable NVRT, the encoder functionality will be reversed. This was added by request of DIY Braids builders who have an easier time sourcing an encoder that has reverse signalling.

# Support

Braids Renaissance is released for free without warranty implied.

Please post in the Muffwiggler thread and I will try to help you solve your issues.

Please DO NOT contact Mutable Instruments for support with Renaissance.

# Thanks

This project stands on the shoulders of many giants.

Thanks to Émilie Gillet not just for the huge contributions to open source, but also for very accurate and detailed feedback on an earlier version of this firmware.

Thanks to Vidar Hokstad and Sebastian Macke for their work reverse engineering SAM from the original C64 binary.

Thanks to the authors of SAM for an inspiring piece of software that has made me question what was possible since I was a kid.

# Disclaimer & Warning

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Installing Braids Renaissance will reset the calibration data in your Braids, so you will need to re-calibrate it, using the (very straightforward) procedure described in the Braids manual. Likewise, re-installing official Braids firmware will also reset the calibration data, so you will need to re-calibrate yet again. However, it only takes a minute or so. But if you are not able to re-calibrate your Braids, then please do not install Braids Renaissance!

If you want to re-install the official Braids firmware, then you MUST re-install the latest release in the v1.8 factory firmware series, which is here: https://mutable-instruments.net/modules/braids/downloads/braids_1.8.wav – or a version of the factory firmware later than v1.8 if that is available. Do not re-install any of the earlier “release candidate” versions of v1.7 factory code, nor version 1.5 or earlier of the factory firmware. The reason for re-installing only v1.7 or higher of the official Braids firmware is that only the very latest version of the official v1.7 Braids code contains a special settings checking routine that ensures that re-installation of the official firmware after installing Braids Renaissance (or other hacked code) will result is sane settings and a fully functional Braids. Of course, if there is a version of the official Braids firmware later than v1.8 available at the time you read this, then you should install that. The main thing to remember is that after installing Braids Renaissance, you may experience problems if you try to re-install any version of the factory Braids firmware earlier than version 1.7. However, if you re-install version 1.7, it should be fine (all testing to date suggests that is the case, at least).

You need to be aware that if you are installing Braids Renaissance via the audio bootloader facilty then there is a very small chance that something may go wrong, either while installing Braids Renaissance, or while re-installing the factory Braids firmware. Émilie Gillet has designed the audio bootloader to be highly fail-safe, and almost foolproof, but nonetheless, there is a very small risk that you could end up with a non-functioning Braids due to a failed firmware upgrade (that is, your Braids ends up being "bricked"). Note that installation of Braids Renaissance cannot physically damage your Braids, so the module will always be recoverable if you have access to an FTDI or JTAG/SWD programmer as described here. If, in the process of installing Braids Renaissance, you end up bricking your Braids module somehow, please post in the Muffwiggler thread and I will try to help you solve the problem.

Note also that the fine print in the Braids manual states that Émilie doesn't offer an unbricking service for Braids that have had alternative firmware installed on them. That said, the likelihood of bricking your Braids when using the audio bootloader is very small – as already noted, it has been designed to be failsafe and nearly idiot-proof.

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BURNS AUDIO

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Music, Software