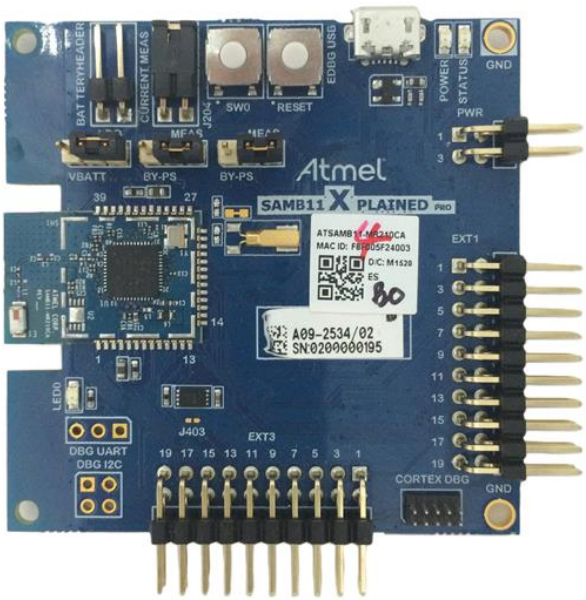
ATSAMB11 BluSDK SMART

Health Thermometer Profile - Getting Started Guide

USER GUIDE



Introduction

The Health Thermometer Profile is used to enable a data collection device to obtain data from a thermometer sensor that exposes the Health Thermometer Service.

The profile defines two roles:

- Thermometer:
  The Thermometer is the device that measures the temperature.
- Collector:
  The Collector is the device that receives the temperature measurement and other data from a thermometer.

Features

- Device Discovery and Disconnection
- Pairing/Bonding
- RSSI Sampling
- Health Thermometer Service
- Health Thermometer Profile iOS/Android Application

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1 Purpose

This getting started guide describes the setup of an Atmel® ATSAMB11 Xplained board and bringing up an example profile supplied as part of BluSDK SMART release. The Bluetooth® Health Thermometer Profile is an example profile application that is embedded as part of the software release package. The device advertises itself as a Health Thermometer. The ATSAMB11 Xplained board includes an on-board temperature sensor (accessible from the host MCU) for the purpose of sensing the ambient temperature.

2 Services and Characteristics

The thermometer implements the one and only one Health Thermometer Service in addition to the Device Information Service to display the information about the thermometer device.

The current thermometer profile implementation implements the following characteristics:

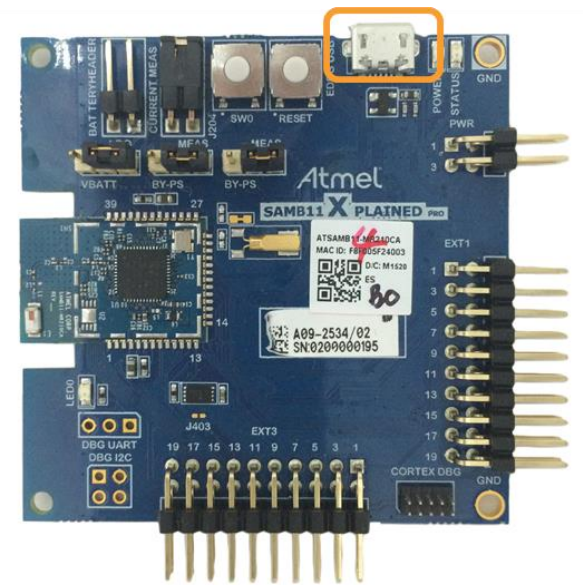
- Temperature Measurement
- Intermediate Temperature
- Measurement Interval

3 Demo Setup

4 Hardware Setup

Connect the ATSAMB11 board to the host PC using a Micro-USB cable.

Figure 4-1. EDBG USB Port



5 Temperature Measurement Location

Onboard the ATSAMB11, the user button is configured to change the temperature measurement location in the human body.

The Health Thermometer profile specifies the following locations at which temperature measurements can be read:

- Body (general)
- Ear (usually ear lobe)
- Finger
- Gastro-intestinal Tract
- Mouth
- Rectum
- Toe
- Tympanum (ear drum)

In order to simulate the change of temperature measurement location from the Thermometer Sensor device, the user button is preprogrammed; Every time the user button is pressed, the temperature location will be changed as per the above list.

This can clearly be observed on a Health Thermometer Collector (Mobile Application).

6 Temperature Type

One more parameter that needs to be simulated is the temperature measurement type which contains two units of measurement; Centigrade and Fahrenheit.

