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Features

- Bluetooth® v4.0 specification compliant
- 80MHz RISC MCU and 80MIPS Kalimba DSP
- Internal ROM, serial flash memory and EEPROM interfaces
- High-performance Stereo codec with stereo line input
- Radio includes integrated balun with RF performance of 8dBm transmit power and -89dBm receiver sensitivity
- AVRCP v1.4
- A2DP v1.2, multipoint A2DP support enables connection to 2 A2DP source devices for music playback
- 5-band fully configurable EQ
- Secure simple pairing, CSR's proximity pairing and CSR's proximity connection
- Stereo line-in
- SBC, MP3 and AAC decoder support
- Serial interfaces: UART, USB 2.0 (full-speed), I²C and SPI
- Integrated dual switch-mode regulators and linear regulators
- Battery charger
- External crystal load capacitors not required for typical crystals
- 3 LED outputs (RGB)
- 68-lead QFN 8 x 8 x 0.9mm 0.4mm pitch
- Green (RoHS compliant and no antimony or halogenated flame retardants)

General Description

CSR's BlueCore® CSR8630 QFN is a single-chip Bluetooth ROM audio solution for Bluetooth audio sink and music streaming applications.

The QFN package integrates an ultra-low power DSP and application processor with embedded ROM memory, a high-performance stereo codec, a power management subsystem, LED drivers and a comprehensive set of analogue and digital peripherals in a single-chip, ensuring minimum system and production costs.

The CSR configuration tools provide manufacturers flexibility to customise from an extensive range of human machine interface settings, define PIO functions, associate device control with different button configuration and define unique LED patterns with user actions, system states and systems.

BlueCore® CSR8630 QFN

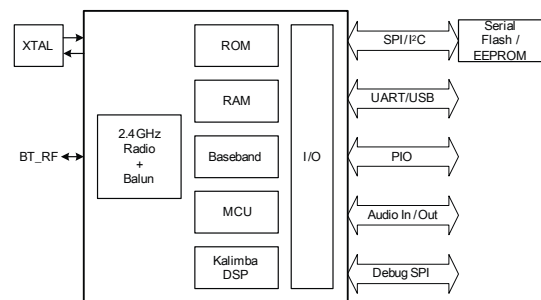
CSR8630 Stereo Speaker A2DP Solution with Music Streaming

Fully Qualified Single-chip Bluetooth® v4.0 System

Production Information

CSR8630A04

Issue 2



Applications

- Bluetooth stereo speakers
- A2DP audio sink (including multipoint) for music streaming

The battery charger architecture enables the CSR8630 QFN to independently operate from the charger supply, ensuring dependable operation for all battery conditions.

The enhanced Kalimba DSP coprocessor with 80MIPS supports enhanced audio and DSP applications.

The integrated audio codec supports stereo input and output, as well as a variety of audio standards.

Full AVRCP v1.4 support enables music play / pause and forward / rewind functionality with assured IOP coverage.

Support for simple Android-based Apps enables options to differentiate user applications, e.g. battery status monitoring.

Device Details

Bluetooth low energy

- Dual-mode Bluetooth low energy radio
- Support for Bluetooth basic rate / EDR and low energy connections
- 3 Bluetooth low energy connections at the same time as basic rate A2DP

Bluetooth Radio

- On-chip balun (50Ω impedance)
- No production trimming of external components
- Bluetooth v4.0 specification compliant

Bluetooth Transmitter

- 8dBm (typ) RF transmit power with level control
- Class 1, Class 2 and Class 3 support, no external PA or TX/RX switch required

Bluetooth Receiver

- -91dBm (typ) $\pi/4$ DQPSK receiver sensitivity and -81dBm (typ) 8DPSK receiver sensitivity
- Integrated channel filters
- Digital demodulator for improved sensitivity and co-channel rejection
- Real-time digitised RSSI available to application
- Fast AGC for enhanced dynamic range
- Channel classification for AFH

Bluetooth Synthesiser

- Fully integrated synthesiser requires no external VCO, varactor diode, resonator or loop filter
- Compatible with crystals 16MHz to 32MHz

Kalimba DSP

- Enhanced Kalimba DSP coprocessor, 80MIPS, 24-bit fixed point core
- 2 single-cycle MACs; 24 x 24-bit multiply and 56-bit accumulator
- 32-bit instruction word, dual 24-bit data memory
- 6K x 32-bit program RAM including 1K instruction cache for executing out of internal ROM
- 16K x 24-bit + 16K x 24-bit 2-bank data RAM

