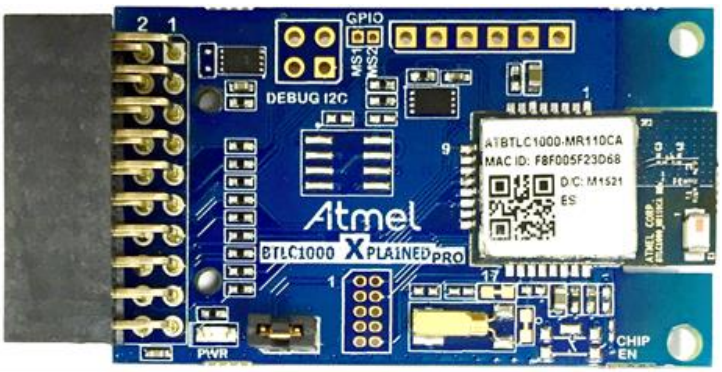
ATBTLC1000 BluSDK

Battery Service Application - Getting Started Guide

USER GUIDE



Introduction

This guide describes the setup of the Atmel® ATBTLC1000 to be used in conjunction with supported platforms (see Table 1-1). The Battery Service application is an example application that is embedded as part of the software release package. This documents explains the bring-up of the Battery Service example application.

The Battery service application provides the capability to report battery level of the device using the battery characteristics. Any application discovering the database can access the Battery service instance during discovery services.

This document explains the details about:

1. Getting started with the setting up the ATBTLC1000 Xplained Pro board using supported platforms (see Table 1-1).
2. To get the battery service example application working, connect the ATBTLC1000 Xplained Pro board to supported platforms (see Table 1-1).

For the purpose of demonstration, the example simulates battery level of the device. The battery level is changed by 1% every second. The range of battery level is from 0% to 100%. At the start of the demo, the battery level is 0%.

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1 Supported Hardware Platforms and IDEs

Table 1-1. BluSDK – Supported Hardware and IDEs

Platform	MCU	Supported BLE device	Supported evaluation kits	Supported IDEs
SAM L21 (MCU)	ATSAML21J18B	ATBTLC1000	ATBTLC1000-XSTK (ATSAML21-XPRO-B + ATBTLC1000 XPRO)	Atmel Studio v6.2
SAM L21 (MCU)	ATSAML21J18A	ATBTLC1000	ATSAML21 XPRO + ATBTLC1000 XPRO	Atmel Studio v6.2
SAM D21 (MCU)	ATSAMD21J18A	ATBTLC1000	ATSAMD21-XPRO + ATBTLC1000 XPRO	Atmel Studio v6.2
SAM G55 (MCU)	ATSAMG55J19	ATBTLC1000	ATSAMG55-XPRO + ATBTLC1000 XPRO	Atmel Studio v6.2

2 Demo Setup

3 Hardware Setup

3.1 SAM L21 Xplained Pro Battery Service Setup

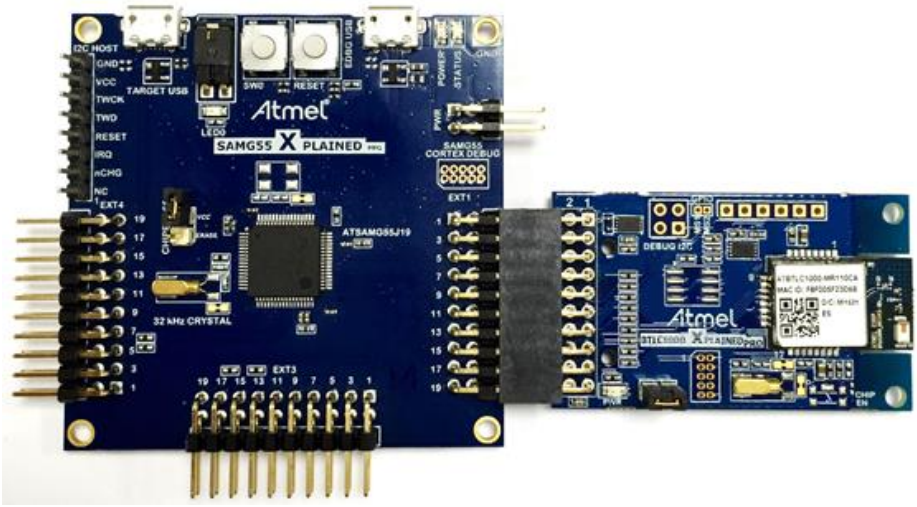
Figure 3-1. ATBTLC1000 Xplained Pro Extension connected to a SAM L21 Xplained Pro

3.2 SAM D21 Xplained Pro Battery Service Setup

Figure 3-2. ATBTLC1000 Xplained Pro Extension connected to a SAM D21 Xplained Pro

3.3 SAM G55 Xplained Pro Battery Service Setup

Figure 3-3. ATBTLC1000 Xplained Pro Extension connected to a SAM G55 Xplained Pro



4 Software Setup

4.1 Installation Steps

1. Atmel Studio installation [**Atmel Studio 6.2 sp2 (build 1563) Installer – with .NET**] http://www.atmel.com/tools/atmelstudio.aspx.
   (Note: SAM D21/SAM L21 Rev A part pack is built-in as part of Atmel Studio 6.2 sp2.)
2. Part Packs.
   a. Install SAML21 Rev B Part Pack http://www.atmel.com/images/ATSAML21revB-6.2.6.zip
      (Note: Atmel BTLC1000 X-STK ships with SAML21 XPRO-B and requires this installer)
   b. Install SAMG55 Part pack http://www.atmel.com/images/as-partpack-ATSAMG55-6.2.13.zip.
      (Note: This installer is needed only if the bring-up is being done on the SAM G55 platform)
3. Atmel USB Driver Installer from http://www.atmel.com/tools/atmelstudio.aspx.
4. Install the standalone ASF package from http://www.atmel.com/tools/AVRSOFTWAREFRAMEWORK.aspx .