To simulate this change on the peripheral side, as there is only one user button available on board which had already been used for changing the temperature location, the trigger that is used for this is to run through all the locations once. Then the application shall toggle the temperature type.

7 Software Setup

7.1 Installation Steps

1. Install the latest Atmel Studio **[Atmel Studio 7.0 (build 629 or later) web installer (recommended)]**
   http://www.atmel.com/tools/ATMELSTUDIO.aspx.
2. Install the latest Atmel Software Framework.

This package will install the following examples within the Atmel Studio environment:

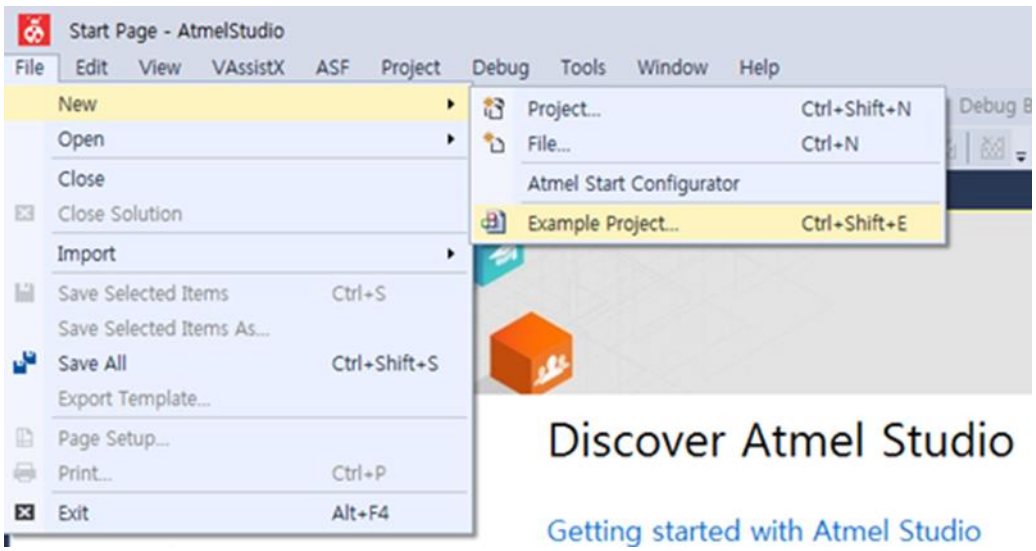
- Health Thermometer Application for ATSAMB11

7.2 Build Procedure

The following procedure is explained for ATSAMB11 application example.

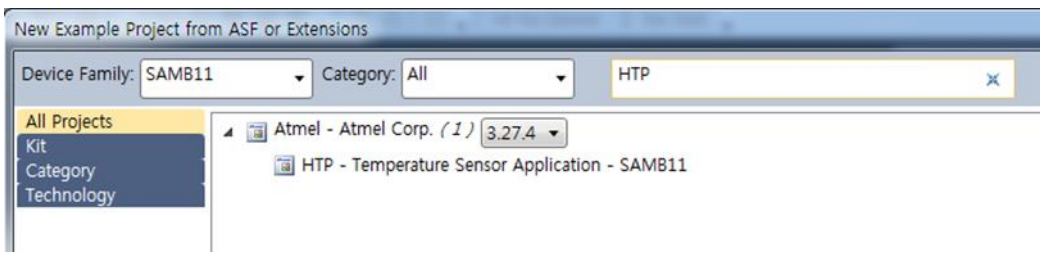
1. Select New Example Project.

Figure 7-1. Creating a New Example Project



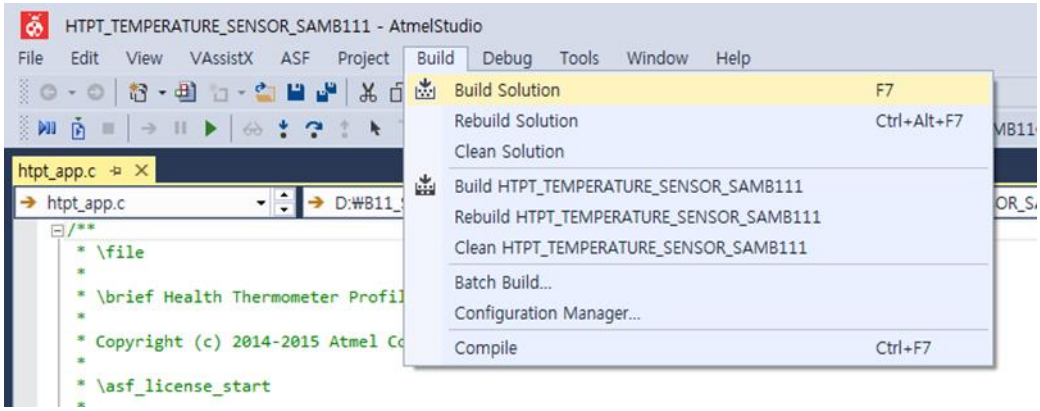
2. Select “SAMB11” in device family, enter “HTP” in the search window, and expand Atmel Corp Projects. The location and the name of the project can be selected in the respective fields. Click OK.

