Transparent UART Demo User’s Guide

Transparent_UART_Demo_User's_Guide

Contents

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1. Overview

This document explains how to setup an Transparent UART demo using SAML21 Xplained Pro, BM71-XPro and Smart phone. This document briefly talks about setting up hardware, building application, programming firmware and running a demo.

This demo application showcases a Proof-of-Concept example of using **ble_host_sdk** to setup BM71 as Transparent UART pipe. This demo application uses predefined Transparent UART service to send and receive user data with remote device.

The following table provides the list of supported BLE services and Characteristics in this application.

Name	UUID	Properties	Size (bytes)
Transparent UART Service (Predefined)	0x49535343FE7D4AE58FA99FAFD205E455	-	-
Transparent TX Characteristic (Predefined)	0x495353431E4D4BD9BA6123C647249616	Notify, Write, Write without response	6
Transparent RX Characteristic (Predefined)	0x49535343884143F4A8D4ECBE34729BB3	Write, Write without response	6

1.1. Hardware Setup

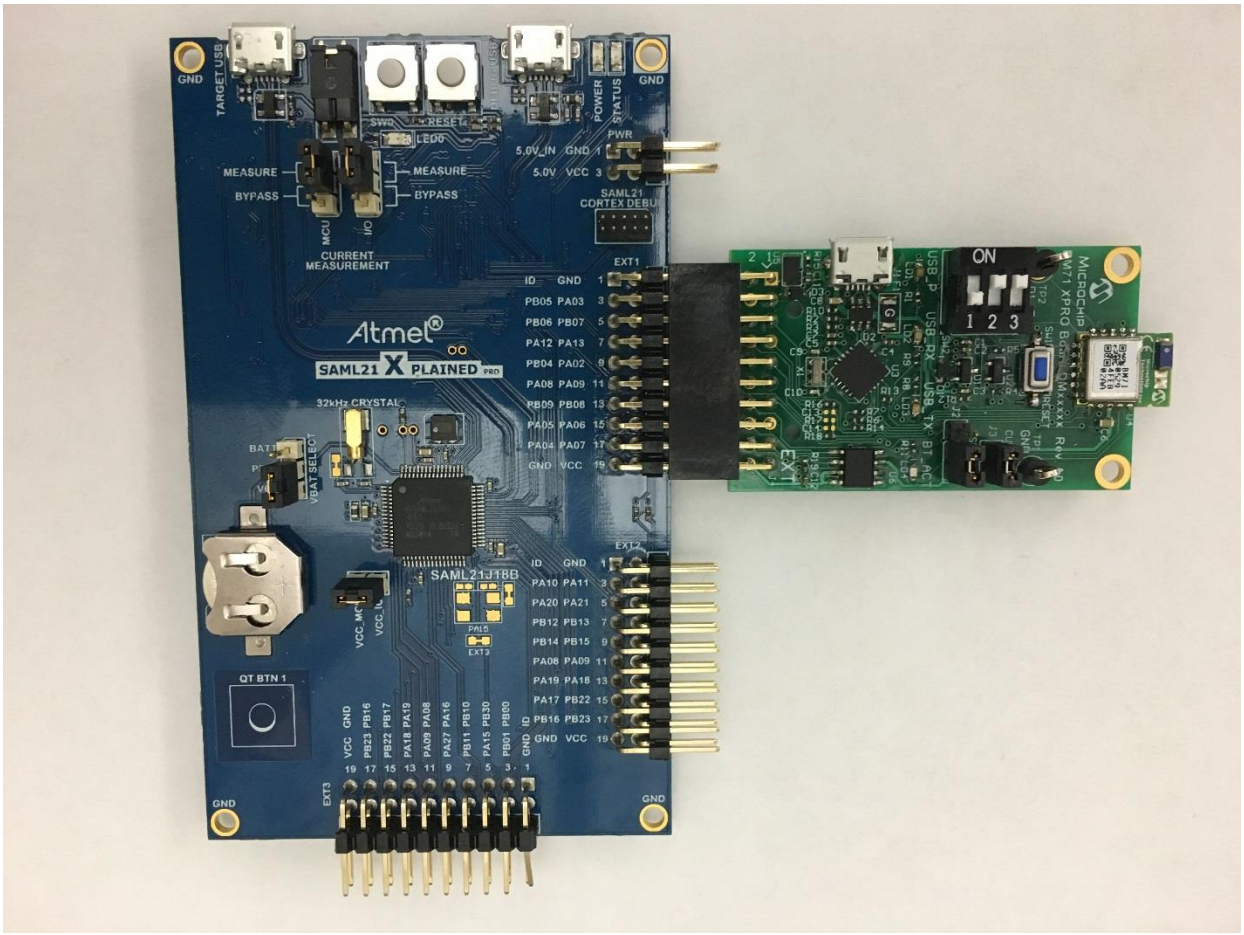


Figure 1: SAML21 Xplained Pro with BM71-XPro

1. Plugin the BM71-XPro board into EXT1 of SAML21 Xplained Pro board as shown in Figure 1.
2. Connect the SAML21 Xplained Pro board to the host PC using micro USB cable.

