Qualcomm®
Bluetooth Low Energy
Selector Guide

Integrated single-mode and dual-mode Bluetooth connectivity SoCs for the Internet of Things
The CSR101x product family consists of five product variants designed to develop devices that use Bluetooth low energy. The CSR101x series provides a built-in processor to run the customer application as well as the qualified Bluetooth single mode stack and radio. CSR101x chips can run directly from a 3V coin cell, and connect directly to a PCB antenna.

### CSR101x Specifications

**MCU**
- 16MHz 16MIPS XAP application processor (RISC) with hardware link controller

**Bluetooth Version**
- Bluetooth v4.1 specification compliant

**Memory**
- 128KB Memory: 64KB RAM & 64KB ROM

**Bluetooth TX/RX**
- +9.5dBm max RF transmit power
- -93dBm receive sensitivity

No external power amplifier or TX/RX switch required

**Interfaces**
- UART, I2C, PIO controller, 4x PWM modules
- 2x hardware quadrature decoders
- 12x or 32x re-assignable GPIOs plus dedicated WAKE pin
- 10-bit SAR ADC/DAC with 1x or 3x AIO
- 32kHz or 16MHz clock output

**Current Consumption**
- <20mA peak current
- 5µA in deep sleep
- 900nA in dormant mode

**Operating Voltage**
- 1.8 to 4.3V

**Operating Temperature**
- -40°C to +85°C
- -30°C to +105°C (CSR1010D)

### CSR101x Block Diagram

#### Peripherals
- UART
- PIO CONTROLLER
- PC MASTER
- SPI FLASH
- GPIO
- AIO
- 4x PWM
- 2x QUADRATURE DECODERS
- CLOCK OUTPUT
- TEMPERATURE
- EDGE CAPTURE
- BATTERY MONITOR

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Qualcomm Bluetooth Low Energy, CSR1010, CSR1010D, CSR1011, CSR1012 and CSR1013 are products of Qualcomm Technologies, Inc. and/or its subsidiaries.
### CSR101x Starter Development Kit

**Contents**
- Target board
- Mini USB cable
- Setup Guide, SDK & other docs on CD-ROM
- Activation code for latest SDK

**Applications**: Supports multiple applications

### CSRmesh™ Development Kit

**Contents**
- 3x Target boards
- 1x USB-SPI programmer
- 2x Connecting cables
- 3x AA alkaline batteries
- Setup guide
- Activation code for latest SDK

**Applications**: Lighting, Home automation, Sensor networks

### Proximity Beacon Development Kit

**Contents**
- 3x Beacon development boards
- 3x plastic beacon enclosures
- USB programmer & interface cables
- Example beacon applications
- Activation code for latest SDK

**Applications**: Industrial, Retail, Home automation

### Environmental Sensor Board

**Contents**
- Target board which includes the following sensors:
  - Accelerometer (Analog Devices ADXL 362)
  - Temperature (STMicroelectronics STTS751)
  - Pressure (Saw Components T5400)
  - Magnetometer (Aichi Steel AMI30kE)
  - Humidity (Sensirion SHT21)
  - Angular rate (InvenSense ITG3050)

**Applications**: Home automation, Wearables

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**To learn more visit:**
- [developer.qualcomm.com](http://developer.qualcomm.com)
- [qualcomm.com](http://qualcomm.com)
The CSR102x product family is optimized for IoT applications including wireless remote controls, smart watches, home automation solutions, and beacons. Where balancing performance, battery life, and cost is critical, the CSR102x products bring extensive and flexible I/O capabilities designed to simplify integration and eliminate expensive interface components.

