

CC256x MSP430 TI Bluetooth Stack

Contents

Demo Overview

Requirements

- Hardware
- Software

Hardware Setup

- MSP430F5438 Experimenter's Board
- EZ430-RF256x
- MSP430F5529 Experimenter's Board
- CC256XB Information

Software Setup

- Downloading and Installing the Software
- Flashing the Bluetooth Code
- Platform Specific
 - EZ430
 - IAR
 - CCS
 - MSP430F5438/MSP430F5529
 - IAR
 - CCS

Demos

- Classic Bluetooth Demos
 - SPP Demo
 - HID Demo
 - A3DP Demo
 - A3DP MultiRoom Demo
 - HFP Demo
- Classic BT + BLE Demos
 - SPP + SPPLD Demo
 - KeyFob Demo
 - SPPLD Demo Lite
- Bluetooth Low Energy Demos
 - ANP Demo
 - HRP Demo
 - HTP Demo
 - PASP Demo
 - HOGP Demo
 - PXP Demo

FMP Demo

See Also

Demo Overview

This demo allows users to evaluate TI's CC256x Bluetooth device by using the PAN1323EMK kit and the MSP-EXP430F5438 board. The CC256x+MSP430 Bluetooth sample applications are provided to enable a rich out-of-box experience to the user. These applications allow the user to use a console to send Bluetooth commands, setup a Bluetooth Device to accept connections, connect to a remote Bluetooth device, and communicate over Bluetooth.



Requirements

Hardware

- CC256xQFNEM (<http://www.ti.com/tool/cc256xqfnem>)

- [MSP-EXP430F5438 Experimenter Board \(http://www.ti.com/tool/msp-exp430f5438\)](http://www.ti.com/tool/msp-exp430f5438)

Note 1: For downloading the sample demos to the EVM, you require [MSP430 USB Debugging Interface \(http://www.ti.com/tool/msp-fet430uif\)](http://www.ti.com/tool/msp-fet430uif). This needs to be purchased separately.

Note 2: Hardware depends on the application, specific demos will have detailed hardware configurations. But all the APPS should work with the hardware listed above.

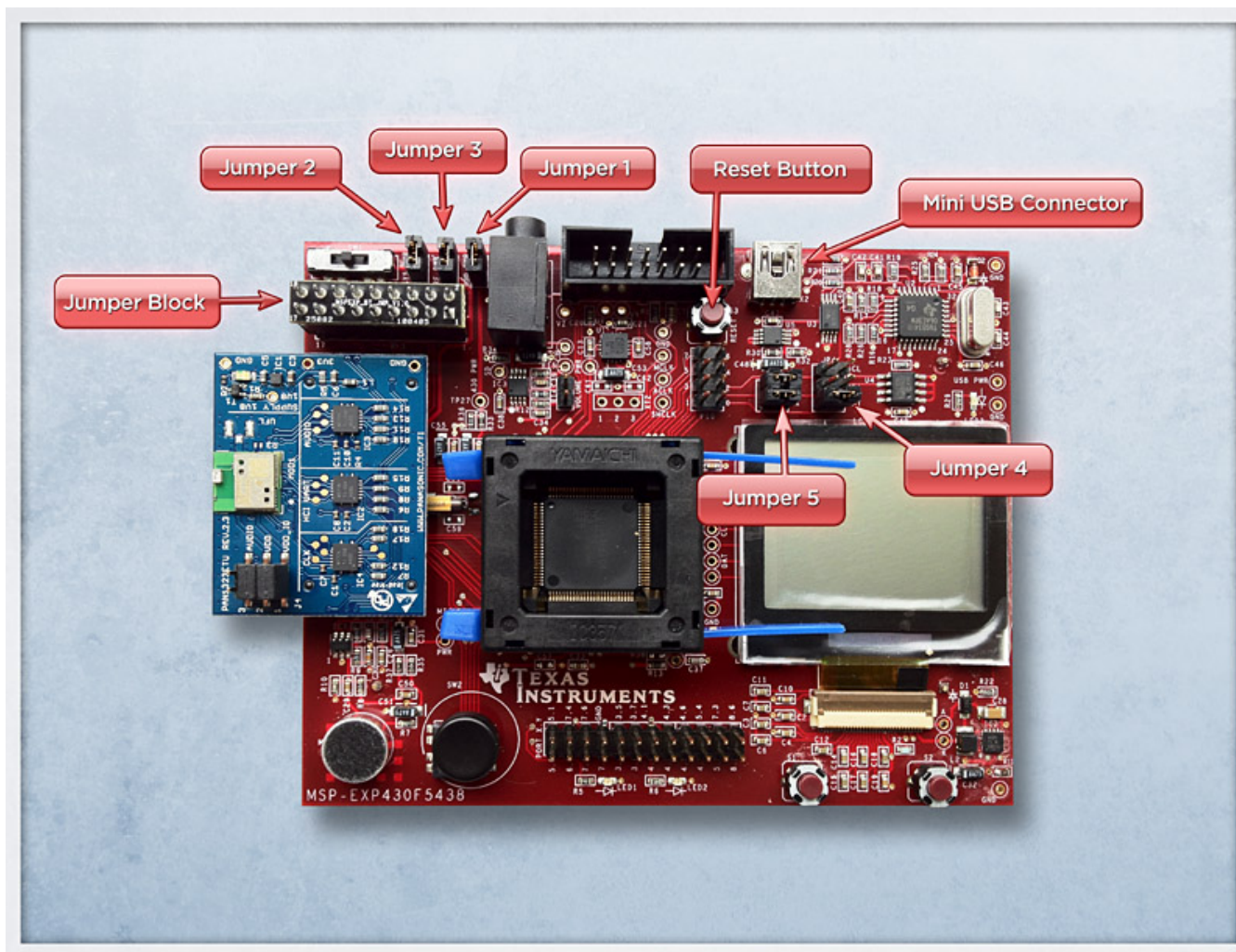
Software

- [CC256x+MSP430 Bluetooth Software - Contains the Sample Applications - Download \(http://www.ti.com/tool/tibluetoothstack-sdk\)](http://www.ti.com/tool/tibluetoothstack-sdk)
- [Lite FET-Pro430 Tool - To flash the example code in the MSP430 chip - Download \(http://www.elprotronic.com/download.html\)](http://www.elprotronic.com/download.html)

