



Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



## Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832

Email & Skype: info@chipsmall.com Web: www.chipsmall.com

Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China



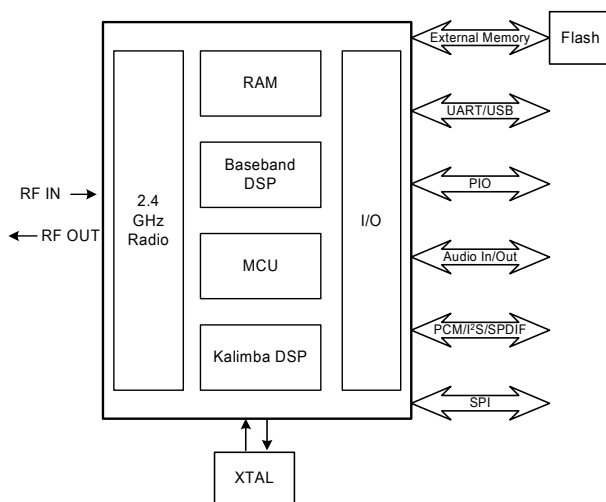
## Features

- Fully Qualified Bluetooth v2.1 + EDR Specification System
- Best in Class Bluetooth Radio with 8dBm Transmit Power and -90dBm Receive Sensitivity
- 64MIPS Kalimba DSP Co-processor
- 16-bit Internal Stereo Codec: 95dB SNR for DAC
- Low-power 1.5V Operation, 1.8V to 3.6V I/O
- Integrated 1.5V and 1.8V Linear Regulators
- Integrated Switched-mode Regulator
- Integrated Battery Charger
- USB, I<sup>2</sup>C and UART with Dual-port Bypass Mode to 4Mbits/s
- Supports up to 32Mbit of External Flash Memory (8Mbit Typical Requirement)
- Multi-configurable I<sup>2</sup>S, PCM or SPDIF Interface
- Enhanced Audibility and Noise Cancellation
- 8 x 8 x 1.2mm, 0.5mm pitch 169-ball TFBGA
- Support for IEEE 802.11 Coexistence
- Green (RoHS Compliant and no Antimony or Halogenated Flame Retardants)

## General Description

The BlueCore<sup>®</sup>5-Multimedia External is a single-chip radio and baseband IC for Bluetooth 2.4GHz systems.

BlueCore5-Multimedia External interfaces up to 32Mbit of external Flash memory. When used with the CSR Bluetooth stack, it provides a fully compliant Bluetooth v2.1 + EDR specification system for data and voice.



## BlueCore<sup>®</sup>5-Multimedia External

### Single Chip Bluetooth<sup>®</sup> v2.1 + EDR System

#### Production Information

BC57E687C

Issue 1

## Applications

- High-quality Stereo Wireless Headsets
- High-quality Mono Headsets
- Hands-free Car Kits
- Wireless Speakers
- VoIP Handsets
- Analogue and USB Multimedia Dongles
- Bluetooth-enabled Automotive Wireless Gateways

BlueCore5-Multimedia External contains the Kalimba DSP co-processor with double the MIPS of BlueCore3-Multimedia External, supporting enhanced audio applications.

BlueCore5-Multimedia External is designed to reduce the number of external components required which ensures production costs are minimised. The device incorporates auto-calibration and BIST routines to simplify development, type approval and production test.

To improve the performance of both Bluetooth and IEEE 802.11b/g co-located systems a wide range of coexistence features are available including a variety of hardware signalling: basic activity signalling, Intel WCS activity and channel signalling.

For additional information about the BlueCore5-Multimedia External refer to the *BlueCore5-Multimedia External Product Data Sheet*.

