Atmel QTouch

Multifunction Compact Keyboard

USER GUIDE

Introduction

Multifunction Compact Keyboard is a turnkey solution for a capacitive touch Bluetooth keyboard based on Atmel® | SMART SAM D21 and ATBTLC1000. This document describes the operation, usage, and troubleshooting of the Multifunction Compact Keyboard.

Prerequisite

- Bluetooth host minimum requirements
  - Hardware
    - Bluetooth version 4.1
  - Operating system
    - Android™ 5.1
    - Windows® 8.1
- USB host minimum requirements
  - Hardware
    - USB 2.0
  - Operating system
    - Windows 7

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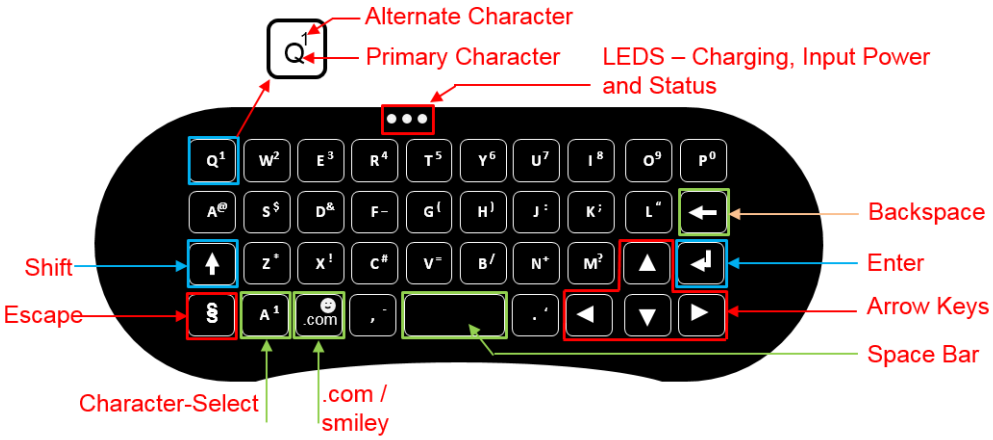
1. Overview

1.1. Layout

The Multifunction Compact Keyboard supports alpha-numeric and special characters. In addition, the keyboard supports Backspace, Enter, Arrows, Space bar, Escape, and Shift keys. The keyboard layout is similar to a QWERTY keyboard layout available on the mobile phones. The following figure shows the top view of the Multifunction Compact Keyboard.

Figure 1-1 Multifunction Compact Keyboard

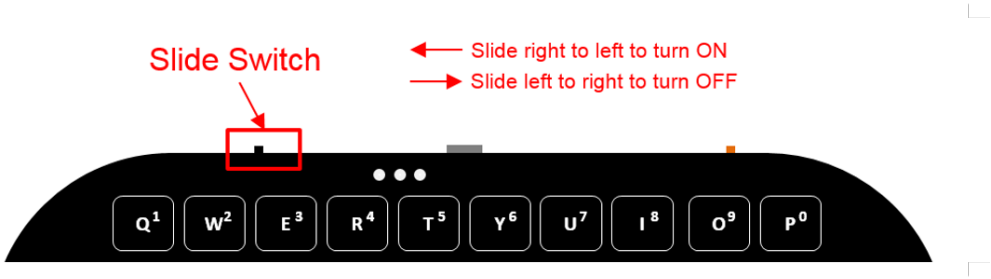


The primary and alternate characters are embedded into a single touch key as shown above. Certain keys do not have alternate characters. Character-Select key is useful to select between primary and alternate characters. More information on Character-Select key is available in Selecting Alternate Characters on page 5.

1.2. Power Switch

A slide switch is used to turn ON/OFF the keyboard.

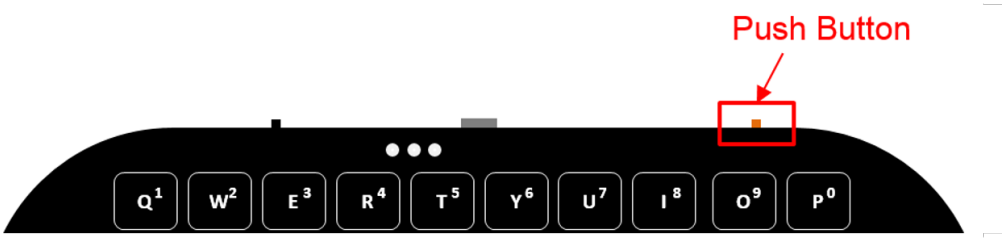
Figure 1-2 Power Switch



1.3. Push Button

Press the push button to switch between Keyboard mode and Air-mouse mode.

