

High efficiency class D codec with integrated audio processing

Data Brief

Features

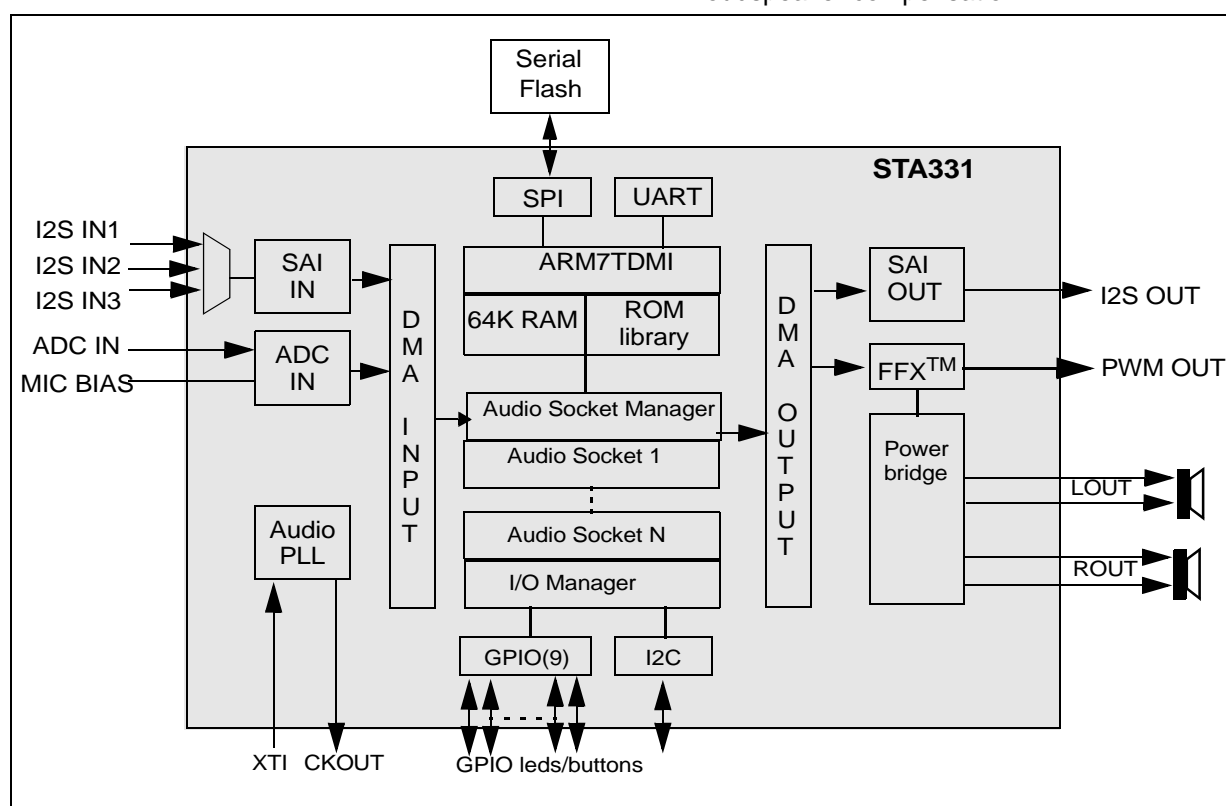
- High efficiency class D FFX™ technology.
- Stereo ADC input with integrated microphone bias
- Digital/analog I/O muxing and down-mixing capability
- Low power architecture
- I/O supply voltage range: 1.8 V to 3.6 V
- Programmable GPIO functionalities for micro-less operation
- Audio processing libraries:
 - tones, WideSurround, StereoEnhancer
 - intelligent volume control (MDCR)
 - enhanced listening modes (voice, midnight modes)

- MP3 and WMA decoders (ROM option only)
- Noise Reduction and Echo Cancellation (NREC)
- Loudspeaker and cabinet compensation EQ
- Third parties audio effects

- Package: LQFP100.