### CSR102x SoC Product Family

**CSR1020**
- All purpose cost-optimized general platform
- 15x GPIO
- 1x AIO

**CSR1021**
- High I/O count cost-optimized variant
- 37x GPIO
- 2x AIO

**CSR1024**
- All-purpose upgradeable platform
- 15x GPIO
- 1x AIO

**CSR1025**
- High I/O count upgradeable platform
- 33x GPIO
- 2x AIO

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### CSR102x Specifications

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bluetooth Version</strong></td>
<td>Bluetooth v4.1 specification compliant</td>
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<tr>
<td><strong>MCU</strong></td>
<td>80MHz embedded RISC co-processor</td>
</tr>
<tr>
<td><strong>DSP</strong></td>
<td>40MHz, 24-bit embedded DSP</td>
</tr>
<tr>
<td><strong>Memory</strong></td>
<td>8Mb internal ROM, 56KB RAM</td>
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<tr>
<td><strong>External SQIF support up to</strong></td>
<td>64Mb</td>
</tr>
<tr>
<td><strong>Bluetooth</strong></td>
<td>TX/RX 9.0dBm RF transmit power w/ level control</td>
</tr>
<tr>
<td><strong>On-chip 6-bit DAC over a dynamic range &gt;30 dB; -90 dBm receive sensitivity; Integrated channel filters</strong></td>
<td>(No external power amplifier or TX/RX switch required)</td>
</tr>
<tr>
<td><strong>Interfaces</strong></td>
<td>UART, I²C, SPI, USB 2.0, Up to 22x PIOs</td>
</tr>
<tr>
<td><strong>SPI debug and programming interface, 7x PWM blocks: 4 dedicated to LED[3:0] 3 assignable to PIO</strong></td>
<td>1x digital microphone channel (CSRB5342/5348)</td>
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<tr>
<td><strong>Power Consumption</strong></td>
<td>Standby: &lt;0.15 mA, Operating: &lt;1 mA</td>
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<td><strong>Operating Voltage</strong></td>
<td>1.8V / 2.8V / 3.2V configurable</td>
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<td><strong>Operating Temperature</strong></td>
<td>-20°C to +70°C (CSRB5341/5342)</td>
</tr>
<tr>
<td></td>
<td>-40°C to +85°C (CSRB5348)</td>
</tr>
</tbody>
</table>

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### Features

- Bluetooth version 4.2 qualified stack with optional features
- Direct 50Ω connection to antenna
- Low BoM count with single crystal operation
- Integrated channel filters
- 4x hardware link controllers
- Variety of integrated hardware accelerators and peripheral interfaces
- Wake-up from interrupt on any input pin in low power sleep modes
- Time-stamping hardware blocks
- Key matrix scanning block
- Integrated audio codecs & audio interfaces
- On-chip temperature and battery monitoring
- PWM hardware blocks for LED patterns and motor control
- Cryptographic accelerators & application security features
- Bluetooth low energy SDK with IDE and debugging tools

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**CSR102x Block Diagram**

- **Peripherals**
  - UART
  - SPI Master/Slave
  - GPIO
  - ADC
  - I²C Master/Slave
  - SW Revision
  - Key Scanner
  - 8x PWM
  - Uart
  - Direct LCD Drive
  - Dimmer
  - PCMCIA ROM
  - G.722 Codec
  - G.711 Codec
  - 10M bit

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### CSR102x DEVELOPMENT BOARDS AND KITS

#### CSR102x STARTER Development Kit
- **Contents:**
  - Target board
  - Mini-USB cable and flexible cable
  - Prototyping leads
  - Setup Guide
  - Activation code for latest SDK
- **Applications:** Heart rate sensor, Security tags

#### IOT Development Kit
- **Contents:**
  - 3x IOT target boards
  - Programmer board
  - Mini-USB cable & flexible cable
  - Setup Guide
  - Activation code for latest SDK
- **Applications:** Lighting, Home automation, Sensor networks

#### BLUETOOTH NODE Development Kit
- **Contents:**
  - Bluetooth node target board
  - Setup Guide
- **Applications:** Beacon, Proximity tag, Footpod form factor

#### PROFESSIONAL Development Kit
- **Contents:**
  - Professional target board
  - Pluggable CSR1025 module
  - Setup Guide
  - Mini-USB cable & flexible cable
  - Prototyping leads
  - Activation code for latest SDK
- **Applications:** Auto keyless entry, Fitness & Health, Keyboards and mice, Beacons, Alert tags

#### SPORT WATCH Application Board
- **Contents:**
  - Application plug-in board
  - Setup Guide
- **Applications:** Wearables

