Atmosic MP Tool

User Guide

SUMMARY: This document describes the Atmosic MP Tool for manufacturing testing of the ATM2/ATM3, ATM33/e and ATM34/e Wireless SoCs on the production lines without using RF testing equipment.

Atmosic™

Doc. No. ATM-UGMPT-0076

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Acronyms and Abbreviations

Acronyms	Definition
AG	Atmosic Golden Device
ATM2	ATM2201 ATM2202 ATM2221 ATM2231 ATM2251
ATM33/e	ATM3325 ATM3330 ATM3330e
ATM34/e	ATM3405 ATM3430 ATM3430e
DL	Download Board
DUT	Device Under Test
EVB	Evaluation Board
EVK	Evaluation Kit
MP	Mass Production
MP Tool	Mass Production Tool
NVDS	Non-Volatile Data Storage
NVM	Non-Volatile Memory
NVS	Non-Volatile Storage (Zephyr Specific)
OTP	One-Time Programmable
PV	Photovoltaics

RAM	Random Access Memory
RRAM	Resistive Random Access Memory
SoC	System-on-Chip

1. Overview

This document describes the mass production (MP) environment used to test ATM33/e and ATM34/e Wireless SoCs on production lines without radio-frequency (RF) test equipment. It consists of the following hardware and software items:

- The MP Tool (AtmMPTool.exe) is a software application designed for MS Windows.
- Atmosic Download Board (DL) provides the capabilities of firmware, NVDS, and OTP programming by MP Tool. This is a cost-effective solution to program the DUT. See Figure 2-1 for the content of the Download Board (DL) Kit.
- The Atmosic Golden Device (AG) is a Bluetooth LE RF Tester developed by Atmosic. It is used for Bluetooth LE testing of the DUTs controlled by the MP Tool. Up to 8 DUTs controlled by the MP Tool can be tested using 8 DL boards and 1 AG. See Figure 2-2 for the content of the Atmosic Golden Device (AG) Kit.

Note: DL and AG Kit information in Table 2-1.

The Atmosic MP Tool software with the AG provides the following functionalities:

- RF Tx Test
- RF Rx Test
- RF Frequency Offset Test
- Clock Calibration
- Program Firmware and factory data to storage

2. Hardware and Software Requirements

2.1 Supported Hardware

Name	Description	Kit Part Number
Download Board (DL)	Product Firmware Download Board	ATMFDL-Mx2xx
Atmosic Golden Device (AG)	RF Golden Tester for Bluetooth LE RF Test	ATMAG-BLE or ATMAG2-BLE

Table 2-1 DL and AG Kit Information

ATM2		ATM3		ATM33/e	ATM34/e
ATM2201-x0x	ATM2201-x1x	ATM3201-x0x	ATM3201-x1x	ATM3325-5DCAQK	ATM3405-5YCABV
ATM2202-x0x	ATM2202-x1x	ATM3202-x0x	ATM3202-x1x	ATM3325-5LCAQK	ATM3430E-5YCAQN
ATM2221-x0x	ATM2221-x1x	ATM3221-x0x	ATM3221-x1x	ATM3325-5DCACM	ATM3405-5WCAQK
	ATM2231-x1x		ATM3231-x1x	ATM3330-5DCAQN	ATM3405-5PCAQK
	ATM2251-x1x			ATM3330e-5DCAQN	

Table 2-2 Supported Atmosic Wireless SoCs

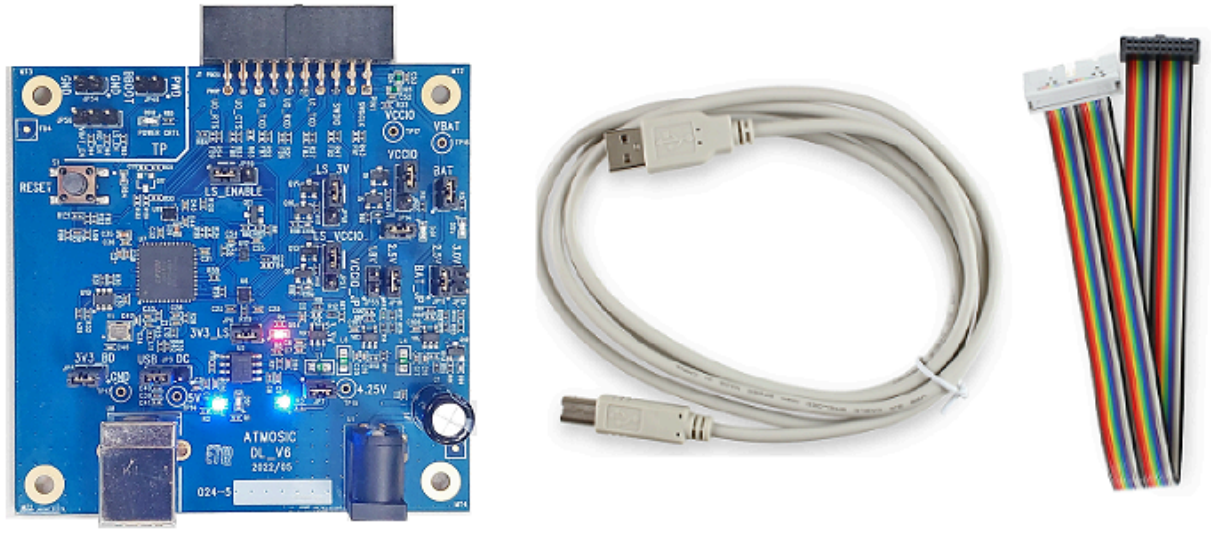


Figure 2-1 Download Board (DL) Kit

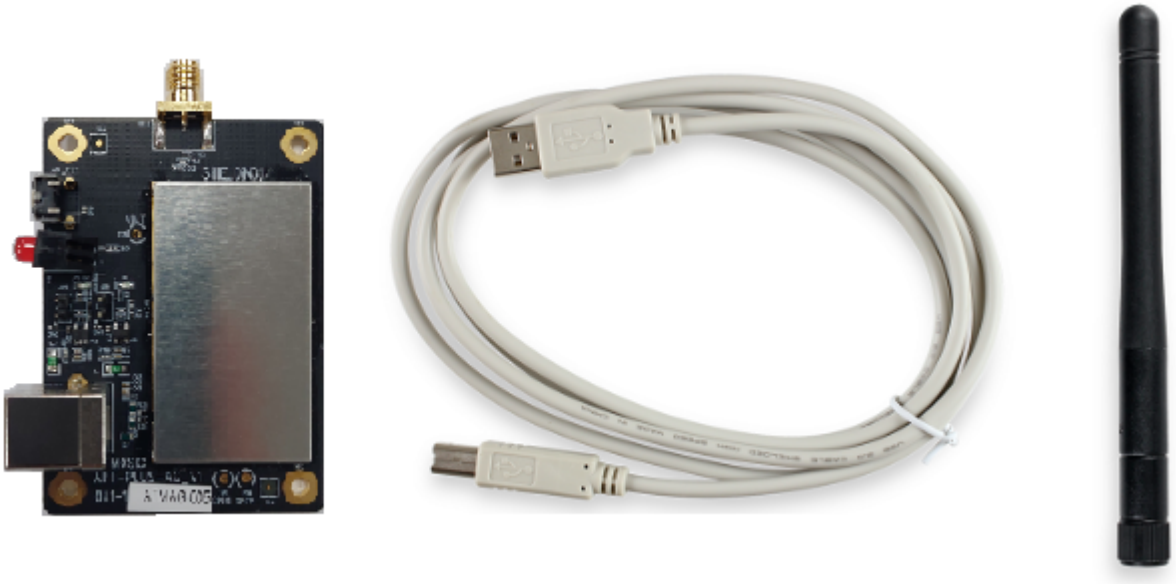


Figure 2-2 Atmosic Golden Device (AG) Kit

Note: The Atmosic Production Tester Kit (APT) hardware is deprecated, and no new software support will be provided.

2.2 Supported Software

- DL+AG: MP Tool software

It is recommended to use the latest version of the MP Tool available on the Atmosic Customer Portal

2.3 Supported OS

- Windows 10, Windows 11

3. Download (DL) Board and Atmosic Golden Device (AG)

3.1 Environment Setup for Download (DL) Board Only

The DL board is used for control and to load code into the memory. The following hardware setup is required:

- 1 x PC:
  - Operating Systems: Windows 10 or Windows 11
- 1 x Atmosic DL Board (Purchase from Atmosic)
- 1 x Type-B USB Cable
- 1 x 20-pin Test Interface Cable
  - Purpose: The cable assembly is to connect the DL J1 connector and production test jig, as shown in Figure 3-2. The length of the cable depends on the production setup. The connector type at the test jig side is dependent on the test jig design. The customers will need to assemble the cable with the right connector.
- 1 x MP Tool Software
  - MP Tool software (Please see the chapter Software Setup)

The DL_V6 picture is shown in Figure 3-1.

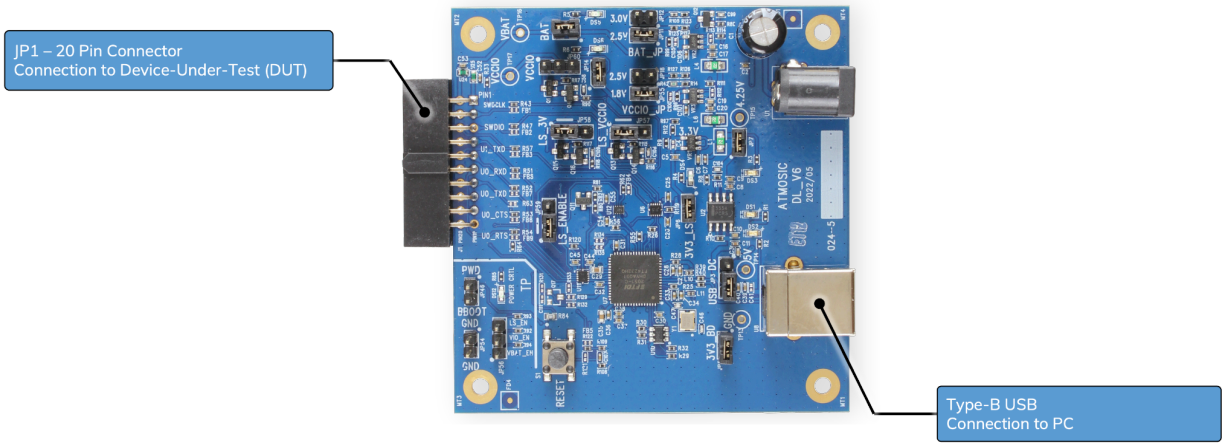


Figure 3-1 Production Download Board (DL) Configuration

Figure 3-2 shows a connection setup between a PC, DL, and DUT.

Figure 3-2 Connection Setup Between PC, DL, and DUT

3.1.1 DL_V6 Jumper Connection with 2.5 V or 1.8 V I/O Voltage

DL_V6 adds a power control function to ensure that the DUT is powered off before the MP Tool test program runs. DL_V6 supports either 2.5 V or 1.8 V I/O voltages.

Since a 2.5 V I/O voltage level is needed to write into OTP, the default jumper settings supporting a 2.5 V I/O voltage are shown in Figure 3-3.

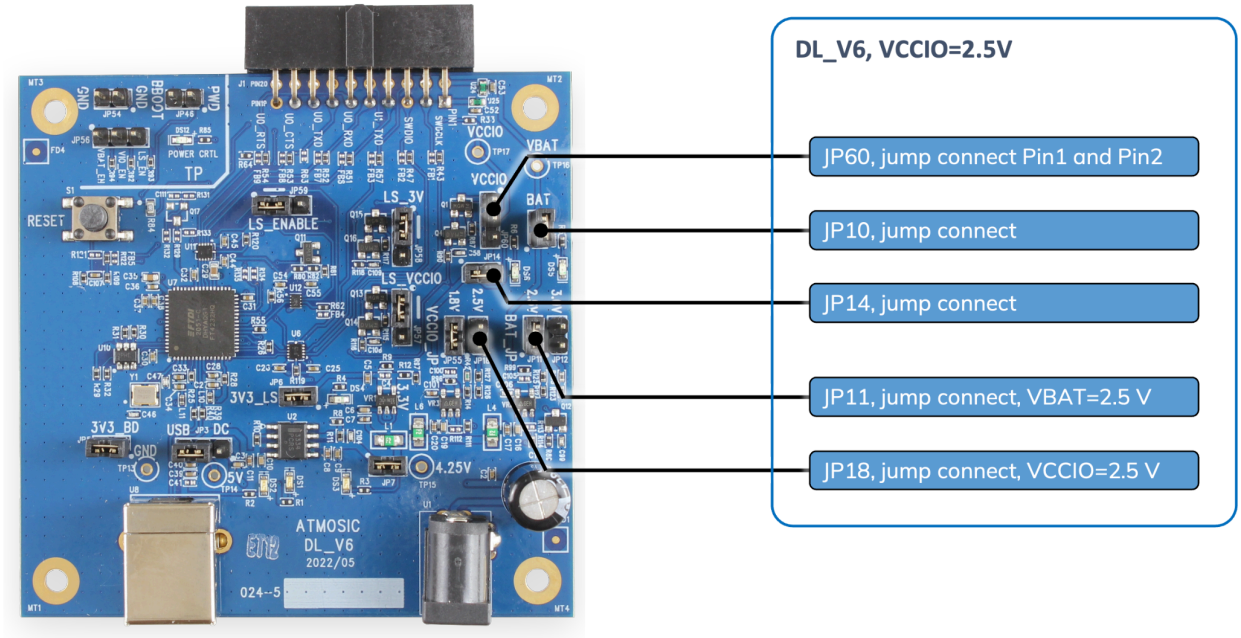


Figure 3-3 DL_V6 with 2.5 V I/O Voltage Critical Jumper Setting

If the I/O voltage needs to use 1.8 V I/O, the recommended jumper settings diagram is shown in Figure 3-4.

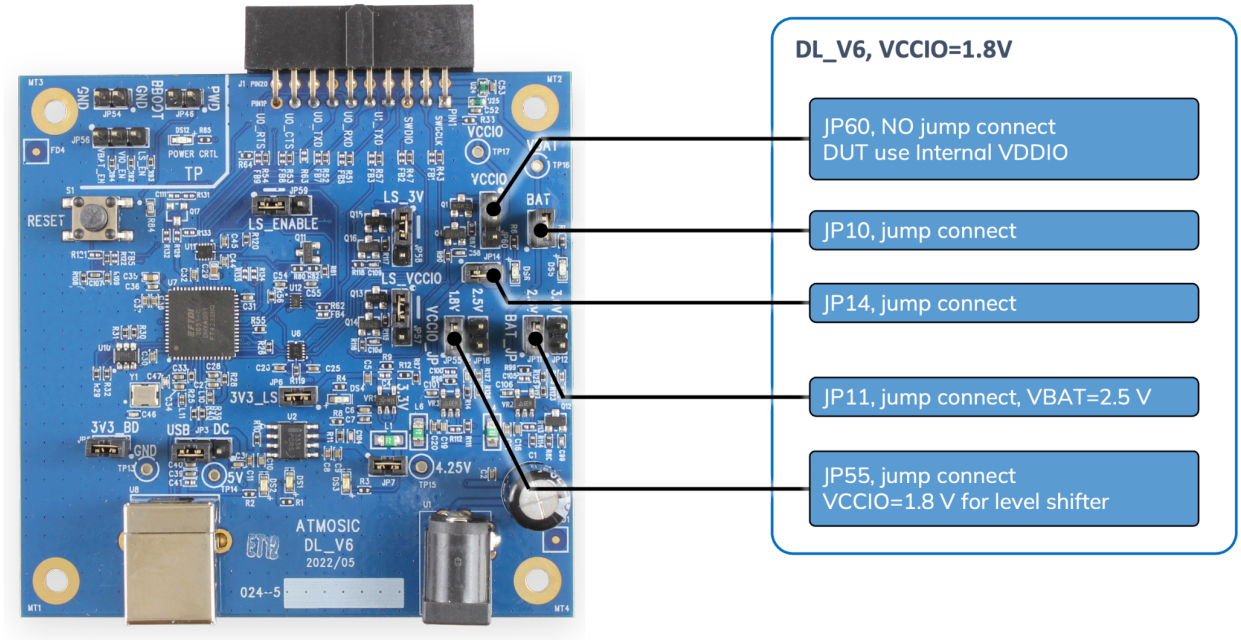


Figure 3-4 DL_V6 with 1.8 V I/O Voltage Critical Jumper Setting

3.2 Environment Setup for Downloaded Board (DL) & Atmosic Golden Device (AG)

The Atmosic Golden Device provides a quick and easy way to validate the RF performance of the products. To accommodate different production test environments and product designs, the Atmosic Golden Device is separated from the MP download board.

A complete set of the testing suite requires:

- 1 x PC
  - Operating Systems: Windows 10 or Windows 11
- 1 x Atmosic AG
- 1 x Dipole antenna
- n x Atmosic DL Board
  - Quantity: n (with a maximum of 8)
- Type-B USB Cable

- Quantity: n+1 (DL needs n, AG needs 1)

- n x 20-pin Test Interface Cable
  - Purpose: Connect from DUT to J1 of DL

- 1 x MP Tool Software
  - MP Tool software (Please see the chapter Software Setup)

Figure 3-5 shows a connection setup between PC, DL, AG, and DUT.

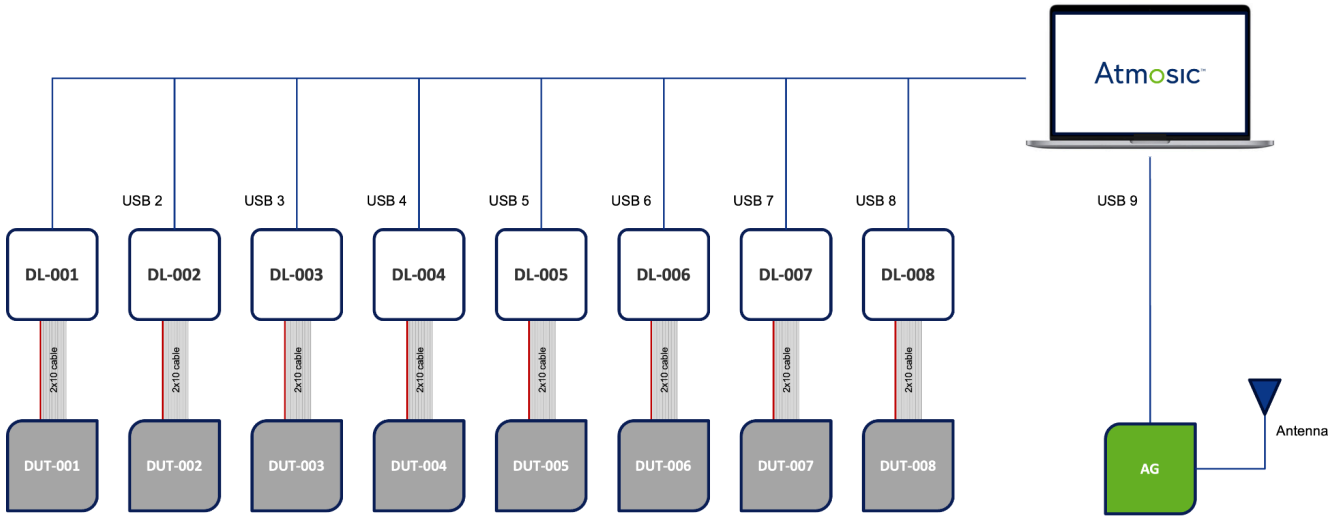


Figure 3-5 Connection Block Diagram Between PC, DL, AG, and DUT

4. Hardware Setup

There is a Type-B USB port on the DL board or the AG board that is connected to the FTDI chip FT4232H, which provides four UART ports.

