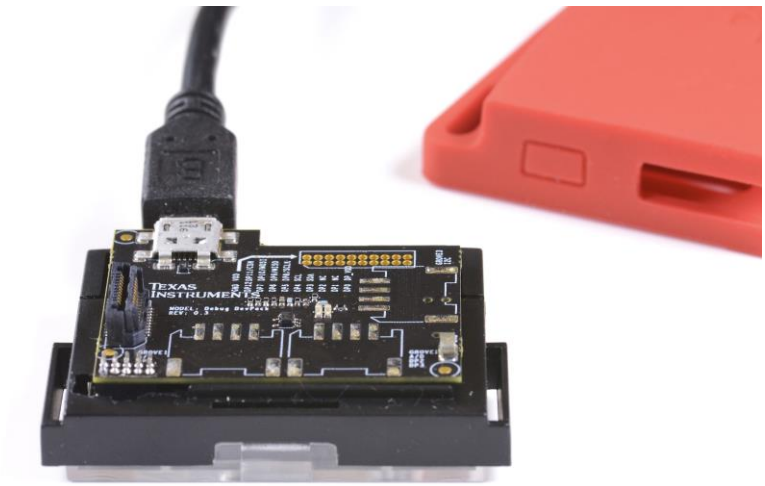
Debug DevPack User Guide



This is the User Guide for the Debugger DevPack for the SensorTag.

The Debugger DevPack is based on the XDS-110 emulator and unlocks a free license to Code Composer Studio. Please remember to change the debug target configuration to XDS-110 before debugging the Sensor Tag. Most projects come with XDS-100v3 set as default.

Please note that on SensorTag version 1.3 and earlier of the PCB, it will be necessary to keep the battery plugged in to power the SensorTag from the Debugger DevPack.

Potential Overheating of Debug DevPack

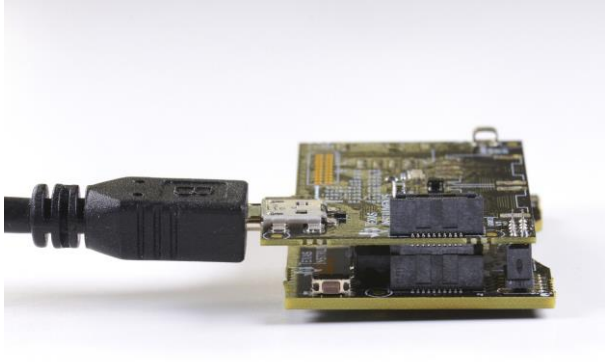
We have observed high temperatures on the TM4C1294 chip on a limited number of Debug DevPack (revison 1.2) when hot-plugging the USB cable. If you encounter this problem, please stop using your Debug DevPack and contact TI sales support line TI sales support to get a replacement debug DevPack.

Debug DevPack resources

[Debug DevPack Schematic and Assembly Drawing]
[BLE Device Monitor including latest hex files for all DevPacks]

Plug the Debug DevPack into the SensorTag

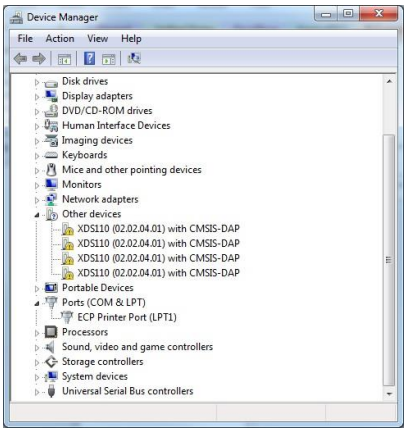
Plug the USB cable into the Debug DevPack and then carefully fit it onto the SensorTag. Note that the debug DevPack will only fit in one direction on to the SensorTag, and that to ensure correct boot-up sequence, the Debugger DevPack should not be plugged into the SensorTag when powering on. **Note that both the 20-pin DevPack connector and 10-pin JTAG connector must fit in place on the SensorTag** If you are using the SensorTag with the inner casing, cut or press out the plastic spacer over the JTAG connector



A green LED with be lit on the Debug DevPack when the DevPack is ready.