1.2. Smart Phone Application

You can download the SmartData for iOS phones from the following link.

iOS: https://itunes.apple.com/us/app/bluetooth-smart-data/id1004033562?mt=8

1.3. Console

The Transparent UART demo application uses the Universal Asynchronous Receiver/Transmitter (UART) interface on SAML21 Xplained Pro to get a user input and print the data received from remote device. Any serial application (ex: TeraTerm) can be used to interact with SAML21

Xplained Pro.

UART (COM port) Settings,

Baud rate	115200
Data	8 bits
Parity	none
Stop	1 bit
Flow control	none

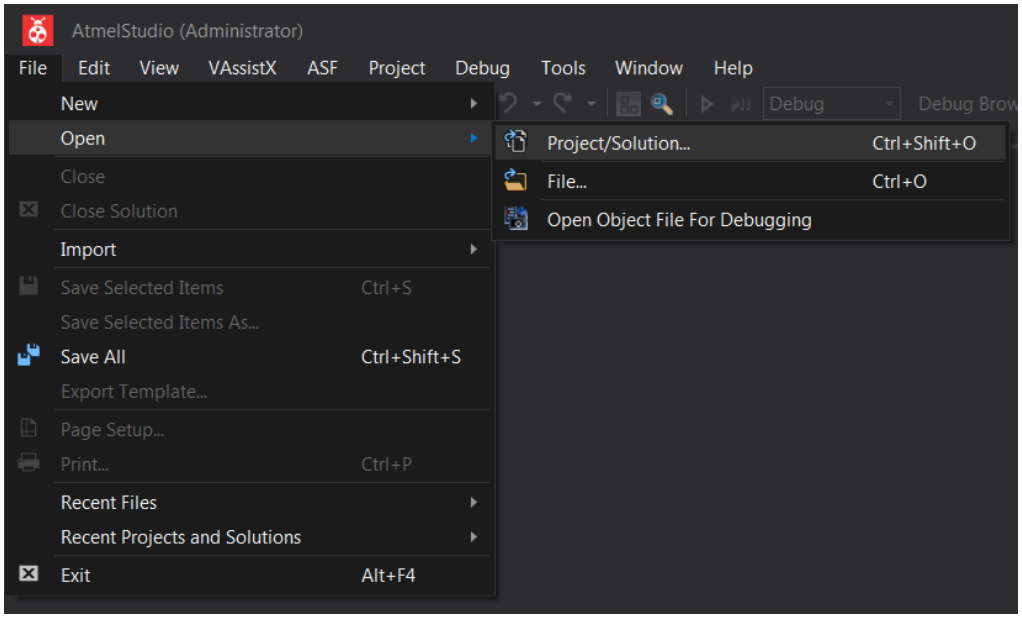
2. Build Procedure

This section describes the build procedure of Transparent UART demo application on Atmel Studio 7.