Hardware Setup

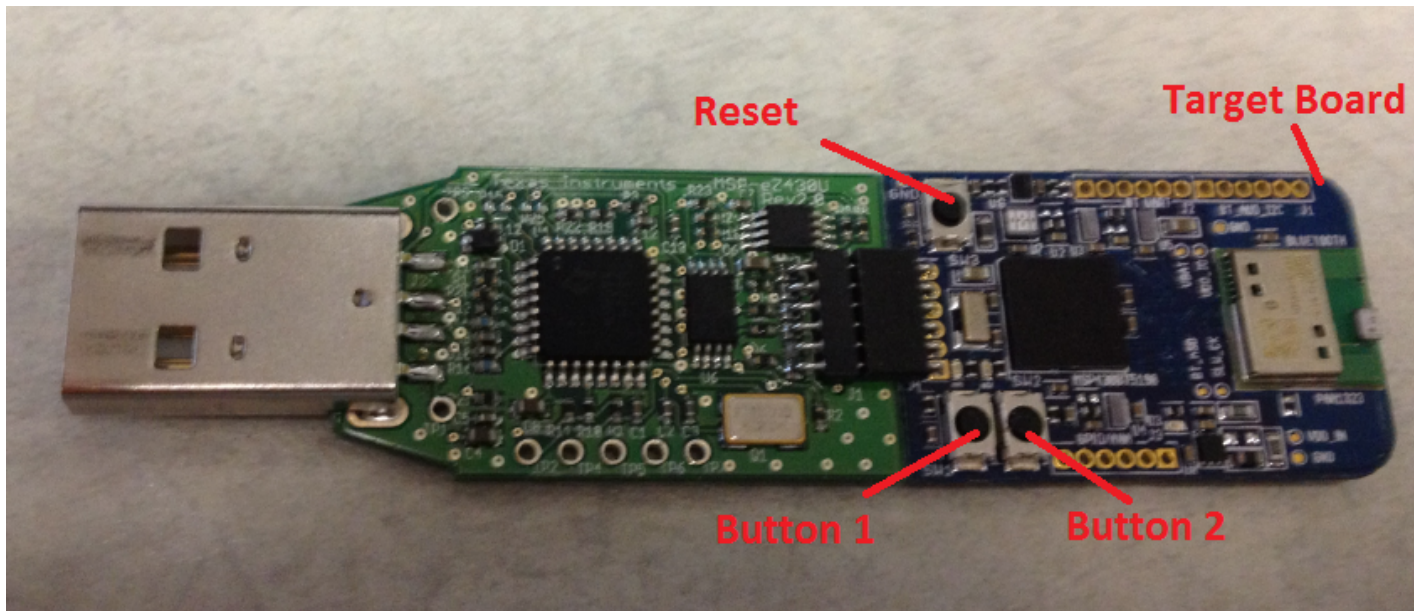
MSP430F5438 Experimenter's Board

- a) Connect the CC256x board [PAN1323ETU \(http://www.panasonic.com/industrial/electronic-components/rf-modules/bluetooth/pan1323etu.aspx\)](http://www.panasonic.com/industrial/electronic-components/rf-modules/bluetooth/pan1323etu.aspx) onto the [MSP-EXP430F5438 board \(http://www.ti.com/tool/msp-exp430f5438\)](http://www.ti.com/tool/msp-exp430f5438) using the RF1/RF2 connectors (RF EVM connectors)
- b) Place the included jumper block on RF3 connector.
- c) Make sure that JP1, JP2, JP3, JP4 and JP5 are as shown in the picture below.
- d) Make sure the other default jumper configuration remains on your MSP-EXP430F5438 board



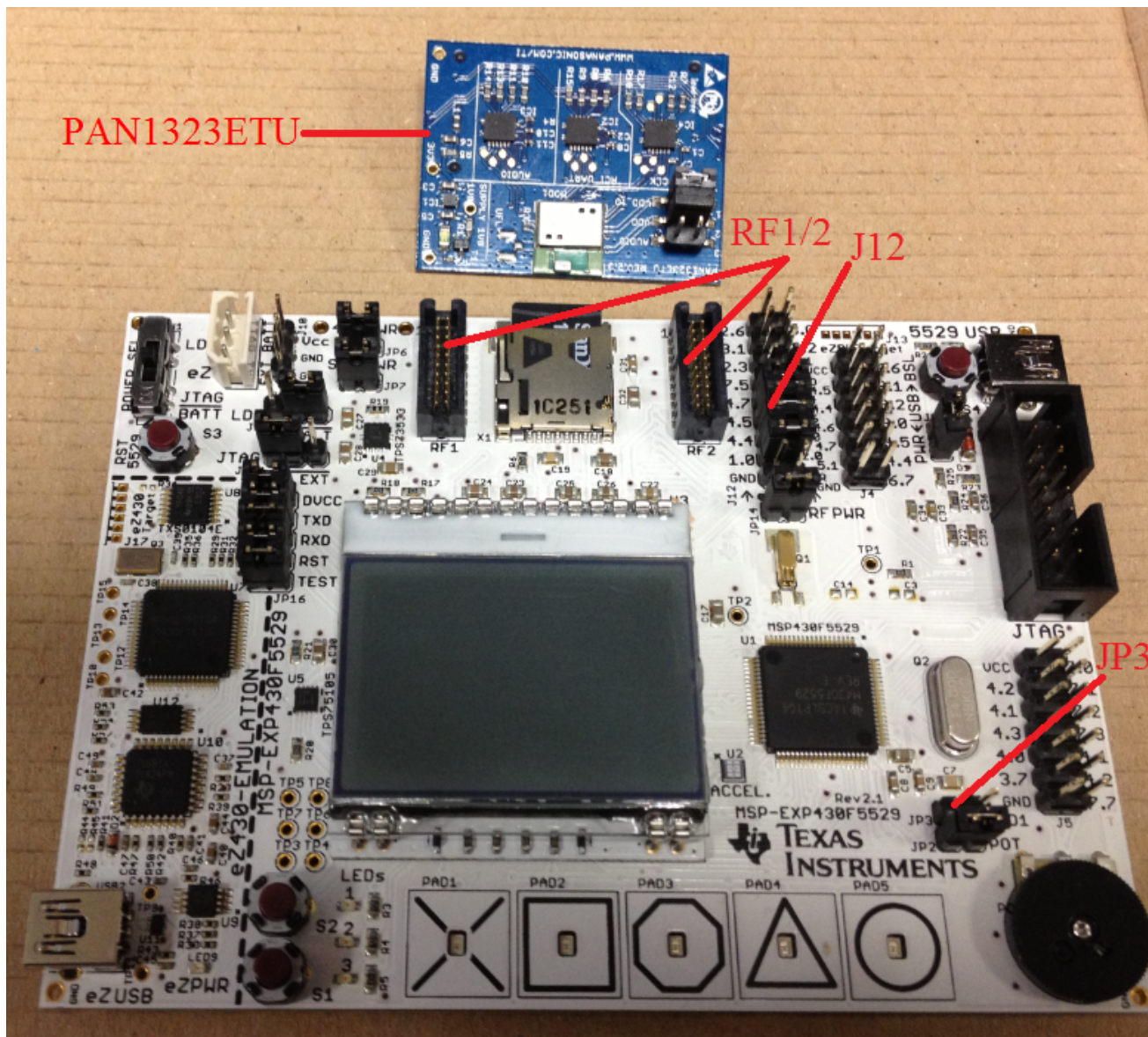
EZ430-RF256x

- a) On Windows-7, please run the windows applications in administrator mode.
- b) Connect the RF256xT Target Board to the USB board. The picture below shows the connected boards.



MSP430F5529 Experimenter's Board

- a) Connect the CC256x board PAN1323ETU (<http://www.panasonic.com/industrial/electronic-components/rf-modules/bluetooth/pan1323etu.aspx>) onto the MSP-EXP430F5529 board (<http://www.ti.com/tool/msp-exp430f5529>) using the RF1/RF2 connectors (RF EVM connectors)
- b) Remove the JP3 Jumper.
- c) In J12, make sure Pin 3 to Pin 4 (P1.0 to P2.0), Pin 5 to Pin 6 (P4.4 to P4.0), Pin 7 to Pin 8 (P4.5 to P4.6), Pin 9 to Pin 10 (P4.7 to P2.4) are connected as shown in the picture.
- d) Make sure the other default jumper configuration remains on your MSP-EXP430F5529 board



CC256XB Information

To use the CC256XB module, the patch CC256XB.h has to be included. To make sure this patch is included, in BTPSVend.C add a line

```
#define __SUPPORT_CC256XB_PATCH__
```

This will make sure that the CC256XB patch is loaded and the CC256XB module can be used without issues.

Software Setup

Downloading and Installing the Software

The Bluetooth SDK can be downloaded from [here](http://www.ti.com/tool/tibluetoothstack-sdk) (<http://www.ti.com/tool/tibluetoothstack-sdk>). You will be prompted for a TI login when you try to download the SDK. If you don't already have a TI login you will be asked to create one. After creating a TI login you will need to complete the export approval form. After completing the form a request will be submitted to TI for approval. After the request is approved you will see a confirmation on the next page and be provided with a link to download the software. Click the "Download" button to start the download.

After the download completes run the setup file (e.g. CC256x_MSP430_Bluetopia_SDK_vx_x_Setup.exe). The setup process will ask you to accept the TI Bluetooth Stack Clickwrap License Agreement. After accepting the license agreement the SDK will be installed to "C:\TI\Connectivity\CC256X_BT\CC256x MSP430 Bluetopia SDK\". The SDK can be accessed using Start / Programs / Texas Instruments / CC256x MSP430 Bluetopia SDK v x.x.

You now have access to sample applications' source code as well as binaries to flash directly to your MSP430 board.

Flashing the Bluetooth Code

Customers can use MSP430 Flasher with MSP430DLLV3 after updating the firmware of FET430 USB Emulator. For instructions visit [MSP430 FET430 setup](#)

You can use the included batch file Flash_CC256x_MSP430_Bluetopia.bat to flash the software. The flashing tool (MSP430Flasher.exe) and documentation (MSP430Flasher_Doc.pdf) are available under Tools folder at the install location.

