ATBTLC1000 BluSDK

iBeacon – Getting Started Guide

USER GUIDE

Introduction

This Beacon guide describes the setup of Atmel® ATBTLC1000 to be used in conjunction with either an Atmel SAM L21 or other Atmel supported platform. The document also explains bringing up an example profile supplied as part of BluSDK release. The Bluetooth iBeacon Profile is an example profile application that is embedded as part of the software release package.

Features

- Device Discovery
- RSSI Sampling
- Beacon Advertising
- iBeacon Demo App for iOS/Android

Table of Contents

1 Description

The Beacon Application advertises iBeacon specific packets that includes UUID, Major and Minor numbers. Any beacon scanner application should be able to find the beacon device. The supplied iOS demo app can be used to find the beacon devices in the vicinity.

The profile defines two roles:

- Monitor: The iOS/Android device that searches for beacon packets.
- Reporter: This device that continuously advertises the beacon packet as part of advertisement data.

This document explains the details about:

1. Getting started with the setting up the ATBTLC1000 Wing board using supported platform (see Chapter 3).
2. Getting the Beacon Profile Application working on the above mentioned setup.

2 Demo Setup

3 Supported Hardware Platforms and IDEs

Table 3-1. 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 v7.0
SAM L21 (MCU)	ATSAML21J18A	ATBTLC1000	ATSAML21 XPRO + ATBTLC1000 XPRO	Atmel Studio v7.0
SAM D21 (MCU)	ATSAMD21J18A	ATBTLC1000	ATSAMD21-XPRO + ATBTLC1000 XPRO	Atmel Studio v7.0
SAM G55 (MCU)	ATSAMG55J19	ATBTLC1000	ATSAMG55-XPRO + ATBTLC1000 XPRO	Atmel Studio v7.0
SAM 4S (MCU)	ATSAM4SD32C	ATBTLC1000	ATSAM4S-XPRO + ATBTLC1000 XPRO	Atmel Studio v7.0

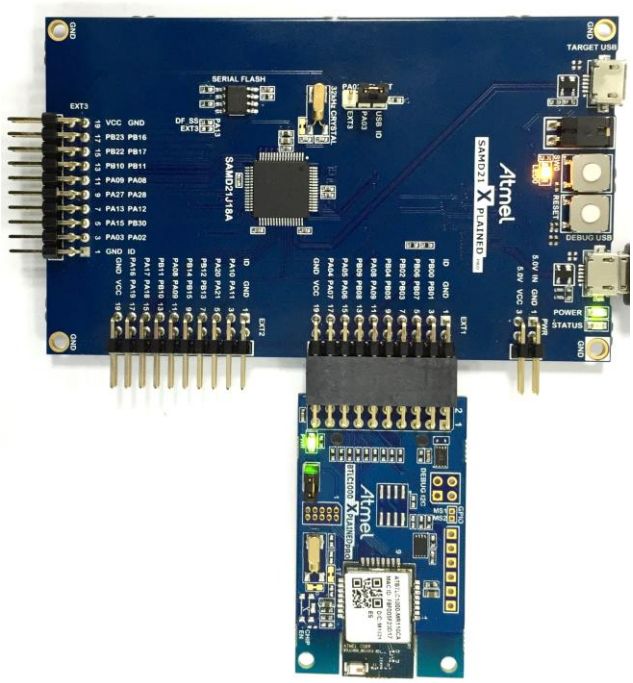
4 Hardware Setup

4.1 SAM L21 Xplained Pro Beacon Setup

Figure 4-1. ATBTLC1000 Xplained Pro Extension Connected to a SAM L21 Xplained Pro

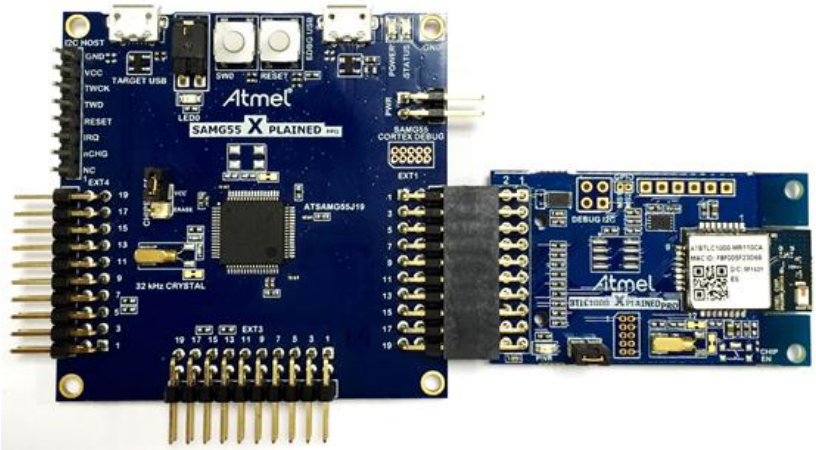
4.2 SAM D21 Xplained Pro Beacon Setup

Figure 4-2. ATBTLC1000 Xplained Pro Extension Connected to a SAM D21 Xplained Pro