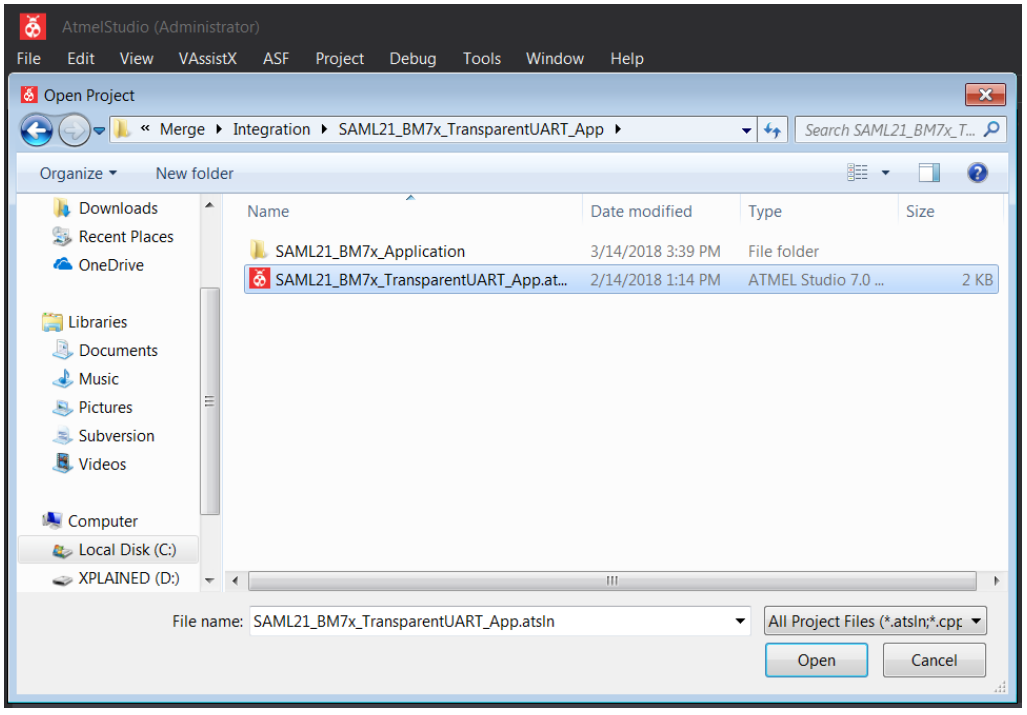
2.1. Open Atmel Studio 7

2.2. Open Transparent UART Demo Application

1. Go to menu **File → Open → Project/Solution**



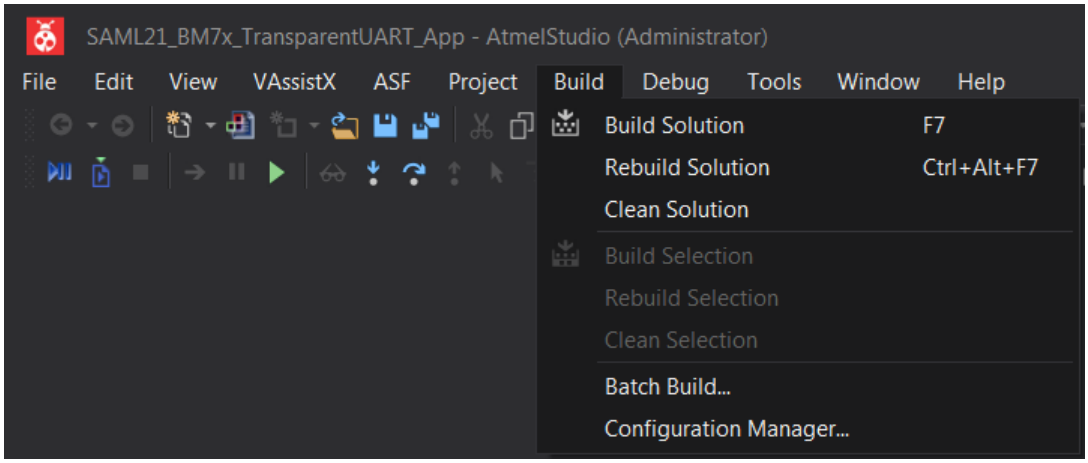
2. Select "SAML21_BM7x_TransparentUART_App.atsln" and press **Open**.



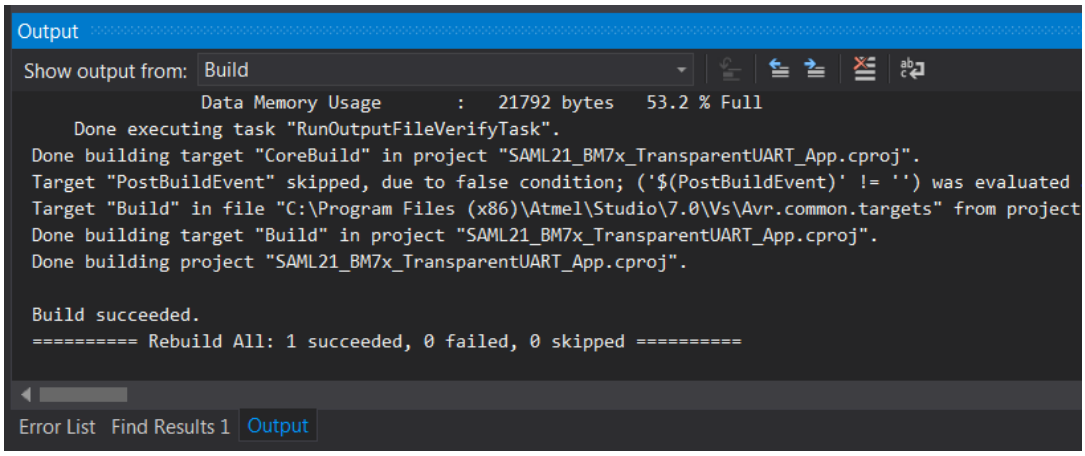
3. Once the project is opened, you can see the files attached to this project in Solution Explorer Window

