ATBTLC1000 BluSDK

HID Keyboard Device – Getting Started Guide

USER GUIDE

Introduction

This getting started guide describes the setup of Atmel® ATBTLC1000 with a supported platform bringing-up an example profile supplied as part of BluSDK. This document explains the bring-up of HOGP Keyboard device example application that is embedded as part of the software release package.

Table of Contents

1 Description

The HID over GATT (HOGP) profile defined by the Bluetooth SIG enables support of HID services over a Bluetooth Low Energy (BLE) protocol stack using Generic Attribute profile (GATT). This allows devices like keyboard or mouse implementing HOGP to connect to a compatible HOGP/BLE host device (e.g.: Mobile Phone, Tablet, TV etc.).

This document explains the details about:

1. Getting started with the setup of supported platform.
2. Demonstration of HID device functionality using Notepad mobile application for Android and iOS.

The HOGP Keyboard device application example (referred as HID Keyboard device in this document) supports the following features:

- Advertisement
- Pairing
- Services: HID Service and Device Information Service
- Report Mode (Keyboard)

The HID Keyboard device application example supports the following characteristics for HID service.

- Protocol Mode
- Report
- Report Map
- Boot Keyboard Input Report
- Boot Keyboard Output Report
- HID Information
- HID Control Point

For the purpose of demonstration, the example application simulates a function of a keyboard. Once the handshake and connection procedure between a mobile phone and the BTLC1000 emulating a keyboard device example is completed, the simulated keyboard will send a pre-determined set of characters is sent on a key press that can be seen on any standard text editor on the mobile phone. (“Hello Atmel”.)

2 Demo Setup

Figure 2-1. Demo Setup of HID Keyboard Device Application on BTLC1000

3 Supported Hardware Platforms and IDEs

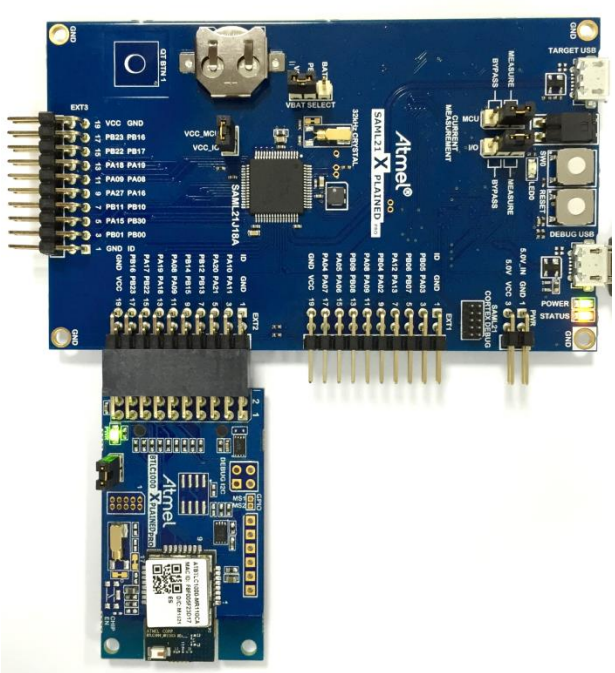
Table 3-1. BluSDK – supported hardware and IDEs

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 + ATBTLC1000	Atmel Studio v6.2
SAM G55 (MCU)	ATSAMG55J19	ATBTLC1000	SAMG55-XPRO + ATBTLC1000	Atmel Studio v6.2

4 Hardware Setup

SAM L21 Xplained Pro HID Keyboard Device Setup

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



SAM D21 Xplained Pro HID Keyboard Device Setup

Figure 4-2. ATBTLC1000 Xplained Pro Extension Connected to a SAMD21 Xplained Pro

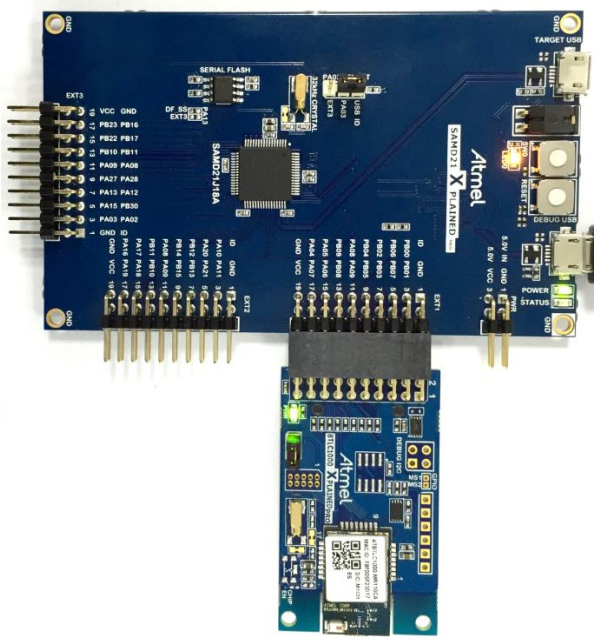
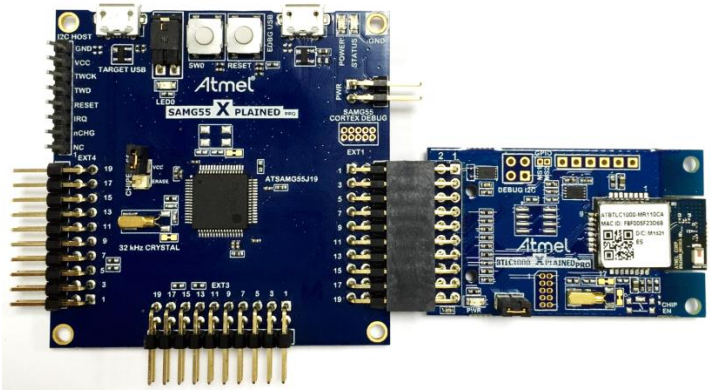


