Introducing
Sound Open Firmware project

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What is Sound Open Firmware?

- https://github.com/thesofproject/
- Open source audio firmware and driver infrastructure
  - Generic audio firmware infrastructure
  - Platform and architecture independent
- Announced in 2018 at Embedded Linux Conference
- License model
  - Firmware: BSD 3 Clause / MIT (dual license)
  - Linux drivers: BSD 3 Clause / GPL v2 (dual license)
The need for an open source solution

• Traditionally firmware was closed source
  • Difficult to debug
  • Hard to understand
  • Lack of documentation
• Usually comes with a proprietary / OS specific driver
• Growth in voice control-based devices
• Demand for voice and speech recognition applications
Key features of Sound Open Firmware

- DSP architecture and platforms agnostic
  - **Now uses Zephyr OS**
- Host AP architecture agnostic
  - Uses generic ALSA interface with Linux
  - Generic communication protocol, firmware not coupled with any OS
- Freedom to define new audio pipelines
  - This includes integration of audio proprietary algorithms
- Dynamically load module binaries
- All development done in public
Sound Open Firmware supported components

- Volume
- IIR / FIR Equalizer
- Mixer
- Keyword detector
- Sample rate converter
- Beamformer
- Audio Echo Cancellation
- Noise Reduction
- Compressed audio
- Module adapter
  - Plugin proprietary algorithms
Sound Open Firmware – Host Application Processor side

- SOF Linux driver
- ALSA interface
- Generic IPC driver
- Host specific platform driver
Architecture overview – DSP side

- RTOS abstraction layer
- Initially started with XTOS
- Switched to Zephyr OS
- Integrates Zephyr native drivers
Collaboration and Community

• All development happens on Github.
Supported platforms

- NXP
  - i.MX8QXP, i.MX8QM, i.MX8MP, i.MX8ULP, i.MX93*
- Intel
  - Allmost all platforms you can think of
  - Lunarlake, Meteorlake, Alderlake, etc
- AMD
  - Renoir, Vangogh, Rembrandt, ACP6.3
- Mediatek
  - MT8186, MT8195
Future developments

• Complete switch to Zephyr OS
• Enable SOF on ARM Cortex-A, M cores
• Enable standalone SOF on i.MX-RT
• Enhance Audio stack in Zephyr
Getting started with SOF

- [https://thesofproject.github.io](https://thesofproject.github.io)
- Joining the SOF community
  - Zephyrproject on Discord, #sof channel
- Google Summer of Code, 2024
  - Implement GUI to control SOF components
Get in touch

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