Sound Development Tools
V2.x → V3.x
What's new?

Introduction

V3.0 introduces support for the new SAM 5xxx series chips through the 5000SDK board.
This document lists their new features, sorted by application.

Instrument Editor

Several new parameters or parameter values are available on the SAM5xxx platform

Oscillator module

New parameter: Delay
Introduces a delay between the moment the MIDI Note On message is received and the moment the split starts playing.

New Loop Type value: One shot
SAM5xxx sound engine supports one shot samples natively: the split stops playing when reaching *Loop end* point. *Loop start* value is ignored

New parameter: Loop tuning
Single-period loops can sound out of tune due to loop length quantization (integer number of samples)
This parameter allows the loop pitch to be fine-tuned in order to eliminate this problem
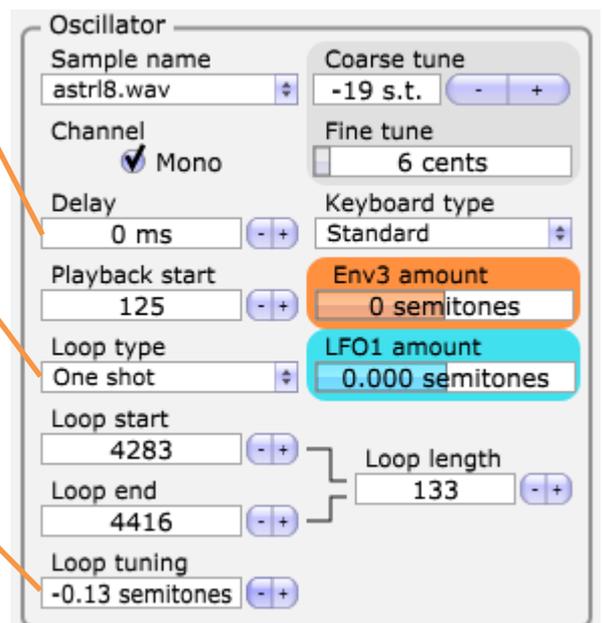
Minimum *Loop length* on SAM5xxx chips is 32 samples. When importing instruments from other formats in which shorter loops are possible, samples are automatically processed and instruments are updated in order to fulfill this requirement.

When importing instruments designed for SAM9708 and SAM2xxx targets (which support fractional loop length) to SAM5xxx (which doesn't), the *Loop tuning* parameter is computed automatically in order to compensate for the loop size rounding, making the conversion as transparent as possible.

Reminder: import from SAM9708 and SAM2xxx targets (which support alternate and flip loop types) to SAM3xxx and SAM5xxx (which don't) is also handled transparently by automatically regenerating appropriate samples and instrument parameters.

Filter module
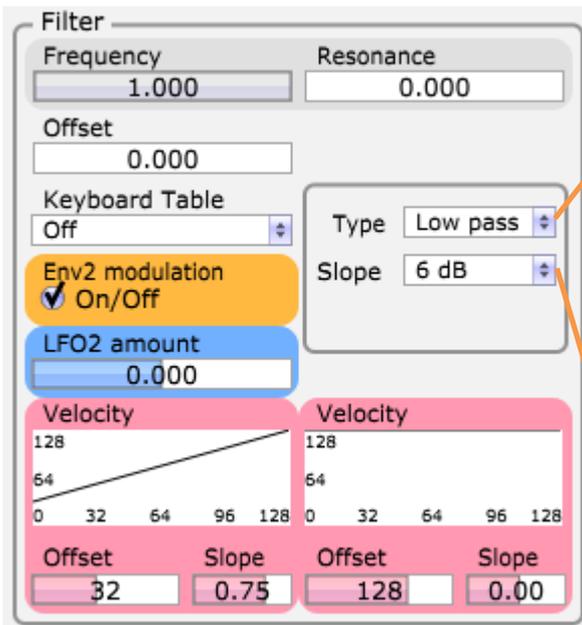
New Filter type values
SAM5xxx sound engine supports:
- *Notch* filters (in addition to *Low pass*, *Band pass* and *High pass*)
- Filter oversampling (*2x* and *3x*) for extended frequency range* and increased accuracy

New Filter slope value: 6dB
SAM5xxx sound engine supports first order low pass and high pass filters.
They provide a smooth attenuation suitable for natural emulation of damping and velocity response in acoustic instruments

*Cutoff frequency range being dependent on the Filter type and slope, the cutoff frequency parameters expressed as [0-1] values (Frequency and Offset) are automatically recomputed when changing filter type or slope in order to preserve the physical cutoff frequency in Hertz (when possible) regardless of the selected filter

Filter types don't all have the same computational cost, therefore the SAM5xxx adapts the polyphony dynamically depending on the settings of the currently playing voices.

Filter cutoff frequency in instruments also used to be dependent on the sampling rate of the board playing them. On SAM5xxx targets, the cutoff frequency remains the same whatever the sampling rate of the board: sound design can therefore be done more or less regardless of the hardware settings.