Once MSP430Flasher tool is ready to flash the code, you can use the included batch file or the shortcut Flash_CC256x_MSP430_Bluetopia.bat to flash the BR/EDR SPP sample application to the board.

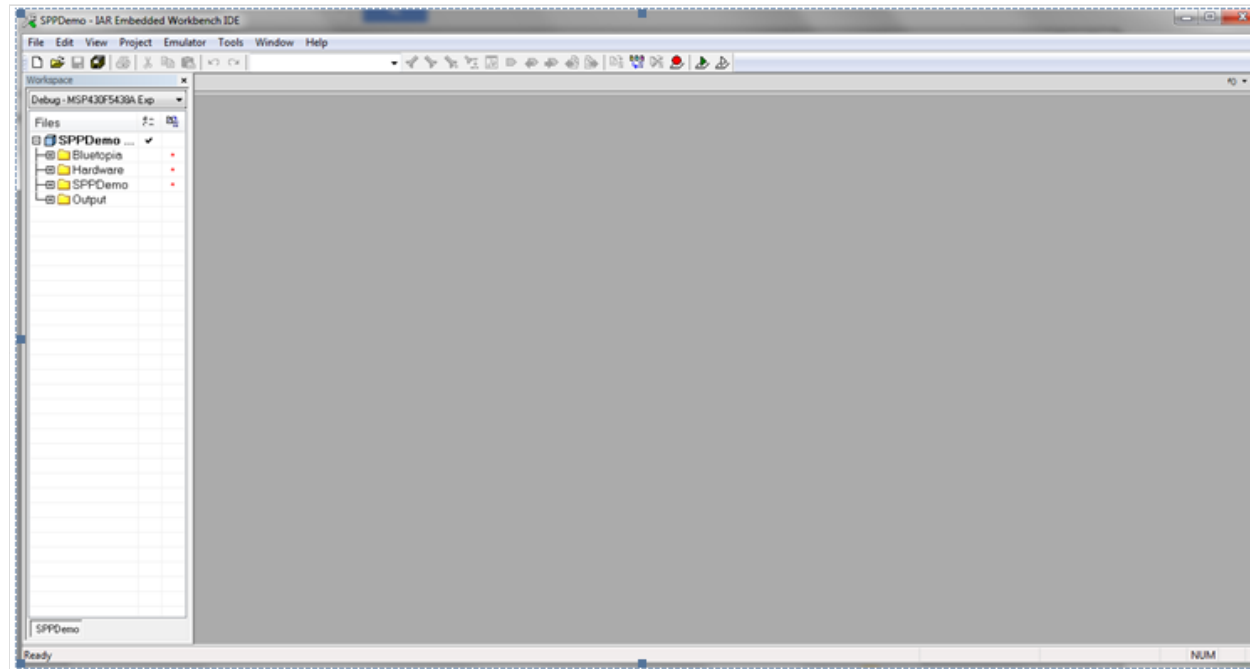
Platform Specific

EZ430

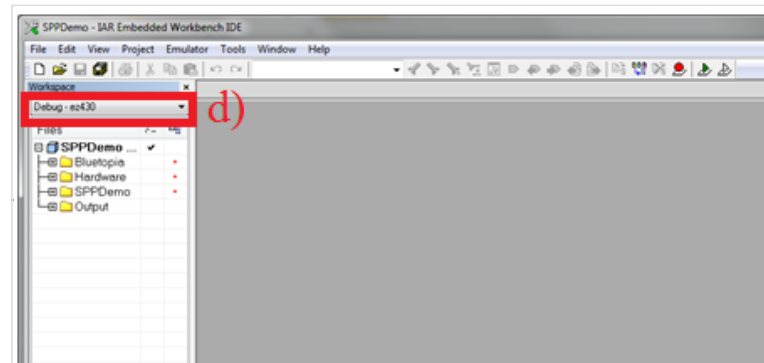
All the demo apps have support for EZ430. Here is the software configurations for the demos:

IAR

- a) Go to TI's_Bluetooth_Stack_Version-Number_MSP430\MSP430_Experimenter\Samples. Here you will see a list of samples.
- b) Select the demo that you want to load on the device. For our example we will use SPPDemo
- c) Navigate to Projects->IAR and select SPPDemo.eww . The IDE should open.

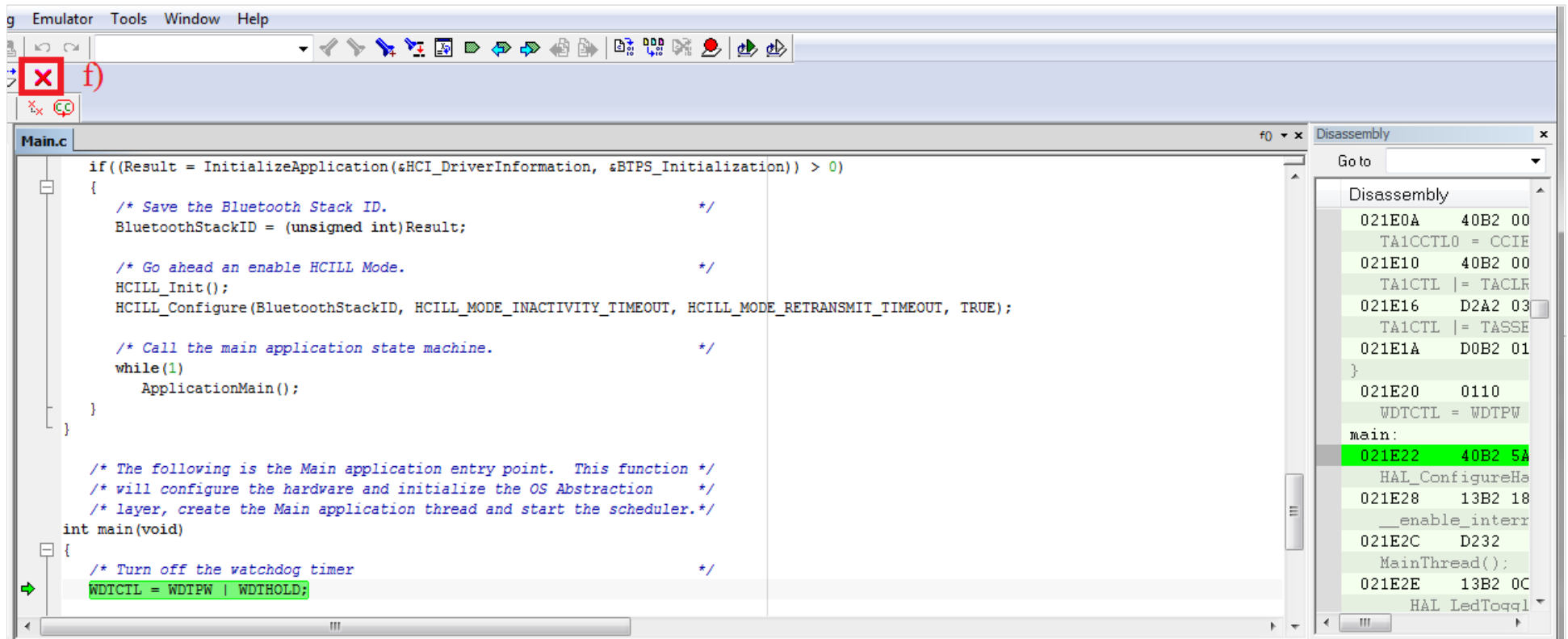


d) In the workspace tab, the configurations to load the device should be present. From the dropdown menu, select either debug or release configurations for EZE-430. In our case we select, Debug-EZE 430.



e) Select download and debug(make sure that the EZE-430 device is conencted) by either clicking on the Play icon or selecting Project->Download and Debug.