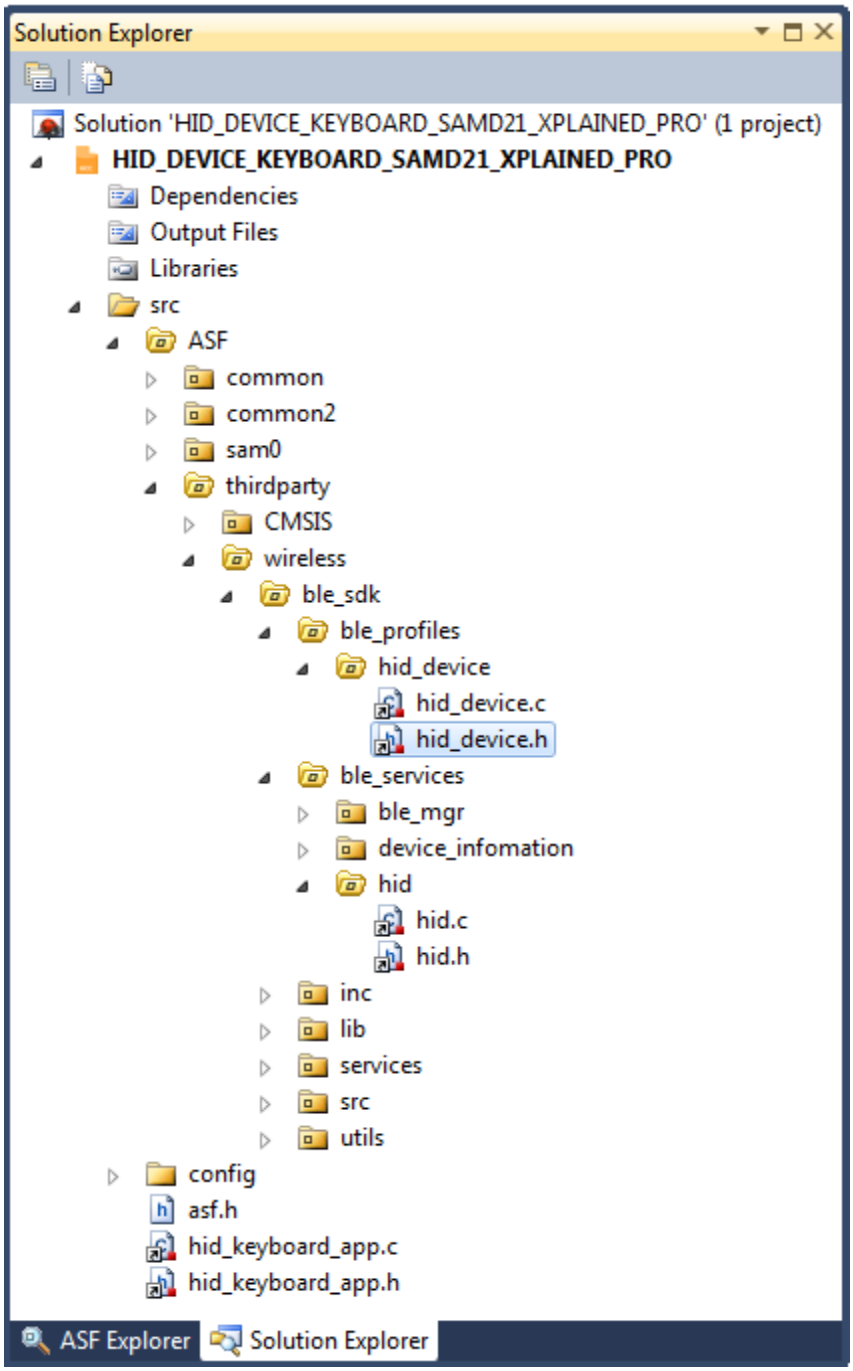
Figure 4-3. ATBTLC1000 Xplained Pro Extension Connected to a SAM G55 Xplained Pro



5 Configuration for HID Keyboard Application

The user may need to modify few macros in hid_device.h (HID Profile) for configuring the profile for Keyboard application as per the desired application use-case.

