ATBTLC1000 BluSDK

Time Information Profile – 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 release. The Bluetooth Time Information Profile is an example profile application implementing BLE Time Service. The Bluetooth device when connected with a compatible iPhone device supporting Time service reads the current time, date and day information from the iPhone and displays it on the console. This example application also works with BLE compatible Android devices running Atmel Smart Connect mobile application.

Features

- Device Discovery and Disconnection
- Pairing / Bonding
- BLE Time Client
- Console Logging

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1 Description

The Time Information Profile implements Time Service that is used to read the current time, date and day information from an iPhone.

The profile defines two roles:

- Time Client:

  The Time Client is the device in peripheral role that reads the time, date and day information. This is implemented in supported platform example application.

- Time Server:

  The Time Server is the device that provides the time related information.

  The Time Service is supported natively in iOS 7.0 and above. For BLE compatible Android devices, Atmel Smart Connect mobile application implements the Time Server.

This document explains the details about:

1. Getting started with the setup of supported platform.
2. Getting the Time Information Profile Application working on the above mentioned setup.

To test this profile example, an iPhone supporting iOS 7.0 (or above) or a BLE compatible Android phone running Atmel Smart Connect mobile application.

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 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

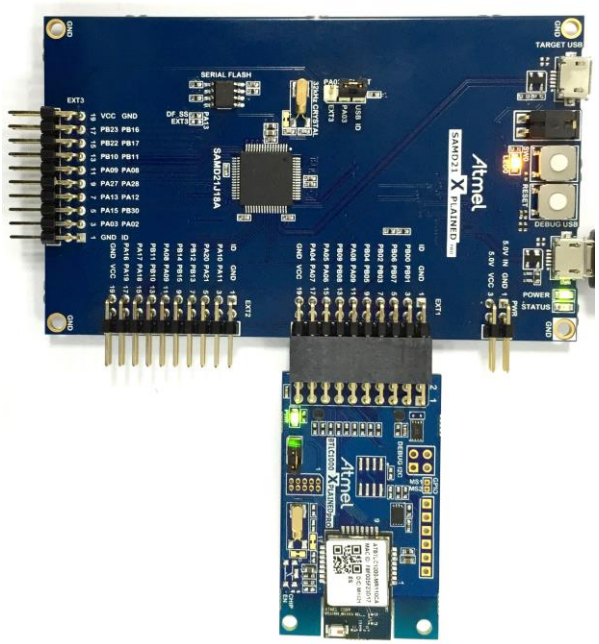
4 Hardware Setup

SAM L21 Xplained Pro Time Information setup

Figure 4-1. ATBTLC1000 Xplained Pro extension connected to a SAM L21 Xplained Pro

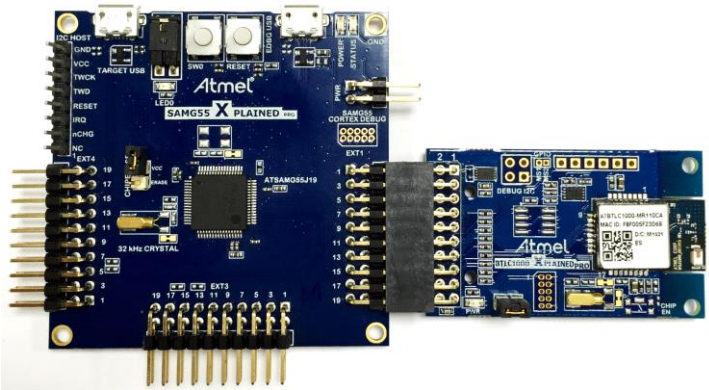
SAM D21 Xplained Pro Time Information setup

Figure 4-2. ATBTLC1000 Xplained Pro extension connected to a SAM D21 Xplained Pro



SAMG55 Xplained Pro Time Information setup

Figure 4-3. ATBTLC1000 Xplained Pro extension connected to a SAM G55 Xplained Pro



5 Software Setup

5.1 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. 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)

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.