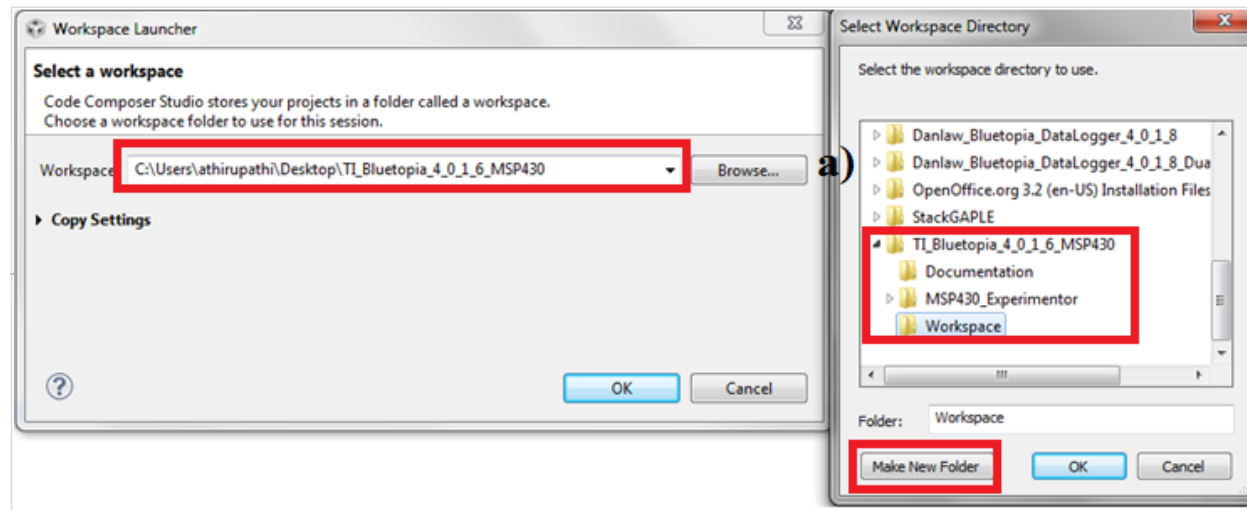
f) Let the IDE debug and load the software on the device. This may take 5-10 minutes. Once it is done debugging, click on the X on the IDE to stop debugging.



g) The software is now ready to use. To begin using the profile disconnect and reconnect the EZE-430 after flashing.

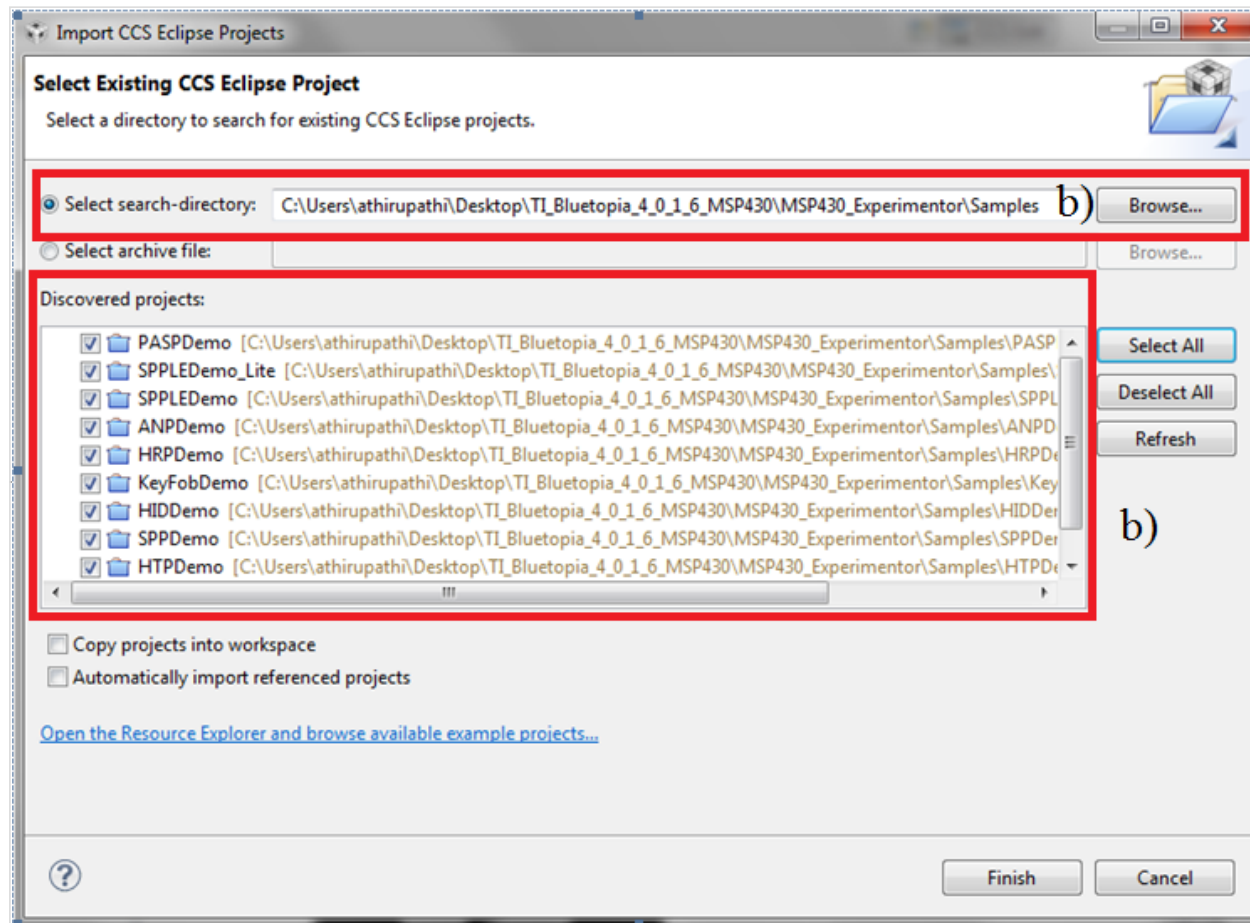
CCS

a) Open Code Composer Studio 5. Select File->Switch Workspace. Navigate to the folder where the TI's Bluetooth Stack Samples are located and make a new folder for the workspace.

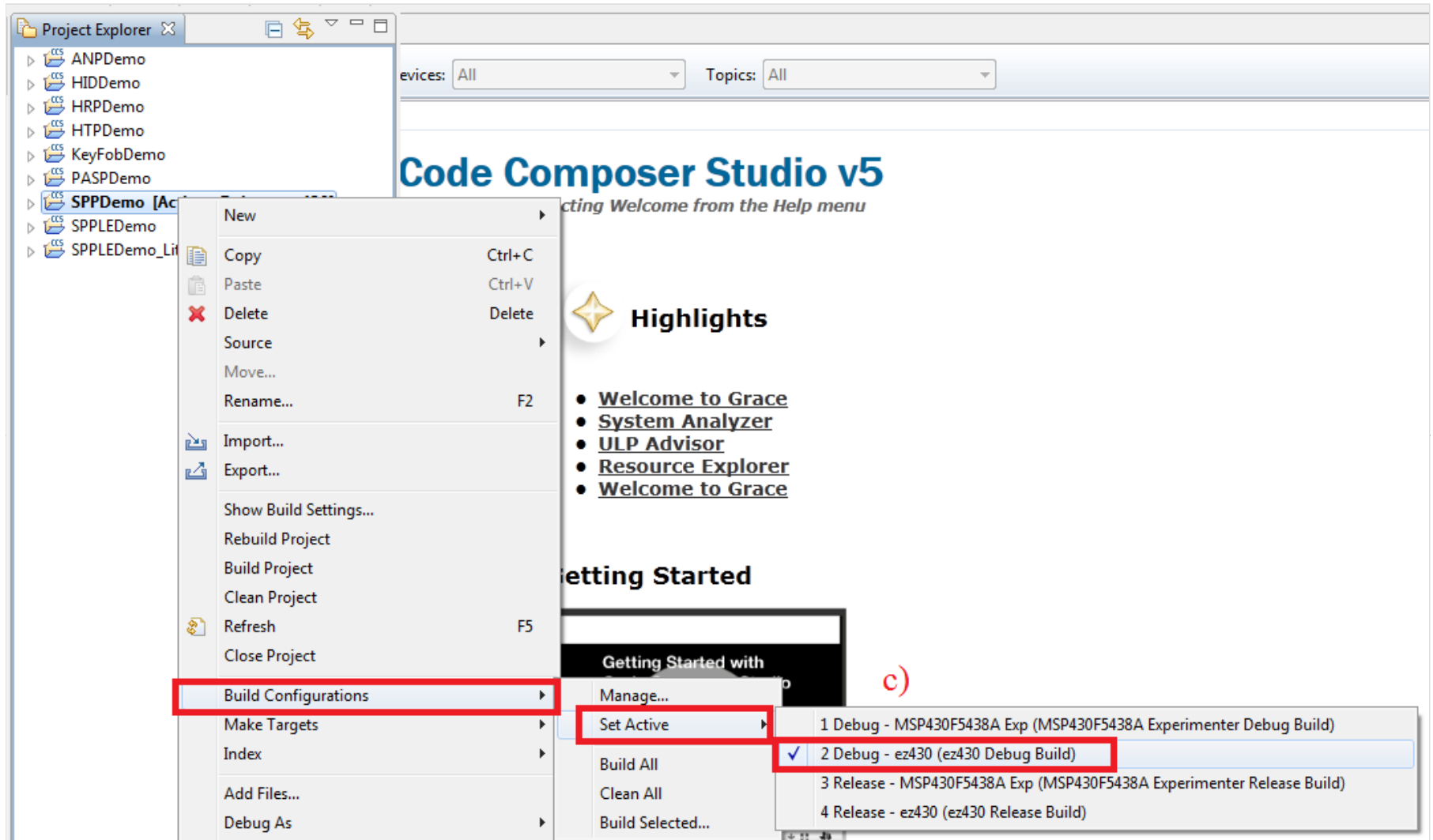



CCS will now exit and reload the software. Each time you load a project it is preferable to create a new workspace for it.

b) Select Project-> Import Existing CCS Eclipse project. In the select Auto search directory point to the TI's_Bluetooth_Stack_Version-Number_MSP430\MSP430_Experimentor\Samples folder. CCS will recognize all available profiles. Select all profiles and hit finish. (If you prefer you can selectively load the profiles you want).



c) The projects should load on the left in Project Explorer. Click on the profile that you want to load. By default it should select the Debug, MSP 430 configuration for the profile. To change the configuration, right click on the profile-> Build Configurations -> Set Active. Select either the debug or release configuration for EZE-430.



d) To begin flashing the device, select from the toolbar  -> Debug as -> Code composer session. Let the IDE debug and load the software on the device. This may take 5-10 minutes. Once it is done debugging, click on the stop button on the IDE to stop debugging.

Debug

KeyFobDemo [Code Composer Studio - Device Debugging]

- TI MSP430 USB1/MSP430 (Suspended - HW Breakpoint)
 - main() at Main.c:102 0x0276F0
 - c_int00_noexit() 0x0075F0 (the entry point was reached)

TI Resource Explorer

Main.c

```

92     ApplicationMain();
93 }
94 }
95
96 /* The following is the Main application entry point. This function */
97 /* will configure the hardware and initialize the OS Abstraction */
98 /* layer, create the Main application thread and start the scheduler.*/
99 int main(void)
100 {
101     /* Turn off the watchdog timer */
102     WDTCTL = WDTPW | WDTHOLD;
103
104     /* Configure the hardware for its intended use. */
105     HAL_ConfigureHardware();
106
107     /* Enable interrupts and call the main application thread. */
108     _enable_interrupt();
109     MainThread();
110
111     /* MainThread should run continuously, if it exits an error occurred. */
112     while(1)
113     {
114         HAL_LedToggle(0);
115         BTPS_Delay(100);
116     }
117 }
118
119
120

```

Name	Type

e) The software is now ready to use. To begin using the profile disconnect and reconnect the EZE-430 after flashing.

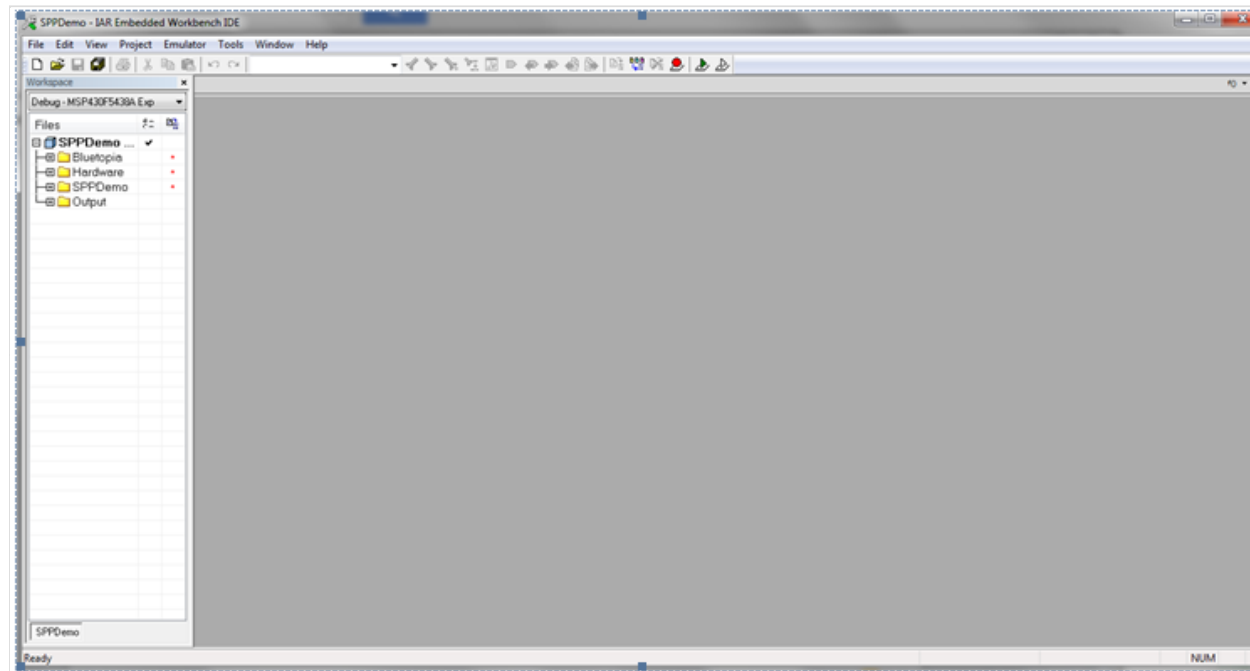
MSP430F5438/MSP430F5529

IAR

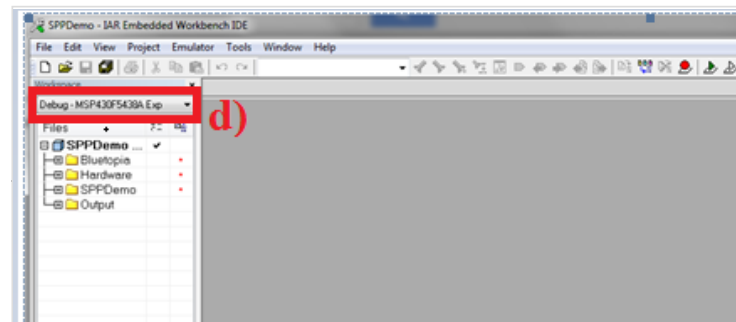
a) Go to TI's_Bluetooth_Stack_Version-Number_MSP430\MSP430_Experimentor\Samples. Here you will see a list of samples.

b) Select the demo that you want to load on the device. For our example we will use SPPDemo

c) Navigate to Projects->IAR and select SPPDemo.eww . The IDE should open.