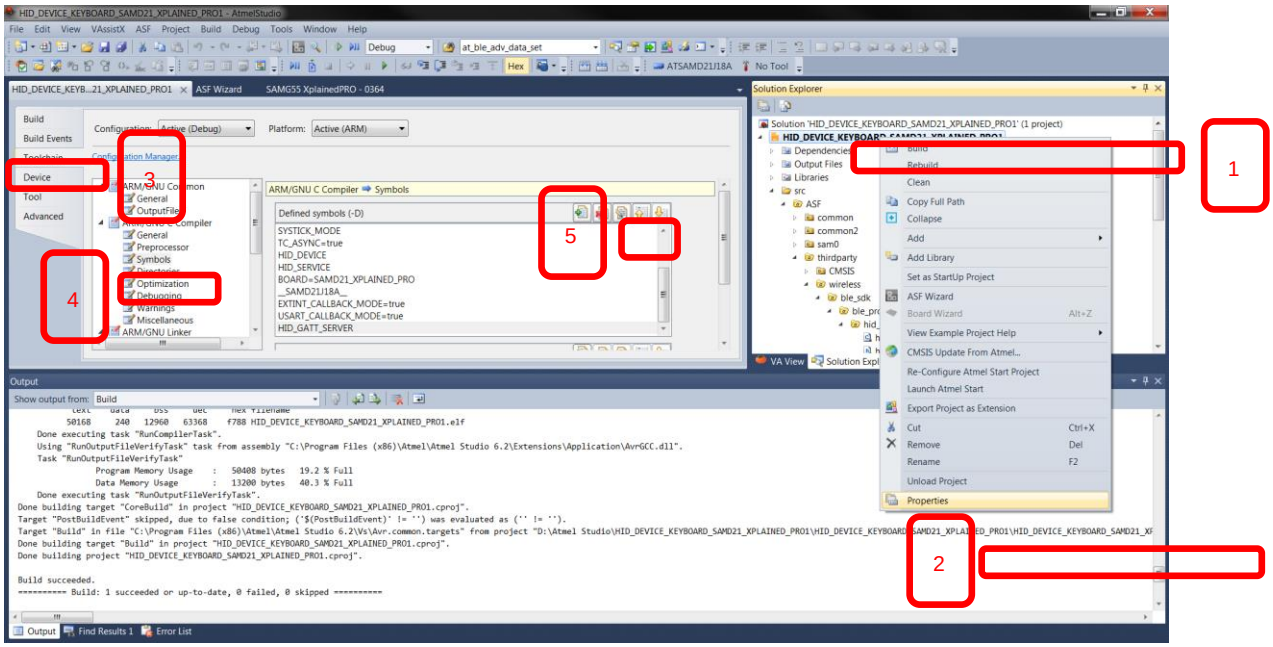
Figure 5-1. HID Profile Code Hierarchy



List of macros that need to be modified by user based on the application use-case is mentioned below:

1. By default the application supports Report mode. In the case the application requires support for only boot mode, the user can add the macro "BOOT_MODE" in the compiler/symbols tabs shown below.

Figure 5-2. Enabling Boot Mode Support



1. User should configure the desired number of reports they want to support in application. Currently the maximum number of reports supported is 10.

```
#define HID_NUM_OF_REPORT                (1)
```

2. User should configure the desired number of service instances. Currently the maximum number of service supported is 2.

```
#define HID_SERV_INST                    (1)
```

6 Software Setup

6.1 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 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 ASF package will install the following examples within the Atmel Studio environment.

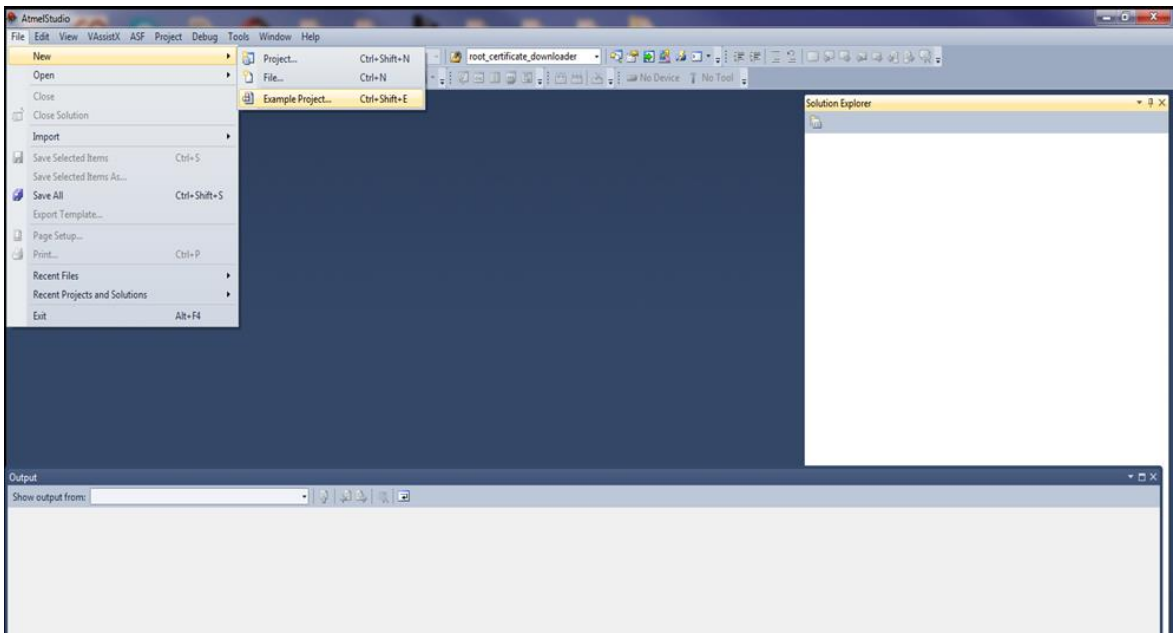
1. HID Profile Device Application for SAM L21
2. HID Profile Device Application for SAM D21
3. HID Profile Device Application for SAM G55

