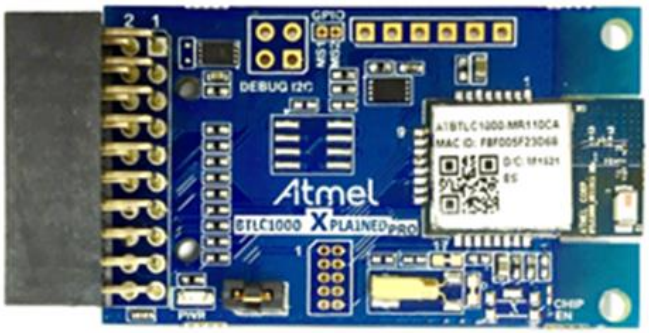
ATBTLC1000 BluSDK

Proximity Monitor - Getting Started Guide

USER GUIDE



Introduction

This getting started guide describes the setup of Atmel® ATBTLC1000 with a supported platform (see Table 2-1) bringing-up an example profile supplied as part of BluSDK release. This document explains the bring up of Bluetooth® Proximity Monitor example application that is embedded as part of the software release package.

The Proximity profile defined by the Bluetooth SIG enables proximity monitoring between two devices. The Proximity Monitor (a GATT client) configures the behavior of a peer Proximity Reporter device (GATT server) based on link conditions. The Proximity Monitor configures desired behavior of the peer device through setting Alerts Levels on Link Loss and Path Loss. In addition, it also maintains the connection with the Proximity Reporter and monitors the link quality of the connection based on RSSI reporting from the peer device.

The Proximity Monitor example application supports the following features:

- Device Discovery and Disconnection
- Services and Characteristics Discovery
- Services: Link Loss Service, Immediate Alert Service and TX Power Service
- Setting up Path Loss and Link Loss
- RSSI Sampling

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1 Demo Setup

Figure 1-1. Demo Setup of Proximity Profile on ATBTLC1000

2 Supported Hardware Platforms and IDEs

Table 2-1. BluSDK – Supported Hardware and IDEs

Platform	MCU	Supported BLE Module	Supported evaluation kits	Supported IDEs
SAM L21 (MCU)	ATSAML21J18A	ATBTLC1000	ATBTLC1000-XSTK	Atmel Studio v6.2
SAM D21 (MCU)	ATSAMD21J18A	ATBTLC1000	SAMD21-XPRO + AT-BTLC1000	Atmel Studio v6.2
SAM G55 (MCU)	ATSAMG55J19	ATBTLC1000	SAMG55-XPRO + ATBTLC1000	Atmel Studio v6.2

3 Hardware Setup

3.1 SAM L21 Xplained Pro Proximity Monitor Setup

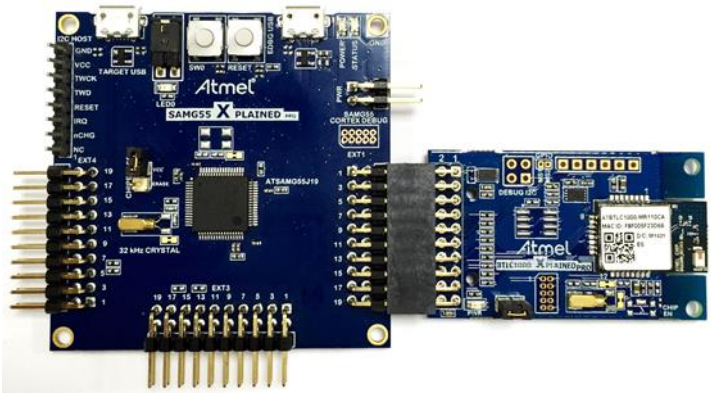
Figure 3-1. ATBTLC1000 Xplained Pro Extension Connected to a SAM L21 Xplained Pro

3.2 SAM D21 Xplained Pro Proximity Monitor Setup

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

3.3 SAM G55 Xplained Pro Proximity Monitor 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 part pack is built-in as part of Atmel Studio 6.2 sp2)
2. Install SAM G55 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 7.0.712 http://www.atmel.com/tools/atmelstudio.aspx.
4. Install the standalone ASF package from http://www.atmel.com/tools/AVRSOFTWAREFRAMEWORK.aspx.