Applications

- Flat panel TV
- Home audio stereo
- Cradle systems
- Soundbar systems (2.1ch)
- Loudspeaker compensation



1 Description

The STA331 device is a high-efficiency audio codec with an integrated ARM7TDMI® core capable of running audio processing algorithms up to 75 MHz. The surrounding analog and digital audio peripherals turn it in the ideal and flexible solution for mid-range sound-processing applications, where final product differentiation is a must. The code runs off from the embedded RAM, uploaded by an external serial flash and the whole set of audio parameters and functionalities may be controlled via I2C or customizable GPIO interface (for micro-less operation). Moreover, the widely adopted core allows for a fast porting of third-parties audio effects, typically available on ARM® processors.

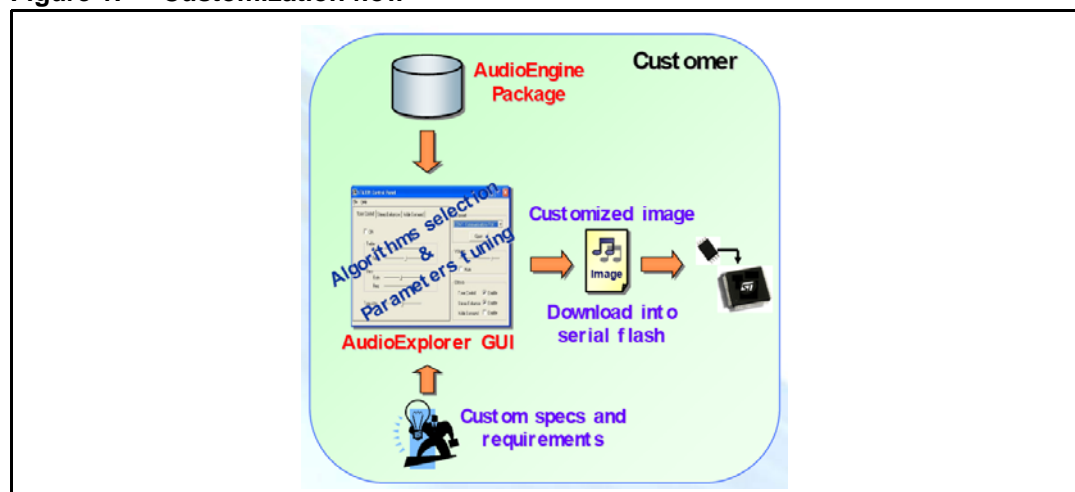
The high-efficiency Class-D codec embeds a stereo ADC, proprietary FFX™ PWM modulator, and a powerful bridge in a single package, along with multi standard digital connectivity and a 3-way selector on the input. Full muxing operations of multiple audio sources are available. The PWM output may drive external power bridges, up to 2 x 100 W.

The software architecture is based on two main components, the Audio Socket Manager (ASM) and the I/O Manager, turning the memory and processing capability of the ARM7TMDI® core into a ready-to-use, yet fully customizable processing engine. The virtual audio sockets allow a flexible selection of pre-compiled audio libraries and a transparent uploading mechanism, on demand, from the external serial flash. A graphical AudioExplorer GUI allows to browse and combine audio libraries out of the AudioEngine (AE) package, as released by STMicroelectronics (see customization flow in [Figure 1](#)). Parameters tuning along with other customizations (GPIO mapping, audio protocol and flow) result in a final binary image ready to be downloaded into the final product.

The evaluation board, fully controllable by the GUI, allows for an immediate listening test of the selected audio algorithms.

Third parties' commercial algorithms are optionally available, through AE packages, in evaluation mode (listening time typically limited to 3 min.). Porting of custom audio libraries is possible as well, through Phoenix SDK (please contact STMicroelectronics for more information).

Figure 1. Customization flow



1.1 Evaluation kit

- STA331-EVAL board, including:
 - schematics
 - gerbers
 - user manual
- AudioExplorer GUI
- AudioEngine package (download updated versions from ST web), including:
 - collection of processing libraries
 - audio libraries manual
- STA331 datasheet

2 Revision history

Table 1. Document revision history

| Date | Revision | Changes |
|-------------|----------|------------------|
| 13-Nov-2007 | 1 | Initial release. |

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