

Stereo Triggered Sampler

4ms Company

New features in Firmware v1.4

October 26, 2017

(Addendum to User Manual 1.0: <http://4mscompany.com/STS/STS-manual-1.0.pdf>)

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Introducing firmware 1.4

We are proud to present the first major firmware update to the Stereo Triggered Sampler, version 1.4! Tighter timing, better tracking and a bunch of cool new features have been added! We recommend all users upgrade their Stereo Triggered Sampler.

What version is my STS?

To determine the version you have, follow these steps:

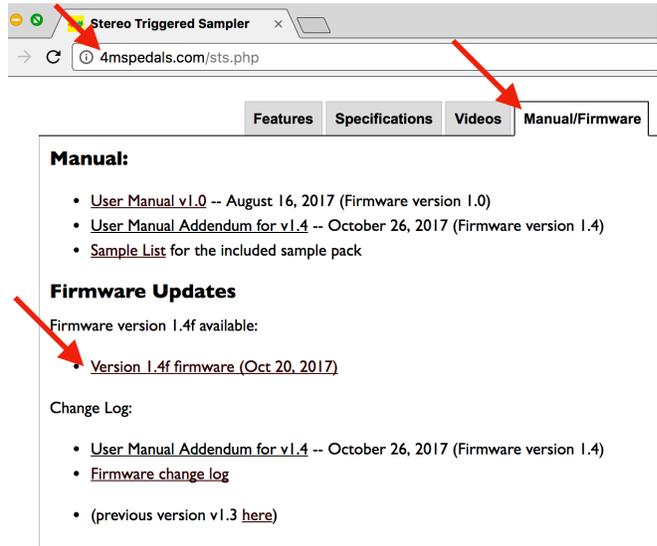
1. Power on the STS.
2. Enter System Mode: Hold down both **Reverse** buttons, both **PLAY** buttons, the **REC** button, and **Rec Bank** for four seconds.
3. Release the buttons when you see all the button lights change and an animation on the Play/Monitor/Busy/Play lights.
4. Press and hold the **Edit** button. Look at the color of the left and right side **Reverse** button lights:
 - Left Reverse = **White** Right Reverse = **Yellow** → 1.4 (*latest version*)
 - Left Reverse = **White** Right Reverse = **Orange** → 1.3
 - Left Reverse = **White** Right Reverse = **Red** → 1.2
 - Left Reverse = **Orange** Right Reverse = **Orange** → 1.0 or 1.1 (*see note below*)

Note: if both Reverse buttons stay Orange when you press Edit, you have v1.0 or v1.1. To tell the difference press and hold the left Reverse button. If both Reverse button lights turn white, you have v1.1. If they remain orange, you have v1.0.

How to Upgrade Your STS's Firmware

You can update the STS firmware by playing an special audio file into the **Left Record In** jack. *Note: the upgrade procedure is the same as the one described in the User Manual v1.0.*