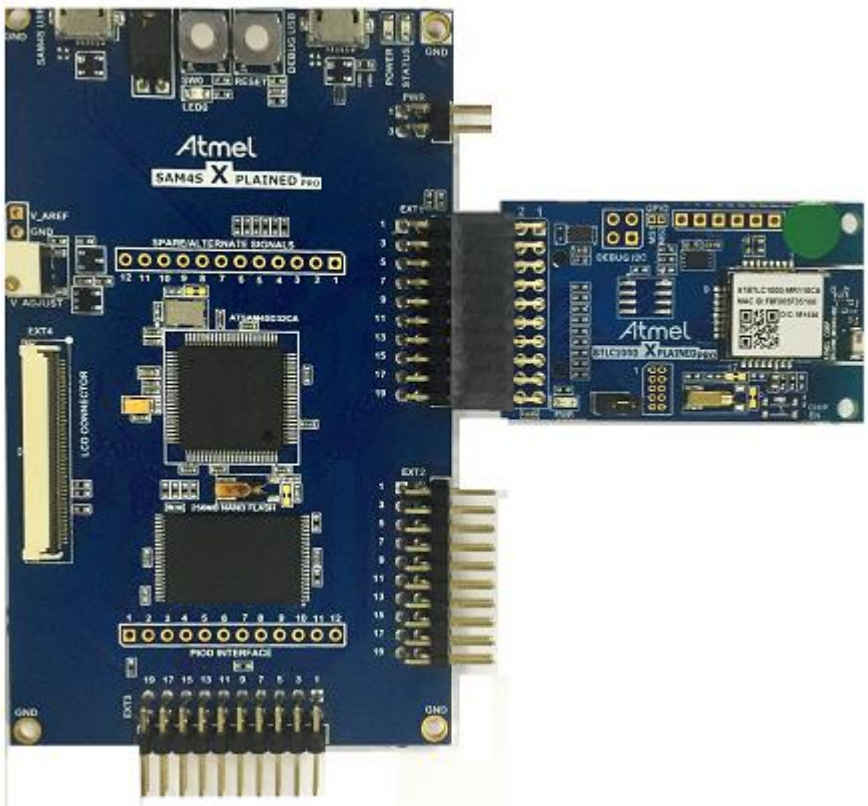
4.3 SAM G55 Xplained Pro Beacon Setup

Figure 4-3. ATBTLC1000 Xplained Pro Extension Connected to a SAM G55 Xplained Pro



4.4 SAM 4S Xplained Pro Beacon Setup

Figure 4-4. ATBTLC1000 Xplained Pro Extension Connected to a SAM 4S Xplained Pro



5 Software Setup

5.1 Installation Steps

1. Atmel Studio installation [**Atmel Studio 7.0 (build 594) Installer – with .NET]**
   http://www.atmel.com/tools/atmelstudio.aspx

   (Note: SAM L21 Rev B/SAM D21/SAM G55/SAM 4S part pack is built-in as part of Atmel Studio 7.0)
2. Atmel USB Driver Installer from http://www.atmel.com/tools/atmelstudio.aspx.
3. 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.

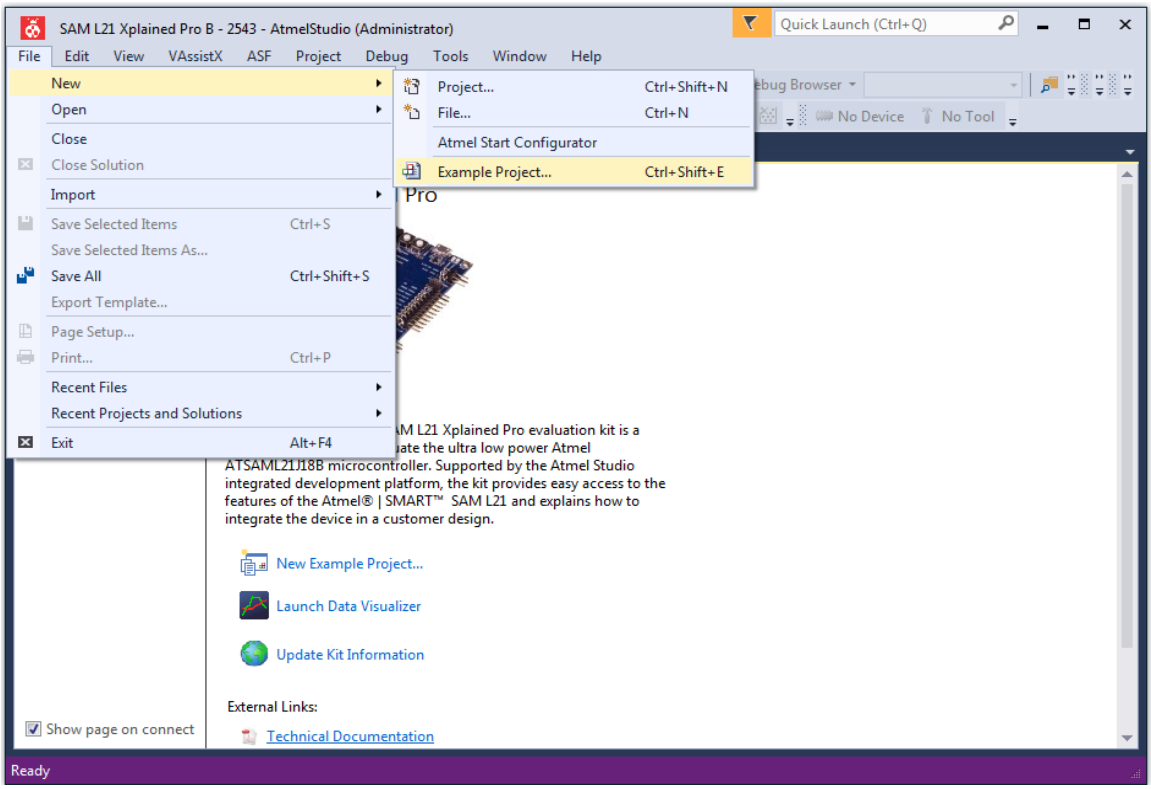
1. Beacon Application for SAM L21
2. Beacon Application for SAM D21
3. Beacon Application for SAM G55
4. Beacon Application for SAM 4S

