Kraftor SAM MIDI

Media

User Manual

Version 1.1

Kraftor SAM is a Software Automatic Mouth text-to-speech firmware for Kraftor / SAMD21 hardware. It reads typed text over USB Serial, stores phrases in RAM and optional RC256 FRAM, and lets you trigger stored phrases or shape the voice via USB MIDI or the hardware serial MIDI input.

Version History

- **v1.1** (2026-05-03) : SAM text-to-speech with USB/serial MIDI control, RAM phrase slots, optional RC256 FRAM phrase storage, serial commands, and OLED status display support.

MIDI Channel Configuration

The firmware listens in **MIDI omni mode**. USB MIDI and Serial1 MIDI are both active at the same time and use the same note, control change, and pitch bend handlers.

No DIP switch channel setup is required for this firmware version.

MIDI Input	Function	Channel

USB MIDI	Trigger sentence slots and control voice parameters	Omni
Serial MIDI	Trigger sentence slots and control voice parameters	Omni

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Sentence Banks

Kraftor SAM can store short sentences and trigger them from MIDI notes. RAM slots are always available. FRAM slots are available when an RC256 FRAM is detected on I2C address **0x50**.

Bank	Slots	MIDI Notes	Persistence
RAM	20 slots, R0-R19	28-47	Cleared on power-off or reset
FRAM	100 slots, F0-F99	48-127 for F0-F79	Saved in optional RC256 FRAM

Each sentence can contain up to **200 characters**. The FRAM stores 100 sentences, but MIDI can directly address the first 80 FRAM slots because MIDI notes stop at 127. The remaining FRAM slots are available through the serial commands.

MIDI Messages

Note On – Sentence Triggering

MIDI Note On messages trigger stored sentences. Velocity is not used for volume in this firmware version.

- **Notes 28-47**: play RAM slots R0-R19.

- **Notes 48-127**: play FRAM slots F0-F79 when RC256 FRAM is present.
- **Other notes**: ignored and reported as out of range on USB Serial and the OLED.
- **Note Off**: turns off the status LED only; spoken phrases play to completion.

MIDI Note	Slot	Action
28	R0	Play RAM sentence slot 0
29	R1	Play RAM sentence slot 1
47	R19	Play RAM sentence slot 19
48	F0	Play FRAM sentence slot 0
49	F1	Play FRAM sentence slot 1
127	F79	Play FRAM sentence slot 79

Pitch Bend — SAM Pitch Control

Pitch Bend controls the SAM pitch parameter. The full 14-bit MIDI pitch bend range is mapped to SAM values **255-0**, so lower MIDI bend values produce higher SAM pitch values in the firmware mapping.

Pitch Bend Value	SAM Pitch Value	Effect
-8192	255	Highest mapped SAM pitch value
0	about 127	Center pitch

+8191	0	Lowest mapped SAM pitch value

Default pitch is **64**.

CC1 – Speed

MIDI CC1 controls SAM speech speed. MIDI values **0-127** are mapped to SAM speed values **255-1**. Higher CC1 values make speech faster.

CC1 Value	SAM Speed Value	Effect
0	255	Slowest mapped speech
127	1	Fastest mapped speech

Default speed is **72**.

CC2 – Mouth

MIDI CC2 controls the SAM mouth parameter. MIDI values **0-127** are mapped linearly to SAM values **0-255**.

CC2 Value	SAM Mouth Value
0	0
127	255

Default mouth is **128**.

CC3 — Throat

MIDI CC3 controls the SAM throat parameter. MIDI values **0-127** are mapped linearly to SAM values **0-255**.

CC3 Value	SAM Throat Value
0	0
127	255

Default throat is **128**.

Ignored MIDI Messages

- Control Change messages other than CC1, CC2, and CC3
- Note velocity
- Notes outside the RAM and FRAM trigger ranges

Serial Text And Commands

Open the USB Serial port at **115200 baud**. Type a line of text and press Enter to speak it. Lines that start with ! are commands for managing the sentence banks.

Command	Function	Example
!INFO?	Report RAM slots, FRAM status, MIDI note bases, max sentence length, and firmware version	!INFO?
!GET	Read one sentence slot	!GET R 0

!SET	Store text in one sentence slot	!SET F 12 hello from SAM
!ERASE	Clear one sentence slot	!ERASE R 3
!PLAY	Speak one sentence slot	!PLAY F 25
!DUMP	List all sentences in a bank	!DUMP R

Use **R** for RAM slots and **F** for FRAM slots. FRAM commands return **!ERR nofram** when no RC256 FRAM is detected.

Quick Reference Table

Message	Function	Range
Note On	Trigger RAM sentence slots	Notes 28-47, slots R0-R19
Note On	Trigger FRAM sentence slots	Notes 48-127, slots F0-F79
Pitch Bend	SAM pitch	-8192 to +8191, mapped to 255-0
CC1	SAM speed	0-127, higher is faster
CC2	SAM mouth	0-127 mapped to 0-255
CC3	SAM throat	0-127 mapped to 0-255
USB Serial	Speak typed text or manage sentence banks	115200 baud

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Connections

The Kraftor SAM firmware accepts control from:

- **USB Serial** for typed speech and sentence bank commands
- **USB MIDI** for notes, control changes, and pitch bend
- **Serial MIDI** on the hardware serial MIDI input

Audio is output from the SAMD21 DAC on **A0**.