Figure 7-2. Selecting Scan Parameter Service Application from Example Projects



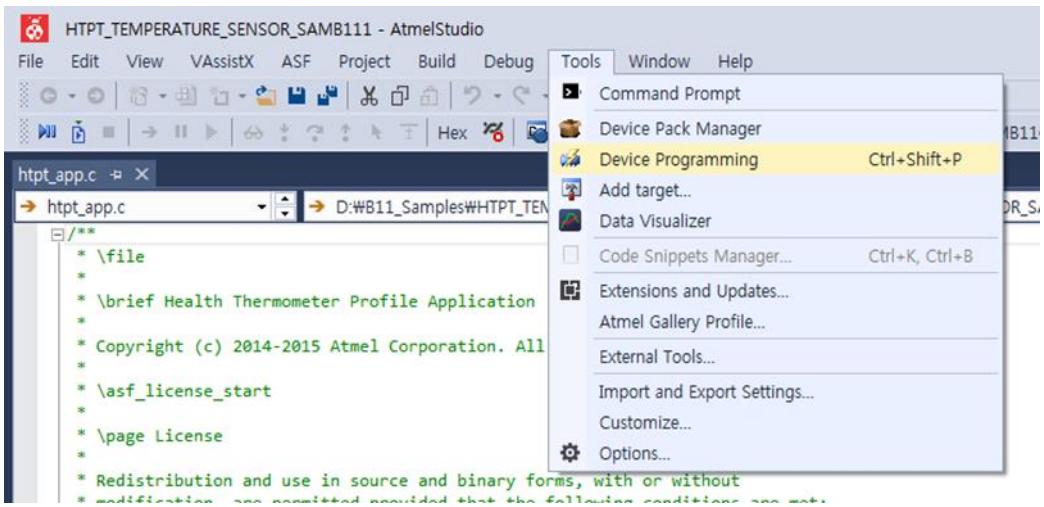
3. Accept the license Agreement. The studio will generate the Health Thermometer Profile project for ATSAMB11.
4. Build the solution.

Figure 7-3. Building the HTPT Temperature Sensor Application



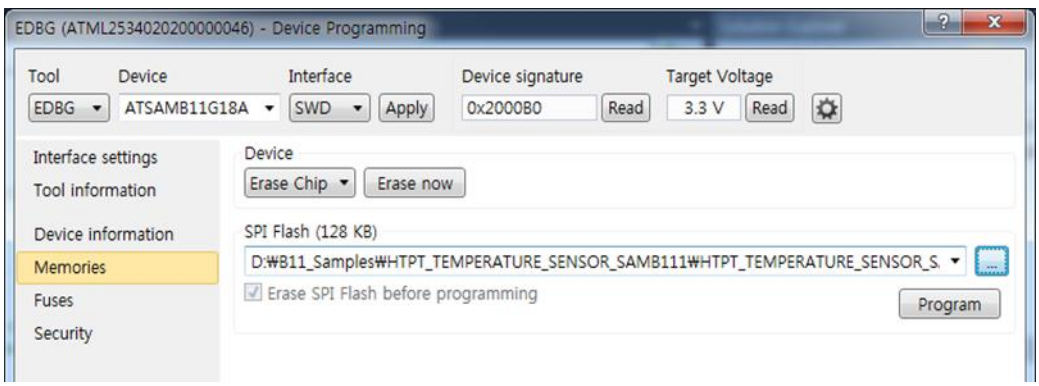
5. Download the application via the USB to the ATSAMB11 board.

Figure 7-4. Flashing the Application on Atmel MCU



6. Inside the device programming the user has to select the correct configuration for the device and finally program the device by using the program button.

Figure 7-5. Flash Programming



7. Once the application is flashed, it is ready to be simulated as Health Thermometer Device.

8 Console Logging

For the purpose of debugging, a logging interface has been implemented in the Health Thermometer Application.