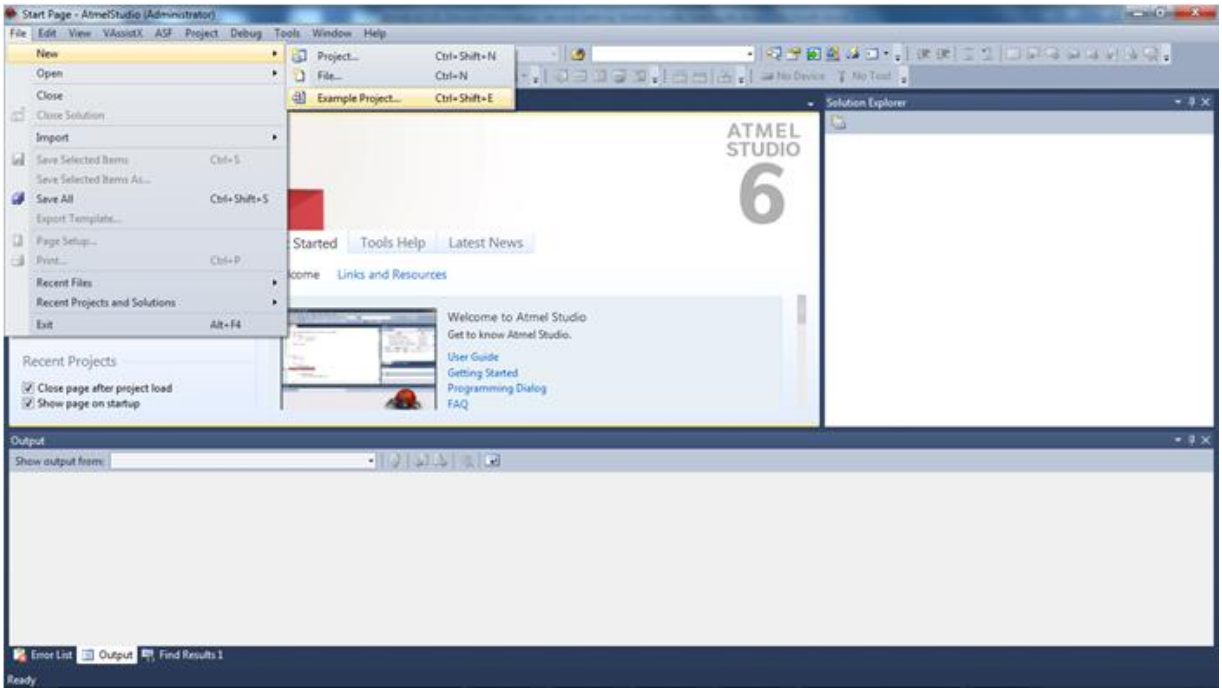
1. Time Information Application for SAM L21.
2. Time Information Application for SAM D21.
3. Time Information Application for SAM G55.

5.2 Build Procedure

The following procedure is explained for SAML21 application example. The same procedure is valid for the case of all the other supported platform as well.

