CC2541 Advanced Remote Control Quick Start Guide

User's Guide

Literature Number: SWRU341B
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Opening the Box and Evaluating *Bluetooth*® low energy

1.1 Kit Contents

- 1 × Advanced remote with batteries
- 1 × CC2540 USB dongle
- 1 × 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.

FCC/IC Regulatory Compliance

- 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.

1.2 Introduction

This document guides you through the steps to run the preprogrammed *Bluetooth* low energy (BLE) demonstration application.

This guide will familiarize you with the hardware in the box, and show you how to interface the advanced remote with different platforms.

- **Evaluate using a USB dongle**. A USB dongle, preprogrammed with firmware acting as a translator between BLE human interface device (HID) and USB HID, is in the kit and works with most operating system platforms (tested on Windows®, OSX®, and Ubuntu®).
- **Evaluate using Windows 8**. Windows 8 includes native support for the BLE HID over GATT profile. Use a *Bluetooth* Smart®Ready dongle or internal *Bluetooth* Smart Ready hardware to connect the advanced remote to the computer.

1.3 Hardware Setup

1. Pull down the white cover on the back of the advanced remote to access the battery holder.
2. Insert 3×AAA (1.5-V alkaline, nonrechargeable) batteries in the battery holder.

NOTE: The advanced remote and CC2540 USB dongle come preprogrammed with their respective HID over GATT profile roles.

The advanced remote works out of the box with both the dongle and Windows 8 machines with *Bluetooth* 4.0 hardware.

When not bonded with a client, the advanced remote advertises for 60 seconds with low duty cycle. If it is bonded, the remote advertises for 5 seconds with a high duty cycle to send the button press quickly when reconnected.

When connected, the advanced remote disconnects after 60 seconds to conserve power. Pressing any button reconnects the remote and transmits that button press.

Connecting Using the Single-Mode BLE CC2540USB HID Dongle

2.1 Inserting the Dongle in the USB Port

NOTE: The dongle is enumerated by a computer as several USB HID class devices.

The dongle translates received *Bluetooth* low energy HID service reports, and transmits them to the computer through these virtual devices.

The red LED on the dongle will be lit, indicating it is idle.

1. To remove old bonding information, press the red key on the remote
2. Press SW1 on the dongle.
3. Press SW2. (The dongle starts scanning for 5 seconds.)

While scanning, the LED blinks red, indicating that it is scanning for a *Bluetooth* low energy peripheral advertising HID service capabilities.

2.2 Advertising and Connecting

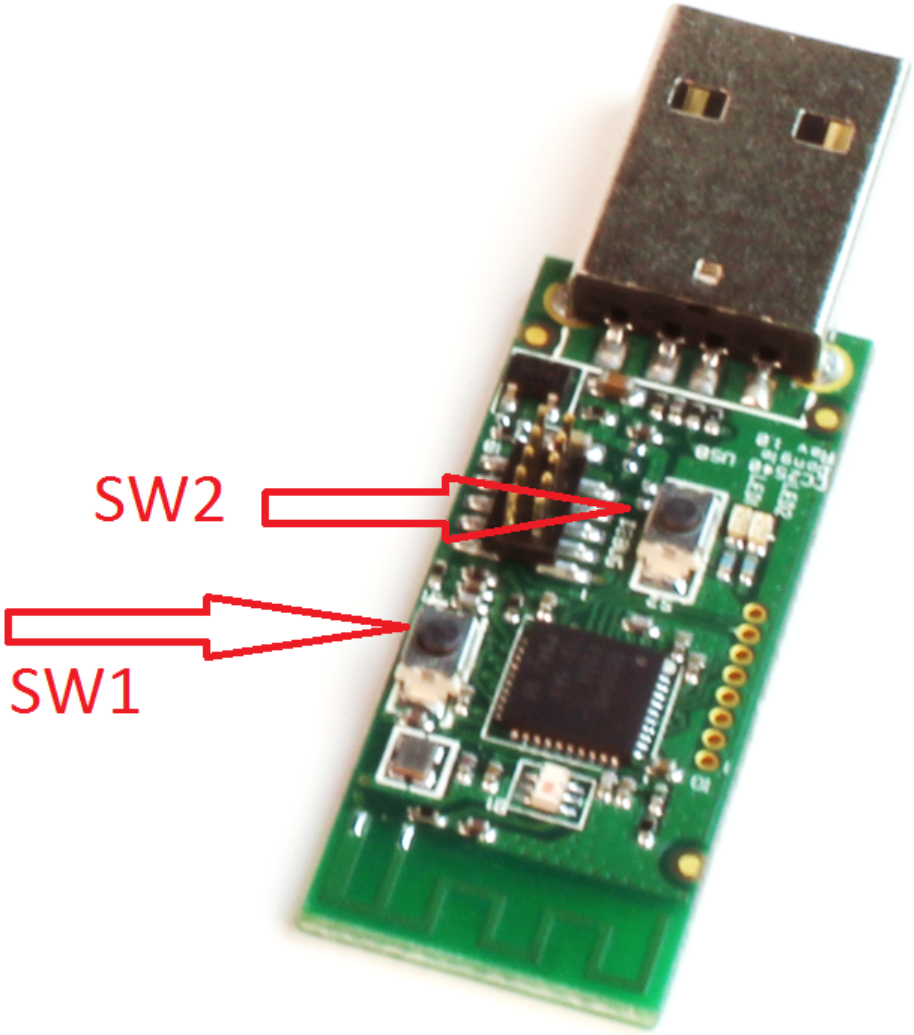
Press any number key or consumer control key, such as play or pause, on the advanced remote to have the device advertise.