Tuning table
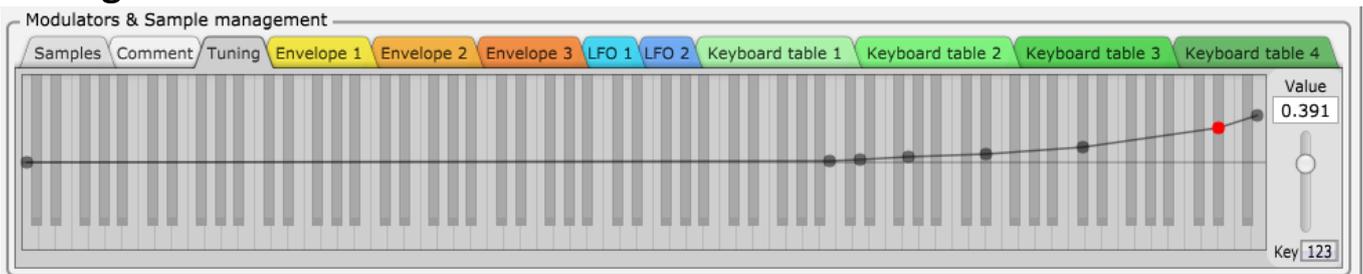
A new *Tuning table* allows the tuning of the whole instrument to be edited key by key.
Easy point addition/selection using a MIDI keyboard is provided (through *Settings | Midi selection mode* menu.)

Key off amplitude modulation

Layers triggered on Note Off were introduced in SAM3xxx series. Their amplitude was modulated by the current level of the corresponding Note On split amplitude envelope. On SAM5xxx series, the modulation source can be selected per instrument through the *Global* menu:
- Off
- Envelope 1
- Envelope 2
- Envelope 3

Flash memory sample storage

In addition to its 256MB RAM, the 5000S-DK board features a 2GB NAND Flash memory. Instrument Editor is able to transfer to and play samples from NAND Flash instead of RAM for increased storage capacity.
Flash memory being persistent, the Editor also keeps track of the samples it stored onboard in order to allow instant instrument reload even after the board and/or computer was turned off.
Note: once loaded in NAND Flash, samples can't have their loop points edited anymore.

Board sample rate

The sample rate of the 5000S-DK board can be selected by software through the Instrument Editor (*Settings* menu). Sample rate used during sound design is stored in the instrument and the board may be automatically switched to the corresponding sample rate when loading an instrument.

Layer mute

In order to allow individual layer auditioning while editing, layers can now be soloed/muted individually, like tracks in a mixer. This feature is available through the Layer menu (shortcut are also available)
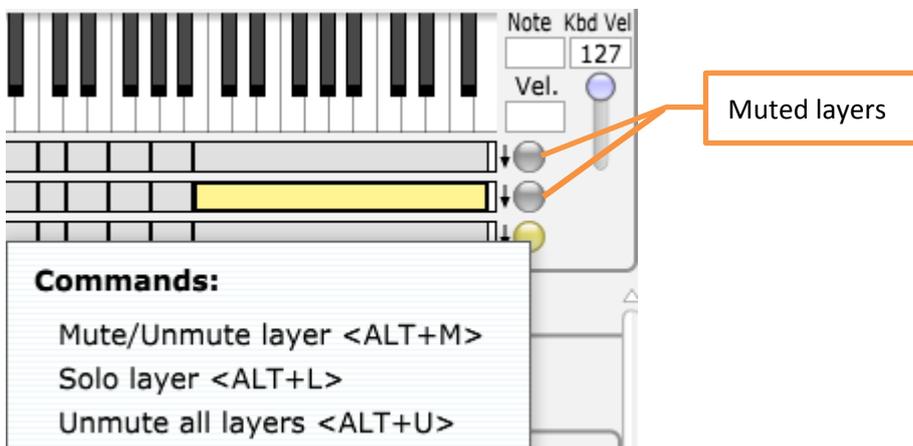
Miscellaneous

- New Copy/Paste/Clear features on Keyboard (and Tuning) Tables
- Window height now adjustable (for small laptop displays…)
- Instrument automatic background-save for recovery after application crash
- Sample loading progress bar now with estimated remaining time and Cancel button

Bank Compiler

New parameter: Target memory
SAM5xxx supports different types of NAND Flash memory, which require special compilation modes

New parameter: Relocatable
Allows a bank to be compiled without specifying a *Start address*. The bank can then be loaded anywhere in the board memory

New 128bit encryption scheme
SAM5xxx features strong sound bank protection through robust sample encryption. Encryption key is extended from 32 to 128bits

| Instruments | Drumsets | Bank settings | Log |

Sound bank compilation settings

Target format: SAM5xxx (SND5000)

Target memory type: NAND 2k

○ Relocatable

Start address: 80000   ○ End address: 100000

☑ Encryption: 8A51123F127515E4AF73CD81245A21B2

○ Generate separate Parameter and Sample binaries

○ Compile samples
Sample start address: 20000

○ Compile parameters
Map file: