ATWINC3400 BLE Provisioning - Setup and Usage

USER GUIDE

Introduction

This user guide describes how to run the Atmel® ATWINC3400 Bluetooth® Low Energy (BLE) Provisioning demo from out-of-box conditions.

Features

- How to download the ATWINC3400 firmware
- How to build and install the iPhone® application
- How to Install the Android™ application
- How to run the demo

Prerequisites

- Hardware Prerequisites
  - Atmel SAM D21 Xplained Pro Evaluation Kit
  - Atmel ATWINC3400 extension
  - Micro-USB Cable
  - TotalPhase Aardvaark I²C/SPI Host Adapter
  - BLE capable SmartPhone:
    - Android 5.1 or higher
    - Apple® iPhone 6
- Software Prerequisites
  - ATWINC3400 Firmware
  - BLE Provisioning SmartPhone Application (IPhone or Android)
  - Atmel Studio version 7.0 or higher
  - samd21_xplained_pro_ble_provision_app

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1 How to Flash the ATWINC3400 Firmware

To write the ATWINC3400 firmware to the current level, refer to the Atmel Getting Started Guide for ATWINC3400 [R01].

2 How to Build, Download, and Use the SAM D21 BLE Provisioning Demo

2.1 Building and Downloading

Using Windows® Explorer, navigate to the release package and the src\Tools\samd21_xplained_pro_wifi_ble_provision_app directory:

1. Open the samd21_xplained_pro_wifi_ble_provision_app.atsln project file in Atmel Studio.
2. Build the software and run the software in Atmel Studio as usual (press ‘F5’).

2.2 Running the Demo

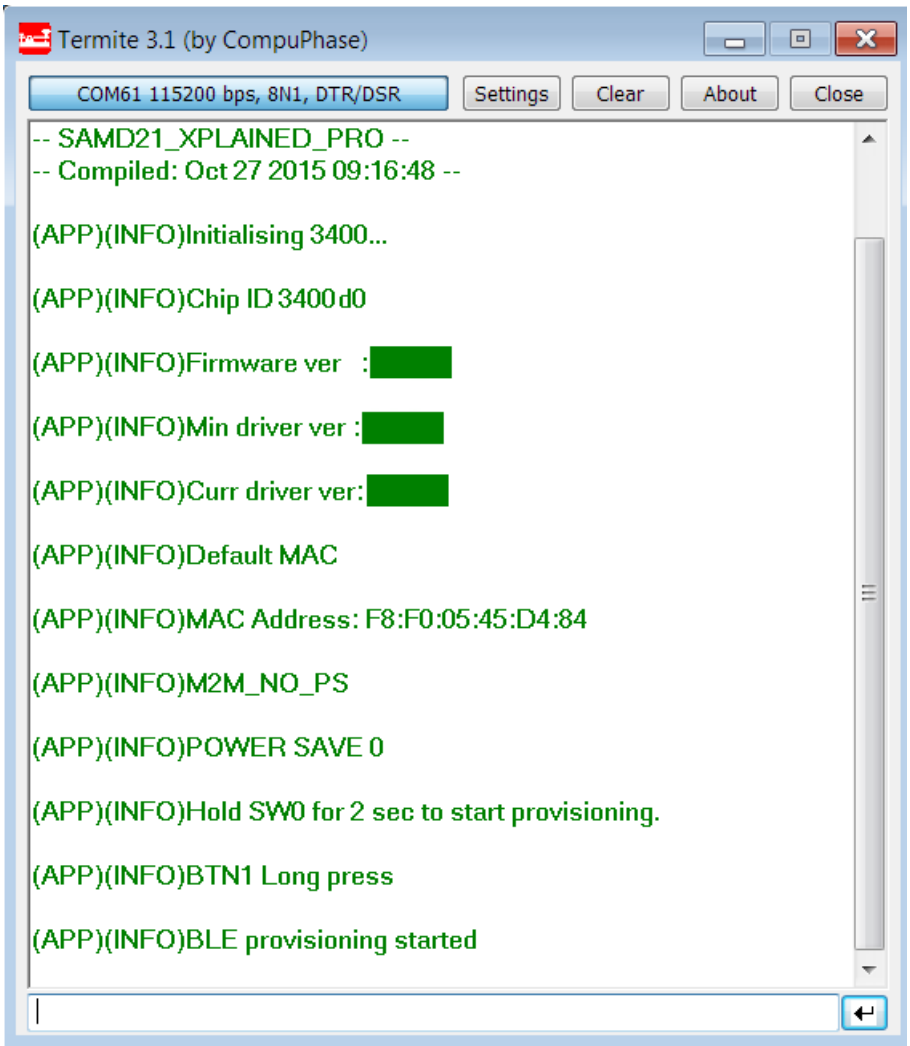
Open a serial terminal to view output from the SAM D21. Baud rate 115200.