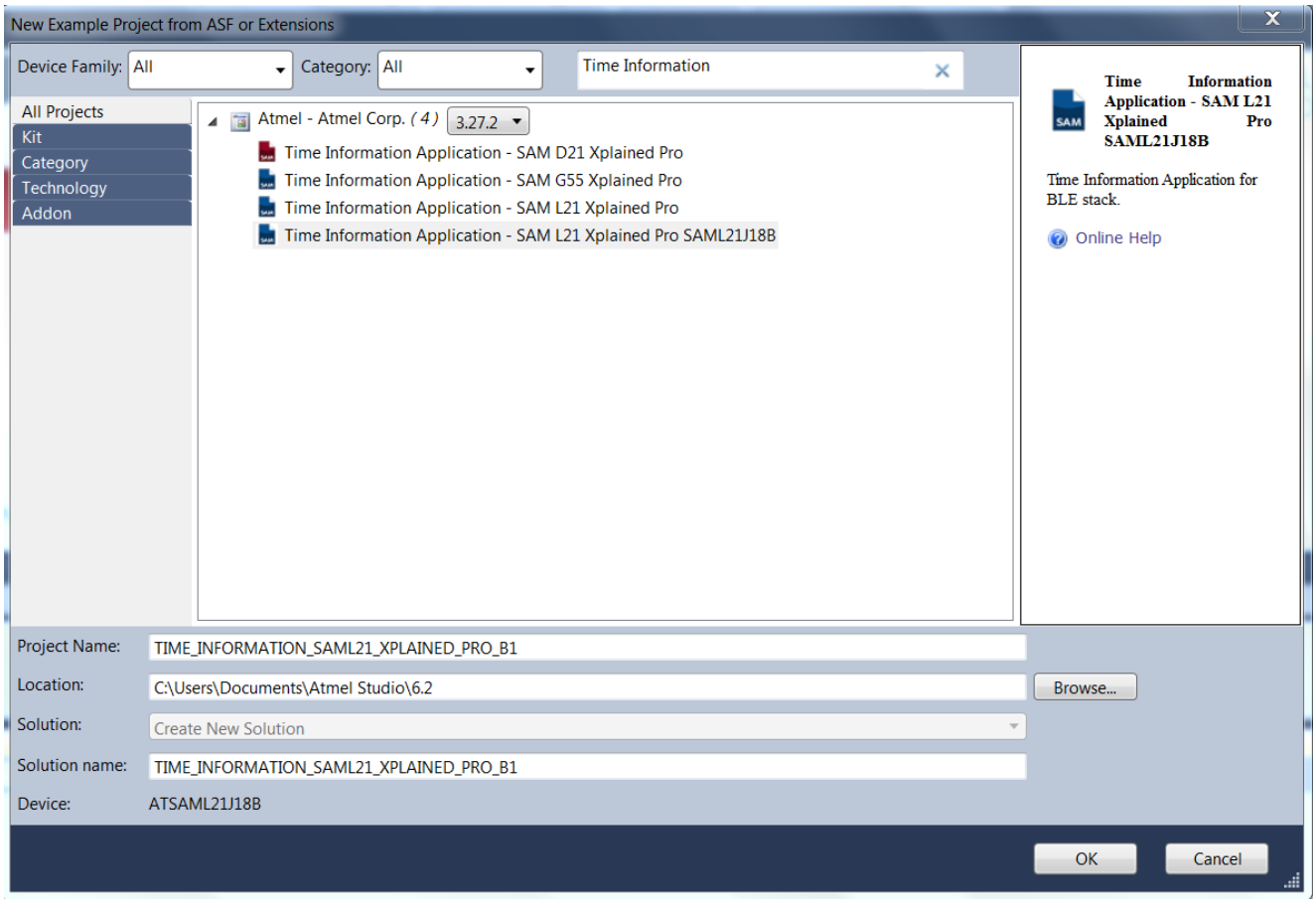
Select New Example Project

Figure 5-1. Creating a New Project



1. Enter “Time Information” 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

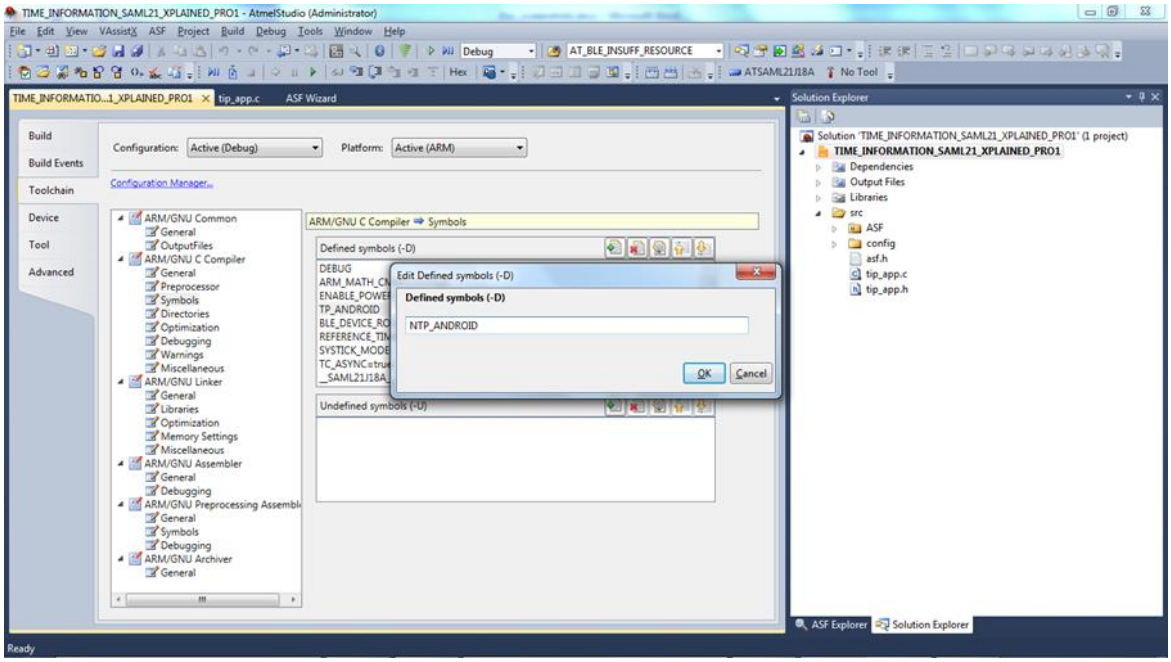
Figure 5-2. Selecting TIP Application from Example Projects



2. Accept the license Agreement. The studio will generate the Time Information Profile project for SAM L21.

3. Before building the solution, if the user is working with android devices user should make sure that there shall be a compiler symbol ” TP_ANDROID” and if user is working with iOS devices the same complier symbol should be renamed as “NTP_ANDROID” as shown below.

