

CC2541 Advanced Remote Control Quick Start Guide

Opening the Box and Evaluating *Bluetooth*® Low Energy

Kit Contents



- 1 x Advanced Remote
- 1 x CC2540USB Dongle
- 1 x CC Debugger/Programmer
- 3 x AAA Battery
- Documentation

The RF Boards in this kit are FCC and IC certified and tested to comply with ETSI/R&TTE over temperature from 0 to +35°C.



Caution! The kit contains ESD sensitive components. Handle with care to prevent permanent damage.

Introduction

This document will guide you through the initial steps required in order to run the pre programmed *Bluetooth*® low energy (BLE) demo application.

You will get familiar with the hardware in the box and how to interface the remote with different platforms.

1. **Evaluate using dongle.** A USB dongle pre-programmed with firmware acting as translator between BLE HID and USB HID is supplied in the kit and works with most operating system platforms.
2. **Evaluate using Windows 8 native.** Windows 8 includes native support for the BLE HID over GATT profile. Using a BT4.0 dongle or internal BT4.0 hardware you can easily connect the Advanced Remote to your computer.

Hardware Setup

Insert 3xAAA (LR03) batteries in the Advanced Remote's battery holder. You are good to go.

Pressing any button on the remote will put it into advertising mode and make it detectable by Bluetooth Low Energy capable hosts.

Connect Using Single Mode BT4.0 Low Energy CC2540USB HID Dongle

1. Insert dongle in USB port

The dongle will be enumerated as three USB Human Interface Device class devices.

- Mouse
- Keyboard
- Consumer control

The LED on the dongle should start blinking red, indicating it's scanning for a Bluetooth Low Energy peripheral which advertises BLE HID service capabilities.

2. Advertise and connect

Press any number key or consumer control key to make the device advertise.

The devices will now connect and pair using JustWorks pairing. The dongle LED should now blink green when data is received from the Advanced Remote and otherwise be off.

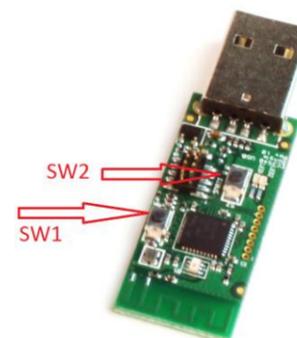
Long term bonding entries will be stored in both the Advanced Remote and dongle to speed up subsequent reconnections.

3. Manage connection and bonds

Pressing **SW1** on the dongle will disconnect any active connection between the dongle and an Advanced Remote.

Pressing **SW2** on the dongle will erase all long term bond information stored on the dongle.

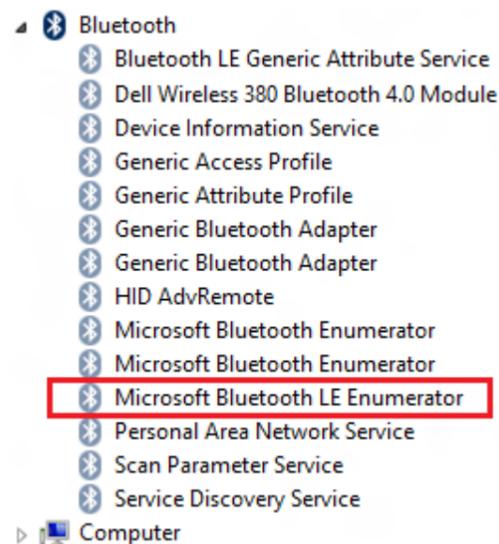
Pressing this button will not affect bond data stored on the Advanced Remote.



Connect to Windows 8 with BT 4.0 LE (*Smart Ready*) hardware

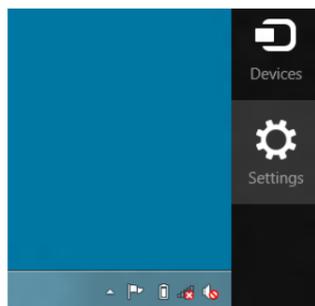
1. Make sure LE works

In Device manager, under Bluetooth, make sure that you see references to Bluetooth LE.