Now run the software in Atmel Studio (press ‘F5’).

The terminal will prompt the user to press button SW0 for two seconds in order to kick off provisioning. Press SW0 on the SAM D21 Xplained Pro.

The ATWINC3400 now connects to the Wi-Fi® Access Point.

Figure 2-1. ATWINC3400 in Provisioning Mode

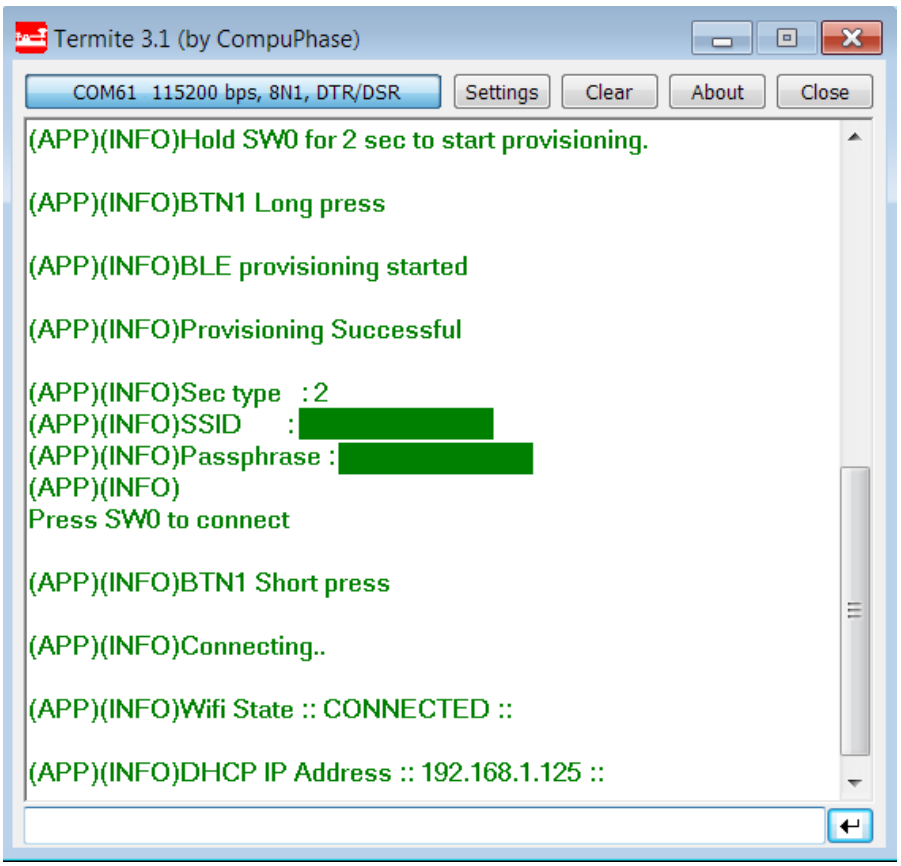


Use one of the SmartPhone apps (described in Chapters 3 and 4) to provide the SSID and Passphrase of the Wi-Fi Access Point.

Provisioning completes and the terminal will prompt the user to press button SW0 for two seconds in order to connect. Press SW0 on the SAM D21 Xplained Pro and hold it for two seconds.

The ATWINC3400 now connects to the Wi-Fi Access Point.

Figure 2-2. ATWINC3400 Connected to Wi-Fi Access Point



Once connection completes, the terminal displays the IP address of the ATWINC3400. The connection can be demonstrated by sending a ping request to this IP address via the Access Point.