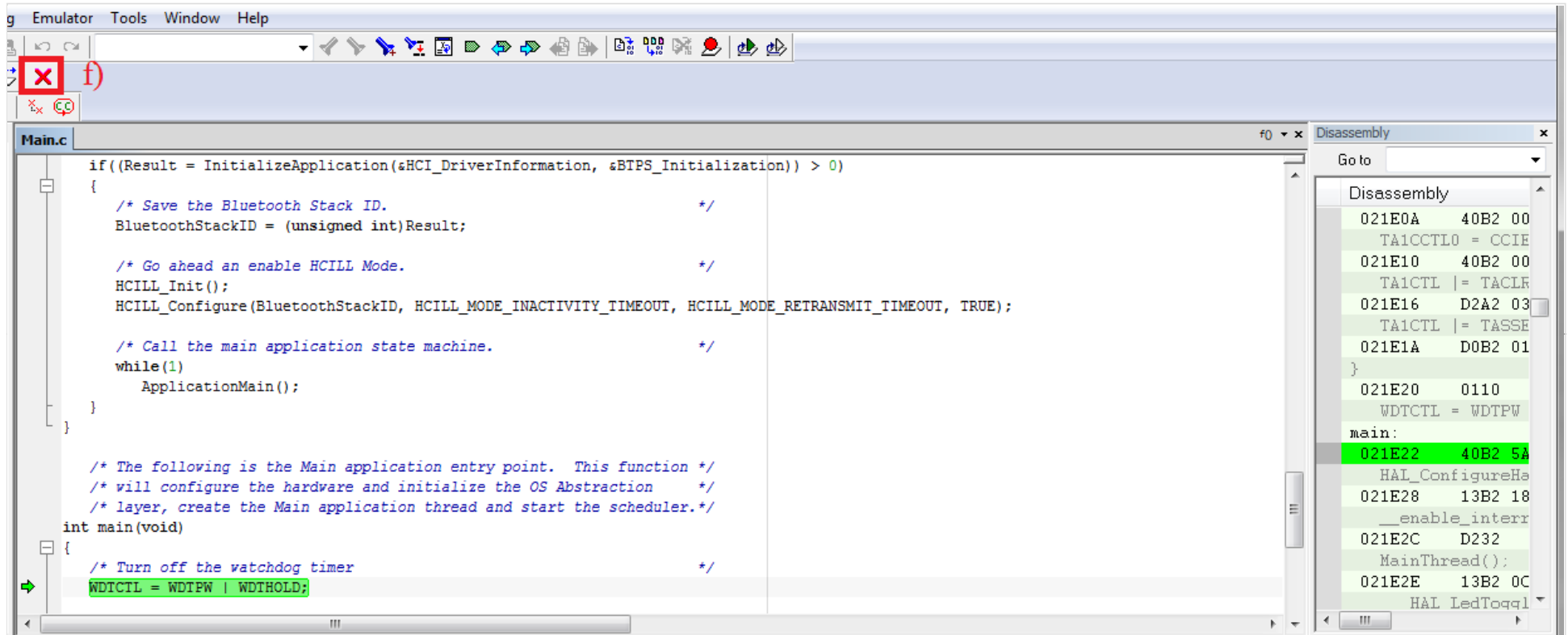


d) In the workspace tab, the configurations to load the device should be present. From the dropdown menu, select either debug or release configurations for EZE-430. In our case we select, Debug-MSP430F5438A.



e) Select download and debug(make sure that the MSP430 device is conencted) by either clicking on the Play icon or selecting Project->Download and Debug.

f) Let the IDE debug and load the software on the device. This may take 5-10 minutes. Once it is done debugging, click on the X on the IDE to stop debugging.



The screenshot shows the IDE interface with the following components:

- Source Code (Main.c):**

```

if((Result = InitializeApplication(&HCI_DriverInformation, &BTPS_Initialization)) > 0)
{
    /* Save the Bluetooth Stack ID. */
    BluetoothStackID = (unsigned int)Result;

    /* Go ahead an enable HCILL Mode. */
    HCILL_Init();
    HCILL_Configure(BluetoothStackID, HCILL_MODE_INACTIVITY_TIMEOUT, HCILL_MODE_RETRANSMIT_TIMEOUT, TRUE);

    /* Call the main application state machine. */
    while(1)
        ApplicationMain();
}

/* The following is the Main application entry point. This function */
/* will configure the hardware and initialize the OS Abstraction */
/* layer, create the Main application thread and start the scheduler.*/
int main(void)
{
    /* Turn off the watchdog timer */
    WDICTL = WDTPW | WDTHOLD;
}

```
- Disassembly Window:**

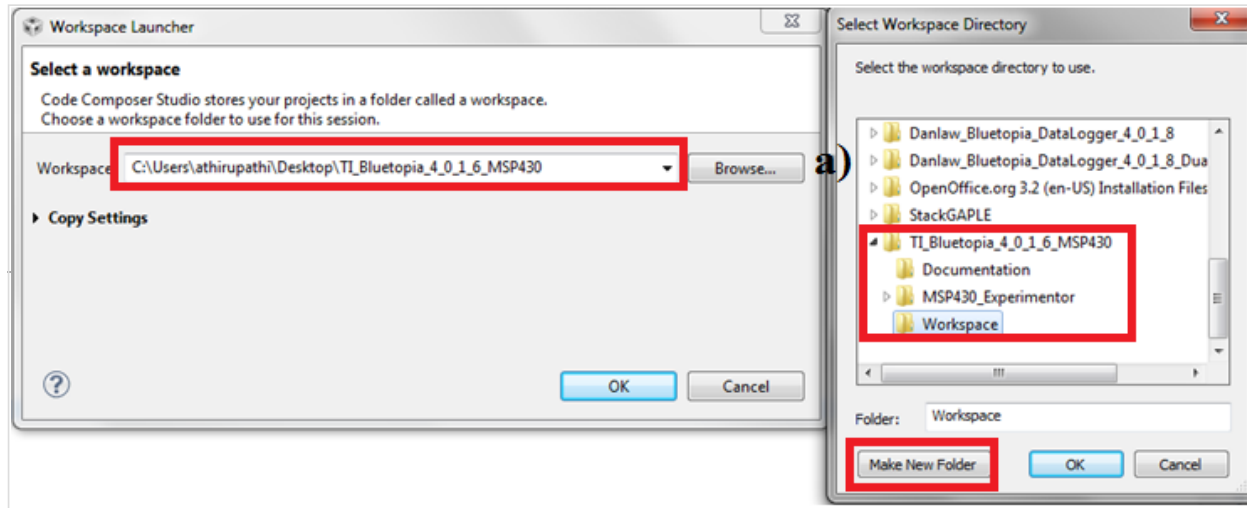
Address	Hex	Disassembly
021E0A	40B2 00	TA1CCTL0 = CCIE
021E10	40B2 00	TA1CTL = TAIFR
021E16	D2A2 03	TA1CTL = TASSEL
021E1A	D0B2 01	}
021E20	0110	WDCTL = WDTPW
main:		
021E22	40B2 5A	HAL_ConfigureHa
021E28	13B2 18	__enable_interr
021E2C	D232	MainThread();
021E2E	13B2 0C	HAL_LedToqql

g) The software is now ready to use. To begin using the profile disconnect and reconnect the MSP430 after flashing.