The devices can 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 are stored in both the advanced remote and the USB dongle to speed up subsequent reconnections.

When bonded and disconnected, the dongle blinks green and always scans for its paired remote.

2.3 Managing Connection and Bonds



Pressing **SW2** on the dongle disconnects any active connection between the dongle and an advanced remote.

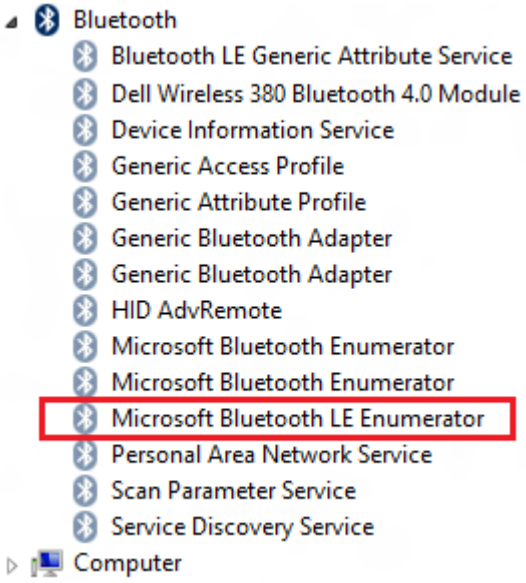
Pressing **SW1** on the dongle when disconnected erases all long-term bond information stored on the dongle.

Pressing **SW1** does not affect bond data stored on the advanced remote.

Connecting to Windows 8 with Bluetooth® 4.0 LE (Smart Ready) Hardware

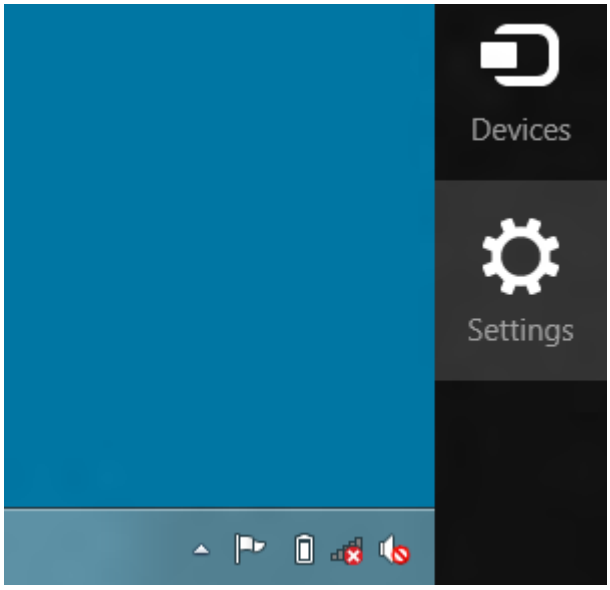
3.1 Ensure BLE Works

In the device manager under *Bluetooth*, look for *Bluetooth* LE.