The logging interface utilizes the same EDBG port that connects to ATSAMB11. A serial port monitor application (for example TeraTerm) shall be opened and attached to the EDBG COM port.

9 Running the Demo

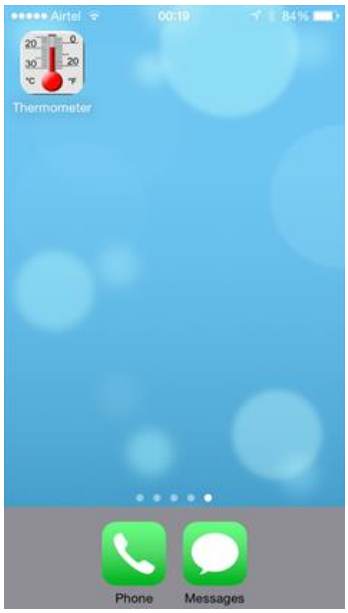
1. Power on the ATSAMB11 by connecting the USB cable.
2. Open the console using TeraTerm or any serial port monitor application and connect to the corresponding COM port of “EDBG”. Serial port settings: Baudrate 115200, None Parity, one Stop bit, one Start bit, no Hardware Handshake.
3. Press the Reset button on the ATSAMB11 board.
4. The board should be in advertising mode. Ensure that the console log looks as shown below.

Figure 9-1. Console Log for Advertising Mode

```
App_entry ====================
AT_BLE_HTPT_CREATE_DB_CFM / 0
Please fine ATMEL-B11-HTP device
```

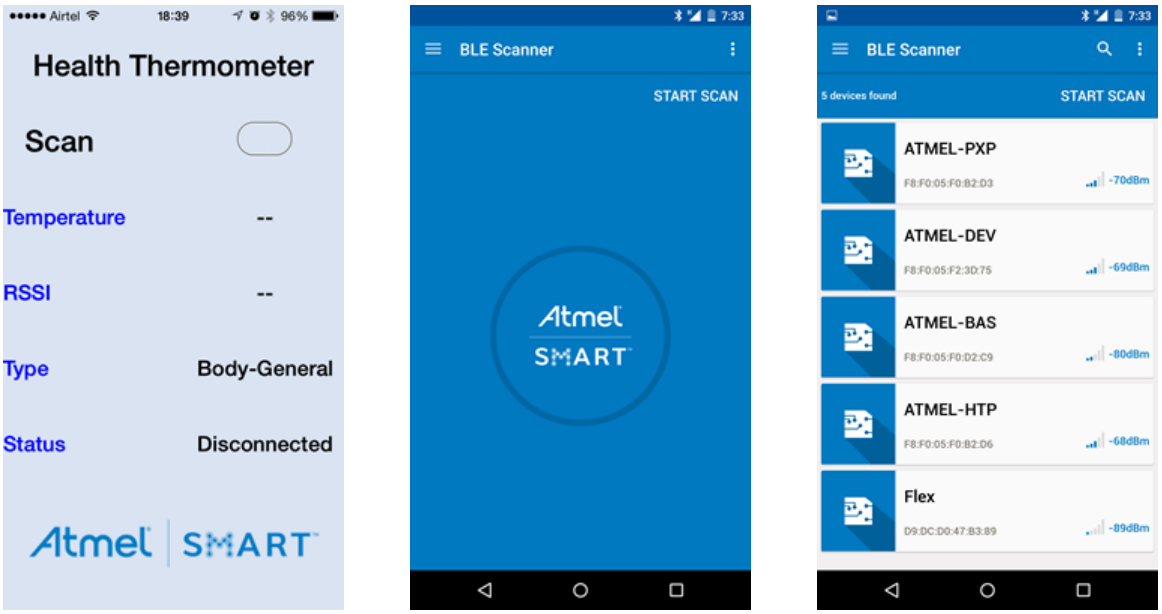
5. Start the Thermometer application on the iPhone/Android.

Figure 9-2. iOS(left)/Android(right) Thermometer Profile App Launch Screen



6. Enable the scan option through the sliding switch. The application is implemented in such a way that it filters out all the other UUID’s and connects to only those peripherals that advertise with Health Thermometer UUID (0x1809).

Figure 9-3. iOS(Left-1-image)/Android(Right-2-images) App Health Thermometer Initial Screen



7. The temperature value, RSSI, and the device name are all displayed on the Mobile App. Console log will be as shown below.