Figure 1-3 Push Button



2. Operation

The keyboard operates in two different modes:

1. Keyboard.
2. Air-mouse.

After a system reset, the keyboard operates in default keyboard mode.

2.1. Keyboard Mode

Figure 2-1 Key Layout

2.1.1. Key Tap

When the user taps on a key, the corresponding HID key code is sent by the keyboard via BLE or USB. To type specific letter multiple times, the user must tap as many times as required. For example, if “q” must be typed, then tap once on the “Q” key. If “qq” must to be typed, then tap twice on the “Q” key.

2.1.2. Capital and Small Letters

The shift key is useful to switch between capital and small letters.

To send single character in capital letter,

1. Tap Shift key once.
2. Shift key LED turns ON.
3. Tap any key. The tapped key will be sent in capital letter.
4. Shift key LED turns OFF.
5. The subsequent characters will be sent in small letters.

To send all characters in capital letter,

1. Double tap on Shift key.
2. Shift key LED turns ON.
3. Caps Lock key code is sent.
4. The subsequent characters to be typed will be sent in capital letters.
5. To turn OFF Caps Lock, perform Double-Tap or Single Tap on Shift key.

For example, to type the word “Atmel”, then tap shift key once, followed by tap keys a, t, m, e, and l. To type the word “ATMEL”, then tap shift key twice, followed by tap keys, a, t, m, e, and l.

2.1.3. Selecting Alternate Characters

Character-Select key is used to select between primary and alternate characters. When user taps on a key, the keyboard sends corresponding key code based on character-select status.

If Character-Select key is not already tapped, then keyboard sends the key code corresponding to primary characters. If Character-Select key is already tapped, then keyboard sends key code corresponding to alternate characters.

To send one alternate character,

1. Tap Character-Select key once.
2. Character-Select LED turns ON.
3. Tap any key. The alternate character of tapped key will be sent.
4. Character-Select LED turns OFF.
5. Primary characters will be sent for subsequent key taps.

To send multiple alternate characters,

1. Double Tap on Character-Select key.
2. Character-Select LED turns ON.
3. Tap on keys as required. The alternate characters of tapped keys will be sent.
4. To switch OFF alternate character mode, perform either Single-Tap or Double-Tap on Character-Select key

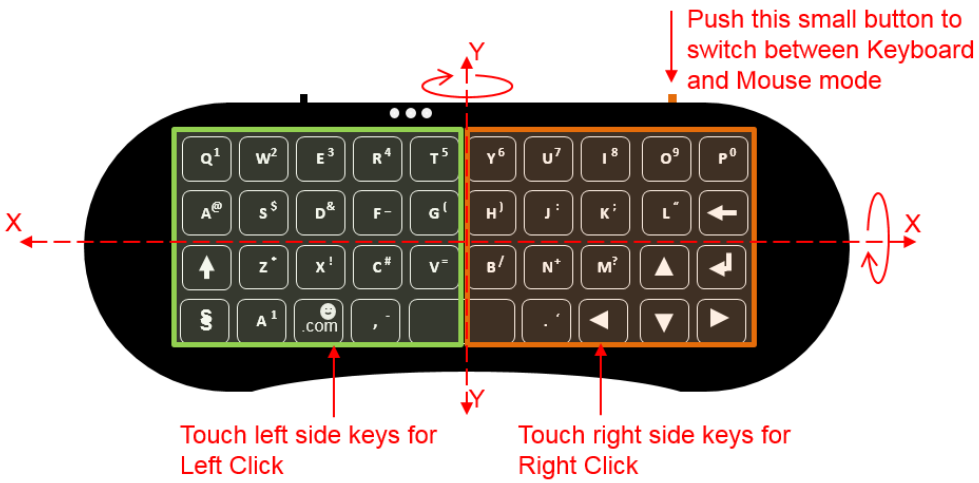
Note: Double-Tap on Character-Select key is useful if user wants to type series of numbers.

2.1.4. .com/smiley

Based on “character-select” status, when “.com/smiley” key is touched the key code for “.com” or “:)” is sent. “.com” is primary character and “:)” is alternate character.

2.2. Air-Mouse Mode

Figure 2-2 Air-Mouse Mode



2.2.1. Mouse Movement

In air-mouse mode, the keyboard continuously process Gyroscope’s X and Y axis data and sends the corresponding HID mouse data via BLE or USB.

Mouse pointer moves

- Left-right based on angular-rotation on Y axis.
- Up-down based on angular-rotation on X axis.

The acceleration algorithm monitors the rate at which keyboard is being rotated. Based on the acceleration, mouse pixel data is controlled. If keyboard is rotated fast the mouse pointer moves faster, and vice versa. This feature is useful when cursor needs to be moved from one side of the screen to other side.

2.2.2. Left and Right Click

In air-mouse mode, left click and right click can be performed.

- Mouse left click can be performed by taping on left side keys
- Mouse right click can be performed by taping on right side keys

Note: In Android devices, the right-click is simulated by a long touch. If the keyboard is connected to Android devices, hold either left or right click for longer time to simulate actual right-click.

3. Connecting to Host

In this chapter, the procedure to interface multifunction compact keyboard to host devices (such as PCs and Smartphones) is described.

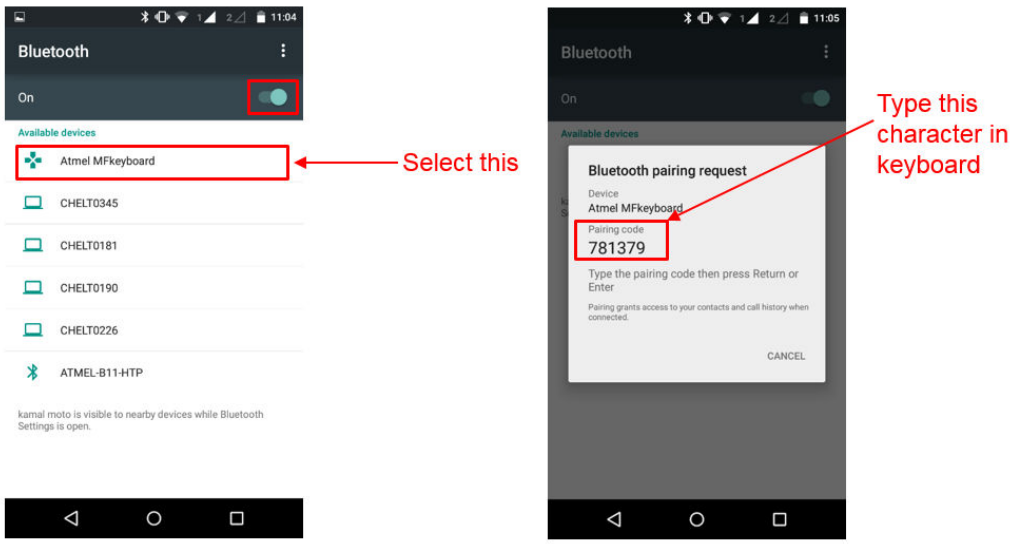
3.1. Bluetooth (BLE) Connection

The following sections describes the procedure to connect multifunction compact keyboard with Android phone and Windows PC using Bluetooth interface.

3.1.1. Android

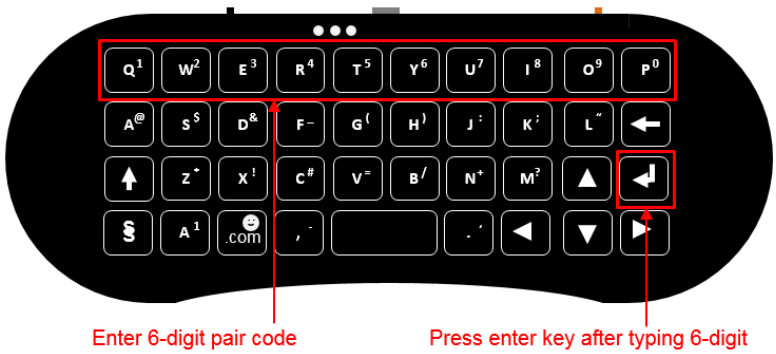
1. Switch ON the keyboard.
2. Turn ON Bluetooth in the mobile device.
3. Select **Atmel MFkeyboard**.

Figure 3-1 Select Keyboard and Pair



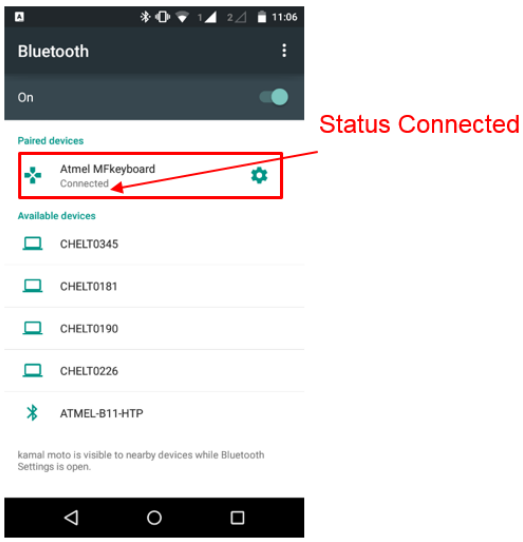
4. Mobile device displays pairing code.
5. Enter the pairing code in the keyboard and tap the **Enter** key.
   Note: During paring keyboard will automatically change to numeric mode. So, there is no necessity to tap Character-Select key before entering pairing code.

Figure 3-2 Type Pairing Code



6. The mobile device starts connecting to the keyboard. The phone displays status as “connected” after connection is established and status LED on keyboard glows.

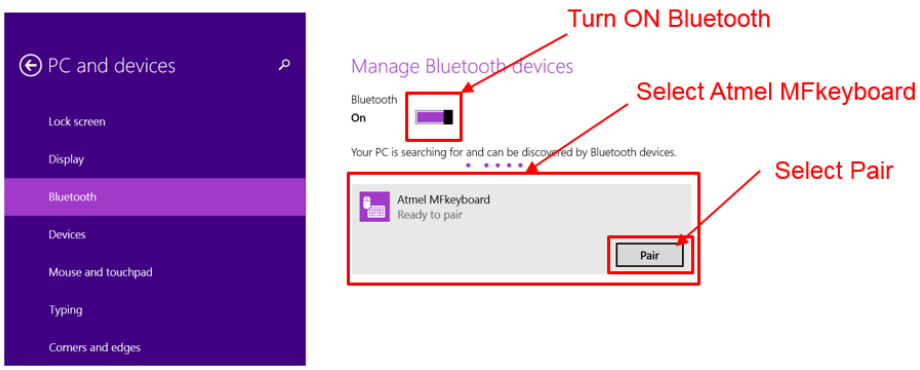
Figure 3-3 Keyboard Connected to Phone



3.1.2. Windows

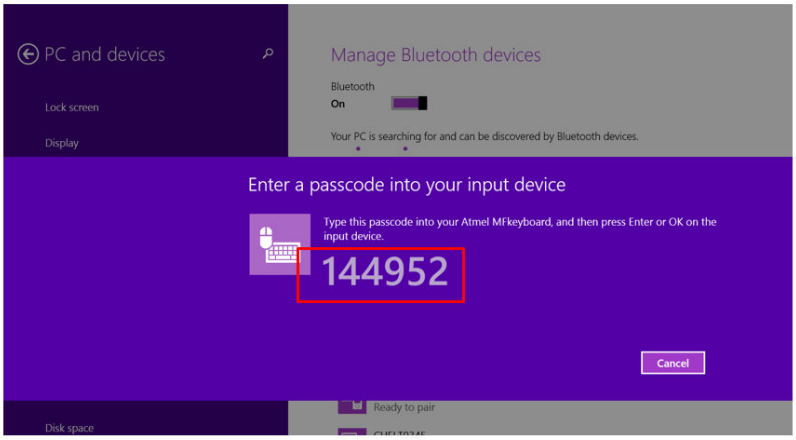
1. Switch ON the keyboard.
2. Turn ON Bluetooth in PC.
3. Select **Atmel MFkeyboard**.

Figure 3-4 Select Keyboard and Pair



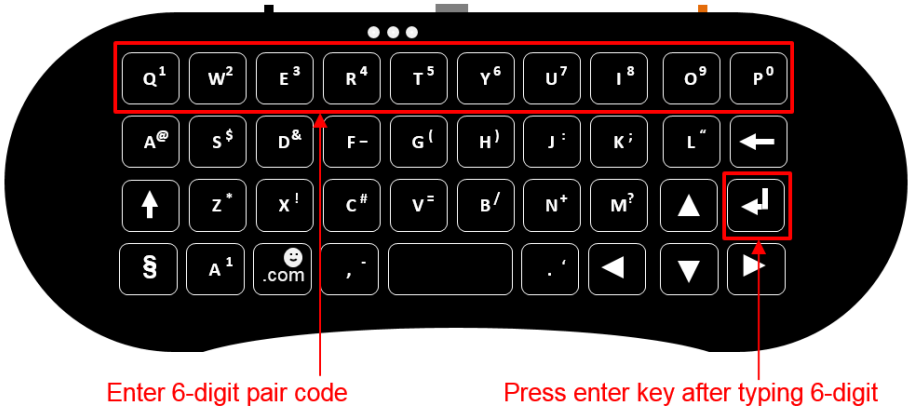
4. PC displays pairing code.

Figure 3-5 PC Displays Pairing Code



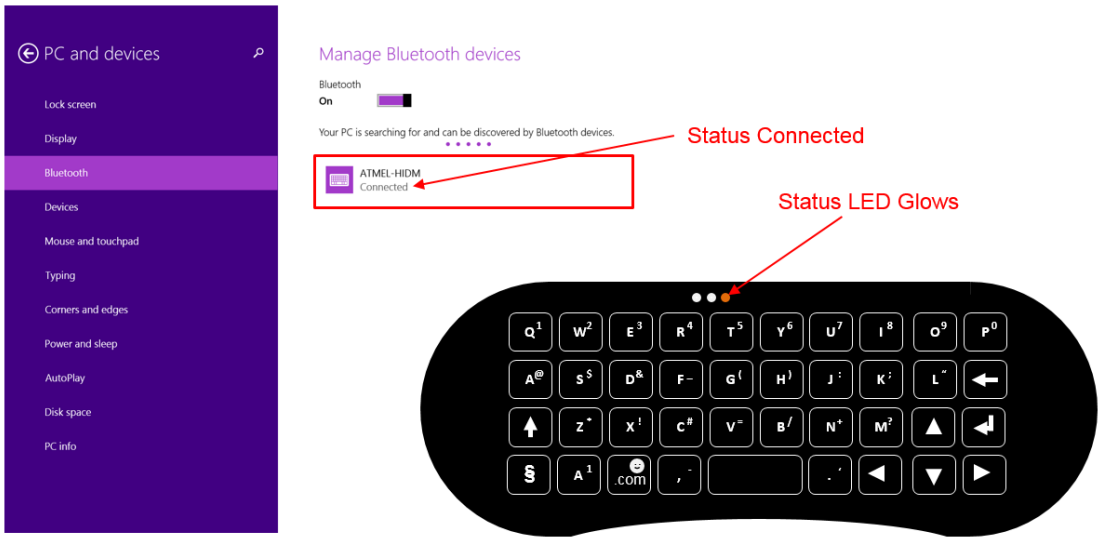
5. Enter the pairing code in the keyboard and tap the **Enter** key.
   Note: During paring the keyboard will automatically change to numeric mode. So, there is no necessity to tap Character-Select key before entering the pairing code.

Figure 3-6 Type Pairing Code



6. PC start connecting to keyboard.
7. Wait until the connection is established. This might take some time.
8. When the connection is established, the PC displays status as connected and status LED on keyboard glows.

Figure 3-7 Keyboard Connected to PC

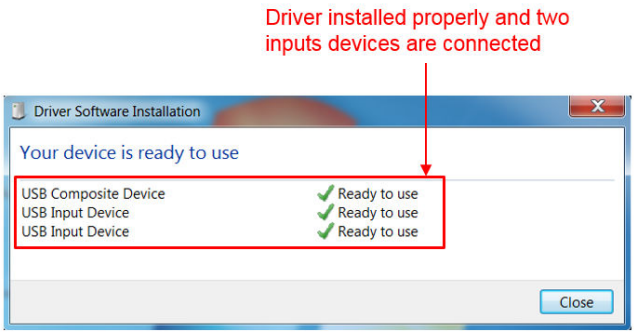


3.2. USB Connection

The procedure to connect multifunction keyboard with PC using USB is as follows.

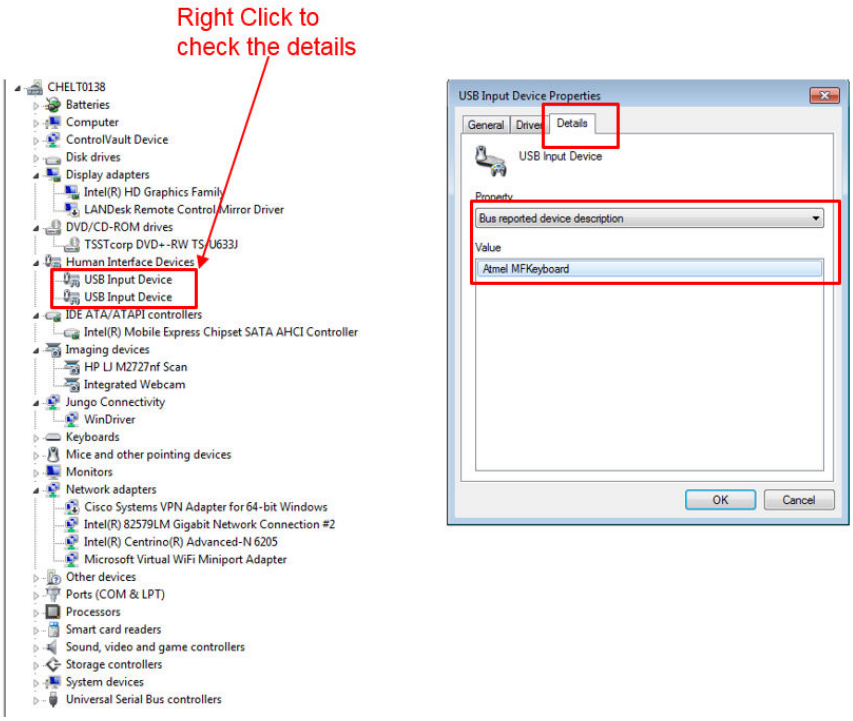
1. Switch ON keyboard.
2. Connect a Micro-USB cable between the PC and the keyboard.
3. If the keyboard is being connected for the first time, wait until the PC has installed the required driver files.
   Note: Windows installs the default USB HID driver. No separate driver file is required.
4. If driver installation fails, then reset power to the keyboard and wait for driver installation.
5. Once the driver is properly installed, Windows displays **Your device is ready to use** as shown in the following figure.

Figure 3-8 USB Driver Initialization



6. When the keyboard is properly connected, the status LED glows.
7. The device details can also be found in Device Manager as shown in the following figure.

Figure 3-9 Check USB Device in Device Manager

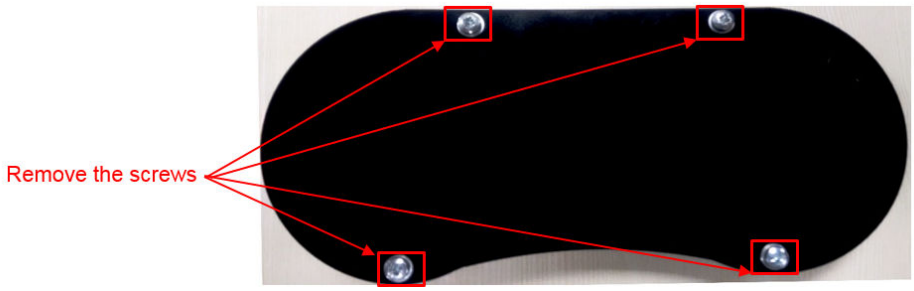


4. Replace Battery

To install/replace battery,

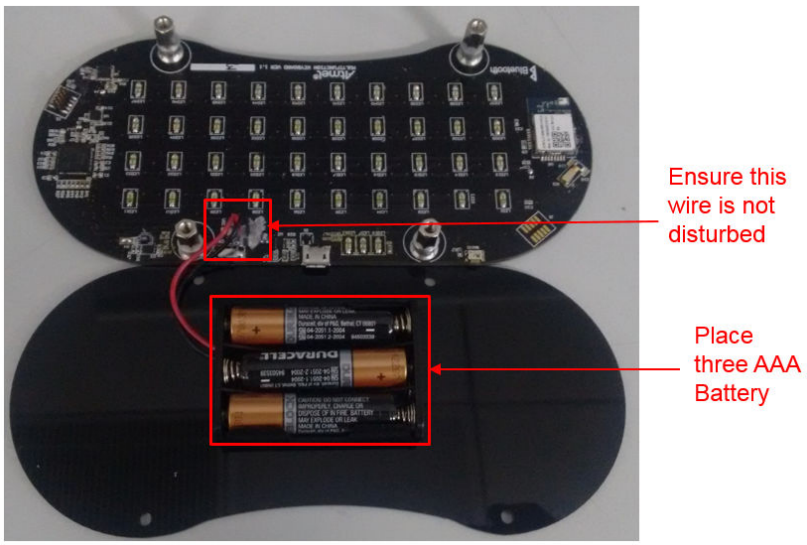
1. Turn the keyboard OFF.
2. Flip the keyboard upside-down.
3. Remove the screws.

Figure 4-1 Remove Screw



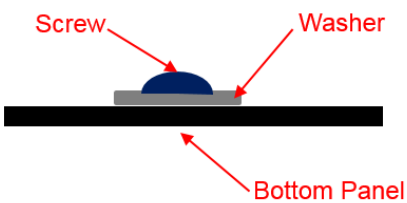
4. Flip the bottom panel slowly to open it.
5. Keep the bottom panel close to the board.
6. Ensure the wire soldered on PCB is not disturbed.

Figure 4-2 Change Battery



7. Replace the three AAA batteries.
8. Flip back bottom panel to close.
9. Fix the screws and washers.

Figure 4-3 Screw and Washer



5. SAM-BA Programming

5.1. Pre-requisite

Download and install the SAM-BA programming tool from http://www.atmel.com/System/BaseForm.aspx?target=tcm:26-42282.