# 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

- 8dBm 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
- Accepts 14.40, 15.36, 16.2, 16.8, 19.2, 19.44, 19.68, 19.8 and 38.4MHz TCXO frequencies for GSM and CDMA devices with sinusoidal or logic level signals

## Baseband and Software

- 32Mbit external Flash
- 48Kbyte internal RAM, allows full-speed data transfer, mixed voice/data and full piconet support
- Logic for forward error correction, header error control, access code correlation, CRC, demodulation, encryption bit stream generation, whitening and transmit pulse shaping
- Transcoders for A-law,  $\mu$ -law and linear voice from host and A-law,  $\mu$ -law and CVSD voice over air

## Physical Interfaces

- SPI with clock speeds up to 64MHz in Master mode<sup>(1)</sup> and 32MHz in Slave mode
- I<sup>2</sup>C master compatible interface
- UART interface with programmable data rate up to 3Mbits/s with an optional bypass mode
- USB v2.0 interface
- Bi-directional serial programmable audio interface supporting PCM, I<sup>2</sup>S and SPDIF formats
- Two LED drivers with faders

<sup>(1)</sup> Requires firmware support

## Kalimba DSP

- Very low power Kalimba DSP co-processor, 64MIPS, 24-bit fixed point core
- SBC decode takes approximately 4mW power consumption while streaming music
- 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, 16K x 24-bit + 12K x 24-bit data RAM
- 64-word x 32-bit program memory cache when executing from Flash

## Stereo Audio Codec

- 16-bit internal stereo codec
- Dual ADC and DAC for stereo audio
- Integrated amplifiers for driving 16 $\Omega$  speakers; no need for external components
- Support for single-ended speaker termination and line output
- Integrated low-noise microphone bias
- ADC sample rates are 8, 11.025, 16, 22.05, 32 and 44.1kHz
- DAC sample rates are 8, 11.025, 12, 16, 22.05, 24, 32, 44.1 and 48kHz

## Auxiliary Features

- User space on processor for customer applications
- 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 and 1.8V output from 2.7V to 4.5V 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 and 8-bit DAC available to applications
- On-chip charger for lithium ion/polymer batteries

## Bluetooth Stack

CSR's Bluetooth Protocol Stack runs on the on-chip MCU in a variety of configurations:

- Standard HCI (UART or USB)
- Audio codec and echo-noise suppression or customer-specific algorithms running on the DSP

## Package Option

- TFBGA 169-ball, 8 x 8 x 1.2mm, 0.5mm pitch

## 2 Ordering Information

Interface Version	Package			Order Number
	Type	Size	Shipment Method	
UART and USB	TFBGA 169-ball (Pb free)	8 x 8 x 1.2mm, 0.5mm pitch	Tape and reel	BC57E687C-GITB-E4

**Note:**

Minimum Order Quantity is 2kpcs taped and reeled.

To contact a CSR representative, email [sales@csr.com](mailto:sales@csr.com) or go to [www.csr.com/contacts](http://www.csr.com/contacts)

## Document History

Revision	Date	Change Reason
Draft A	19 JUN 08	Original publication of document as BlueCore5-Multimedia External changed to revision C silicon. Technical Overview replaces revision B silicon, document number CS-116035-TOP. If you have any comments about this document, email <a href="mailto:comments@csr.com">comments@csr.com</a> giving the number, title and section with your feedback.

## Trademarks, Patents and Licences

Unless otherwise stated, words and logos marked with <sup>™</sup> or <sup>®</sup> are trademarks registered or owned by CSR plc or its affiliates. Bluetooth<sup>®</sup> and the Bluetooth logos are trademarks owned by Bluetooth SIG, Inc. and licensed to CSR. Other products, services and names used in this document may have been trademarked by their respective owners.

The publication of this information does not imply that any license is granted under any patent or other rights owned by CSR plc.

CSR reserves the right to make technical changes to its products as part of its development programme.

While every care has been taken to ensure the accuracy of the contents of this document, CSR cannot accept responsibility for any errors.

CSR's products are not authorised for use in life-support or safety-critical applications.

Refer to [www.csrsupport.com](http://www.csrsupport.com) for compliance and conformance to standards information.