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# FluidSynth

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## Sostenuto pedal for FluidSynth Fluidsynth Specifications How to use Sustain an Sostenuto pedals

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- 27/02/2015 0001-Add-sostenuto-pedal-functionality.patch - obsolete
- 11/03/2015 0002-Add-sostenuto-pedal-functionality.patch
- 22/03/2015 More détails on specification 4 (1.2.1) : 0003-Add-sostenuto-pedal-functionality.patch
- 29/03/2015 Better implementation of specification 4 (1.2.1):  
0004-Add-sostenuto-pedal-functionality.patch
- 14/09/2019 FluidSostenuto-005, remove chapters 1.4 , 1.5, 1.6 from FluidSostenuto-004.

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## 1. Introduction

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In FluidSynth (v 1.1.6) only Sustain pedal is supported. Sostenuto pedal is ignored. Since v 1.1.6, Sostenuto has been implemented as described by this document.

If you have no idea of what sostenuto pedal is you could read chapters 1.1, 1.2, and chapter 1.3 that gives instructions on how to play Sostenuto and Sustain pedals.

### **1.1. Sustain pedal behavior.**

Talking about Sustain pedal, musicians often say "the damper pedal" or "pedale forte".

When a musician play a key note on accoustic instrument, the sound release quickly when he release the key note.

Using sustain pedal, note continues when musician release key note. Depending of the instrument , sound take more or less time to release.

The advantages are:

- The sound resonates among.
- The musician can enhance easily a legato playing. This enhancement is particularly necessary on keyboard instruments that naturally aren't favorable to legato playing.

The disadvantages are:

- If musician insists too (i.e he forgets releasing the pedal), the sound may increase each time a note is sustained.
- Also , the musician must be careful with a lot of dissonances introduced very easily by sustained notes.

So, using the sustain is beneficial when used sparingly and carefully.

#### 1.1.1. Sustain behavior

To sustain note, a musician must depress the Sustain pedal before he releases the key note. (No matter if pedal is depressed before or after this key note).

As the pedal is depressed, any note is sustained when the musician releases the key note. Any following notes will be sustained too. Alls sustained notes will be released when Sustain pedal is released.

The best way is to try this immediately.

#### 1.1.2. FluidSynth specifications

##### Specification 1

- On noteOff event, note is sustained if sustain pedal is depressed.

##### Specification 2:

- When sustain pedal is released, alls notes sustained will be released.

### **1.2. Sostenuto pedal behavior.**

Talking about Sostenuto pedal, musicians often say "the tonal pedal".

Sostenuto behavior is similar to sustain, so when sostenuto is depressed, any note is sustained when a key is released, however the purpose of this pedal is to choose some notes to sustain and others notes that will not be sustained.

This is the point of interest of sostenuto pedal. Only notes depressed before sostenuto pedal will be sustained, following notes will not be sustained. As a musician you can consider the notes played before

sostenuto pedal as base notes of your chord (consonants notes). Following notes could be extensions of your sustained chord. That means that these following notes can be temporarily introduce interesting dissonances with current sustained chord and the musician can control easily duration of these dissonances.

As you see, a musician have a better control on notes played after the sostenuto pedal as these will not be sustained by sostenuto pedal but can be sustained and released later by sustain pedal. This can be done independently of notes sustained by sostenuto pedal. That means that sustain pedal can be changed while the sostenuto pedal is down without affecting the notes held by the sostenuto pedal.

So the musician may think of two independant groups of notes, one sustained/released by sostenuto and the following one not sustained or sustained/released by sustain pedal !.

### 1.2.1. FluidSynth specifications

#### Specification 3

On noteOff event, if sostenuto pedal is depressed

- (1) Notes depressed before Sostenuto pedal will be sustained.
- (2) Notes depressed after Sostenuto pedal will not sustained (see exception below in spec 4).

If both sostenuto and sustain pedal are both depressed, sostenuto has precedence over sustain. That means that:

- notes depressed before sostenuto are sustained by sostenuto and not by sustain (FLUID\_VOICE\_HELD\_BY\_SOSTENUTO).
- notes depressed after sostenuto are sustained by sustain (FLUID\_VOICE\_SUSTAINED) (see spec 6).

#### Specification 4:

- When a note is currently sustained (by sustain or sostenuto), playing a same note stops the previous note and starts a new note.  
If the previous note was sustain by sostenuto, on noteOff the new note will keep a sustained state (even if Sostenuto pedal is depressed before the new note is released).

#### Specification 5:

- When sostenuto pedal is released, alls notes sustained by sostenuto (FLUID\_VOICE\_HELD\_BY\_SOSTENUTO) will be released.

#### Specification 6:

While notes are sustained by sostenuto, next notes aren't allowed to be sustained by sostenuto but can be sustained by sustain.

This means than while notes are sustained by Sostenuto , a musicien can add more sustained notes (FLUID\_VOICE\_SUSTAINED) using sustain pedal temporary. Those later notes (FLUID\_VOICE\_SUSTAINED) will be released when sustain will be released and former notes continue to be sustained by sostenuto. Those former notes (FLUID\_VOICE\_HELD\_BY\_SOSTENUTO) will be released when sostenuto will be released.

### **1.3. How to play Sustain or Sostenuto pedal easily ?**

There is a simple and unified way to play Sustain or Sostenuto pedal. For example to play a sustained chord follow the instructions below:

- 1) Play your chord (keys down)
- 2) Play your pedal down (sustain or sostenuto) and release your chord (keys up).

Now you chord is sustained (depending of the choosen soundfont instrument).

Each time you want to change chord you may need to use the pedal (sustain or sostenuto) so that next chord overlaps previous chord ending. This is called legato playing.

- 3) Play your next chord (keys down).

4) (a)Release the pedal (this release previous chord). (b)Depress your pedal down and (c) release your chord (key up). (Execute steps 4.a, 4.b, 4.c consecutively).

So for each chord change you need to do steps (3) and (4.x) consecutively thus:  
(3,4.x)....(3,4.x)....(3,4.x)...

3) Now play following notes. These are not allowed to be sustained by sostenuto pedal but you can use sustain pedal to sustain/release these notes.

#### **1.4. Using fluidsynth router to simulate a sostenuto pedal by Sustain pedal**

##### **1.4.1. Verifying Sustain behavior**

Before verifying Sostenuto you may prefer to verify Sustain behavior. Please follow specifications in 1.1

##### **1.4.2. Verifying Sostenuto behavior**

In the case of only a sustain pedal is available, you don't need to buy a sostenuto pedal to try sostenuto effect. You can instruct FluidSynth MIDI router to transform a MIDI sustain event (or any other CC event) to a MIDI Sostenuto event.

Using fluidsynth application, you need to enter the following commands in the shell to instruct the router.

*# Remove current rules (to remove cc sustain events):*

**router\_clear**

*# Set the rule to transform CC sustain (64d) to CC Sostenuto (66d)*

**router\_begin cc**

**router\_par1 64 64 0 66**

**router\_end**

*# Set the rules to pass through other messages types (note, prog, pbend, cpress, kpress)*

**router\_begin note**

**router\_end**

**router\_begin prog**

**router\_end**

**router\_begin pbend**

**router\_end**

**router\_begin cpress**

**router\_end**

**router\_begin kpress**

**router\_end**

To verify sostenuto behavior, please follow specifications in 1.2.