Note: Refer to the BluSDK release notes for updates to version numbers of the components mentioned above.

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

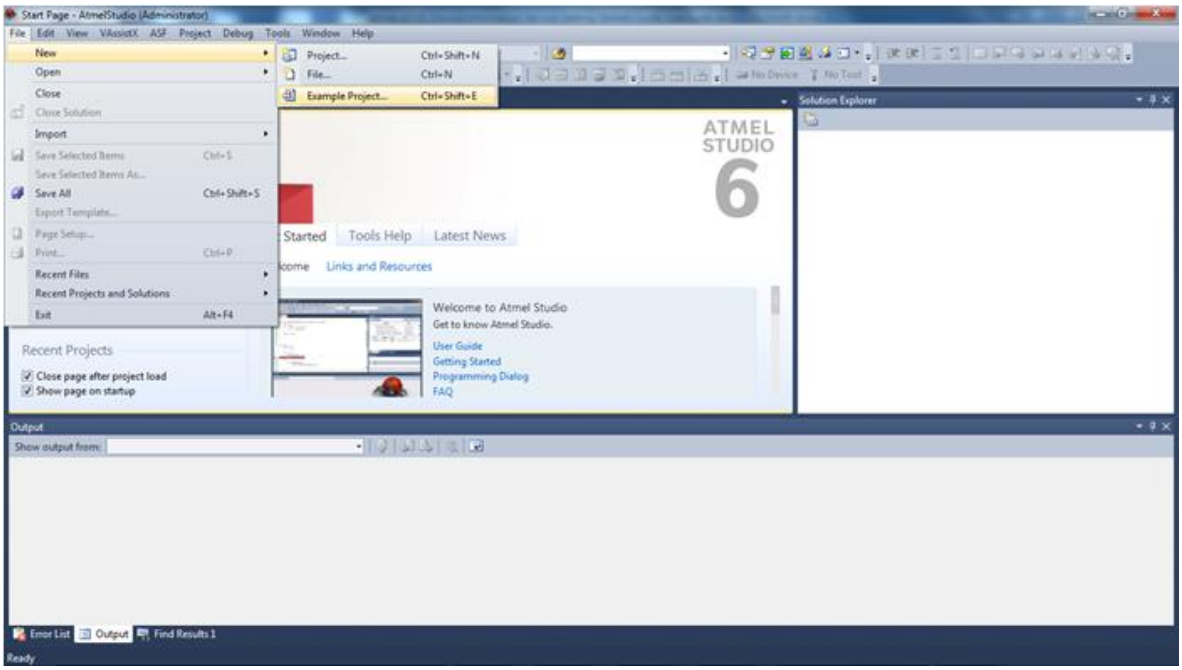
1. Battery Service Application for SAM L21.
2. Battery Service Application for SAM D21.
3. Battery Service Application for SAM G55.

4.2 Build Procedure

The following procedure is explained for SAM L21 application example. The same procedure is valid for the case other supported platforms (see Table 1-1) as well.

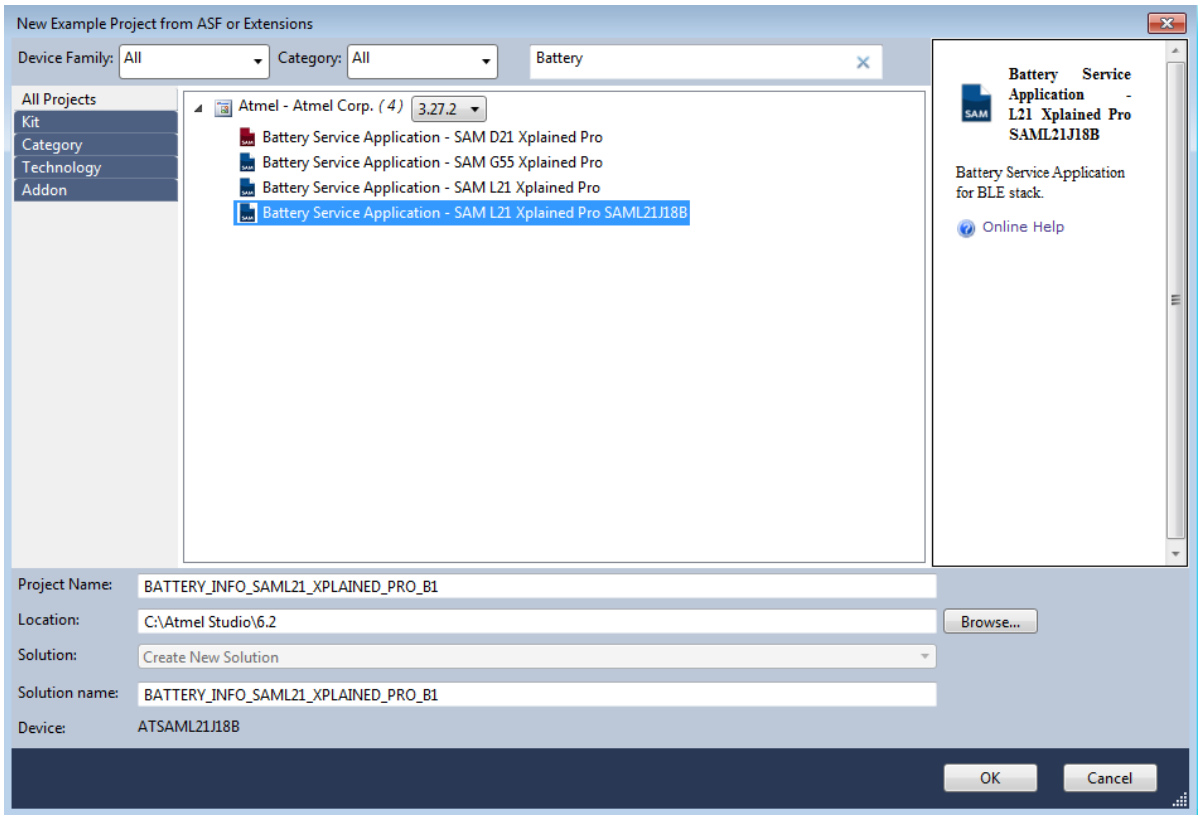
1. Select New Example Project.