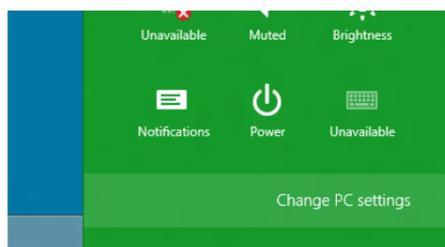


2. Open PC settings

Move your mouse to the lower right hand corner and click on Settings.

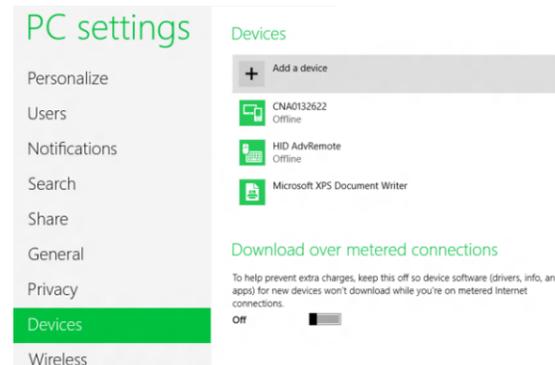


Then click on Change PC settings.



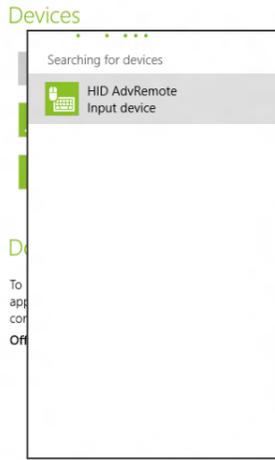
3. Add Advanced Remote

Then click on Devices and Add a device.



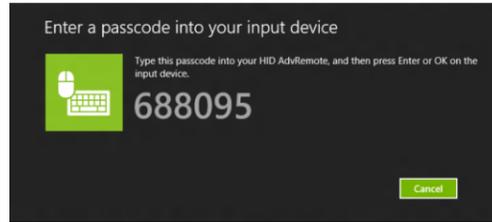
4. Select and add the remote

If you have pressed a button on the Advanced Remote, and it's not connected to another host, it will show up in the list of found devices.



5. Enter pairing code

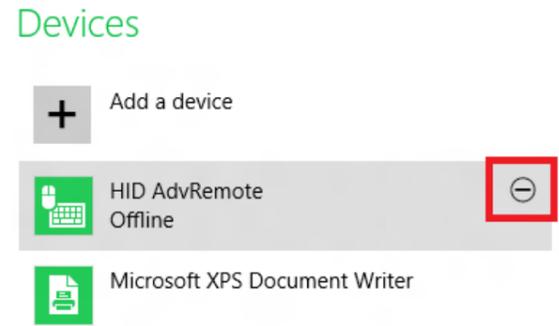
The devices will now pair using Passkey entry. On your Advanced Remote, enter the 6-digit passkey displayed on the computer screen.



The Advanced Remote is now paired with Windows and bond data is stored on both devices, making reconnection faster and passkey entry unnecessary.

6. Remove device

A device can be removed from Windows and bond data deleted by clicking on the device and then the (-) symbol.



Using the Advanced Remote Control



Mouse keys

Mouse speed

Action keys

1. Advertise and connect

Almost all the keys will make the Advanced Remote start advertising and be discoverable by hosts scanning for HID capable BLE devices.

2. Keyboard input

Pressing any number will act as a keyboard input of that number. The same goes for **OK** which is *Enter*, **Back** which is *Backspace* and the four keys surrounding **OK**, which act as directional or arrow keys.

3. Consumer control

Buttons such as Volume, Mute, Play/Pause etc. are consumer control keys, and will control media settings on your computer.

4. Mouse input

Holding down the middle button will prompt the Advanced Remote to interpret your movement of the remote as mouse input and send this to the computer.

Double clicking the middle button will lock the mouse function. The left and right buttons act as left and right mouse buttons.

Pressing **AV** and **-/+** will decrease and increase mouse speed.