3 How to Install (Sideload) and Use the Android Application

3.1 Installation

The Android application is supplied as an Android Package file (app-debug.apk) in the release package under directory src\Tools\Android_apps\BLE_Prov_Demo.

Firstly you must enable “Unknown Sources” on your Android SmartPhone:

1. Navigate to Settings\Security and check the box next to “Unknown Sources”.
2. A dialog window may pop up asking for confirmation, tap OK to confirm.

Figure 3-1. Unknown Sources.

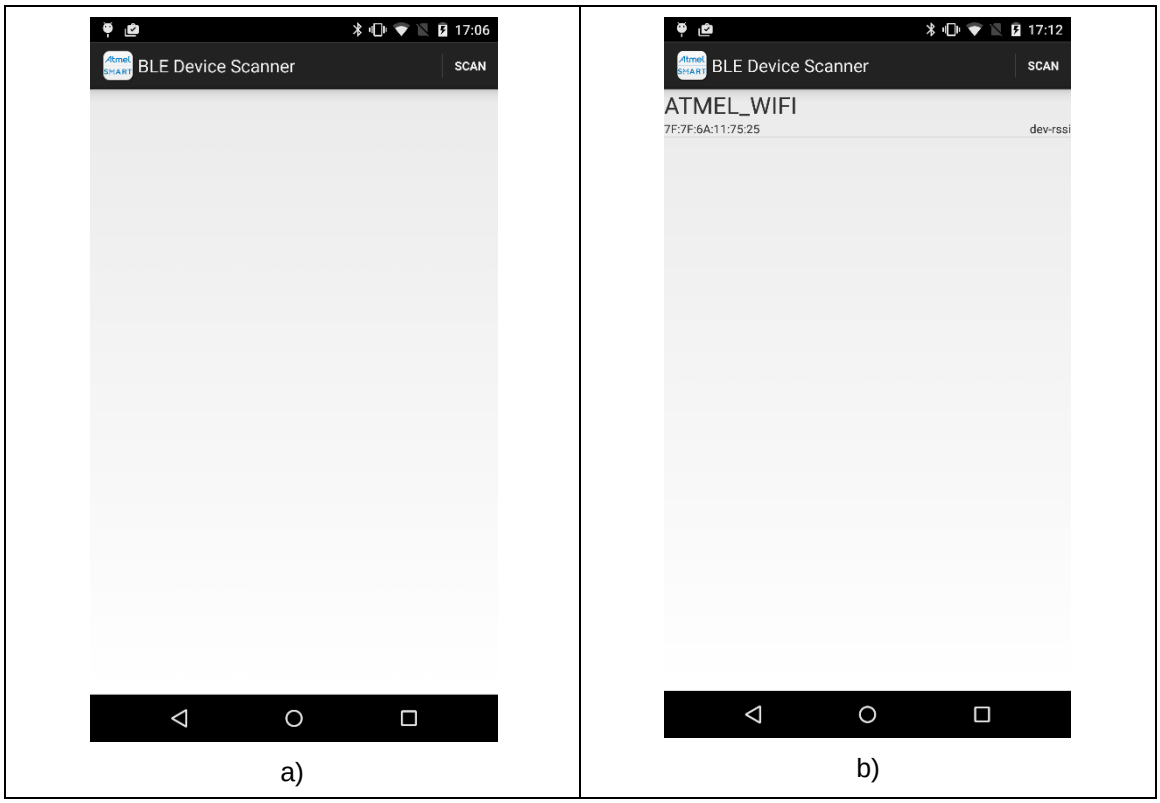
3. Connect the SmartPhone to the Host PC via a USB cable and copy the Android package from the release onto the Phone (e.g. into the ‘Download’directory).
4. Use a file manager on the SmartPhone, navigate to the APK file, and tap on it. As part of the installation, the app will request access to Bluetooth settings and for permission to pair with other Bluetooth devices. Accept these requirements by tapping the INSTALL button.

3.2 Using the Android Provisioning Application

On launching, the application will present a basic user interface for detecting BLE devices that supports the Atmel provisioning profile.