5.2 Build Procedure

The following procedure is explained for SAM L21 application example. The same procedure is valid for Atmel supported platform (see Chapter 3) as well.

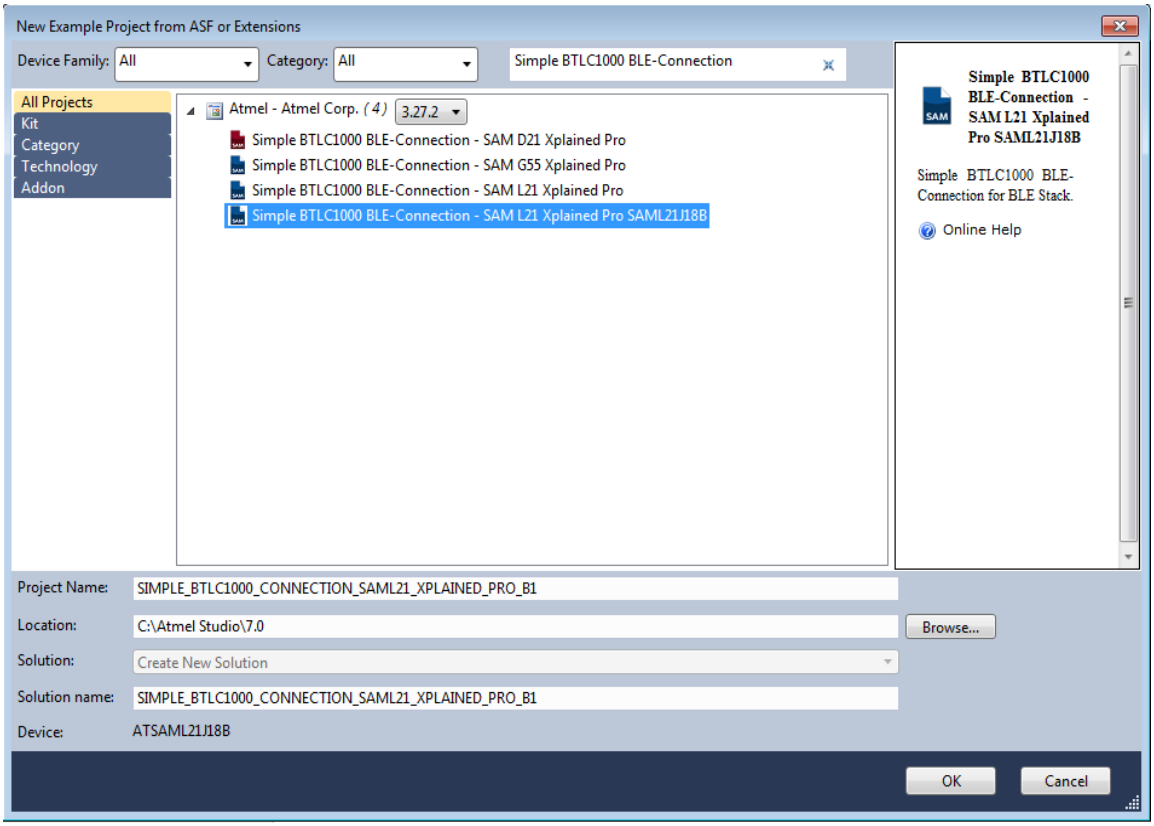
1. Select New Example Project

Figure 5-1. Creating a New Project



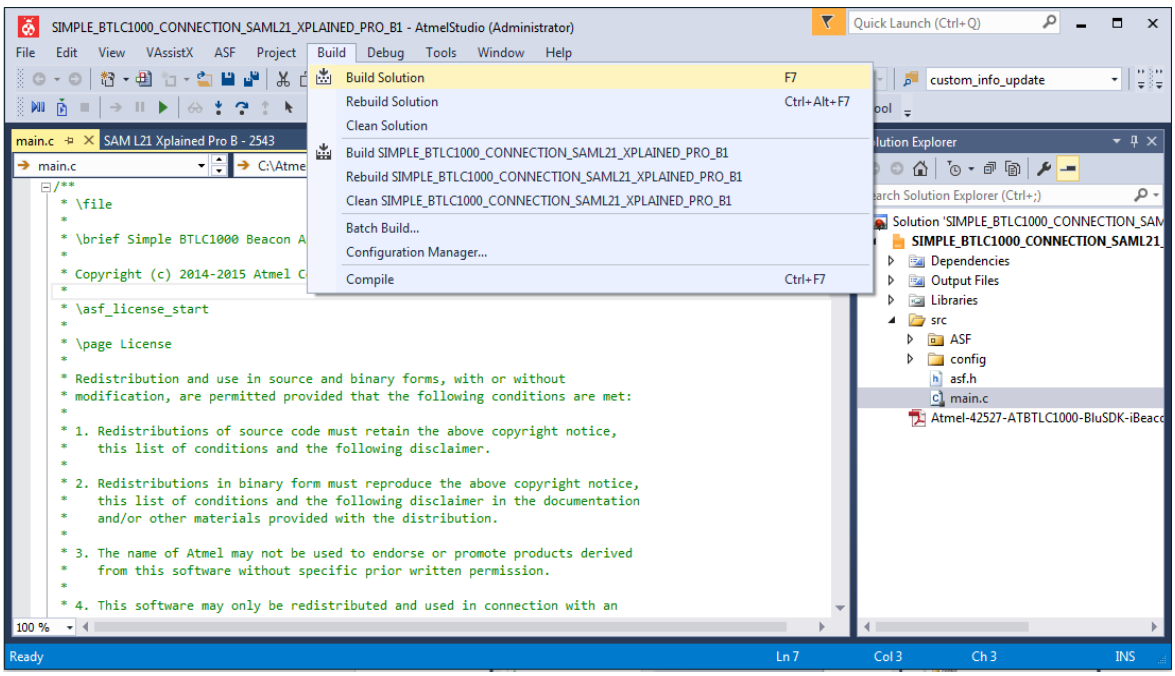
1. Select “SAML,32-bit” in device family, enter “Simple BTLC1000 