CCS

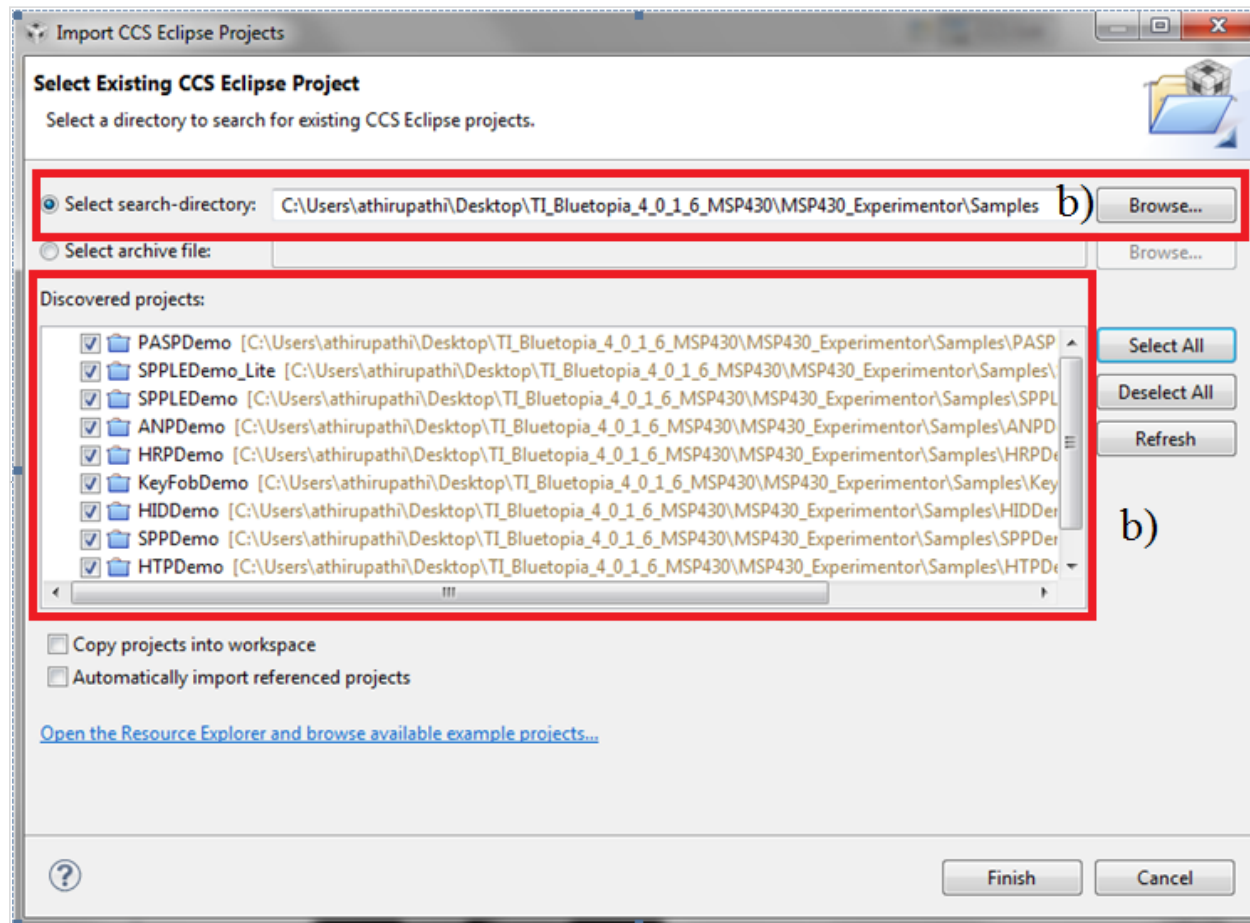
 **Note:** The MSP430F5529 is not supported with CCS due to code size limitations.

a) Open Code Composer Studio 5. Select File->Switch Workspace. Navigate to the folder where the TI's Bluetooth stack Samples are located and make a new folder for the workspace.

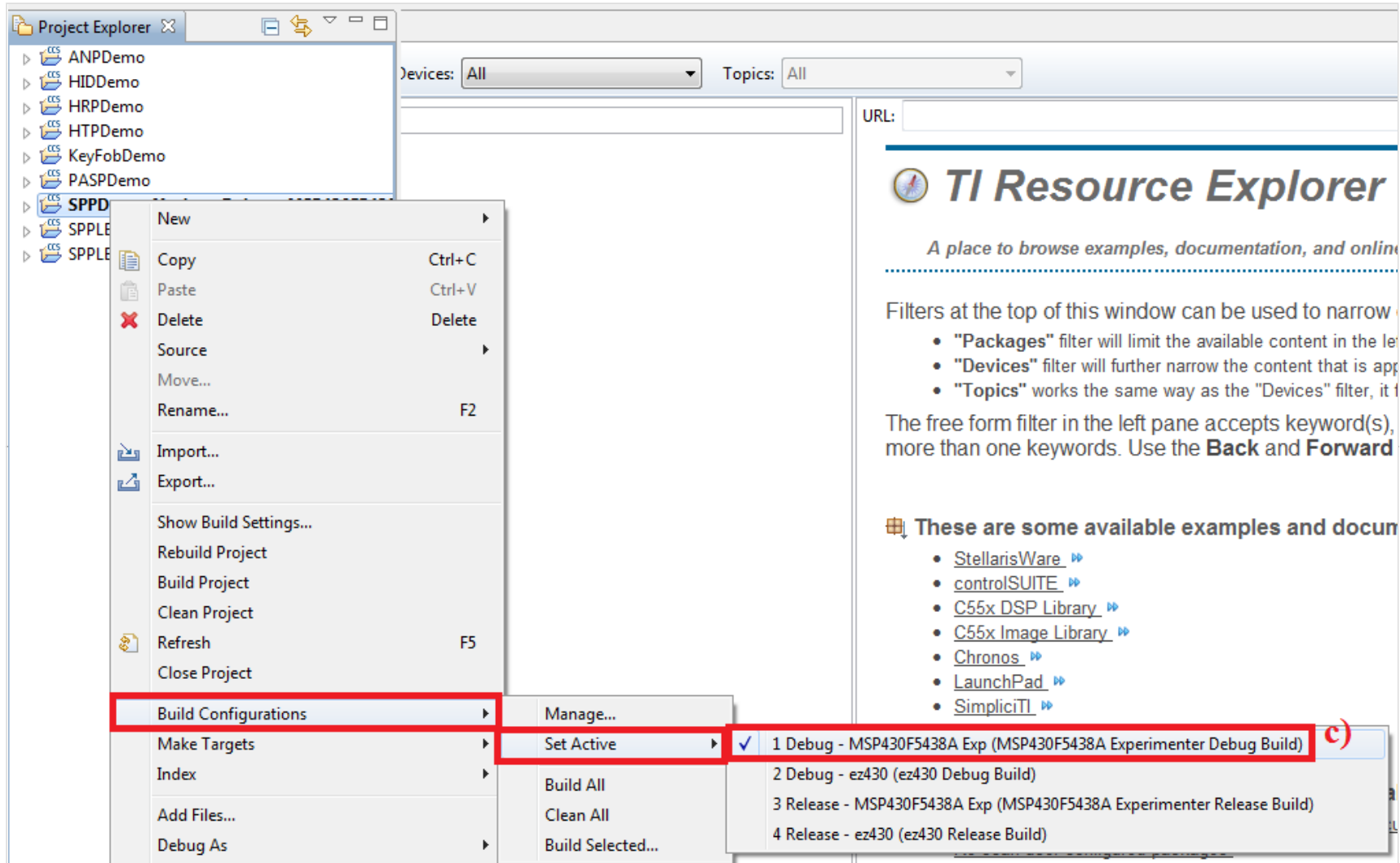



CCS will now exit and reload the software. Each time you load a project it is preferable to create a new workspace for it.