1. Start a BLE scan by tapping the ‘SCAN’ button, see Figure 3-2(a).

Figure 3-2. BLE Peripheral Scanning



2. After tapping on an ATMEL_WIFI BLE peripheral, the application will transition to Wi-Fi Provisioning Mode as depicted in Figure 3-3(a). The user may choose a security type and enter the SSID and passphrase (“Network Key”) manually.

   Alternatively the user may wait for discovered access points to be displayed in a list underneath the CLEAR, PROVISION, and SCAN buttons. Tapping on a discovered access point entry in the list will automatically populate the Security and SSID user interface elements. The user must then enter the passphrase (“Network Key”) if it is a secured network.

   Tapping the tick-box next to the “Network Key” field will reveal the text being typed.

   There are restrictions to the length of the network key required for provisioning to be enabled, depending on the security method chosen. These are described in Table 3-1.

Table 3-1. Network Key Length Restrictions

Security	Required key length
Open	0
WEP	5 or 13 characters
WPA	8 to 63 characters

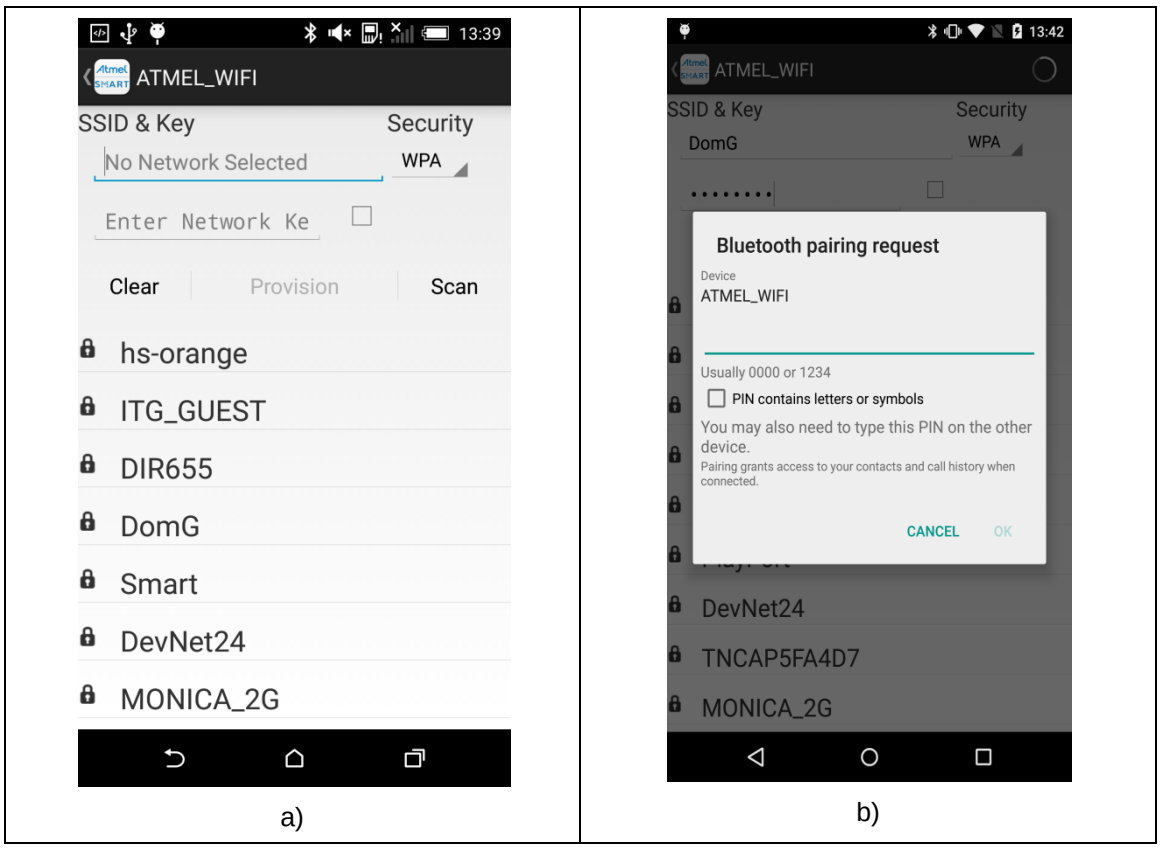
3. To proceed with provisioning, the user should tap the PROVISION button.