5. Remove bond information

Pressing the Red action button will remove bonding information stored on the Advanced Remote. Pairing will have to be done again, using passkey entry if applicable.

6. Calibrate

Pressing the Blue action button will force the Advanced Remote to recalibrate the onboard gyroscope and accelerometer used for motion sensing.

Additional Tools and Links

BLE Packet Sniffer

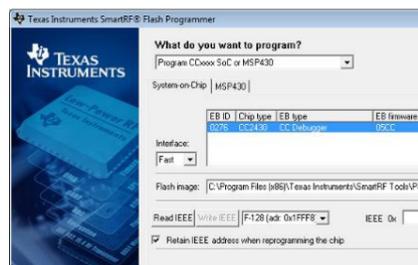
The CC2540 USB Dongle can be used as a BLE sniffer and monitor packets while the iPhone 4S Demo is running.



The SmartRF Protocol Packet Sniffer software can be downloaded at www.ti.com/packetsniffer.

SmartRF Flash Programmer

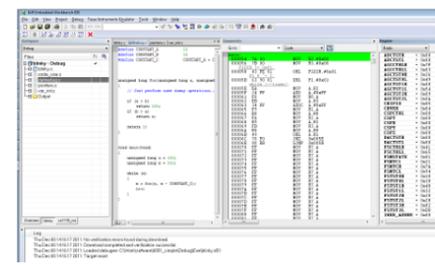
Texas Instruments has a simple tool which can be used to program and flash the CC2541.



SmartRF Flash Programmer can be downloaded at www.ti.com/tool/flash-programmer.

IAR Embedded Workbench

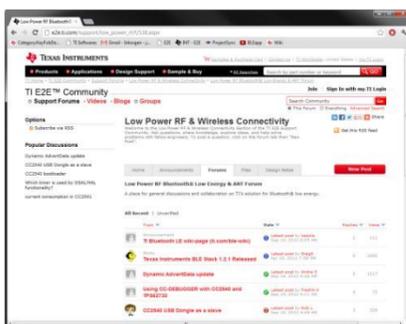
To develop software, program, and debug the CC2541, you should use IAR Embedded Workbench for 8051.



More information on IAR EW8051, including a free evaluation version download, can be found at www.iar.com/ew8051.

BLE E2E Forum

For additional help, visit the TI Bluetooth low energy E2E forum, www.ti.com/ble-forum, for instant support during your development.



BLE Wiki

Our BLE Wiki contains application examples, guides and documentation covering those extra steps you might need help with. The Wiki is not only managed by Texas Instruments employees but also E2E community members. Anyone can share, edit and make use of the information posted here.

The Wiki is found at www.ti.com/ble-wiki.

Useful Links

TI BLE Stack and Software: www.ti.com/ble-stack

CC2540/41 Mini Development Kit User Guide: www.ti.com/lit/swru270

CC2540/41 BLE Software Developer's Guide: www.ti.com/lit/swru271

CC2540/41 User's Guide: www.ti.com/lit/swru191

CC2541 Product Page: www.ti.com/cc2541

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As noted in the EVM User's Guide and/or EVM itself, this EVM and/or accompanying hardware may or may not be subject to the Federal Communications Commission (FCC) and Industry Canada (IC) rules.

For EVMs **not** subject to the above rules, this evaluation board/kit/module is intended for use for ENGINEERING DEVELOPMENT, DEMONSTRATION OR EVALUATION PURPOSES ONLY and is not considered by TI to be a finished end product fit for general consumer use. It generates, uses, and can radiate radio frequency energy and has not been tested for compliance with the limits of computing devices pursuant to part 15 of FCC or ICES-003 rules, which are designed to provide reasonable protection against radio frequency interference. Operation of the equipment may cause interference with radio communications, in which case the user at his own expense will be required to take whatever measures may be required to correct this interference.

General Statement for EVMs including a radio

User Power/Frequency Use Obligations: This radio is intended for development/professional use only in legally allocated frequency and power limits. Any use of radio frequencies and/or power availability of this EVM and its development application(s) must comply with local laws governing radio spectrum allocation and power limits for this evaluation module. It is the user's sole responsibility to only operate this radio in legally acceptable frequency space and within legally mandated power limitations. Any exceptions to this are strictly prohibited and unauthorized by Texas Instruments unless user has obtained appropriate experimental/development licenses from local regulatory authorities, which is responsibility of user including its acceptable authorization.