The test point connector is the interface between the DUT and DL board, as shown in Figure 4-1. It provides a host computer access to some commonly needed interfaces to the DUT, such as:

- Power and Ground:
  - VBAT
  - VCCIO
  - GND
- Serial Wire Debug (SWD):
  - SWDCLK
  - SWDIO
- 4-wire HCI UART for RF Test Control:
  - UART0_TXD
  - UART0_RXD
  - UART0_CTS: Optional
  - UART0_RTS: Optional
- Status Control Signal:
  - PWD: Used to Reset/PWD the DUT
  - BBOOT: Used to configure the DUT into the CPU idle state for programming OTP and Flash
- Debug UART:

- UART1_TXD: Optional, for debugging only

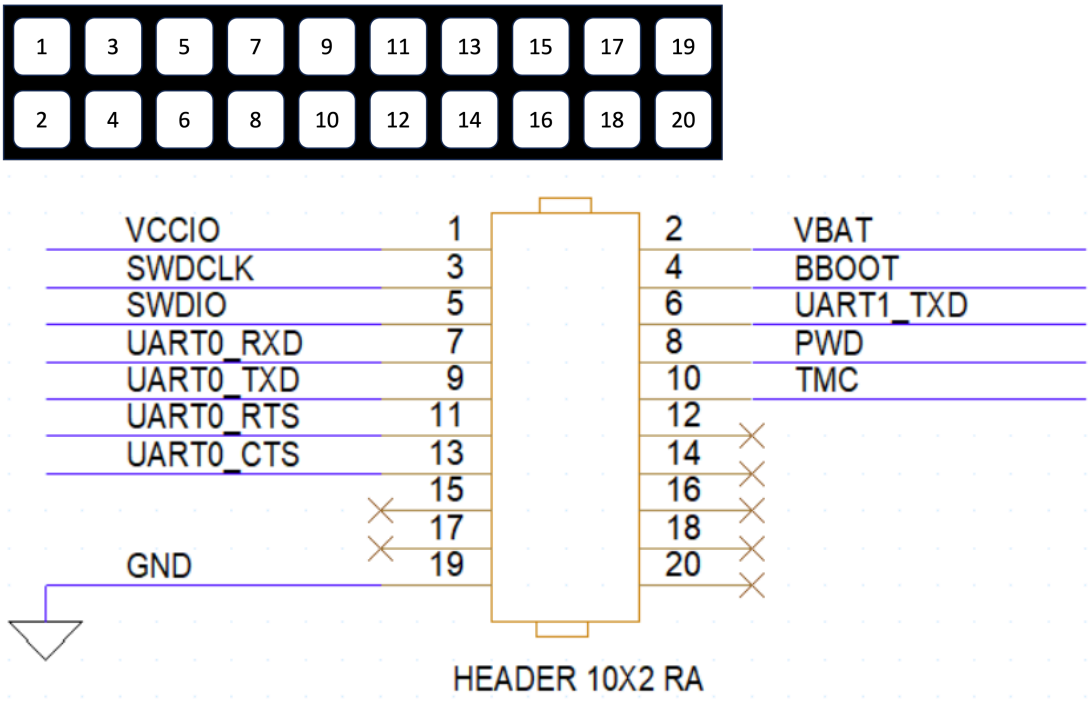


Figure 4-1 Test Point Connector Pin Definition

5. DUT Design Requirements for Manufacturing

The DUT must have a matching set of headers or test points that allow the DL board to connect to it for downloading firmware or executing mass production tests by the MP Tool. The interface between the DUT and DL is shown in Figure 4-1.

The MP Tool's configuration for UART to GPIO mapping must match the DUT. This configuration is detailed in the Burn Test Code section.

6. Software Setup

6.1. Install Visual C++ Redistributable

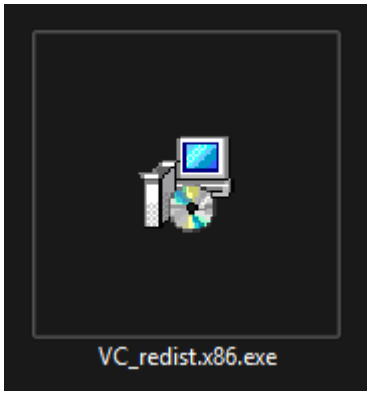
MP Tool is a library developed using VC++. The corresponding VC++ Redistributable package must be installed.

6.1.1 Download Visual C++ Redistributable

Please download the latest version (2017-2026) of vc_redist_x86.exe from https://learn.microsoft.com/en-us/cpp/windows/latest-supported-vc-redist?view=msvc-170.

6.1.2 Install Visual C++ Redistributable

Navigate to the directory where you downloaded vc_redist_x86.exe, then double-click vc_redist_x86.exe and follow the prompts to complete the installation.



6.2 Uninstall Any Previous Versions of the MP Tool

If an earlier version of the MP Tool was installed, execute its uninstaller, located at C:\AtmosicMP\unInst_MP.exe, and wait for the uninstallation to complete. Then click Close. See Figure 6-1.

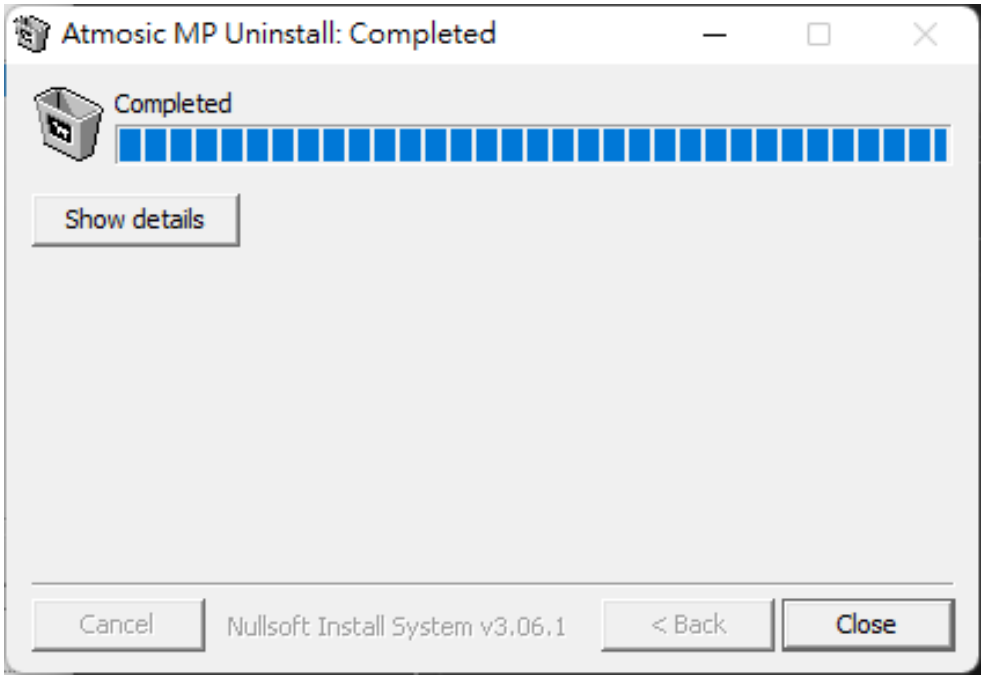


Figure 6-1 Uninstall Previous MP Tool Version Completed

6.3 Install Atmosic MP Tool

The setup package of Windows Installer for the Atmosic MP Tool is a compressed file named `AtmosicMP_Inst_20xxxxxx_vx.x.x.x.zip`. Extract the file and double-click the `AtmosicMP_Inst_20xxxxxx_vx.x.x.x.exe` to start the Atmosic MP Tool Installer.

The Atmosic MP tool will be installed in the C:\AtmosicMP folder. Click `Install` to continue.

Figure 6-2 shows the Atmosic MP Tool Destination Folder.

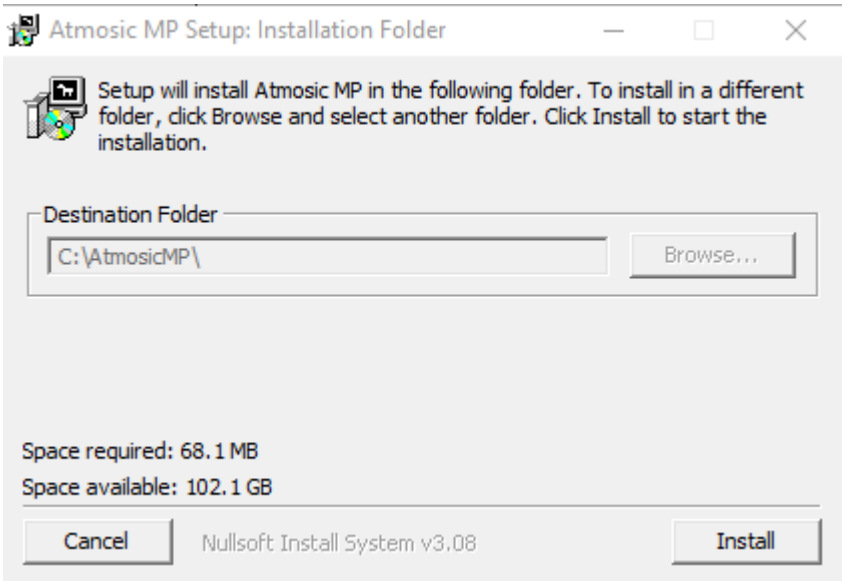


Figure 6-2 Atmosic MP Tool Destination Folder

Figure 6-3 shows the screen after the installer is completed. The installer will create a folder named AtmosicMP in Start Menu\Atmosic, and create shortcuts to invoke Atmosic MP Tool features that will be discussed in the next section.

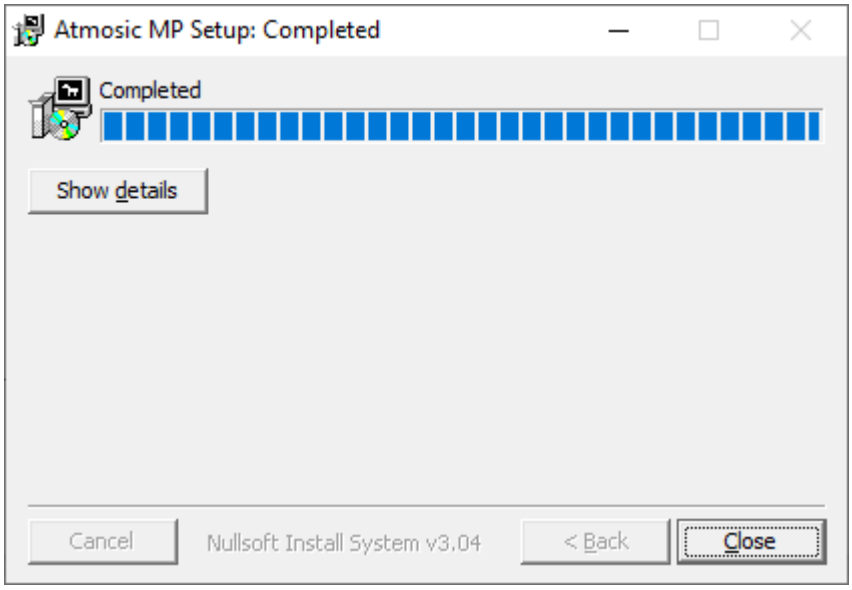


Figure 6-3 Atmosic MP Tool Setup Completed

6.4 Atmosic MP Tool Shortcuts

The Atmosic MP Tool Installer will create shortcuts in Start Menu\AtmosicMP after the installer is completed. The shortcuts include installing or removing the MFx interface and MP API document, as shown in Figure 6-4.

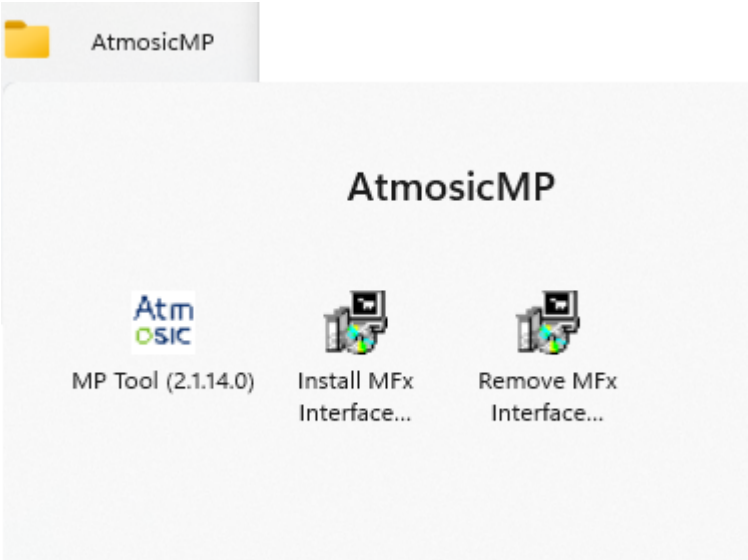


Figure 6-4 Start Menu Shortcuts

6.5 Install MFx Interface

Connect the Download Board (DL) and/or the Atmosic Golden Device (AG) to the PC. Wait for approximately 30 seconds for the system to install the basic FTDI driver. If the computer cannot install this automatically, download and manually install the D2xx driver from the FTDI website.

Navigate to the `Start Menu / AtmosicMP` folder and click the `Install MFx Interface` shortcut to configure the Atmosic MFx driver.

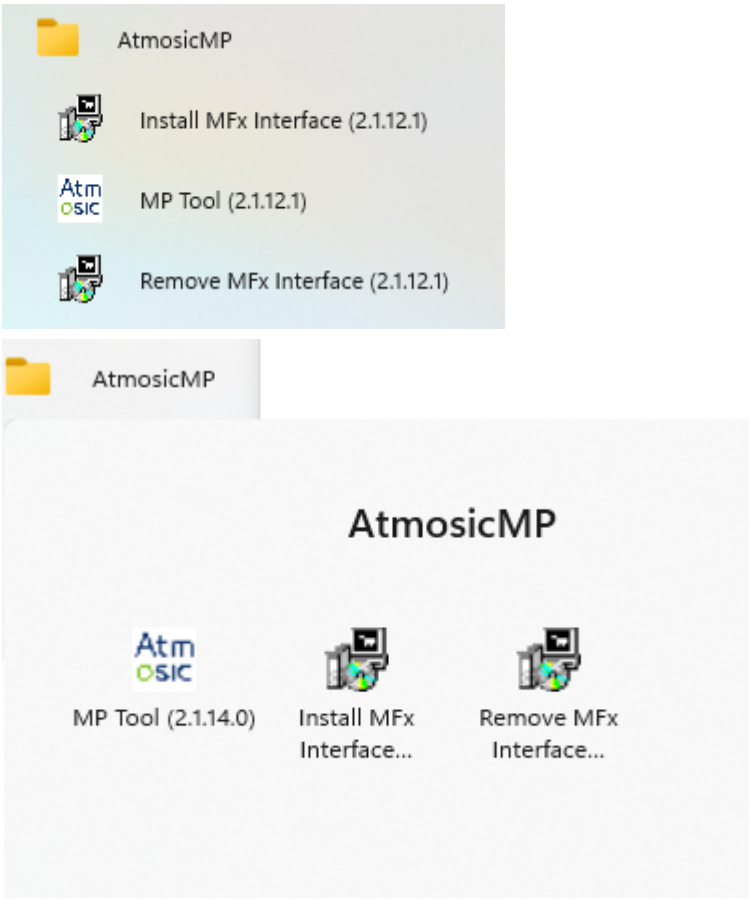


Figure 6-5 Atmosic MFx Driver

After the installation is complete, verify the device structure in the Windows `Device Manager`. The correct result must match **Figure 6-6**:

- Under **libusbK USB Devices**, **Atmosic MFG (Interface 0)** should appear.
- Under **Ports (COM & LPT)**, the remaining **3 USB Serial Ports** should be listed.

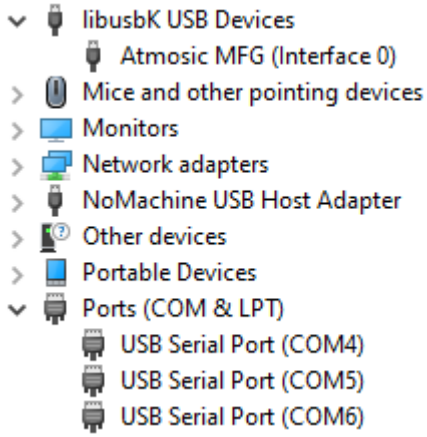


Figure 6-6 COM Port Assignment

Port Function Assignments:

- **Atmosic MFG (Interface 0)**: Connects to the **SWD interface** on the chip; used for **programming and debugging**.
- **The second COM port**: Connects to the chip's **UART1** interface.
- **The third COM port**: Connects to the chip's **UART0** interface.
- **The fourth COM port**: Not used.

6.6 Uninstall MFx Interface

All Atmosic MFx Interfaces that are installed in the Windows OS will be uninstalled after performing the Uninstall MFx Interface program.

7. Adjust Serial Port Latency Timer

Setting a lower latency timer will speed up the testing process when the test item uses the UART HCI command.

Open the Windows Device Manager (open the Run dialog box by pressing and holding the Windows key, then pressing the R key).

Type-in devmgmt.msc then click *OK* to verify whether the Atmosic MFx interface exists or not.

As shown in Figure 7-1, for every USB Serial Port, right-click and select `Properties`.

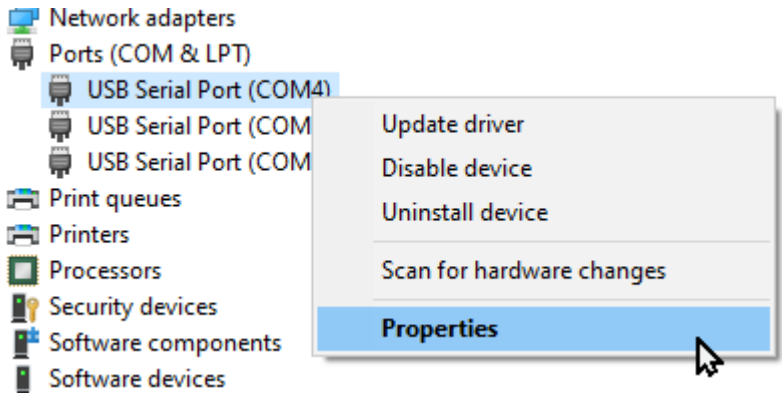


Figure 7-1 COM Port Setup in Device Manager

See Figure 7-2, select Port Settings, then click `Advanced`.

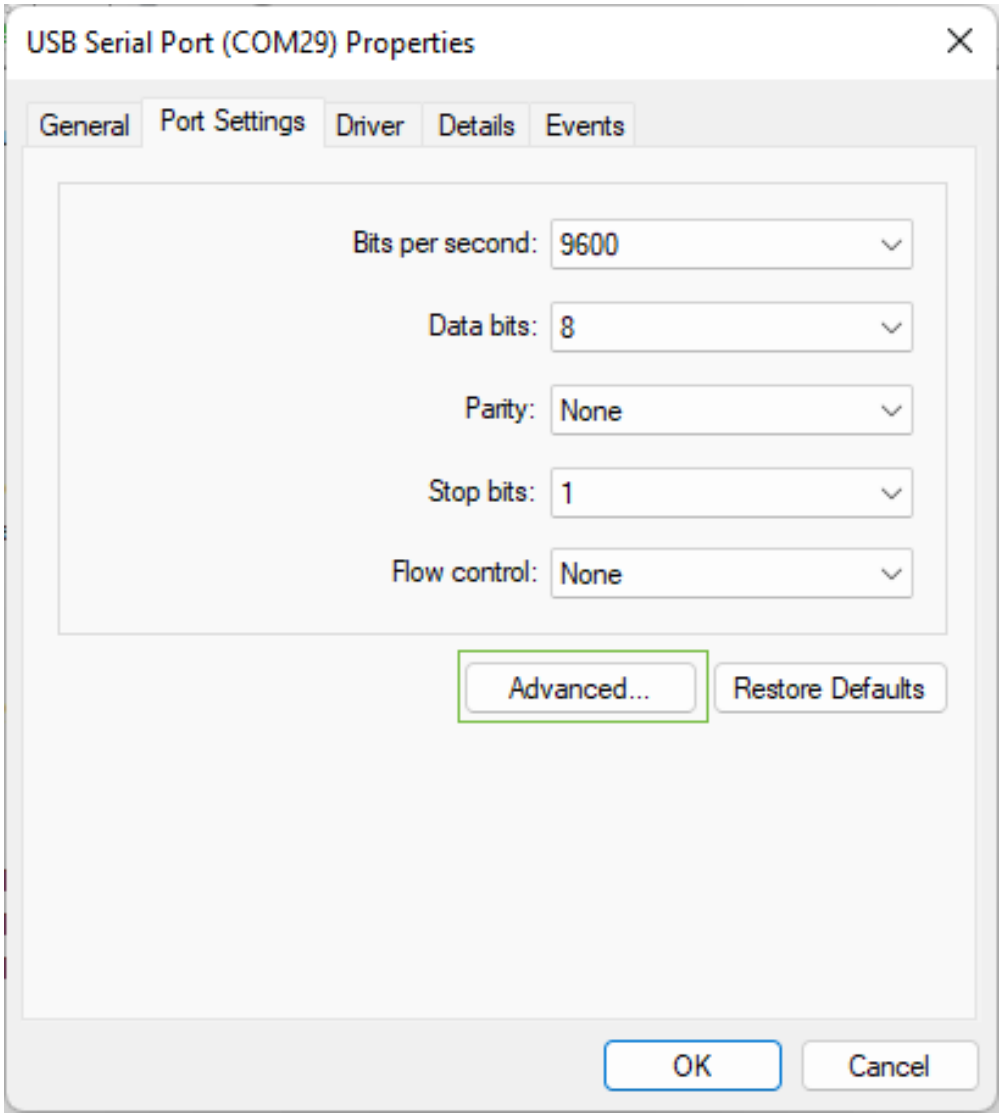


Figure 7-2 USB Serial Port Properties

See Figure 7-3, change `Latency Timer` to 1 msec (millisecond).