   If “Open” Security is selected, the user will be warned and asked to confirm that he wish to connect. After tapping the PROVISION button (and confirming in the case of open security), the application will cause

the SmartPhone to request Bluetooth pairing information (the SmartPhone may present a dialog, or vibrate and present a notification that the user must open). This is shown in Figure 3-3(b).

4. To pair with the ATMEL_WIFI provisioning peripheral, the user must enter a PIN of '123456' and tap the OK button.

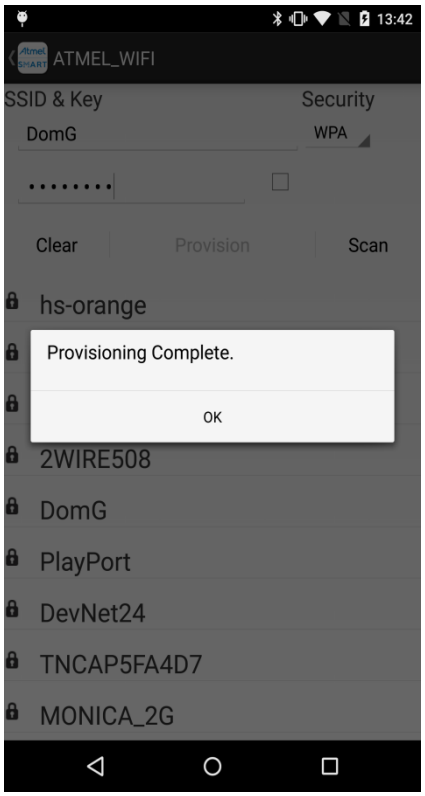
Figure 3-3. Android Application in Wi-Fi Provisioning Mode



The application will then securely transfer the information related to the chosen access point to the ATMEL_WIFI provisioning peripheral.

5. Once provisioned, a short press of the SW0 button on the peripheral will initiate a Wi-Fi connection using the provided provisioning info. The Android app will update the user as this connect progresses, and will display the result of the connect attempt in a dialog (successful or otherwise) as shown in Figure 3-2.

Figure 3-4. Provisioning Complete



6. Tapping on the OK button will return the application to BLE scanning mode (Figure 3-2(a)).

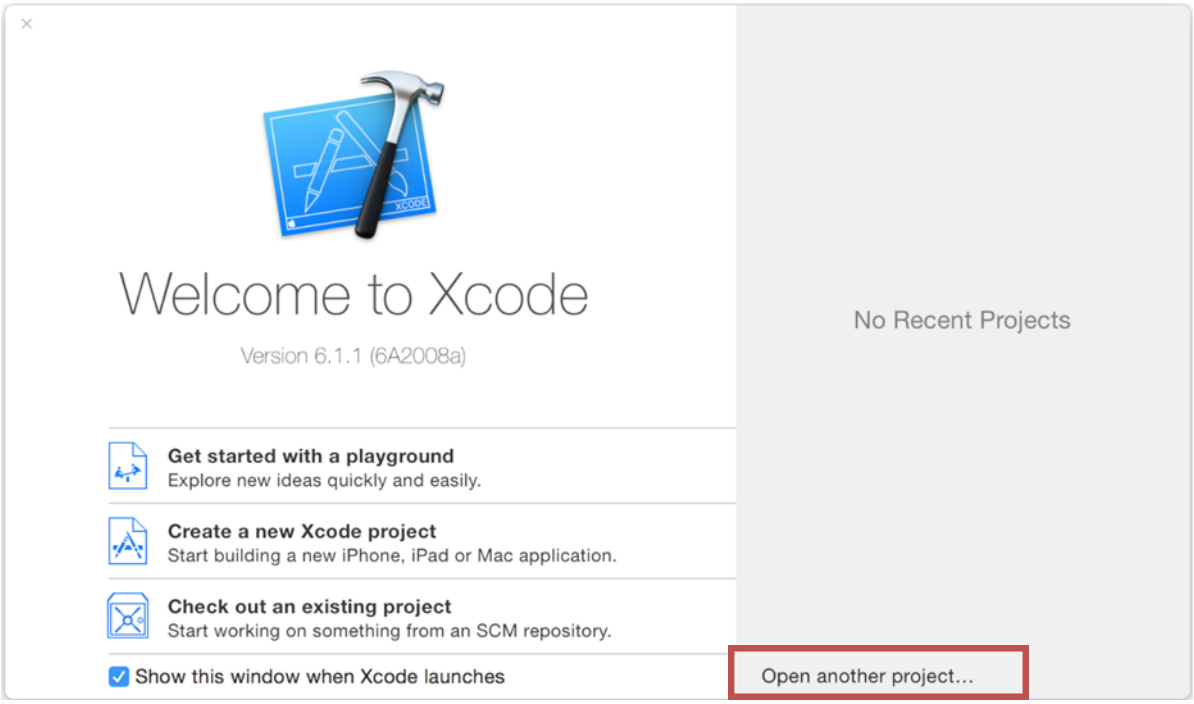
WARNING There is a 2 minute provisioning timer that starts counting from the moment the SW0 button is held on the SAMD21 Xplained Pro to put the device into provisioning mode. When the timer expires, the BLE connection will be closed and the phone will display a dialog accordingly to notify of this event.