1. Go to <http://4mscompany.com/sts.php> and click "Manual/Firmware".
2. Download the .wav file for "Version 1.4f firmware".
3. After the download completes, open the .wav file with an audio playback program such as QuickTime Player, Audacity, VLC, Windows Media Player, etc. *Note: we do not recommend using high-end software such as Ableton or iTunes, etc. because of the possibility of the playback being "enhanced" or "EQ" being applied or otherwise altered.*
4. Unplug all cables on the STS and power it up.
5. Enter System Mode by holding down both **PLAY** buttons, both **Reverse** buttons, **REC** and **REC Bank** buttons for four seconds.
6. Release those buttons when you see the lights change and an animation on the Play/Monitor/Busy/Play lights.
7. While in System Mode, hold down left side **Bank**, right side **Bank**, **REC**, and **REC Bank** for four seconds. Keep holding them down until the lights change. Release the buttons. You are now in bootloader mode.
8. The left side **PLAY** button should be green. If the left side **Reverse** button is green, tap it once to restart the bootloader. If you got here by mistake, you can exit the boot loader by tapping the **PLAY** button when it's green. The **Monitor** and **Busy** lights should be flashing and alternating.
9. Connect a computer or smart phone's audio output to the **Left Record** jack. Either a stereo or mono cable is fine. Remove your phone case, it may be preventing the cable from fully plugging in.
10. Connect the **OUT(L)** jack to an amp/speakers so you can listen. You may hear some background noise that comes and goes, that's normal. Turn the amp/speaker volume down but not off: this is going to be LOUD!
11. **Set the computer/phone's volume to 100%**. Set the audio player software to 100% volume. Turn off all audio and vibrate notifications (use Airplane mode). Close any applications that make notification sounds such as Facebook.
12. Begin playing the file. Immediately you should see the white LEDs and the **Busy** and **Monitor** LEDs flash a lot. The buttons will also start to light up in colors, one by one. You should be hearing the sounds very loudly out the **OUT(L)** jack.
13. If the sound stops before the file is done playing, there was an error. The **Reverse** light will turn green and the four LEDs will turn on.
 - a. Stop the file and rewind to the beginning.
 - b. Check all cables are plugged in tightly.
 - c. Tap the **Reverse** button. It should turn off and the **PLAY** button will turn on green again.
 - d. Play the file again from the beginning.
14. If the file loads successfully, the STS will beep a few times and then boot.



Tip: some audio cards play a pop when they first start playing a file. If this happens, the Reverse light will trip as soon as you start playing. One way to overcome this is to hit the Reverse light immediately, before the noise starts playing (there's a 2 second lead time of silence). Or a better way to get around this is to use a different device (phones seem to work better than computers).

New Features in v1.4

Quantized 1V/OCT jack

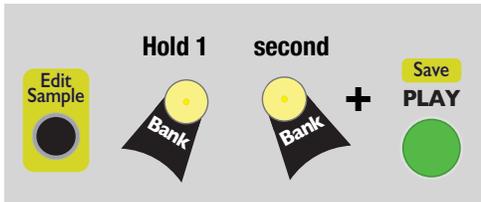
Each channel can be set to quantize its **1V/OCT** jack to semitones (12 notes per octave). In System Mode, tap the **Bank** button for either channel to toggle the mode:

- **Bank button Blue:** 1V/OCT jack is quantized to semitones.
- **Bank button Orange:** 1V/OCT jack is not quantized (default value).

The setting only effects the jack, not the **Pitch** knob. Like all System Mode settings, the value is saved onto the microSD card and will be loaded on power-up.

Start-up banks

You can now set the default bank to be loaded at start-up.



Hold down **Edit + Bank 1 + Bank 2 + left PLAY (Save)** buttons for one second. The current bank selections on both channels will be saved as the default after power-on.

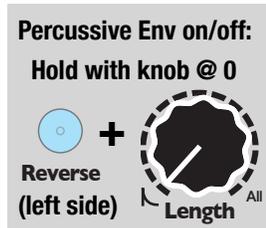
Envelopes on/off

The STS can apply two types of envelopes to sample playback, and in v1.4 both these types can be turned on/off independently. Previous versions had both these envelopes always enabled.

- **Percussive envelopes:** this is the decay envelope applied to playback when **Length** is less than 50% (if **Reverse** is on, it's an attack envelope). This envelope gives the playback a "percussive" sound.
- **Fade in/out envelopes:** this is a very short envelope applied to the beginning and end of playback when **Length** is over 50%. It reduces clicks when starting, stopping, or looping, especially when starting or ending in the middle of a sample file.

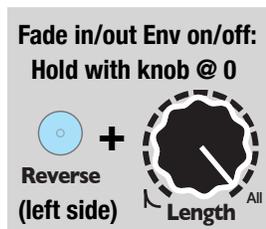
Turning off Percussive envelopes is often preferred when doing "Granular" patches (see User Manual v1.0 for example patches). Turning off Fade in/out envelopes is sometimes interesting if you want to introduce the click of a loop as an audio artifact. Turning off both types of envelopes is recommended when playing CV sample files (.wav files with clocks/gates, sequencer CV, or slow LFOs, etc).