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

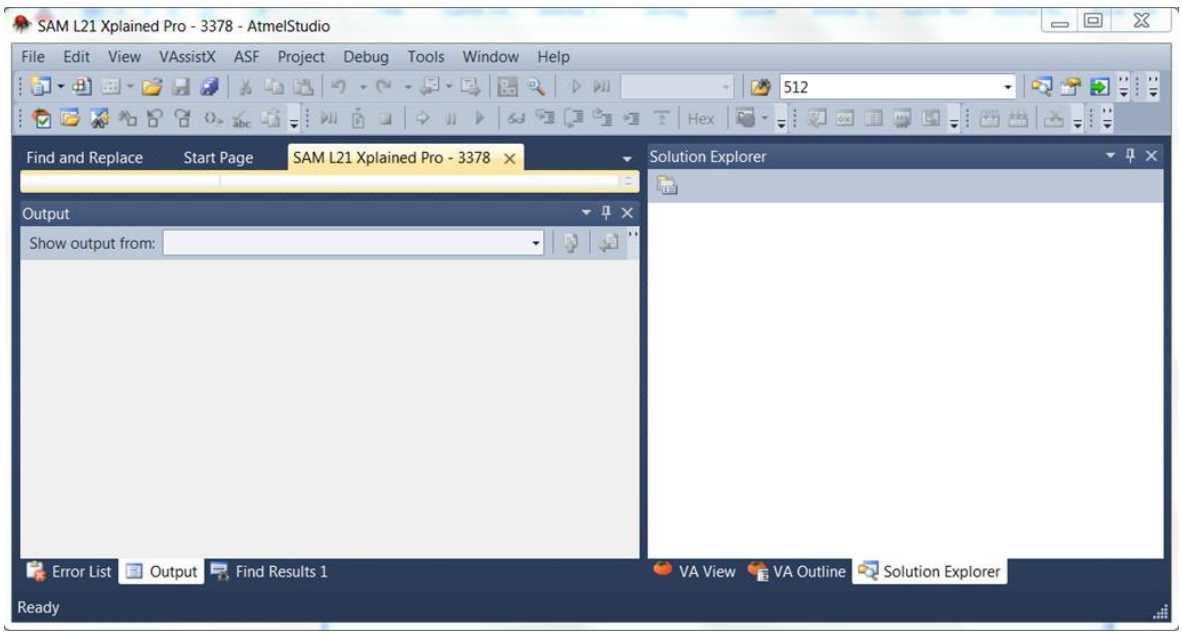
1. Proximity Monitor Application for SAM D21.
2. Proximity Monitor Application for SAM G55.
3. Proximity Monitor Application for SAM L21.

5 Build Procedure

The following procedure is explained for SAM L21 application example. The same procedure is valid for the case of all the other supported platforms as well.

