

## High efficiency class D codec with integrated audio processing

Data Brief

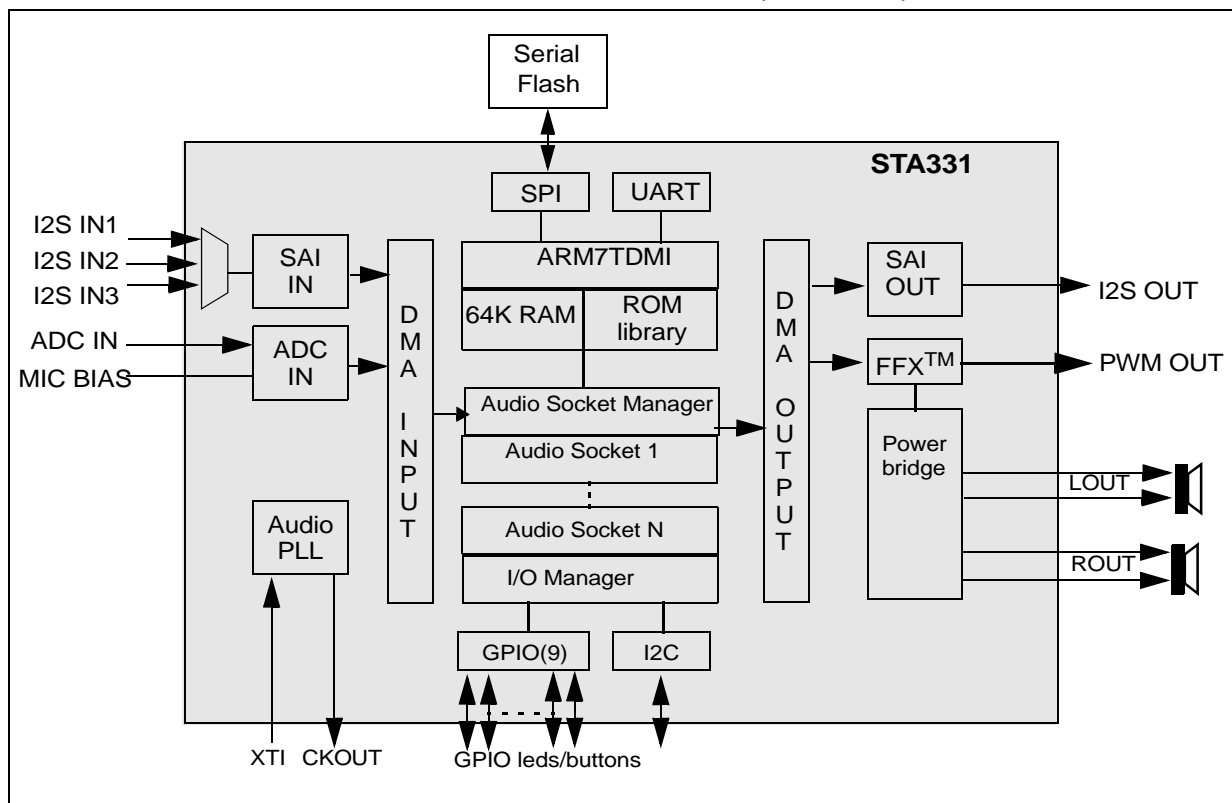
### Features

- 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<sup>®</sup> 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<sup>®</sup> processors.