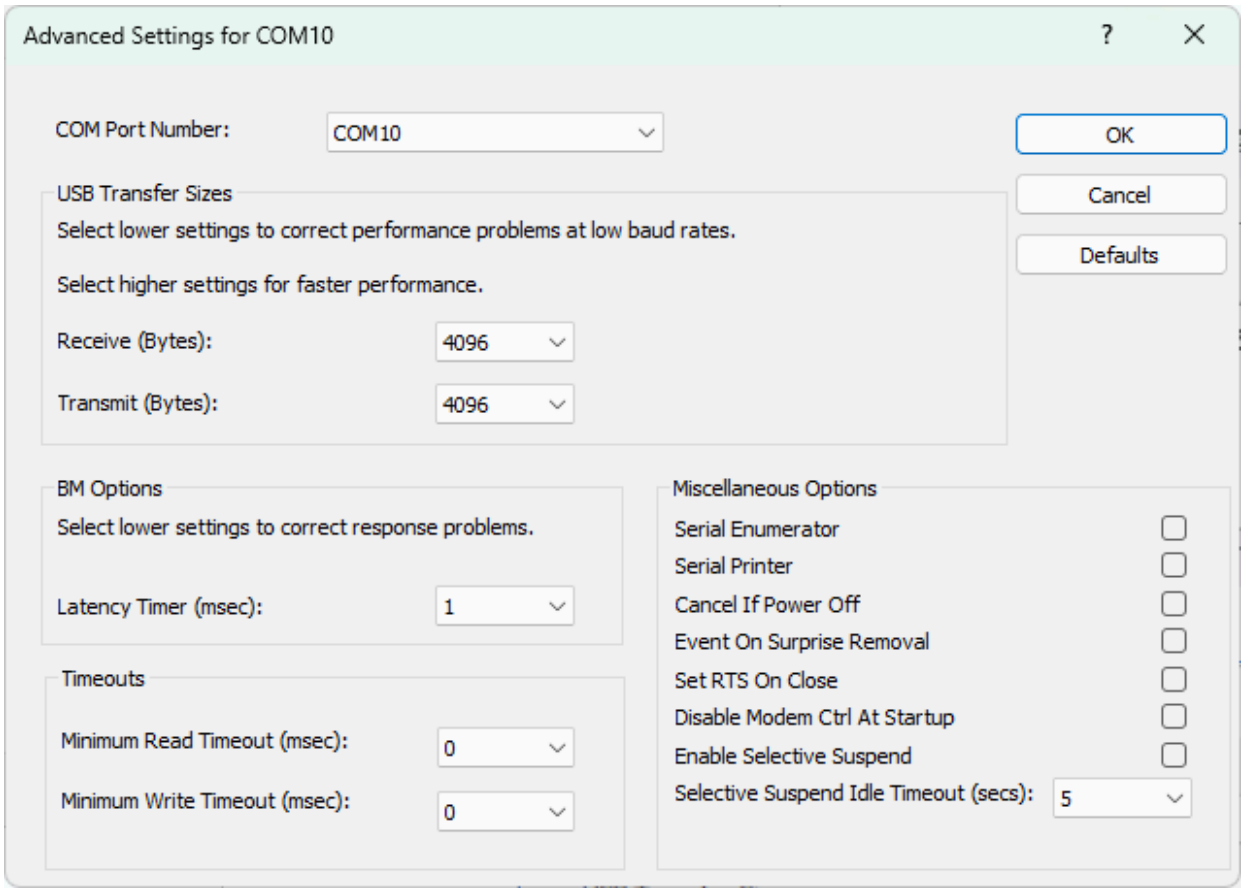


Figure 7-3 Advanced Settings for COM Ports

8. GUI Mode Quick Start

In GUI mode, refer to the settings in this chapter first; the following sections are steps to start testing quickly. Launch the GUI MP Tool from the Start Menu/AtmosicMP folder.

8.1 Startup Dialog

The following dialog will display after launching the MP Tool.

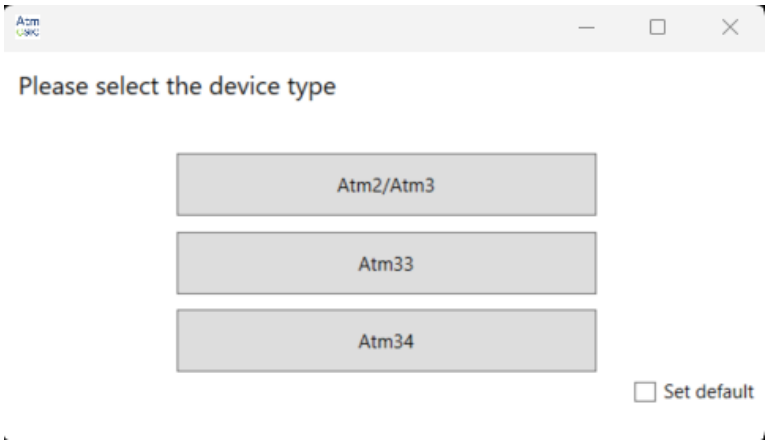


Figure 8-1 Startup dialog

Choose the DUT's Atmosic Wireless SoC that is being tested. To auto-select the same option next time, select `Set default`.

8.2 Unlock Settings Pages

When you want to modify the option in the `Settings` pages, you need to unlock the `Settings` pages first:

- Select the `Unlock` button under the `Setting` button on the Menu

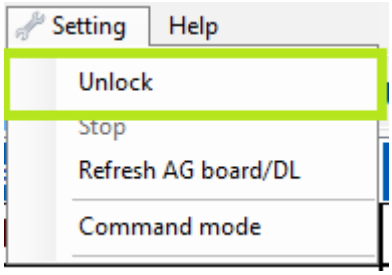


Figure 8-2 Unlock Button

- Type in the password (the default password is Atmosic123) and press `Enter`
- The password can be updated in the C:\AtmosicMP\bin\xml_setting\StartupSettings.xml file

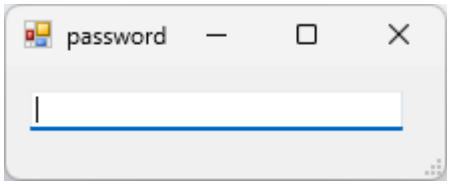


Figure 8-3 Password window

8.3 Select ATM File

To program Flash and RRAM(ATM33/e and ATM34/e only), choose an ATM file as shown in Figure 8-4.

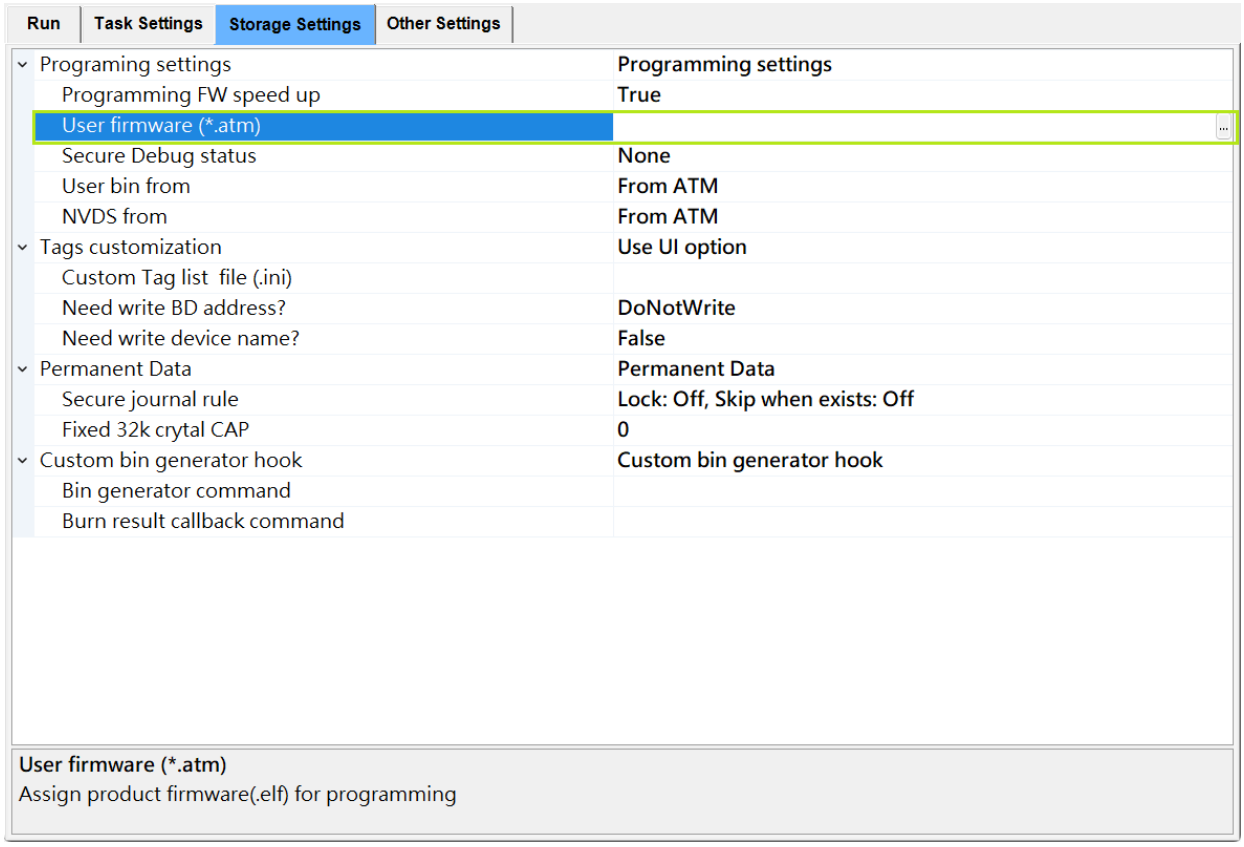


Figure 8-4 Select ATM File

***Note**: If the ATM File is not selectable, the `Setting` Tab is in a locked state. Review the Unlock Setting Page to unlock the `Setting` Tab.*

8.4 RF Testing

8.4.1 Test Items

There are four test items:

- Clock Calibration
- Frequency Offset Test
- TX output power
- RX Sensitivity Test

Set these items to *Enable* to enable these items. See Figure 8-5.

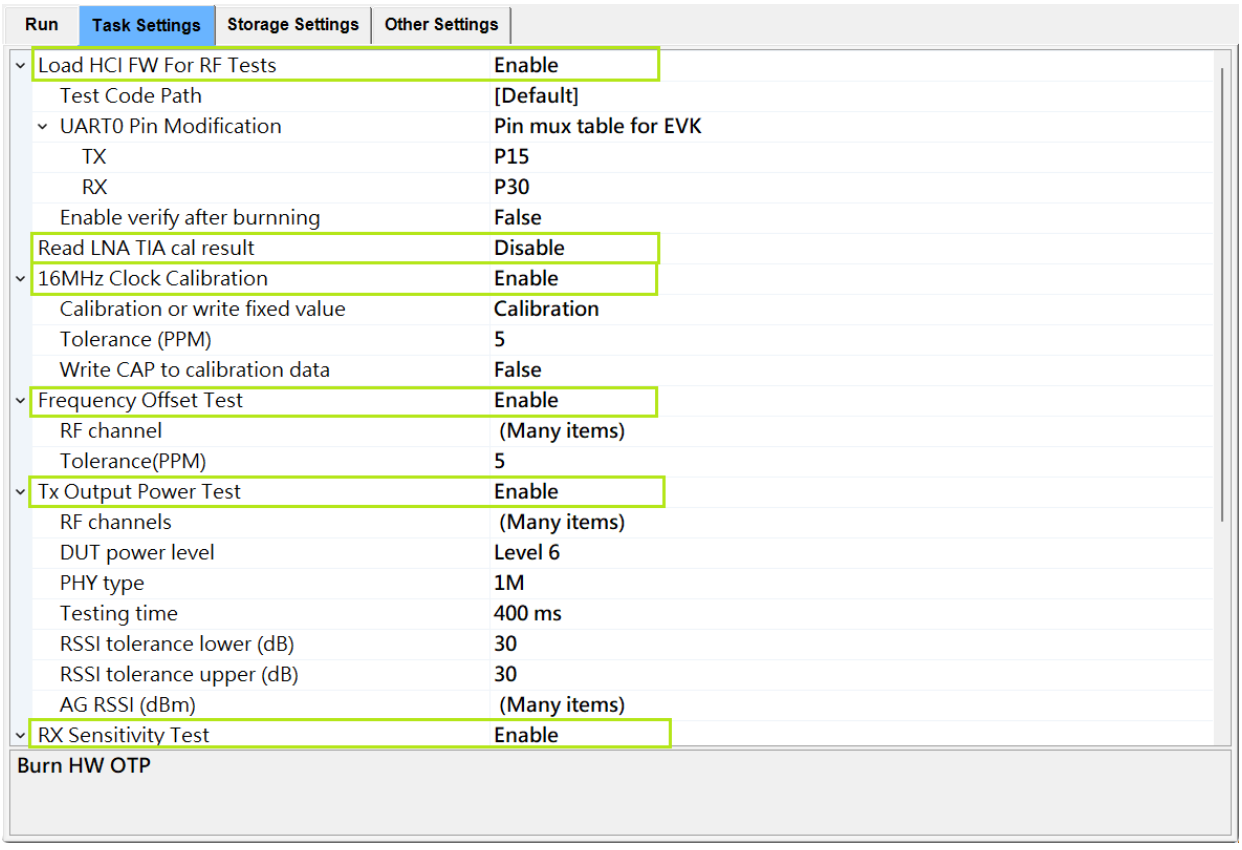


Figure 8-5 Choose Test Options

All RF Tests require the use of the HCI command from the HCI Vendor example in the SDK. If you do not have the HCI Vendor loaded on the DUT, the user can enable the

Load HCI FW For RF Tests and configure the correct UART pin mux for the DUT. See Figure 8-6.

Figure 8-6 Load HCI FW for RF tests

9. Atmosic Mass Production Tool User Interface

The MP Tool is used for mass production tests on ATM33/e and ATM34/e Wireless SoCs. The functions include Clock Calibration, Frequency Offset Test, Tx Output Power Test, RX Sensitivity Test, and program firmware.

After installation, users can launch AtmMPTool.exe from the Start Menu/AtmosicMP folder of the Windows OS.

MP Tool will generate production log files for each test. These log files are saved in the log folder. It can be opened by clicking the Open Production Log Folder menu item.

See Figure 9-1.

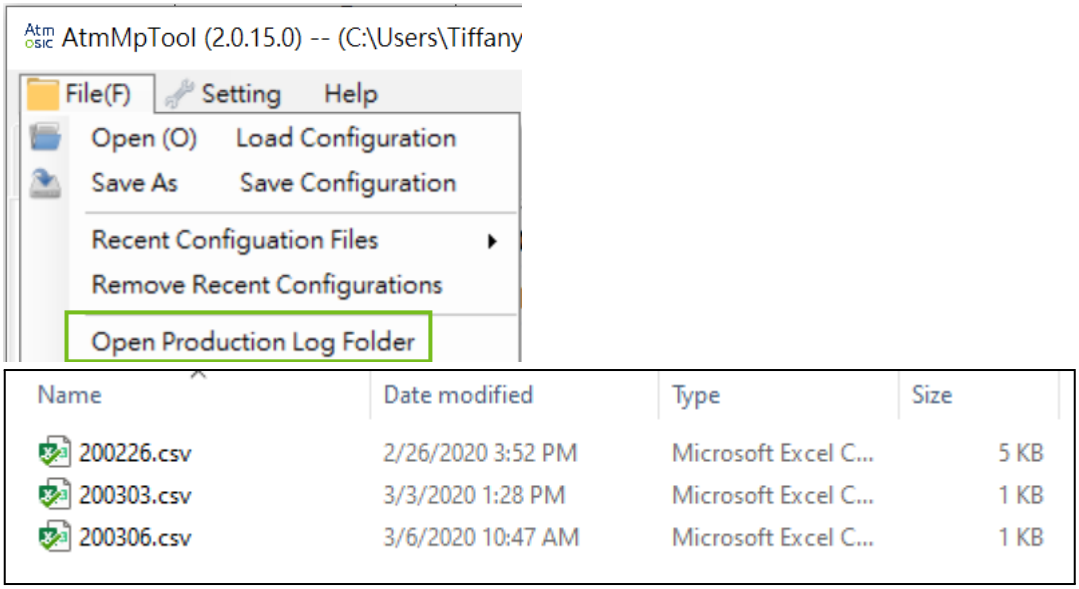


Figure 9-1 Production Logs

The production logs were written in .csv format, and one file per day.

The GUI contains three parts:

- [Main Menu]: File(F), Setting, and Help (Used for saving the config, refreshing devices, unlocking the Settings Tabs, and selecting a language).
- [Run Tab]: Used for controlling the running of tests.
- [Task/Storage/Other Settings Tabs]: Used for setting the parameters of test items.

Figure 9-2 MP Tool Run Menu

9.1 Main Menu

9.1.1 File Menu

There are five menu items as shown in Figure 9-3:

- [Open] - Load the configuration file into the application.
- [Save as] - Save the current test configuration to a file.
- [Recent Configuration Files] - Recent list of configuration files.
- [Remove Recent Configurations] - Remove the recent list.
- [Open Production Log Folder] - Open production log folder.

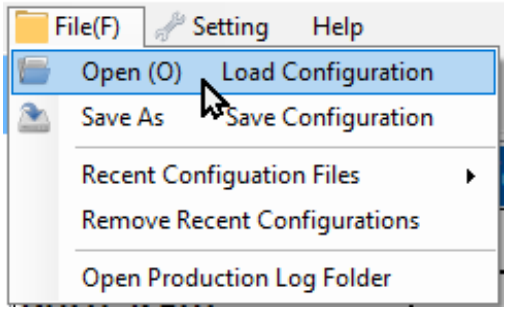


Figure 9-3 MP Tool File Menu

9.1.2 Setting Menu

There are four menu items as shown in Figure 9-4

- [Unlock] Unlock the Setting Tab from read-only mode.
- [Stop] Stop testing after testing is started.

- [Refresh DL] Search for any updated DL. Generally, DLs are searched automatically during program startup. This is used when a user plugs in/out DLs without relaunching the MP Tool.

- [Command mode] In command line mode, the user can perform the unit test by typing predefined commands.

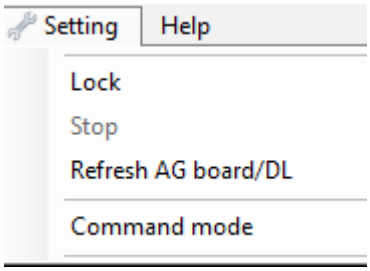


Figure 9-4 MP Tool Setting

9.1.3 Help Menu

Figure 9-5 shows the MP Tool Help Menu.

- Language: Switch the language between English and Simplified Chinese.

- About Atmosic Manufacturing Tool: Information about the tool

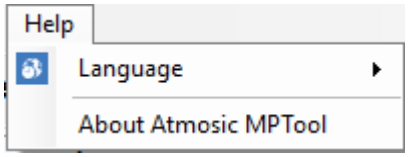


Figure 9-5 MP Tool Help Menu

9.2 Run Tab

There are three main parts in the Run Tab, as shown in Figure 9-6:

1) The Start/Stop button is used for controlling each test iteration.

2) The Debug log window shows a detailed log of the current test.

3) The Test Item progression table indicates the current testing schedule.