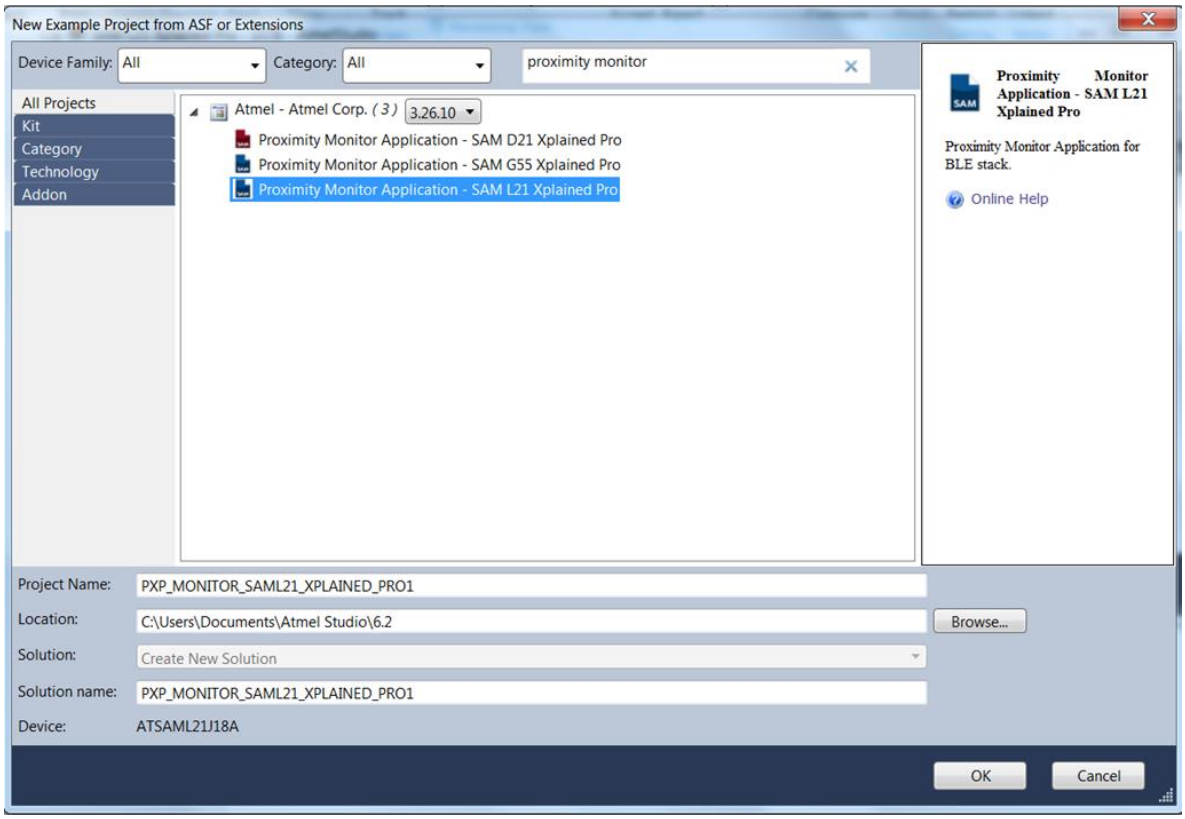
1. Select New Example Project

Figure 5-1. Creating a New Project



2. Enter “Proximity” 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.

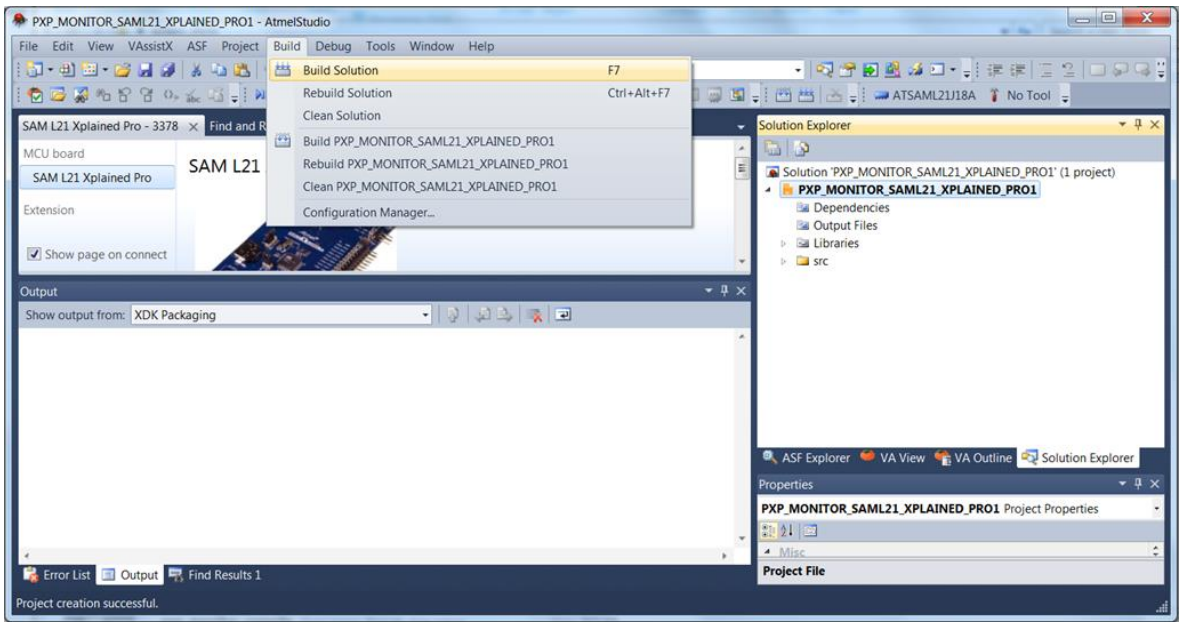
Figure 5-2. Selecting Proximity Monitor Profile Application from Example Projects



3. Accept the license Agreement. The studio will generate the Proximity Monitor project for SAM L21.

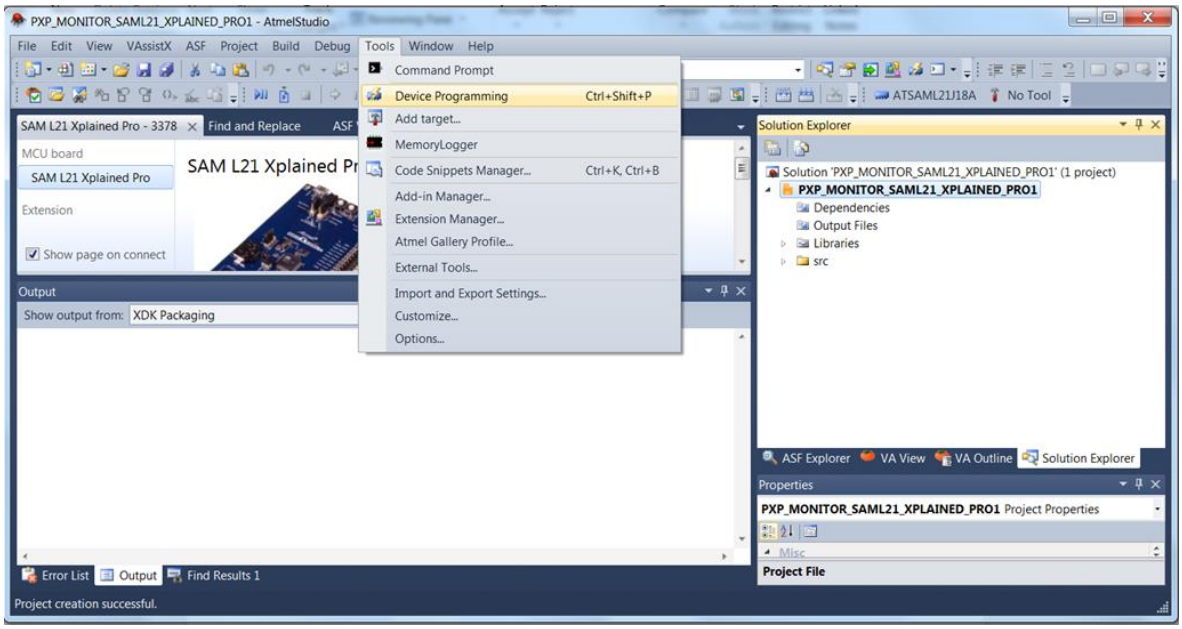
4. Build the solution.