4 How to Build, Install, and Use the iPhone Application

4.1 Building and Installation

1. Download XCode IDE 6.3 on your machine.
2. Download “Atmel Provision” project from the release directory src\Tools\iPhone_apps\BLE_Prov_Demo\Atmel Provision.
3. Open XCode IDE, then select “Open another project…”.

Figure 4-1. XCode IDE

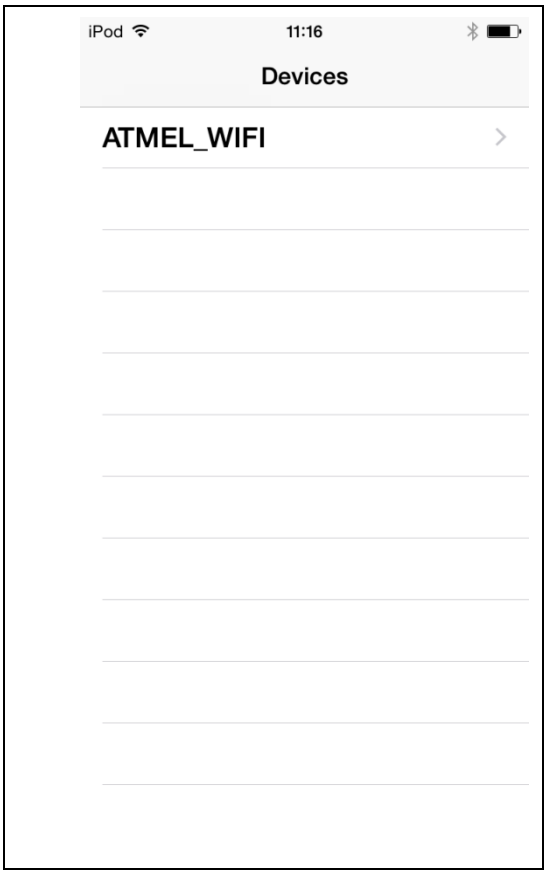


4. Select “Atmel Provision” folder then click open.
5. From the tool bar choose “Product → Build For → Running”, new folder will be created in root folder (Atmel Provision) named as “Build”.
6. Go to build “folder → Products → Debug-iphone”, copy the file named “Atmel Provision”.
7. Connect your iPhone to your machine and open iTunes® as usual to install this Software.

