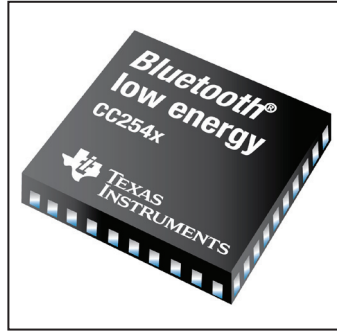


# Bluetooth® low energy



## Ultra-low power wireless connectivity for consumer medical, mobile accessories, sports and wellness applications

Texas Instruments provides *Bluetooth* low energy solutions for *Bluetooth* Smart sensor applications and *Bluetooth* Smart Ready mobile handholds. TI's *Bluetooth* low energy devices for sensor applications are true one-chip integrated solutions. Combined with TI's protocol stack and profile software with associated sample applications, the CC254x form the market's most flexible and cost-effective single-mode *Bluetooth* low energy solutions.

[www.ti.com/bluetoothlowenergy](http://www.ti.com/bluetoothlowenergy)

## Bluetooth® low energy technology

Bluetooth low energy technology offers ultra-low power state-of-the-art communication capabilities for consumer medical, mobile accessories, sports and wellness applications. Compared to classic Bluetooth capabilities, Bluetooth low energy technology is a connectionless protocol, which significantly reduces the amount of time the radio must be on. Requiring only a fraction of the power consumption of traditional Bluetooth technology, Bluetooth low energy can enable target applications to operate on a coin cell for more than a year.

## TI Bluetooth low energy – single mode and dual mode

TI provides Bluetooth low energy single-mode solutions for Bluetooth Smart sensor applications and dual-mode solutions for Bluetooth Smart Ready mobile handheld devices. With both sides of the link, TI delivers a fully tested and robust Bluetooth low energy ecosystem.

## CC254x Bluetooth low energy system-on-chip

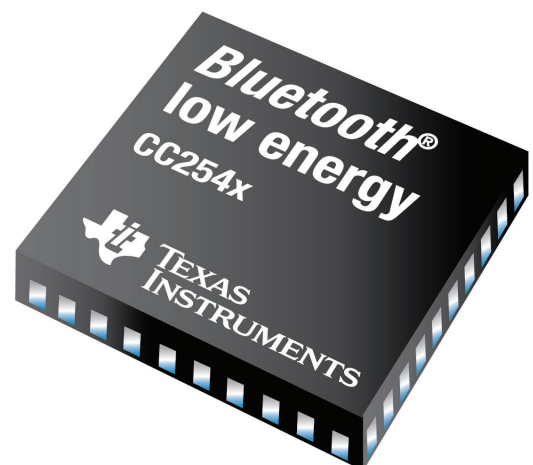
TI's Bluetooth low energy solution for sensor applications includes the CC2541/CC2540 2.4 GHz system-on-chip (SoC) devices, TI protocol stack and profile software with associated sample applications. The CC254x devices are ultra-low power, true one-chip integrated solutions with controller, host and application on one device. The devices feature a combination of TI's best-in-class RF transceiver technology and an industry-standard enhanced 8051 MCU, and include peripherals to interface with analog and digital sensors, in-system reprogrammable flash memory, accurate RSSI function, full-speed USB 2.0 interface (CC2540 only), integrated AES-128 encryption engine and many other powerful supporting features and peripherals.

The CC254x enable robust master or slave nodes to be built with low total bill-of-material costs. With low power sleep modes and short transition times between operating modes, the CC254x are suitable for systems where ultra-low power consumption is required. The CC254x come in two different versions: CC254xF128/F256 with 128 and 256 KB of flash memory, respectively. Combined with TI's Bluetooth low energy protocol stack, the CC254xF128/F256 form the market's most flexible and cost-effective single-mode Bluetooth low energy solution.

The CC254x come in 40-pin 6mm x 6mm x 0.85mm QFN package.

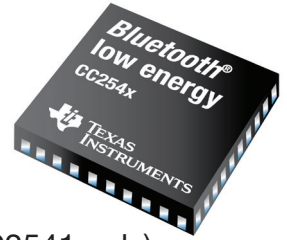
## CC254x Key Features

- **Turnkey solution** – 2.4 GHz system-on-chip, TI protocol stack, profile software with associated sample applications, and application support.
- **Ultra-low power consumption** – enables sensor applications to operate for >1 year on a coin cell battery.
- **Leading RF performance** – up to +97 dB link budget for long range. Excellent coexistence with other 2.4-GHz devices.
- **One-chip integrated solution** – controller, host and application on one 6mm x 6mm device reducing required PCB area. Applications can be written directly onto the CC254x, which supports both analog and digital peripherals.
- **Flash-based and flexible device** – firmware can be updated in the field and data can be stored on-chip.
- **Single mode and dual mode** – as a supplier of both single mode and dual mode Bluetooth low energy solutions, TI delivers fully tested and robust ecosystem solutions – from smart sensors to smart phones.



## CC2541/CC2540 SoC features

- **8051 MCU** – 128/256 kB in-system programmable Flash - 8 kB SRAM
- **Fully integrated radio** – *Bluetooth* low energy (1Mbps GFSK)
- **Digital peripherals** – 21 GPIOs, 2 USART (UART or SPI), I2C interface (CC2541 only), full speed USB 2.0 (CC2540 only), 2x 16 bit, 2x 8-bit timers, dedicated link layer timer for *Bluetooth* low energy protocol timing, AES-128 encryption/decryption in hardware
- **Advanced analog peripherals** – 8-channel, 8- to 12-bit delta-sigma ADC, ultra-low-power analog comparator, integrated high-performance op amp (CC2540 only)
- **All in a 40-pin 6mm x 6mm x 0.85mm QFN package**



## CC254x development kits

TI's CC254x development kits for single-mode *Bluetooth* low energy applications provide application designers with a comprehensive hardware performance test platform and generic software development environment. TI's full system-solution is aimed at simplifying design and shrinking development time for *Bluetooth* Smart sensor applications.

For more information, please visit [www.ti.com/bluetoothlowenergy](http://www.ti.com/bluetoothlowenergy).

### **Bluetooth low energy dual mode**

Dual-mode *Bluetooth* low energy technology is available as a part of TI's proven WiLink™ and BlueLink™ connectivity combo solutions. These solutions support dual-mode operations by providing classic *Bluetooth* technology capability along with *Bluetooth* low energy technology. The WiLink and BlueLink solutions provide size, cost, performance, power management advantages and includes on-chip coexistence which eases customer development cycles and improves the user experience. WiLink 8.0 is the latest TI addition and is the industry's first true single-chip mobile WLAN, GNSS, NFC, *Bluetooth*, *Bluetooth* low energy, ANT™ and FM transmit/receive solution. WiLink8.0 brings connectivity features to mainstream products such as smart phones, tablets, eBooks, ultrathin computing devices and other feature-rich mobile products.

For more information visit [www.ti.com/wilink](http://www.ti.com/wilink).

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