Figure 5-3. Building the Proximity Monitor Application



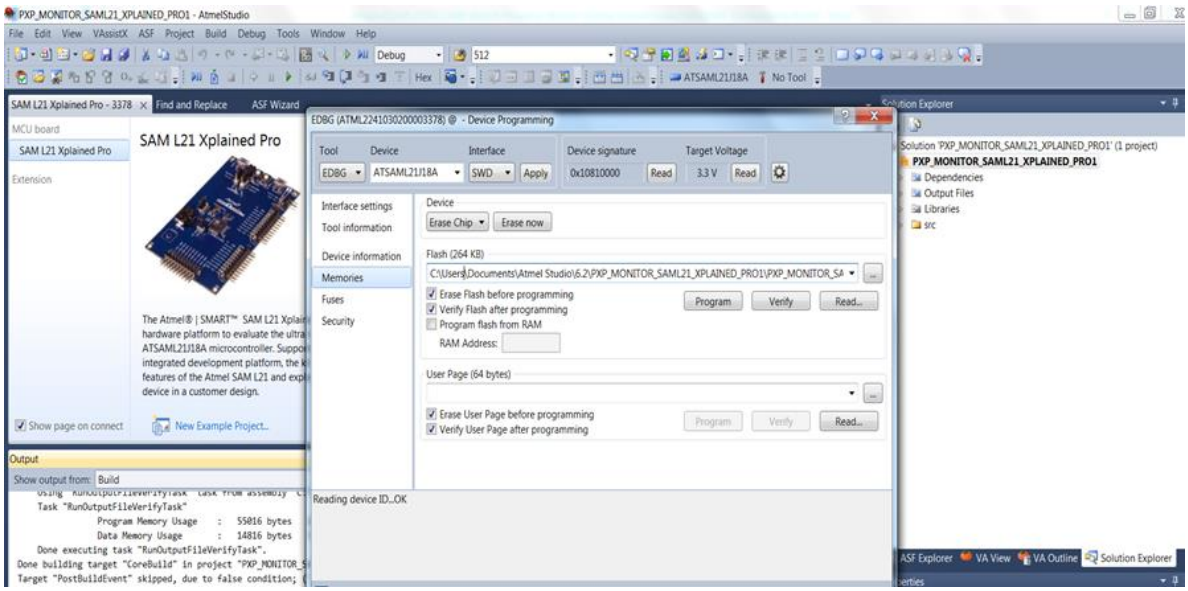
5. Download the application via the USB to the SAM L21 board using Device Programming option available in Tools as mentioned below.

Figure 5-4. Flashing the Application on Atmel MCU



6. Inside device programming, the user has to select the correct configuration for device and finally program the device by clicking on ‘Program’ button as shown below.