2.3. Build Transparent UART Demo Application

1. Go to menu **Build → Build Solution** or Press **F7**



2. Build status can be checked in **Output** window

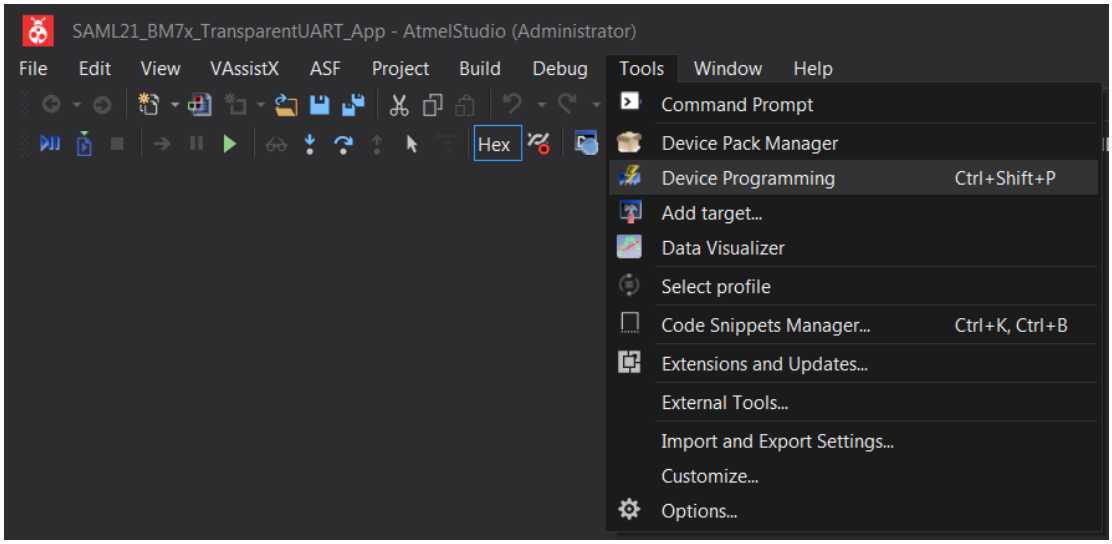


3. You can find the Hex images in "..\SAML21_BM7x_Application\Debug".

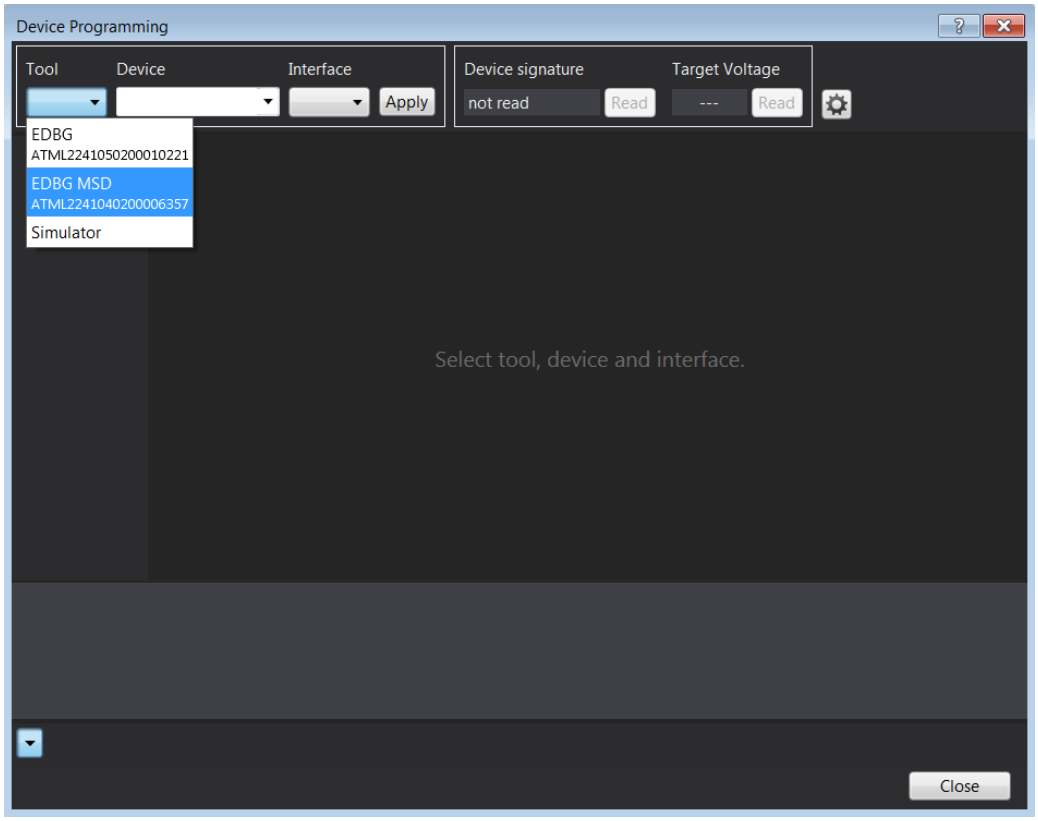
3. Programming Firmware

This section describes the procedure to program Transparent UART demo firmware on SAML21 Xplained Pro board.