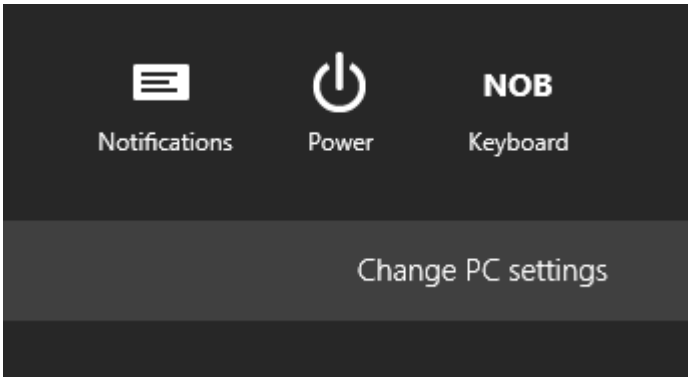


3.2 Opening PC Settings

1. Click on Settings.

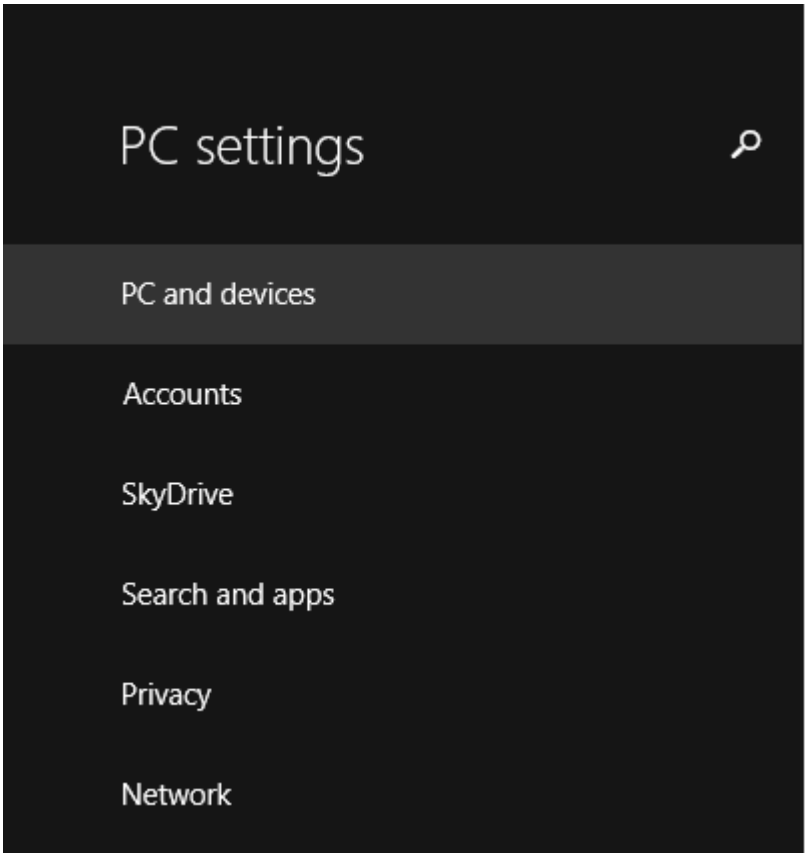


2. Click Change PC settings.

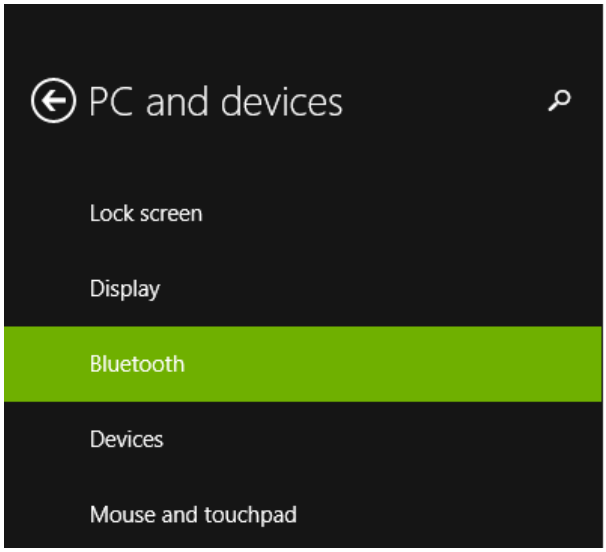


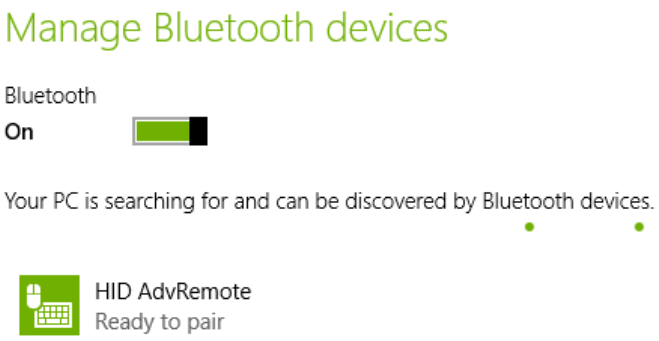
3.3 Adding an Advanced Remote

1. Click on PC and devices.