BLE-Connection” in search window and expand Atmel Corp. Projects. The location and the name of the project can be selected in the respective fields. Click **OK**

Figure 5-2. Selecting Beacon Application from Example Projects



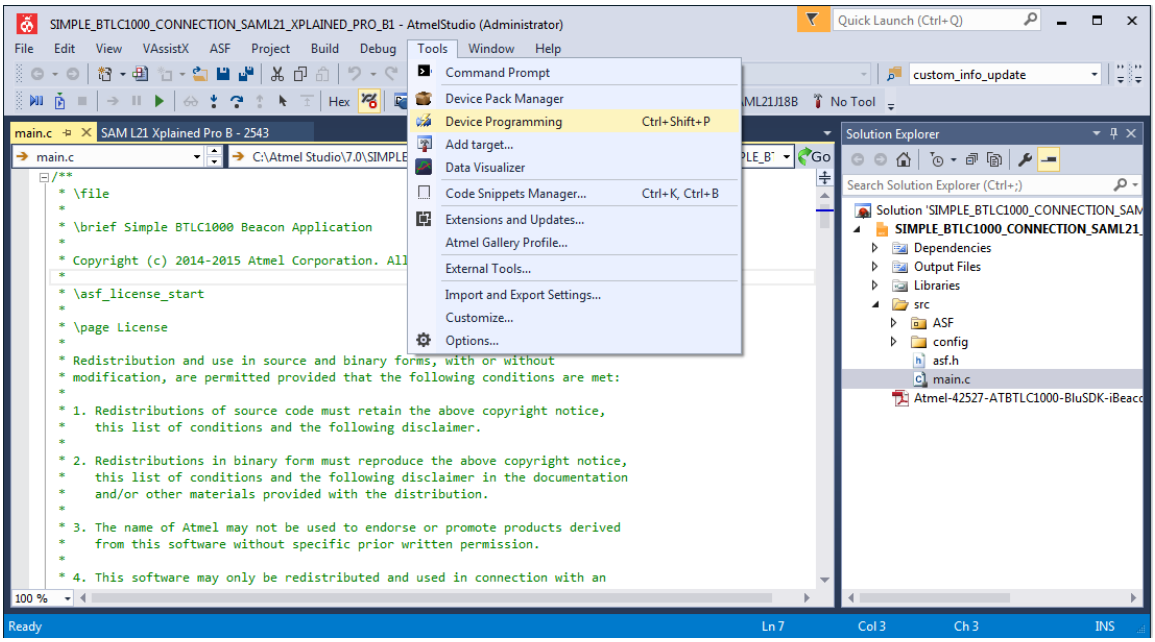
2. Accept the license Agreement. The studio will generate the Beacon Profile project for SAM L21.
3. Build the solution.