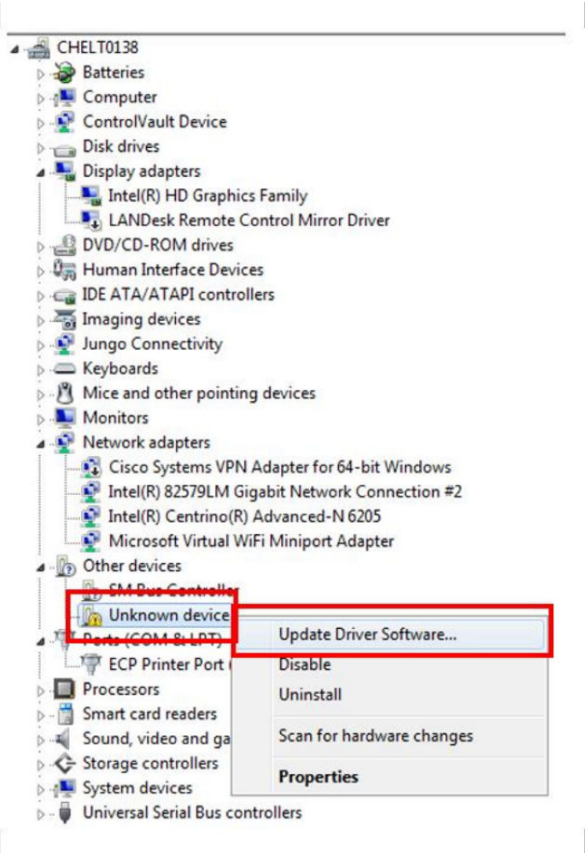
Download the driver:

http://www.atmel.com/images/atm6124_cdc_signed.zip

5.2. SAM-BA Driver Installation

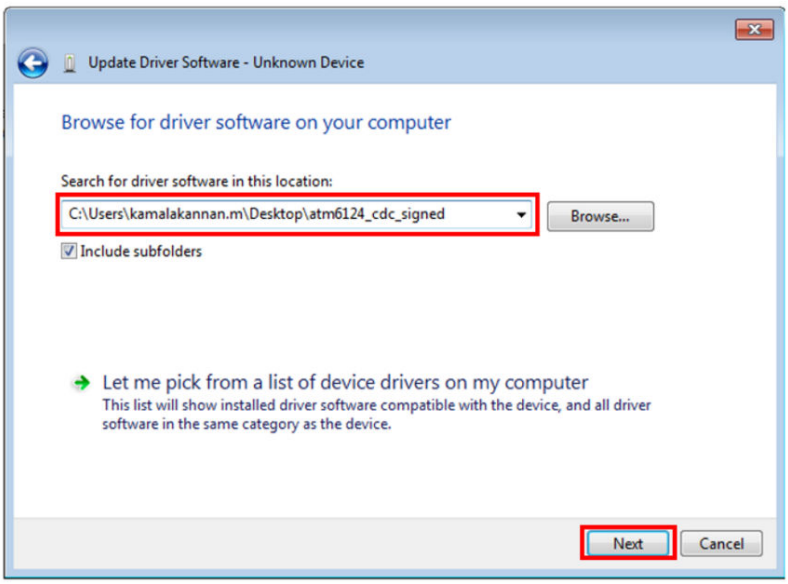
1. To enable SAM-BA programming, press the push button and power ON the keyboard.
2. Connect Micro-USB cable between keyboard and PC.
3. If the keyboard is connected for the first time for SAM-BA programming, driver files must be installed based on the following steps.
4. Open the Device Manager by selecting **Start** → **Control Panel** → **Device manager**.
5. Search for **Unknown Device** and **Right Click Unknown Device** → **Update Driver Software…**.

Figure 5-1 Select Driver Software



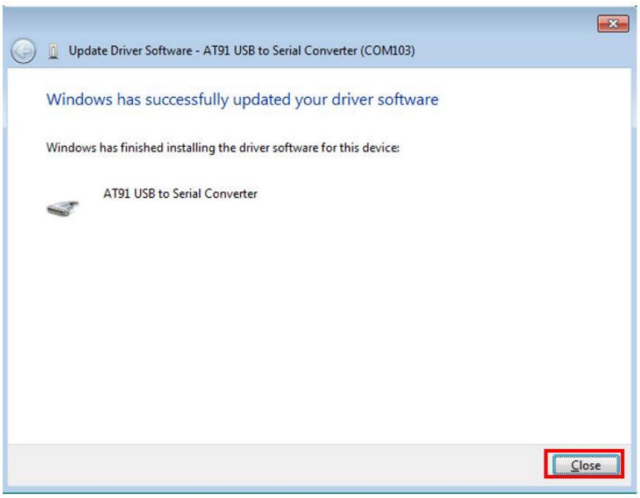
6. Select **Browse my computer for driver software** option in the next window.
7. Browse for the desired driver file and click **Next** as shown in the following figure.

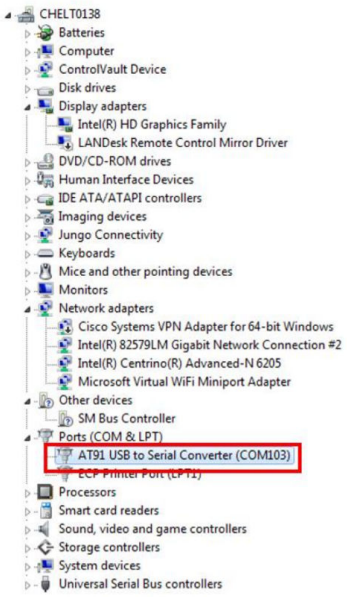
Figure 5-2 Browse Driver File



8. The driver will be installed. If installed successfully the USB device will enumerate as COM port. Note the COM port number.

