TEXAS INSTRUMENTS

CC2541 Advanced Remote Control Quick Start Guide

Opening the Box and Evaluating *Bluetooth*® low energy

Kit Contents

1 x Advanced Remote with batteries
1 x CC2540 USB Dongle
1 x CC Debugger with cables
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.

<u>FCC/IC Regulatory Compliance</u>
FCC Part 15 Class A Compliant
IC ICES-003 Class A Compliant

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 Advanced Remote with different platforms.

1. **Evaluate using USB dongle**. A USB dongle pre-programmed with firmware acting as translator between BLE HID (Human Interface Device) and USB HID is supplied in the kit and works with most operating system platforms*.

2. **Evaluate using Windows 8**. Windows 8 includes native support for the BLE HID (Human Interface Device) over GATT profile. Using a *Bluetooth*® Smart Ready dongle or internal *Bluetooth*® Smart Ready hardware you can easily connect the Advanced Remote to your computer.

* Tested on Windows, OSX and Ubuntu.

Hardware Setup

Pull down the white cover on the back of the Advanced Remote to access the battery holder. Insert 3xAAA (1.5V alkaline, non-rechargeable) batteries in the Advanced Remotes battery holder.

The Advanced Remote and CC2540 USB dongle come pre-programmed with their respective HID over GATT profile roles.

The Advanced Remote will work out of the box together with both the dongle and Windows 8 machines with Bluetooth 4.0 hardware.

When not bonded with a client, the Advanced Remote will advertise for 60 seconds with low duty cycle. If it is bonded, it will advertise for 5 seconds with a high duty cycle to send the button press quickly once reconnected.

When connected, the Advanced Remote will disconnect after 60 seconds to conserve power. Pressing a button will cause it to reconnect and transmit that button press.

Connect Using Single Mode BLE CC2540USB HID Dongle

1. Insert dongle in USB port

The dongle will be enumerated by a computer as several USB Human Interface Device class devices.

The dongle will translate received *Bluetooth*® low energy HID Service reports and transmit them to the computer through these virtual devices.

To remove any old bonding information, please press the red key (lower left corner) on the remote and SW1 on the dongle. The red LED on the dongle will be lit, indicating that it is idle. Pressing **SW2** will start scanning for **5 seconds**.

While scanning, the LED will blink red, indicating it's scanning for a *Bluetooth*® low energy peripheral which advertises HID service capabilities.

2. Advertise and connect

Press any number key or consumer control key like play or pause on the Advanced Remote to make the device advertise.

The devices will now connect and pair without PIN entry. The dongle LED should be lit green, and blink red whenever data is received from the Advanced Remote.

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

When bonded and disconnected, the dongle will blink green and always scan for its paired remote.

3. Manage connection and bonds

Pressing **SW2** on the dongle will disconnect any active connection between the dongle and an Advanced Remote.

Pressing **SW1** on the dongle when disconnected will erase all long term bond information stored on the dongle.
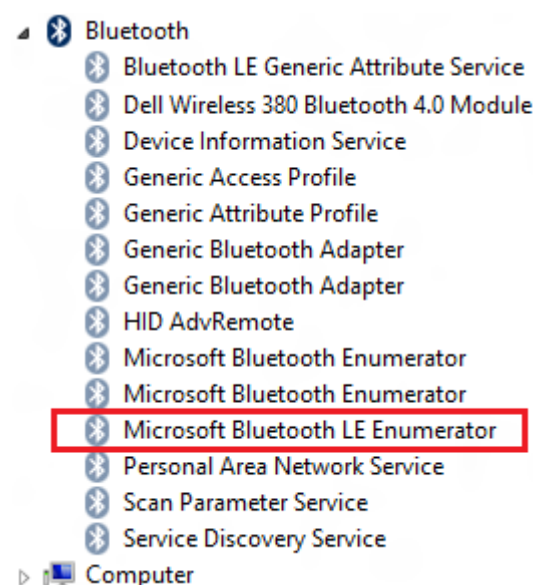
Pressing **SW1** button will not affect bond data stored on the Advanced Remote.
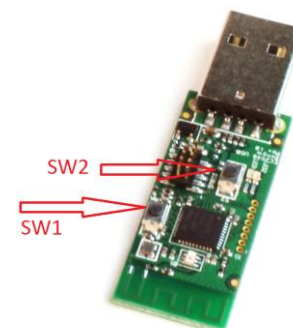
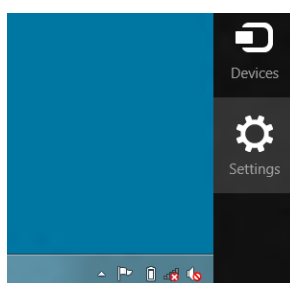# Connect to Windows 8 with *Bluetooth*® 4.0 LE *(Smart Ready)* hardware