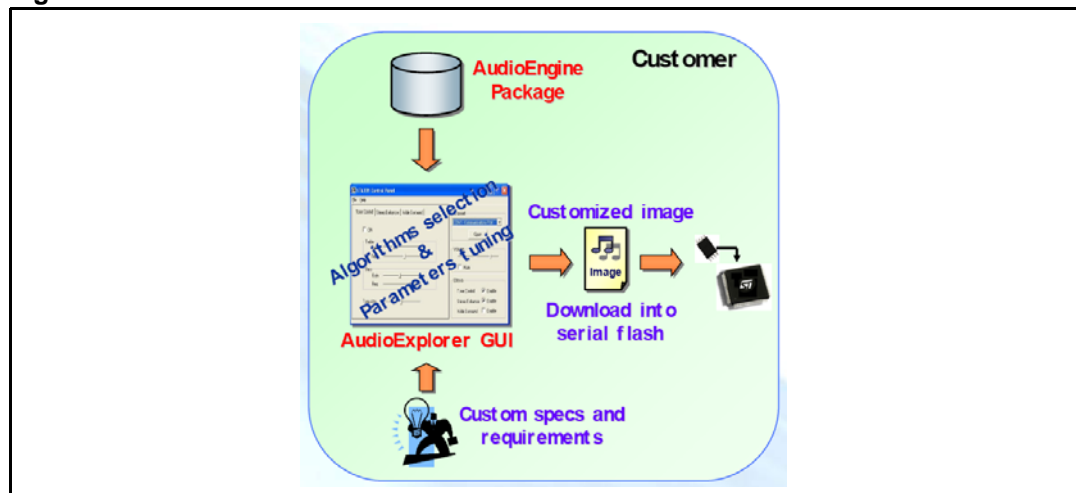
The high-efficiency Class-D codec embeds a stereo ADC, proprietary FFX<sup>™</sup> PWM modulator, and a powerful bridge in a single package, along with multi standard digital connectivity and a 3-way selector on the input. Full muxing operations of multiple audio sources are available. The PWM output 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<sup>®</sup> 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.

**Please Read Carefully:**

Information in this document is provided solely in connection with ST products. STMicroelectronics NV and its subsidiaries ("ST") reserve the right to make changes, corrections, modifications or improvements, to this document, and the products and services described herein at any time, without notice.

All ST products are sold pursuant to ST's terms and conditions of sale.

Purchasers are solely responsible for the choice, selection and use of the ST products and services described herein, and ST assumes no liability whatsoever relating to the choice, selection or use of the ST products and services described herein.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted under this document. If any part of this document refers to any third party products or services it shall not be deemed a license grant by ST for the use of such third party products or services, or any intellectual property contained therein or considered as a warranty covering the use in any manner whatsoever of such third party products or services or any intellectual property contained therein.

**UNLESS OTHERWISE SET FORTH IN ST'S TERMS AND CONDITIONS OF SALE ST DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTY WITH RESPECT TO THE USE AND/OR SALE OF ST PRODUCTS INCLUDING WITHOUT LIMITATION IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION), OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT.**

**UNLESS EXPRESSLY APPROVED IN WRITING BY AN AUTHORIZED ST REPRESENTATIVE, ST PRODUCTS ARE NOT RECOMMENDED, AUTHORIZED OR WARRANTED FOR USE IN MILITARY, AIR CRAFT, SPACE, LIFE SAVING, OR LIFE SUSTAINING APPLICATIONS, NOR IN PRODUCTS OR SYSTEMS WHERE FAILURE OR MALFUNCTION MAY RESULT IN PERSONAL INJURY, DEATH, OR SEVERE PROPERTY OR ENVIRONMENTAL DAMAGE. ST PRODUCTS WHICH ARE NOT SPECIFIED AS "AUTOMOTIVE GRADE" MAY ONLY BE USED IN AUTOMOTIVE APPLICATIONS AT USER'S OWN RISK.**

Resale of ST products with provisions different from the statements and/or technical features set forth in this document shall immediately void any warranty granted by ST for the ST product or service described herein and shall not create or extend in any manner whatsoever, any liability of ST.

ST and the ST logo are trademarks or registered trademarks of ST in various countries.

Information in this document supersedes and replaces all information previously supplied.

The ST logo is a registered trademark of STMicroelectronics. All other names are the property of their respective owners.

© 2007 STMicroelectronics - All rights reserved

STMicroelectronics group of companies

Australia - Belgium - Brazil - Canada - China - Czech Republic - Finland - France - Germany - Hong Kong - India - Israel - Italy - Japan - Malaysia - Malta - Morocco - Singapore - Spain - Sweden - Switzerland - United Kingdom - United States of America

[www.st.com](http://www.st.com)