Figure 5-3. Building the Beacon Application



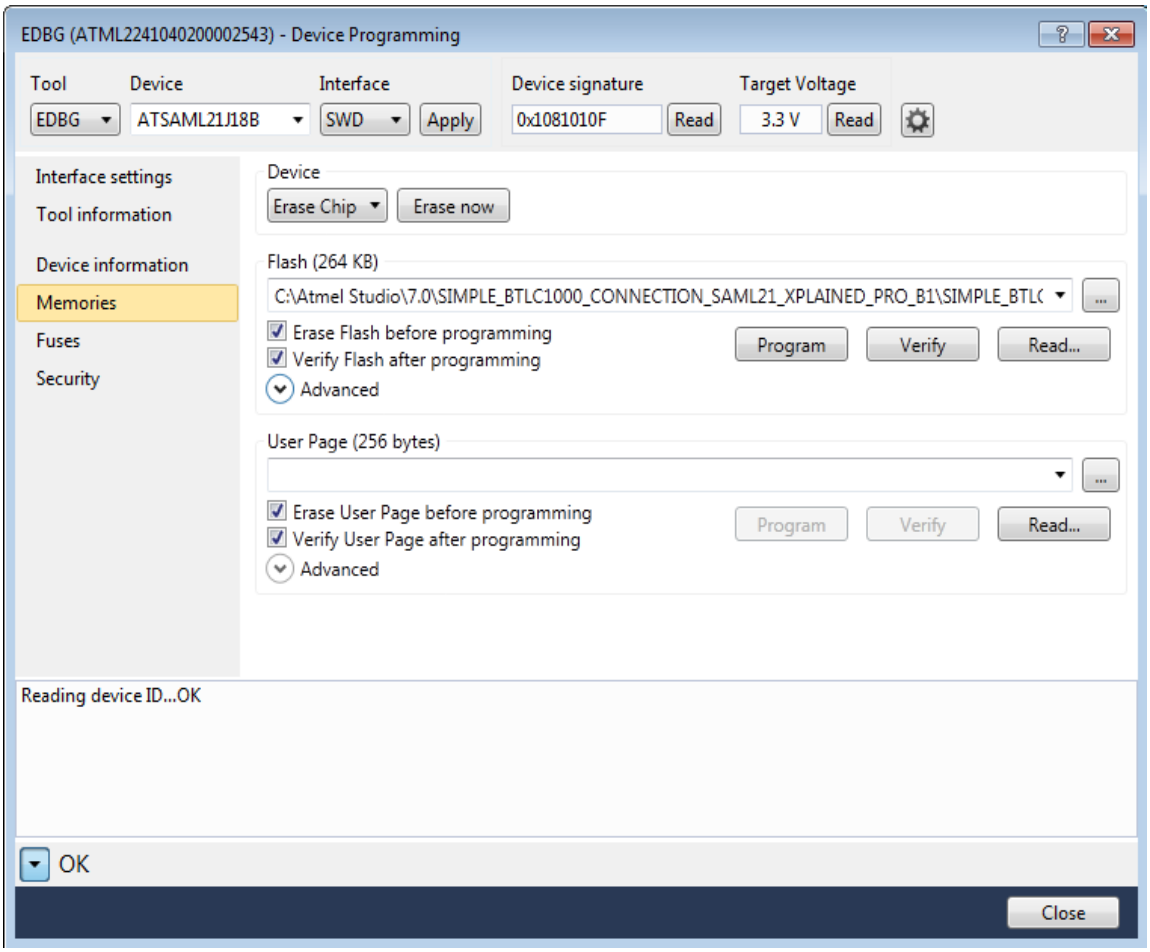
4. Download the application via the DEBUG-USB to the SAM L21 board using Device Programming option available in Tools as shown in Figure 5-4.

Figure 5-4. Selecting Device Programming



5. Inside device programming user have to select the correct configuration for device and finally program the device using program button.

Figure 5-5. Flash Programming

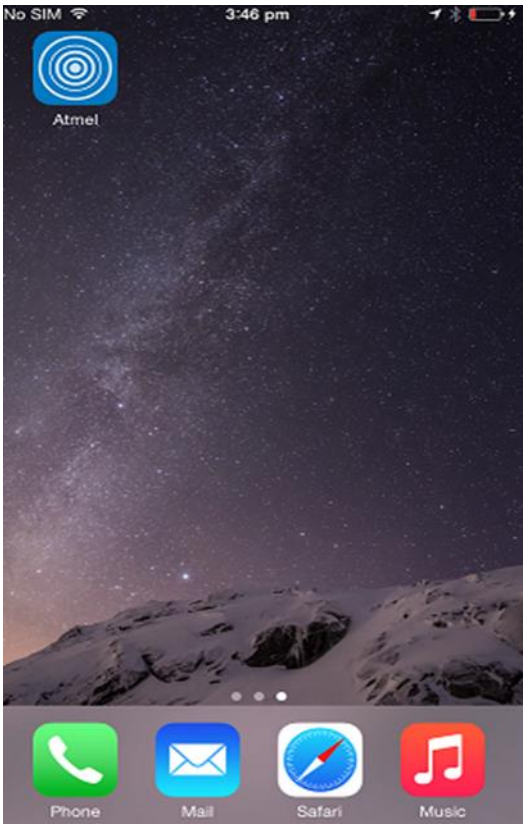


6. Once the application is flashed, it is ready to be advertise beacon packets.

6 Running the demo

1. Connect the BTLC1000 Wing Board to SAM L21 or supported platform (see Chapter 3) as indicated in Figure 4-1.
2. Power on the SAM L21 by connecting the USB Cable.
3. Press the Reset button on the SAM L21 board.
4. Wait for around 10 seconds for the patches to be downloaded from SAM L21 to ATBTLC1000 board.
5. Start the Atmel Beacon application on the iPhone/Android. The illustrations below are from the app running on iPhone. The Android version has same functionality, look and feel. Hence the same steps described below can be followed for users using BLE compatible Android phones.