#### SMART REMOTE Application Board
- **Contents:**
  - Application plug-in board
  - Setup Guide
- **Applications:** Accessories

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CSR102x Starter Development Kit, IoT Development Kit, CSRmesh, Bluetooth Node Development Kit, Professional Development Kit, Sport Watch Application Board and Smart Remote Application Board are products of Qualcomm Technologies, Inc. and/or its subsidiaries.
The Qualcomm Bluetooth Stereo CSRB534x series of dual-mode SoCs (System-on-Chip) features a rich Bluetooth v4.1 compliant platform and offers a powerful, versatile and cost-effective solution, making it ideal for a variety of next generation wireless and VR (virtual reality) gaming accessories and embedded modules.

**Qualcomm® CSRB534x Bluetooth Stereo Series**

The Qualcomm Bluetooth Stereo CSRB534x series of dual-mode SoCs (System-on-Chip) features a rich Bluetooth v4.1 compliant platform and offers a powerful, versatile and cost-effective solution, making it ideal for a variety of next generation wireless and VR (virtual reality) gaming accessories and embedded modules.

**Features**

- Integrated application processor with internal ROM, a power management subsystem and LED drivers in a SoC IC
- Programmable DSP for exclusive use of customer applications
- 22 programmable digital I/O & 22 analog I/O
- Optional serial flash interface
- On-chip balun (50Ω impedance in TX and RX modes)
- Integrated 1.35V switch-mode regulator
- All internally required regulators integrated on chip
- Integrated Li-Ion battery charger with instant-on (CSRB5342/48 only) or dry-cell battery technology (CSRB5341)
- Dedicated SDK includes xIDE & market leading Bluetooth stack
- OTA/USB updates for future proofing products
- 7 hardware PWM controllers, 4 on dedicated LED pads
- Keyscan hardware
- Requires minimum external components

**CSRB534x Specifications**

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**CSRB534x Block Diagram**

[Block Diagram Image]

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CSRB534x Development Boards and Kits

CSRB5341 Development Kit

Compliant platform for development of next-gen wireless gaming controllers and more. Designed to provide for low latency control and ultra-low power operation with enhanced connection topologies for improved smart device and accessory support.

Applications: Wireless gaming controllers, TV remote controls, VR accessories, toys and modules

Contents:
- CSRB534x development board
- CSRB5341 QFN example board
- Micro and mini USB leads
- Setup Guide

DK-CSRB5341-10229

CSRB5342 Development Kit

Compliant platform for development of next-gen wireless gaming controllers and more. Designed to provide for low latency control and ultra-low power operation with enhanced connection topologies for improved smart device and accessory support.

Applications: Wireless gaming controllers, TV remote controls, VR accessories, toys and modules

Contents:
- CSRB534x development board
- CSRB5342 BGA example board
- Micro and mini USB leads
- 560mAh Li-ion battery
- Setup Guide

DK-CSRB5342-10230

CSRB5348 Development Kit

Compliant platform for development of next-gen embedded systems and modules with industrial grade temperature requirements. Designed to provide for low latency control and ultra-low power operation with enhanced connection topologies for improved smart device and accessory support.

Applications: Embedded modules, Industrial and home automation, EPOS, data loggers, barcode readers, metering devices and systems with large interface requirements.

Contents:
- CSRB534x development board
- CSRB5348 BGA example board
- Micro and mini USB leads
- 560mAh Li-ion battery
- Setup Guide

DK-CSRB5348-10203

Where to Buy


CSRB534x Development Kit, CSRB5342 Development Kit and CSRB5348 Development Kit are products of Qualcomm Technologies, Inc. and/or its subsidiaries.

To learn more visit: developer.qualcomm.com or qualcomm.com
Qualcomm Technologies International, Ltd. works with some of the world’s leading module manufacturers to create pre-certified solutions that reduce time to market and meet technical qualifications and quality requirements. The third party module suppliers listed below will be able to help you with all pricing, detailed features and purchasing inquiries.

Find additional information at developer.qualcomm.com/hardware/csr101x-product-family/module-suppliers

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