Figure 4-1. Creating a New Project



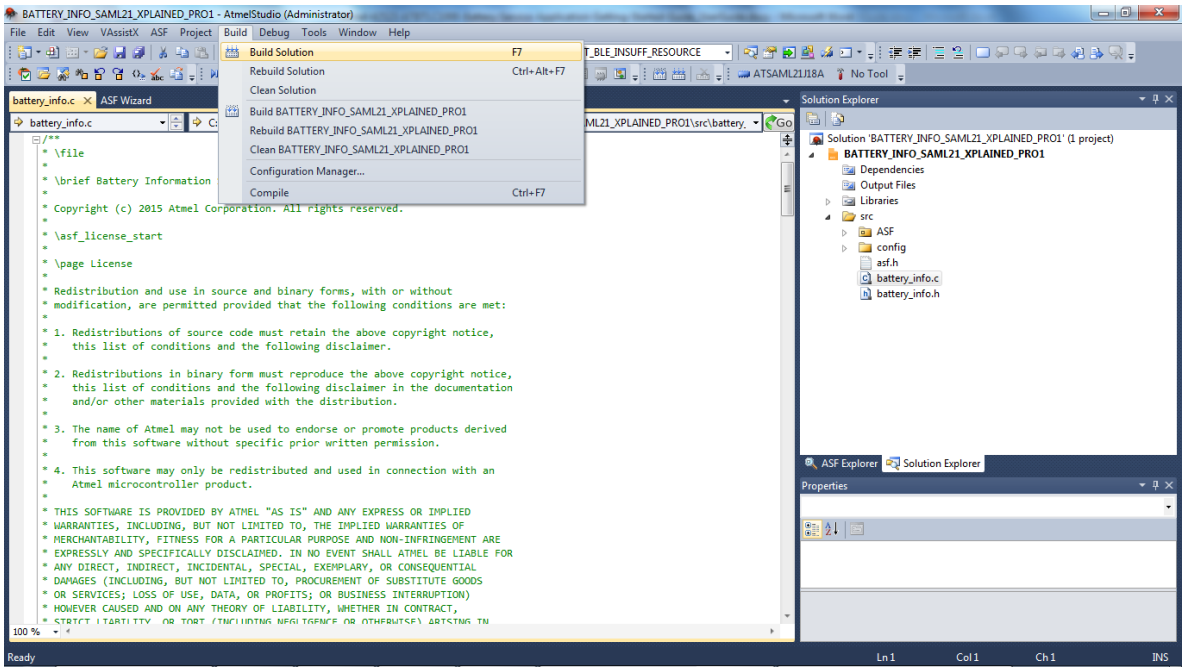
2. In the search box, enter “battery” in the search window and expand Atmel Corp Projects. The location and the name of the project can be selected in the respective fields. Click **OK**.

Figure 4-2. Searching for Battery Service Application Example



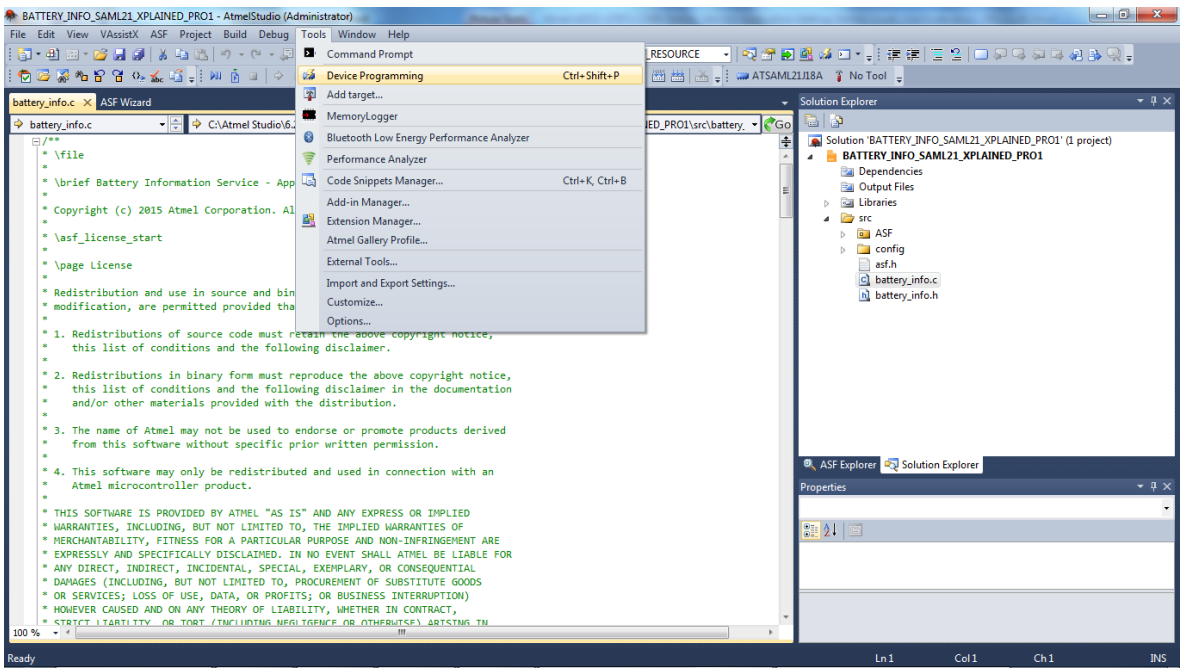
3. Accept the license Agreement. The Atmel Studio will generate the Battery Service Example project for SAM L21.
4. Build the solution by selecting menu option as shown below.