Figure 6-1. Atmel Beacon Radar Profile App Launch Screen



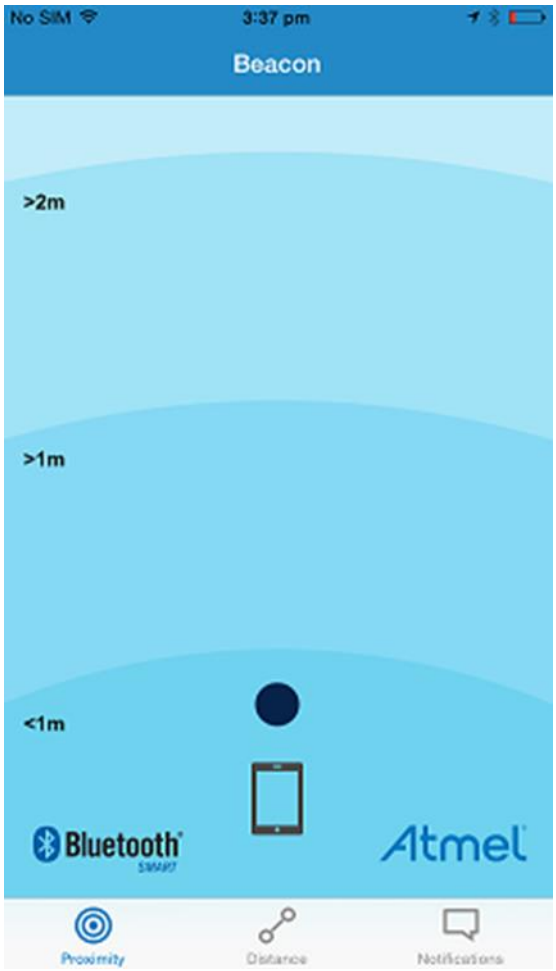
6. As soon as beacon application is launched it will show the positioning of beacon device with respect to mobile device. It also represent three modes as mentioned below.

   Proximity: This mode is used to display beacon specific information when the mobile device comes in close proximity to a given beacon. The mode then shows the corresponding product related information that is configured for this particular beacon device.

   Distance: To indicate the distance between beacon device and the Mobile.

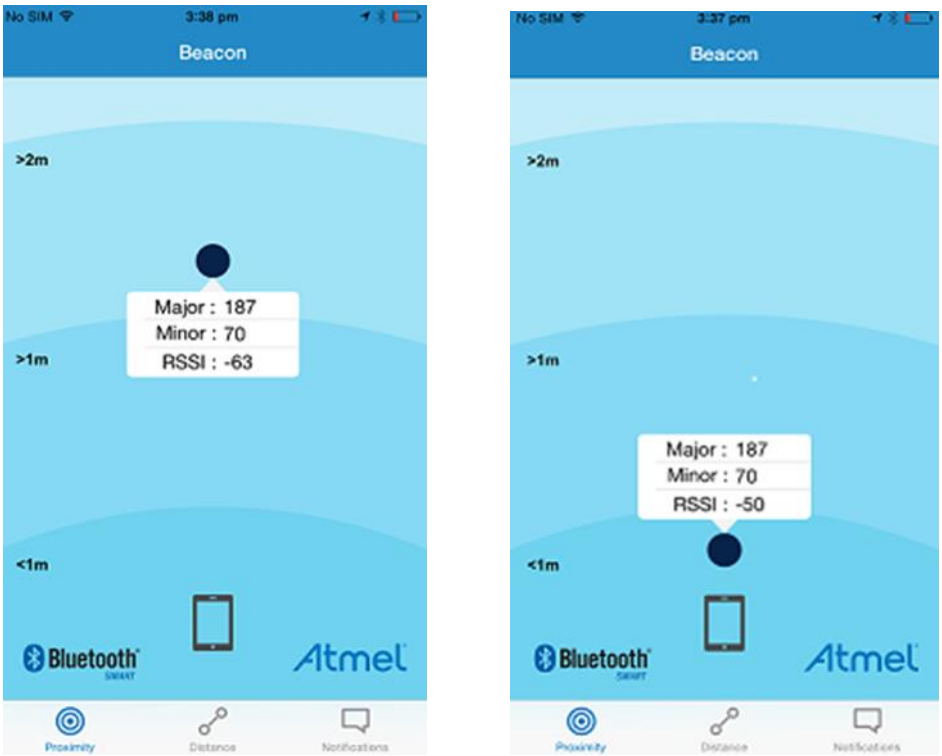
   Notification: This mode is used to demonstrate the ranging capabilities of a given beacon. The notification messages change appropriately based on the proximity to a given beacon.