Install XDS110 drivers and tools

Before installation of drivers the XDS110 will be listed in the Windows Device Manager as an unknown device

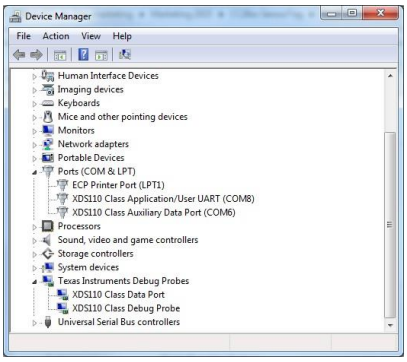


The Debug DevPack is using the XDS110 debug probe. This debugger is supported by a number of tools.

- [Code Composer Studio (CCS) Integrated Development Environment (IDE) for Wireless Connectivity]
- [TI Cloud Tools Including Code Composer Studio Cloud]
- [SmartRF flash programmer 2]

(Official IAR IDE support is coming, meanwhile please follow these instruction: [[1]]

All of these tools include drivers for the XDS110 on the debug DevPack. When you install one of the tools the drivers will be installed. After installing the drivers, the XDS110 will be listed in the Windows Device Manager with 2xCOM ports and Debug/Data probes.



In addition to these tools the BLE Device Monitor is a useful tool for testing and development with Windows: [BLE Device Monitor Download], documentation for this tool can be found here: [BLE Device Monitor User Guide]. An added feature of the BLE device monitor is that after installation it includes the latest hex files for the SensorTag and DevPacks at: C:\Program Files (x86)\Texas Instruments\SmartRF Tools\BLE Device Monitor\firmware

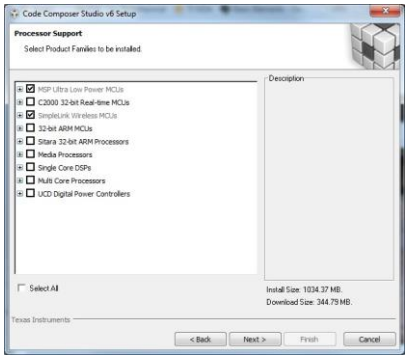
Using the Debug DevPack with TI Cloud Tools

The TI Cloud tools are the quickest and easiest way to get started with developing and compiling code for the SensorTag. [Here is a blog post with inspiration]

This video shows how to get started in no time: [Using the CC2650 with TI Cloud Tools]

Using the Debug DevPack with Code Composer Studio IDE

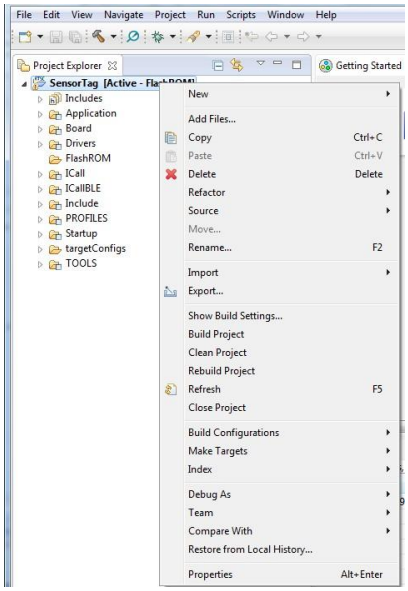
Download and Install Code Composer [Code Composer Studio (CCS) Integrated Development Environment (IDE) for Wireless Connectivity]. During installation make sure you include support for Simplelink Wireless MCU processor support and TI XDS Debug Probe support. Make sure you have the latest version of CCS installed, the Debug DevPack is supported in CCS v 6.1.0 and newer.



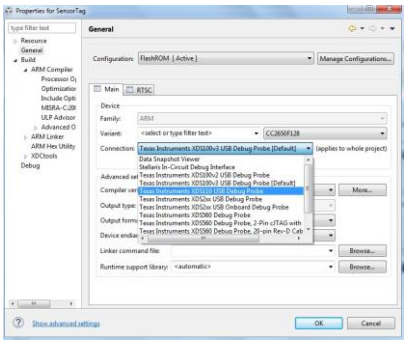
Next download and install the BLE-stack for the SensorTag. The stack can be downloaded from [[2]].