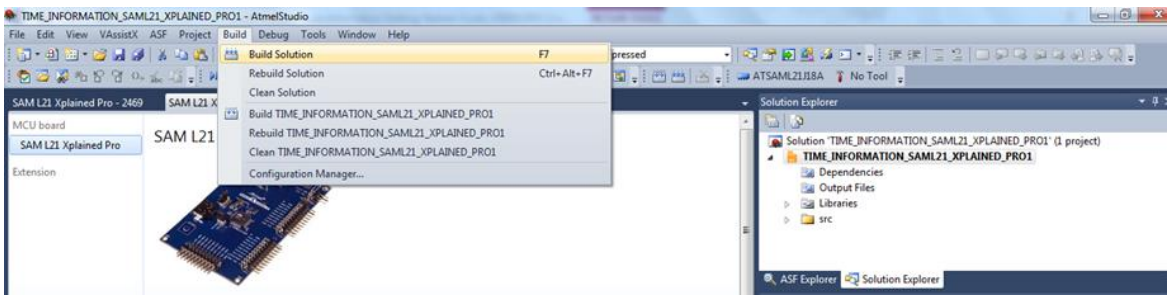
Figure 5-3. Editing compiler symbols



Note: iOS requires the device supporting Time Profile to include service solicitation advertisement type in the advertisement data. The above setting provides configurability to build the Time Profile for iOS or for Android. iOS natively supports Time Server and does not require a specific mobile application. To enable devices to be displayed in the iOS BLE devices page, the service solicitation advertisement data type configuration is necessary.

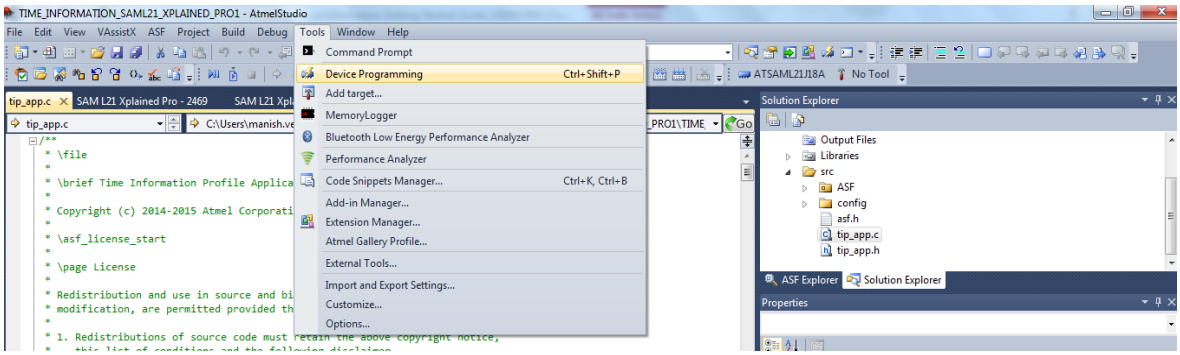
4. Build the solution.