4.2 Using the iOS Provisioning Application

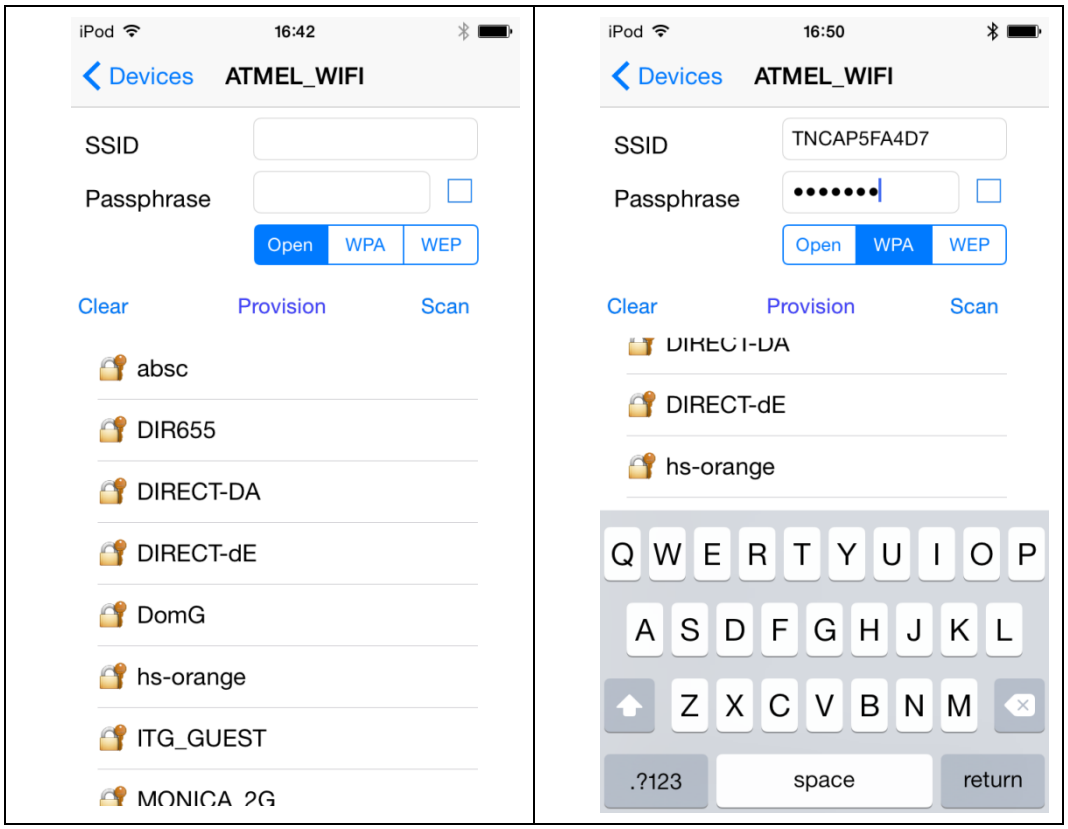
The iOS provisioning application is very similar to the Android application. On launching, the application will present a basic user interface for detecting compatible BLE devices as shown in Figure 4-2. The application may detect multiple BLE peripherals, including those that are not running the Atmel provisioning service. The user should only tap on devices named “ATMEL_WIFI”. Tapping on any other device will result in an error dialog appearing and the application will return to the BLE discovery phase.

Figure 4-2. IPhone Application Scanning for BLE Peripherals



After tapping on an ATMEL_WIFI BLE peripheral, the application will transition to Wi-Fi Provisioning Mode as depicted in Figure 4-3.

Figure 4-3. IPhone Application in Wi-Fi Provisioning Mode



The user may choose a security type, and enter the SSID and Passphrase manually.

Alternatively, the user may wait for discovered access points to be displayed in a list underneath the CLEAR, PROVISION and SCAN buttons. Tapping on a discovered access point entry in the list will automatically populate the security and SSID user interface elements. The user must then enter the Passphrase if a secured network.

Tapping the tick-box next to the “Passphrase” field will reveal the text being typed.

There are restrictions to the length of the network key required for provisioning to be enabled, depending on the security method chosen. These are described in Figure 4-4.