OLED Display

If an OLED display is detected at I2C address **0x3C**, it shows:

- **SAM MIDI** on startup
- The firmware version
- The last MIDI note and sentence slot
- The spoken text or empty/error status for the selected slot

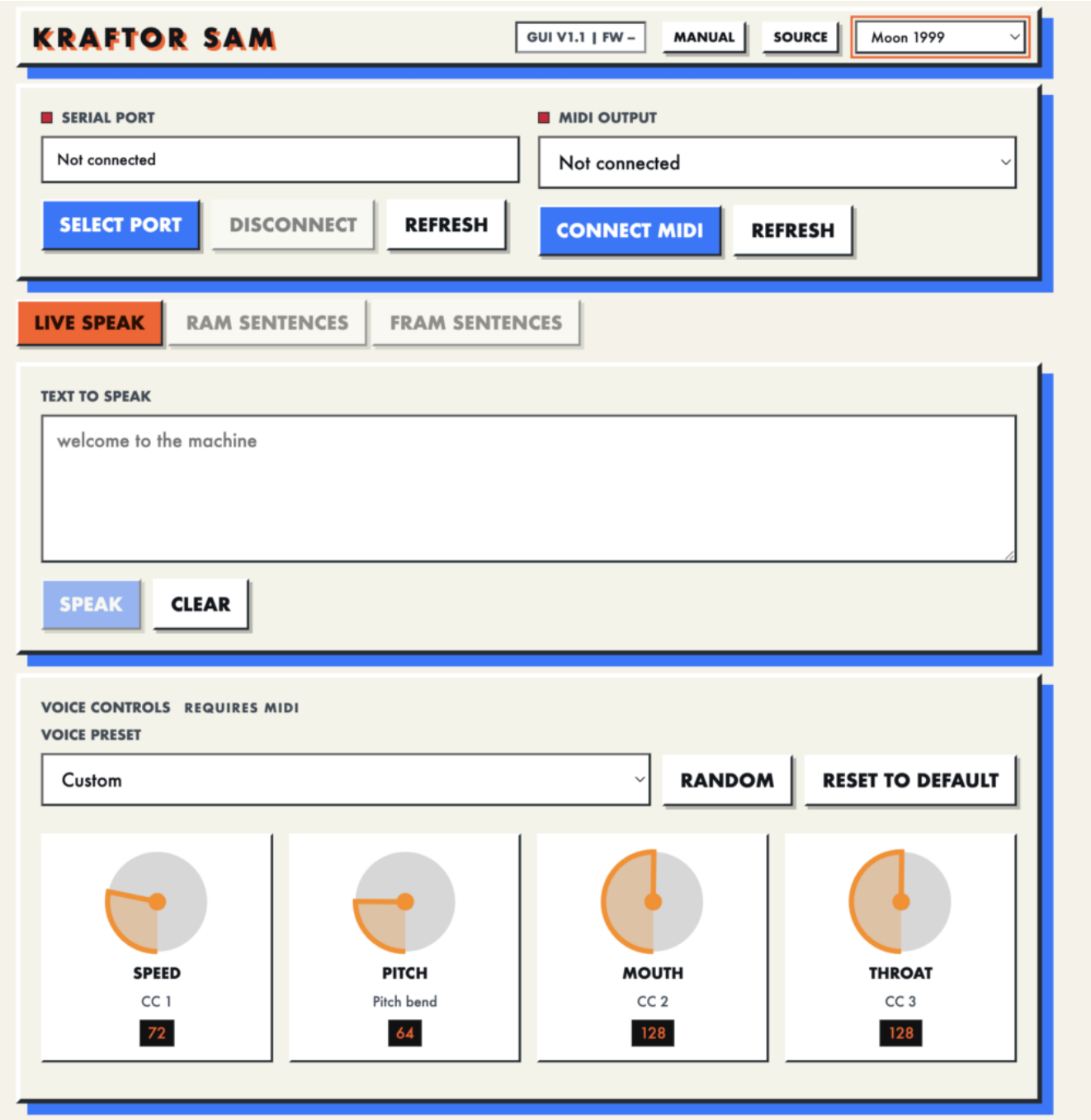
Optional FRAM

If an RC256 FRAM is detected at I2C address **0x50**, the firmware enables persistent sentence slots. On first use, a missing FRAM header is initialized automatically.

Tools

The best way to use Kraftor SAM is with the companion SAM Designer tool:

https://deladriere.github.io/SAM_Designer/



SAM Designer runs in the browser and provides a dedicated interface for typing text, sending it to Kraftor SAM, saving and recalling sentence slots, and controlling voice parameters. Use a Chromium-based browser for Web Serial and Web MIDI support.

You can also use any USB Serial terminal at **115200 baud** to type text, save phrases, dump sentence banks, and trigger stored sentences. Use a USB MIDI or DIN MIDI controller to play sentence slots and control pitch, speed, mouth, and throat.

Firmware

Do not use this firmware for Emy, Emy Terminal.

How to install the firmware on Kraftor

SAM MIDI for Kraftor

1 file(s) 52.50 KB
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