Figure 4-3. Building Battery Service Application



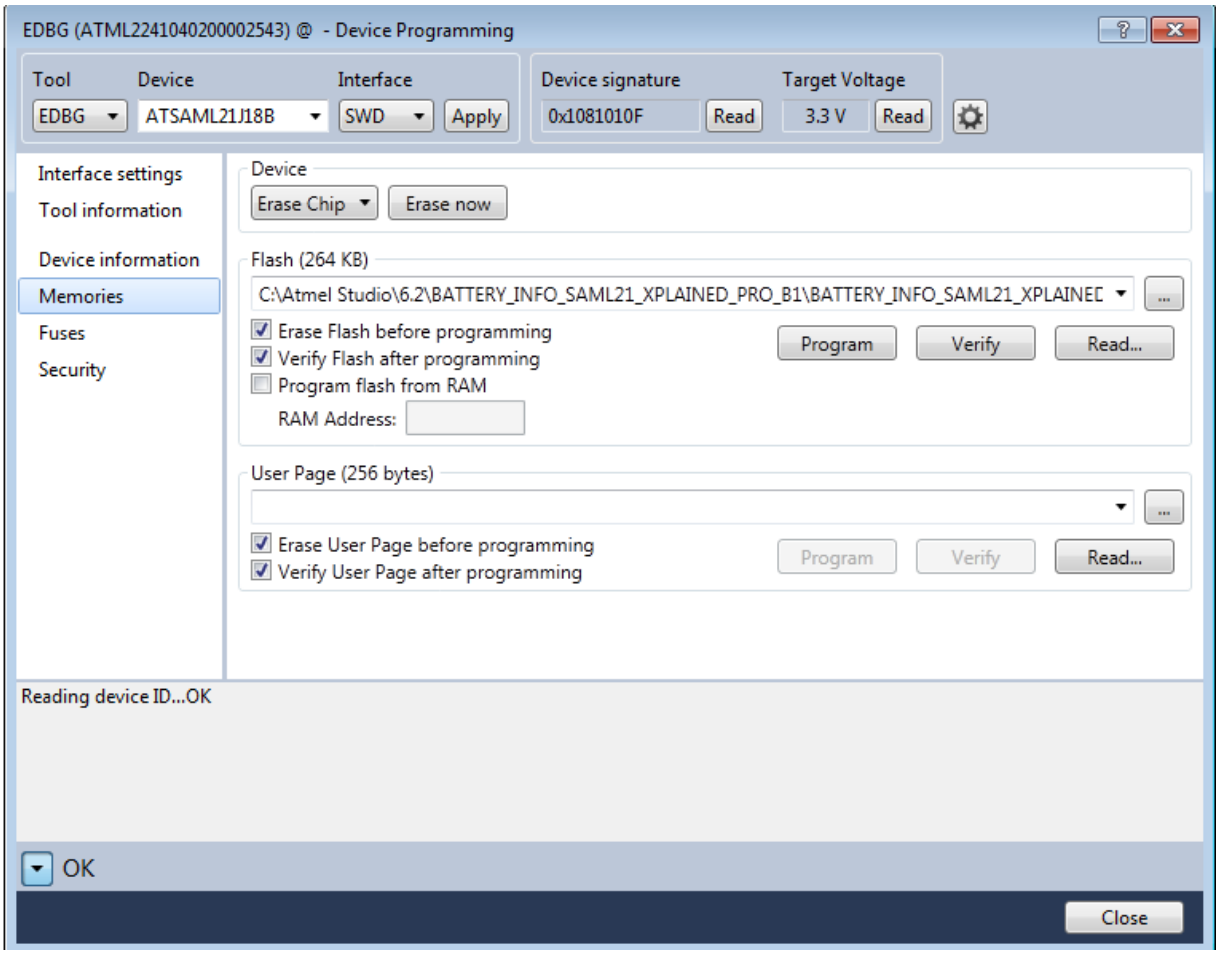
5. Download the application via the DEBUG-USB to the SAM L21 board using Device Programming option available in Tools as mentioned below.

Figure 4-4. Selecting Device Programming



6. Inside device programming the user has to select the correct configuration for the device and finally program the device by clicking the “Program” button.

Figure 4-5. Flash Programming

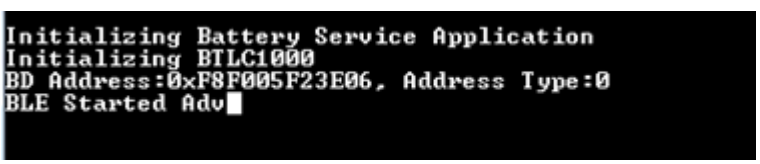


7. Once the application is flashed, it is ready to be used as a BLE device supporting Battery Service.

5 Running the Demo

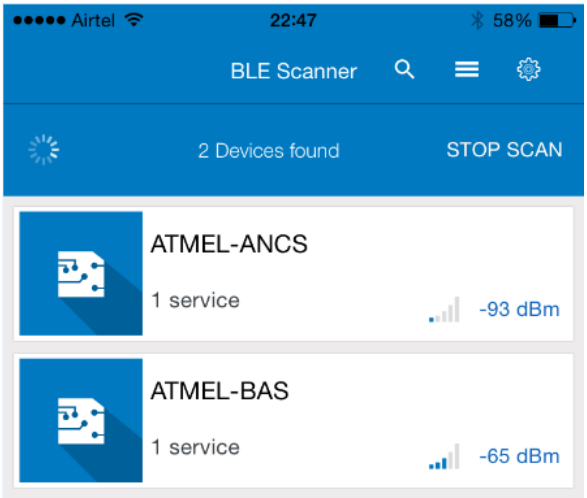
1. Connect the ATBTLC1000 Xplained Pro Board to SAM L21 Xplained Pro EXT2 as indicated in Figure 3-2.
2. Power on the SAM L21 by connecting the USB Cable.
3. Open any Terminal Application (e.g. TeraTerm) Select the COM Port with the following settings: Baudrate 115200, Parity None, 1 Stop bit, 1 Start bit, No Hardware Handshake.
4. Press the Reset button on the SAM L21 board or supported platforms (see Table 1-1).
5. The device is now in advertising mode.