Figure 5-5. Flash Programming



7. Once the application is flashed, it is ready to be function as a Proximity Monitor Device.

6 Console Logging

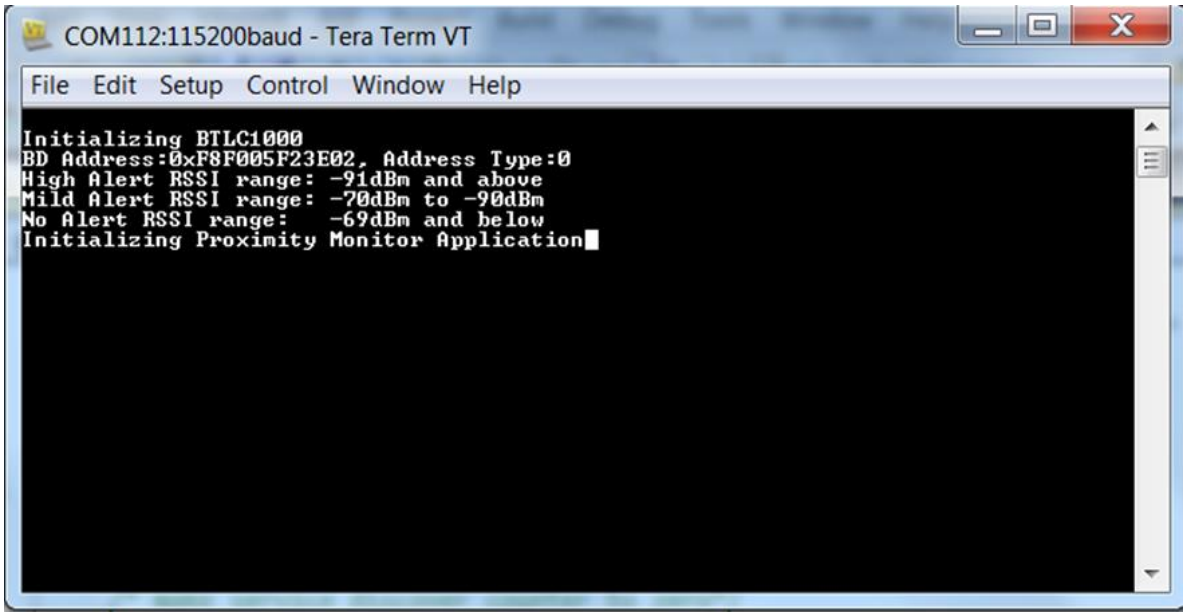
For the purpose of debugging, a logging interface had been implemented in the Proximity Monitor Application.

The logging interface utilizes the same EDBG port that connects to supported platform. A serial port monitor application (for example Teraterm) shall be opened and attached to the appropriate COM port enumerated by the device on the PC.

7 Running the demo

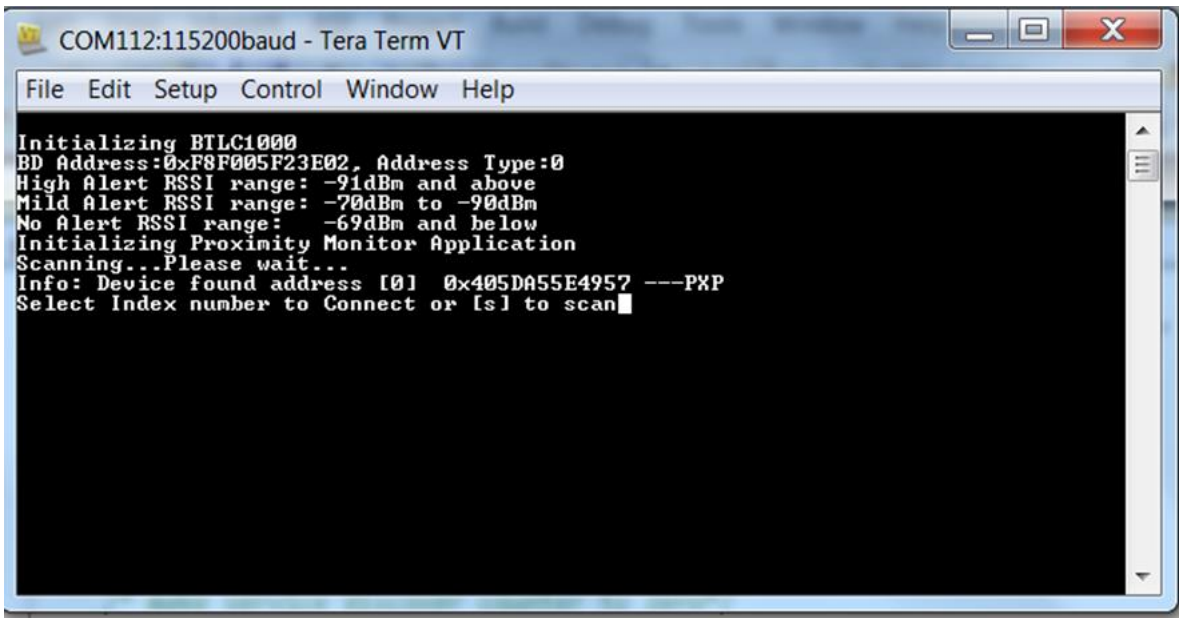
1. Power on the SAM L21 (see Figure 2) by connecting the USB Cable
2. Open the console using TeraTerm or any serial port monitor application and connect to the corresponding COM port enumerated by the device on the PC. (Settings: Baudrate 115200, Parity None, 1 Stop bit, 1 Start bit, No Hardware Handshake)
3. Press the Reset button on the SAM L21 or supported platform board.
4. The device will initialize and start-up – as seen in the console log shown below.

