BlueTunes® ROM QFN

BlueTunes ROM Stereo Headset Solution

Advance Information

BC57F687A05

Issue 1

BlueTunes ROM QFN Product Technical Overview

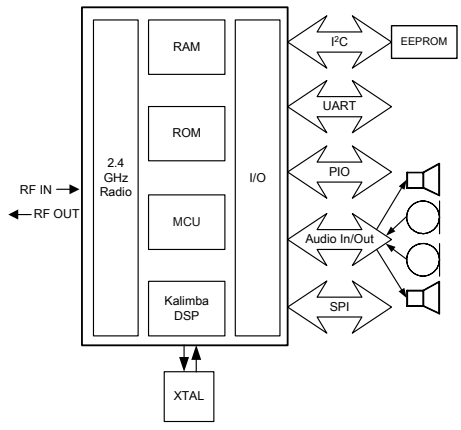
Features

- Cost-effective single-chip solution for stereo headset and wireless speaker applications
- A2DP1.2 and AVRCP1.0 profiles enabled with SBC encoder for streaming audio over Bluetooth and for remote control functionality
- MP3 decoder for improved audio quality and reduced power consumption
- Configurable A2DP 5-band EQ
- High-quality audio 95dB SNR on DAC playback
- 64MIPS Kalimba DSP co-processor
- FastStream, CSR's low-latency codec for video and gaming applications
- HFP 1.5 (includes 3-way calling) and HSP 1.0 support
- cVc support for echo and noise reduction
- Low-power consumption: over 10 hours of audio playback from a 200mAh battery
- Fully-qualified Bluetooth v2.1 + EDR specification system with support for secure simple pairing
- Best-in-class Bluetooth radio with 7dBm transmit power and -90dBm receive sensitivity
- Integrated 1.5V and 1.8V linear regulators
- Integrated switch-mode regulator
- Integrated 150mA lithium battery charger
- 68-lead 8 x 8 x 0.9mm, 0.4mm pitch QFN package
- Green (RoHS and no antimony or halogenated flame retardants)
- BlueTunes ROM Stereo Headset Solution Development Kit (includes example design) available. Order code BTN-003-1A

General Description

Based on **BlueCore®5-Multimedia ROM QFN**, the **BlueTunes ROM QFN** integrates a Bluetooth radio, baseband, DSP, high-quality audio codec, SMPS, LDOs and a battery charger for minimal BOM, component count and PCB area.

BlueTunes ROM QFN uses advanced DSP features for the latest stereo enhancements to improved audio quality; including SBC and MP3 decoder, support for FastStream (low-latency codec) and 5-band EQ.



Applications

- Stereo headset solution with support for echo and noise reduction
- Wireless stereo speakers

BlueTunes ROM QFN includes as standard cVc single microphone algorithm for echo and noise suppression. cVc 1-mic provides full duplex echo cancellation and a 10dB stationary noise suppressor.

The cVc dual microphone algorithm provides >30dB of noise suppression in both dynamic and stationary noise conditions such as babble, road, music and competing voices. In addition an acoustic echo canceller is now integrated into the cVc dual-microphone solution, further enhancing the far-end user-experience. This dual-microphone algorithm is enabled through a software license.

BlueTunes ROM QFN includes secure simple pairing, which greatly simplifies the pairing process, making it even easier to use a Bluetooth headset.

BlueTunes ROM QFN is available in a 8 x 8 x 0.9mm QFN package.

1 Device Details

Radio

- Common TX/RX terminal simplifies external matching; eliminates external antenna switch
- BIST minimises production test time
- Bluetooth v2.1 + EDR specification compliant

Transmitter

- 7dBm RF transmit power with level control from on-chip 6-bit DAC over a dynamic range >30dB
- Class 2 and Class 3 support without the need for an external power amplifier or TX/RX switch

Receiver

- Receiver sensitivity of -90dBm
- Integrated channel filters
- Digital demodulator for improved sensitivity and co-channel rejection
- Real-time digitised RSSI available on HCI interface
- Fast AGC for enhanced dynamic range