To toggle the envelope modes:



Percussive envelope mode toggle:

Turn left side **Length** to 0%. Then press left side **Reverse** for 2 seconds. Both **Reverse** button lights will flicker yellow when the envelope mode is disabled, and fade-up yellow when the mode is enabled.



Fade in/out envelope mode toggle:

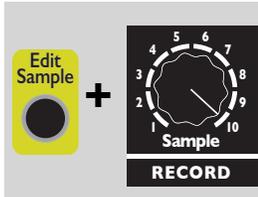
Turning left side **Length** to 100%. Then press left side **Reverse** for 2 seconds. Both **Reverse** button lights will flicker red when the envelope mode is disabled, and fade-up red when the mode is enabled.

You also can change the envelope modes in System Mode. The left **Reverse** button sets the modes:

- **Orange:** Both envelope types enabled (default).
- **Red:** Fade in/out envelopes enabled. Percussive envelopes disabled.
- **Yellow:** Fade in/out envelopes disabled. Percussive envelopes enabled.
- **Off:** Both envelope types disabled.

Variable Trigger Delay

You can enable a Trigger Delay for the **Play Trig** jack. This adds a 0 - 14ms delay after a trigger is received on the **Play Trig** jacks. This feature is useful to compensate for slew/lag when using a CV sequencer with the **Sample CV** and/or **IV/OCT** jacks. The STS will read the voltages on the **Sample CV** and **IV/OCT** jacks after the Trigger Delay period, so adding this extra delay allows for the voltage to “settle”. On early PCB versions (v1.0a) there’s a small amount of slew on the **IV/OCT** jack’s response due to the STS’s hardware. Adding some trigger delay can reduce or eliminate this extra slew.



To set the Trigger Delay, hold down **Edit** and turn the **RECORD Sample** knob. The knob’s numbers (1-10) correspond to a trigger delay amount. With the knob at 1, there is no delay. With the knob at 10, there is maximum delay (about 14ms in PCB 1.0a, and 8ms in PCB 1.1). The setting applies to both channels.

If you wish to have the least amount of latency, set this to “1”. If you wish to have the maximum amount of compatibility with all sequencers, set this to “8” or above. The default value is “8” when you first upgrade to v1.4.

The Trigger Delay is saved automatically in the settings file on the microSD Card, and will be loaded after power-on.

Split Monitoring

In previous versions, the STS was either monitoring both inputs or neither input. In v1.4, the left and right channels can be independently monitoring or not. To use this feature, you must be in Mono mode (see Stereo/Mono Mode section in User Manual v1.0). Start monitoring as normal (hold **REC** button for 2 seconds). The **Monitor** light will turn solid blue. Then, press **PLAY** on the channel you wish to stop monitoring. The **Monitor** light will go from solid blue to blinking to indicate “split monitoring”: the channel for which you pressed **PLAY** will stop monitoring, and the other channel will stay monitoring.

A typical patch that uses split monitoring would be to record the mono playback of the right side, while monitoring it. To do so, monitor the left side only (exit monitoring mode on the right side), and patch this:

OUT (R) -> Left RECORD In

OUT (L) -> mixer/speakers

Enhancements in v1.4

Reduced Latency

We’ve made the timing tighter even v1.4. The latency, calculated from play trigger’s rising edge until actual audio playback, has been reduced to a minimum of 0.7ms. To get the fastest latency, make sure to disable Trigger Delay by setting the it to “1” (see **Variable Trigger Delay** section above).