6.2 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.

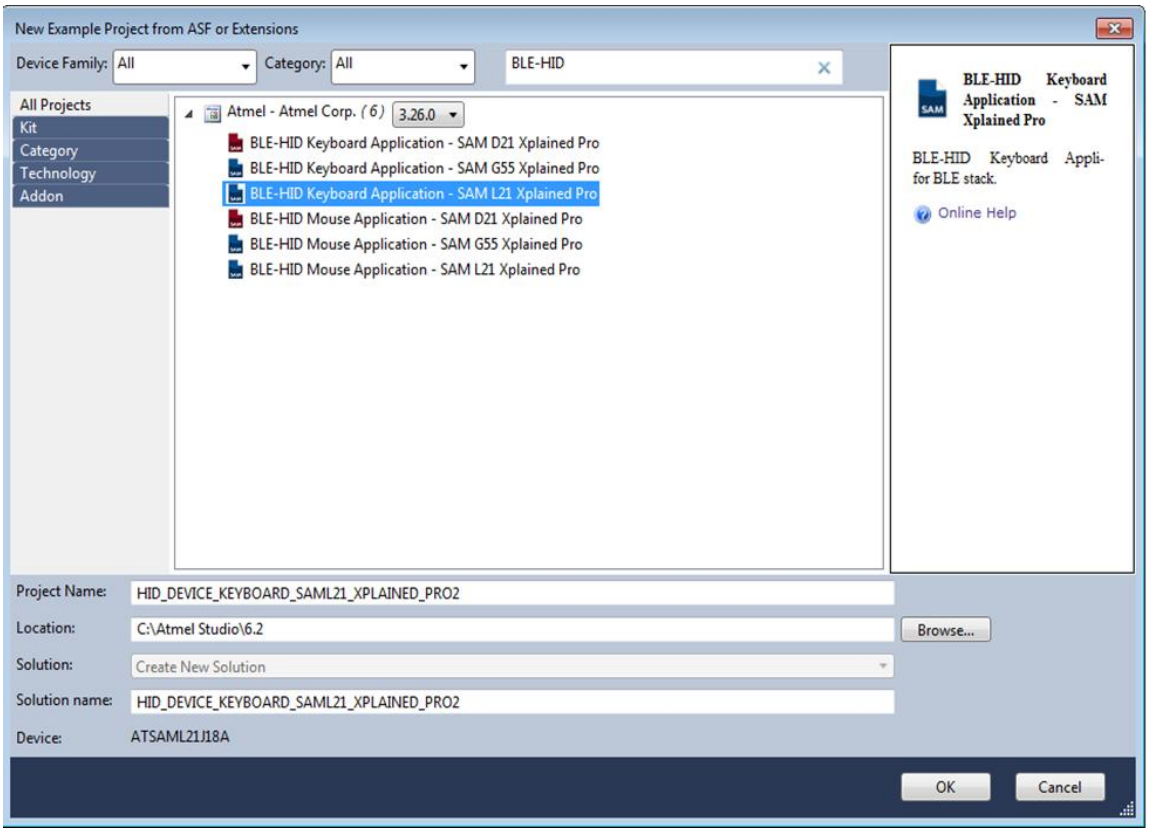
1. Select New Example Project

Figure 6-1. Creating a New Project



2. Enter “ble-hid” 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**.