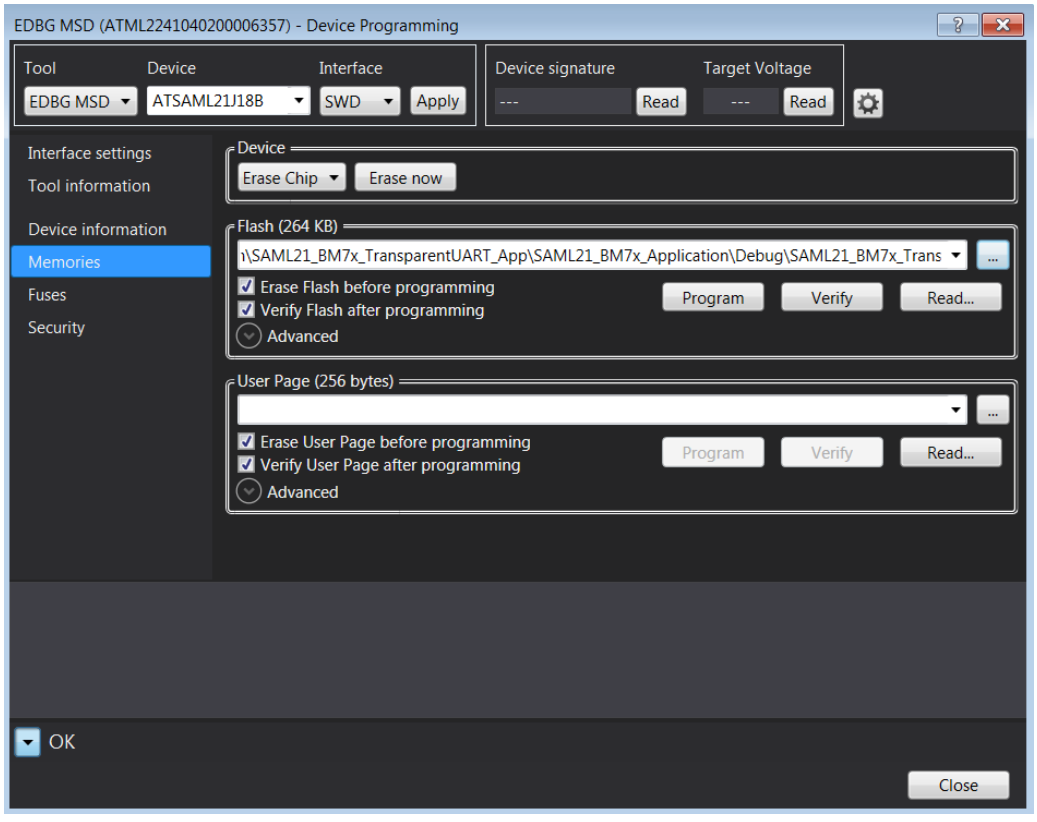
1. Connect the SAML21 Xplained Pro board to the host PC using micro USB cable. Perform the following steps:
    a. Verify that the virtual COM port is enumerated on the host PC.
    b. Make sure that POWER LED (green) is solid ON.
2. To program the HEX files into the SAML21, go to menu **Tools → Device Programming** or Press **Ctrl + Shift + P**.



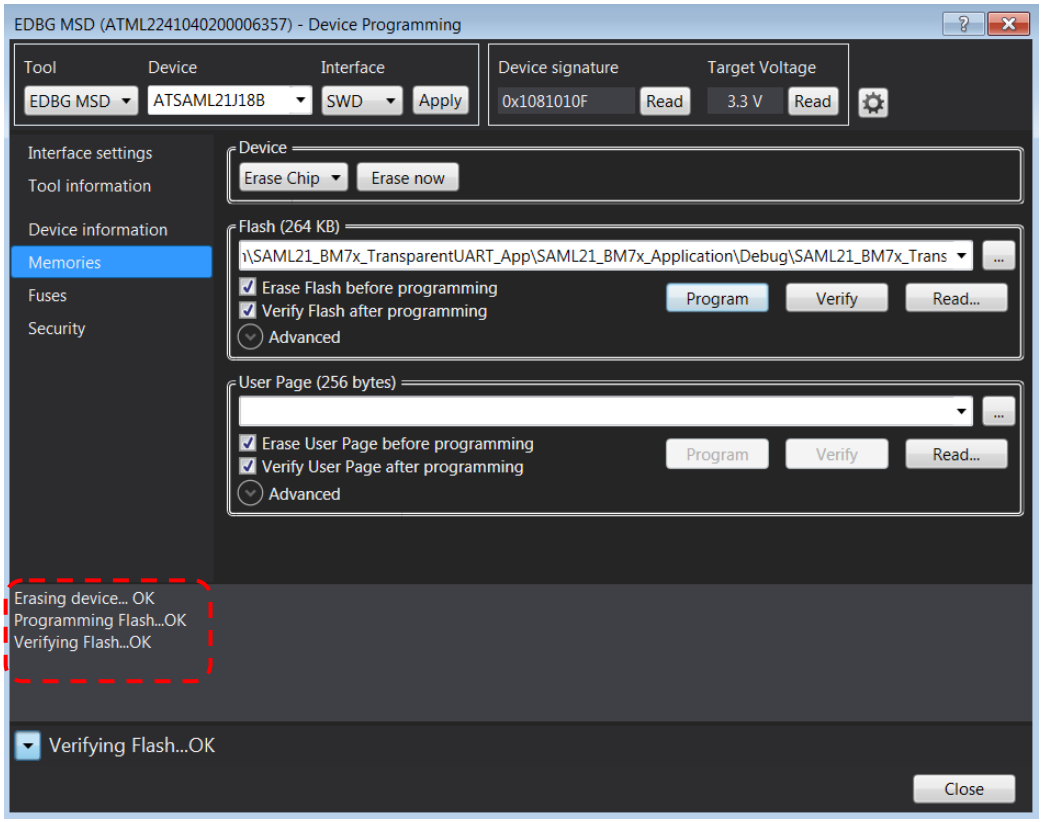
3. Select the corresponding **EDBG** and press **Apply**.