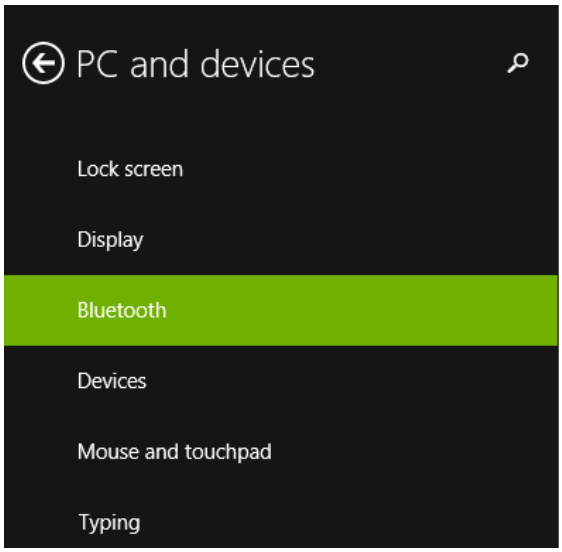
2. Choose *Bluetooth.*

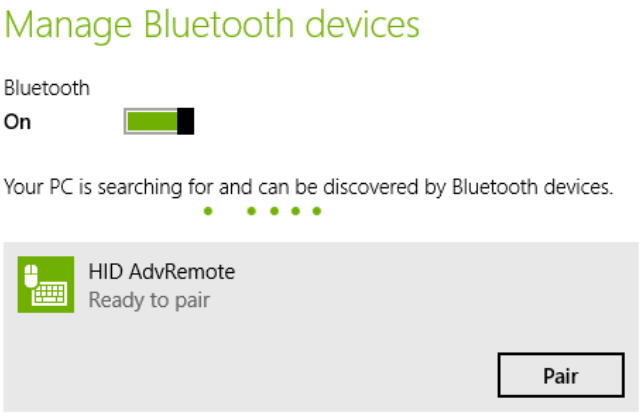




3.4 Adding an HID AdvRemote

To remove old bonding information, press the red key on the remote. If you have pressed a button on the advanced remote and it is not connected to another host, the remote appears in the list of found devices.