Figure 5-3 Driver Installed



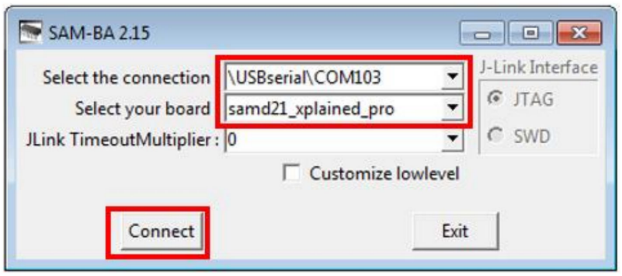


5.3. SAM-BA Programming

To enable SAM-BA programming,

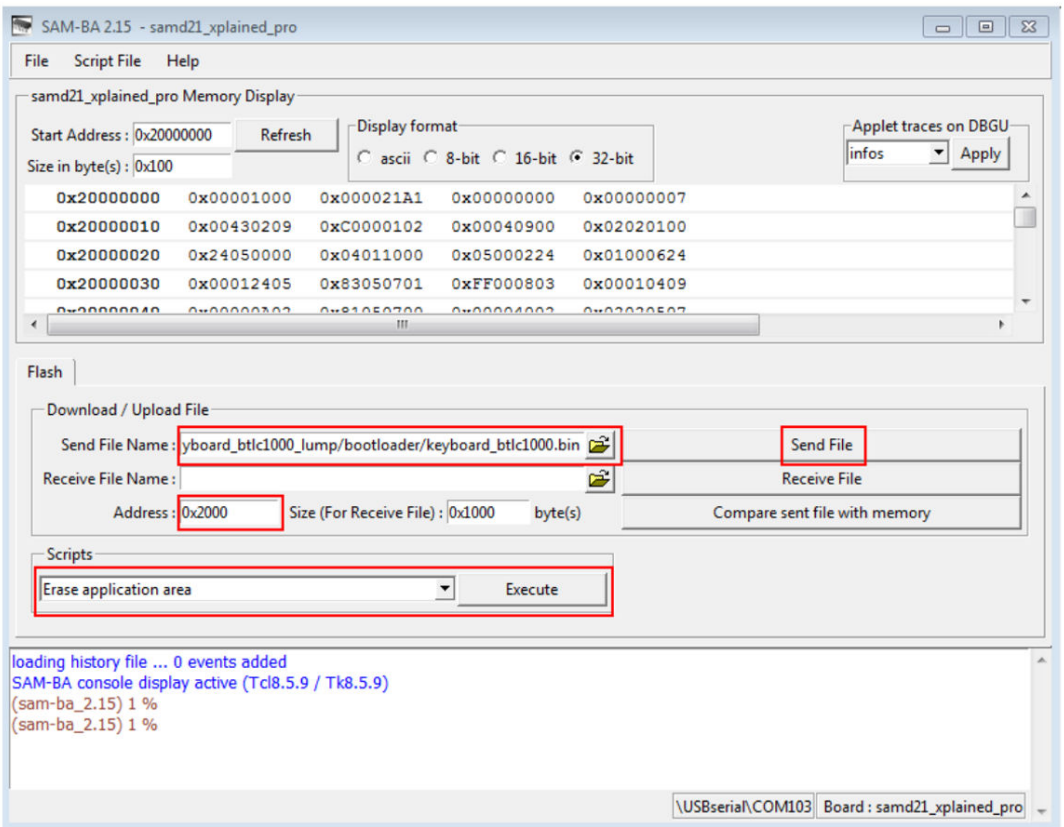
1. Press the push button and power ON keyboard.
2. Connect Micro-USB cable between keyboard and PC.
3. Select **Start → SAM-BA v2.15**.
4. Select the correct COM Port from drop down menu.
5. Select **samd21_xplained_pro** as the board and click connect.

Figure 5-4 Open SAM-BA Tool



6. Browse the `.bin` file and enter ***0x2000*** in Address field as shown in the following figure.

Figure 5-5 Program using SAM-BA Tool



7. Select **Erase application area** in scripts and click **Execute**. Wait for the action to complete.
8. Click **Send File** and wait for the action to complete.
9. Switch OFF power to the keyboard and remove the Micro-USB cable.
10. Power ON the keyboard.

6. Revision History

Doc Rev.	Date	Comments
42580A	12/2015	Initial document release.

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