Figure 5-4. Building the TIP Application



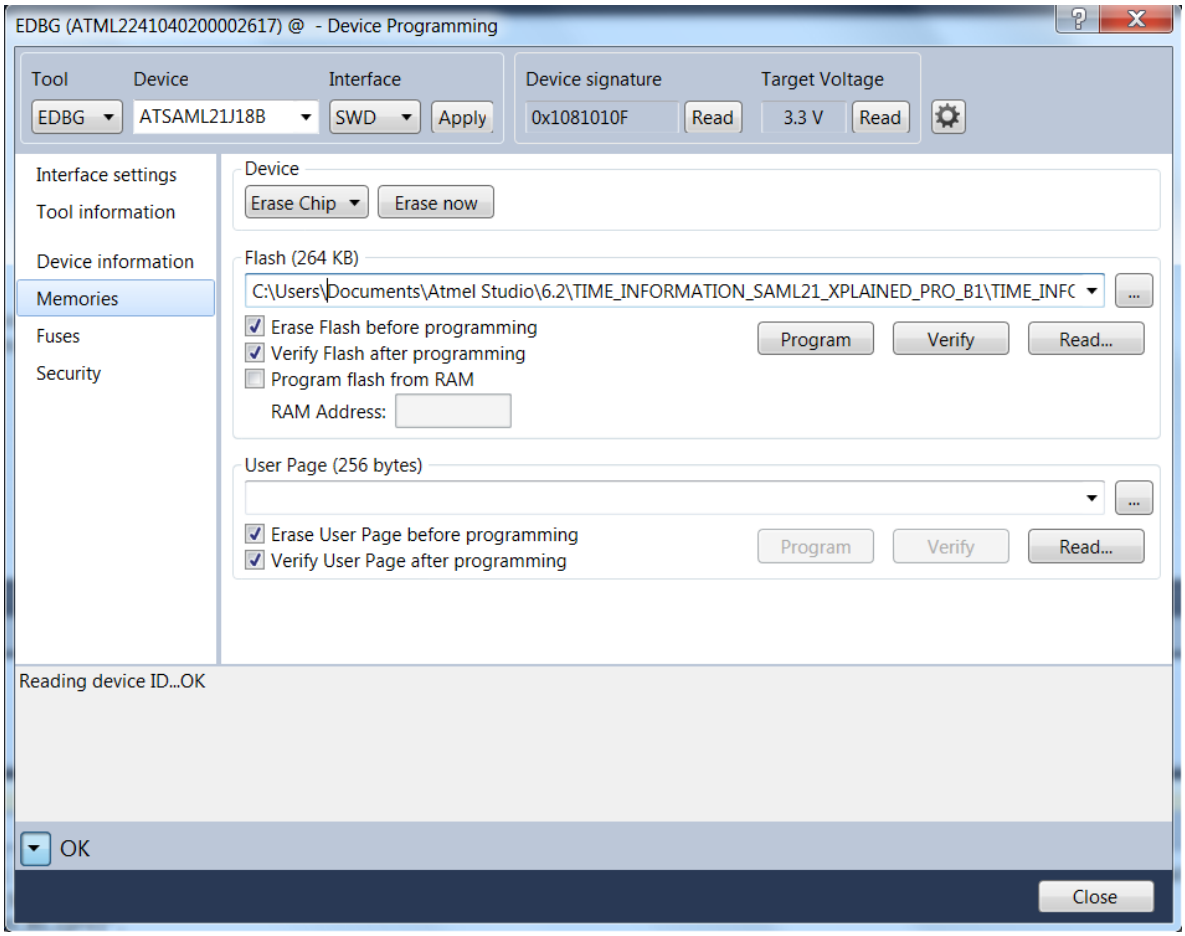
5. Download the application via the USB to the SAML21 board using Device Programming option available in Tools as mentioned below.

Figure 5-5. Select Device Programming



6. In the device programming tab, the user has to select the correct configuration for device and finally program the device using program button.

Figure 5-6. Flash Programming



7. Once the application is flashed, the Time Information client is ready for usage.

6 Console Logging

For the purpose of debugging, a logging interface had been implemented in the Time Information 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 corresponding COM port enumerated on the PC by the device.

7 Running the demo for iOS devices

1. The device must be flashed with the Time information client image built with the compiler symbol “NTP_Android” to be compatible with iOS devices.
2. Power on the SAM L21+ATBTLC1000 setup by connecting the USB Cable as indicated in Figure 1
3. 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, None Parity, 1 Stop bit, 1 Start bit, No Hardware Handshake)

4. Press the Reset button on the SAML21 or supported platform board.
5. The device is now in advertising mode.

Figure 7-1. Display for Advertising Mode

6. On the iPhone, enable Bluetooth in the Settings page. The phone will start to scan for devices. ATMEL-TIP will be appear amongst the devices scanned. Click on ATMEL-TIP to connect to the SAM L21 or supported platform +ATBTLC1000 device.