Run Tab before testing:

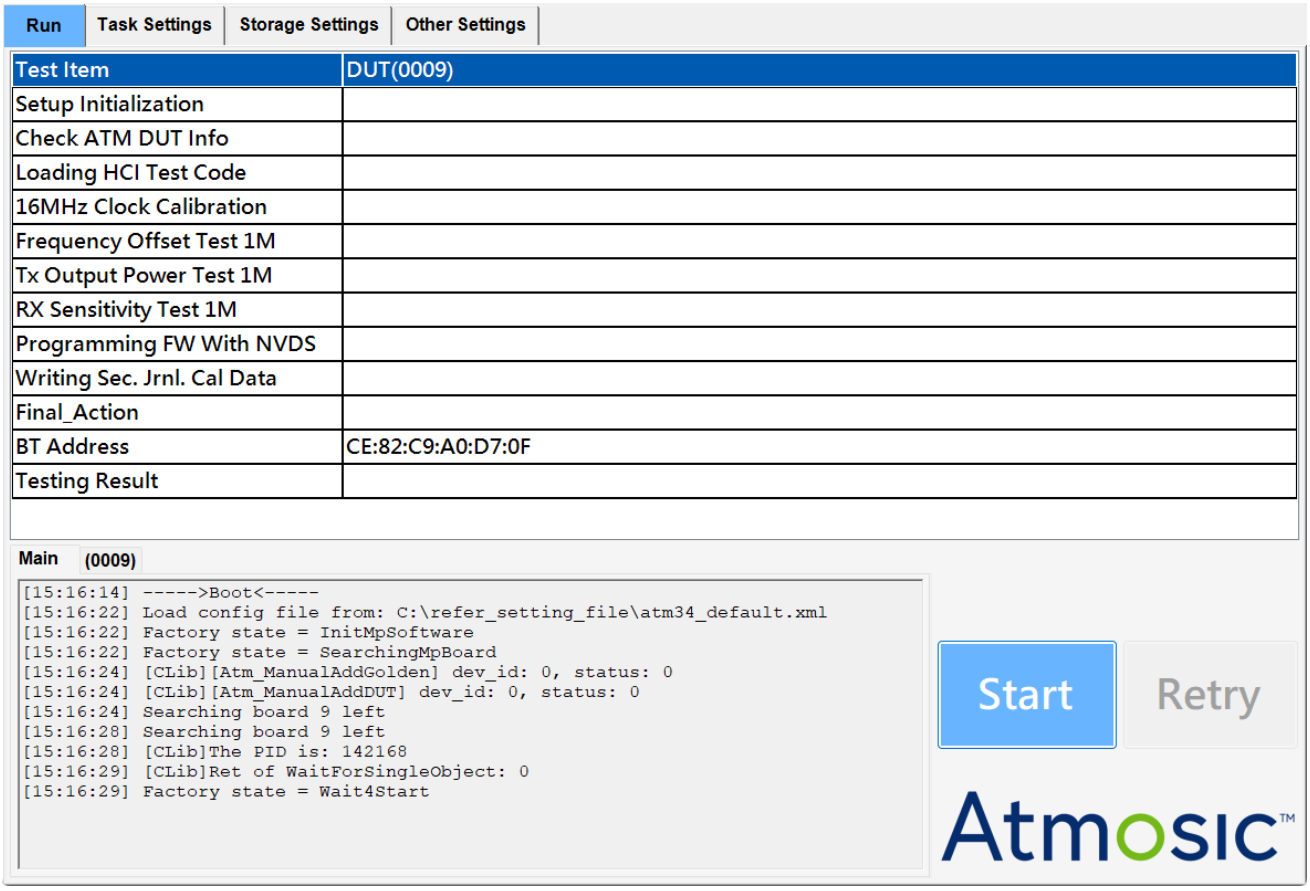


Figure 9-6 Run Tab Before Testing

Before running, all the names of the test items enabled will show in the first column of the progression table.

Run Tab under testing:

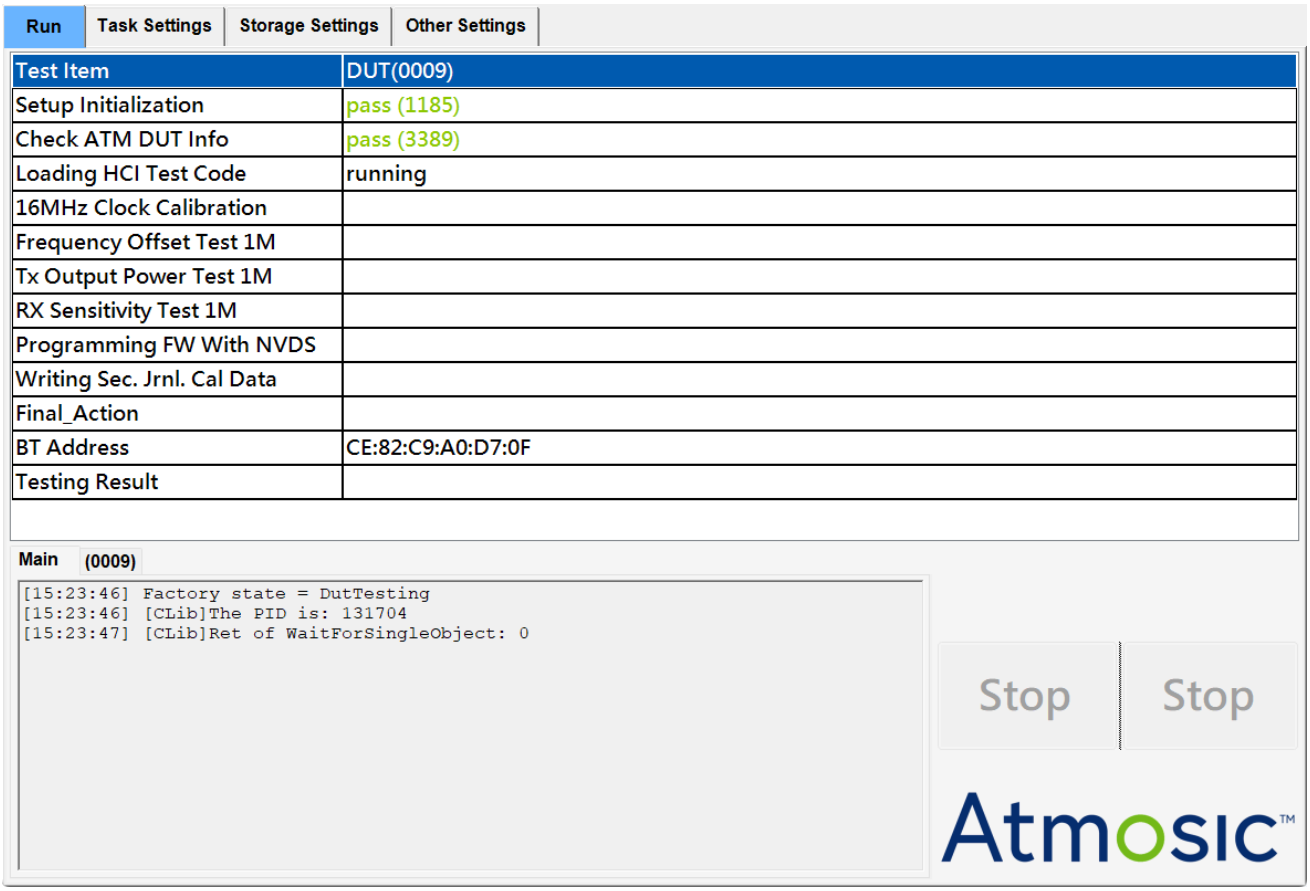


Figure 9-7 Run Tab Under Testing

When running, the corresponding row will display pass or fail, and its execution time in milliseconds. See Figure 9-7.

Run Tab after testing is successful:

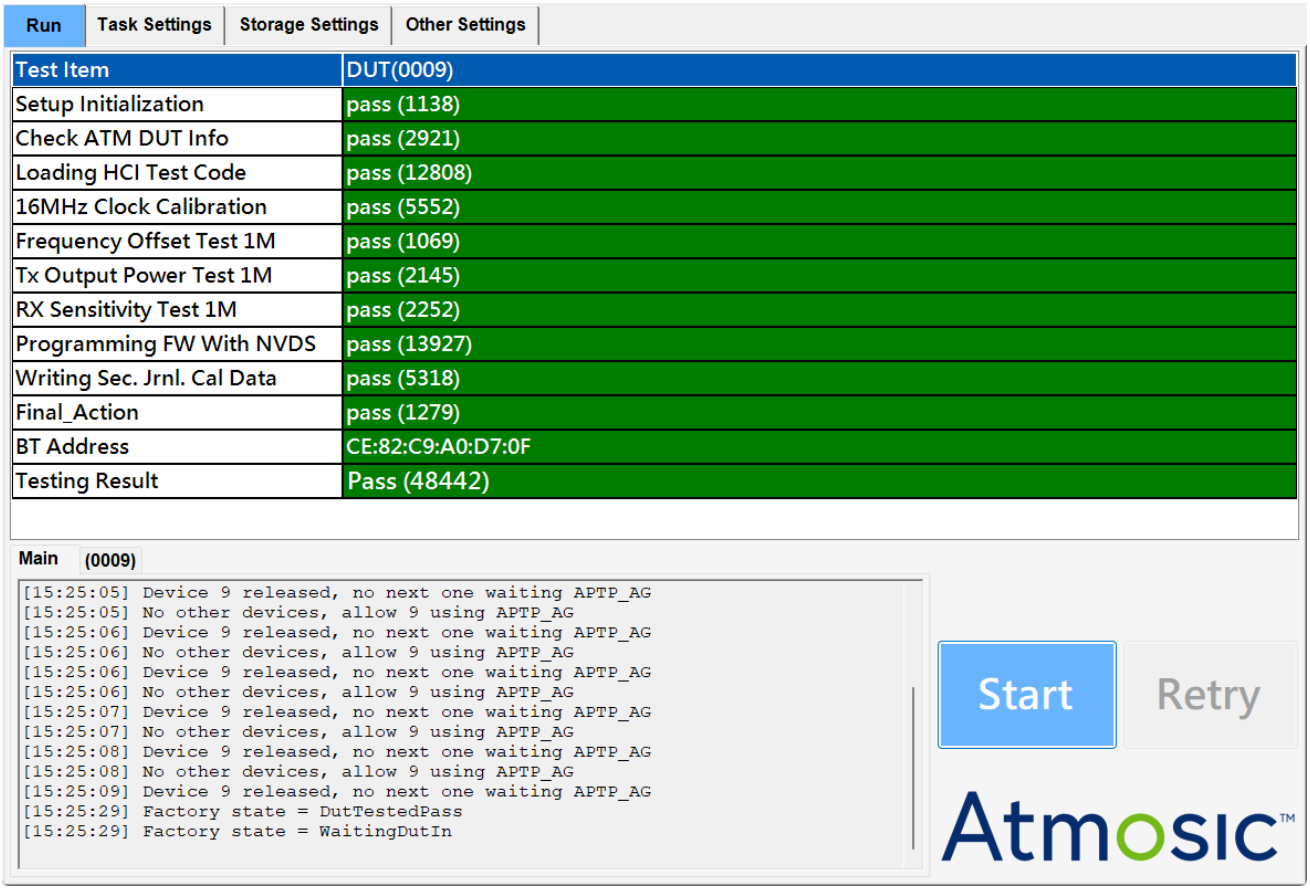


Figure 9-8 Run Tab After Testing Success

After tests are finished and all items pass, the background will become green. See Figure 9-8.

Run Tab after testing fails:

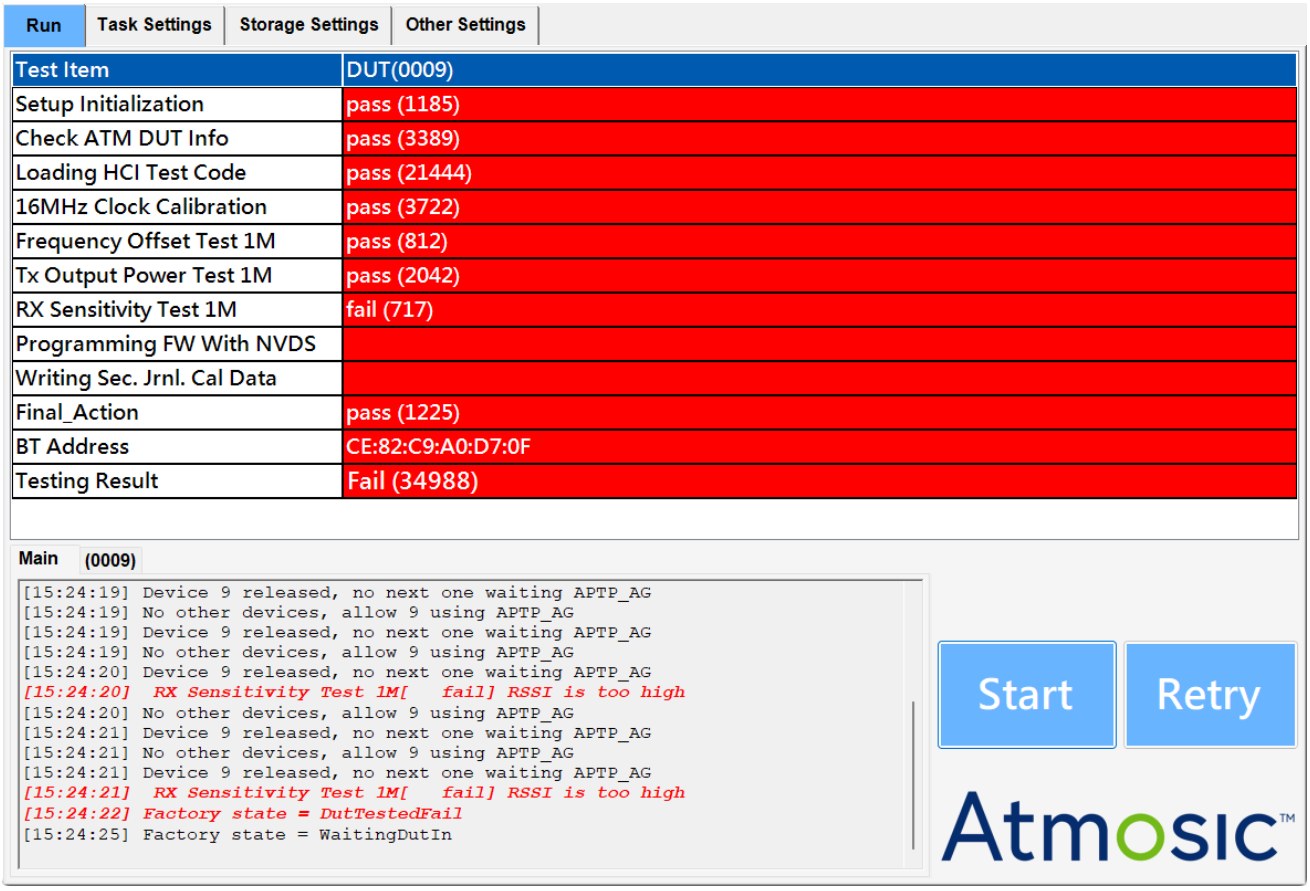


Figure 9-9 Run Tab After Testing Fails

The background color will become red if there is a failed item. See Figure 9-9.

9.3 Settings Tabs

There are three Settings Tabs:

1) Task Settings (Shown in Figure 9-10)

2) Storage Settings (Shown in Figure 9-11)

3) Other Settings (Shown in Figure 9-12)

To start setting the parameters, unlock the Tabs by clicking on the unlock menu item.