4. Go to **Memories** Tab and select Hex file.



5. Press **Program**, the tool will program SAML21. You can check the status of programming.



6. Once programming is done, close the Device Programming window.

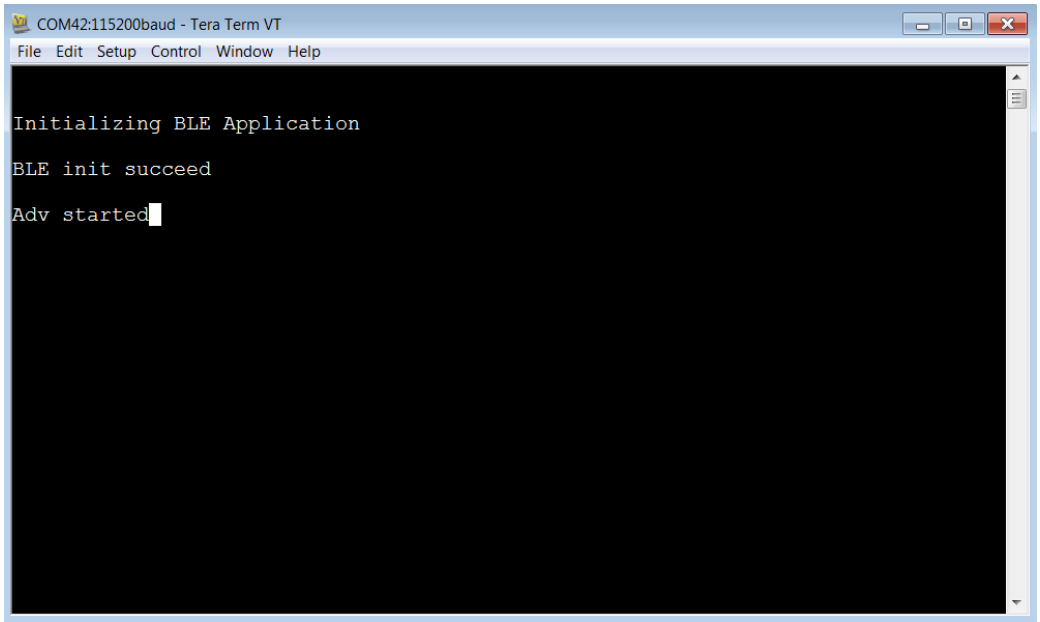
4. Running Transparent UART Demo with Smart Data App

This section describes the Transparent UART Demo procedures to work with iOS Smart Data App.

1. Connect BM71-XPro on EXT1 of SAML21 Xplained Pro board (Transparent UART device).
2. Connect the Transparent UART device to the host PC using micro USB cable. Perform the following steps:
    a. Verify that the virtual COM port is enumerated on the host PC.
    b. Open the enumerated COM port on a serial terminal application like TeraTerm with the following settings:

Baudrate	115200
Data	8 bits
Parity	none
Stop	1 bit
Flow control	none

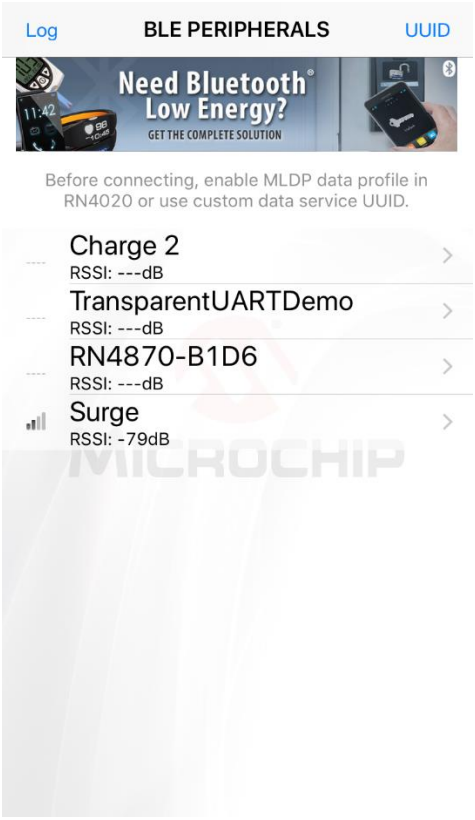
    c. Make sure that POWER LED (green) on SAML21 Xplained Pro board is solid ON.
    d. Press Reset button on SAML21 Xplained Pro board and verify that LD4 (blue) on BM71-XPro is blinking at a regular interval.
3. Ensure that the Transparent UART device is advertising by checking the TeraTerm window for advertising status message.