Figure 6-2. Beacon Radar Application Initial Screen



7. Click on dark blue circle to check the Major, Minor and RSSI Value. The RSSI values get automatically updated based on the movement of the scanner device.

Figure 6-3. Beacon Radar Application in Distance Mode

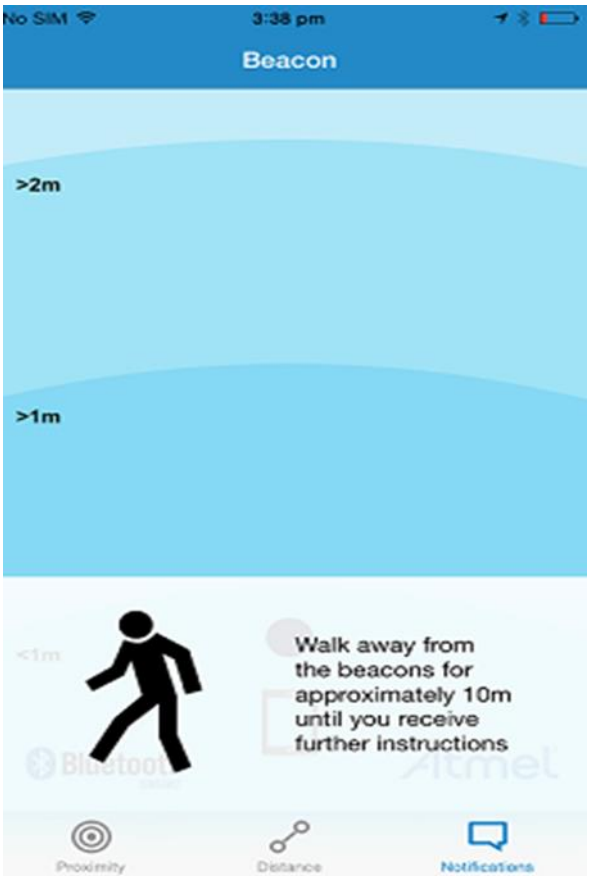


8. Inside the proximity mode if the scanner device is very near to beacon, User will see the product information when user is in close proximity to a given beacon device. When the user moves away from beacon device information content will not be shown any more. It is just an indication that user moved away from beacon device. User can optionally close the message by clicking on close.

Figure 6-4. Beacon Radar Application in Proximity Mode

9. User can select the notification mode and follow the instructions on the screen to check the range of a given beacon device.