1. Make sure BLE works

In Device manager, under "Bluetooth", make sure that you see references to "Bluetooth LE".
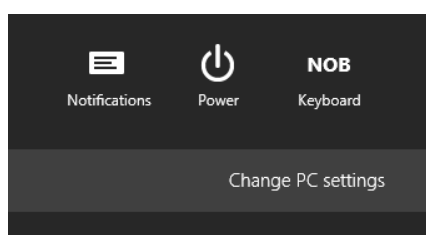
2. Open PC settings

On the PC, move your mouse pointer to the lower right hand corner and click on "Settings".
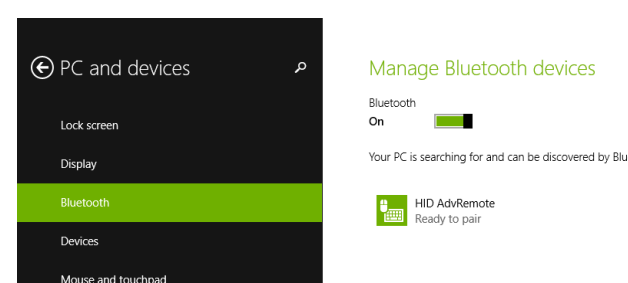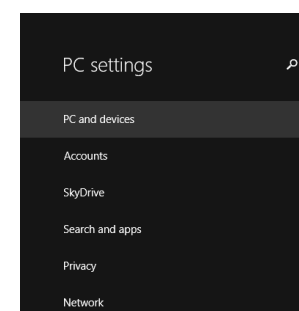
Then click on "Change PC settings".

3. Add Advanced Remote

Then click on "PC and devices" and choose "Bluetooth".

Web sites: www.ti.com/ble
**E2E Forum:**   www.ti.com/ble-forum

4. Add "HID AdvRemote"

To remove any old bonding information, please press the red key (lower left corner) on 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.
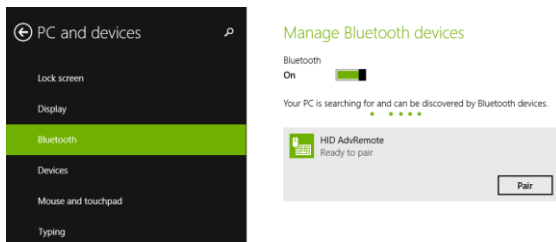
5. Enter pairing code

The devices will now pair using Passkey entry. On your Advanced Remote, enter the 6-digit passkey displayed on the computer screen.
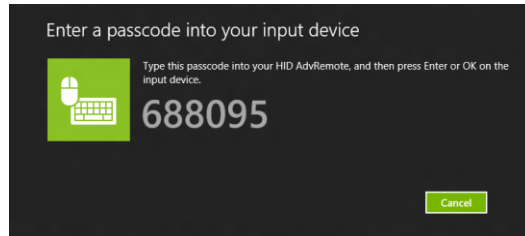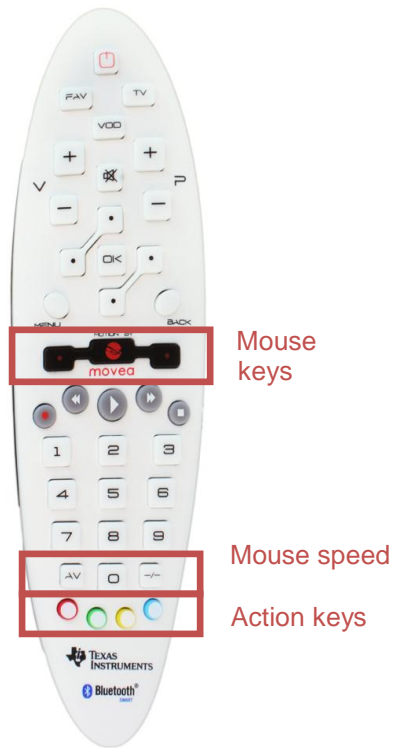
The Advanced Remote is now paired with Windows and bond data is stored on both devices, making reconnection faster and passkey entry unnecessary.