Figure 5-1. Console Display for Device in Advertising Mode



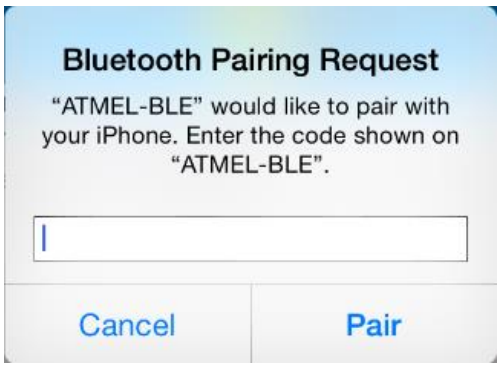
6. Enable Bluetooth® from the Settings page on a BLE compatible Android device or iPhone®. Use the Atmel Smart Connect application to scan for peripheral devices. A device with the name 'ATMEL-BAS' will appear in the list of scanned devices.

Figure 5-2. Atmel-BLE Device Discovered by Atmel Smart Connect Application



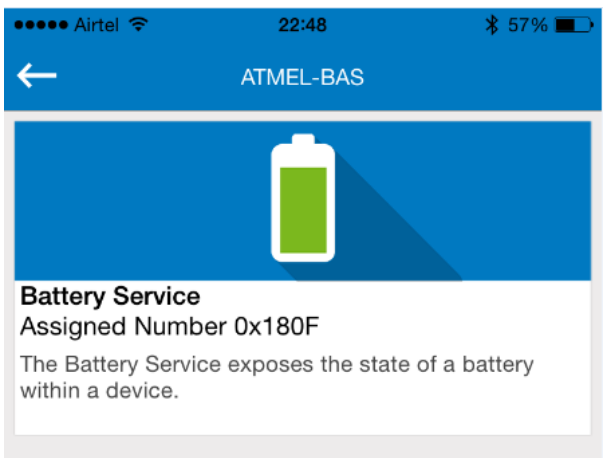
7. Click on the “ATMEL-BAS” device. A pop-up will appear requesting pass-key. Enter “123456” and click on ‘Pair’.

Figure 5-3. Pairing Pop-up Screen



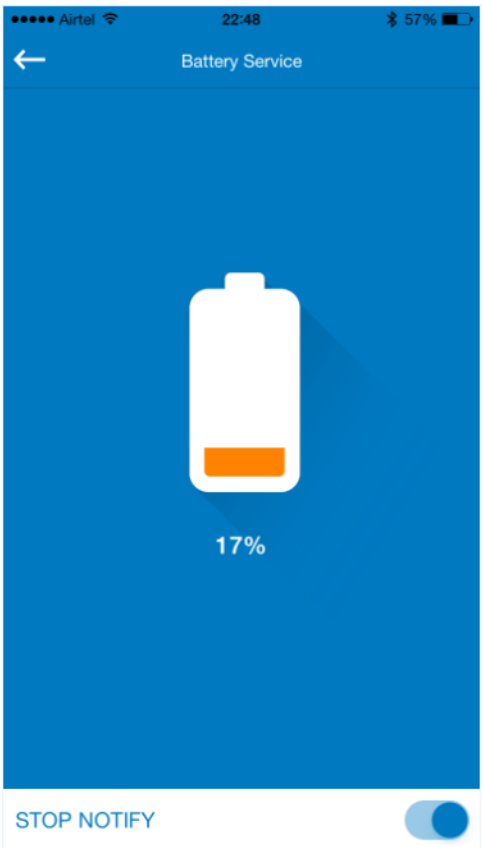
8. Once paired, the application displays the battery service as shown in Figure 5-4.

Figure 5-4. Display of Battery Service



9. Once the “Battery Service” is clicked user gets notifications for battery level characteristic. User can stop receiving the notifications by disabling notifications as shown in Figure 5-5.

Figure 5-5. Battery Level Characteristic Notification Options



6 Console Logging

For the purpose of debugging, a logging interface had been implemented in the Battery Service application.

The logging interface utilizes the same EDBG port that connects to supported platforms (see Table 1-1). A serial port monitor application (e.g. TeraTerm) shall be opened and attached to the EDBG COM port.