4. Download and install the Smart Data App on iOS device using the links below:

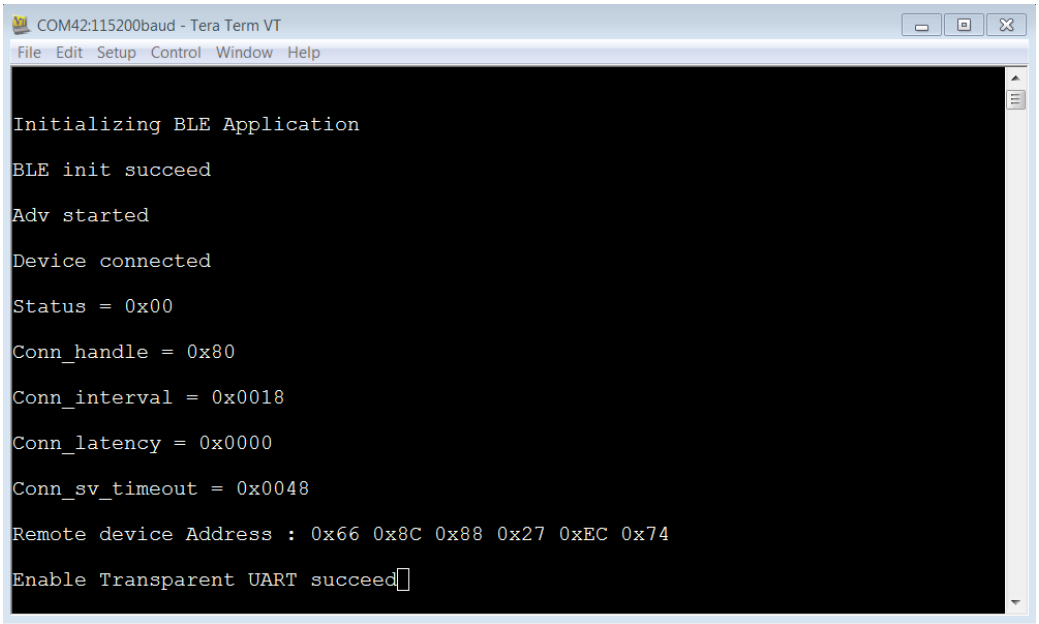
iOS: https://itunes.apple.com/us/app/bluetooth-smart-data/id1004033562?mt=8

5. Open **Smart Data App** on Smart phone.
6. Smart Data App will show all the BLE devices in vicinity.
7. Click on **TransparentUARTDemo** from device list showed in Smart Data App to connect to the BM71.