For EVMs annotated as FCC – FEDERAL COMMUNICATIONS COMMISSION Part 15 Compliant

Caution

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

FCC Interference Statement for Class B EVM devices

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

For EVMs annotated as IC – INDUSTRY CANADA Compliant

This Class B digital apparatus complies with Canadian ICES-003.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Concerning EVMs including radio transmitters

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Concerning EVMs including detachable antennas

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.

This radio transmitter has been approved by Industry Canada to operate with the antenna types listed in the user guide with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

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Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

Les changements ou les modifications pas expressément approuvés par la partie responsable de la conformité ont pu vider l'autorité de l'utilisateur pour actionner l'équipement.

Concernant les EVMs avec appareils radio

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes: (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Concernant les EVMs avec antennes détachables

Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante.

Le présent émetteur radio a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés dans le manuel d'usage et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur.

【Important Notice for Users of this Product in Japan】

This development kit is NOT certified as Confirming to Technical Regulations of Radio Law of Japan

If you use this product in Japan, you are required by Radio Law of Japan to follow the instructions below with respect to this product:

1. Use this product in a shielded room or any other test facility as defined in the notification #173 issued by Ministry of Internal Affairs and Communications on March 28, 2006, based on Sub-section 1.1 of Article 6 of the Ministry's Rule for Enforcement of Radio Law of Japan,
2. Use this product only after you obtained the license of Test Radio Station as provided in Radio Law of Japan with respect to this product, or
3. Use of this product only after you obtained the Technical Regulations Conformity Certification as provided in Radio Law of Japan with respect to this product. Also, please do not transfer this product, unless you give the same notice above to the transferee. Please note that if you could not follow the instructions above, you will be subject to penalties of Radio Law of Japan.

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Your Sole Responsibility and Risk. You acknowledge, represent and agree that:

1. You have unique knowledge concerning Federal, State and local regulatory requirements (including but not limited to Food and Drug Administration regulations, if applicable) which relate to your products and which relate to your use (and/or that of your employees, affiliates, contractors or designees) of the EVM for evaluation, testing and other purposes.
2. You have full and exclusive responsibility to assure the safety and compliance of your products with all such laws and other applicable regulatory requirements, and also to assure the safety of any activities to be conducted by you and/or your employees, affiliates, contractors or designees, using the EVM. Further, you are responsible to assure that any interfaces (electronic and/or mechanical) between the EVM and any human body are designed with suitable isolation and means to safely limit accessible leakage currents to minimize the risk of electrical shock hazard.
3. You will employ reasonable safeguards to ensure that your use of the EVM will not result in any property damage, injury or death, even if the EVM should fail to perform as described or expected.
4. You will take care of proper disposal and recycling of the EVM's electronic components and packing materials.

Certain Instructions. It is important to operate this EVM within TI's recommended specifications and environmental considerations per the user guidelines. Exceeding the specified EVM ratings (including but not limited to input and output voltage, current, power, and environmental ranges) may cause property damage, personal injury or death. If there are questions concerning these ratings please contact a TI field representative prior to connecting interface electronics including input power and intended loads. Any loads applied outside of the specified output range may result in unintended and/or inaccurate operation and/or possible permanent damage to the EVM and/or interface electronics. Please consult the EVM User's Guide prior to connecting any load to the EVM output. If there is uncertainty as to the load specification, please contact a TI field representative. During normal operation, some circuit components may have case temperatures greater than 60°C as long as the input and output are maintained at a normal ambient operating temperature. These components include but are not limited to linear regulators, switching transistors, pass transistors, and current sense resistors which can be identified using the EVM schematic located in the EVM User's Guide. When placing measurement probes near these devices during normal operation, please be aware that these devices may be very warm to the touch. As with all electronic evaluation tools, only qualified personnel knowledgeable in electronic measurement and diagnostics normally found in development environments should use these EVMs.

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