Figure 7-1. Proximity Monitor Device Initialization



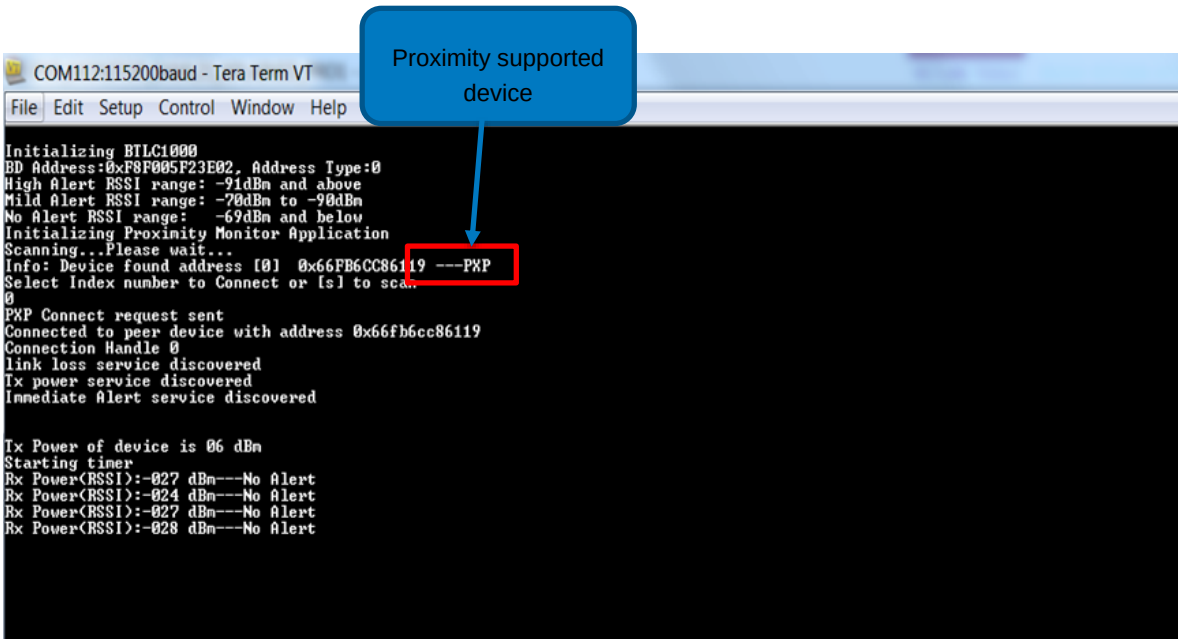
5. Device will then start scanning and will display devices found as shown below

Figure 7-2. Proximity Monitor – Scanning Devices



6. The proximity monitor scans and then displays the list of all BLE devices which are advertising. Proximity Reporter devices (GATT server role) are indicated with tag " ---PXP ". Select the appropriate index number for the Proximity Reporter. The Proximity Monitor will then connect to the selected peer device.

Figure 7-3. Proximity Monitor Connection with a Proximity Reporter



7. Once the connection is established the Proximity Monitor will set link loss alert value to High Alert and start monitoring the RSSI value of the reporter device. The Proximity Monitor implements path loss monitoring in the case where a Proximity Reporter supports also 'Immediate Alert Service' and 'Tx-Power' service. The Atmel Proximity Reporter application referred in this example supports both these optional services.

   The default alert settings are as follows:

   High Alert RSSI set to -91 dBm and above, alert type "HIGH ALERT", LED will turn on

   Mild Alert RSSI set to -70 dBm to -90dBm, alert type "MILD ALERT", LED will Toggling

   No Alert RSSI set to -69 dBm and below, alert type "No Alert", LED will be turned off.

   If Proximity Reporter device moves out of the pre-set proximity range the corresponding alert value will be set and the alert notification will be displayed on the console as shown below.