Audio Interfaces

- Stereo audio ADC with line input
- Stereo audio DAC
- Supported sample rates of 8, 11.025, 16, 22.05, 32, 44.1, 48 and 96kHz (DAC only)

Auxiliary Features

- Crystal oscillator with built-in digital trimming

Package Option

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

Physical Interfaces

- UART interface for debug
- USB 2.0 (full-speed) interface, including charger enumeration
- 1-bit SPI flash memory interface
- SPI interface for debug and programming
- I²C interface for EEPROM
- Up to 20 general purpose PIOs with 3 extra open-drain PIOs available when LED not used
- PCM and I²S (only in HCI mode) interfaces
- 3 LED drivers (includes RGB) with PWM flasher independent of MCU

Integrated Power Control and Regulation

- Automatic power switching to charger when present
- 2 high-efficiency switch-mode regulators with 1.8V and 1.35V outputs direct from battery supply
- 3.3V linear regulator for USB supply
- Low-voltage linear regulator for internal digital circuits
- Low-voltage linear regulator for internal analogue circuits
- Power-on-reset detects low supply voltage
- Power management includes digital shutdown and wake-up commands for ultra-low power modes

Battery Charger

- Lithium ion / Lithium polymer battery charger
- Instant-on function automatically selects the power supply between battery and USB, which enables operation even if the battery is fully discharged
- Fast charging support up to 200mA with no external components. Higher charge currents using external pass device.
- Supports USB charger detection
- Support for thermistor protection of battery pack
- Support to enable end product design to PSE law:
 - Design to JIS-C 8712/8714 (batteries)
 - Testing based on IEEE 1725

Baseband and Software

- Internal ROM
- Memory protection unit supporting accelerated VM
- 56KB internal RAM, enables full-speed data transfer, 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

CSR8630 Stereo Speaker A2DP Solution with Music Streaming Details

Bluetooth Profiles

- Bluetooth v4.0 specification support
- A2DP v1.2
- AVRCP v1.4
- DI v1.3

Music Enhancements

- Configurable 5-band EQ for music playback (rock, pop, classical, jazz, dance etc)
- SBC decoder
- Volume Boost
- Stereo Widening (S3D)

Additional Functionality

- Support for multi-language programmable audio prompts
- CSR's proximity pairing and CSR's proximity connection
- Multipoint support for A2DP connection to 2 A2DP sources for music playback
- Talk-time extension

CSR8600 ROM Series Configuration Tool

Configures the CSR8630 stereo speaker A2DP solution with music streaming software features:

- Bluetooth v4.0 specification features
- Reconnection policies, e.g. reconnect on power-on
- Audio features, including default volumes
- Button events: configuring button presses and durations for certain events, e.g. double press on PIO for last number redial
- LED indications for states, e.g. device connected, and events, e.g. power on
- Indication tones for events and ringtones
- Battery divider ratios and thresholds, e.g. thresholds for battery low indication, full battery etc.
- Advanced Multipoint settings

CSR8630 Stereo Speaker A2DP Solution with Music Streaming Development Kit

- Example CSR8630 QFN module design
- Carrier board
- Output stage: headphone amplifier
- Interface adapters and cables
- Works in conjunction with the CSR8600 ROM Series Configuration Tool and other supporting utilities

1 Ordering Information

Device	Package			Order Number
	Type	Size	Shipment Method	
CSR8630 Stereo Speaker A2DP Solution with Music Streaming	QFN-68-lead (Pb free)	8 x 8 x 0.9mm 0.4mm pitch	Tape and reel	CSR8630A04-IQQF-R

Note:

CSR8630 QFN is a ROM-based device where the product code has the form CSR8630Axx. Axx is the specific ROM-variant, A04 is the ROM-variant for CSR8630 Stereo Speaker A2DP Solution with Music Streaming.

Minimum order quantity is 2kpcs taped and reeled.

Supply chain: CSR's manufacturing policy is to multisource volume products. For further details, contact your local sales account manager or representative.

1.1 Contacts

General information	www.csr.com
Information on this product	sales@csr.com
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Details of compliance and standards	product.compliance@csr.com
Help with this document	comments@csr.com

1.2 CSR8630 Stereo Speaker A2DP Solution with Music Streaming Development Kit Ordering Information

Description	Order Number
CSR8630 Stereo Speaker A2DP Solution with Music Streaming Audio Development Kit	DK-8630-10153-1A

Document History

Revision	Date	Change Reason
1	22 JUL 13	Original publication of this document.
2	08 OCT 13	Production Information added and number of GPIOs updated.

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