AB156x Series One-Wire UART Tool Users Guide

Version: 1.2
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Document revision history

Revision	Date	Description
1.0	02 November 2020	Initial release
1.1	02 December 2020	Modify Figure 2-9 and Table 2-2
1.2	19 May 2022	Modify Chapter 1.3

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Lists of tables and figures

1. Introduction

1.1. OverviewOverview

This document describes the AB156x One-Wire UART DFU Tool provided by Airoha Technology. The goal of the DFU Tool is to provide a utility to upgrade an AB1562x device and without the need for additional equipment. The One-Wire UART DFU Tool contains the following hardware and software items:

- One-Wire UART Board – Enables communication with the DFU Tool application.
- Development Firmware Upgrade Tool (DFU Tool) – A software application running on the Microsoft Windows operating system.

The following functionality is provided by this pack:

- Firmware Update
- NVKEY Update
- Device Name Update

Table 1-1. Difference between standard UART and One-Wire UART.

	Standard UART	1-Wire UART
Number of lines	Tx, Rx, GND	Data, GND
Type of communication	Full duplex	Half duplex
Data rate	Up to 3M	Up to 3M
Dongle	USB to UART(1Port)[C295] or USB to UART(4Port)[C714]	USB to UART(4Port)[C714] And 1-Wire UART Adapter(4Port)[C757]

1.2. Supported chips

The Airoha AB156x One-Wire UART DFU Tool supports AB156x series chipsets.

1.3. Required Software

Before using the Airoha Tool Kit (ATK), you need to install all of the following software on your computer.

Click the following link to download Microsoft .NET Framework 3.5:
https://www.microsoft.com/en-US/download/details.aspx?id=21

Click the following link to download Microsoft .NET Framework 4.5:
https://www.microsoft.com/en-US/download/details.aspx?id=30653

Click the following link to download Microsoft Visual C++ 2012 Update 4 Redistributable Package(x86):
https://www.microsoft.com/en-US/download/details.aspx?id=30679

Click the following link to download Microsoft Visual C++ 2015/2017/2019 Redistributable Package(x86):
https://aka.ms/vs/17/release/vc_redist.x86.exe

You may be asked to restart your computer when you complete the installation process. Please make sure to do so before running the One-Wire UART Tool.

2. Environment Setup

A complete set of a testing suite includes:

- PC x 1 (running Windows XP operating system or later)
- 1-to-4 one-wire UART board for AB156x (provided by Airoha)
- Micro-USB-5P cables x 1
- 5V/3A adapter (provided by Airoha)
- One-wire DFU Tool (provided by Airoha)

Figure 2-1 shows a 1-to-4 one-wire UART board for AB156x. The user must connect the DC 5V/3A adapter to supply power to the 1-to-4 one-wire UART board. To avoid any instability caused by supply-related issues, we suggest using the 5V/3A adapter that is provided by Airoha.

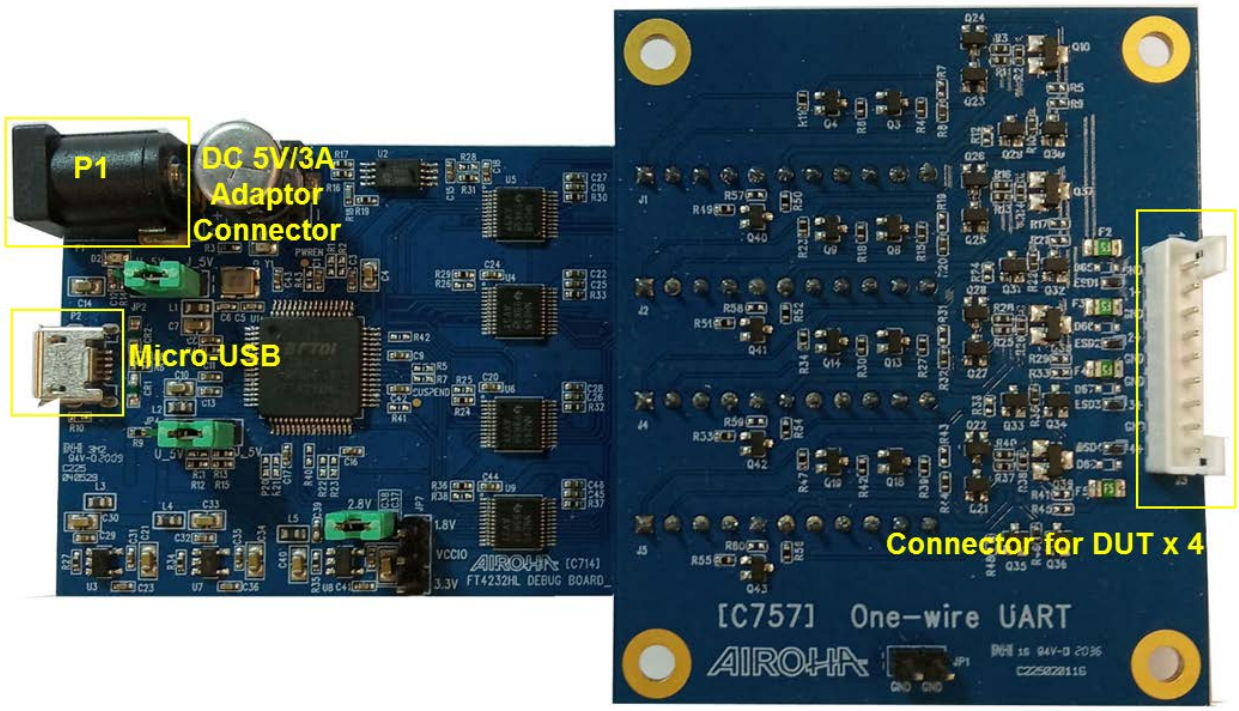

Figure 2-1. Connectors on 1-to-4 one-wire UART board

Figure 2-2 shows a reference connection setup between a PC, 1-to-4 one-wire UART board, and the DUT.

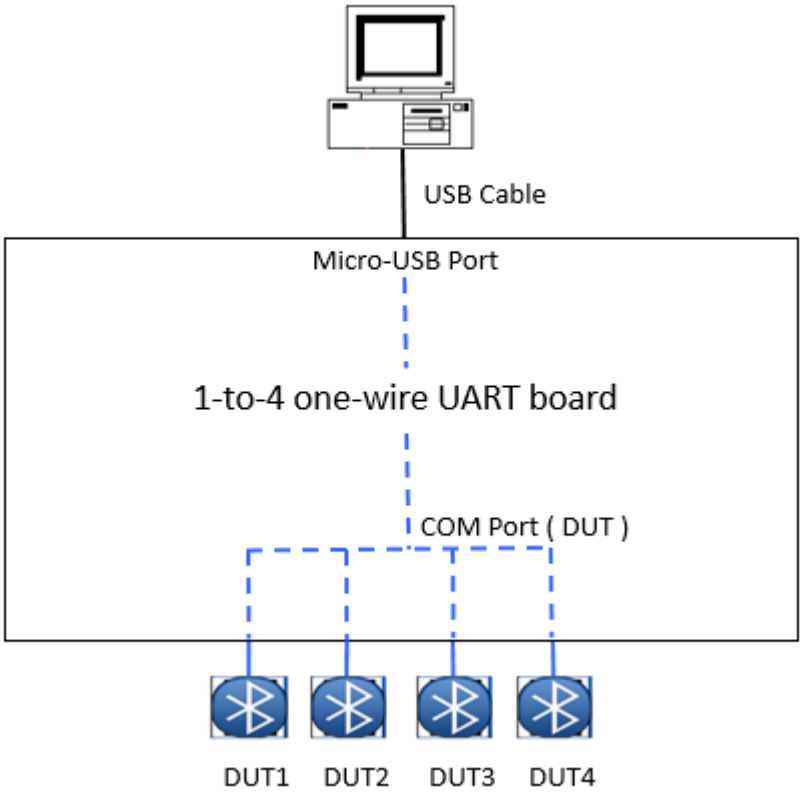

Figure 2-2. 1-to-4 Connection block diagram

2.1. Hardware setup

To set up the 1-to-4 one-wire UART is to connect the micro-USB port on the 1-to-4 one-wire UART board to the USB port on the PC. You must use a DC 5V/3A adaptor to supply power to the 1-to-4 one-wire UART board before you connect the micro-USB port to the PC. There is one micro-USB port on the 1-to-4 one-wire UART board for the connection to the PC. There is a USB-to-UART bridge IC after the micro-USB port on the 1-to-4 one-wire UART board. Four virtual UART ports (as USB-to-Serial bridges) appear in Windows Device Manager when the USB port is connected to the PC. Four UART ports are then detected when the 1-to-4 one-wire UART board is connected to the PC through the micro-USB port. The software settings use the COM port number of each device.

One way to set up the 1-to-8 one-wire UART is to connect the micro-USB port on the second 1-to-4 one-wire UART board to another USB port on the PC. You must use a DC 5V/3A adaptor to supply power to the second 1-to-4 one-wire UART board before you connect the micro-USB port to a USB port on the PC. When the micro-USB port on the second 1-to-4 one-wire UART board is connected to a USB port on the PC, eight virtual UART ports (as USB-to-Serial bridges) appear in Windows Device Manager. Eight UART ports are then detected when the two one-wire UART boards are connected to the PC through the micro-USB ports. The software settings use the COM port number of each device. Figure 2-3 shows the setup between the PC, two 1-to-4 one-wire UART boards, and the DUT.

1-to-8 Setup

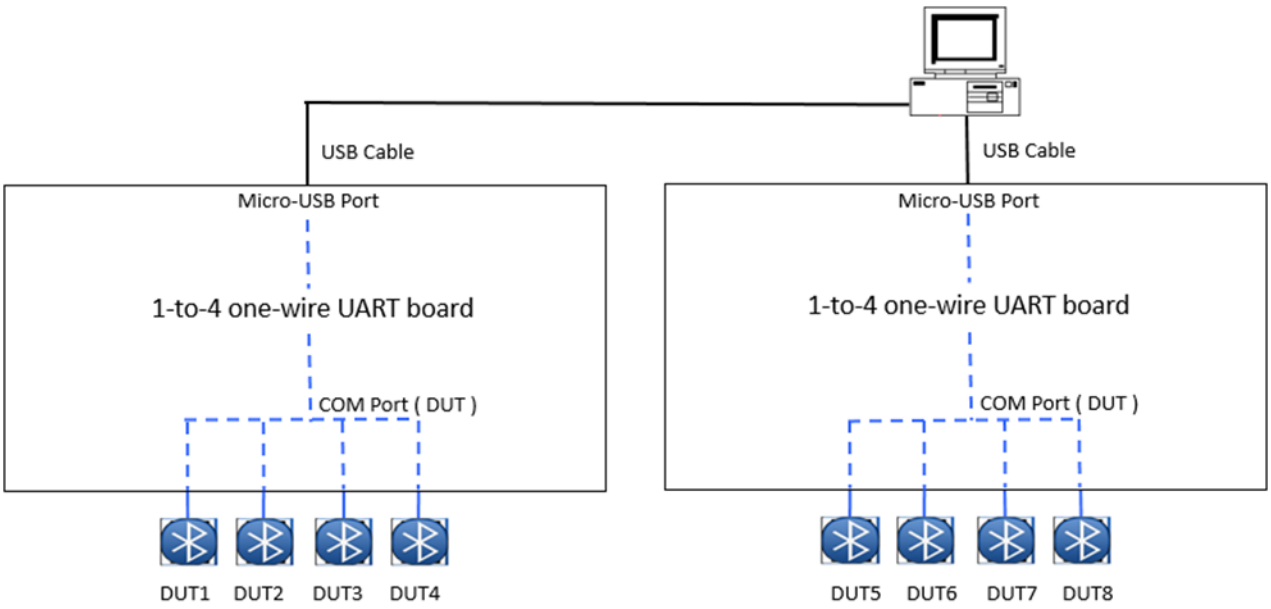

Figure 2-3. 1 to 8 connection block diagram

2.2. Power supply of 1-to-4 one-wire UART board

Power is supplied to the 1-to-4 one-wire UART board by a 5V/3A DC power supply. You must use a DC 5V/3A adaptor to supply power to 1-to-4 one-wire UART board before you connect the micro-USB port to the PC. We strongly recommend using the 5V/3A power adaptor provided by Airoha for the 1-to-4 one-wire UART board to prevent any instability problem that can be caused by supply-related issues.

Figure 2-4 shows the top view of the 1-to-4 one-wire UART board.

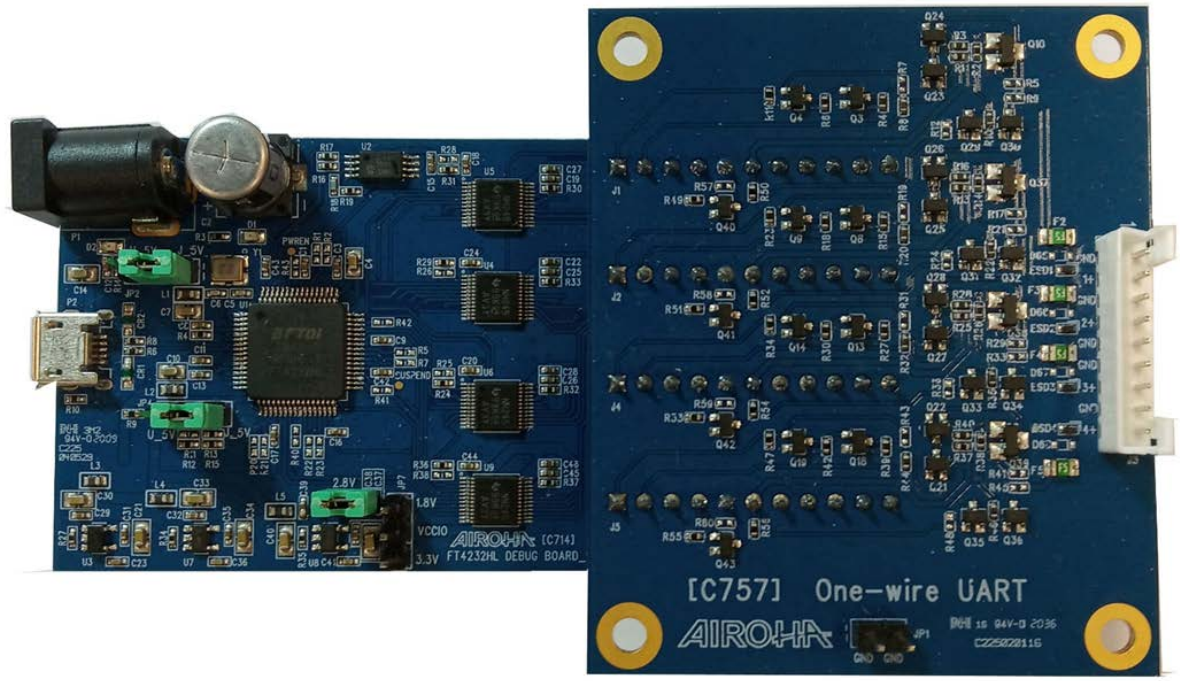

Figure 2-4. Top view of 1-to-4 one-wire UART board

When using AB156x EVKs with 1-to-4 one-wire UART board, supply power should follow the sequence as below:

1. Connect 1-to-4 one-wire UART board to AB156x EVKs through One-wire UART 1+ ~ 4+ and GND.
2. Use a DC 5V/3A adapter to supply power to AB156x EVKs, then turn on the switch on each AB156x EVK.
3. Use a DC 5V/3A adapter to supply power to the 1-to-4 one-wire UART board.
4. Connect the 1-to-4 one-wire UART board to PC through an USB cable.

Figure 2-5 shows the connection between the 1-to-4 one-wire UART board and AB1561/AB1562/AB1563 EVK.

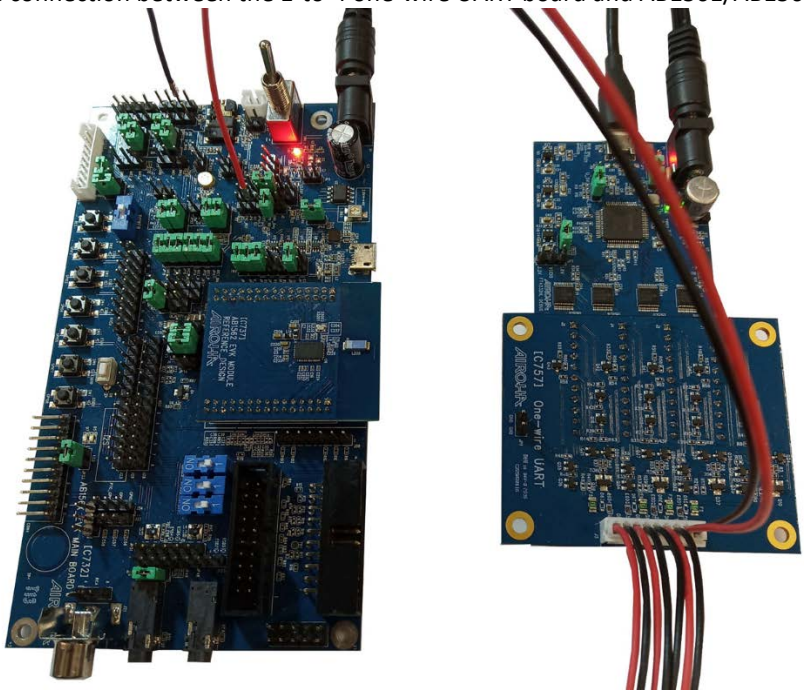

Figure 2-5. Connect AB1561/AB1562/AB1563 EVK to 1-to-4 one-wire UART board

Figure 2-6 shows the connection between the 1-to-4 one-wire UART board and AB1565 EVK.

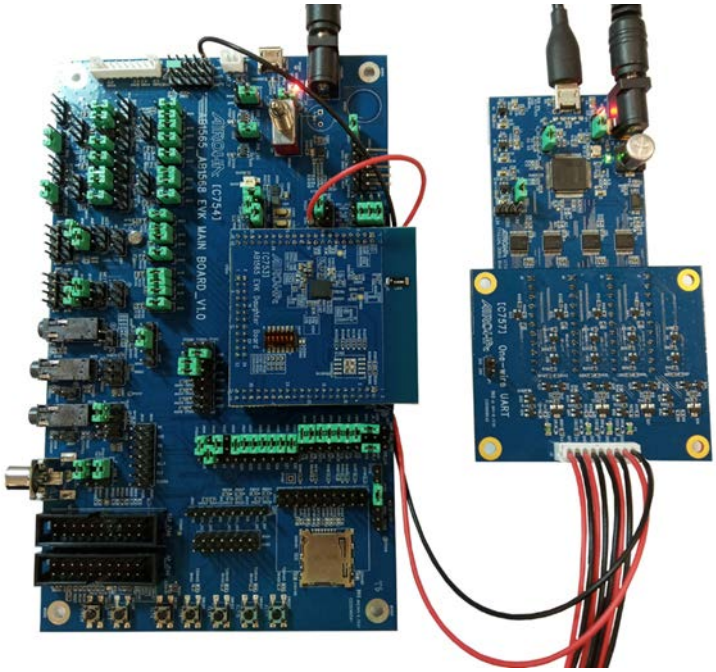

Figure 2-6. Connect AB1565 EVK to 1-to-4 one-wire UART board

Figure 2-5 is an example which shows the connection between the 1-to-4 one-wire UART board and an AB1568 EVK.

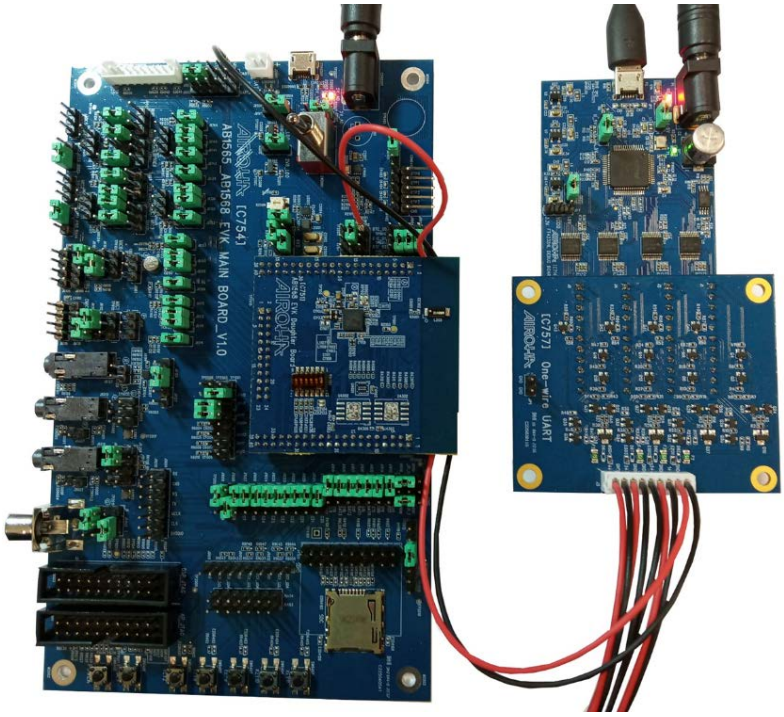

Figure 2-7. Connect AB1568 EVK to 1-to-4 one-wire UART board

Figure 2-8 and Table 2-1 show the AB1561/AB1562/AB1563 EVK (C732) jumper settings for the EVK connected to the 1-to-4 one-wire UART board.

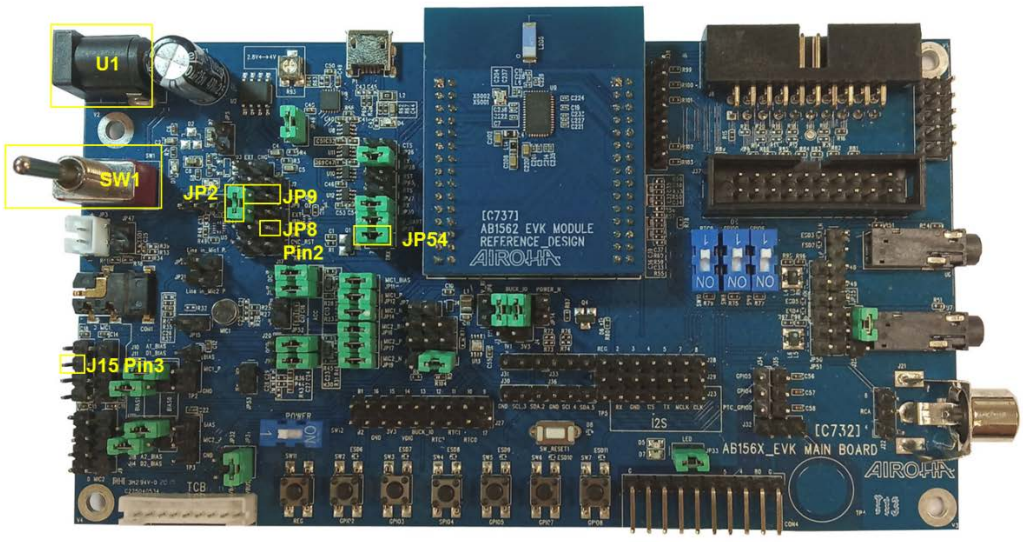

Figure 2-8. AB1561/AB1562/AB1563 EVK jumper settings

Table 2-1. AB1561/AB1562/AB1563 EVK jumper functions

U1	SW1	JP2	JP9	JP54	JP8 Pin2	J15 Pin3
DC 5V/3A adaptor jack	Turn On	Short	Open	Short	VBUS_UART	GND

Figure 2-9 and Table 2-2 show the AB1565 EVK (C754) jumper settings for the EVK connected to the 1-to-4 one-wire UART board.

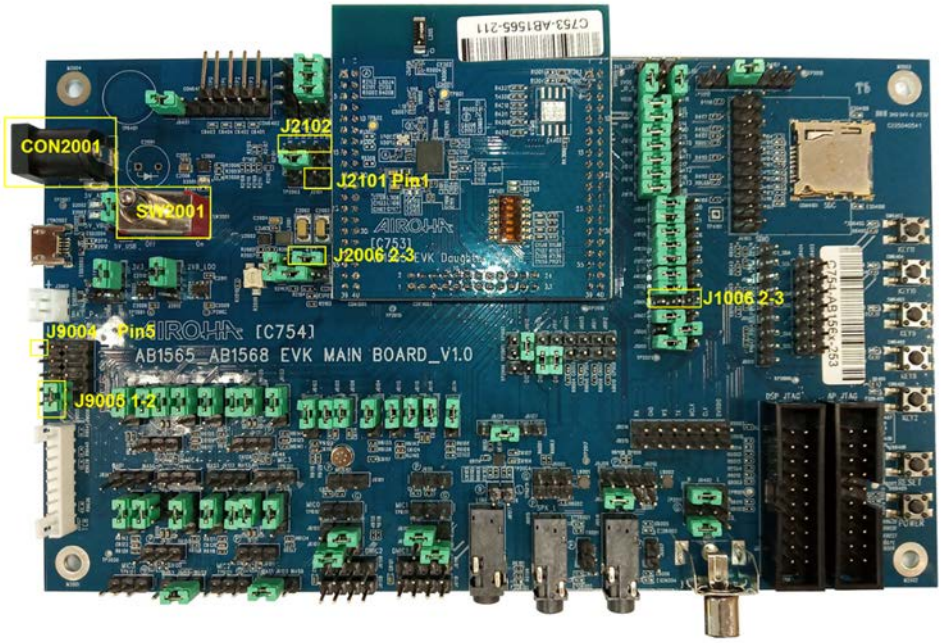

Figure 2-9. AB1565 EVK jumper settings

Table 2-2. AB1565 EVK jumper functions

CON2001	SW2001	J1006 2-3	J2006 2-3	J9005 1-2	J2102	J2101 Pin1	J9004 Pin5
DC 5V/3A adaptor jack	Turn On	Open	Short	Short	Open	VBUS_UART	GND

Figure 2-10 and Table 2-3 show the AB1568 EVK (C754) jumper settings for the EVK connected to the 1-to-4 one-wire UART board.

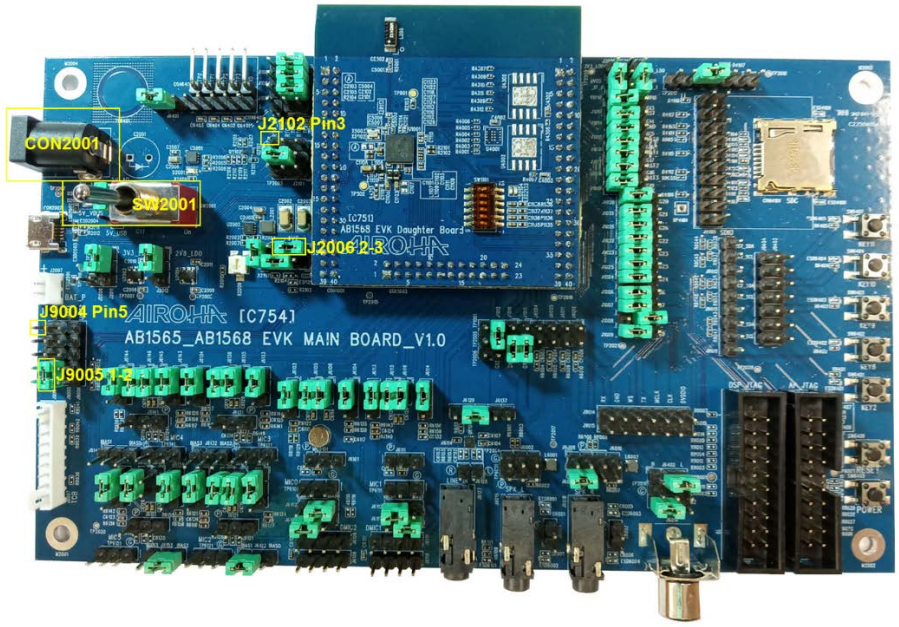

Figure 2-10. AB1568 EVK jumper settings

Table 2-3. AB1568 EVK jumper functions

CON2001	SW2001	J2006 2-3	J9005 1-2	J2102 Pin3	J9004 Pin5
DC 5V/3A adaptor jack	Turn On	Short	Short	VBUS_UART	GND

Figure 2-11 shows the jumpers, jacks, and power supply circuit of the 1-to-4 one-wire UART board. Please refer to Table 2-4, Table 2-5, and Table 2-6 for a detailed description of each jumper, jack, and J3 pin define.

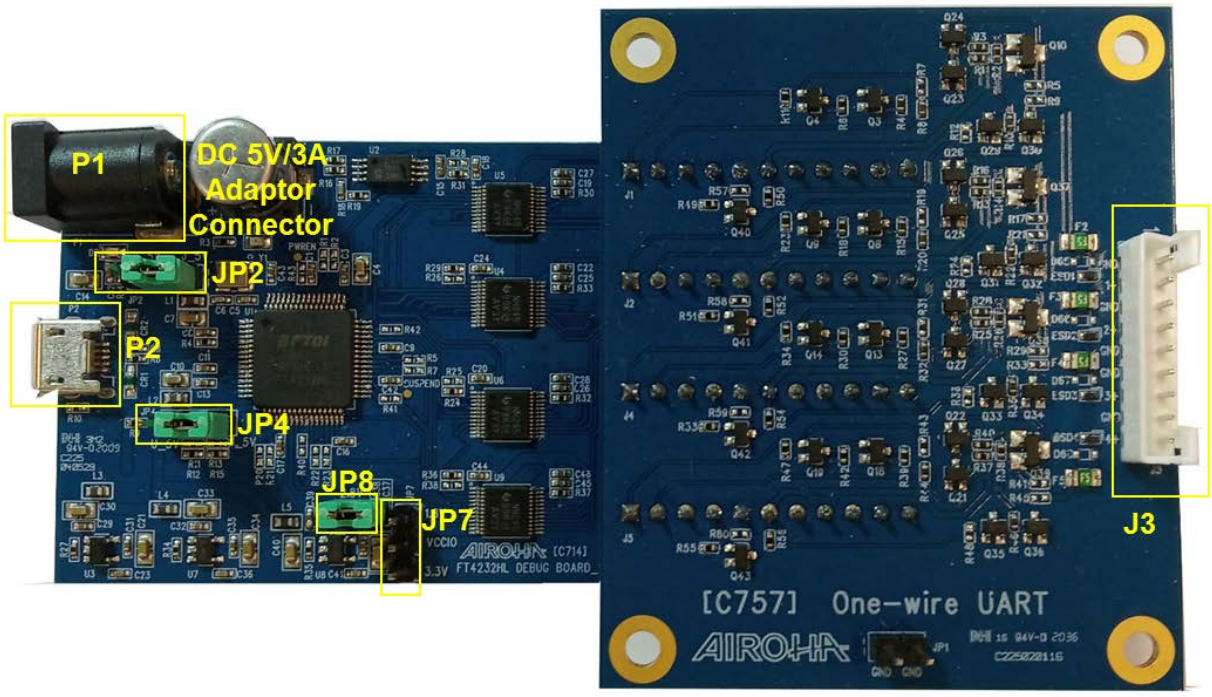

Figure 2-11. 1-to-4 one-wire UART board jumper settings

1-to-4 one-wire UART board Jumpers

Table 2-4. 1-to-4 one-wire UART board jumper functions

Block	Description
JP2	Default is 1-2 short – Use the 5V/3A adaptor to supply power to the 1-to-4 one-wire UART board. Connect the 5V/3A adaptor to P1. 2-3 short – Only use micro-USB to supply power to the 1-to-4 one-wire UART board.
JP4	Default is 2-3 short – Use the 5V/3A adaptor to supply power to the 1-to-4 one-wire UART board. Connect the 5V/3A adaptor to P1. 2-3 short – Only use micro-USB to supply power to the 1-to-4 one-wire UART board.
JP7	Open
JP8	Short

1-to-4 one-wire UART board Jacks

Table 2-5. 1-to-4 one-wire UART board jack list

Block	Description
P1	5V/3A adapter jack
P2	Micro-USB port

J3 pin define

Table 2-6. J3 pin define

Block	Description
Pin1	GND
Pin2	One-wire UART1+
Pin3	GND
Pin4	One-wire UART2+
Pin5	GND
Pin6	GND
Pin7	One-wire UART3+
Pin8	GND
Pin9	One-wire UART4+

2.3. Software setup

A third-party driver must be installed because there is one micro-USB port and USB-to-RS232 converter on the 1-to-4 one-wire UART board (CDM v2.12.00 WHQL Certified.exe).

To install the driver:

1. Open the drivers folder.
2. Double-click “CDM v2.12.00 WHQL Certified.exe”
    a. Follow the prompts to install the FTDI driver.

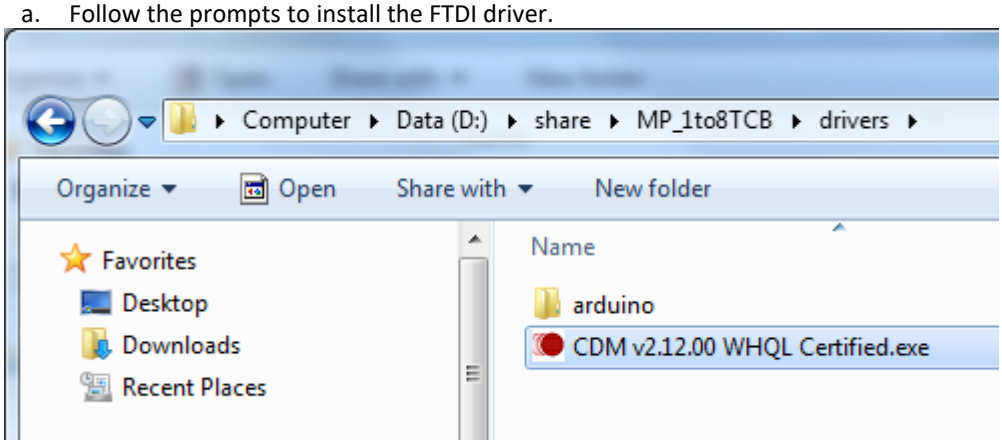

Figure 2-12. FTDI driver

Four COM ports appear when the 1-to-4 one-wire UART board is connected, as shown in Figure 2-13.

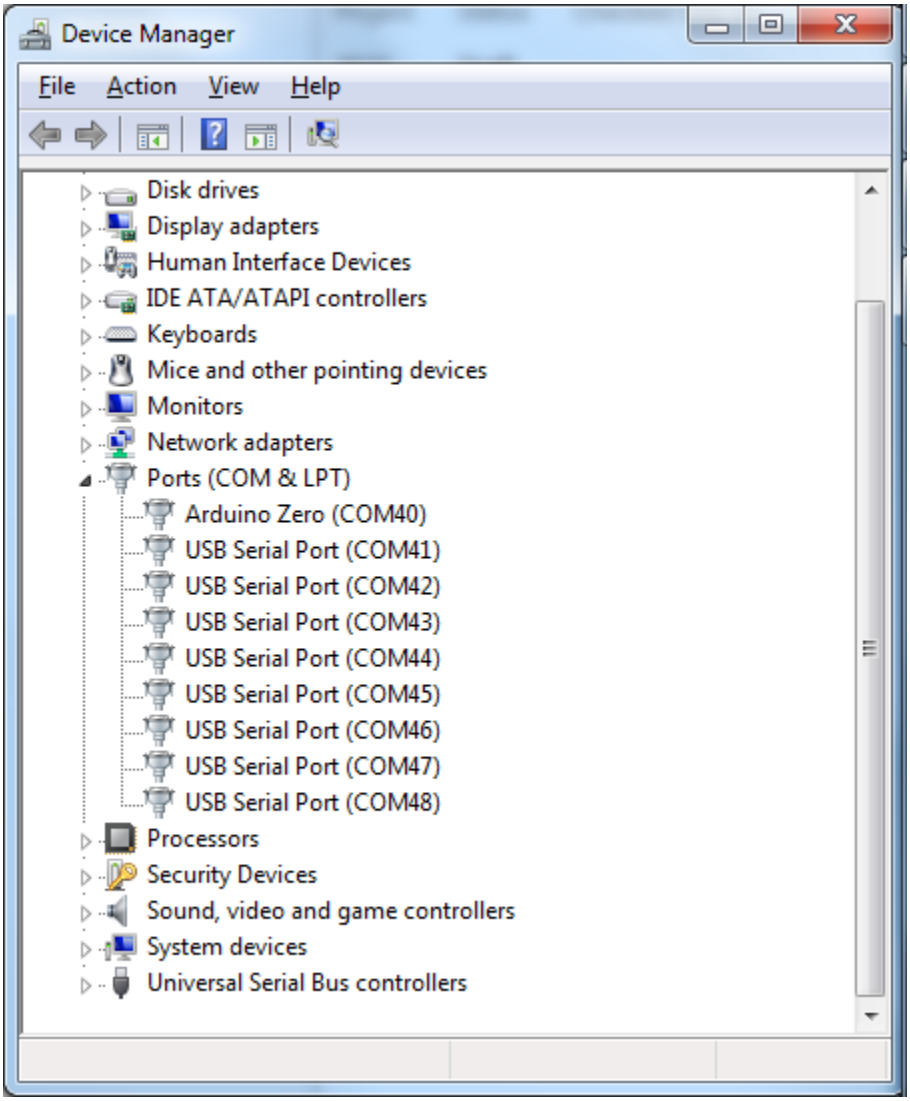

Figure 2-13. Driver installed device manager

3. One-Wire UART DFU Tool User Interface

The One-Wire UART DFU Tool is used for upgrade devices with an Airoha chip. The processes include firmware upgrade, NVKEY update and device name update. The following procedure and images show how to operate the One-Wire UART DFU Tool on AB1562. The AB1565/AB1568 One-Wire UART DFU Tool operation flow is the same as AB1562.

To operate the One-Wire UART DFU Tool:

1) Open the AB1561_AB1562_AB1563_Airoha_Tool_Kit(ATK) folder.
2) Double click Airoha.Tool.Kit.exe.
3) Click the “1-Wire DFU Tool” icon as shown in the following image.

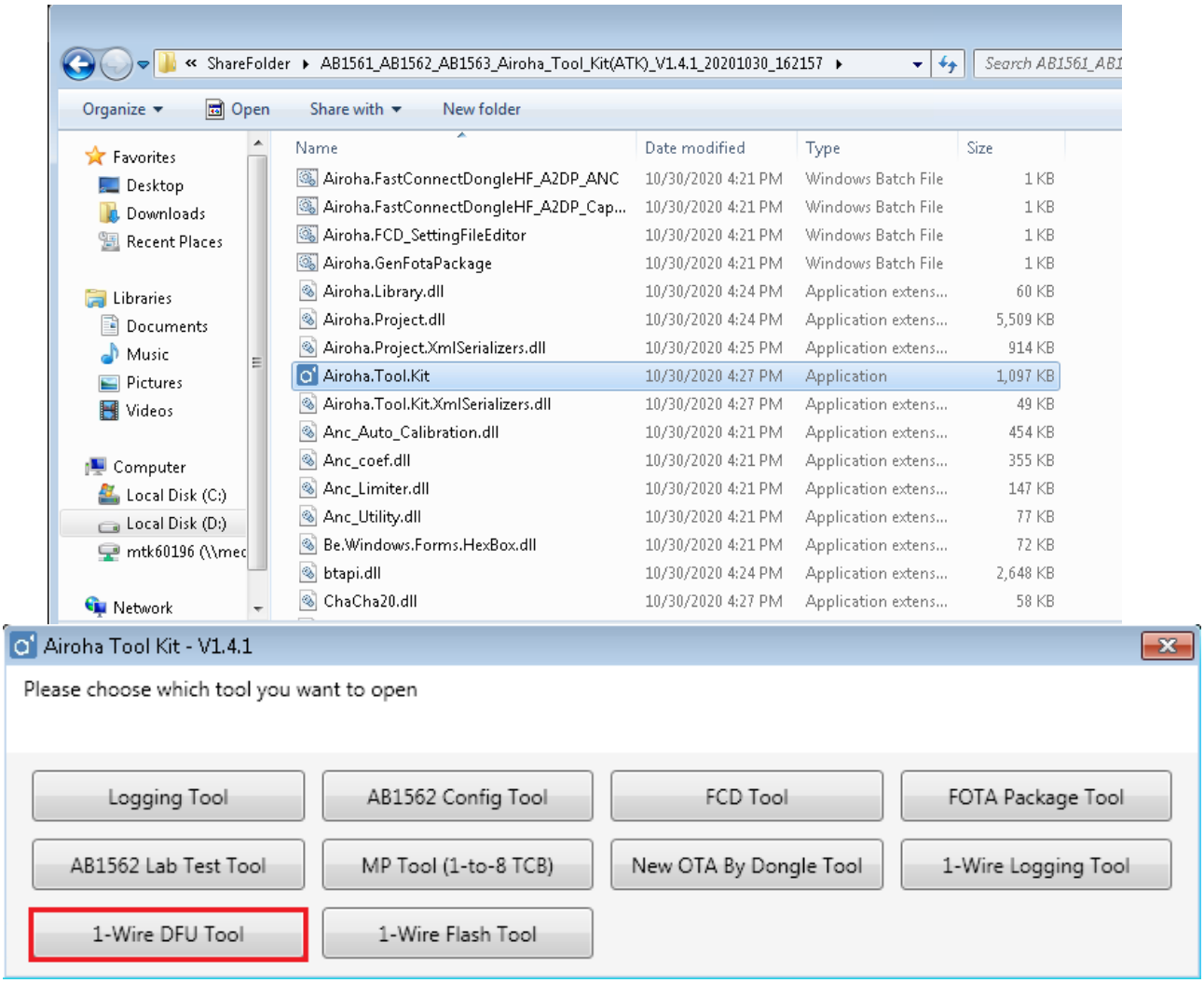

Figure 3-1. Launch One-Wire UART DFU tool

The DFU Tool creates a log file for each DUT. The log files are saved in the working folder, as shown in Figure 3-2.

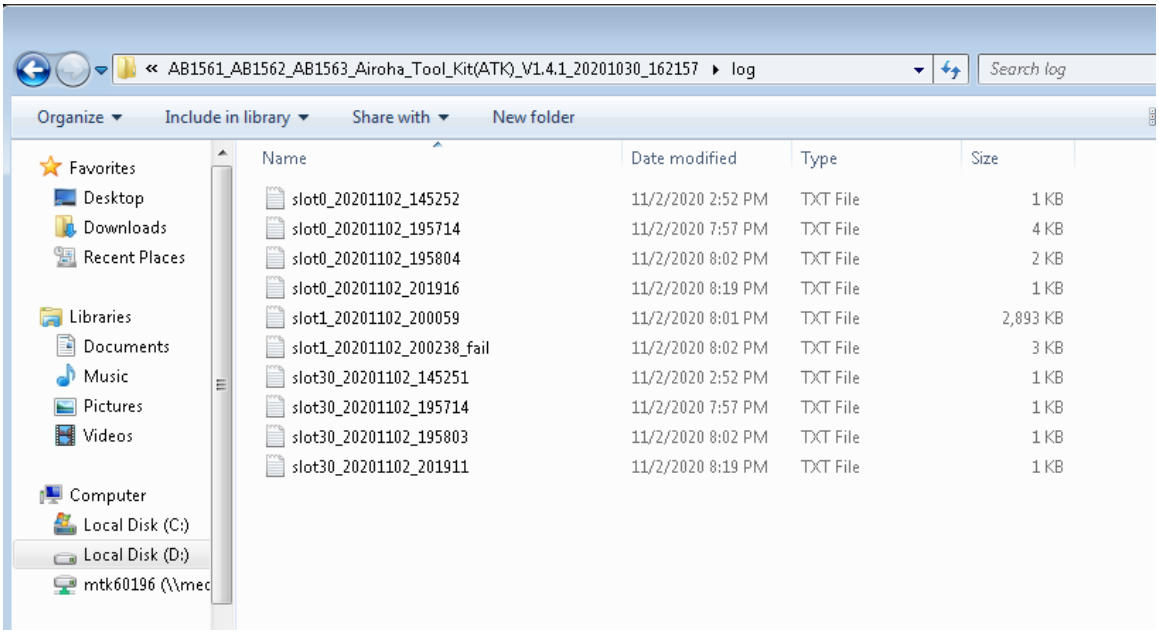

Figure 3-2. Log list in file manager

Figure 3-3 shows the DFU Tool interface.

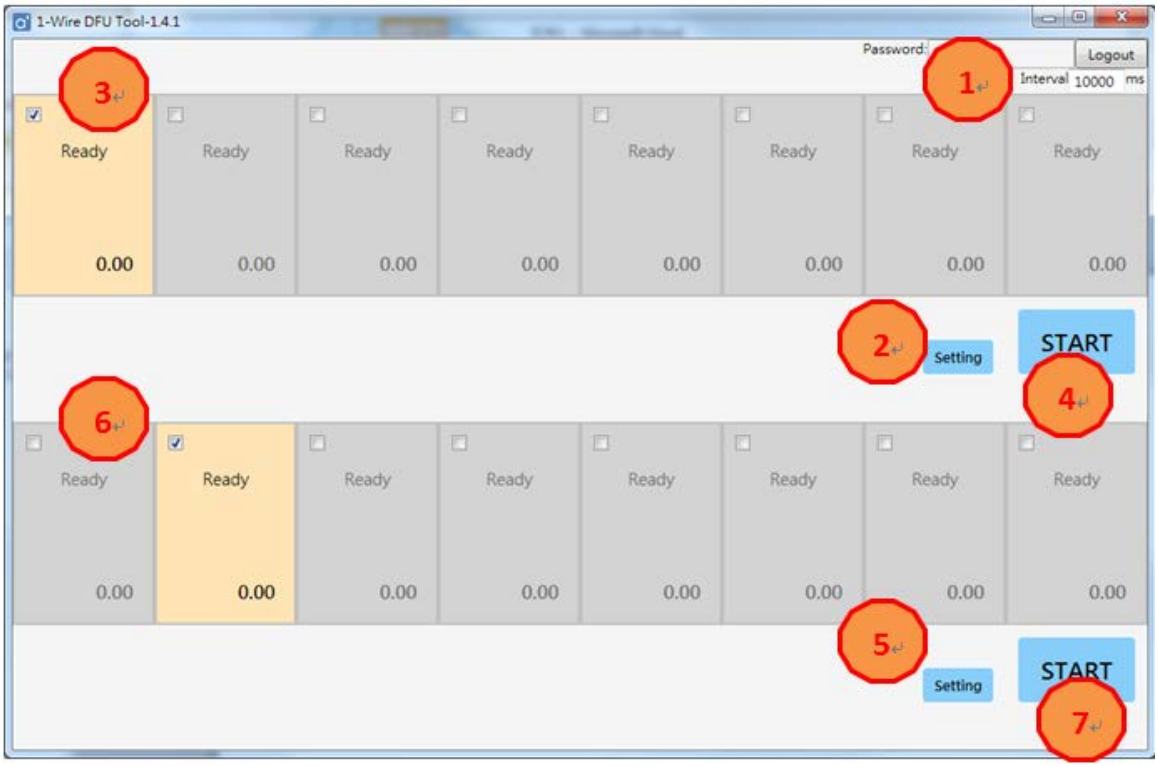

Figure 3-3. Tool setup progress

The quick start procedure is as follows:

1. Log in. A password is necessary. The default password is 11111.
2. Set the test parameters on the **Setting Form** for the selected test item(s).
3. Select the checkbox to select the DUT for testing. The DUTs are shown in the same sequence as the COM port settings.
4. Click the "**START"** button to start testing the DUTs.
5. Set up the second panel if necessary.
6. Select the DUT testing checkbox.
7. Click the "**START**" button to start testing DUTs.

If the DUT passes all tests, the corresponding DUT button is green, as shown in Figure 3-4.

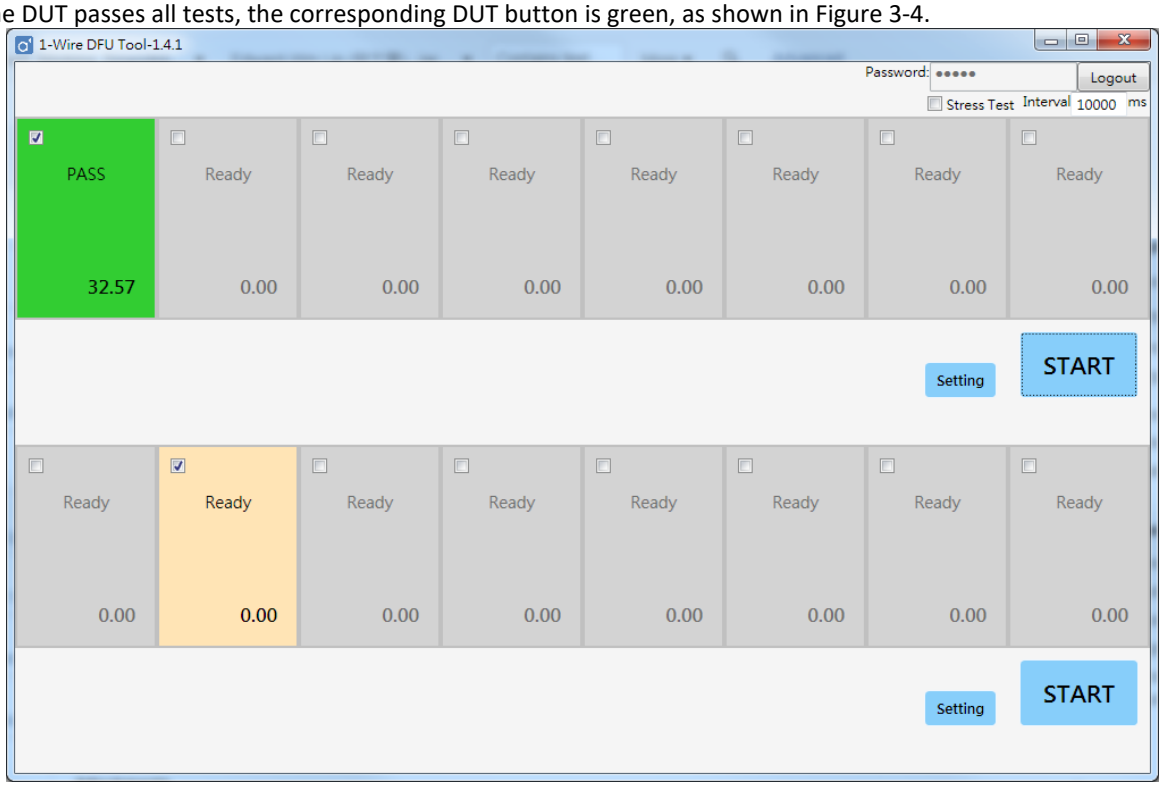

Figure 3-4. Test pass result

If the DUT fails a test, the corresponding DUT button is red, as shown in Figure 3-5Figure 3-5.

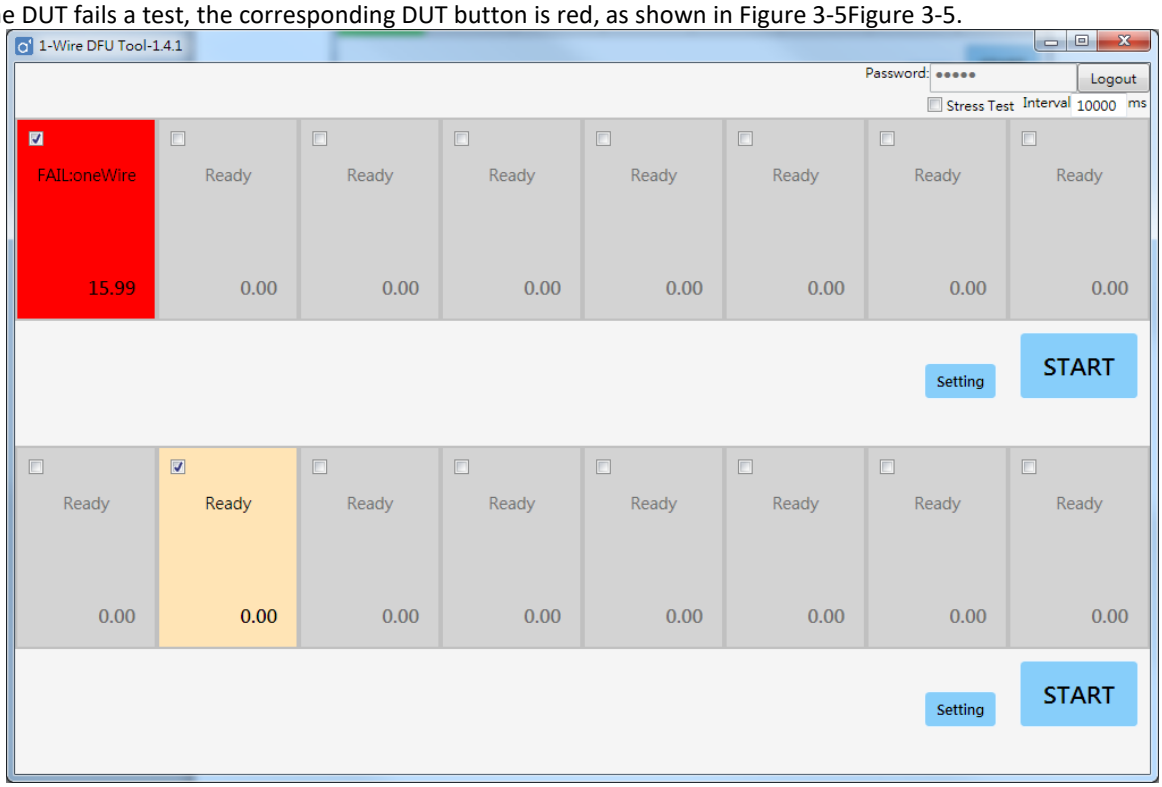

Figure 3-5. Test fail result

4. Parameter Setting

4.1. Test items

The DFU Tool operation procedure is explained as below. Please refer to Figure 4-1.

1. Select a specific COM port on the DeviceUart-down list.
2. Select the checkboxes for each test item.
3. Set detail item for each test.

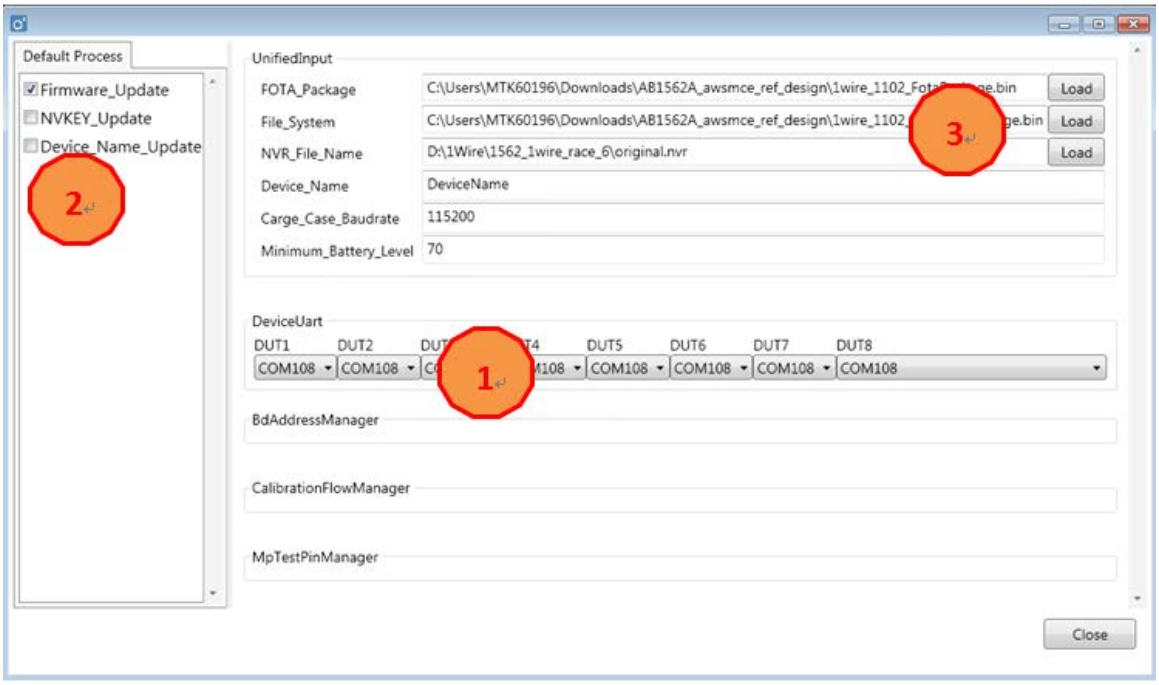

Figure 4-1. Setting dialog

4.2. Firmware Update

You can select whether to use bin files in the local storage to be programmed. The operating environment is described as follows. Please refer to Figure 4-2.

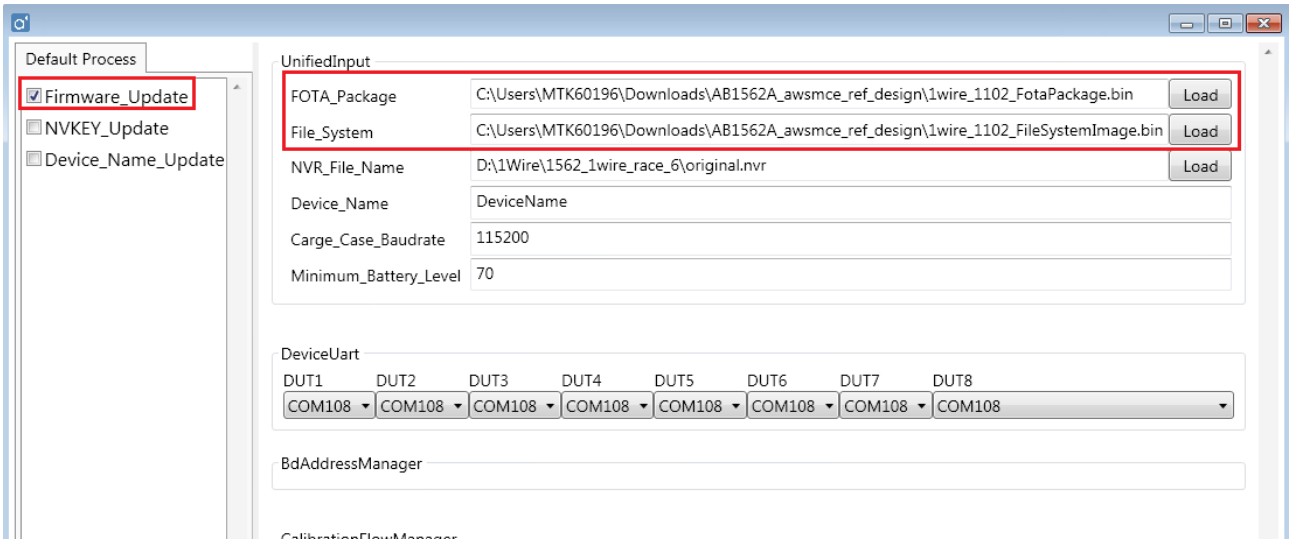

Figure 4-2. Task item Firmware_Update settings

4.3. NVKEY Update

If there is any NVR data that must be updated, please set the NVR file, as shown in Figure 4-3.