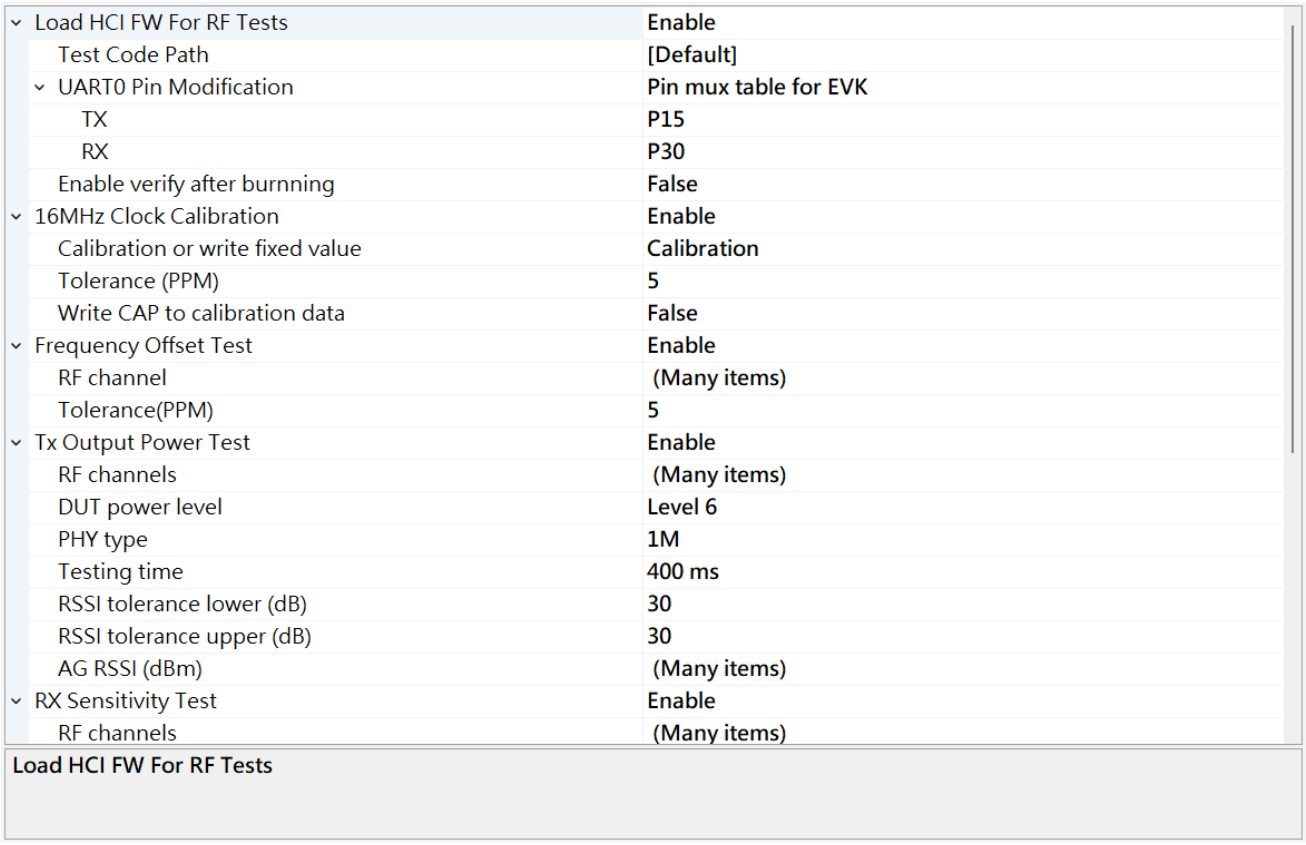


Figure 9-10 Task Settings Tab

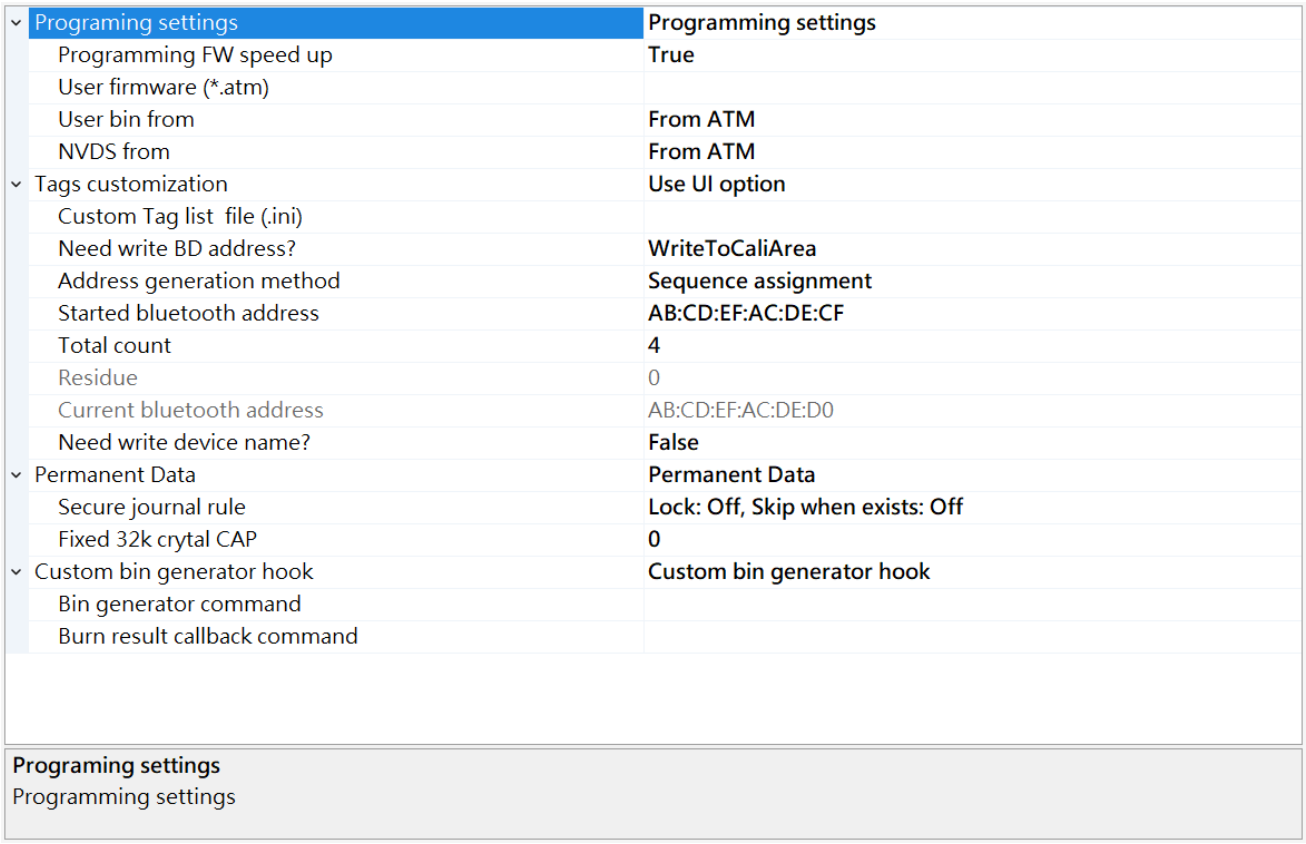


Figure 9-11 Storage Settings Tab

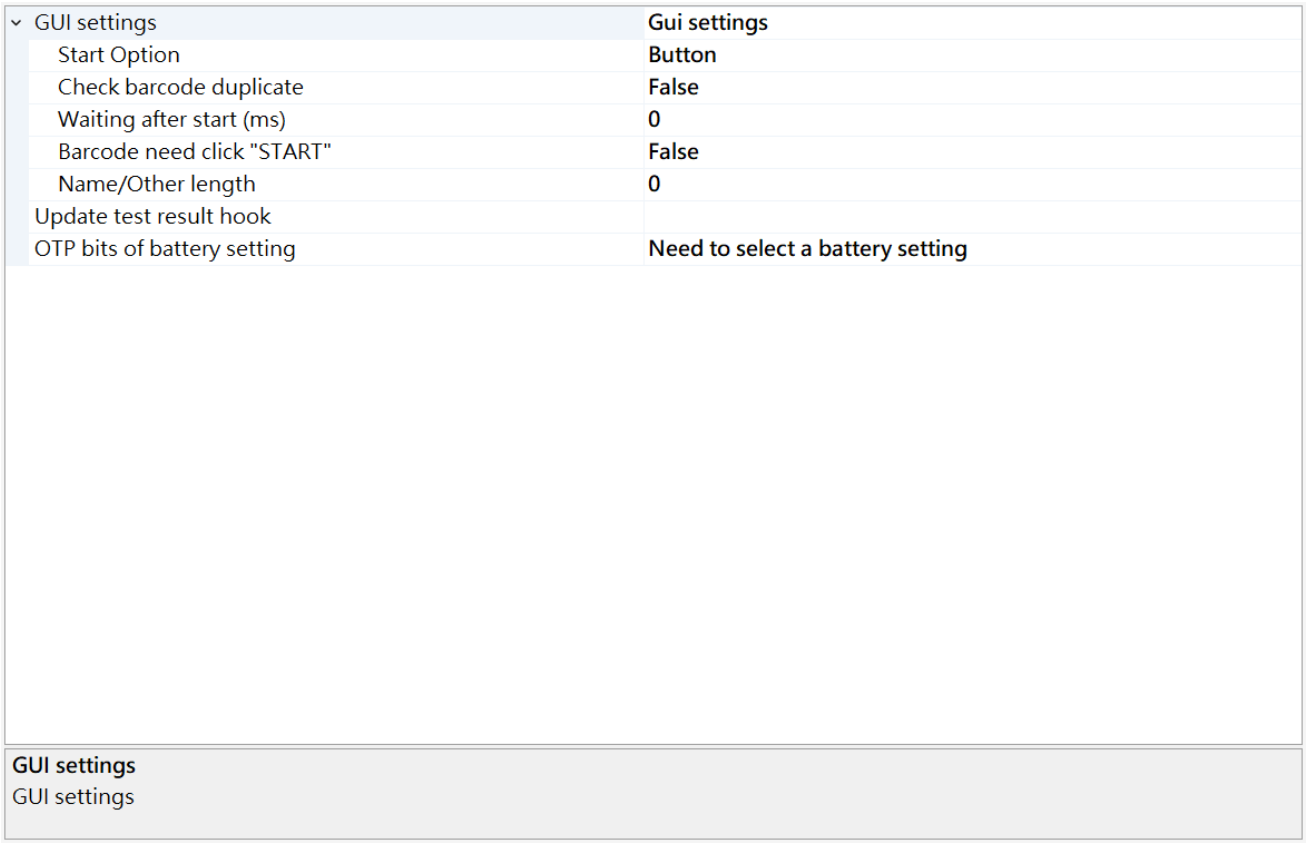


Figure 9-12 Other Settings Tab

9.4 Load HCI FW for RF Tests

All RF Tests require the use of the HCI command from the HCI Vendor example in the SDK. If the user does not have the HCI Vendor loaded on the DUT, the user can enable the Burn Test Code and configure the correct UART pin mux for the DUT. See Figure 9-13.

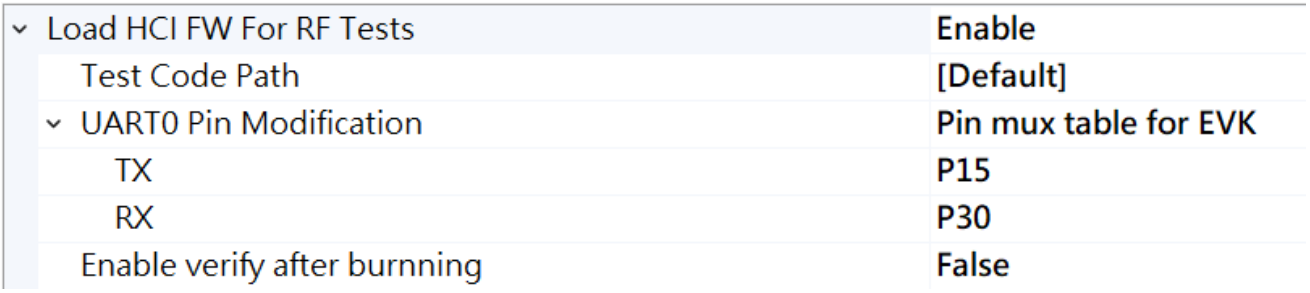
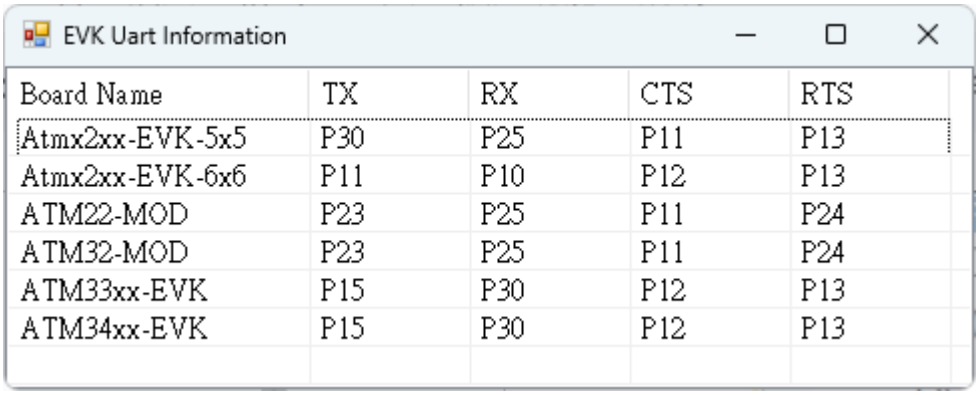


Figure 9-13 Burn Test Code

If your board is Atmosic's EVK or module, you can open the EVK pin table, which provides the default mappings, see Figure 9-14.



Board Name	TX	RX	CTS	RTS
Atmx2xx-EVK-5x5	P30	P25	P11	P13
Atmx2xx-EVK-6x6	P11	P10	P12	P13
ATM22-MOD	P23	P25	P11	P24
ATM32-MOD	P23	P25	P11	P24
ATM33xx-EVK	P15	P30	P12	P13
ATM34xx-EVK	P15	P30	P12	P13

Figure 9-14 UART Setting for EVK (EVB) and Modules

9.5 Clock Calibration

This test item trims the crystal offset by measuring the frequency offset of the crystal signal using the AG board. After trimming, users can write the crystal CAP (capacitance) to OTP in ATM2/ATM3 or Secure Journal in ATM33/e or ATM34/e. When performing Clock Calibration, the AG board will tune the capacitance of the crystal circuit and measure the frequency offset by the AG board. Figure 9-15 shows the Clock Calibration Setting.

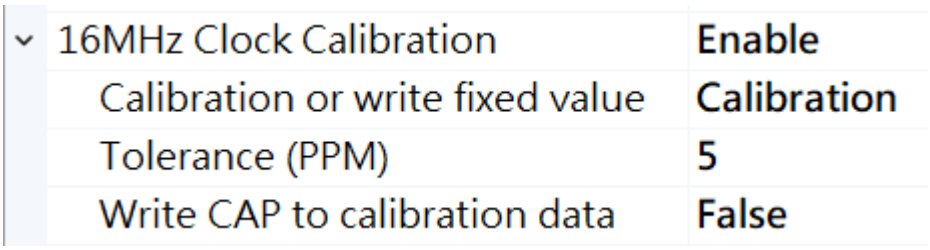


Figure 9-15 Clock Calibration Setting

The Calibration or write fixed value can choose this test run calibration flow, or only write fixed value.

The Tolerance (PPM) is the accuracy requirement of crystal trim.

Setting the `Write CAP to calibration data` to `True` will overwrite the CAP in the calibration area.

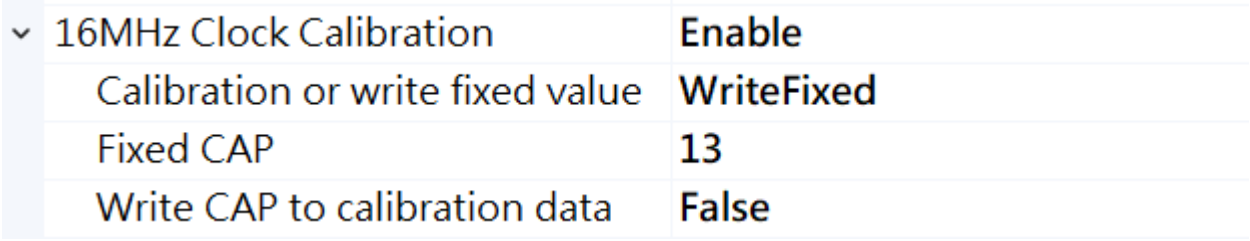


Figure 9-16 Clock Calibration settings for writing a fixed CAP value

Set the `Calibration or write a fixed value` to `WriteFixed`, which will use the Fixed CAP value for each test. The Fixed CAP is used when you want to write the same CAP for all DUTs. Figure 9-16 shows the Clock Calibration Setting.

See Figure 9-17 for test status.

```
[15:33:17] Run task "16MHz Clock Calibration", timeout: 50000 ms
[15:33:17] Allow using APTP_AG
[15:33:18] [CLib][Atm_MpRf16MXtalCalTest] cval: 80, Freq Delta: -60301
[15:33:18] [CLib][Atm_MpRf16MXtalCalTest] cval: C0, Freq Delta:  15135
[15:33:19] [CLib][Atm_MpRf16MXtalCalTest] cval: A0, Freq Delta: -32958
[15:33:19] [CLib][Atm_MpRf16MXtalCalTest] cval: B0, Freq Delta: -11962
[15:33:20] [CLib][Atm_MpRf16MXtalCalTest] cval: B8, Freq Delta:  732
[15:33:20] [CLib][Atm_MpRf16MXtalCalTest] cval: B4, Freq Delta: -6347
[15:33:20] [CLib][Atm_MpRf16MXtalCalTest] cval: B6, Freq Delta: -2929
[15:33:21] [CLib][Atm_MpRf16MXtalCalTest] cval: B7, Freq Delta: -1708
[15:33:22] [CLib][Atm_MpRf16MXtalCalTest] trim result fval: B8, Freq Delta:  976
[15:33:22] Release APTP_AG
[15:33:22] OK, CAP: 0xB8 FREQ: 976Hz
[15:33:22]  16MHz Clock Calibration[   pass] SUCCESS
```

Figure 9-17 Clock Calibration Test Status

9.6 Frequency Offset Test

This test measures the frequency offset of the radio. Figure 9-18 shows the Frequency Offset Test Setting.

The `Tolerance (PPM)` is the accuracy criterion by percentage per million (PPM) for passing this test.

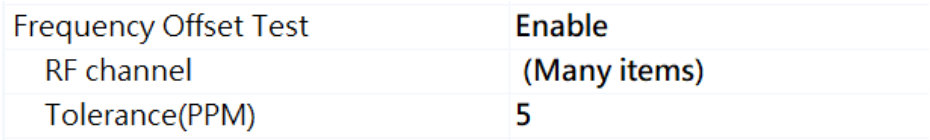


Figure 9-18 Frequency Offset Test Setting

After starting the test, DUT will start to transmit continuous TX, and AG will measure the frequency of the DUT. The DUT's frequency must be in the target frequency ± `Tolerance (PPM)`.

Figure 9-19 shows the test status.

```
[16:07:25] Run task "Frequency Offset Test 1M", timeout: 50000 ms
[16:07:25] Allow using APTP_AG
[16:07:25] [CLib][Atm_MpRfFosTest] Freq Delta: 488
[16:07:25] Release APTP_AG
[16:07:25] CH12, Frequency offset = 488Hz, 0.2ppm
[16:07:25]  Frequency Offset Test 1M[   pass] SUCCESS
```

Figure 9-19 Frequency Offset Test Status

9.7 Tx Output Power Test

DUT transmits continuous TX packets on the specified RF `channels`, `power level`, and PHY `type`, and the AG measures the RSSI. Figure 9-20 shows the Tx Output Power Test Setting.

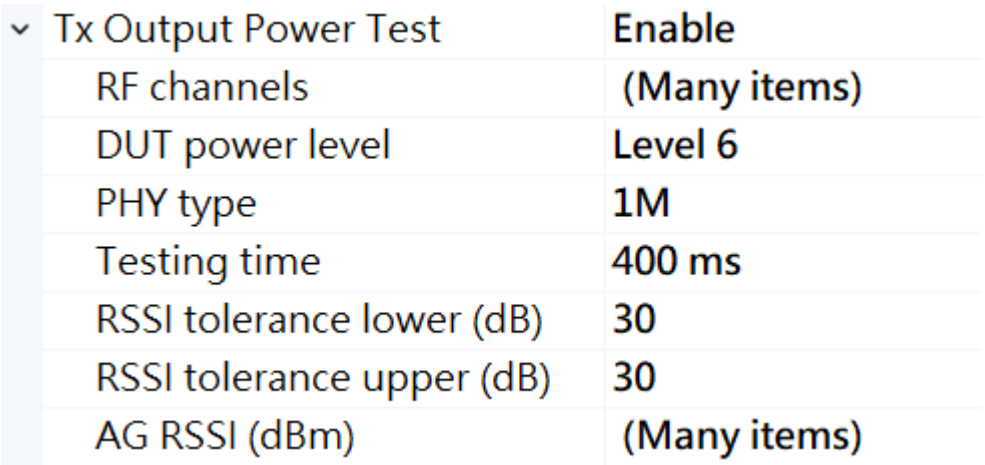
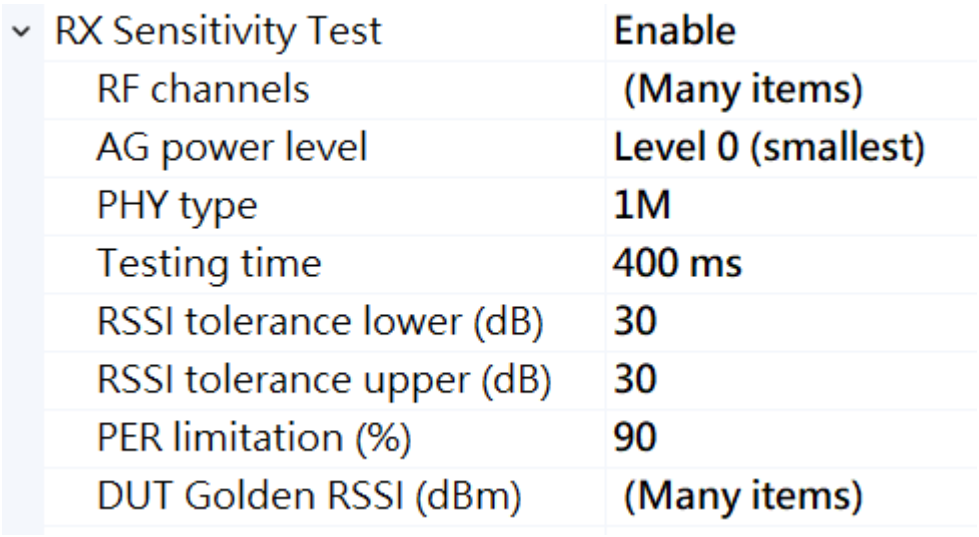


Figure 9-20 Tx Output Power Test Setting

The test result should be in the range of `DUT power level` ± `RSSI Tolerance (dB)`. Otherwise, it will report a failure.

9.8 RX Sensitivity Test

RX Sensitivity tests the PER of the DUT. AG transmits a burst of TX packets on the specified `RF channels`, `power level`, and `PHY type`, and the DUT starts to receive for a certain time. Figure 9-21 shows the RX Sensitivity Test Setting.



RX Sensitivity Test	Enable
RF channels	(Many items)
AG power level	Level 0 (smallest)
PHY type	1M
Testing time	400 ms
RSSI tolerance lower (dB)	30
RSSI tolerance upper (dB)	30
PER limitation (%)	90
DUT Golden RSSI (dBm)	(Many items)

Figure 9-21 RX Sensitivity Test Setting

If the PER is lower than the value from the setting page, RX sensitivity passes. The default is 90%. Otherwise, it will report a failure. Figure 9-22 shows the RX Sensitivity Status.

```
[21:05:41]  RX_1M[running] RX Setting: CH0 Power:Level 1, Path Loss: 1dB
[21:05:42]  RX_1M[running] DUT:RX, LE_1M, CH00, PER=0/1198(0.00%), DUT RSSI(-72).
[21:05:42]  RX_1M[running] RX Setting: CH19 Power:Level 1, Path Loss: 1dB
[21:05:43]  RX_1M[running] DUT:RX, LE_1M, CH19, PER=0/1069(0.00%), DUT RSSI(-73).
[21:05:43]  RX_1M[running] RX Setting: CH39 Power:Level 1, Path Loss: 1dB
[21:05:44]  RX_1M[running] DUT:RX, LE_1M, CH39, PER=7/1213(0.58%), DUT RSSI(-75).
[21:05:44]  RX_1M[   pass] Success
```

Figure 9-22 RX Sensitivity Test Status

9.9 User Firmware (.atm, .mpbin) / NVDS file (.bin) / Tags Customization

After selecting the files to `User firmware (.atm, .mpbin)` and `NVDS file (.bin)`, the MP Tool will program the Flash after all the RF-related test items have passed through the SWD interface. Figure 9-23 shows the User Firmware/Tags Setting.

To use the enhancement method in programming FW, set `True` for Programming FW speed up.

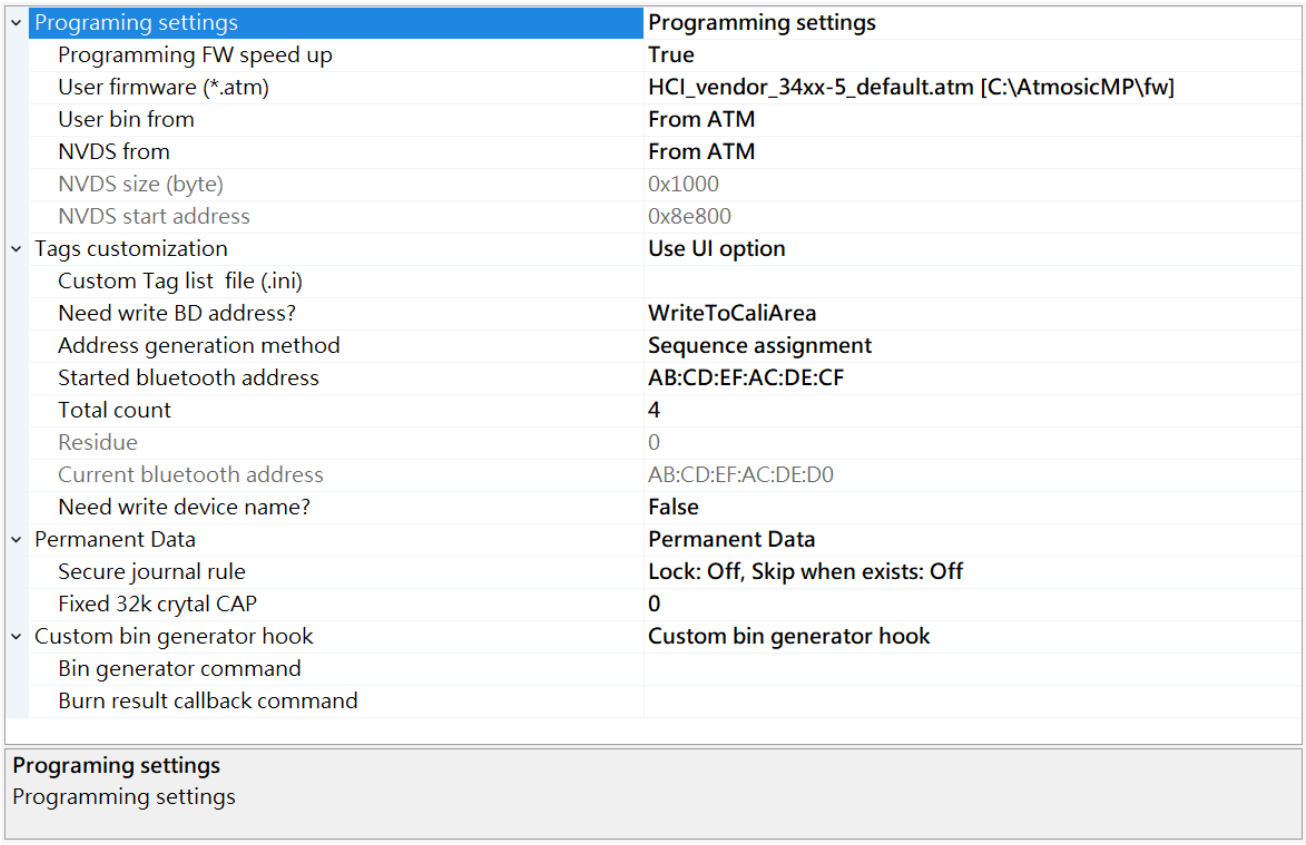


Figure 9-23 User Firmware/Tags Setting

9.9.1 Custom Tag List File

The Tags customization is used to give every DUT a different Bluetooth address, name (if needed), and application-specific tag. The application-specific tag could be defined by assigning a Custom Tag List file using the following format:

```
<Number of Entry(decimal)> <Tag(hex)> <Length(hex)>
0=<Data(hex)>
1=<Data(hex)>
2=...
  ...
```

Figure 9-24 Tags customization

Figure 9-25 shows 500 entries with tag 0xAA, and their data length is 48 bytes (0x30).

```
500 AA 30
0=e5a72e4629d341389dbe26eef485d08ab643f236356342bfa3b4f63c7cbc6558bf4f7c6a56394a018cfec
ac61078755f
1=646c921C03ac48bfbab22230fd36760f7e3c32f08226434ea50c3ec8ff6f3b6c32109069ce0042329e70b
f4ee8b5a7c8
```

```
2=f7791bac37dc4c4ebd8882c160fd17b294e7cf1c52e94642810014ccf33d883ec1873d1ff6214239bfa3e
badc9c1a6f0
3...
```

Figure 9-25 Example of 500 Entries

9.9.2 Write BD Address

The MP Tool supports writing BD addresses and Device Names. Please refer to the table below for the specific storage locations supported.