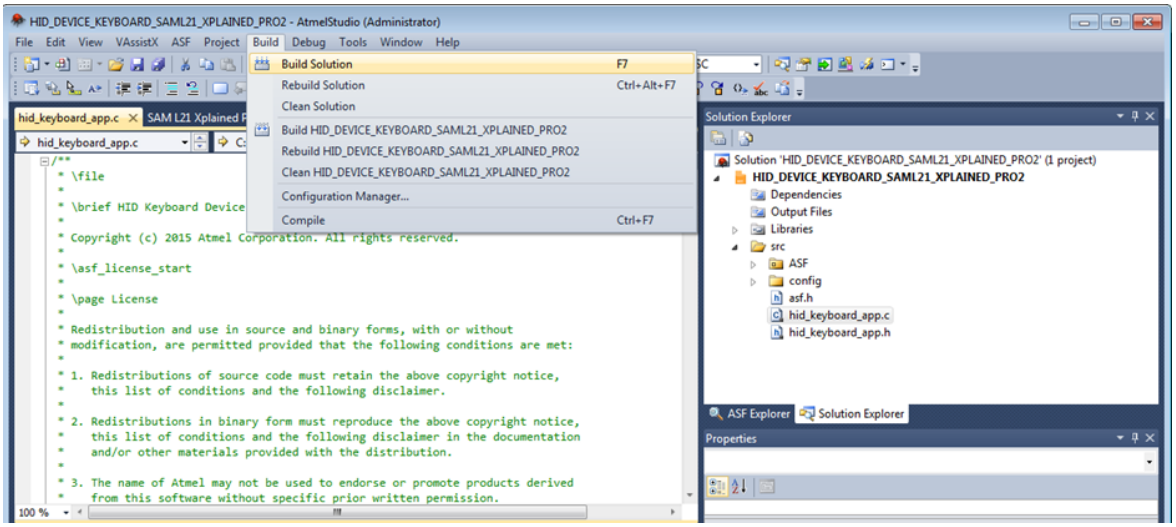
Figure 6-2. Selecting HID Device Application from Example Projects



3. Accept the license Agreement. The studio will generate the BLE-HID Keyboard project for SAM L21.

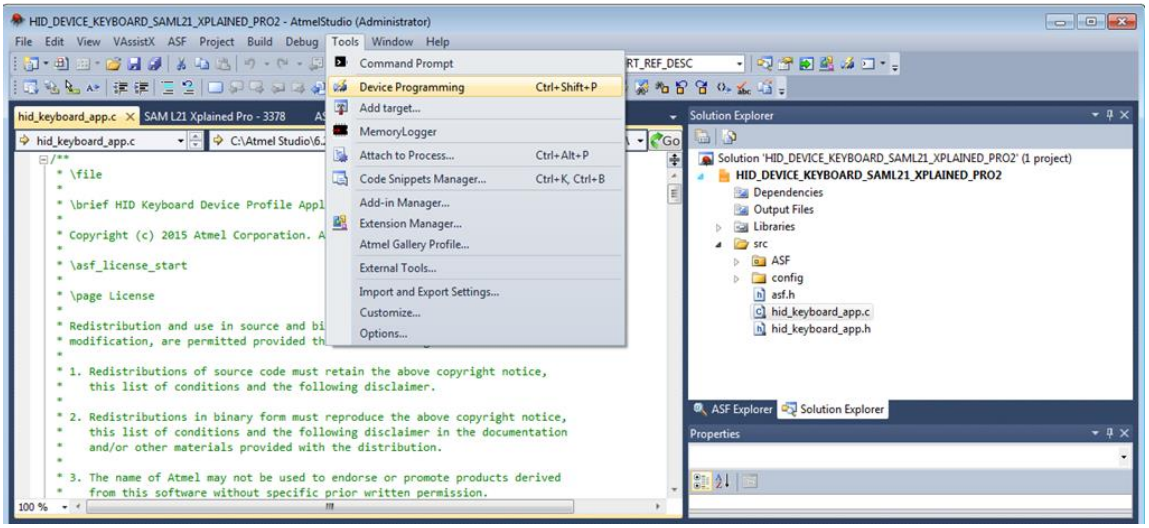
4. Building the solution.