Figure 9-4. iOS(Left)/Android(Right-2-images) App Health Thermometer Connected Screen

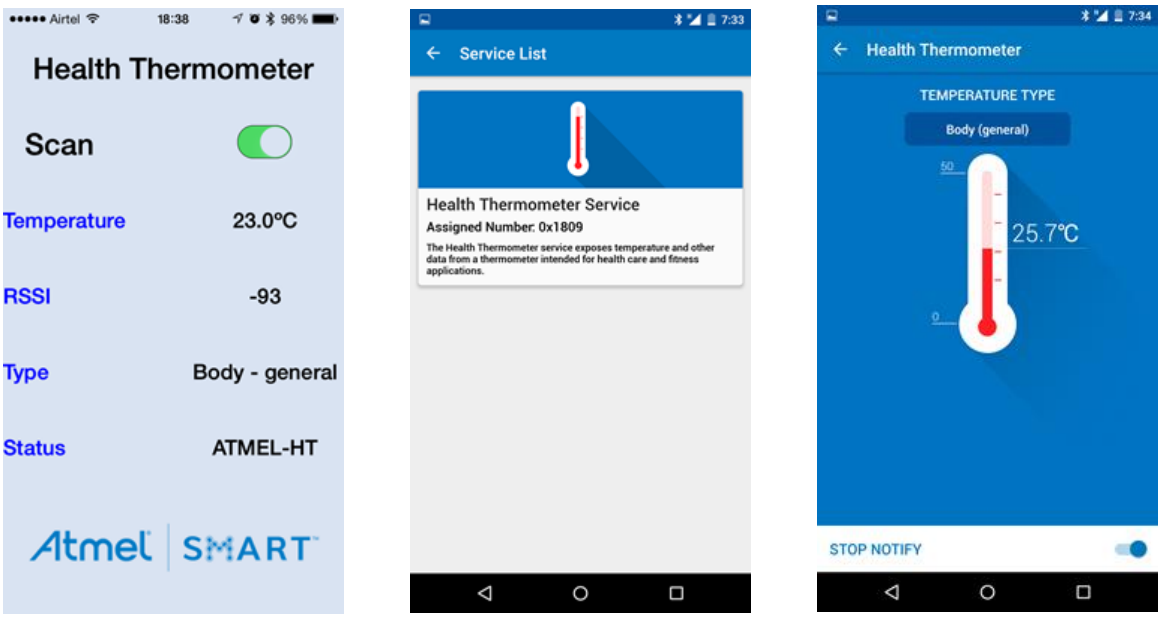
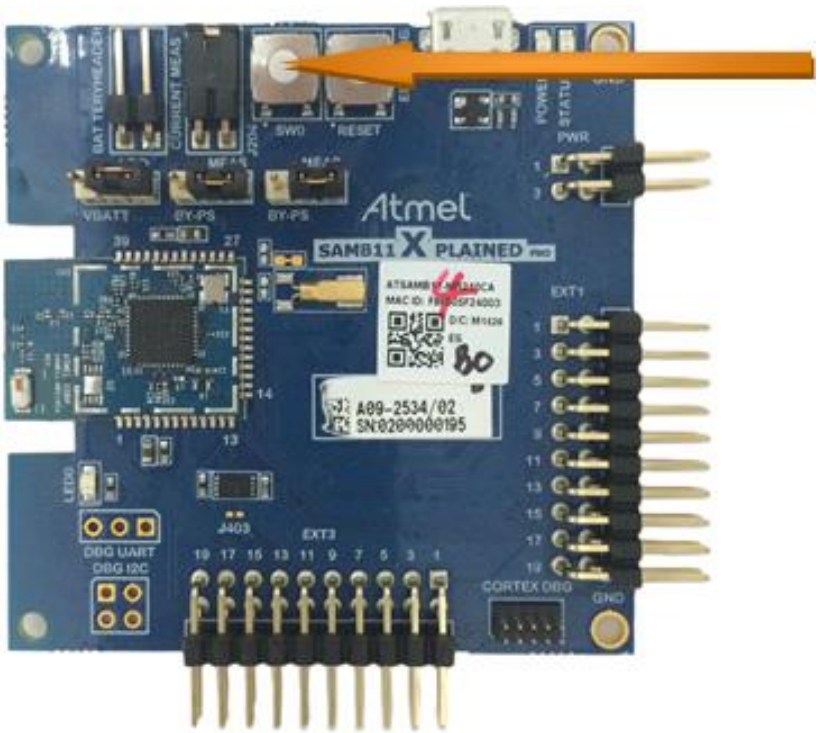