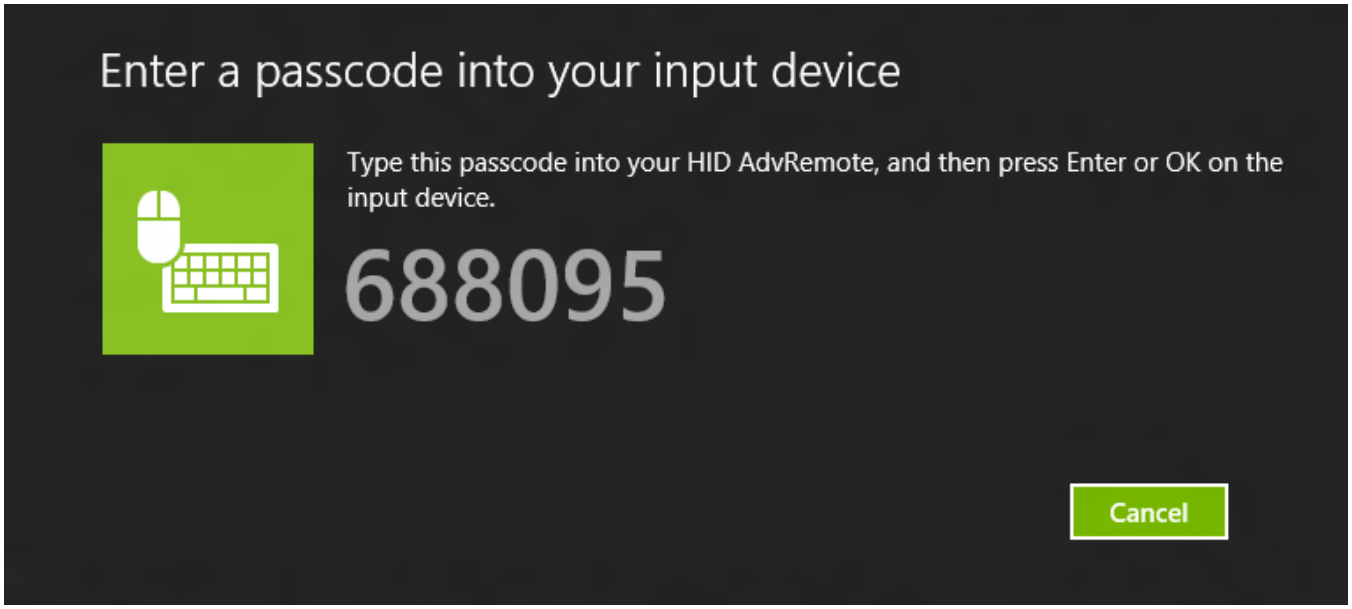




3.5 Entering the Pairing Code

The devices pair using a passkey entry.

On the advanced remote, enter the 6-digit passcode displayed on the computer screen.

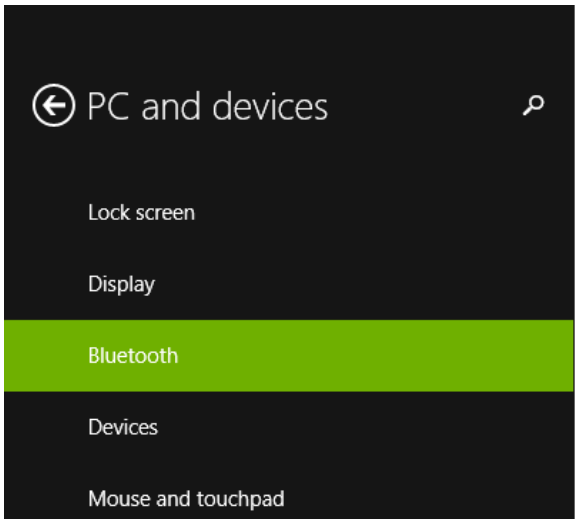


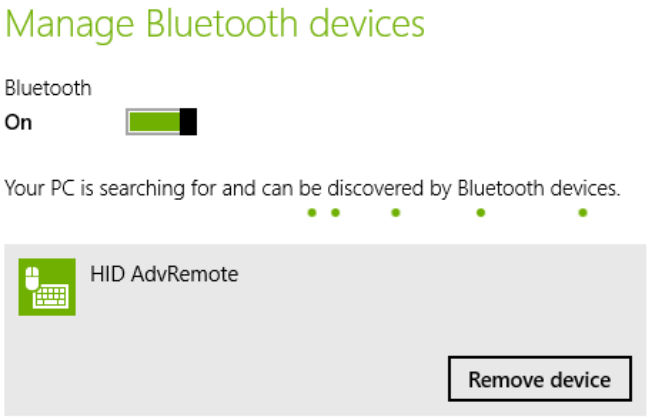
The advanced remote is paired with Windows and bond data is stored on both devices, making reconnecting faster and passcode entry unnecessary.

3.6 Removing a Device

You can remove a device from Windows and delete bond data by doing the following:

1. Click the device.
2. Click Remove device .





Using the Advanced Remote Control

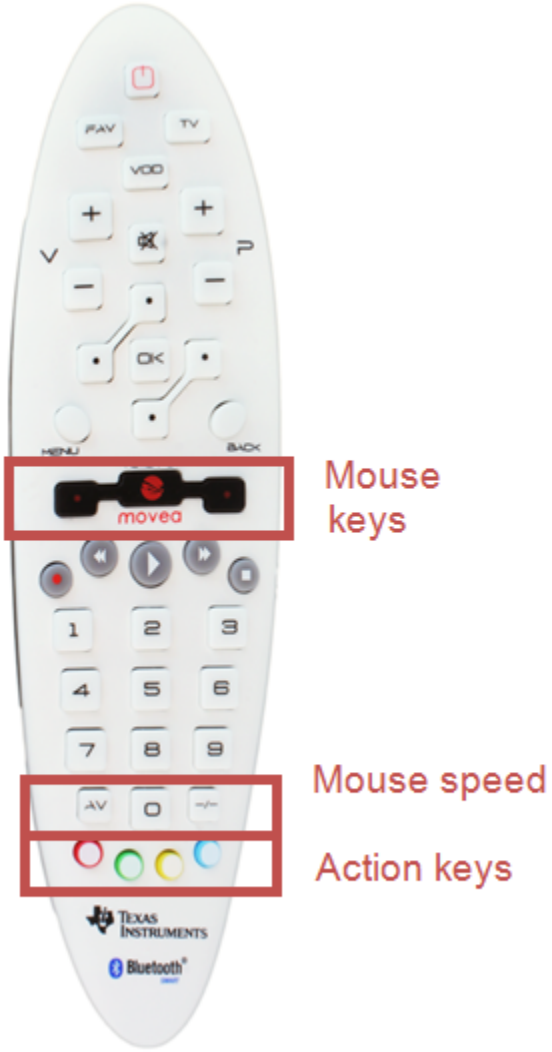


Figure 4-1. Advanced Remote Control

4.1 Advertising and Connecting

All keys, except the action keys and mouse speed keys, cause the advanced remote to advertise and become discoverable by hosts scanning for HID-capable, BLE devices.

4.2 Using the Keyboard

Pressing any number acts as a keyboard input of that number. OK acts as Enter, Back is backspace, and the four keys surrounding OK act as directional keys.

4.3 Controlling the Media Settings With Consumer Control Buttons

Volume, Mute, Play, Pause, and so forth are consumer control keys and control the media settings on the computer.

4.4 Using the Mouse

Holding down the middle mouse button prompts the advanced remote to interpret the movement of the remote as mouse input and sends this input to the computer.

Double-clicking the middle button locks the mouse function. The left and right buttons function as typical mouse buttons.

Pressing AV and –/– decreases and increases mouse speed.

4.5 Removing Bond Information

Pressing the red action key removes the bonding information stored on the advanced remote. Pairing must be done again, using a passcode entry if applicable. The peer device is not notified of this unpairing.

4.6 Calibrating

4.6.1 Calibrating

1. Ensure the mouse function is off and the device is laying on a flat surface.
2. Press the Blue action key to recalibrate the onboard motion sensors.

NOTE: If the advanced remote is not ready for calibration, a high-pitched note sounds.

3. Press the blue key again

NOTE: During calibration, a low-pitched tick sounds for 12 seconds. A high-pitched note indicates success.

Additional Tools and Links

5.1 BLE Packet Sniffer

You can use the CC2540 USB dongle as a BLE sniffer and monitor packets sent wirelessly.

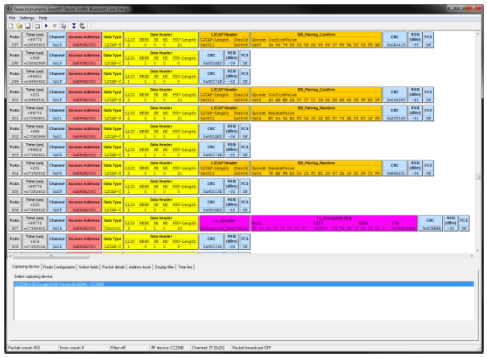


Figure 5-1. BLE Packet Sniffer

You can download the SmartRF™ Protocol Packet Sniffer software from http://www.ti.com/tool/packet-sniffer.

5.2 SmartRF Flash Programmer

TI provides a tool to program the flash on the CC2541.

