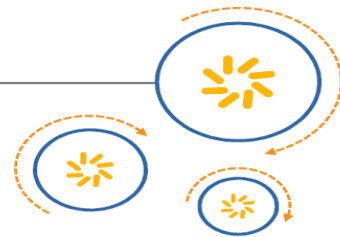




Qualcomm Technologies International, Ltd.



# CSR8512 HIGHLANDER TECHNICAL OVERVIEW

80-CT954-1 AC

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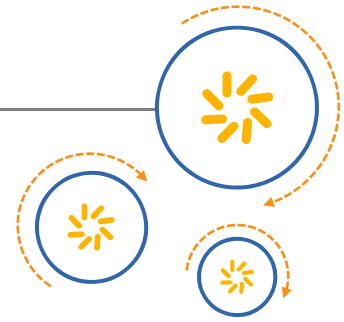
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United Kingdom

## Features

- Bluetooth Smart Ready
- Bluetooth v4.2 specification compliant
- Dual-mode Bluetooth/Bluetooth low energy operation
- HCI mode operation with full Bluetooth stack
- HID over GATT
- High-sensitivity Bluetooth and Bluetooth low energy receiver
- Class 1, Class 2 and Class 3 support without external power amplifier or TX/RX switch
- Low energy active 3D glasses signalling (fee-free)
- Low energy voice command support
- Internal ROM, serial flash memory and EEPROM interfaces
- Radio includes integrated balun
- Embedded encoder support for aptX® and aptX-LL® A2DP streaming
- Embedded SBC encoder
- 2 x PCM/I²S digital audio interfaces
- Serial interfaces: UART, USB 2.0 (full-speed), I²C and SPI
- Configurable host wakeup for TV/STB remote control on/off function
- WLAN coexistence interface
- On-chip synthesizer
- Internal power regulation for USB operation
- Selectable I/O voltage
- 68-lead QFN 8 x 8 x 0.9mm 0.4mm pitch
- Green (RoHS compliant and no antimony or halogenated flame retardants)

## General Description

CSR8512 QFN is a product from CSR's Connectivity Centre. It is a single-chip radio and baseband IC for Bluetooth 2.4GHz systems.

CSR offers a comprehensive ecosystem of hardware and software components to aid rapid device development, including:

- CSR Synergy™ software for embedded devices
- CSR µEnergy™ platform for Bluetooth low energy devices
- BlueZ and BlueDroid host software patches: HID2HCI switch (including host wake-up function); and Bluetooth low energy audio support.

## BlueCore® CSR8512 A12 QFN

### HID/HCI Dual-mode Solution

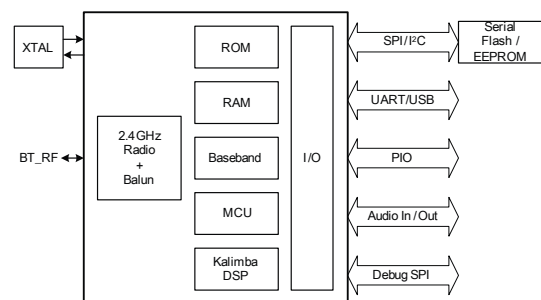
**Bluetooth Low Energy:  
3D Glasses Signalling  
HID Proxy Support  
Voice Command Support**

**Fully Qualified Single-chip  
Bluetooth® v4.2 System**

### Production Information

CSR8512A12

Issue 3



## Applications

Embedded home entertainment devices:

- Digital TVs
- Set-top Boxes

After-market low-power Bluetooth accessories:

- USB Dongle

## Device Details

### Bluetooth low energy

- Dual-mode Bluetooth low energy radio
- Support for Bluetooth BDR/EDR and low energy connections

### Bluetooth Radio

- On-chip balun (50Ω impedance in TX and RX modes)
- No trimming of external components required in production
- Bluetooth v4.2 specification compliant

### Bluetooth Transmitter

- 9dBm (typical) RF transmit power with level control from on-chip 6-bit DAC
- Class 1, Class 2 and Class 3 support without the need for an external power amplifier or TX/RX switch

### Bluetooth Receiver

- BDR receiver sensitivity of -90dBm (typical)
- EDR receiver sensitivity of -91dBm (typical) for π/4 DQPSK and -82dBm (typical) for 8DPSK
- 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

### Physical Interfaces

- High-speed UART (up to 4 Mbps) interface
- USB 2.0 (full-speed) interface
- 1-bit SPI flash memory interface
- SPI interface for debug and programming
- I<sup>2</sup>C interface for EEPROM
- Up to 22 general purpose PIOs
- 2 x PCM interface/I<sup>2</sup>S interface

### Integrated Power Control and Regulation

- 2 high-efficiency switch-mode regulators with 1.8V and 1.35V outputs
- 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

### Baseband and Software

- Internal ROM
- 56KB internal RAM, enables 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, μ-law and linear voice from host and A-law, μ-law and CVSD voice over air
- Support for IEEE 802.11 coexistence

### Auxiliary Features

- Crystal oscillator with built-in digital trimming

### Package Option

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

## 1 Ordering Information

Device	Package			Order Number
	Type	Size	Shipment Method	
CSR8512 Extended HCI Solution	QFN-68-lead (Pb free)	8 x 8 x 0.9mm 0.4mm pitch	Tape and reel	CSR8512A12-IQF-R

**Note:**

CSR8512 QFN is a ROM-based device where the product code has the form CSR8512Axx. Axx is the specific ROM-variant, A12 is the ROM-variant for CSR8512 Extended HCI Solution.

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	<a href="http://www.csr.com">www.csr.com</a>
Information on this product	<a href="mailto:sales@csr.com">sales@csr.com</a>
Customer support for this product	<a href="http://www.csrsupport.com">www.csrsupport.com</a>
Details of compliance and standards	<a href="mailto:product.compliance@csr.com">product.compliance@csr.com</a>
Help with this document	<a href="mailto:comments@csr.com">comments@csr.com</a>

## 2 Terms and Definitions

### Document History

Revision	Date	Change Reason
Issue 1	11 NOV 14	Original publication of this document.
Issue 2	20 FEB 15	Production Issue.
Issue 3	03 SEP 15	Updating Bluetooth to v4.2.

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