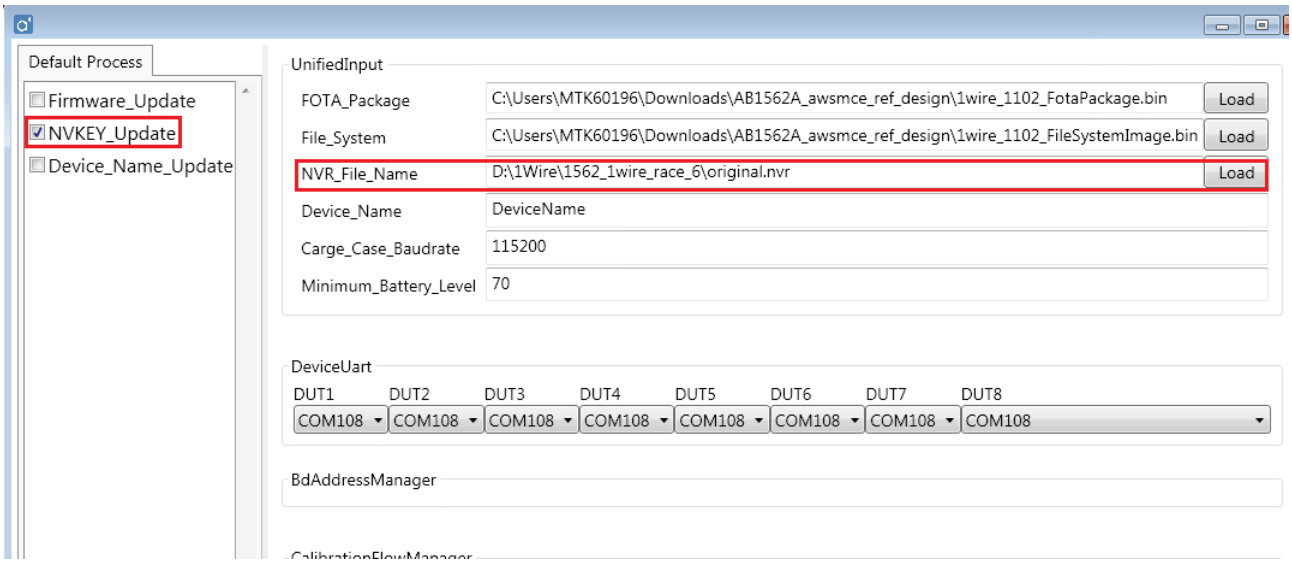

Figure 4-3. Task NVKEY_Update settings

4.4. Device Name Update

Set a device name to write to flash, as shown in Figure 4-4.

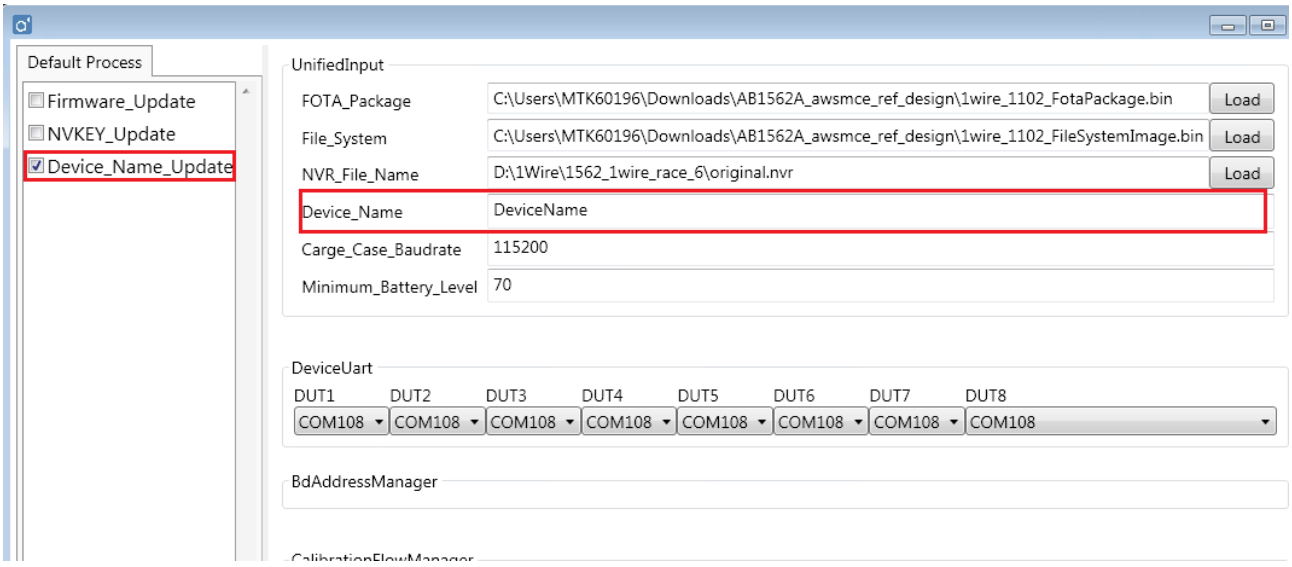

Figure 4-4. Task Device_Name_Update settings

4.5. Summary

Please make sure to pay attention to the following items:

- Please use AB1561_AB1562_AB1563_Airoha_Tool_Kit(ATK)_V1.4.1 or a newer version to AB1562x series chipsets.
- Please use AB1565_AB1568_Airoha_Tool_Kit(ATK)_v2.1.5 or a newer version to AB1565/AB1568 series chipsets.

5. One-Wire UART Flash Tool User Interface

The One-Wire UART Flash Tool is used for upgrade devices with an Airoha chip. The processes include firmware upgrade. The following procedure and images show how to operate the One-Wire UART Flash Tool on AB1562. The AB1565/AB1568 One-Wire UART DFU Tool operation flow is the same as AB1562.
To operate the One-Wire UART Flash Tool:

1) Open the AB1561_AB1562_AB1563_Airoha_Tool_Kit(ATK) folder.
2) Double click Airoha.Tool.Kit.exe.
3) Click the “1-Wire Flash Tool” icon as shown in the following image.

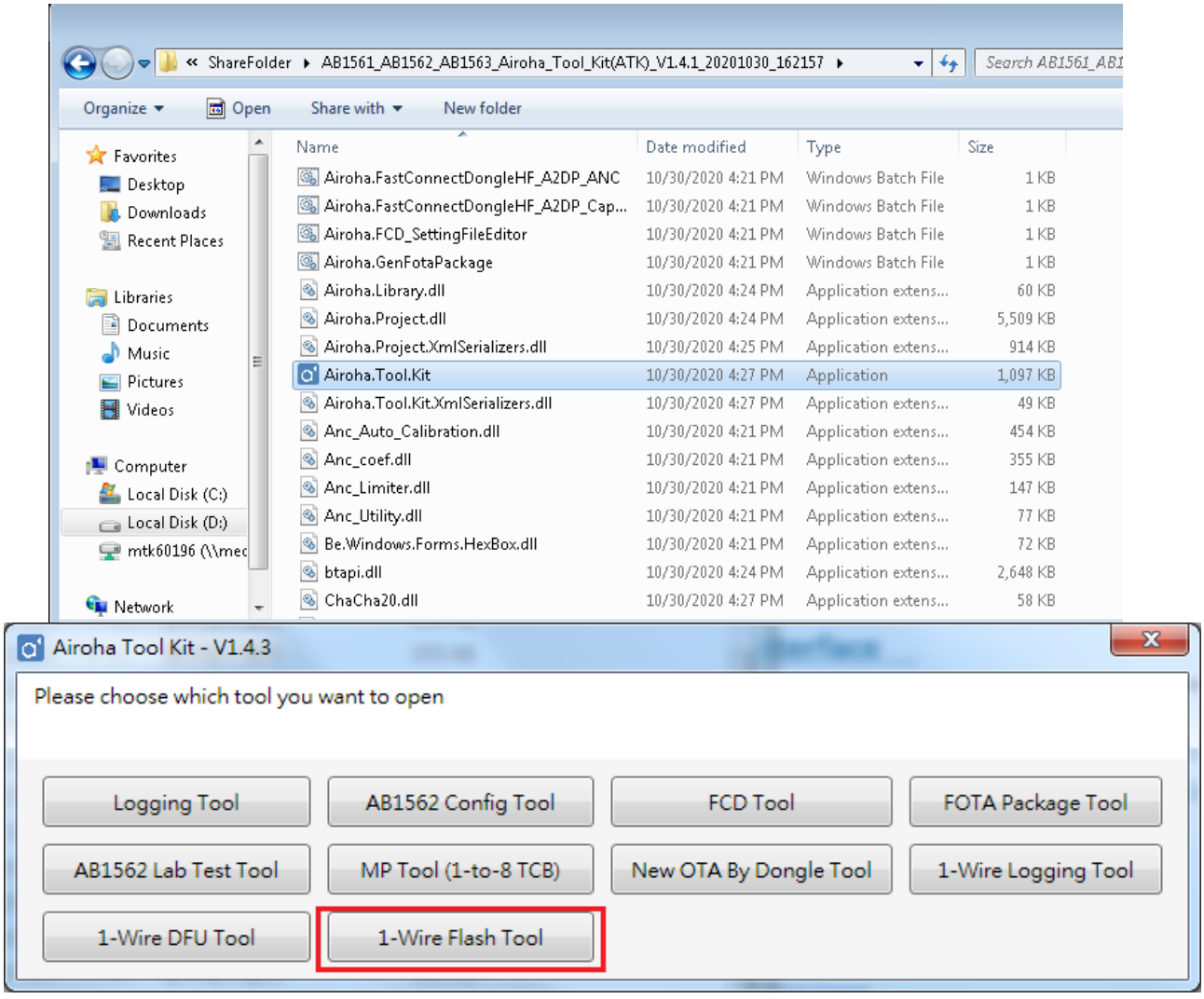

Figure 5-1. Launch One-Wire UART DFU tool

The Flash Tool creates a log file for each DUT. The log files are saved in the working folder, as shown in Figure 5-2.

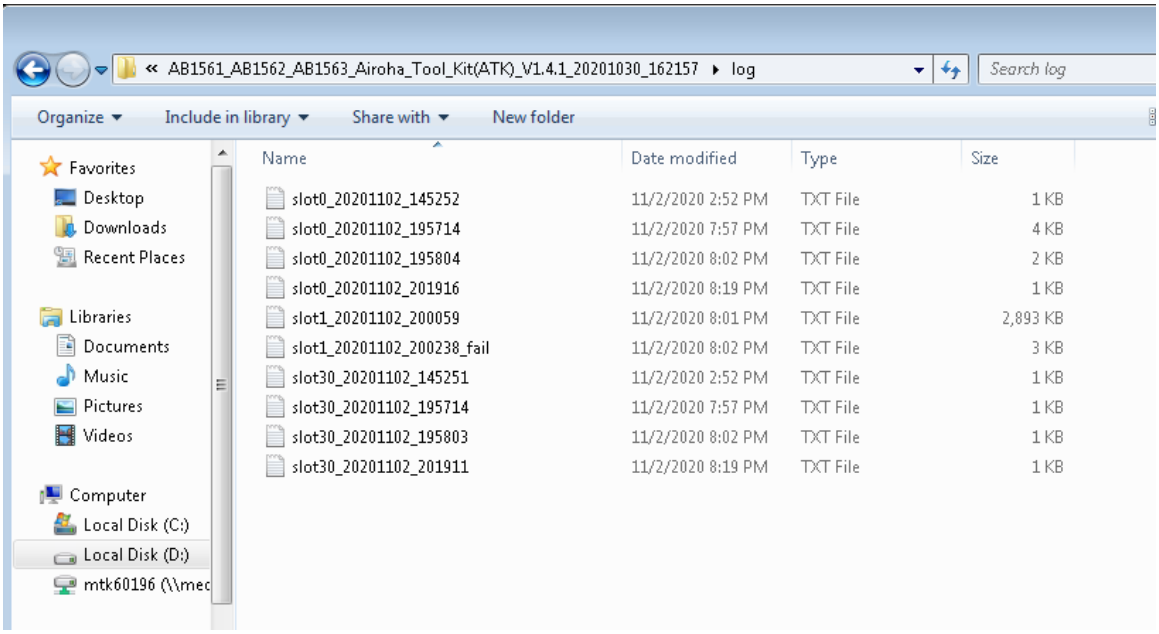

Figure 5-2. Log list in file manager

Figure 5-3 shows the Flash Tool interface.

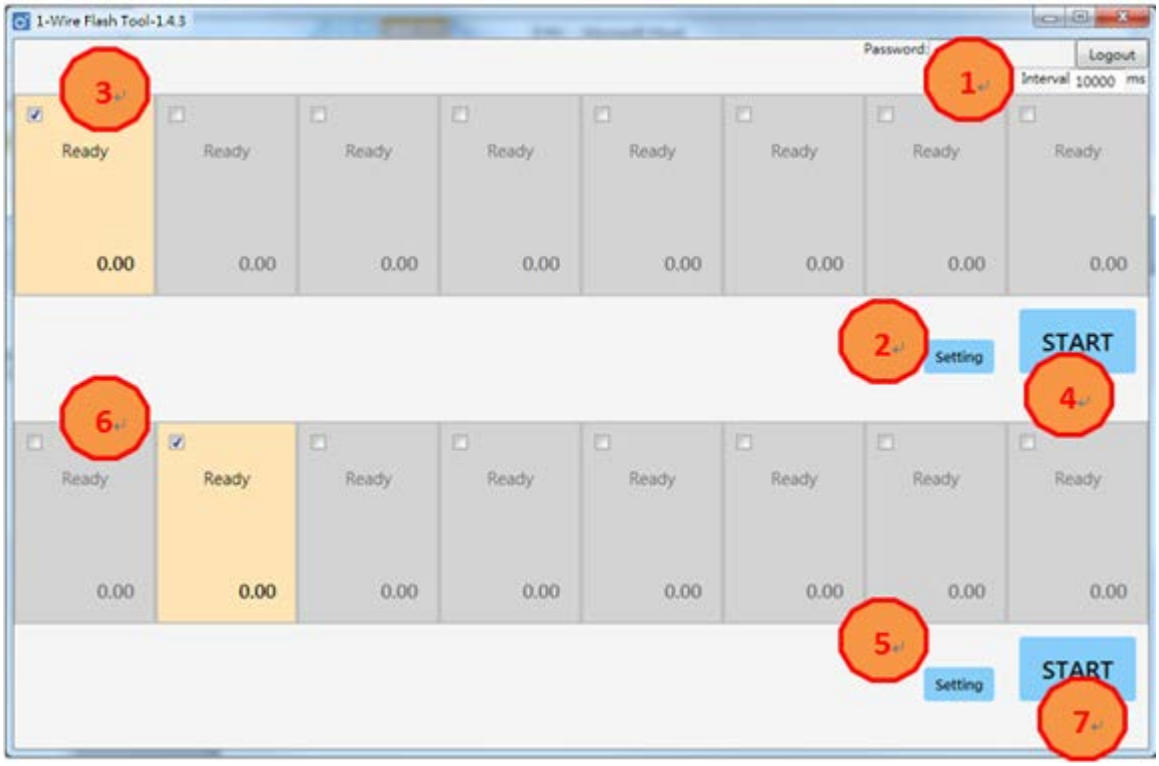

Figure 5-3. Tool setup progress

The quick start procedure is as follows:

1. Log in. A password is necessary. The default password is 11111.
2. Set the test parameters on the **Setting Form** for the selected test item(s).
3. Select the checkbox to select the DUT for testing. The DUTs are shown in the same sequence as the COM port settings.
4. Click the "**START"** button to start testing the DUTs.
5. Set up the second panel if necessary.
6. Select the DUT testing checkbox.
7. Click the "**START**" button to start testing DUTs.