Figure 7-4. LED Indicator used for Path Loss/Alerts on SAM L21s

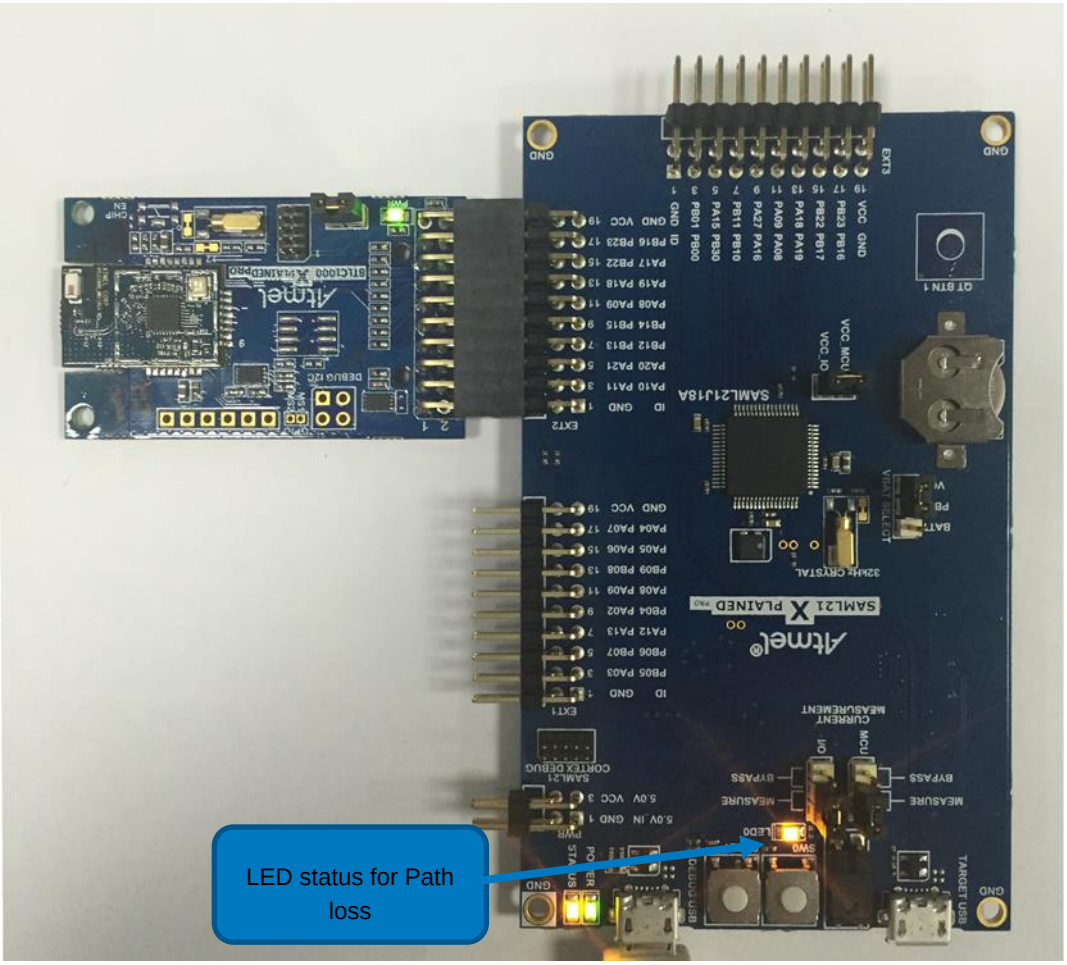
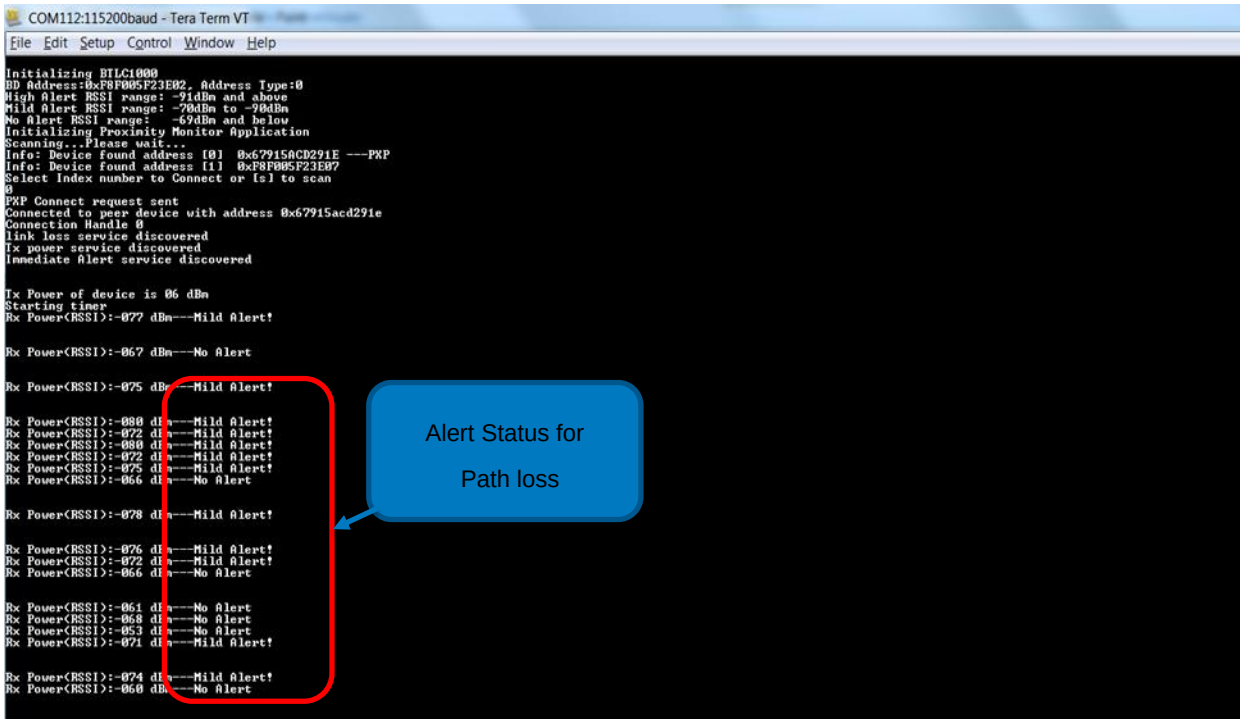