Figure 4-4. Passphrase Length Restrictions

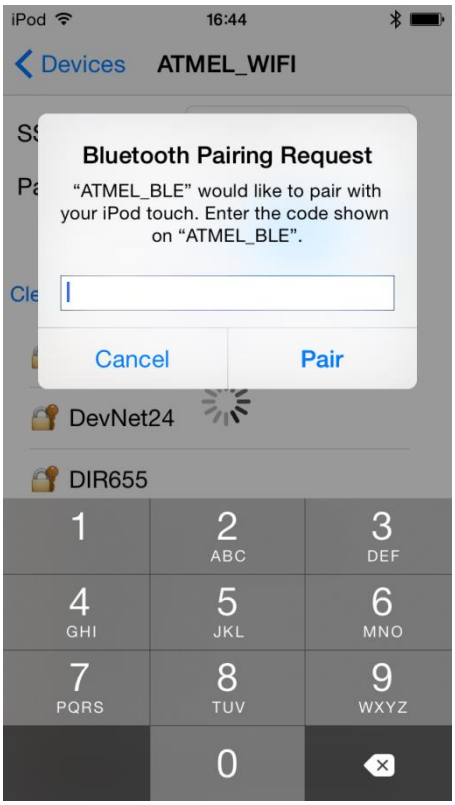
Security	Required key length
Open	0
WEP	5 or 13 characters
WPA	8 to 63 characters

To proceed with provisioning, the user should tap the PROVISION button.

If “Open” Security is selected, the user will be warned and asked to confirm that they wish to connect.

After tapping the PROVISION button (and confirming in the case of open security), the application will cause the SmartPhone to request Bluetooth pairing information (the SmartPhone may present a dialog, or vibrate and present a notification that the user must open). This is shown in Figure 4-5.

Figure 4-5. Bluetooth Pairing



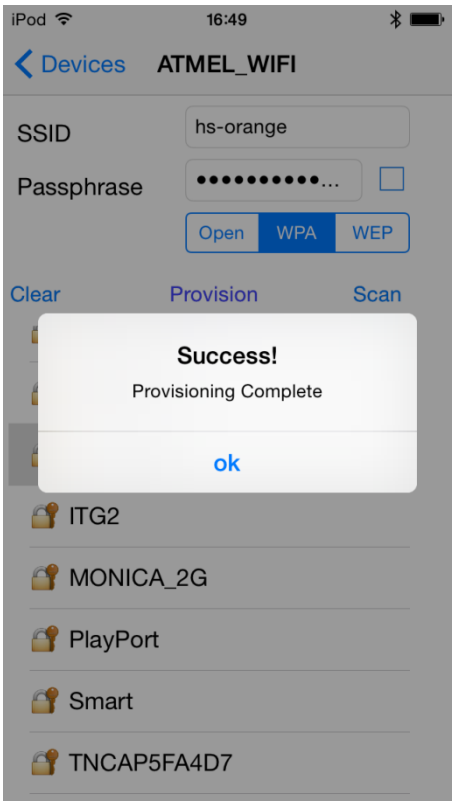
To pair with the ATMEL_WIFI provisioning peripheral, the user must enter a PIN of '123456' and tap the PAIR button.

The application will then securely transfer the information related to the chosen access point to the ATMEL_WIFI provisioning peripheral.

Once provisioned, a short press of the SW0 button on the peripheral will initiate a Wi-Fi connection using the provided provisioning info.

The iPhone app will display the result of the connect attempt in a dialog (successful or otherwise).

Figure 4-6. Provisioning Complete and Connection Successful



Tapping on the OK button shown in Figure 4-6 will return the application to BLE scanning mode.

WARNING The iOS application can only provision a device once. To run the demo multiple times it is necessary to delete the bonding/pairing information for the ATWINC3400 board. To do this, navigate to the Settings → Bluetooth screen on the iOS device, select the ATWINC3400 and tap 'forget device'.

5 Reference

[R01] Atmel-42640-Getting-Started-Guide-for-ATWINC3400WiFi-using-SAMD21-Xplained-Pro_UserGuide

6 Document Revision History

Doc Rev.	Date	Comments
42497C	02/2016	The shortcut on page 15 (References) has been corrected.
42497B	02/2016	1. Changed revision of Atmel Studio to 7.0 in Perquisites. 2. Updated screen shots to reflect 3400 in Figure 2-1 and Figure 2-2. 3. Updated Software Prerequisites. 4. Revised most of the screenshots. 5. Added Figure references. 6. Revised Section Titles. 7. Chapter 1 refers to the ATWINC3400 Getting Started Guide to Flash the AT-WINC3400. 8. Revised WARNING's on page 9 and 14. 9. Revised text in all sections. 10. Added document reference chapter.
42497A	10/2015	Initial document release.

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