If the DUT passes all tests, the corresponding DUT button is green, as shown in Figure 5-4.

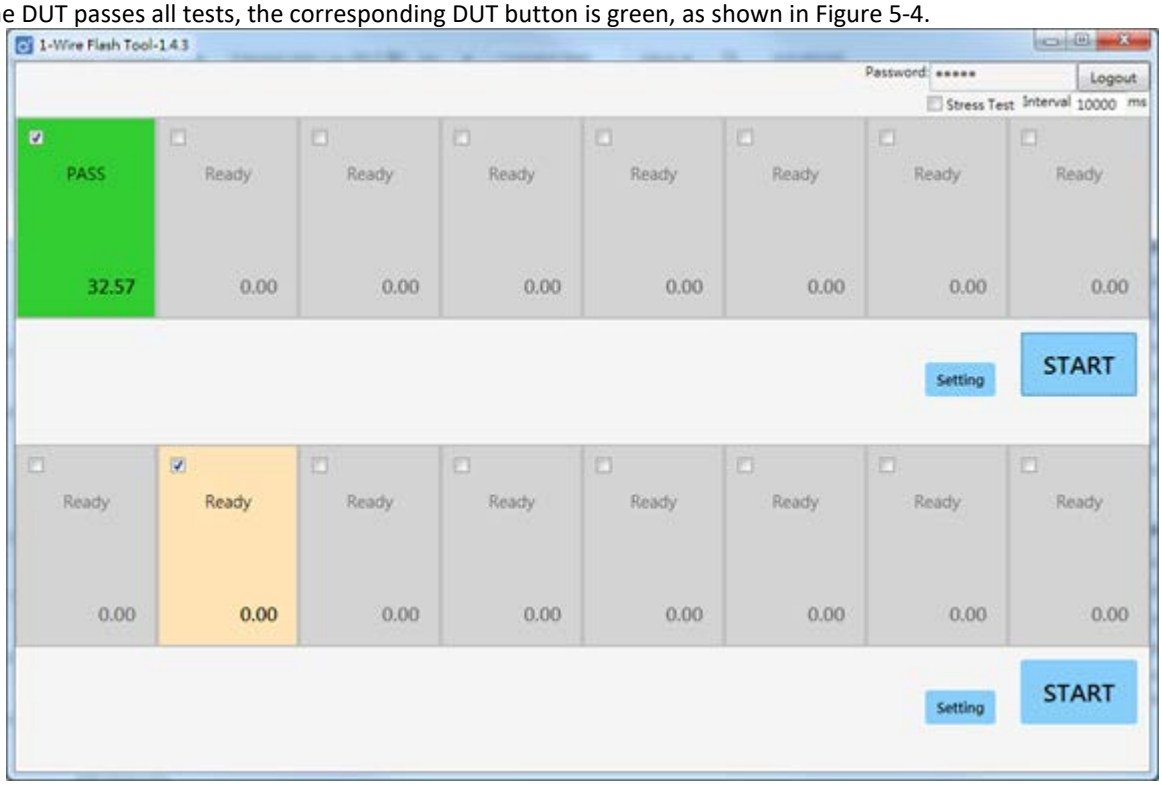

Figure 5-4. Test pass result

If the DUT fails a test, the corresponding DUT button is red, as shown in Figure 5-5.

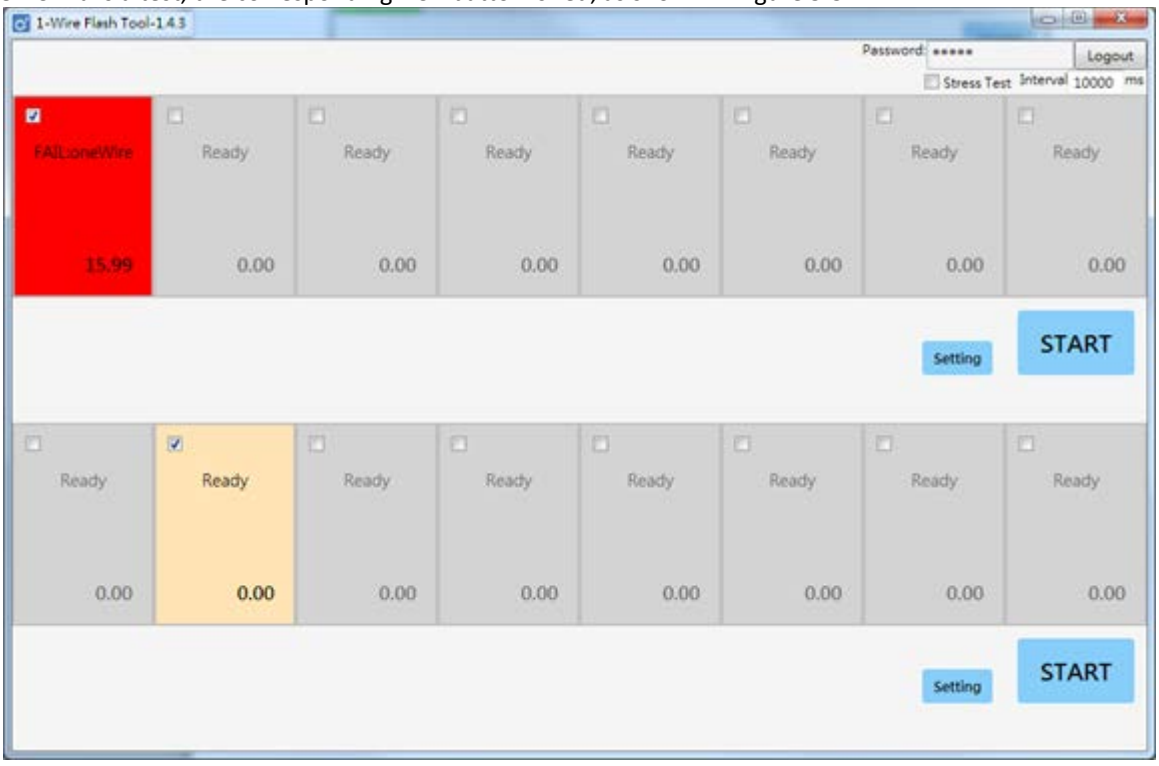

Figure 5-5. Test fail result

6. Parameter Setting

6.1. Test items

The Flash Tool operation procedure is explained as below. Please refer to Figure 6-1.

1. Select a specific COM port on the Device Uart-down list.
2. Select the checkboxes for each test item.
3. Set detail item for each test.

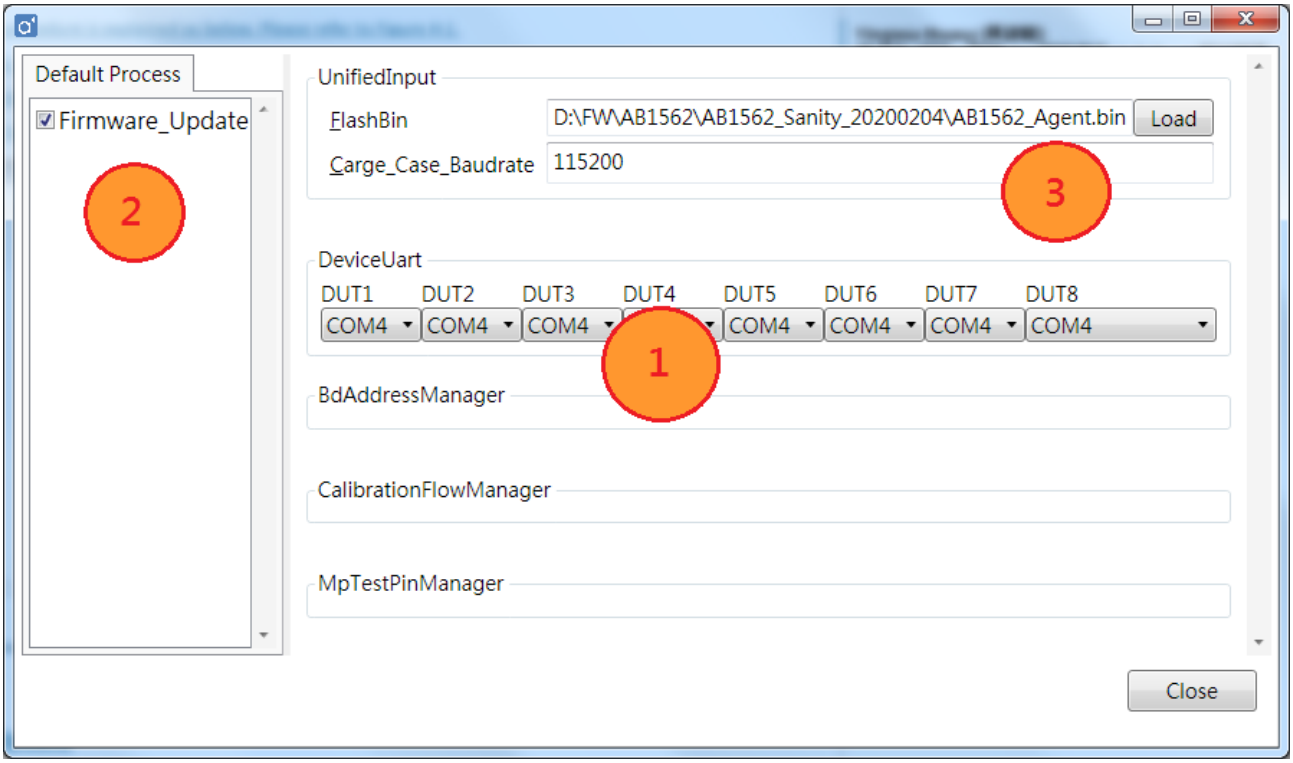

Figure 6-1. Setting dialog

6.2. Firmware Update

You can select whether to use bin files in the local storage to be programmed. The operating environment is described as follows. Please refer to Figure 6-2.

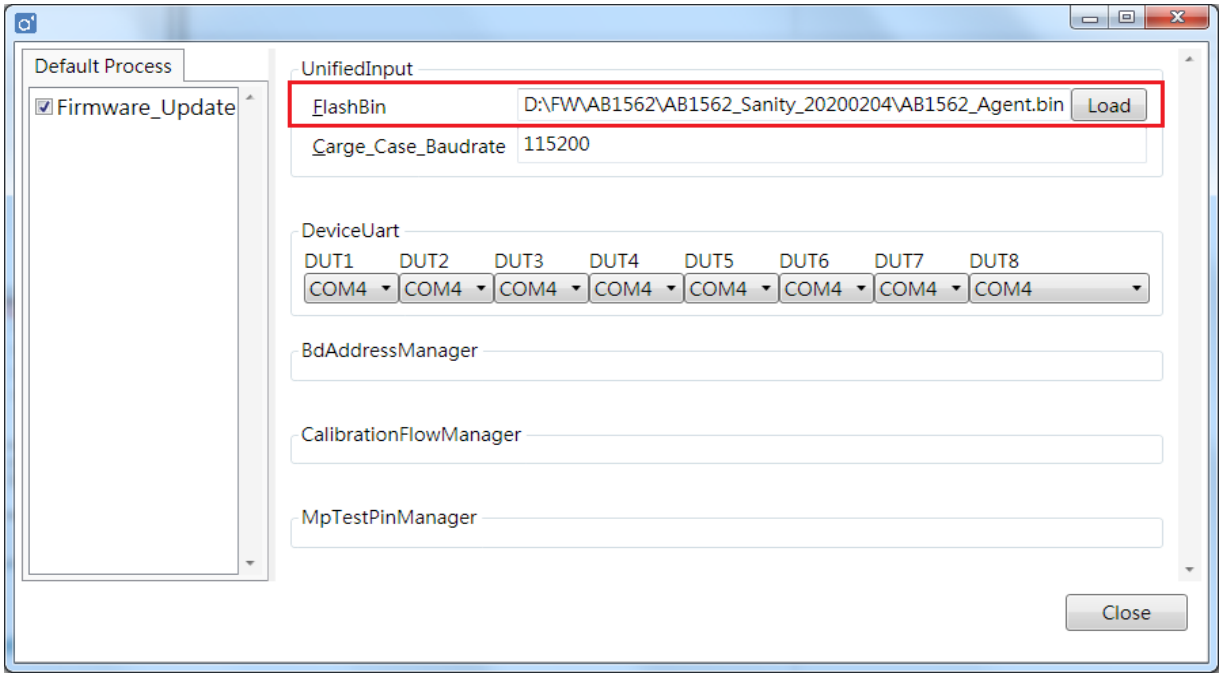

Figure 6-2. Task item Firmware_Update settings

6.3. Summary

Please make sure to pay attention to the following items:

- Please use AB1561_AB1562_AB1563_Airoha_Tool_Kit(ATK)_V1.4.1 or a newer version to AB1562x series chipsets.
- Please use AB1565_AB1568_Airoha_Tool_Kit(ATK)_v2.1.5 or a newer version to AB1565/AB1568 series chipsets.

7. One-Wire Logging Tool

7.1. Quick start

Install the Configure Tool software if it is the first time to use this tool on your PC.
You must prepare the following items to start the Configure Tool:

1) An AB1561_AB1562_AB1563 EVK
2) A message Id (MsgId) binary file matched with AB1561_AB1562_AB1563 EVK firmware

Double-click the Airoha.Tool.Kit.exe file to start the logging tool.