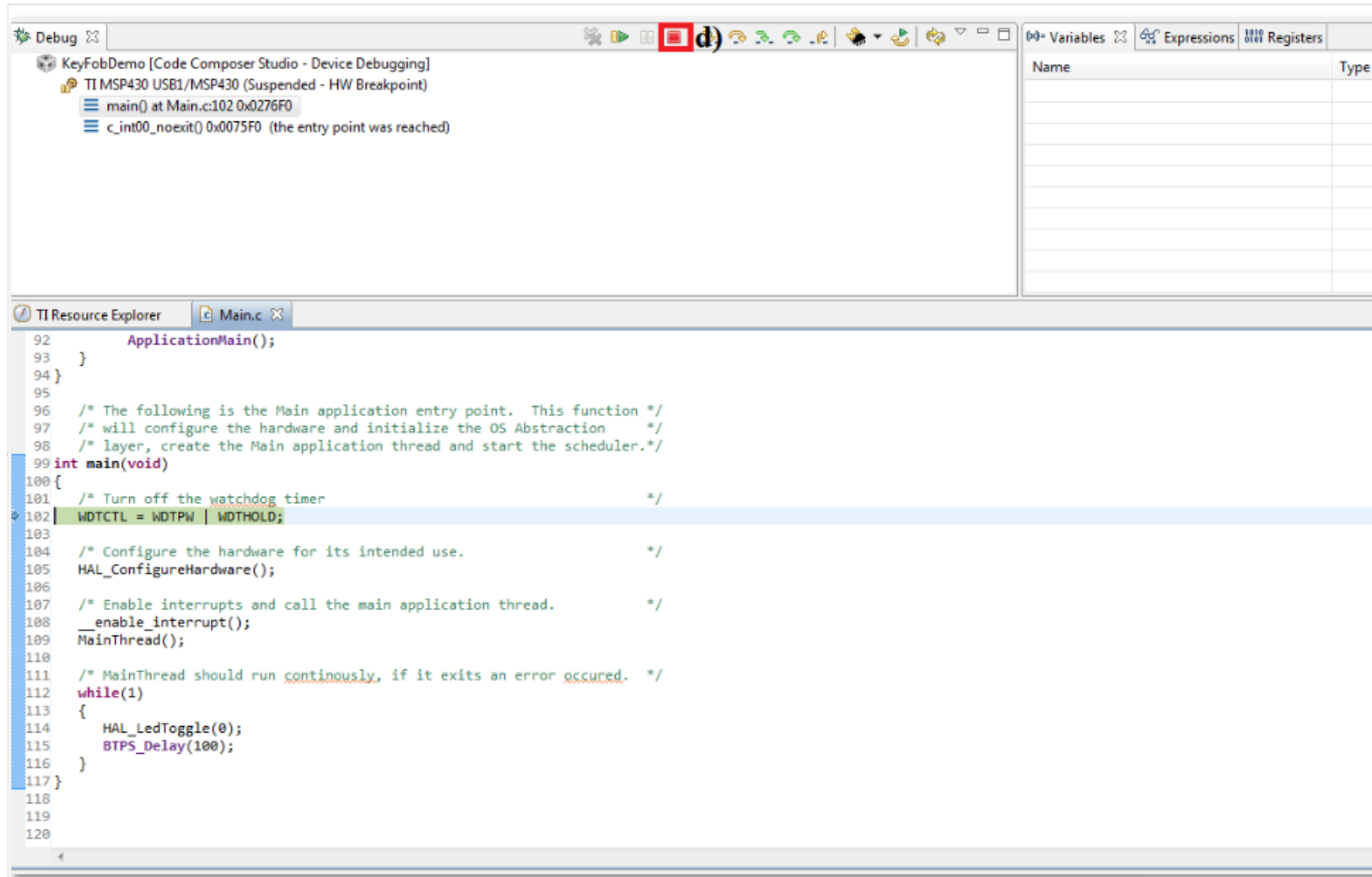
b) Select Project-> Import Existing CCS Eclipse project. In the select Auto search directory point to the TI's_Bluetooth_Stack_Version-Number_MSP430\MSP430_Experimentor\Samples folder. CCS will recognize all available profiles. Select all profiles and hit finish. (If you prefer you can selectively load the profiles you want).



c) The projects should load on the left in Project Explorer. Click on the profile that you want to load. By default it should select the Debug, MSP 430 configuration for the profile. To change the configuration, right click on the profile-> Build Configurations -> Set Active. Select either the debug or release configuration for MSP430.



d) To begin flashing the device, select from the toolbar  -> Debug as -> Code composer session. Let the IDE debug and load the software on the device. This may take 5-10 minutes. Once it is done debugging, click on the stop button on the IDE to stop debugging.



e) The software is now ready to use. To begin using the profile disconnect and reconnect the MSP430 after flashing.

Demos

Classic Bluetooth Demos

SPP Demo

- This application shows how to utilize the SPP module and also how handle the different callback events. The application can be used to interface with a remote SPP Client or Server.

- For a step by step demonstration on how to run this application visit the [SPP Demo Wiki](#).

HID Demo

- The human interface device enables a host to connect and control a HID device.
- For a step by step demonstration on how to run this application visit the [HID Demo Wiki](#).

A3DP Demo

- The Assisted Advanced Audio Distribution Profile shows how to send stereo audio over Bluetooth.
- For a step by step demonstration on how to run this application for the Sink Role visit the [A3DP Demo Sink Wiki](#)
- For a step by step demonstration on how to run this application for the Source Role visit the [A3DP Demo Source Wiki](#)

A3DP MultiRoom Demo

- The A3DP MultiRoom demo allows us to stream high quality audio to 2 different speakers at the same time.
- For a step by step demonstration on how to run the MultiRoom application visit the [A3DP MultiRoom Demo Wiki](#).

HFP Demo

- The Hands Free Profile shows how to provide remote control and voice connections over Bluetooth to a mobile device. This profile supports the HandsFree Role.
- For a step by step demonstration on how to run this application visit the [HFP Demo Wiki](#)

Classic BT + BLE Demos

SPP + SPPL Demo

- This application shows how to utilize Low Energy (LE) and the GATT profile. This sample emulates using SPP over LE using the GATT Profile. This sample acts as a LE Master and LE Slave.
- This application also shows how to utilize the SPP module and how to handle the different SPP callback events. This will act as either a SPP Server or SPP Client and exposes the same command set for SPP as the SPPDemo.
- For a step by step demonstration on how to run this application visit the [SPP + SPPL Demo Wiki](#).

KeyFob Demo

- The KeyFobDemo is used to demonstrate button press or accelerometer data over LE.
- For a step by step demonstration on how to run this application visit the [KeyFob Demo Wiki](#).

SPPLE Demo Lite

- The SPPL Lite demo is a server-only version of SPP LE where, in addition to supporting the SPP LE protocol, the classic Bluetooth profile SPP is also initialized as a server, and the device is ready to accept connections over classic Bluetooth (a.k.a. BR/EDR) or Bluetooth Low Energy (BLE).
- For a step by step demonstration on how to run this application visit the [SPPLE Demo Lite Wiki](#).

Bluetooth Low Energy Demos

ANP Demo

- This application shows how to utilize Low Energy (LE) and the GATT profile. This sample implements the Alert Notification Profile (ANP) using the GATT profile. This sample acts as a LE Master and LE Slave.
- For a step by step demonstration on how to run this application visit the [ANP Demo Wiki](#).

HRP Demo

- This application shows how to utilize Low Energy (LE) and the GATT profile. This sample implements the Heart Rate Monitoring Profile (HRP) using the GATT profile. This sample acts as a LE Master and LE Slave.
- For a step by step demonstration on how to run this application visit the [HRP Demo Wiki](#).

HTP Demo

- This application shows how to utilize Low Energy (LE) and the GATT profile. This sample implements the Health Thermometer Profile (HTP) using the GATT profile. This sample acts as a LE Master and LE Slave.
- For a step by step demonstration on how to run this application visit the [HTP Demo Wiki](#).

PASP Demo

- This application shows how to utilize Low Energy (LE) and the GATT profile. This sample implements the Phone Alert Status Profile (PASP) using the GATT profile. This sample acts as a LE Master and LE Slave.
- For a step by step demonstration on how to run this application visit the [PASP Demo Wiki](#).

HOGP Demo

- This application shows how to utilize Low Energy (LE) and the GATT profile. This sample implements the Human Interface Device (HID) using the GATT profile.
- For a step by step demonstration on how to run this application visit the [HOGP Demo Wiki](#).
- [{HOGP Demo Legacy page}](#).

PXP Demo

- This application shows how to utilize Low Energy (LE) and the GATT profile. This sample implements the ProXimity Profile(PXP) using the GATT profile. This sample acts as a LE Master and Slave.
- For a step by step demonstration on how to run this application visit the [PXP Demo Wiki](#).

FMP Demo

- This application shows how to utilize Low Energy (LE) and the GATT profile. This sample implements the Find Me Profile(FMP) using the GATT profile. This sample acts as a LE Master and Slave.
- For a step by step demonstration on how to run this application visit the [FMP Demo Wiki](#).

See Also

- [CC256x Main Wiki Page](#)
- [CC256x Tiva TI Bluetooth Stack](#)
- [TI Bluetooth Stack Download \(http://www.ti.com/tool/tibluetoothstack-sdk\)](http://www.ti.com/tool/tibluetoothstack-sdk)

```

{{
1. switchcategory:MultiCore=
  ▪ For technical support on MultiCore devices, please post your questions in the C6000 MultiCore Forum
  ▪ For questions related to the BIOS MultiCore SDK (MCSDK), please use the BIOS Forum
Please post only comments related to the article CC256x MSP430 TI Bluetooth Stack here.

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MAVRK=For technical support on MAVRK please post your questions on The MAVRK Toolbox Forum. Please post only comments about the article CC256x MSP430 TI Bluetooth Stack here.

For technical support please post your questions at http://e2e.ti.com. Please post only comments about the article CC256x MSP430 TI Bluetooth Stack here.
}}
    
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