Storage Location	Flash/RRAM NVDS (WriteToNVDS)	OTP/Secure Journal (WriteToCaliArea)	NVS(Zephyr)
BD Address	V	V	Not supported

On Zephyr OS, the BD address is stored in OTP/Secure Journal.

On the MP Tool GUI, you can switch the write position by using the settings field in the image below Figure 9-26.

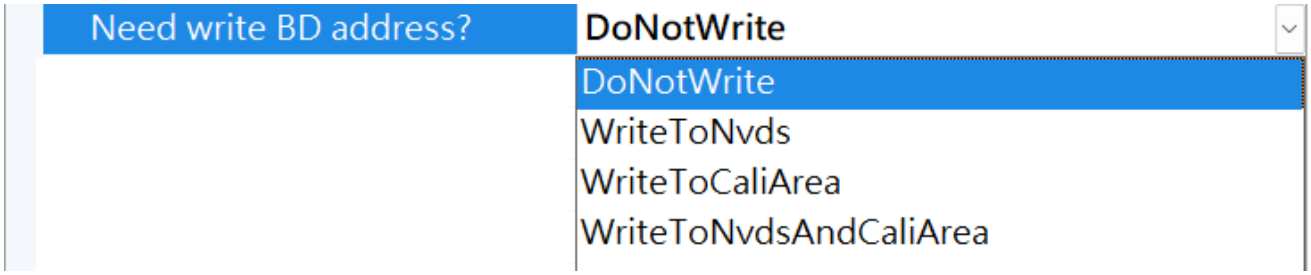


Figure 9-26 Need to write the BD address

If the option `Need write BD address?` is set to `WriteToNvds`, `WriteCaliArea`, or `WriteToNvdsAndCaliArea`, the `Address generation method` will become visible. There are two kinds of address generation methods:

- Auto generate address
- Sequence assignment

If the `Auto generated address` mode is selected, the address will be generated randomly as a static random address of the Bluetooth standard on each DUT.

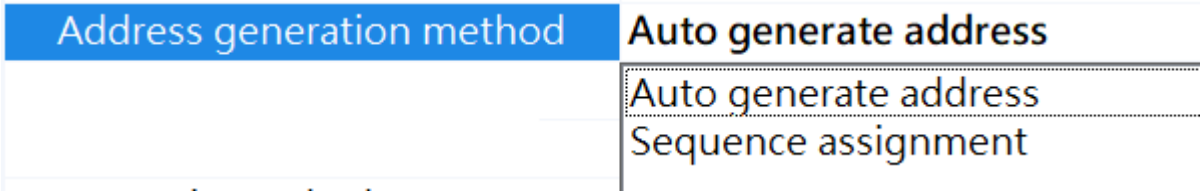


Figure 9-27 Address generation method

If the `Sequence assignment` is selected, the user needs to define the address range as an address pool.

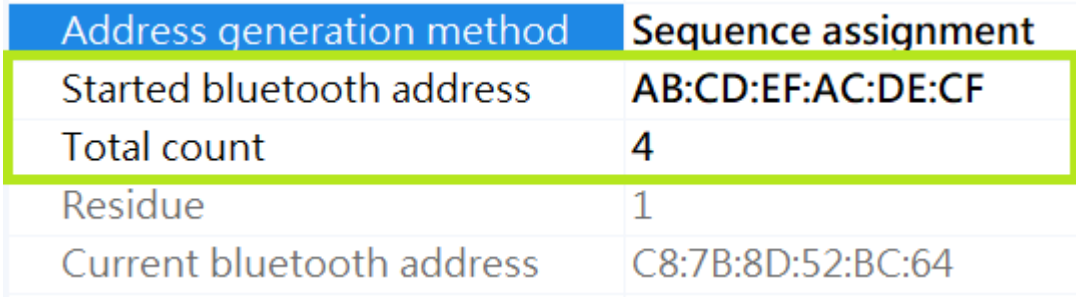


Figure 9-28 Generate Address by Sequence Assignment

The Bluetooth address pool starts from the `Started bluetooth address` and has a `Total count` of addresses. These addresses will be assigned to each tested DUT. The `Residue` indicates the number of unused addresses in the pool. The `Current bluetooth address` indicates the next address, which will be assigned to the next DUT. If DUT fails a test, the address will be reused for the next DUT.

If the pool is empty when the addresses run out, some messages will be shown to the user, and MP Tool will not assign an address to DUT until the user specifies a new address pool. Figure 9-29 shows an Out of Address Error.

```
[10:55:36] ----->Boot<-----
[10:55:36] Load config file from: C:\Lab\setting.xml
[10:55:36] Factory state = InitMpSoftware
[10:55:36] Factory state = SearchingMpBoard
[10:55:37] Factory state = Wait4Start
[10:55:37] base = AA:BB:CC:DD:EE:FF, total = 1, left = 0
```

Figure 9-29 Out of Address Error

9.9.3 Write Device Name

The MP Tool supports writing BD addresses and Device Names. Please refer to the table below for the specific storage locations.

Storage Location	Flash/RRAM NVDS	OTP / Secure Journal	NVS(Zephyr)
Device Name	V	Not Supported	V

On the MP Tool GUI, you can switch the write position by using the settings field in the image below Figure 9-30

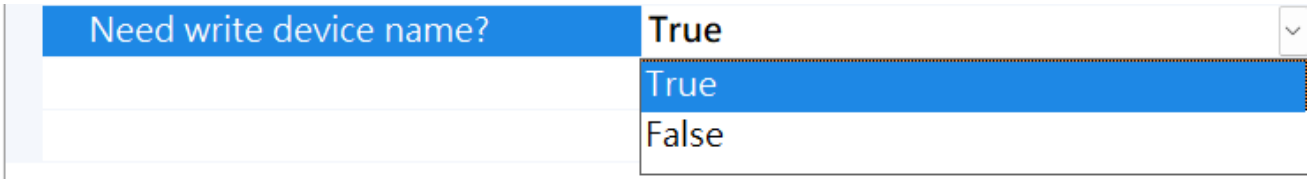


Figure 9-30 Need to write device name

The `Device name` is used to specify the DUT's name. It could be treated with a C# string with an extra parameter of the uint64 form of the assigned Bluetooth address.

For example, if the current DUT Bluetooth address is 7C:69:6B:00:03:FF and the Device name is AT-{0:X3}, then the result would be AT-3FF.

9.9.4 Program Zephyr Firmware

In MP Tool, you don't need to set up Zephyr, as long as you load Zephyr's ATM, MP Tool will automatically conform to Zephyr's burning process.

9.10 OTP File (.nvm) (ATM2/ATM3 Only)

This property is used to assign a specific NVM file to update OTP. After selecting the file, the OTP area will be programmed in the last step of the MP Tool process. Usually, the NVM file is used for OTP applications or some complement HW parameters setting.

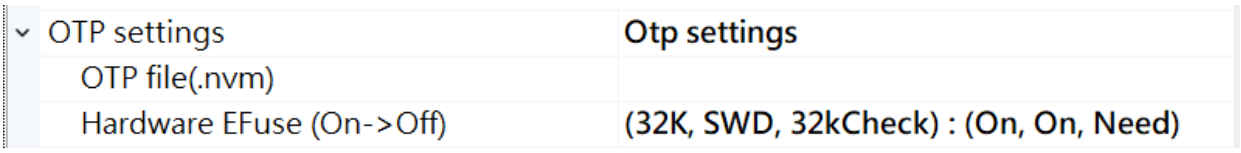


Figure 9-31 OTP Settings

The option "Hardware EFuse" has some options to modify the hardware config bit in the DUT, however, this is an irreversible operation. If the user wants to select this option, please have test runs to make sure the use of setting these bits is expected for your design.

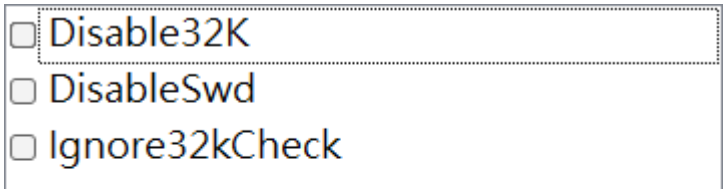


Figure 9-32 Hardware EFuse Settings

9.11 Start Option

The `Start Option` property is for users to choose how to start the MP Tool process. Currently, two options are supported: `Button Start` and `SN Input Start`.

When `Button Start` is selected, the user clicks the Start/Stop button to control the testing procedure.

When `SN Input Start` is selected, the user inputs the serial number into the SN text box and then press enter to start.

The serial number default is 12 hexadecimal letters. Figure 9-33 shows the selection of start options. Figure 9-34 shows the SN text box, which waits for the start.

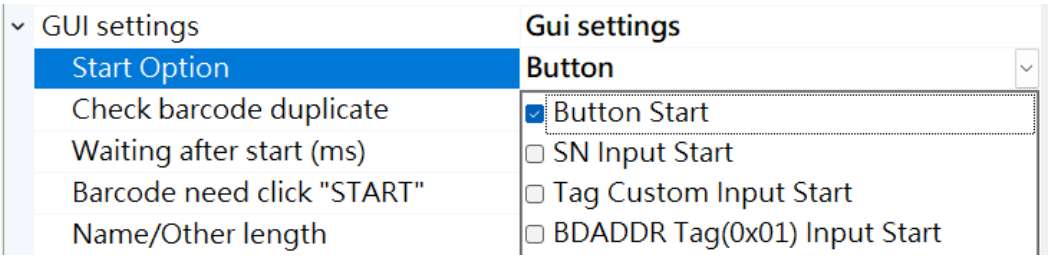


Figure 9-33 Start Option

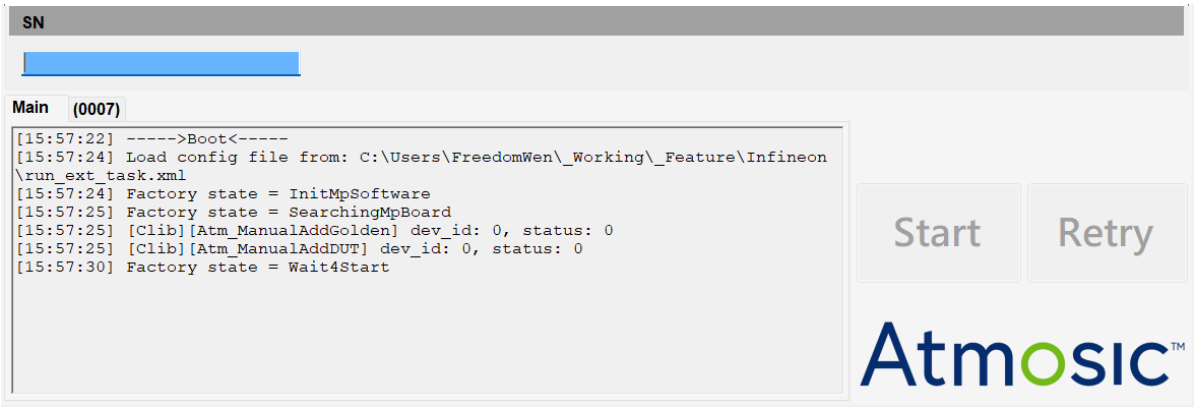


Figure 9-34 SN Text Box

9.12 PV Harvesting Test (ATM33/e only)

This test is for PV harvesting-enabled applications to test their functionality by using harvesting detection signals in the ATM33/e. The test setup is illustrated in Figure 9-35.

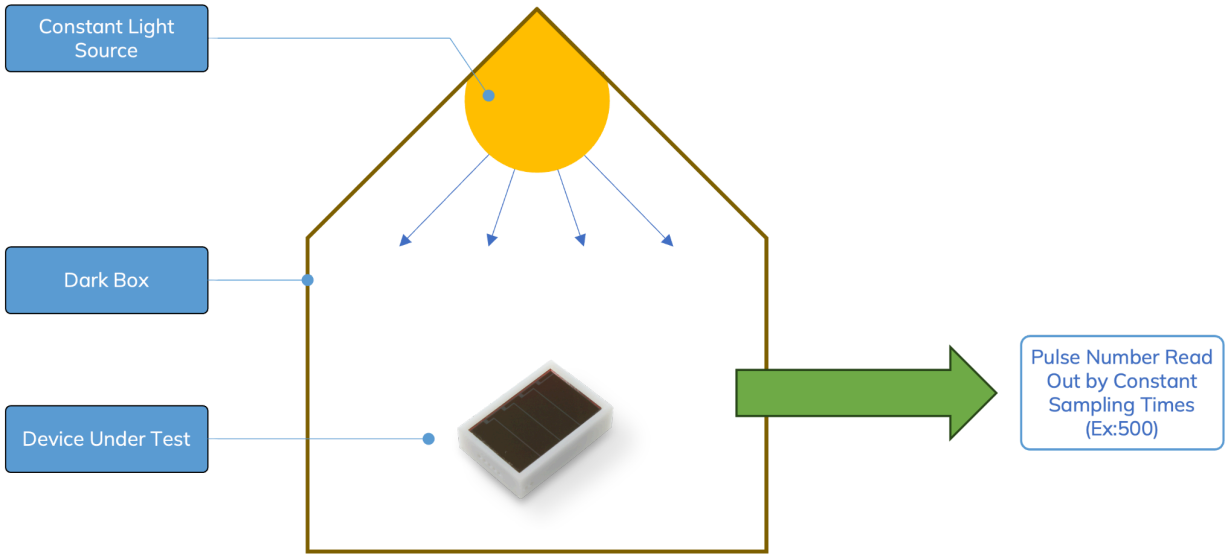


Figure 9-35 PV Test Setup

The harvesting detection signal monitors the incoming harvesting power from the VHARV pin and the duty-cycled behavior of the switching supply that supplies power to the chip. This test polls the harvesting detection signal 500 times and records the times it is high to roughly estimate the harvesting power consumed by the chip, which is also an indicator of the harvesting function.

***Note**: This test only indicates if the chip harvesting function is working. It's not a precise measurement of the actual light level or harvested energy.*

Figure 9-36 shows the setting that can be adjusted based on the PV cell model and light level.

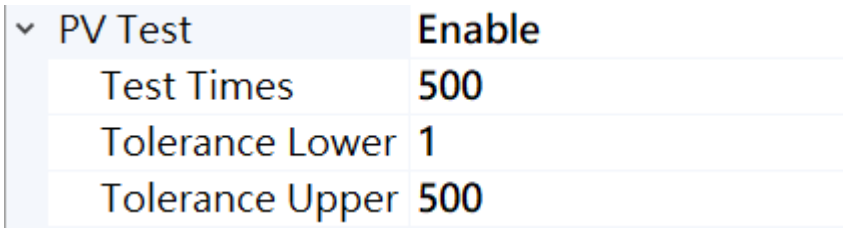


Figure 9-36 PV Test Setting

- Test Times
  - The number of times that polls the harvesting detection signal. The default value is 500. This is also a necessary value.
- Tolerance Lower
  - The lower limit of the harvesting power.
- Tolerance Upper
  - The upper limit of the harvesting power. The maximum value should equal the value of the Test Times.

The tolerance varies from different light levels in the production line and also different PV cell models. Atmosic suggests that customers test a batch of the DUT and find the appropriate criteria.

9.13 Programming User Data to External Flash

This section outlines the 4 methods for managing user data.

9.13.1 From ATM

To load user data directly from an ATM file, you can load and set the `User bin from` the `From ATM` setting:

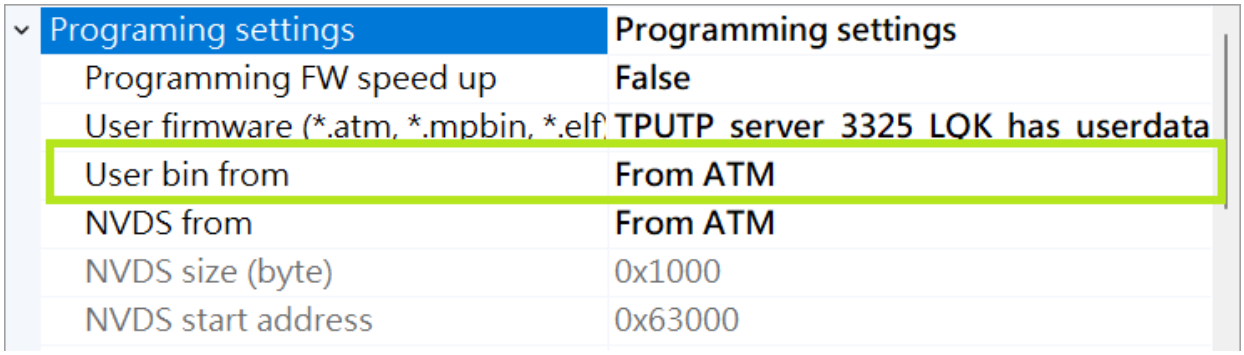


Figure 9-37 User Data From ATM File

Below is a command example for creating an ATM file in the SDK:

```
make BOARD=ATMEVK_3330e_QN \
    USE_MCUBOOT=1 \
    ATMWSTK=PD100 \
    MCUBOOT_SECONDARY_EXT_FLASH=1 \
    USER_OTA_DATA_FILE=<user_data_bin> \
    build_archive
```

Figure 9-38 Build ATM file command

9.13.2 From User Bin Setting File (XML)

If you want to be able to write independently, you can use XML setting files.

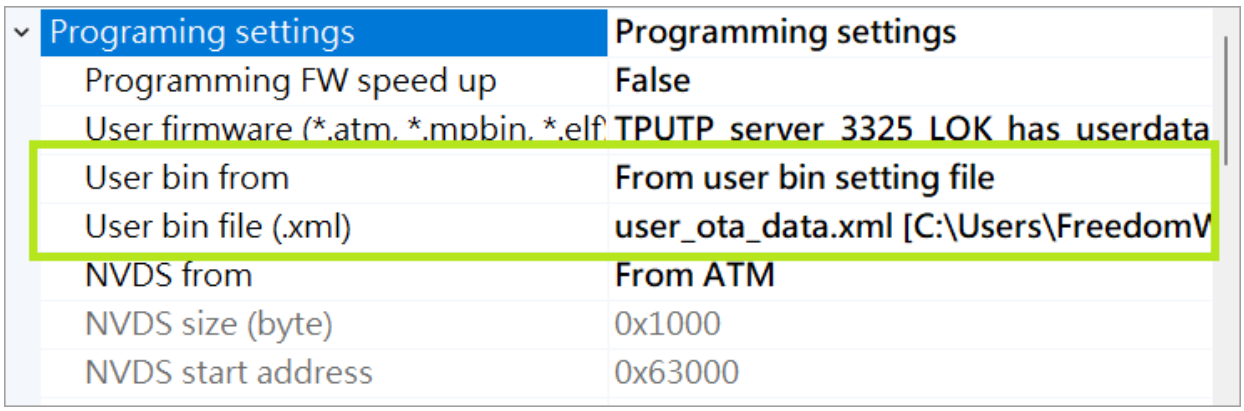


Figure 9-39 User Data From XML Setting File

The format of the XML setting file is as follows:

```
<?xml version="1.0"?>
<Bins>
    <Bin>
    <Name>SEC_OTA_DATA</Name>
    <Address>0x24b000</Address>
```

```
    <Region_start>0x4b000</Region_start>
    <Region_size>0xb5000</Region_size>
    <Path>D:\\TestFW\\flash_nvds.bin</Path>
    </Bin>
</Bins>
```

Figure 9-40 XML Settings

9.13.3 Merge User Bin Setting and .atm File

To update some user data in an ATM file, you can use this option and load an ATM file and an XML file.