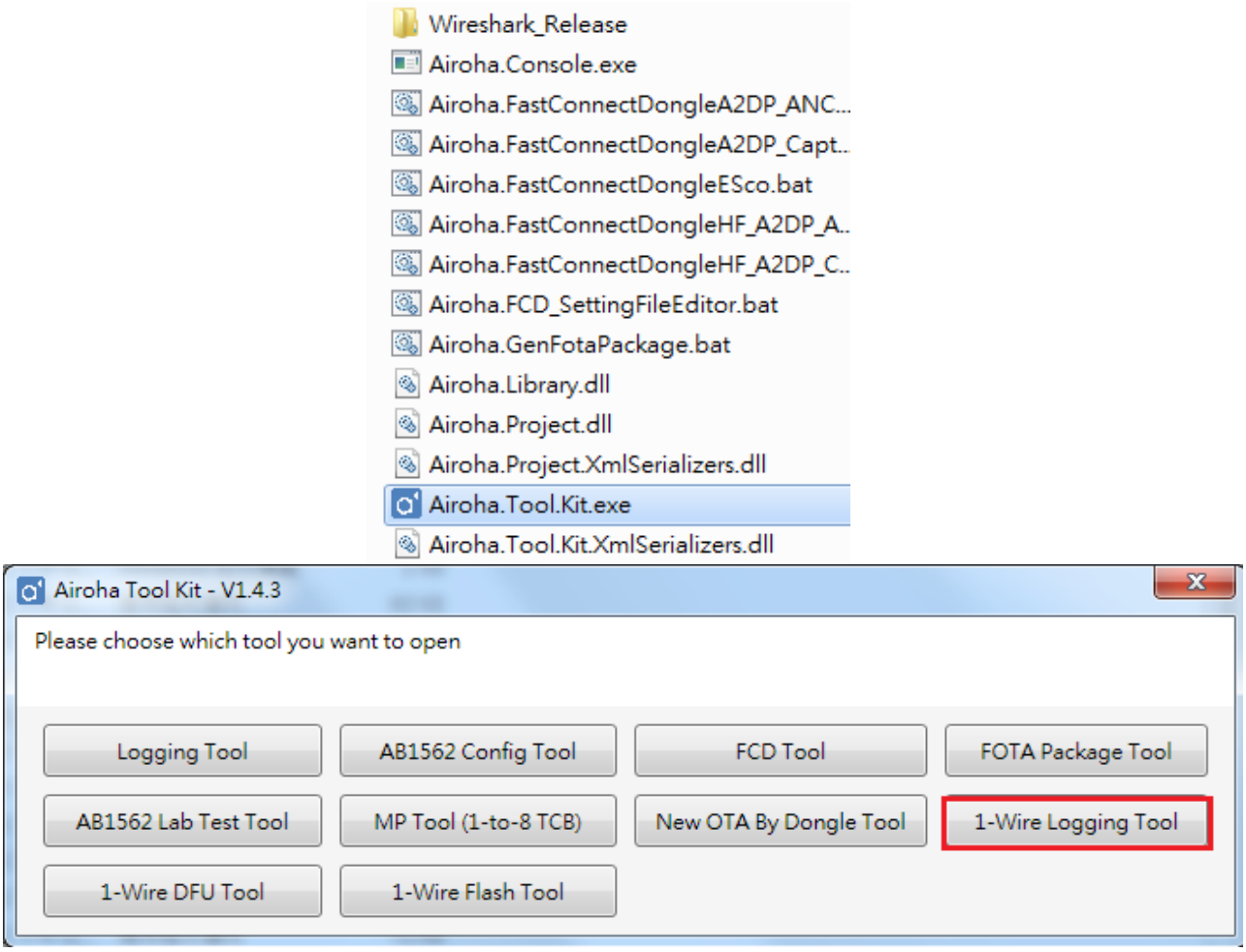

Figure 7-1. Software path

The AG3335 Logging Tool window is divided into four sections as shown in Figure 7-2.

1) **Tool Bar** – Icons graphically represent the functions, such as enable/disable COM port, start/stop pipe log to Wireshark, set the MsgId log bin file, and trigger device assert.
2) **Function Tabs** – Set the configuration parameters.

3) **Output Window** – Show the message when processes occur.
4) **Workspace** – Main section for showing the configuration parameters.

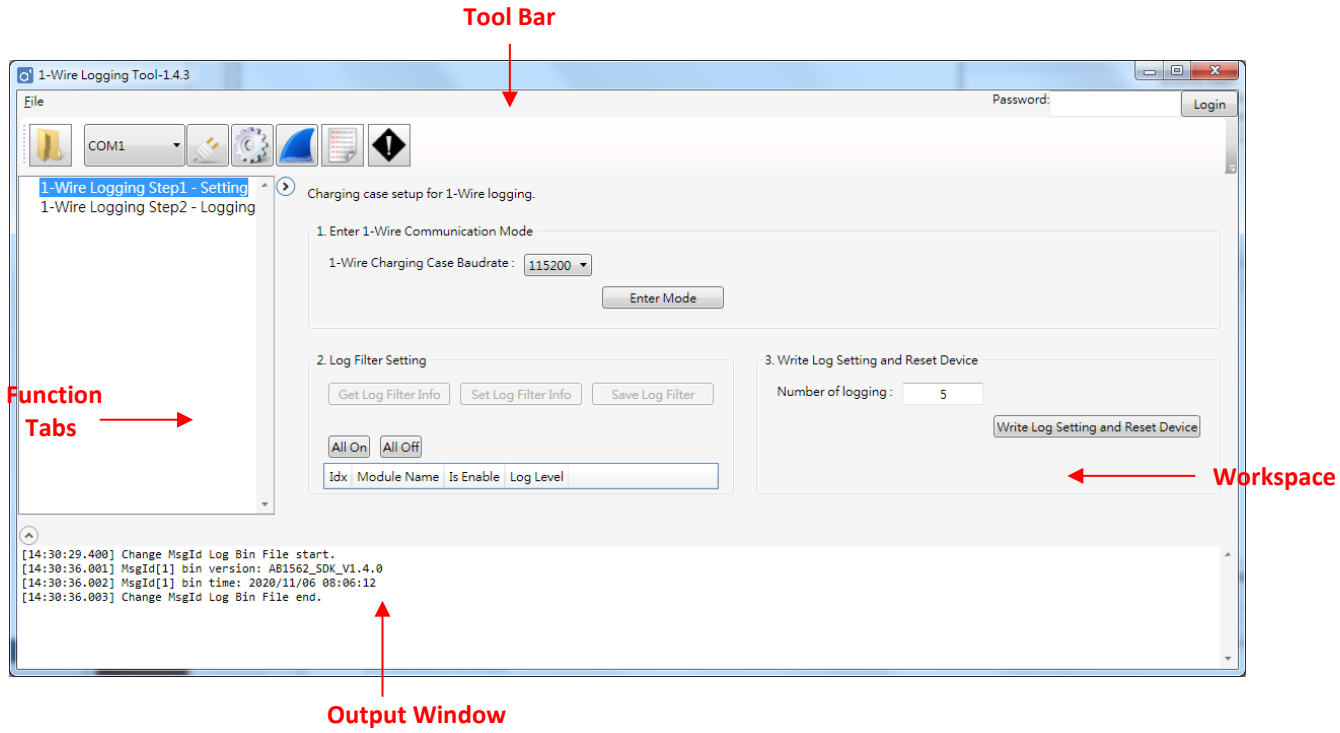

Figure 7-2. Tool window

You usually perform the following actions when you start the logging tool:

1) Setting the MsgId binary file (Ex: cm4_log_str.bin).
2) Pipe log to Wireshark.
3) Modify the device log filter.

The following sections show how to perform these actions.

7.2. Setting the Message ID (MsgId) binary file

You must set the MsgId binary file before receiving and processing the message ID log.

Action:

1) Click the **Set MsgId Bin File** button on the Tool Bar.
2) Select a specific *.bin file and click **Open** (e.g.: cm4_log_str.bin)

Figure 7-3. Open file button

7.3. Pipe log to Wireshark

The following section shows how to display the log in Wireshark.

Action:

1) Select the COM port to which the device is connected.

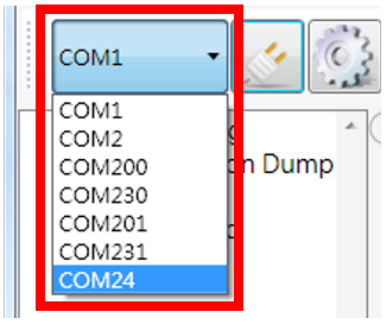

Figure 7-4. COM Port List

2) Click the **Enable COM port** button in the Tool Bar to connect to the AB1561_AB1562_AB1563 Series module.

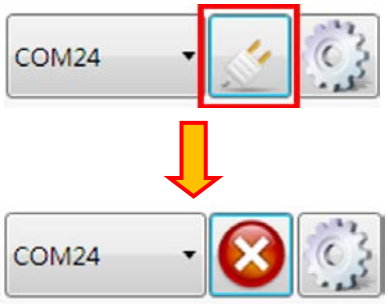

Figure 7-5. Connect To COM Port

3) Click the **Wireshark** button in the Tool Bar to launch Wireshark and display the log.

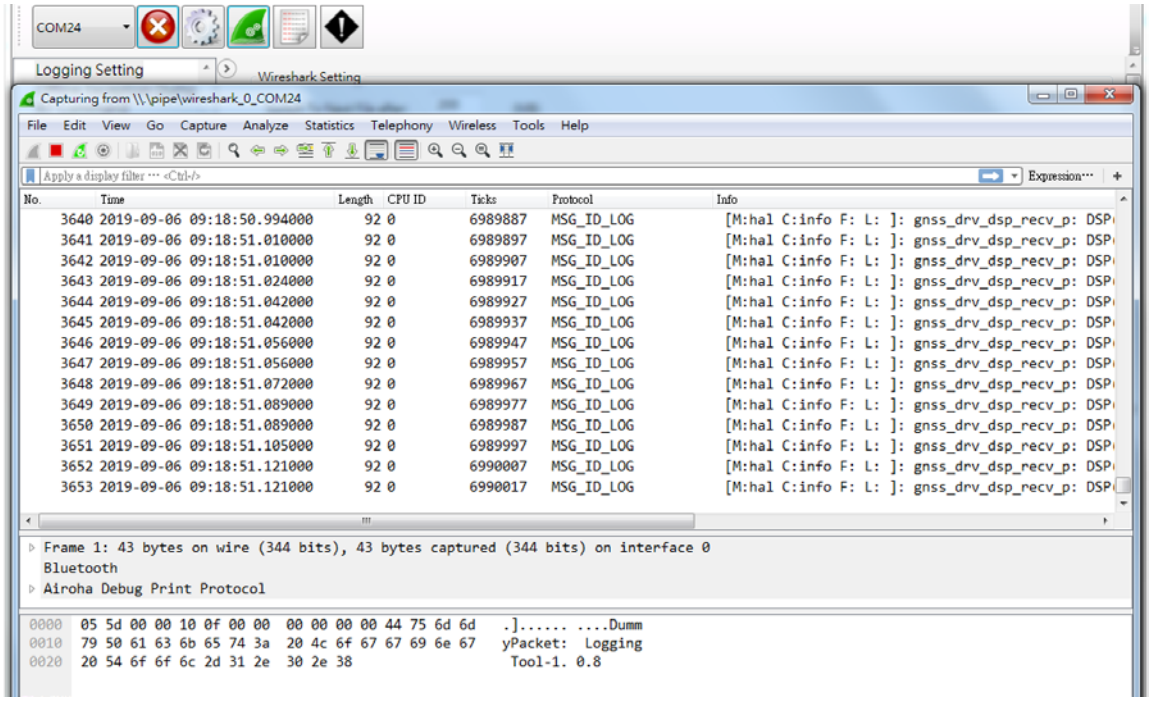

Figure 7-6. Launch Wireshark

Wireshark log - pcapng file is automatically saved in the tool\log folder.

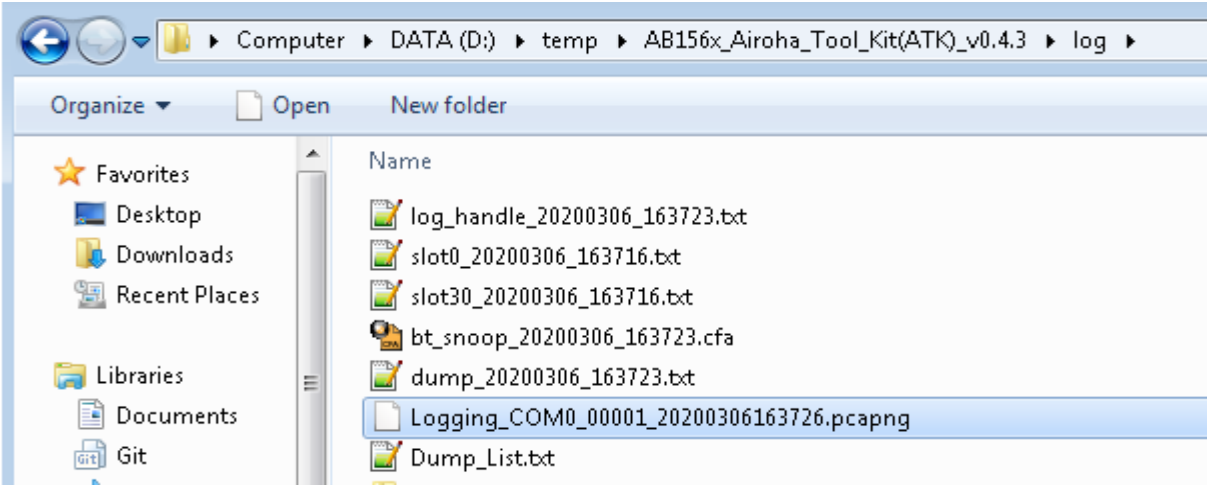

Figure 7-7. Wireshark log

7.4. Enter 1-Wire Communication

Action:

1. Set Baudrate and Enter Mode.

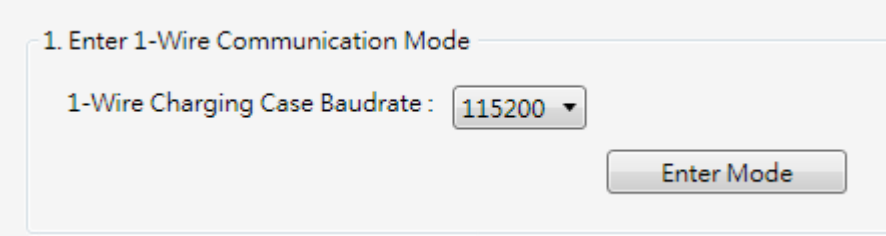

Figure 7-8. Get log filter info. button

7.5. Modify the log filter setting

Action:

1. Open the COM port that is connected to the AB1561_AB1562_AB1563 module as shown in Section 7.3.
2. Click the **Get Log Filter Info** button to get the current device settings. The set save log filter buttons are enabled when the device settings load.