Figure 6-3. Building the HID Device Application



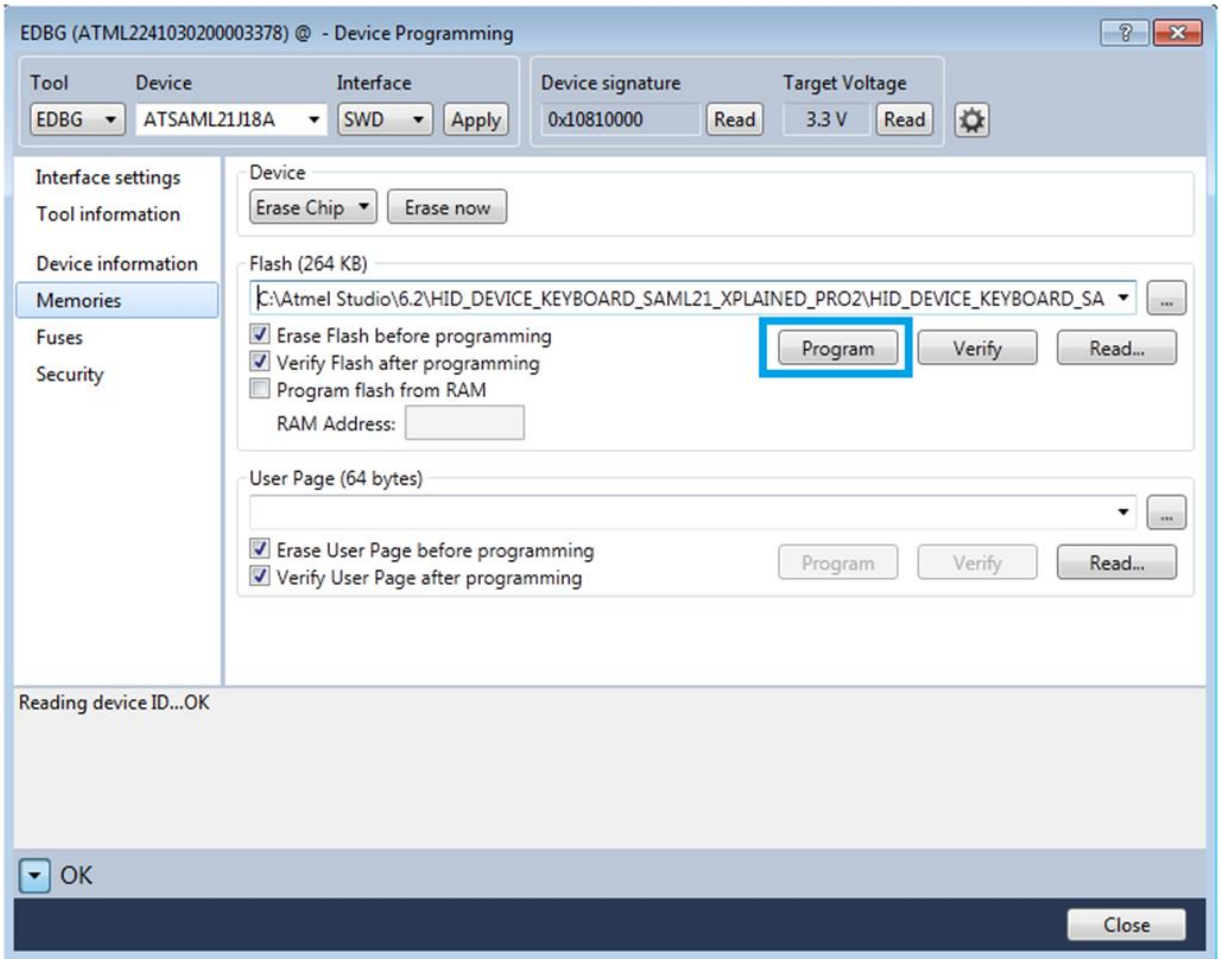
5. Download the application via the DEBUG USB to the SAM L21 board using Device Programming option available in Tools as shown below.

Figure 6-4. Selecting Device Programming Option



2. Program the device to download the HID Device application as shown below.

Figure 6-5. Flashing the Application on Atmel MCU



7 Console Display

For the purpose of debugging, logging is made available through a serial console. The logging interface utilizes the same COM 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.

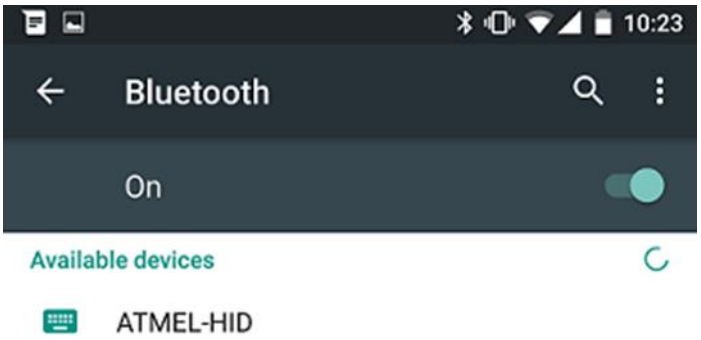
8 Running the demo

1. Connect the ATBTLC1000 Xplained Pro Board to SAM L21 Xplained Pro EXT2 as indicated in Figure 2 (The steps mentioned below use SAM L21 as reference. If SAM G55 or SAMD21 is used for the demo, the same steps are applicable)
2. Power on the SAM L21 by connecting the USB Cable.
3. On the PC, open any Terminal Application (e.g Teraterm). Select the appropriate COM Port (Settings: Baud rate 115200, None Parity, 1 Stop bit, 1 Start bit, No Hardware Handshake)
4. Press the Reset button on the SAM L21 or supported platform board
5. The device is now in advertising mode as shown below

Figure 8-1. HID Keyboard Device in Advertising Mode

6. The demo requires use of an Android mobile phone supporting HOGP. The HOGP profile is natively supported in Android from version 4.4(Android KitKat) and upwards. The phone must include support a Bluetooth chipset supporting BT 4.0 and upwards. On the mobile phone, go to Bluetooth settings page, scan for the devices. A device with “ATMEL-HID” will be found as shown below. Click on “ATMEL-HID” to get connected.

Figure 8-2. HID Keyboard Instance on Bluetooth Setting Page



7. Once the user clicks on “ATMEL-HID”, pairing procedure is initiated. User needs to enter the pairing code on the terminal console.