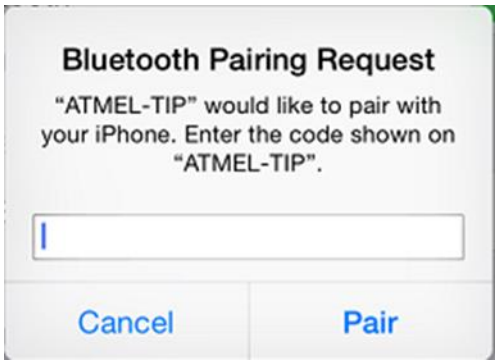
Figure 7-2. Atmel TIP device discovery on iPhone

7. Once connected, on the client side will request for pairing procedure with iPhone. The console log provides guidance to the user to enter the pass-key on iPhone.

Figure 7-3. Display for Connection and Pairing Info

8. On iPhone side, a pop-up screen prompting the user to enter the pass-key will appear. Enter ‘123456’ in the text box and click on ‘Pair’.

Figure 7-4. Pairing request Pop-Up on iPhone

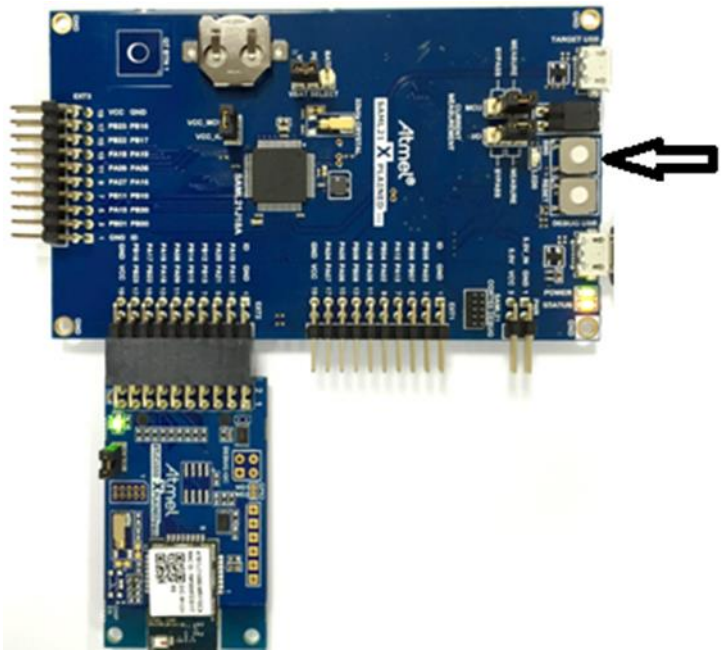


9. Once the device is connected. ATMEL-TIP will appear in the MY DEVICES section on the iPhone.

Figure 7-5. Pairing request Pop-Up on iPhone

10. Press the SW0 button on SAML21 or supported platform to read the internally supported characteristic values from iPhone.

Figure 7-6. Button for Reading Time Information



11. The console log on ATBTLC1000+SAML21 or supported platform will display the values for all characteristics supports by Iphone internally.

Figure 7-7. Console Display – Date, Time and Day Information

```
Current Time:[DD:MM:YYYY]: 13-09-2015 [HH:MM:SS]: 15:50:06  Day:SUN  Fraction:67
Time Zone 22
DST Offset 00  Standard Time
Current Time:[DD:MM:YYYY]: 13-09-2015 [HH:MM:SS]: 15:50:08  Day:SUN  Fraction:223
Time Zone 22
DST Offset 00  Standard Time
```