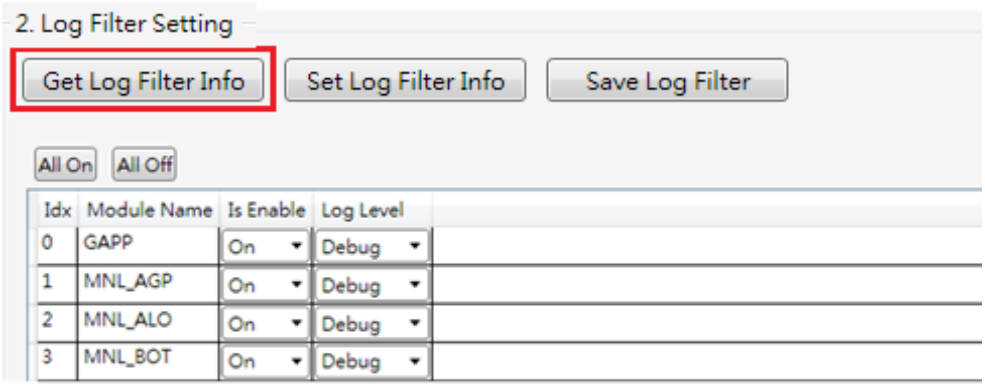

Figure 7-9. Get log filter info. button

3. Turn the log modules on or off and make any necessary changes to the log levels (i.e. Debug/Info/Warning/Error).

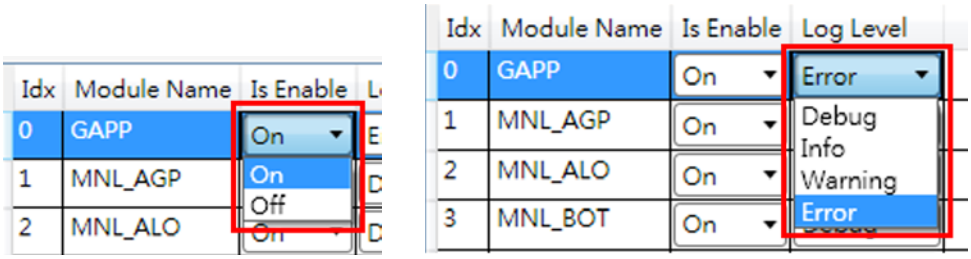

Figure 7-10. Modify log setting

4. Click the **Set Log Filter Info** button to change log status on the AB1561_AB1562_AB1563 device, or click the **Save Log Filter** button save the new log setting on the device.

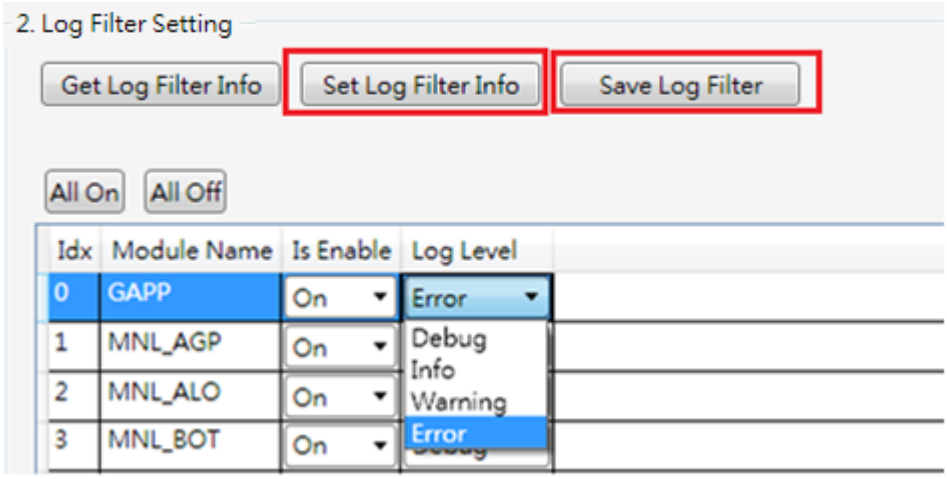

Figure 7-11. Set/Save Log Filter

7.6. Write Log Setting and Reset Device

Action:

1. Set number of logging and Reset Device.

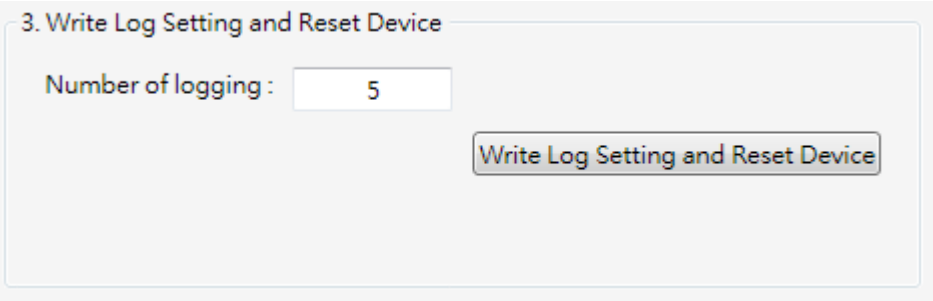

Figure 7-12. Get log filter info. button

8. Wireshark Settings

8.1. Log file size

Before launching Wireshark, you can adjust the maximum size of Wireshark log file in single file. When the log file size reaches the size of this setting, Wireshark creates a new log file. We strongly suggest that this value should not be greater than 200 MB, because it could occupy too many RAM space and have a negative effect on the PC's performance.

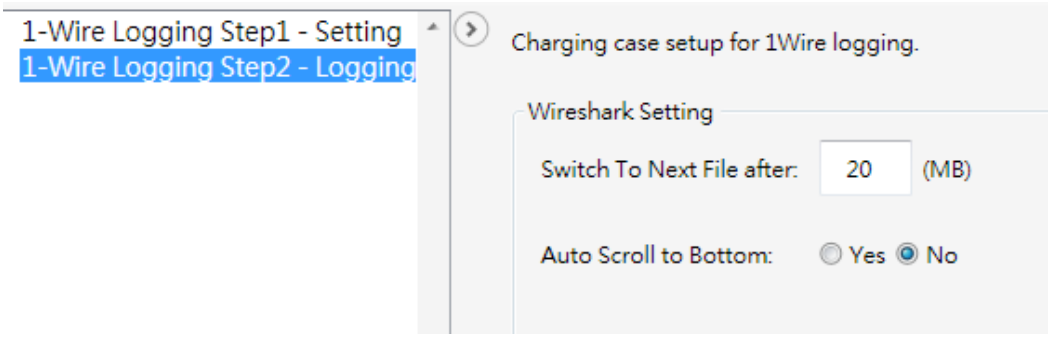

Figure 8-1. Wireshark log file size setting

8.2. Open previously saved log file

You can launch Wireshark directly from **tool/Wireshark_Release/Wireshark.exe**.

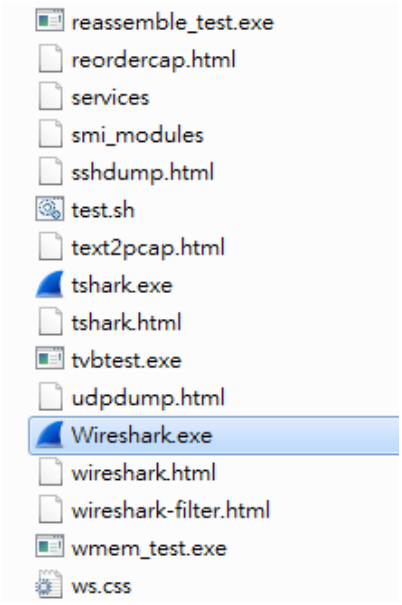

Figure 8-2. Wireshark folder

When Wireshark has started, you can choose the pcapng log file by selecting File > Open on the tool bar, or drag and drop the pcapng file onto the main window of the Wireshark application.

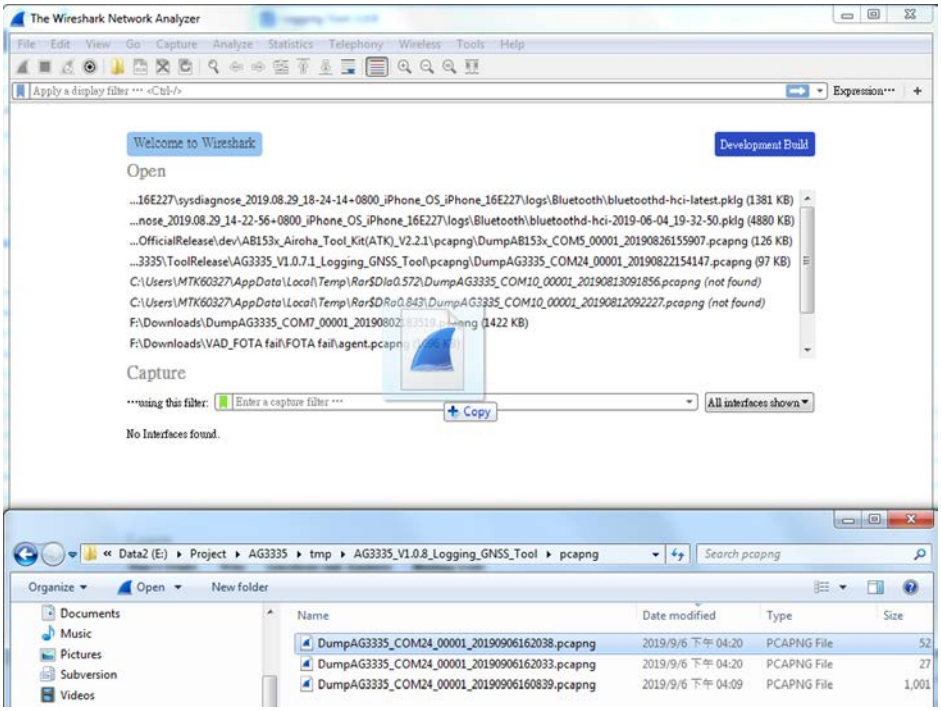

Figure 8-3. Drag and drop the log file to Wireshark

8.3. Search and filter keywords

You can easily search packets when you have already captured packets or read them in a previously saved log file.

8.3.1. Searching for keywords

Please press **CTRL+F** and key into the textbox the string of text you want to find (as shown in Figure 8-4). Then click the **Find** button. Wireshark jumps to the line if it finds a packet including the text string.

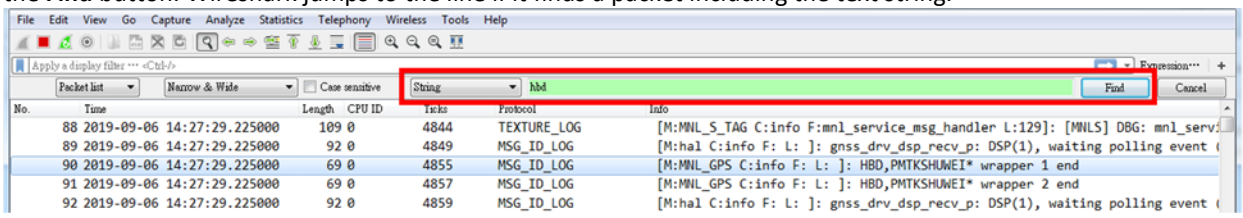

Figure 8-4. Search keyword

8.3.2. Filtering keywords

If you want to focus only on a specific packet, you can use the filter function. There are two common expression commands that you can use to filter packets:

1. **frame contains "string"** – Filter the string by case sensitive.
2. **frame matches "(?i)string"** – Filter the string by case insensitive.

Please key in the text string in the expression textbox as shown in Figure 8-5, and press the Enter key. Wireshark shows the packets that including the text string.

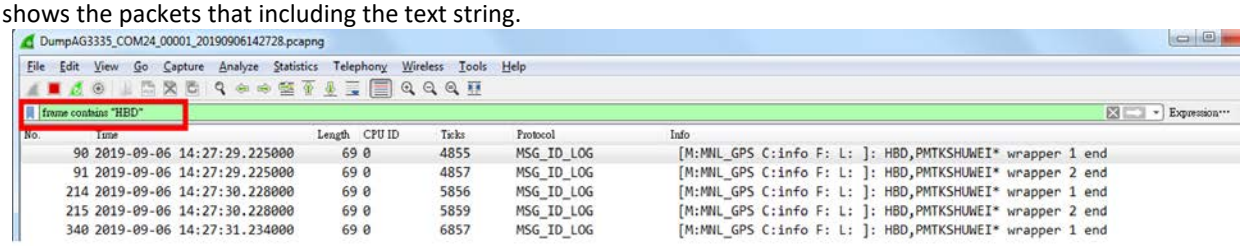

Figure 8-5. Filter keyword

8.4. Changing Time display formats

You can adjust the time display formats by selecting View > Time Display Format on the tool bar as shown in Figure 8-6.

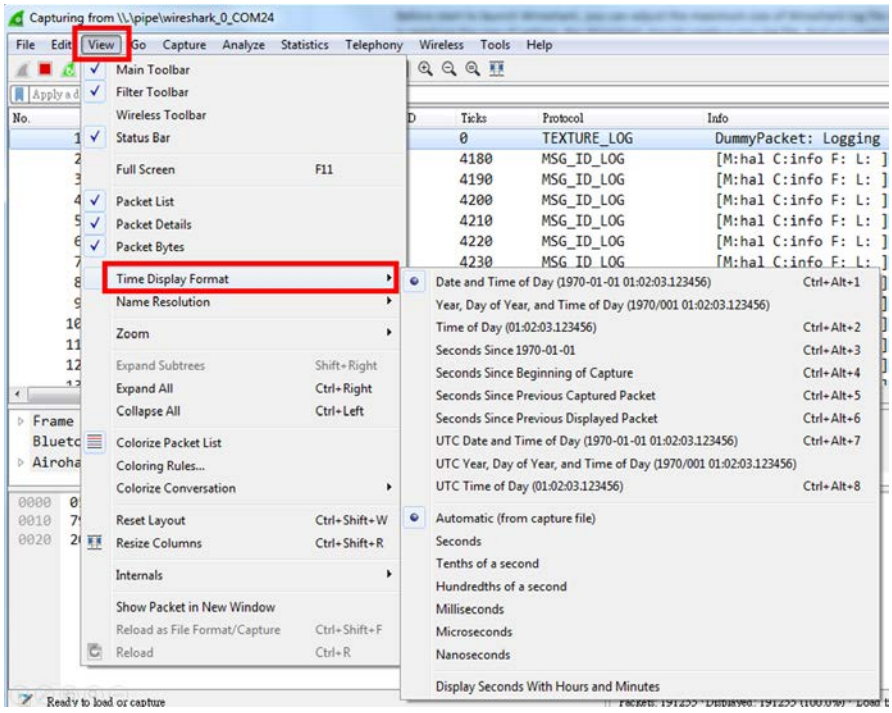

Figure 8-6. Time display formats