Figure 8-3. Pairing Procedure with HID Device

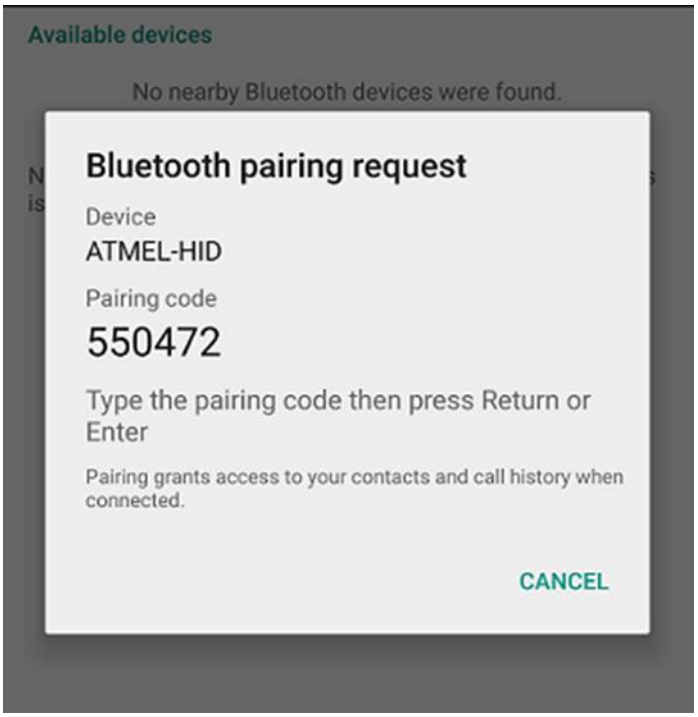
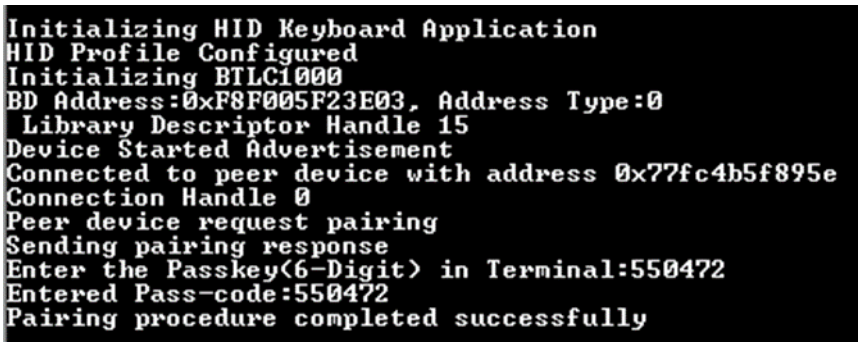
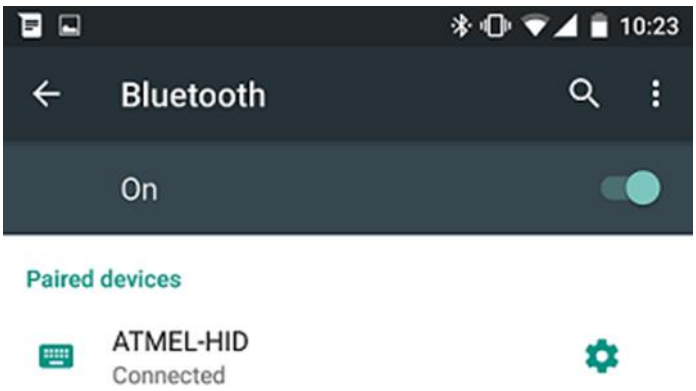


Figure 8-4. Entering Pairing Code on the Terminal Application



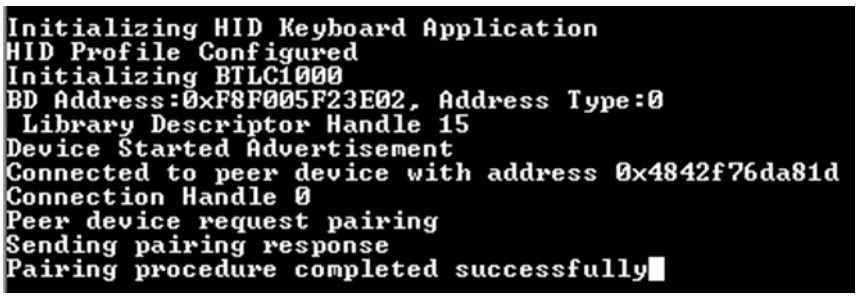
8. Once the pairing done connected device is listed in paired devices section

Figure 8-5. ATMEL-HID Device Shown as Connected



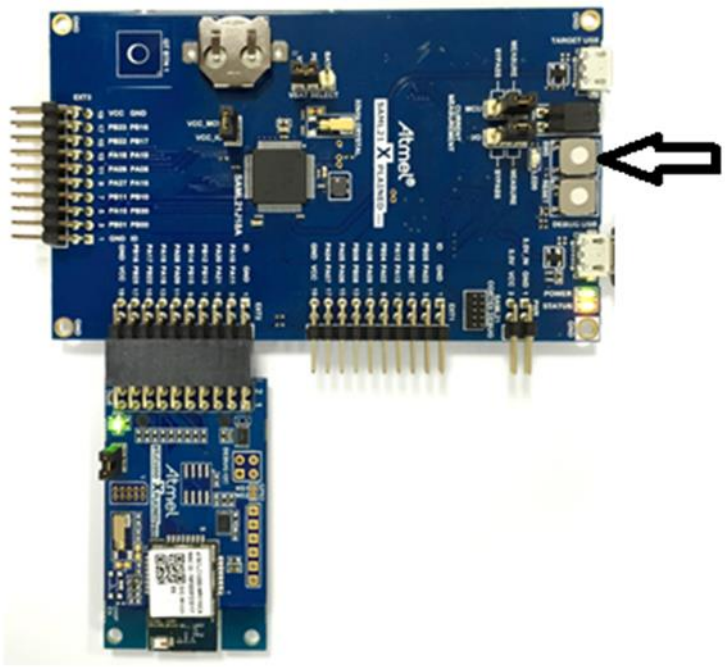
9. Console logs showing the device connected to the peer.

