

Introducing TI's Dual-mode Bluetooth® 4.2 CC2564C Solution



Naomi Heller

As the [Internet of Things](#) (IoT) continues to evolve, *Bluetooth*® low energy technology now faces a higher volume of security threats than ever before. Given the increased reliance on wireless technology, developers must consider the types of data being shared via point-of-sale (POS) terminals, mobile POS (mPOS) exchanges, medical devices and military equipment – all of which include Bluetooth connectivity.

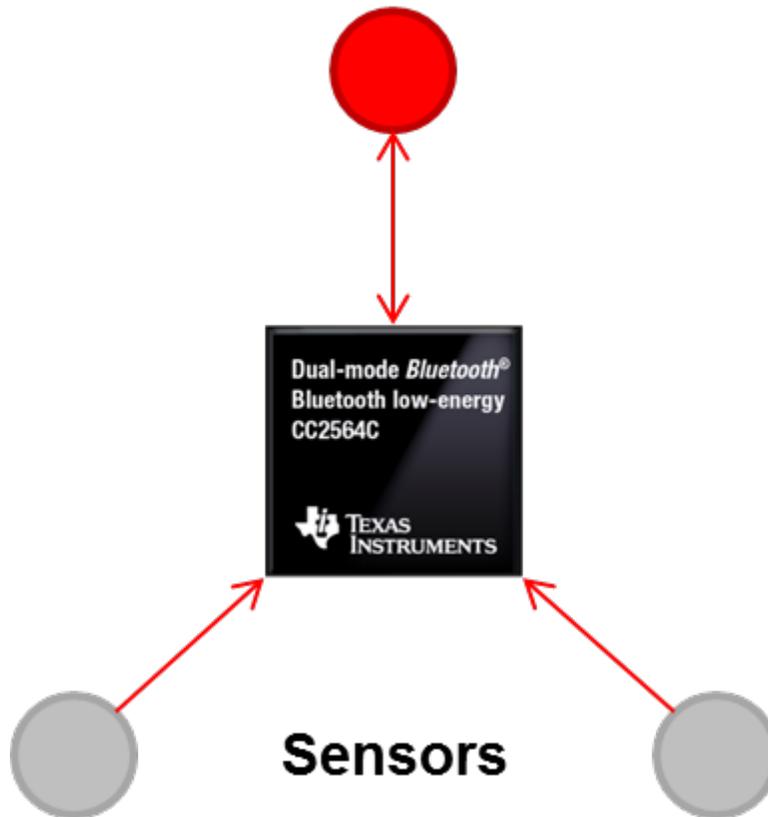
Simple end equipment, such as smart home gadgets or fitness trackers, has now even become a point of interest for hackers because they can hold valuable personal information. And while Bluetooth devices running on version 4.1 and below still encrypt data, it still remains vulnerable to passive eavesdropping and man-in-the-middle (MITM) attacks during the connection process and key exchanges.

These challenges are now reduced with the new dual-mode Bluetooth CC2564C 4.2 solution. The 4.2 design features in this device include advanced Bluetooth low energy secure connection pairing. This foundation gives developers the ability to secure and simplify pairing using the Elliptic Curve Diffie-Hellman (ECDH) public key cryptography algorithm. Using the ECDH key provides much stronger security against passive eavesdropping and MITM attacks. As a result, this feature enables developers to provide a higher level of security for connection authorization. Customers may find a royalty-free download of this feature for many MCU and MPU platforms on the TI [dual-mode Bluetooth software stack](#) website.

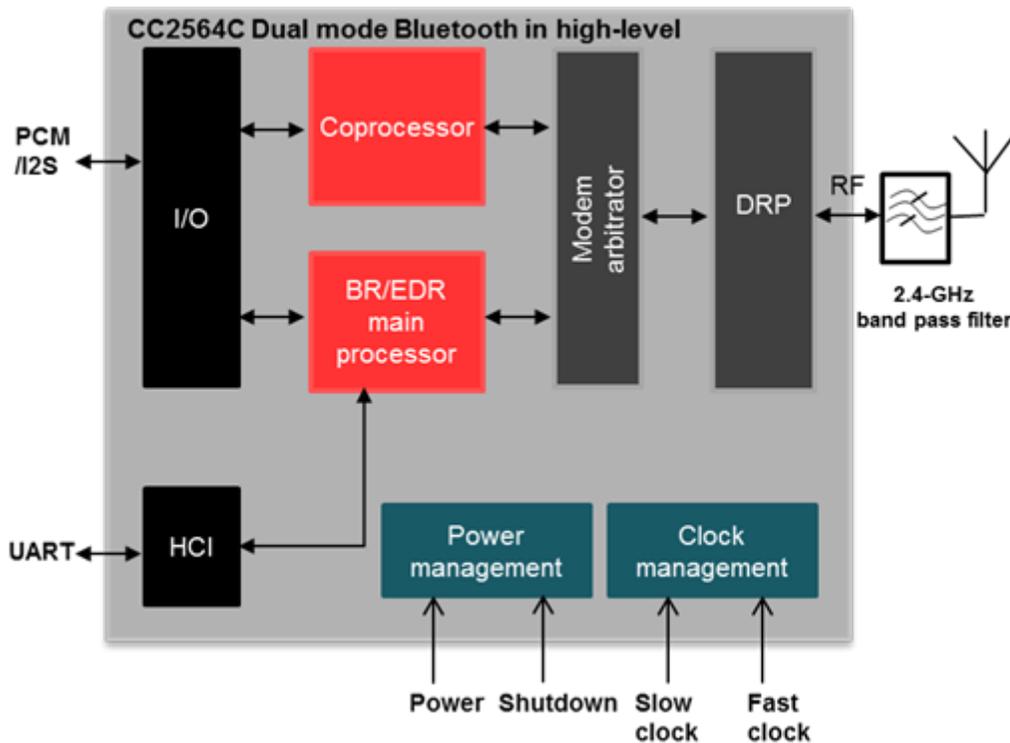
As more sensors connect to a single device, Bluetooth topology is inevitably becoming more intricate. Often, customers are looking for new ways to simultaneously collect data from several devices and transfer it over Bluetooth low energy to another entity like a cloud hub. While not possible in previous generations, the CC2564C solution now enables complex Bluetooth low energy topologies.