6. Remove device

A device can be removed from Windows and bond data deleted by clicking on the device and then the "Remove device" button.

Using the Advanced Remote Control

Mouse keys

Mouse speed

Action keys
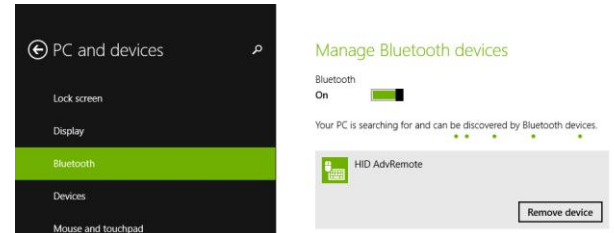
1. Advertise and connect

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 mouse 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 key (leftmost) will remove bonding information stored on the Advanced Remote. Pairing will have to be done again, using passkey entry if applicable. The peer device is not notified of this un-pairing.

6. Calibrate

Pressing the Blue action key (rightmost) will recalibrate the onboard motion sensors. The mouse function must be off and the device must lie on a flat surface when doing this. If the Advanced Remote is not ready for calibration, a high pitched note will sound. Just press the blue key again. During calibration a low-pitched tick will sound for 12 seconds. A high-pitched note at the end indicates success.

## Additional Tools and Links

BLE Packet Sniffer

The CC2540 USB Dongle can be used as a BLE sniffer and monitor packets sent over the air.

The SmartRF Protocol Packet Sniffer software can be downloaded from our website at http://www.ti.com/tool/packet-sniffer.
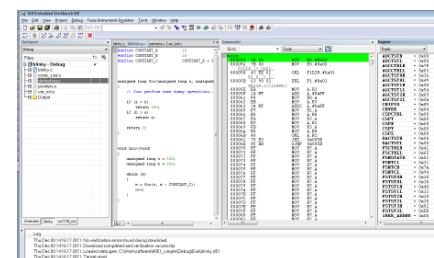
SmartRF Flash Programmer

Texas Instruments has a simple tool which can be used to program the flash on the CC2541.
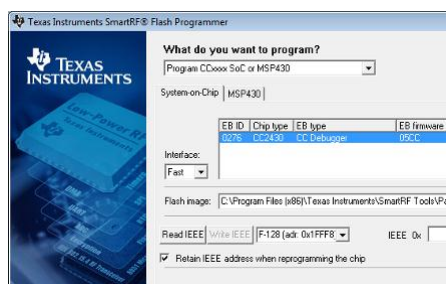
SmartRF Flash Programmer can be downloaded at www.ti.com/tool/flash-programmer.

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.
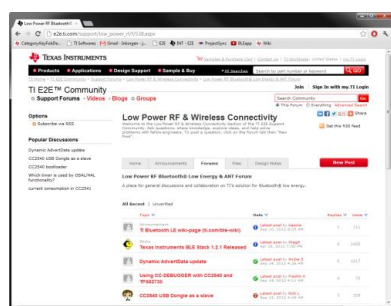
BLE Wiki

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.

! For optimal performance and the latest bug-fixes, download the newest software stack version at ti.com/ble-stack.

Useful Links

TI BLE Advanced Remote User Guide www.ti.com/lit/swru343

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

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