Open Code Composer Studio, choose **Import Project** and open the **SensorTag** project.

The project explorer will now have all the SensorTag project files listed on the left side of the screen. Right click on the SensorTag project(or press Alt+Enter)



From the **General - Main - Connection** pull-down menu - Select '**Texas Instruments XDS110 USB Debug Probe**'



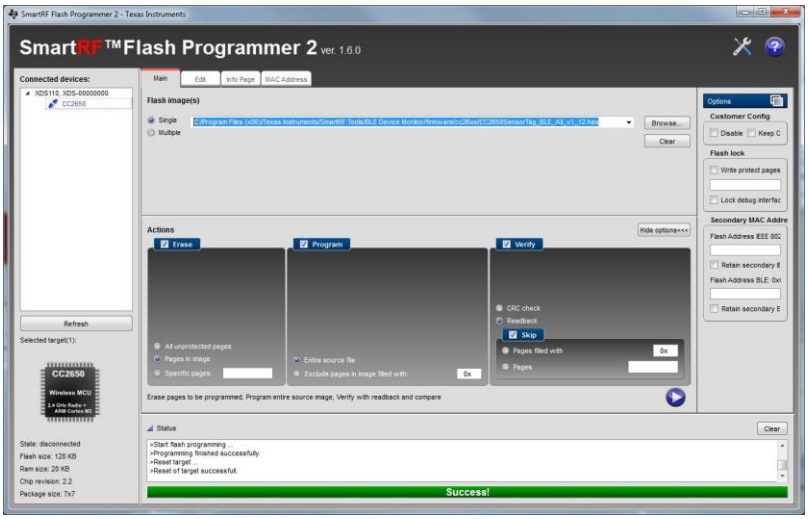
Using the Debug DevPack with the SmartRF Flash programmer 2

The SmartRF flash programmer 2 is the gives a quick and easy way to flash the SensorTag using the Debug DevPack. [Download the Flash Programmer 2]. Install it and connect the SensorTag with the Debug DevPack.

The XDS110 debugger with **CC2650** will be listed on **Connected Devices** on the left side of the screen.
'**Important: Click once on the CC2650 text in the Connected Devices list before proceeding**'

If you have installed the [BLE Device Monitor], the latest hex files for the SensorTag is located at the
C:/Program Files (x86)/Texas Instruments/SmartRF Tools/BLE Device Monitor/firmware/cc26xx/ folder.

From the '**Action**' settings, select to program '**Pages in image**' and press the blue/white arrow to start programming.



Tips and tricks

Connections

It is not recommended to use the Debug DevPack without the USB power atteched due to the risk of powering the Debugger from the coin cell battery on the SensorTag. The SensorTag battery voltage will be disconnected from the Debug DevPack power supply but there is a risk that the I/O lines from the CC2650 will power the MCU on the debugger. The following I/O DevPack signals are connected to the MCU on the DevPack

Pin number	Name
5	DP12/AUDIO_FS/TDO

10	DP5/UART_TX
12	DP4/UART_RX
15	DP8/SCLK/TDI

Device Firmware Upgrade

In some cases when the Debugger DevPack is powered on through USB, the XDS110 may enter Device Firmware Upgrade mode if the SensorTag is connected during power-up. The DevPack will then identify as a "TIVA Device Firmware Upgrade" rather than an XDS110. In that case, please unplug the DevPack from the SensorTag and from USB. Plug-in the USB connector, wait for the green LED to power on and then plug the DevPack into the SensorTag.

JTAG and SPI Flash

The CC2650 on the SensorTag uses the same I/O pin for SPI SCLK signal and JTAG TDI signal. The current firmware version of the XDS110 does not support the 2-pin c-JTAG standard, so it needs to use TDI and TDO in addition to TCK and TMS (full 4-pin JTAG). Due to this shared resource, it is not possible to access the external serial flash while debugging the SensorTag with the Debug DevPack. An alternative can be to use the XDS100v3 on the SmartRF06EB board for example. It supports c-JTAG.