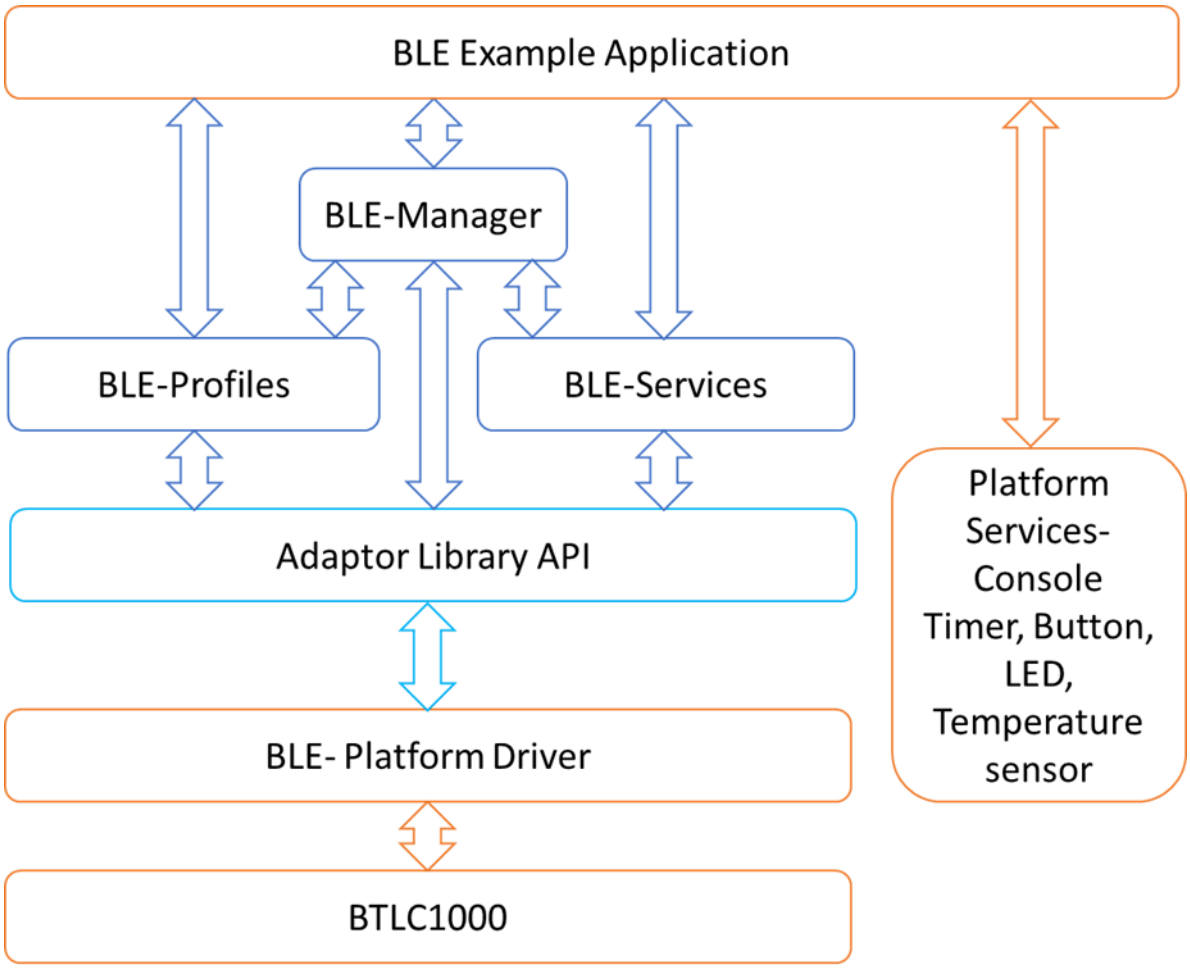
Figure 6-1 shows the information about BLE initialization and the periodic battery level updates.

Figure 6-1. Battery Service Application Console

7 BluSDK Software Architecture

Figure 7-1 illustrates the various layers in the BLU-SDK Architecture. The external host can be supported platforms (see Table 1-1).

Figure 7-1. BluSDK Software Architecture

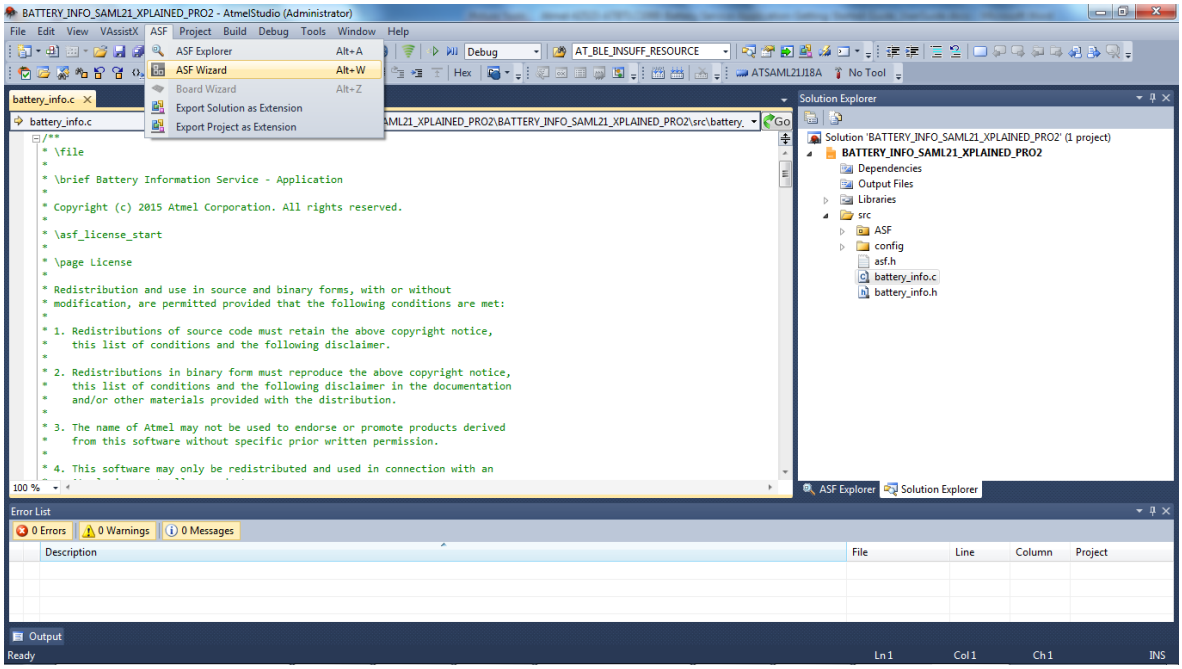


8 Adding a BLE Standard Service

The user can add another service such as “Device Information Service’ to the application by using the ASF wizard as mentioned below:

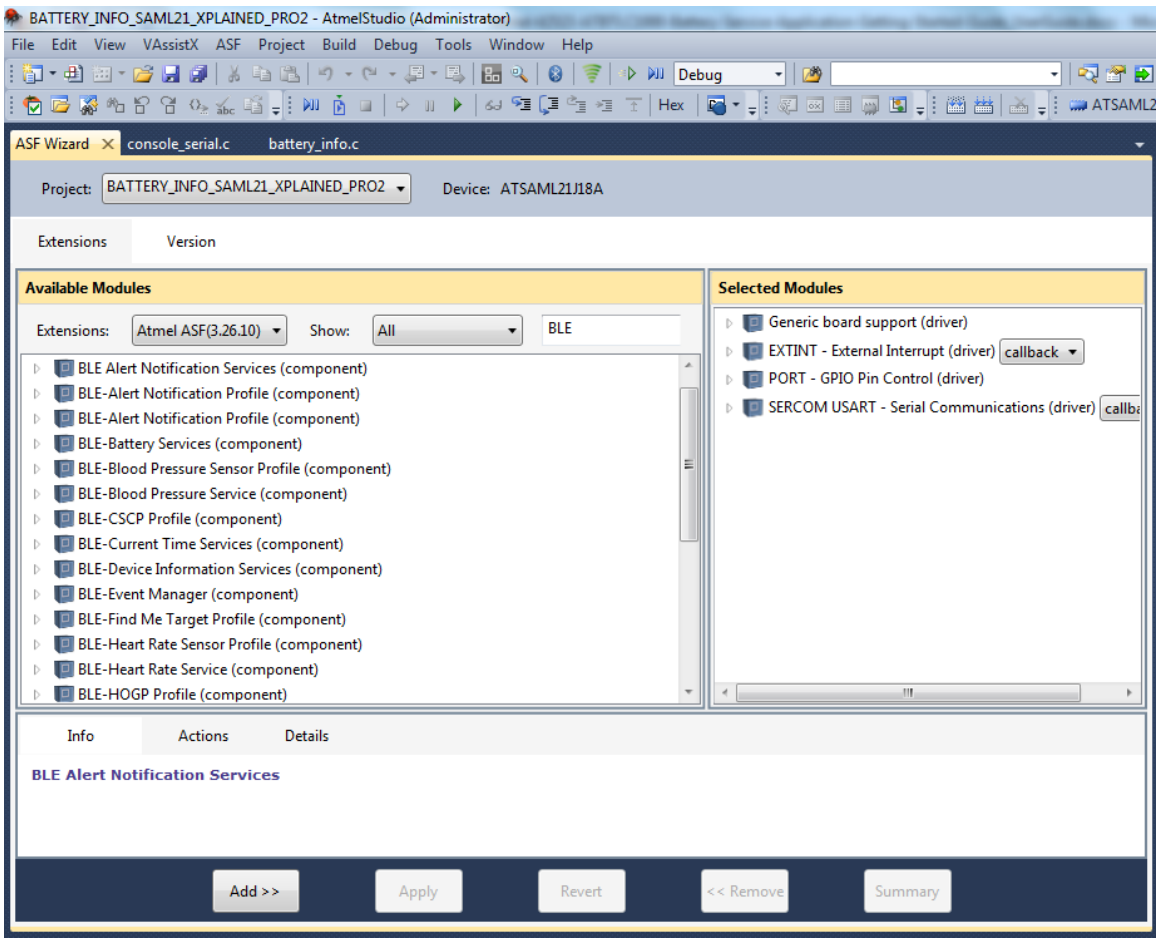
1. Select ASF → ASF Wizard as shown in Figure 8-1.

Figure 8-1. Invoking ASF Wizard



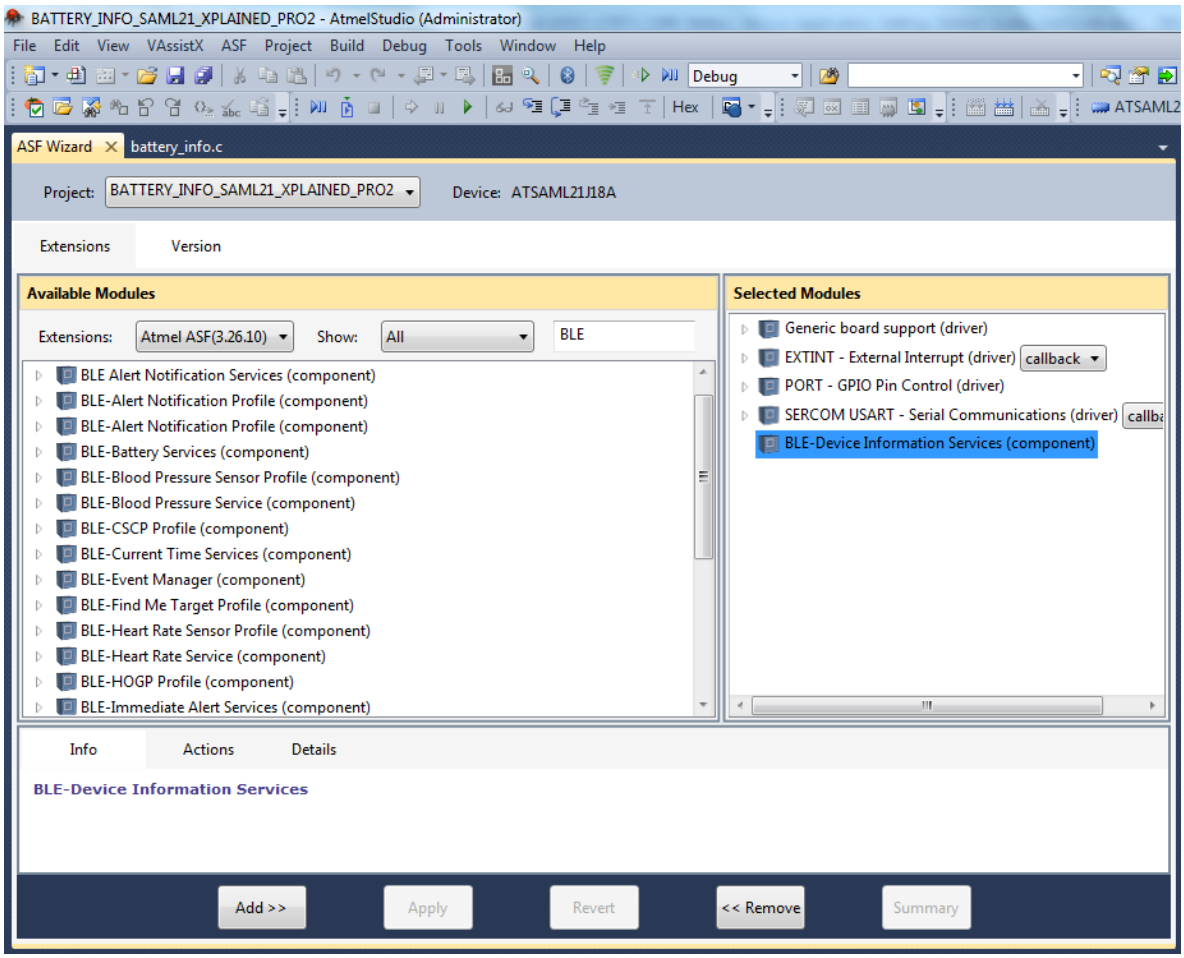
2. In the ASF Wizard, enter the “BLE” text in the search area as shown in Figure 8-2.