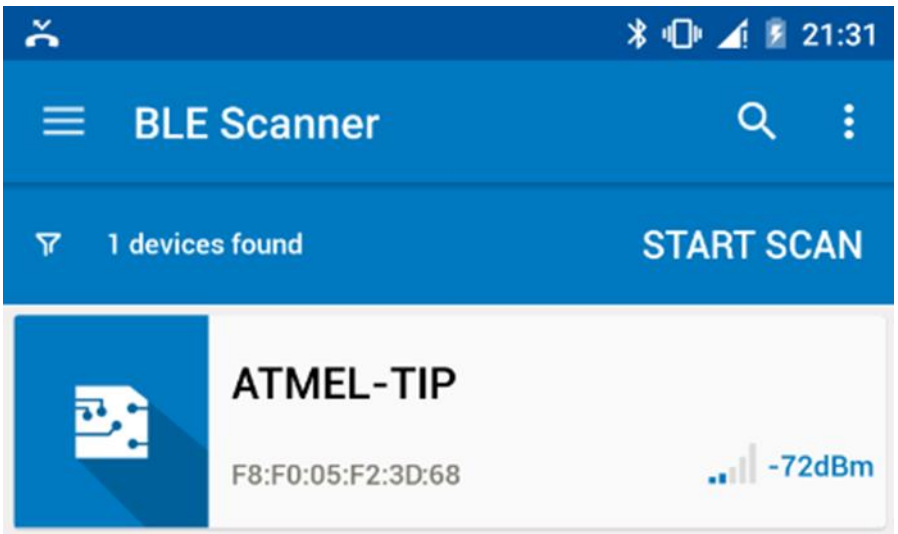
8 Running the demo for Android devices

1. The device must be flashed with the Time information client image built with the compiler symbol “TP_Android” to be compatible with BLE compatible Android devices running Atmel Smart Connect application.
2. Power on the SAM L21+ATBTLC1000 setup by connecting the USB Cable as indicated in Figure 1
3. 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, None Parity, 1 Stop bit, 1 Start bit, No Hardware Handshake)
4. Press the Reset button on the SAML21 or supported platform board.
5. The device is now in advertising mode.

Figure 8-1. Display for Advertising Mode

6. On the Android device, enable Bluetooth in the Settings page. Use the Atmel Smart Connect application to scan for peripheral devices. A device with name ‘ATMEL-TIP’ will appear amongst the list of scanned devices

Figure 8-2. ATMEL-TIP Device Discovered by Atmel SMART Application

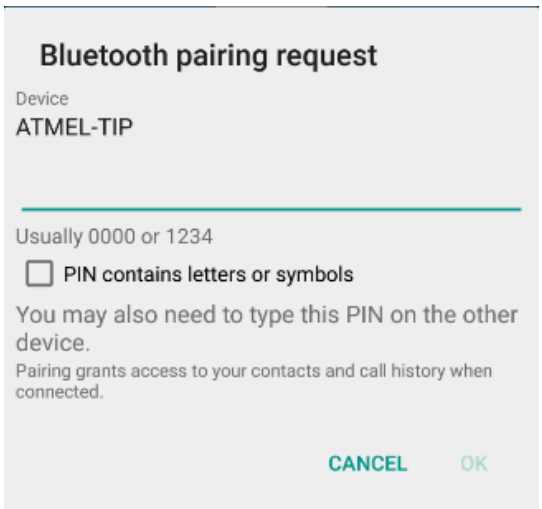


7. Once connected, on the client side will request for pairing procedure with Android device. The console log provides guidance to the user to enter the pass-key on device.

Figure 8-3. Display for Connection and Pairing Info

8. On device side, a pop-up screen prompting the user to enter the pass-key will appear. Enter '123456' in the text box and click on 'OK'

Figure 8-4. Pairing request Pop-Up on Android phone



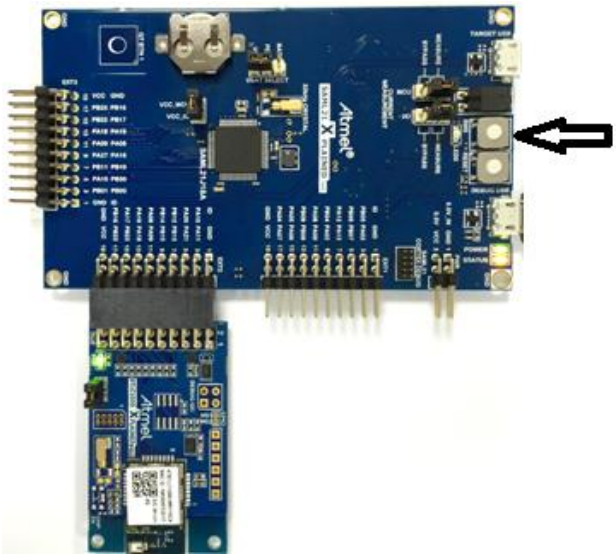
9. Once the device is connected. User can see the services as shown below.

Figure 8-5. Services of Time information profile

10. User has to click on the services to read the characteristic values.

11. Press the SW0 button on SAML21 or supported platform to read the internally supported characteristic values from device as shown in figure below.

Figure 8-6. Button for Reading Time Information



12. The console log on ATBTLC1000+SAML21 or supported platform will display the values for all characteristics supports by the device.