Figure 9-5. Console Log for Connected State

```
app_entry ======================
AT_BLE_HTPT_CREATE_DB_CFM / 0
Please find ATMEL-B11-HTP device
AT_BLE_CONNECTED / 2, 0x43, 0x15, 0xdb, 0x9c, 0xd0, 0x53, 0, 0
AT_BLE_PAIR_REQUEST /
AT_BLE_PAIR_DONE /
AT_BLE_HTPT_CFG_INDNTF_IND / 0, 2, 0
AT_BLE_HTPT_CFG_INDNTF_IND / measurement_interval 5
AT_BLE_HTPT_CFG_INDNTF_IND / 0, 1, 2
htpt_temperature_send / at_ble_htpt_temp_send / 28.062500
HTPT_TEMP_SEND_CFM / 0, 0, cfm_type 1
htpt_temperature_send / at_ble_htpt_temp_send / 28.062500
HTPT_TEMP_SEND_CFM / 0, 0, cfm_type 1
```

8. To change the body measurement location, press the user button on the ATSAMB11. The new value should be updated in the application.

Figure 9-6. The User Button

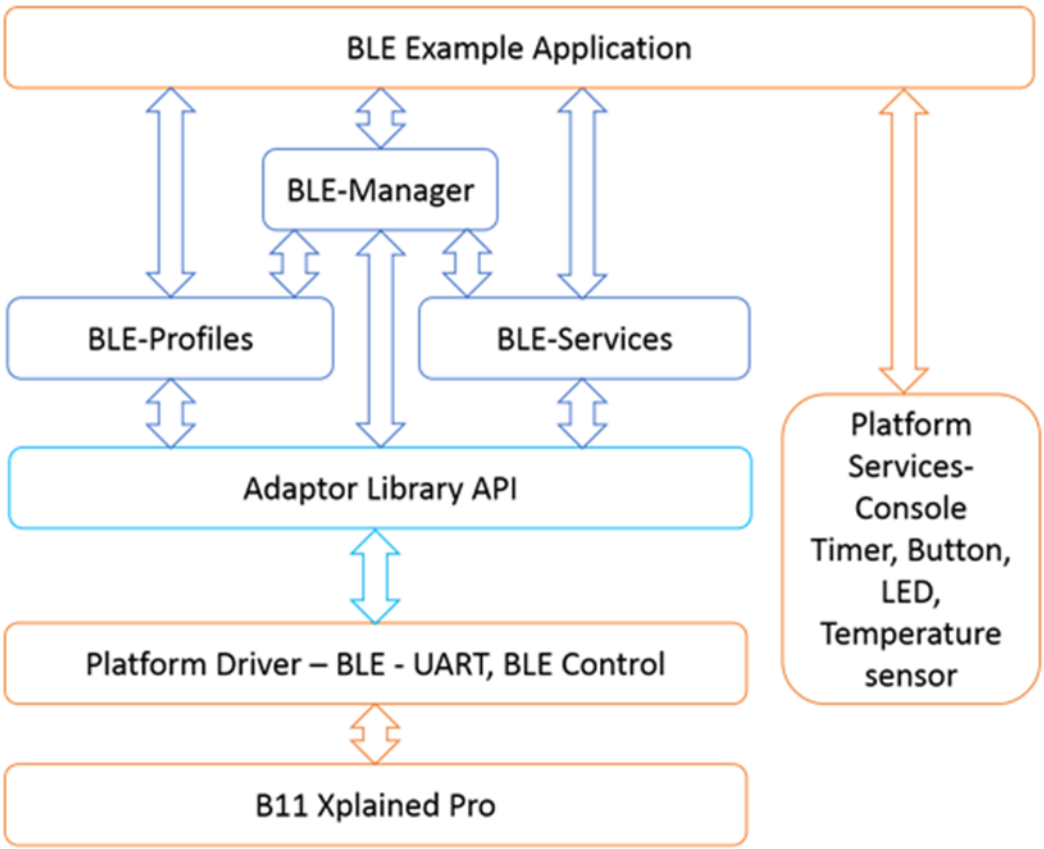


9. In the iOS app, pull the slider to disconnect the device with mobile application. On the Atmel SmartBLU Android application, going back to the scanning screen will disconnect the device with mobile application.

10 BluSDK SMART Software Architecture

Figure 10-1 illustrates the top level diagram for the ATSAMB11 configuration.

Figure 10-1. ATSAMB11 Software Architecture



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42601A	11/2015	Initial document release.

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