Figure 8-2. Showing ASF BLE Services and Components



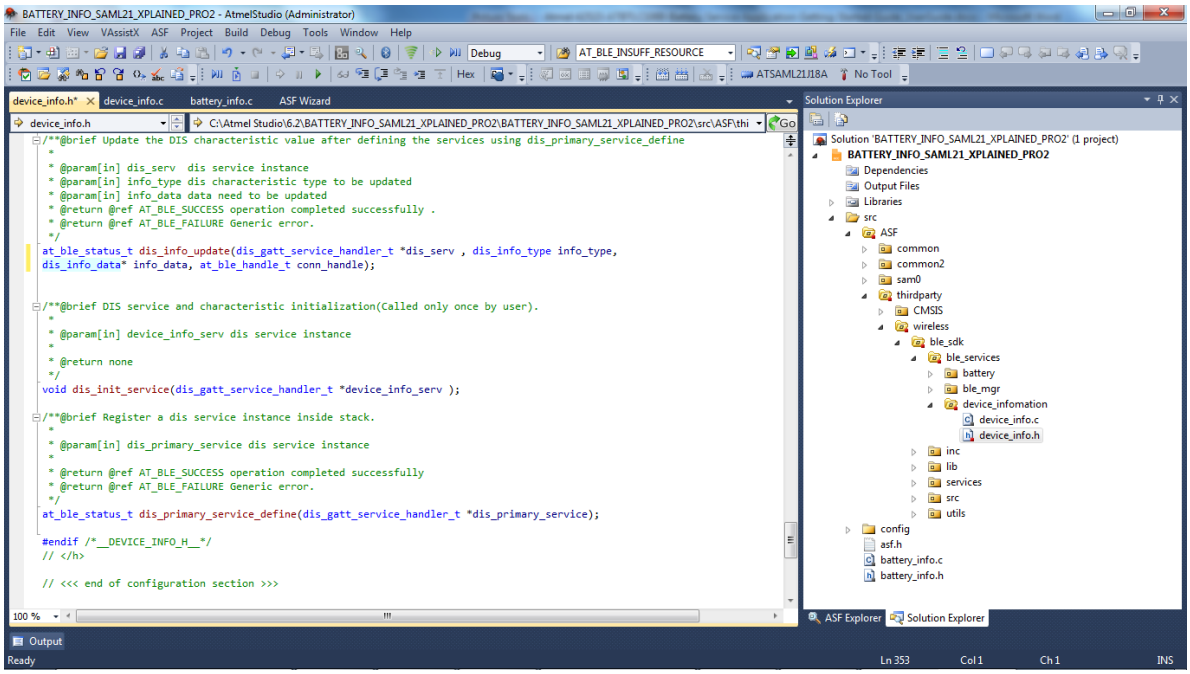
3. Select the required BLE Services/Profiles Component as shown in Figure 8-3 (e.g. Device Information Services), press the “Add >>” button, and then press the “Apply” button and press “OK”.

Figure 8-3. Selecting BLE-Device Information Service ASF Component



4. Added New BLE Service component will be shown as under src\thirdparty\wireless\ble_sdk\ble_services\device_information as shown in Figure 8-4.

Figure 8-4. Viewing Newly Added ASF BLE-Service Component



5. Use the APIs which is mentioned as included in. Device Information Service (device_info.h) for incorporating this functionality if required in the application.

```
/**@brief Update the DIS characteristic value after defining the services using dis_primary_service_define
 *
 * @param[in] dis_serv  dis service instance
 * @param[in] info_type dis characteristic type to be updated
 * @param[in] info_data data need to be updated
 * @return @ref AT_BLE_SUCCESS operation completed successfully.
 * @return @ref AT_BLE_FAILURE Generic error.
 */
at_ble_status_t dis_info_update(dis_gatt_service_handler_t *dis_serv , dis_info_type info_type,
dis_info_data* info_data, at_ble_handle_t conn_handle);


/**@brief DIS service and characteristic initialization (Called only once by user).
 *
 * @param[in] device_info_serv dis service instance
 *
 * @return none
 */
void dis_init_service(dis_gatt_service_handler_t *device_info_serv );

/**@brief Register a dis service instance inside stack.
 *
 * @param[in] dis_primary_service dis service instance
 *
 * @return @ref AT_BLE_SUCCESS operation completed successfully
 * @return @ref AT_BLE_FAILURE Generic error.
 */
at_ble_status_t dis_primary_service_define(dis_gatt_service_handler_t *dis_primary_service);
```

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10 Revision History

Doc Rev.	Date	Comments
42523A	08/2015	Initial document release.

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