Bluetooth 4.1 link layer topology allows sensor networks to collect Bluetooth low energy data from several devices while simultaneously transferring it via Bluetooth low energy to another device. A practical use case would be aggregating health data from wearable fitness sensors via a fitness tracker, which then pushes this information to an athlete's smartphone.

Mobile device / HUB



As detailed in the figure above, the Bluetooth 4.1 link layer topology can connect up to 10 Bluetooth low energy or Classic Bluetooth devices, depending on their data intervals. While Classic Bluetooth was previously used to transmit data to mobile gateways, the new topology allows devices to concurrently receive (RX) and transmit (TX) signals via Bluetooth low energy. This approach consumes lower amounts of energy, while the data format and application remains the same. The complete block diagram can be found in the following diagram.



In Addition to Bluetooth Low Energy Security Features, a Number of Other Features Are Also Present in the CC2564C Solution, Including:

- Enhanced audio time synchronization supporting multi-speaker functionality
- Fully programmable digital pulse-code modulation (PCM) narrowband speech (NBS)/ wideband speech (WBS) enhancements
- Internet infrastructure access (Bluetooth 4.1 L2CAP dedicated channels)
- Enhanced voice hands-free profile (HFP) 1.6 (CSA2 spec commands)
- Adaptive frequency hopping (AFH) enhancements
- Complete Bluetooth 4.2 SIG certification for the controller, stack and profiles

Target Applications for Each Feature Are Listed below:

- Bluetooth 4.2 LE secure connections:
 - Point of sale (POS)
 - Mobile point of sale (mPOS)
 - Medical
 - Home automation
- Bluetooth 4.1 link layer topology:
 - Wearables
 - Asset tracking
 - Sensor gateways

Pin compatible with previous CC2564 generations, this new chip provides a seamless migration for those looking to upgrade existing designs. If you're looking for a great way to connect your device with dual-mode Bluetooth, the CC2564C solution provides a strong combination of security enablers, legacy high throughput, range and advanced Bluetooth low energy configurations. Visit <http://www.ti.com/product/CC2564C> to learn more.

IMPORTANT NOTICE AND DISCLAIMER

TI PROVIDES TECHNICAL AND RELIABILITY DATA (INCLUDING DATA SHEETS), DESIGN RESOURCES (INCLUDING REFERENCE DESIGNS), APPLICATION OR OTHER DESIGN ADVICE, WEB TOOLS, SAFETY INFORMATION, AND OTHER RESOURCES "AS IS" AND WITH ALL FAULTS, AND DISCLAIMS ALL WARRANTIES, EXPRESS AND IMPLIED, INCLUDING WITHOUT LIMITATION ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT OF THIRD PARTY INTELLECTUAL PROPERTY RIGHTS.

These resources are intended for skilled developers designing with TI products. You are solely responsible for (1) selecting the appropriate TI products for your application, (2) designing, validating and testing your application, and (3) ensuring your application meets applicable standards, and any other safety, security, regulatory or other requirements.

These resources are subject to change without notice. TI grants you permission to use these resources only for development of an application that uses the TI products described in the resource. Other reproduction and display of these resources is prohibited. No license is granted to any other TI intellectual property right or to any third party intellectual property right. TI disclaims responsibility for, and you will fully indemnify TI and its representatives against, any claims, damages, costs, losses, and liabilities arising out of your use of these resources.

TI's products are provided subject to [TI's Terms of Sale](#) or other applicable terms available either on [ti.com](https://www.ti.com) or provided in conjunction with such TI products. TI's provision of these resources does not expand or otherwise alter TI's applicable warranties or warranty disclaimers for TI products.

TI objects to and rejects any additional or different terms you may have proposed.

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265
Copyright © 2023, Texas Instruments Incorporated