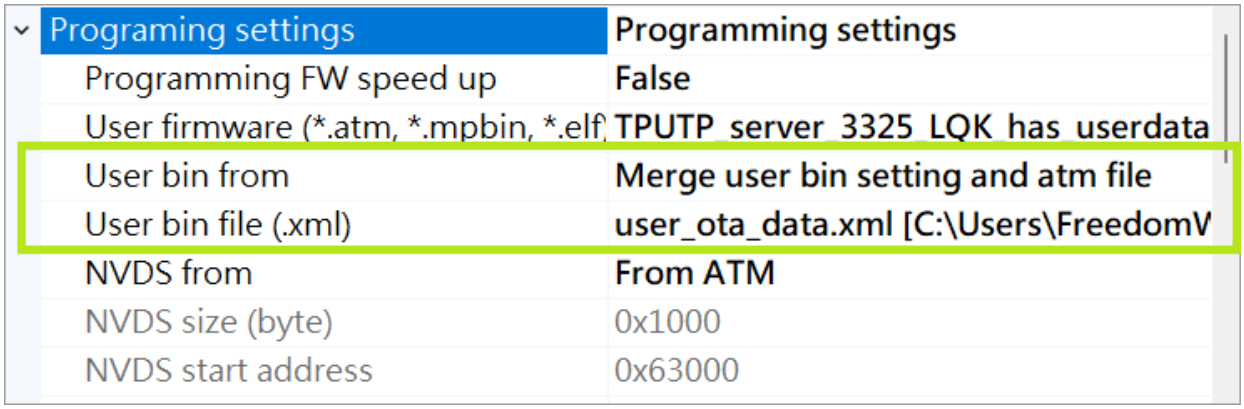


Figure 9-41 Merge User bin Setting and atm File

9.13.4 Disable Program User Data

Users who have an ATM file with User Data, but don't want to write user data, should use this option.

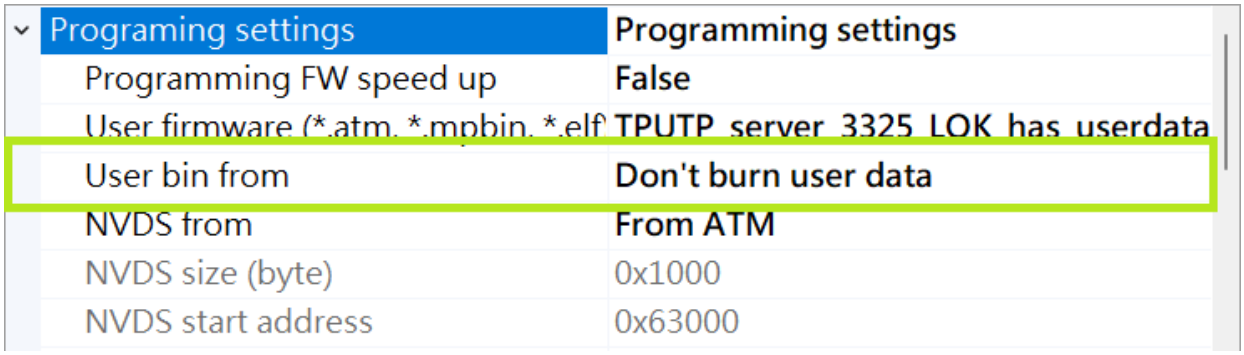


Figure 9-42 Don't Burn User Data

9.14 Burn HW OTP

Note: *Changing the OTP is irreversible. Proceed with caution.*

ATM33/e or ATM34/e features a 64-bit OTP. Use the ‘Burn HW OTP’ option for updates.

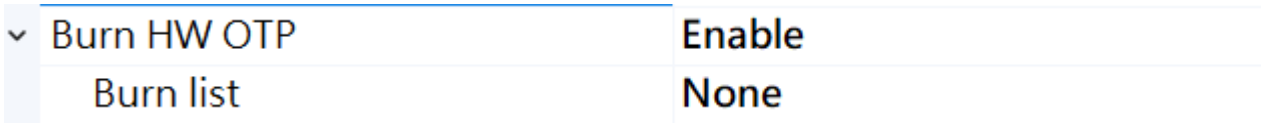


Figure 9-43 Burn HW Interface

Click on the corresponding button in the `Burn list` to open the dialog box.

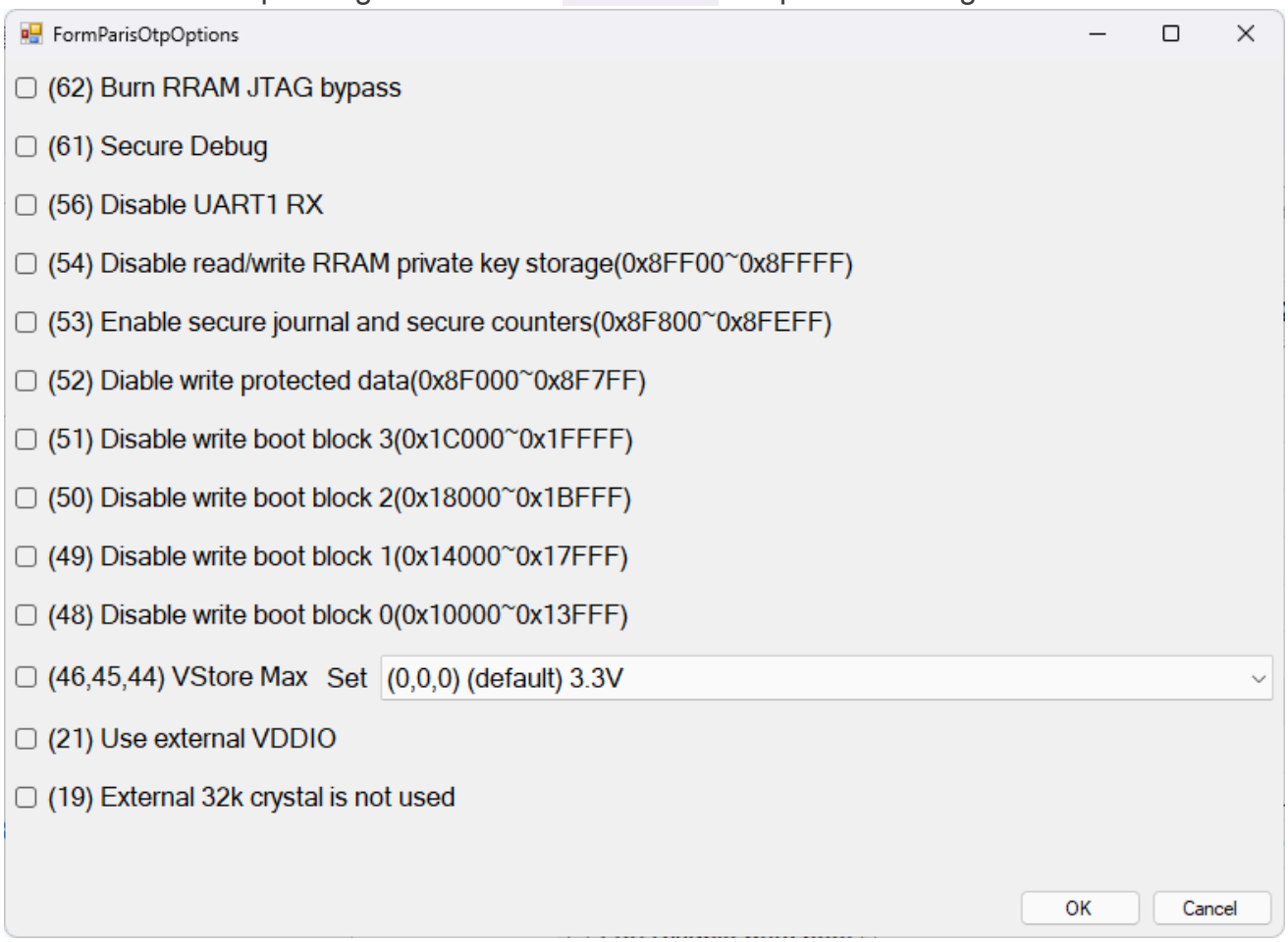


Figure 9-44 HW OTP Dialog

The dialog contains three types of options:

1) Single-bit options

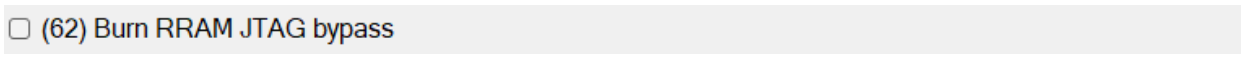


Figure 9-45 Single-bit Option

For single-bit options, selection is immediate, and the text will turn red upon selection.

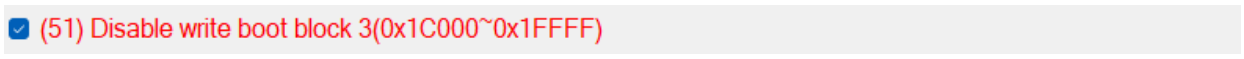


Figure 9-46 Single-bit Option Selected

2) Multi-bit options with dropdown selection

Figure 9-47 Multi-bit Options via Dropdown

3) Multi-bit options with manual value input

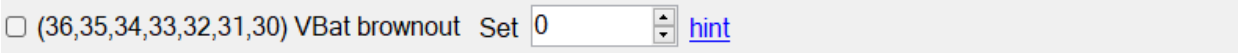


Figure 9-48 Multi-bit Options via Manual Input

For multi-bit options, a two-step confirmation is required:

a) Select the checkbox

Figure 9-49 Checkbox Selection for Multi-bit via Dropdown

Figure 9-50 Checkbox Selection for multi-bit via Manual Input

b) Enter the desired value

After both steps, the option text will turn red to indicate successful selection.

Figure 9-51 Multi-bit via Dropdown After Checkbox and Value Set

Figure 9-52 Multi-bit via Manual Input After Checkbox and Value Set

After setting these options and clicking ‘OK’, the dialog will notify you of the OTP bits that will be altered.

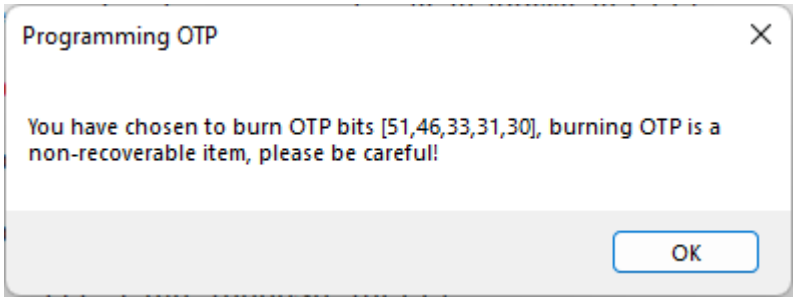


Figure 9-53 Dialog Notification for OTP Bit Changes

Additionally, on the Run page, a message box will appear, and the corresponding test list entry will turn red as a further alert.

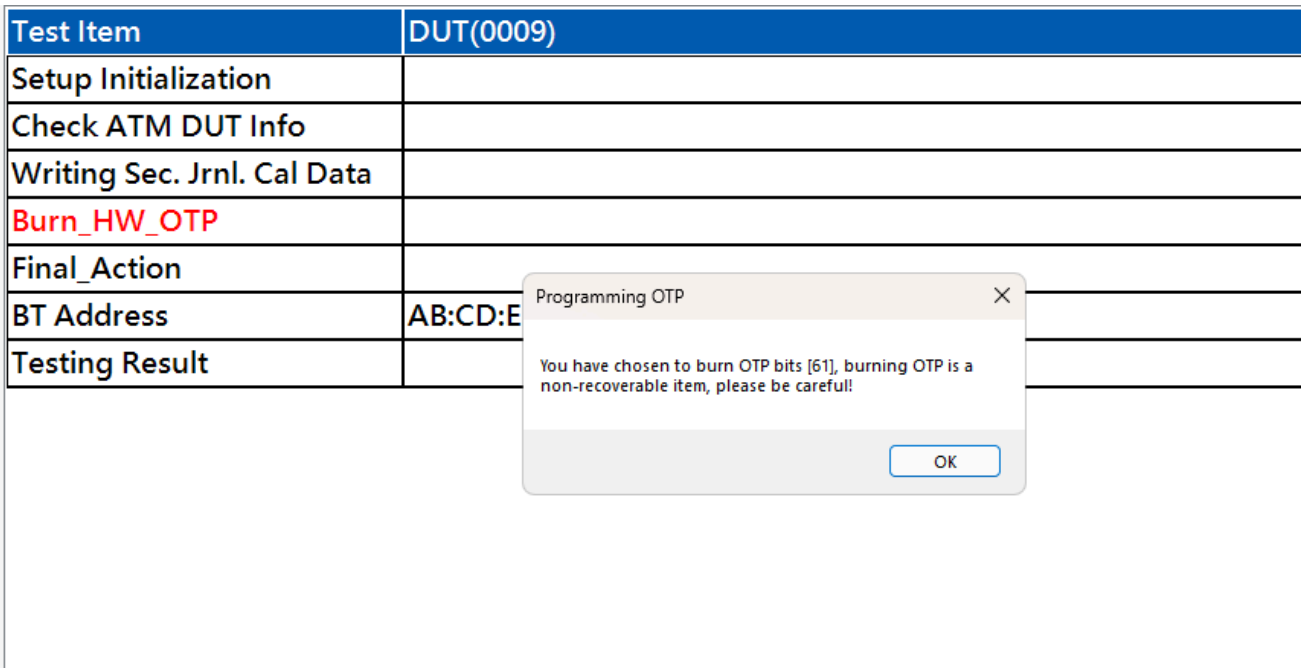


Figure 9-54 Run Page Alert

If you have saved these test settings, a warning will also pop up when reloading them.

9.15 Check BD Address (ATM33/e only)

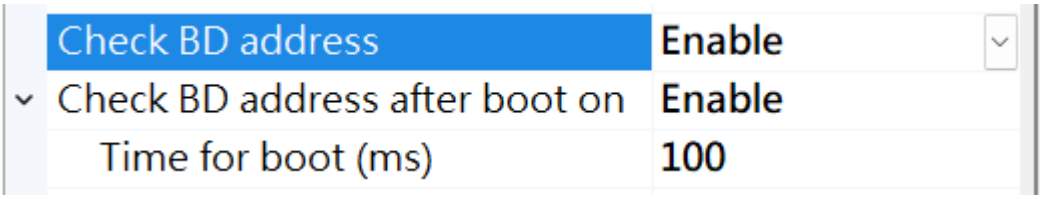


Figure 9-55 Test options for check BD address / check BD address after boot on

You can enable these two test tasks to perform an additional validation check on the BD address in the DUT after burning.

The `Check BD address` process is: after programming, reset to boot mode, then dump NVDS and check.

The process of `Check BD address after boot on` is: after programming, first reset to normal mode, go through <Time for boot> ms, then reset to boot mode, and finally dump NVDS and check.

9.16 Program Private Key(ATM33/e only)

This task provides options for typing a hex string to write private keys to a DUT. There are 8 pairs of keys, and each slot supports up to 32 bytes.

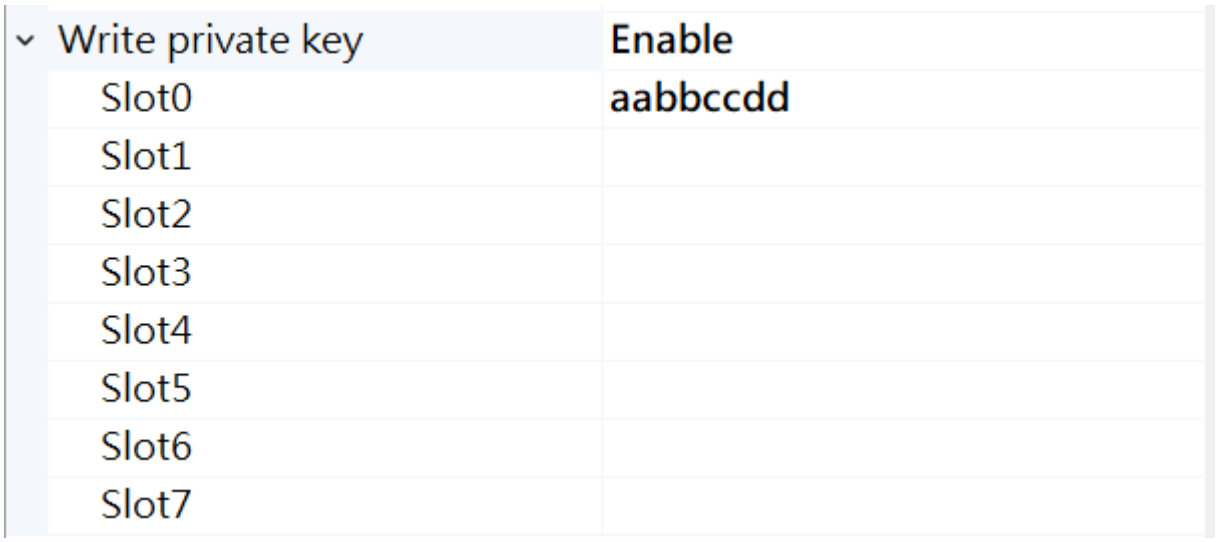


Figure 9-56 Program Private Key

9.17 Program Secure Journal

9.17.1 Generate a Blank Secure Journal Binary File

Use the CLI command to generate the file (Generate a blank secure journal file)

```
AtmMPTool FILE SECJRNL <file> BLANK
```

9.17.2 Add Secure Journal Tag into the Binary File

Use the CLI command, Secure Journal Tag Addition with File

```
AtmMPTool FILE SECJRNL <file> TAG ADD <tag> <hex data> <new file>
```

9.17.3 Select the Secure Journal File in the GUI Option

Change the task `Secure Journal` to enable, and you can select the secure journal file for the task.

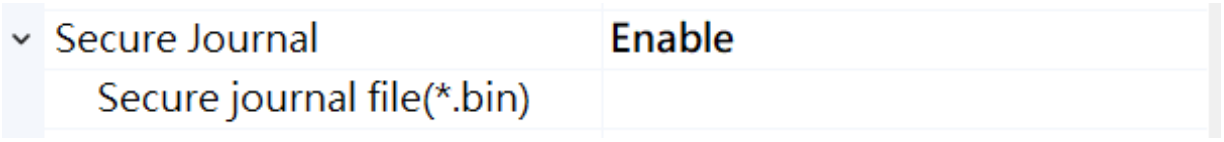


Figure 9-57 Secure Journal

9.18 Burn Battery Setting

ATM33/e or ATM34/e must be programmed with the corresponding battery settings according to the product specifications to ensure the device operates correctly.

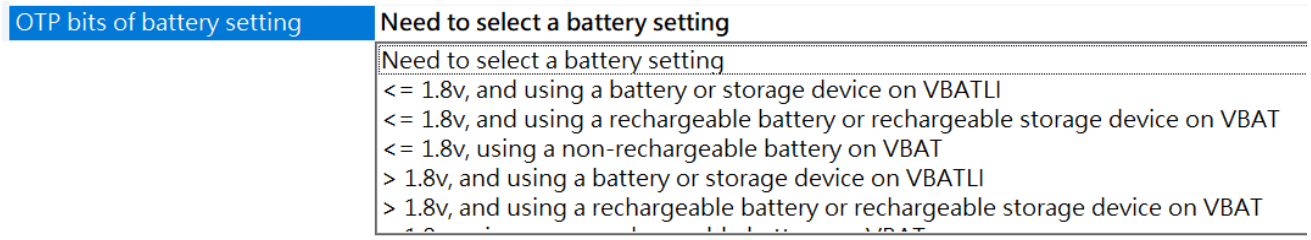


Figure 9-58 Burn battery setting

9.19 Restore LNA-TIA Calibration Result (ATM34/e only)

To save the LNA-TIA calibration results of the ATM34/e during production testing to the Secure Journal, enable this test item.

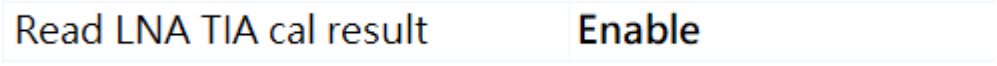


Figure 9-59 Read LNA-TIA calibration result setting

10. Atmosic MP Tool Console Mode

10.1 Use Console Mode

Use console mode to run AtmMPTool.exe with the command directly. For example:

```
AtmMpTool APT DISC
```

Figure 10-1 MP Tool CLI

```
C:\AtmosicMP\bin>AtmMPTool APT DISC
Find 1 APT/DL boards(s).
Board DevID: 7.
============================================================
Success
============================================================
```

Figure 10-2 Call MP Tool CLI in the CMD

10.2 Detailed Command Descriptions

The Atmosic Mass Production Tool also provides a console mode for user control. The user needs to go to the working directory in C:\AtmosicMP\bin and input the command. The user should follow the command format of the `AtmMPTool.exe MP Tool` parameters.