Synthesiser

- Fully integrated synthesiser requires no external VCO, varactor diode, resonator or loop filter
- Compatible with crystals 16MHz to 26MHz or an external clock 12MHz to 52MHz

Physical Interfaces

- Synchronous serial interface for system debugging
- I^2C compatible interface to external EEPROM containing device configuration data (PS Keys)
- UART interface
- 2 LED drivers with faders

Auxiliary Features

- Crystal oscillator with built-in digital trimming
- Power management includes digital shutdown and wake-up commands with an integrated low-power oscillator for ultra-low power Park/Sniff/Hold mode
- Clock request output to control external clock
- On-chip regulators: 1.5V output from 1.8V to 2.7V input
- On-chip high-efficiency switched-mode regulator: 1.8V output from 2.7V to 4.4V input
- Power-on-reset cell detects low-supply voltage
- 10-bit ADC available to applications
- On-chip 150mA charger for lithium ion/polymer batteries

Kalimba DSP

- Very low-power Kalimba DSP co-processor, 64MIPS, 24-bit fixed point core
- support for SBC and MP3[1] codec for improved audio quality
- Single-cycle MAC; 24 x 24-bit multiply and 56-bit accumulator
- 32-bit instruction word, dual 24-bit data memory
- 6K x 32-bit program RAM, 8K x 24-bit + 8K x 24-bit data RAM
- 64 x 32-bit program memory cache when executing from ROM

Audio Codec

- 16-bit internal codec
- ADC and DAC for stereo audio
- Integrated amplifiers for driving 16Ω speakers; no need for external components
- Support for single-ended speaker termination and line output
- Integrated low-noise microphone bias

Baseband and Software

- Internal ROM
- 48KB of internal RAM, allows full-speed data transfer, mixed voice/data and full piconet support
- Logic for FEC, HEC, access code correlation, CRC, demodulation, encryption bit stream generation, whitening and transmit pulse shaping
- Transcoders for A-law, μ-law and linear voice from host and A-law, μ-law and CVSD voice over air
- FastStream, CSR low latency codec significantly reduces the latency of the audio link, from source to sink, avoiding lip-sync issues when simultaneously listening to audio and watching video images
- Configurable stereo headset ROM software to set-up headset features and user interface
- HFP 1.5 (including 3-way calling) and HSP 1.0 support
- Bluetooth v2.1 + EDR specification Secure Simple Pairing support
- DSP based single-microphone cVc echo and noise reduction is included in the BlueTunes ROM QFN
- A new high-performance dual-microphone noise reduction is available in BlueTunes ROM QFN as a licensed option for an extra 20dB of noise suppression, order code BCSW-CVC-HS-2M-R3

Package Option

- QFN 68-lead, 8 x 8 x 0.9mm, 0.4mm pitch

[1] MP3 decode functionality requires an appropriate license from Thomson

2 Ordering Information

Device	Package			Order Number
	Type	Size	Shipment Method	
BlueTunes ROM QFN	QFN 68-lead (Pb free)	8 x 8 x 0.9mm, 0.4mm pitch	Tape and Reel	BC57F687A05-IQF-E4

Note:

MP3 decode functionality requires an appropriate license from Thomson.

Until BC57F687A05 reaches **Production** status, engineering samples order number applies. This is BC57F687A05-ES-IQF-E, with no minimum order quantity.

BlueTunes ROM QFN is a ROM-based device where the product code has the form BC57F687Axx. xx is the specific ROM-variant, 05 is the ROM-variant for BlueTunes ROM Stereo Headset Solution.

At **Production** status **Minimum Order Quantity** is 2kpcs taped and reeled.

To contact a CSR representative, email sales@csr.com or go to www.csr.com/contacts

2.1 BlueTunes ROM Stereo Headset Solution Development Kit Ordering Information

Description	Order Number
BlueTunes ROM Stereo Headset Solution Development Kit, including headset example design	BTN-003-1A

Document History

Revision	Date	Change Reason
Issue 1	06 AUG 08	Original publication of this document If you have any comments about this document, email comments@csr.com giving the number, title and section with your feedback.

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