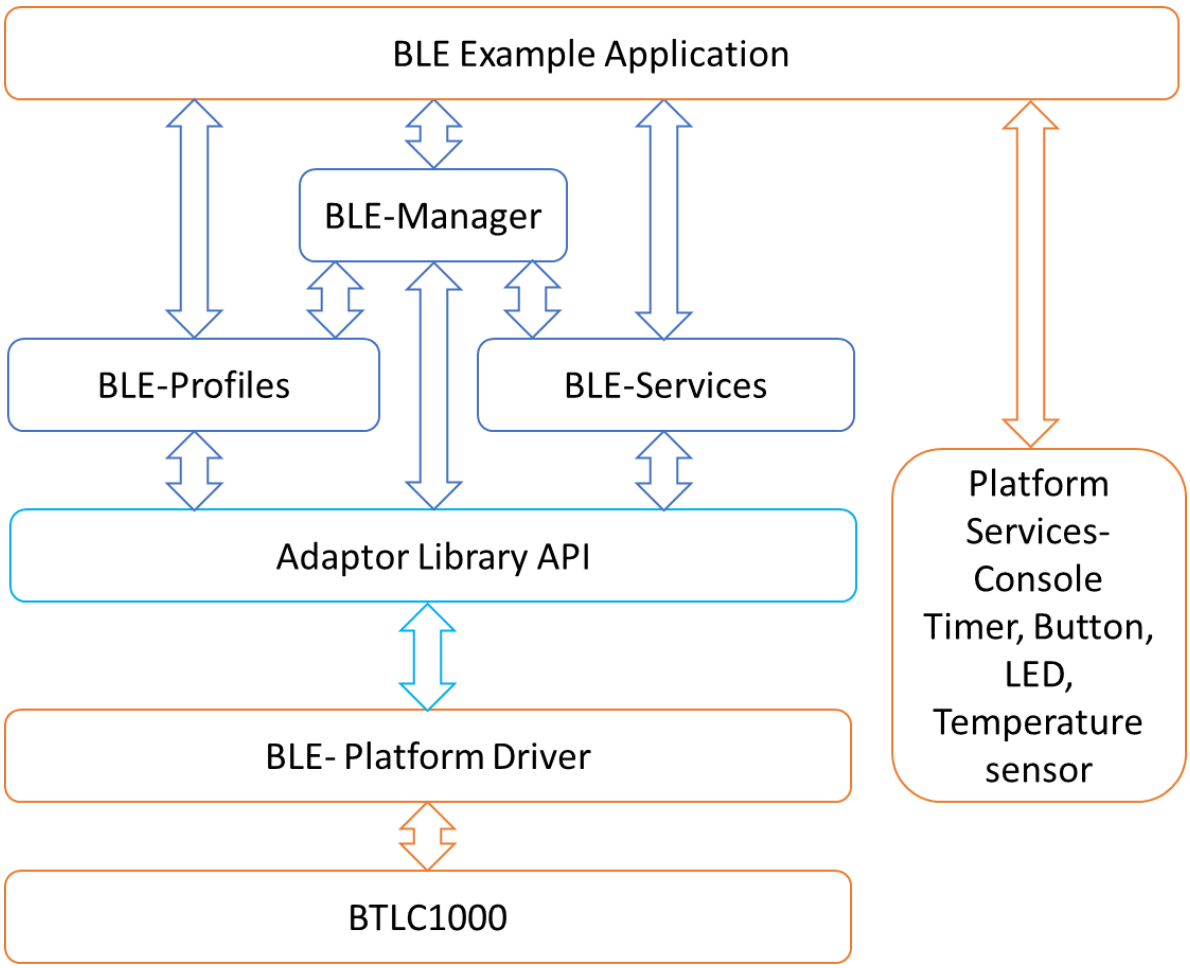
Figure 8-7. Console Display - All supported characteristic values

```
Current Time:[DD:MM:YYYY]: 13-09-2015 [HH:MM:SS]: 04:42:56  Day:SUN  Fraction:00
Time Zone 22
DST Offset 00  Standard Time
Time Source = 6 Cellular Network
Accuracy    = 255
Day  Since Update = 255
Hour Since Update = 255
DST Time is Time:[DD:MM:YYYY]: 13-09-2015 [HH:MM:SS]: 04:42:56  DST Offset is :00
Source = 255
Result = 00
```

9 BluSDK Software Architecture

The following diagram illustrates the various layers in the BLE subsystem for the ATBTLC1000 configuration. The External host can be supported platform. The application in this example is Time Information Application.

Figure 9-1. BluSDK Software Architecture



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11 Revision History

Doc Rev.	Date	Comments
42520A	09/2015	Initial document release.

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 Rev.:Atmel-42520A-ATBTLC1000-BluSDK-Time-Information-Profile-Getting-Started-Guide_USERGUIDE_092015