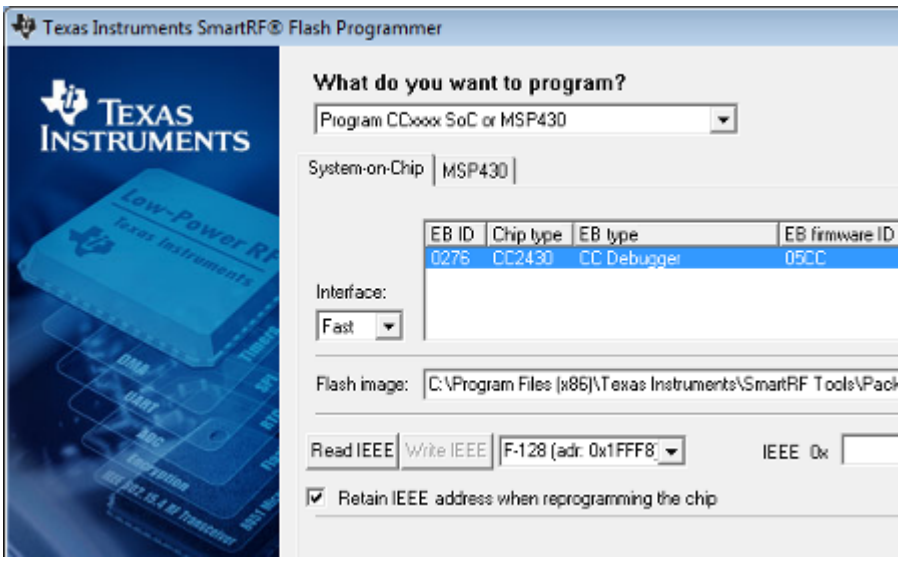


Figure 5-2. SmartRF Flash Programmer

You can download SmartRF Flash Programmer from http://www.ti.com/tool/flash-programmer.

5.3 IAR Embedded Workbench

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

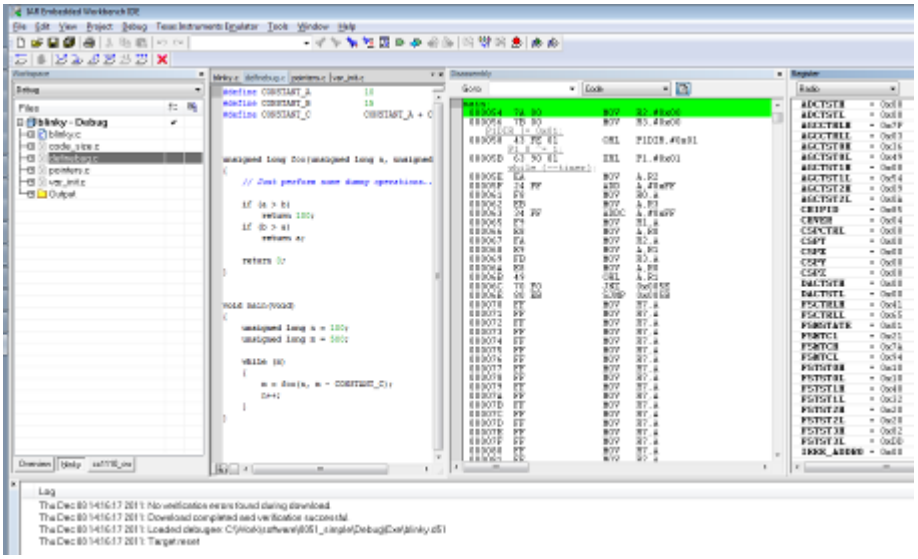


Figure 5-3. IAR Embedded Workbench

You can find more information on IAR EW8051, including a free evaluation version download, at http://www.iar.com/ew8051.

5.4 BLE E2E Forum

Visit the TI *Bluetooth* low energy E2E forum, www.ti.com/ble-forum, for support during development.

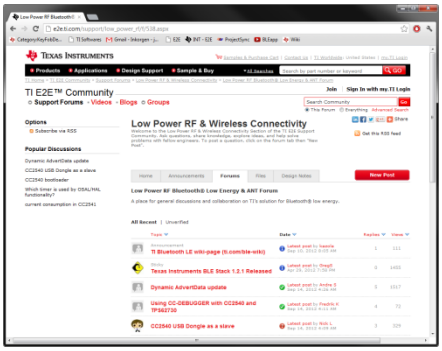


Figure 5-4. BLE E2E Forum

5.5 BLE Wiki

TI's BLE Wiki contains application examples, guides, and documentation covering extra steps with which you might need help. The Wiki is managed by TI employees and E2E community members.

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

5.6 Links

TI BLE Advanced Remote User Guide – (SWRU343)

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

CC2540/41 BLE Software Developer's Guide – (SWRU271)

CC2540/41 User's Guide – (SWRU191)

CC2541 Product Page – www.ti.com/cc2541

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