



SAI Linux driver



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1 Article purpose

This article introduces the SAI Linux[®] driver for the SAI internal peripheral.

2 Short Description

The SAI^[1] Linux driver is an ASoC CPU DAI driver implemented in the Linux ALSA framework.

3 Configuration

3.1 Kernel Configuration

Activate the SAI^[1] Linux driver in the kernel configuration using the Linux Menuconfig tool: Menuconfig or how to configure kernel.

```
[*] Device Drivers
    [*] Sound card support
        [*] Advanced Linux Sound Architecture
            [*] ALSA for SoC audio support
                STMicroelectronics STM32 SOC audio support
                    [*] STM32 SAI interface (Serial Audio Interface) support
```



3.2 Device tree

Refer to the [SAI device tree configuration](#) article when configuring the SAI Linux kernel driver.

4 How to use

The SAI Linux driver can be accessed from userland through an ALSA device. Refer to [ALSA overview](#) for information on how to list and use ALSA devices.

5 How to trace and debug

The `debugfs` and `procfs` file system can be checked to get information on the SAI driver and the resources it uses. A non-exhaustive list of these file system entries is provided below. Refer to [ALSA overview](#) for more details on debugging tools.

- `debugfs` entries:
 - **asoc**: refer to [ALSA_overview#How_to_monitor](#)
 - **clk**: refer to [Clock_overview#How_to_monitor_with_debugfs](#) to get information on clocks.
 - **pinctrl**: refer to [Pinctrl_overview#How_to_monitor](#) to get information on pins.
 - **regmap**: allow to monitor SAI peripheral registers.

```
$ cat /sys/kernel/debug/regmap/xxx.audio-controller/registers
```

- `procfs` entries:
 - **asound**: refer to [ALSA_overview#How_to_debug](#)
 - **interrupts**: allow to check interrupts.

```
$ cat /proc/interrupts
```

6 Source code location

The STM32 SAI peripheral includes two independent audio subblocks that share common resources. The driver source code reflects this architecture.

`sound/soc/stm/stm32_sai.c` : handles common resources such as clock, interrupt, reset and shared register.

`sound/soc/stm/stm32_sai_sub.c` : handles the resources dedicated to each subblock.



7 References

- 1.01.1 SAI internal peripheral

Serial Audio Interface (Mechanism used to transfer non-buffered audio data between processors and/or audio converters.)

ALSA System on Chip

Central processing unit

Digital Audio Interface

Advanced Linux sound architecture

Process File System (See <https://en.wikipedia.org/wiki/Procsfs> for more details)

Debug File System (See <https://en.wikipedia.org/wiki/Debugfs> for more details)