Figure 8-6. HID Keyboard Device Connected



10. Once the device connected, start any notepad application on the mobile phone.
11. Click the button “SW0” on supported platform as shown below.

Figure 8-7. Button "SW0" on SAM L21



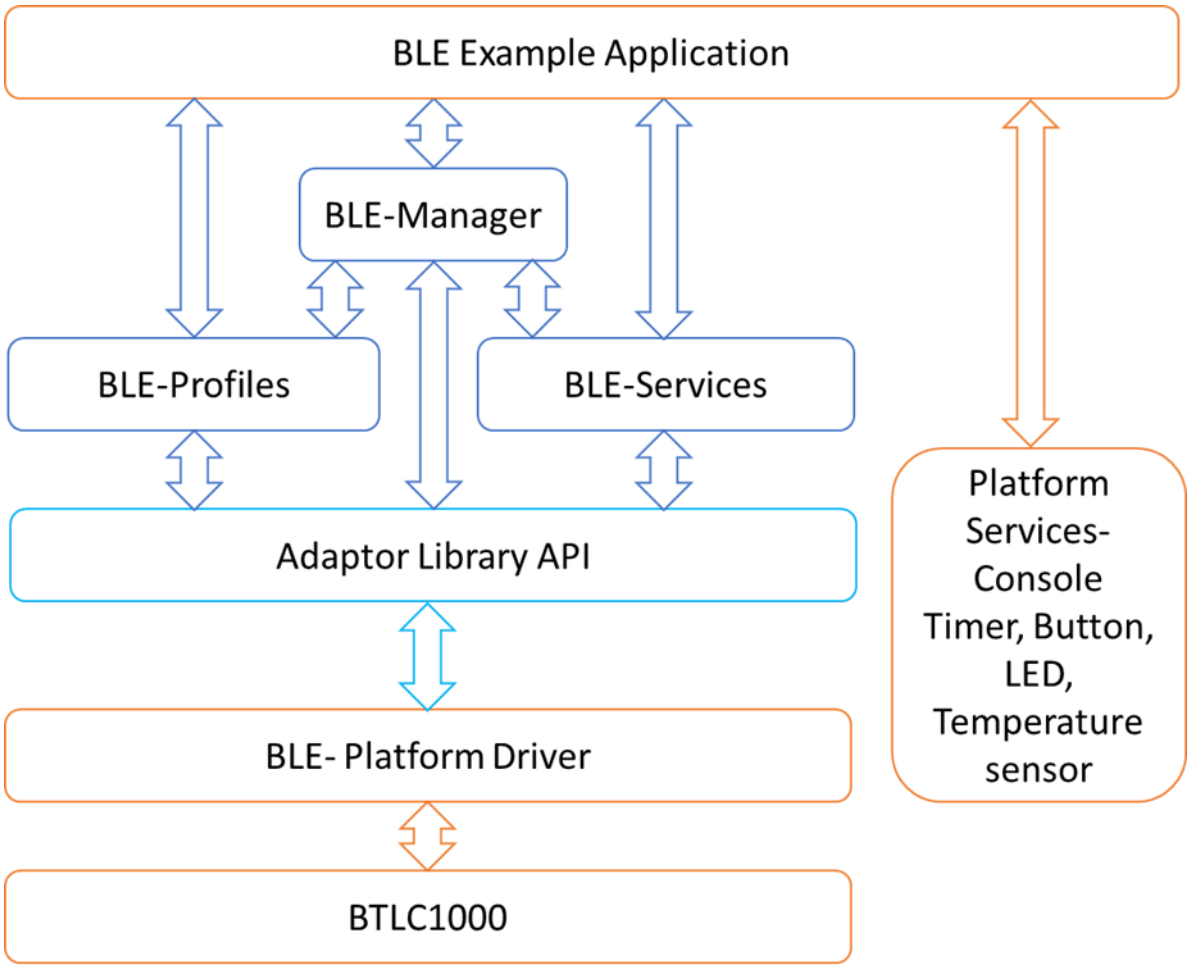
12. User can see a letter for each press in the application “Fast notepad” as shown below.
13. User can see a complete “Hello Atmel” in the application as shown below.

Figure 8-8. ”Hello Atmel” Displayed in the Application

9 BluSDK Software Architecture

The following diagram illustrates the various layers in the BLE subsystem for the BTLC1000 configuration. The External host can be supported platform.

Figure 9-1. BluSDK Software Architecture



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