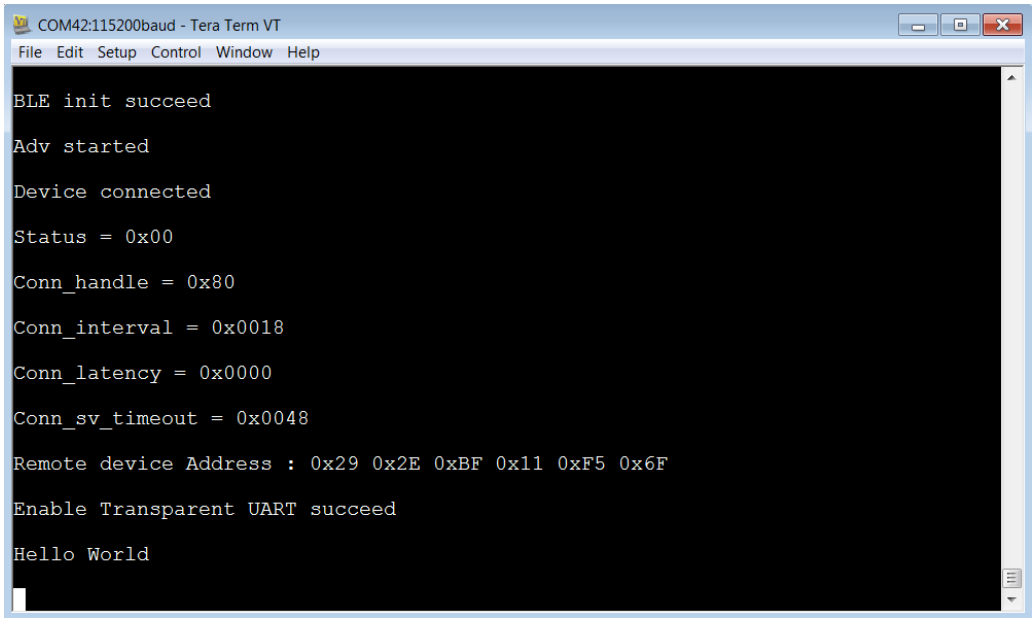


8. Once connected, the Smart Data App opens transparent UART pipe and ready to send/receive data.

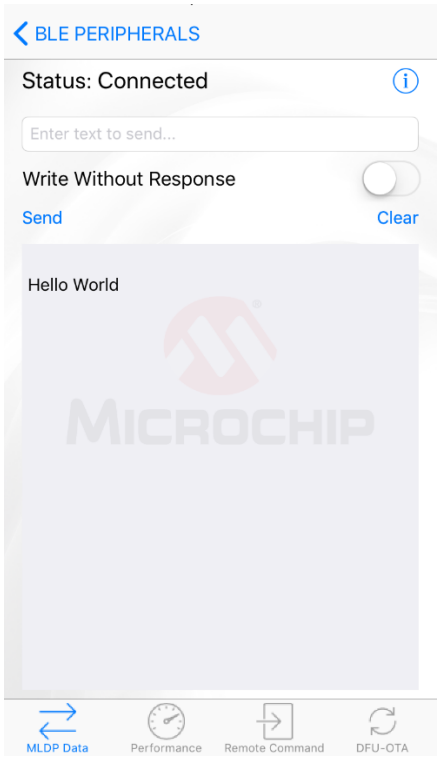
9. Similarly, after successful connection Transparent UART application prints the connection details in console and opens transparent UART pipe.



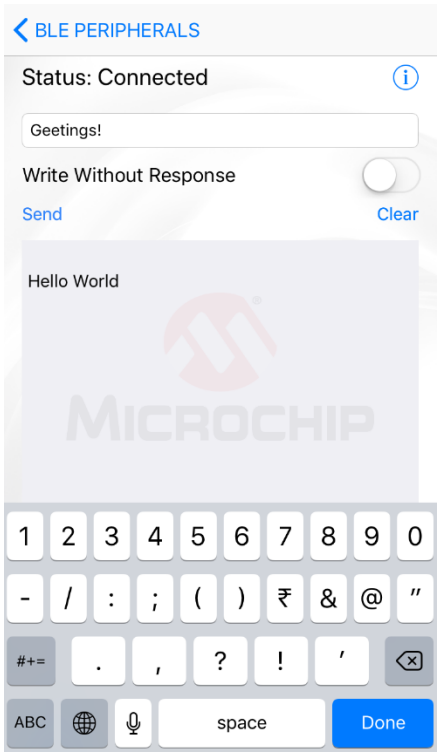
10. Once transparent UART pipe is opened, the data entered in serial console application will be transferred to Smart Data App over BLE transparent UART.



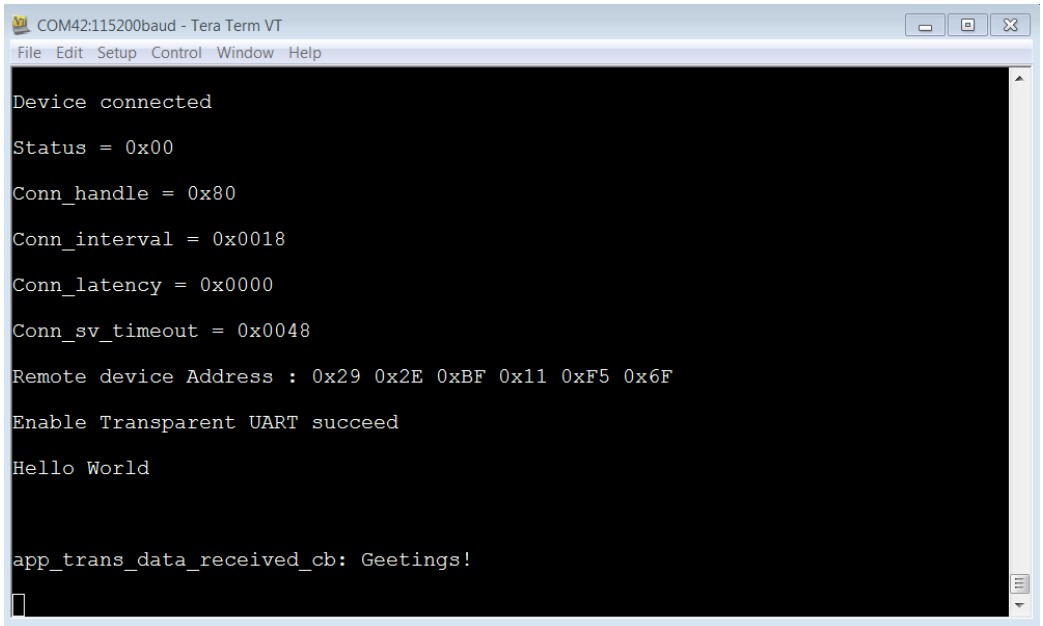
11. Smart Data App will display the received data from BM71.



12. Smart Data App can also send data to BM71 by enter the message in text box and press **Send**.



13. Transparent UART demo application will print the received data in serial console.



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