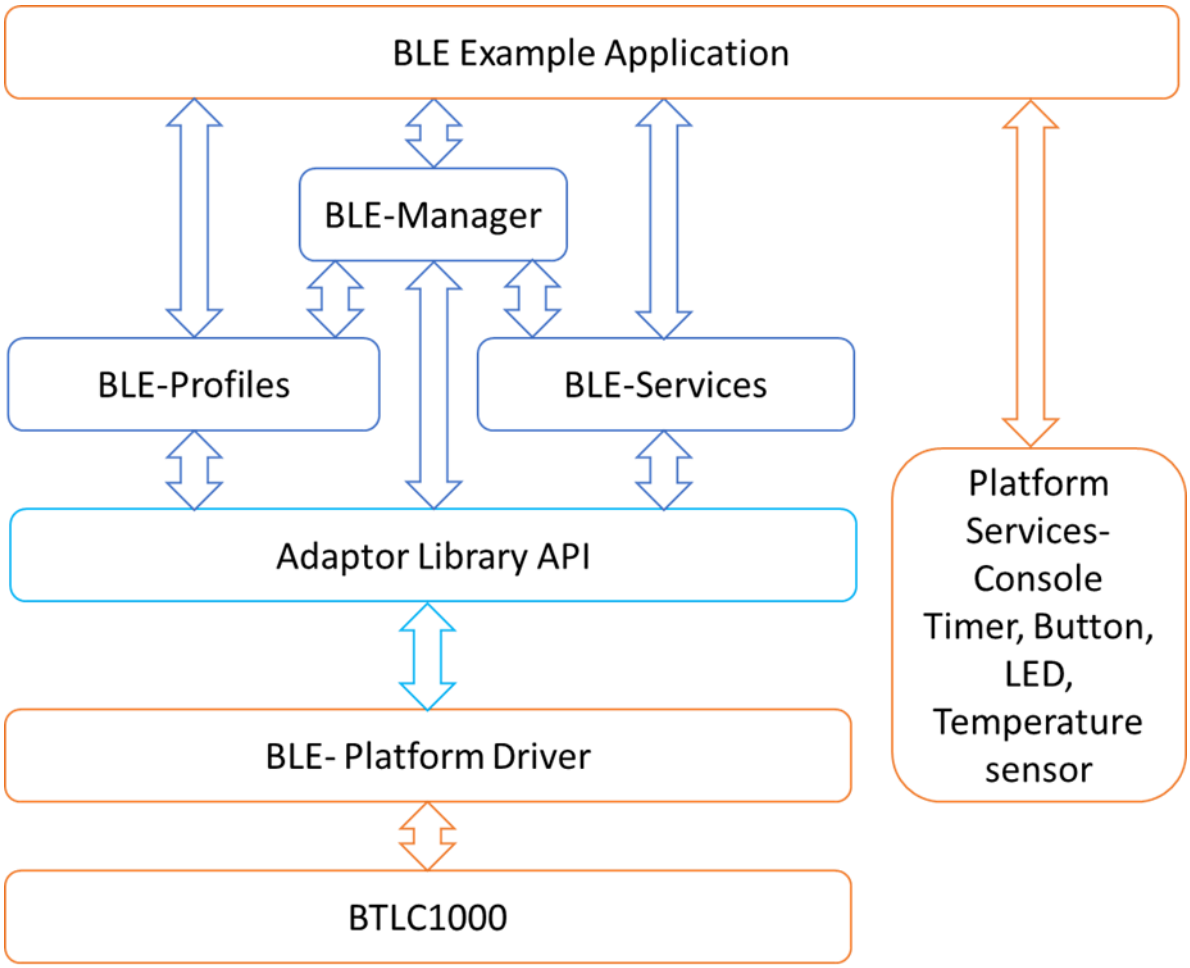
Figure 7-5. Proximity Monitor Setting Alert Levels



8 BluSDK Software Architecture

The following diagram illustrates the various layers in the BluSDK Architecture. The External host can be supported platform. The application in this example is Proximity Monitor Profile.

Figure 8-1. BluSDK Software Architecture



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10 Revision History

Doc Rev.	Date	Comments
42516A	09/2015	Initial document release.

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