A bit of technical explanation regarding latency: Each sample slot (1-10 on the left side and 1-10 on the right side) has its own ultra-fast RAM cache that’s about 6 seconds. Once the samples in the bank have been loaded into the cache, you can trigger any of the 10 samples in a bank (20 samples if you count both sides) with very low latency. The only limitation is that only the first 6 seconds of a sample file is loaded into the cache (the 6 seconds starts at the **Start Pos** position). The process of loading into the cache typically adds 5ms to the latency, on the *very first time* a sample is played after changing banks. After the sample has been played once, the latency will be 0.7ms for all future times. You can tell that a sample has already been loaded because when you play it, the **Busy** light doesn’t turn on.

Pro tip: If you play a sample and then move the **Start Pos** more than +/-6 seconds, the sample file data starting at the new **Start Pos** will have to be loaded into the cache again. If you require faster latency while still being able to select multiple start points greater than 6 seconds apart, consider using the **Edit+Copy** and **Edit+Scrub Start/End** features to create multiple copies of a sample with different start/end points.

Drag-and-drop WAV files into folders

Dragging WAV file(s) into an existing folder on the microSD card will automatically add the files to the bank if the bank has empty slots available. In previous versions, the file(s) were added only if the *entire* bank was empty.

If there are no empty slots in the bank, then use the **Edit+Next File** feature. If you have a complex bank/slot setup where you've used **Edit+Next File** to create banks containing samples in multiple folders, then the STS will try to fill the empty slots in each bank by searching in the folder of the lowest-numbered sample's file location.

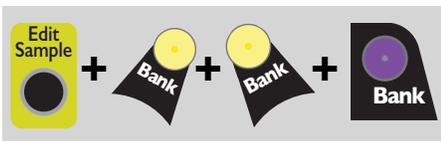
Calibrate IV/OCT jack offset

If there is a difference in pitch between the audio being recorded/monitored and playback of the same audio, or if there's a difference in playback pitch between channels, then this may need to be adjusted on your unit. Note that if the difference in pitch is heard in response to different voltages on the **IV/OCT** jacks, then the issue is probably with tracking compensation, not with offset.

To adjust: Unplug the **IV/OCT** jacks. Double-check the **Pitch** knobs are centered in their detents. Set the channel you wish to adjust to looping playback. Make sure the other channel is not playing.



Edit+Bank+Bank+REC decreases the offset.
(whichever channel(s) are currently playing will be calibrated)



Edit+Bank+Bank+REC Bank increases the offset.
(whichever channel(s) are currently playing will be adjusted)

The setting can be saved into memory by holding **Edit + PLAY (Save)** for 2 seconds.

Reset Tracking Compensation

As shown in the User Manual 1.0, tracking compensation can be adjusted using **Edit + REC/REC Bank**. The tracking can be reset to 1.0000 simply by holding down all three buttons **Edit+REC+REC Bank** for 2 seconds. *Note: when upgrading from v1.0 or v1.1 to a later version, tracking compensation will be automatically reset to 1.0000*

Tighter Tracking Compensation

In v1.4, the tracking of the **IV/OCT** jacks has been made tighter, +/-0.4 cents over C0-C3

New Auto-stop playback mode

The play modes set by the right **PLAY** button in System Mode are changed:

- **Green:** changing to a new sample never interrupts playback.
- **Blue:** changing to a new sample restarts playback only when looping.
- **Red:** changing to a new sample always stops/restarts playback.

Fixes/minor changes

- After exiting System Mode, right side **Length** was set to 0 until the knob was moved. Fixed.
- Creating a new folder with an exact color name in all lowercase would add the bank twice. Fixed.
- **Edit+Next File** while in an empty slot now searches in the folder of the first filled slot.
- **Pitch** knob has a larger plateau around the center detent, and gradually slopes away from center to make it easier to fine-tune and de-tune.
- Tapping **Reverse** after changing Channel Volume prematurely updated the **Start Pos** setting. Fixed.
- **Scrub End** setting for samples was not loaded after reboot until the **Edit** button was pushed. Fixed.
- It now takes two seconds instead of four seconds to enter System Mode.