Figure 6-5. Beacon Radar Application in Notification Mode

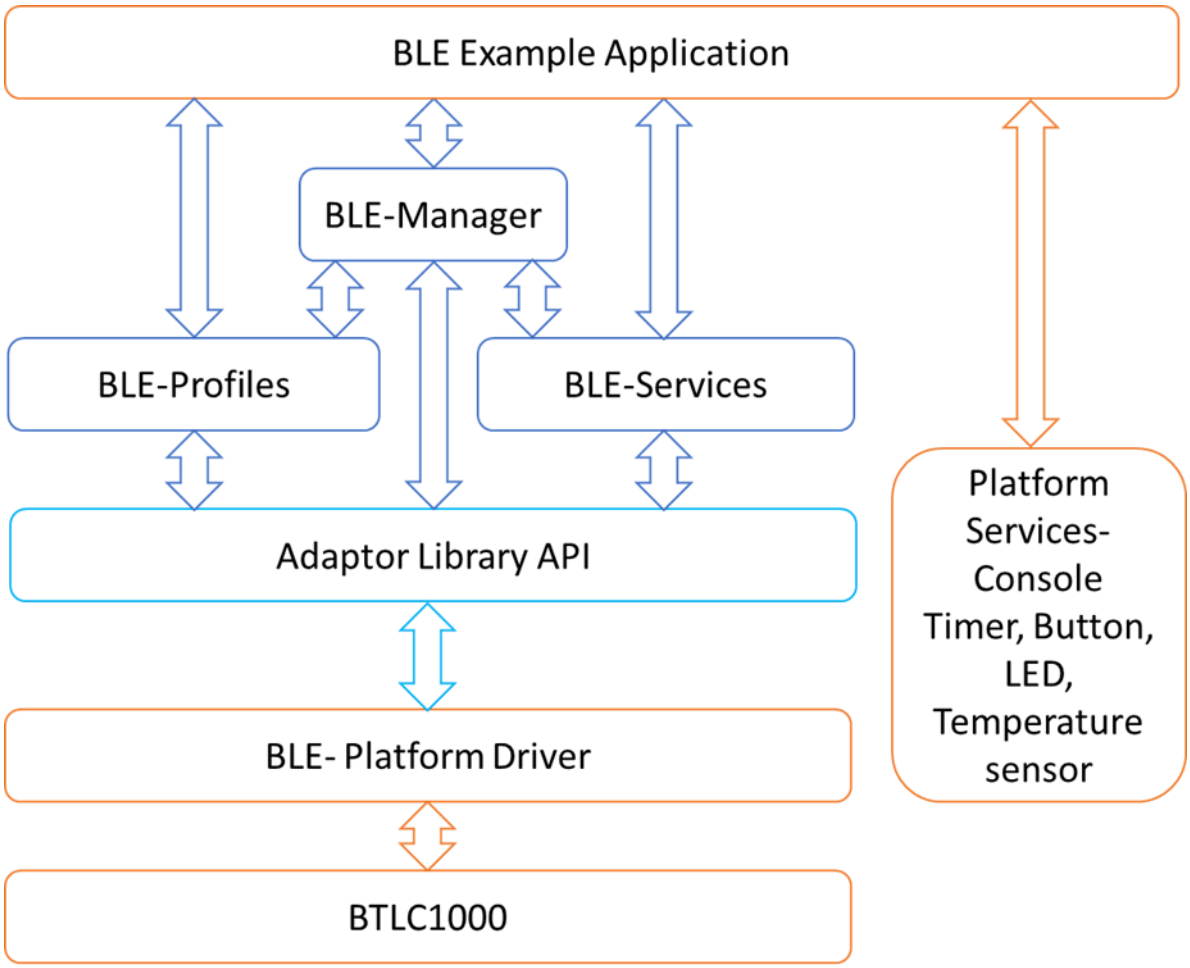


7 Software Architecture

The following diagram illustrates the various layers in the BLE subsystem for the ATBTLC1000 configuration. The External host can be Atmel supported platform (see Chapter 3).

The beacon example does not require a profile and services. The application directly interfaces with the Adapter API.

Figure 7-1. BluSDK Software Architecture



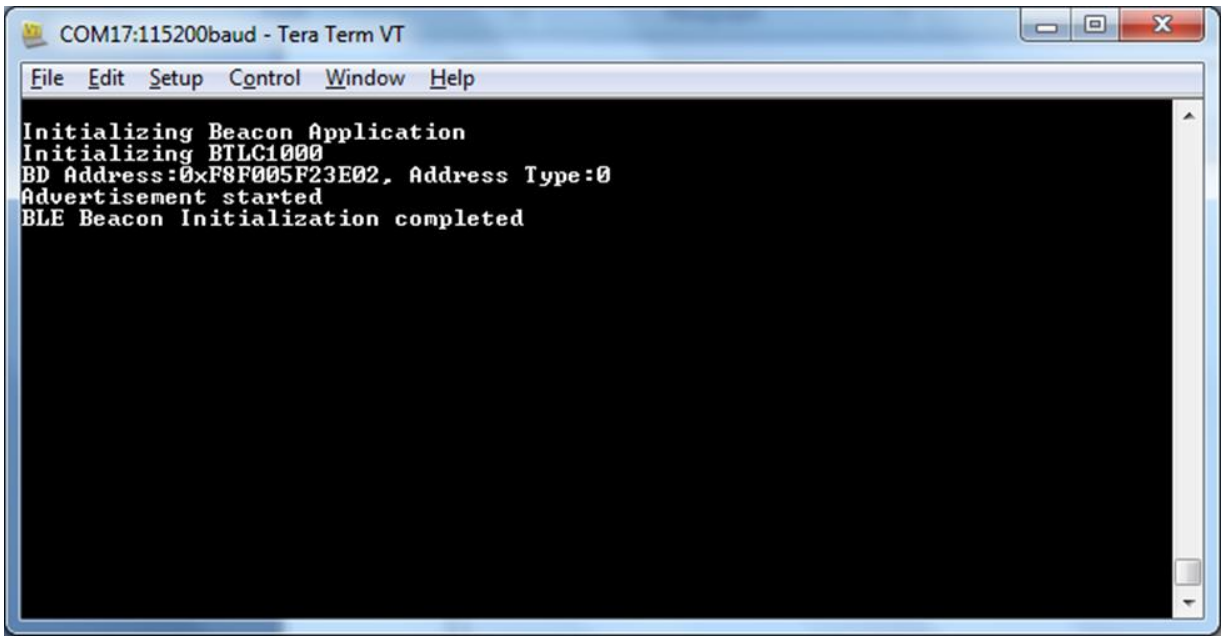
8 Console Logging

For the purpose of debugging, a logging interface had been implemented in the iBeacon Application.

The logging interface utilizes the same EDBG port that connects to supported platform (see Chapter 3). A serial port monitor application (for example Teraterm) shall be opened and attached to the EDBG COM port.

The below screenshot shows the information about BLE initialization and iBeacon advertisement.

Figure 8-1. Beacon Application Console when Advertisement Starts



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10 Revision History

Doc Rev.	Date	Comments
42527C	02/2016	Table 3.1 is updated with SAM4S support. Figure 4.4 is updated with SAM4S Xplained Pro Image. Section 5.1 Installation Steps are updated.
42527B	11/2015	Figure 4-1 is updated. The screenshots in Chapter 5 are updated.
42527A	09/2015	Initial document release.

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