There are a few conventions in these command formats:

- S symbol is a fixed string S. The matched input could be case-insensitive.
- <S> symbol is for dynamic inputs, such as an ID or a file name. The matched input would depend on the situation of the real execution environment.
- (S1|S2|...|Sn) symbol is one of the fixed strings between S1 and Sn. The matched input shall be one of S1 to Sn, being case-insensitive.
- [S] symbol is for enumerated numbers. Only predefined numbers are allowed.
- <<S>> symbol is optional, and the definition is the same as <S>.
- [[S]] symbol is optional, and the definition is the same as [S].

10.3 CLI Environment Setting

10.3.1 Set Chip Type

Set <chip type> into the file ‘CliGlobalValue.xml’, when some commands show ‘No explicit IC type, please set chip type first.’

Command
• AtmMPTool GLOBAL CHIP_TYPE <chip type>

Parameter	
<chip type>	Atm33|Atm34
Result	SUCCESS or FAIL

10.3.2 Set Testing Log Refresh

The production test will write detailed logs in the log folder. Use this command to create a new log file of the current time and import subsequent logs into the file.

Command
• AtmMPTool LOG REFRESH

Parameter	
No parameters	
Result	The next log will be written to the new log file

10.3.3 Set Testing Log Finished

Call this command to update the final status on the file name of the log.

Command
• AtmMPTool LOG FINISHED

Parameter	
No parameters	

Result	Update the log file name if this test has an error message

10.3.4 Set UART Baud Rate

Call this command to set the baud rate to the CLI common setting; this setting will continue until the next time this command is called again.

Command

- AtmMPTool GLOBAL <baud rate>

Parameter	
<baud rate>	UART baud rate
Result	Update global setting

10.3.5 Hide Interface Log

Disables the display of OpenOCD logs and UART output.

By default, the CLI displays both OpenOCD logs and UART data on the console. Use this command to suppress these outputs for a cleaner interface.

Command

- AtmMPTool LOG HIDE_INTERFACE_LOG

Parameter	
Result	Update global setting

10.3.6 Display Interface Log

Enables the display of OpenOCD logs and UART output.

This command restores the printing of OpenOCD logs and UART data to the console if they were previously suppressed.

Command
• AtmMPTool LOG DISPLAY_INTERFACE_LOG

Parameter	
Result	Update global setting

10.4 Test Board Control

10.4.1 Board Discovery

Discover the connected DL boards by using the following command.

Command
• AtmMPTool APT DISC

Parameter	
DISC	Discover DL boards
Result	Return all <DevID> of DL boards

10.4.2 FTDI Pin Control

Command
• AtmMPTool APT <DevID> FTDI_CONTROL (NO_POWER) (<CONTROL_FLOW...>)

Parameter	
NO_POWER	If setting this parameter, the default VBAT, VCCIO, and LS pins would be set to low
<CONTROL_FLOW…>	Follow the format <ACTION_LABLE> <delay_ms> <ACTION_LABLE> <delay_ms> <ACTION_LABLE>....to control these pins The valid ACTION_LABEL: • VBAT_H: control VBAT pin to high • VBAT_L: control VBAT pin to low • VCCIO_H: control VCCIO pin to high

	• VCCIO_L: control VCCIO pin to low • LS_H: control the LS pin to high • LS_L: control the LS pin to low • BBOOT_H: control BBOOT pin to high • BBOOT_L: control BBOOT pin to low • PWD_H: control PWD pin to high • PWD_L: control PWD pin to low Example 1 - sends AtmMPTool APT 50 AG FTDI_CONTROL NO_POWER VBAT_H 50 VCCIO_H 150 LS_H to: 1. Default VBAT, VCCIO, and LS are low 2. Set VBAT to high 3. Delay 50 ms 4. Set VCCIO to high 5. Delay 150 ms 6. Set LS to high Example 2 sends AtmMPTool APT 50 AG FTDI_CONTROL BBOOT_H 20 PWD_H 0 PWD_L 20 BBOOT_L to: 1. Default VBAT, VCCIO, and LS are high 2. Set BBOOT to high 3. Delay 20 ms 4. Set PWD to high 5. Delay 0 ms 6. Set PWD to low 7. Delay 20 ms 8. Set BBOOT to low
Result	SUCCESS or FAIL

10.4.3 Power On

For the DL Board, before starting the test, run this command to power on the device.

Command
• AtmMPTool APT <DevID> POWER_ON

Parameter	
No parameters	
Result	SUCCESS or FAIL

10.4.4 Power Off

For the DL Board, after doing all testing, you must run this command to power off the device.

Command

- AtmMPTool APT <DevID> POWER_OFF

Parameter	
No parameters	
Result	SUCCESS or FAIL

10.5 Program & Dump Storage

10.5.1 DUT Firmware Programming

Program firmware to Flash.

Command

- AtmMPTool APT <DevID> DUT FLASH FW <atm file> [EUD] [NCE]
- AtmMPTool APT <DevID> DUT FLASH FFW <atm file> [EUD] [NCE]

Parameter	
FW/FFW	FW - Program firmware and verification. FFW - Program firmware and verification. The program uses a speed-up process.
<atm file>	File pathname (.atm) For Example, C:\AtmosicMP\Test.atm for firmware
[EUD] Optional	Erase upgrade data or not 1 for erasing If not provided, the default value is 1
[NCE] Optional	Do a chip erase before programming Flash

Result	SUCCESS or FAIL

10.5.2 DUT NVDS Programming or Pull

Program NVDS data to Flash (for ATM2/ATM3).

Command

- AtmMPTool APT <DevID> DUT FLASH (NVDS|PNVDS) <file> <addr> <size>
- AtmMPTool APT <DevID> DUT FLASH (NVDS|PNVDS) <file>

Parameter	
(NVDS|PNVDS)	NVDS - Program NVDS data to Flash PNVDS - Pull NVDS data from Flash
<file>	NVDS file pathname (.bin) For Example, C:\AtmosicMP\flash_nvds.bin
<addr> Optional	NVDS start address This information is customer-specific If not provided, the default address of NVDS is 0x78000
<size> Optional	NVDS maximal size This information is customer-specific If not provided, the default maximum size of NVDS is 0x8000 (32 KB)
Result	SUCCESS or FAIL

10.5.3 DUT Firmware Validation

Validate firmware in Flash.

Command

- AtmMPTool APT <DevID> DUT FLASH VFW <file> <addr>
- AtmMPTool APT <DevID> DUT FLASH VFW <file>

Parameter	
<file>	File to be programmed, bin file for firmware

	For Example, C:\AtmosicMP\Test.bin
<addr> optional	FW start address This information is customer-specific If not defined, the default address of FW is 0x0
Result	SUCCESS or FAIL

10.5.4 DUT Flash Firmware and NVDS Programming Concurrently

Program firmware and NVDS data to Flash at the same time.

Command

- AtmMPTool APT <DevID> DUT FLASH BOTH <ATM> <NVDS BIN> [EUD] [NCE]
- AtmMPTool APT <DevID> DUT FLASH FBOTH <ATM> <NVDS BIN> [EUD] [NCE]

Parameter	
BOTH/FBOTH	BOTH: using legacy program process FBOTH: using the fastload program process
<ATM>	FW file (.atm) to be programmed For Example, C:\AtmosicMP\Test.atm
<NVDS BIN>	NVDS file (.bin) to be programmed For Example, C:\AtmosicMP\flash_nvds.bin
[EUD] Optional	Erase upgrade data or not 1 for erasing If not provided, the default value is 1
[NCE] Optional	Do a chip erase before programming Flash
Result	SUCCESS or FAIL

10.5.5 DUT Flash Erase

Remove Flash according to Address and Size.

Command

- AtmMPTool APT <DevID> DUT FLASH ERASE <FADR> <FSIZE>

Parameter	
<FADR>	Start address If not provided, the default is 0
<FSIZE>	Erase Size If not provided, the default value will be the Flash size
Result	SUCCESS or FAIL

10.5.6 Dump Flash to Bin File

Dump Flash to a bin file.

Command

- AtmMPTool APT <DevID> DUT FLASH DUMP BIN <bin file> <addr> <size>

Parameter	
<bin file>	output file name
<addr>	start address (default is 0x0)
<size>	size (default is dump to end)
Result	Save the binary content of the IC Flash to a file

10.5.7 Flash Chip Erase

Erase all contents of the Flash.

Command

- AtmMPTool APT <DevID> DUT FLASH CHIP_ERASE

Parameter	

No parameters	
Result	Erase all contents of the Flash

10.5.8 Check Flash Protection (For ATM2/ATM3)

Check if the Flash is protected or not.

Command
• AtmMPTool APT <DevID> DUT FLASH CHECK_PROTECTING

Parameter	
No parameters	
Result	If it fails, show the error status and its error reason

10.5.9 DUT RRAM Firmware Programming (For ATM33/e, ATM34/e)

Program firmware to RRAM.

Command
• AtmMPTool APT <DevID> DUT RRAM FW <atm file>

Parameter	
<atm file>	File path(*.atm), created from SDK command `make build_archive`
Result	SUCCESS or FAIL

10.5.10 DUT RRAM NVDS Programming (For ATM33/e, ATM34/e)

Program NVDS data to RRAM.

Command
• AtmMPTool APT <DevID> DUT RRAM NVDS <file> <addr>

Parameter	
<file>	NVDS file pathname (.bin). E.g, C:\AtmosicMP\flash_nvds.bin
<addr>	NVDS start address
Result	SUCCESS or FAIL

10.5.11 DUT RRAM Erase

Erase data to 0xff by address, size, or all sizes for the RRAM.

Command

- AtmMPTool APT <DevID> DUT RRAM ERASE <ADDR> <SIZE>

Parameter	
<ADDR>	Start address
<SIZE>	Erase Size
Result	SUCCESS or FAIL

10.5.12 Programming Private Key (For ATM33/e, ATM34/e)

Command

- AtmMPTool APT <DevID> DUT SECJRNL PRIVATEKEY <SLOT_INDEX> <KEY>

Parameter	
<SLOT_INDEX>	0~7
<KEY>	Hex string (max size: 32 bytes)
Result	SUCCESS or FAIL

10.5.13 DUT RRAM Firmware and NVDS Programming Concurrently (For ATM33/e, ATM34/e)

Program firmware and NVDS data to Flash at the same time.

Command

- AtmMPTool APT <DevID> DUT RRAM BOTH <ATM> <NVDS BIN>
- AtmMPTool APT <DevID> DUT RRAM FBOTH <ATM> <NVDS BIN>

Parameter	
BOTH/FBOTH	BOTH: using legacy program process FBOTH: using the fastload program process
<ATM>	FW file (.atm) to be programmed For Example, C:\AtmosicMP\Test.atm
<NVDS BIN>	NVDS file (.bin) to be programmed For Example, C:\AtmosicMP\flash_nvds.bin
Result	SUCCESS or FAIL

10.5.14 DUT RAM Programming (For ATM2/ATM3)

Program DUT RAM

Command

- AtmMPTool APT <DevID> DUT FLASH RAM <file>

Parameter	
<file>	For RAM: If not provided, C:\AtmosicMP\fw\DTM.bin will be used
Result	SUCCESS or FAIL

10.5.15 DUT OTP Programming (For ATM2/ATM3)

Program DUT OTP data.

Command	
• AtmMPTool APT <DevID> DUT FLASH (OTP|POTP) <file>	
Parameter	
(OTP|POTP)	OTP - Program OTP data to OTP **(CANNOT REVERT SETTING!)** POTP - Pull OTP data from OTP
<file>	For OTP: Read this file and program to OTP For POTP: Pull data from OTP and write to this file
Result	SUCCESS or FAIL

10.5.16 DUT Secure Journal Push

Program secure journal data from/to RRAM.

Command	
• AtmMPTool APT <DevID> DUT SECJRNL PUSH <file> (<new_lock_counts>)	
Parameter	
<file>	NVDS file pathname (.bin). E.g, C:\AtmosicMP\flash_nvds.bin
<new_lock_counts>	Set the new size for protection
Result	SUCCESS or FAIL

10.5.17 DUT Secure Journal Dump

Dump secure journal data from/to RRAM.

Command	
• AtmMPTool APT <DevID> DUT SECJRNL DUMP <file>	
Parameter	
<file>	NVDS file pathname (.bin). E.g, C:\AtmosicMP\flash_nvds.bin

Result	SUCCESS or FAIL

10.6 Test Code

10.6.1 Programming Test Code

For ATM33/e or ATM34/e, before performing RF or HCI command testing, you can run this command to program the default HCI vendor to the DUT. Programming the HCI vendor is through the SWD interface.

When running this command, it will auto-detect the chip type and set it to the file ‘CliGlobalValue.xml’. The command can be skipped as shown in the Set Chip Type section.

Command

- AtmMPTool APT <DevID> DUT BURN_TEST_CODE

Parameter	
No parameters	
Result	SUCCESS or FAIL

10.6.2 Change the UART Pin Mux

If the product’s UART pin definition does not equal the default setting, use this command to change it before calling UART RX enable.

Command

- AtmMPTool APT <DevID> DUT UART MUX <Tx pin> <Rx pin> <Cts pin> <Rts pin>

Parameter	
<Tx pin><Rx pin> <Cts pin><Rtx pin>	Key in the I/O number
Result	Change the UART pin mux setting command working status

10.6.3 Set UART Rx Enable

To use the UART after downloading the default RAM code, use this command.

Command
• AtmMPTool APT <DevID> DUT UART RX_ENABLE

Parameter	
No parameters	
Result	Show the UART Rx enable command working status

10.7 RF Testing Command

10.7.1 DUT/AG HCI Reset Command

Reset AG or DUT.

Command
• AtmMPTool APT <DevID> (AG|DUT) RESET

Parameter	
(AG|DUT)	AG - Atmosic Golden (Not allowed with DL board) DUT - Device under test
Result	SUCCESS or FAIL

***Note**: Users must download the HCI firmware to use this command.*

10.7.2 DUT/AG Tx Test

Apply the AG or DUT to Bluetooth LE Tx mode.

Command	
• AtmMPTool APT <DevID> (AG|DUT) TEST TX [PHY] [CHNL] [PKTYPE] <PktLen> <Tms> • AtmMPTool APT <DevID> (AG|DUT) TEST END	

Parameter	
(AG|DUT)	AG - Atmosic Golden (Not allowed with DL board) DUT - Device under test
[PHY]	1 - 1M 2 - 2M 3 - Coded (S8) 4 - Coded (S2)
[CHNL]	0 ~ 39
[PKTYPE]	0 - PRBS9 1 - 11110000 2 - 10101010 3 - PRBS15 4 - 11111111 5 - 00000000 6 - 00001111 7 - 01010101
<PktLen>	0 ~ 255
<Tms>	Time in ms for continuously transmitting packets 0: Infinite 1 ~ 8000
Result	Return how many packets were transmitted

***Note**: Users must download the HCI firmware to use this command.*

10.7.3 DUT/AG Rx Test

Apply the AG or DUT to Bluetooth LE Rx mode.

Command

- AtmMPTool APT <DevID> (AG|DUT) TEST RX [PHY] [CHNL] [PKTYPE] <PktLen> <Tms>
- AtmMPTool APT <DevID> (AG|DUT) TEST END

Parameter	
(AG|DUT)	AG - Atmosic Golden (Not allowed with DL board) DUT - Device under test
[PHY]	1 - 1M 2 - 2M 3 - Coded (S8)

	4 - Coded (S2)
[CHNL]	0 ~ 39
[PKTYPE]	0 - PRBS9 1 - 11110000 2 - 10101010 3 - PRBS15 4 - 11111111 5 - 00000000 6 - 00001111 7 - 01010101
<PktLen>	0 ~ 255
<Tms>	Any number from 1 to 8000. If it is not set to 0, the DUT will automatically end the reception after Tms and display the number of received packets. If it is set to 0, the DUT will continue to receive until the user sends TEST END.
Result	Return how many packets were received

***Note**: Users must download the HCI firmware to use this command.*

10.7.4 DUT/AG Tx Power Gain

Command and parameters for setting the Tx power to AG or DUT.

Command
• AtmMPTool APT <DevID> (AG|DUT) GAIN [GAINIDX]

Parameter	
(AG|DUT)	AG - Atmosic Golden (Not allowed with DL board) DUT - Device under test
[GAINIDX]	For ATM33/e, ATM34/e, AG_V2 0 - (-20dBm) 1 - (-10dBm) 2 - (-8dBm) 3 - (-6dBm) 4 - (-4dBm) 5 - (-2dBm) 6 - (0dBm) 7 - (2dBm) 8 - (4dBm) 9 - (6dBm)

	10 - (8dBm) 11 - (10dBm) For ATM2/ATM3, AG_V1: 0 - (-20dBm) 1 - (-10dBm) 2 - (-6dBm) 3 - (-4dBm) 4 - (-2dBm) 5 - 0dBm 6 - 2dBm 7 - 4dBm
Result	SUCCESS or FAIL

***Note**: Users must download the HCI firmware to use this command.*

10.7.5 DUT/AG Test ADV

Start or stop advertising

Command

- AtmMPTool APT <DevID> (AG|DUT) TEST ADV START <payloads>
- AtmMPTool APT <DevID> (AG|DUT) TEST ADV STOP

Parameter	
(START|STOP)	Testing starts or stops
<payloads>	Use --0x<tag>.(ascii|hex)=data to set payload context E.g. --0x09.ascii=001122334455
Result	Show the ADV command working status

***Note**: Users must download the HCI firmware to use this command.*

10.7.6 DUT/AG Set/Get Runtime Crystal CAP

Set or get the runtime crystal CAP value.

Command

- AtmMPTool APT <DevID> (AG|DUT) CAP SET <val>
- AtmMPTool APT <DevID> (AG|DUT) CAP GET

Parameter	
(SET | GET)	SET: set output I/O pin to low(0) or high(1) GET: get I/O pin low or high
<val>	0 ~ 31
Result	Show the CAP value setting command working status

***Note**: Users must download the HCI firmware to use this command.*

10.7.7 DUT/AG RSSI Test

This command needs to be executed after performing an RX TEST command to obtain the RSSI value. About the RX Test, refer to the section DUT/AG Rx Test.

Command
• AtmMPTool APT <DevID> (AG|DUT) TEST RSSI

Parameter	
(AG|DUT)	AG - Atmosic Golden (Not allowed with DL board) DUT - Device under test
Result	Return DUT RSSI value

***Note**: Users must download the HCI firmware to use this command.*

10.8 Component Testing

10.8.1 DUT Test WuRx

WuRx test commands.

Command
• AtmMPTool APT <DevID> DUT TEST WURX SEND_TX_PACKET • AtmMPTool APT <DevID> DUT TEST WURX RESET_RX • AtmMPTool APT <DevID> DUT TEST WURX CHECK_RX_COUNT <count1_limit> <count2_limit>

Parameter	
(SEND_TX_PACKET | RESET_RX | CHECK_RX_COUNT)	SEND_TX_PACKET: send WURX waveform RESET_RX: reset the DUT to catch the WuRx packet CHECK_RX_COUNT: check WuRx packet count
<count1_limit>, <count2_limit>	Set a limit for the count
Result	Show the WuRx command working status and register the change log

10.8.2 DUT/AG I/O Setting

Control the GPIO pin action or get the GPIO pin status.

Command

- AtmMPTool APT <DevID> (AG|DUT) IO (SETUP|SET) <io> <0|1>
- AtmMPTool APT <DevID> (AG|DUT) IO GET <io>

Parameter	
(SETUP|SET|GET)	SETUP: set I/O pin to input(0) or output(1) SET: set output I/O pin to low(0) or high(1) GET: get I/O pin low or high
<io>	number of the pin
Result	Show the I/O setting command working status

***Note**: Users must download the HCI (DTM) firmware to use this command.*

10.8.3 DUT Get PV Count

Poll the harvesting detection signal according to the number of test times and return the number of times it is high to roughly estimate the harvesting power consumed by the chip.

Command

- AtmMPTool APT <DevID> DUT PV_GET <TEST TIMES>

Parameter	

<TEST TIMES>	Test times(500~65535)
Result	PV count value(0~65535)

***Note**: Users must download the HCI (DTM) firmware to use this command with the DUT role.*

10.9 Data Viewer

10.9.1 View Flash NVDS (For ATM2/ATM3)

Display the value of NVDS in the Flash.

Command
• AtmMPTool APT <DevID> DUT FLASH DUMP NVDS <addr> <size> TAG <id>

Parameter	
<addr>	The address of NVDS start address.
<size>	The size of the NVDS area
<id>	Tag ID, please refer to Common OTP/NVDS Tag ID
Result	NVDS value for the tag and the command result of SUCCESS or FAIL

10.9.1 View RRAM NVDS (For ATM33/e, ATM34/e)

Display the value of NVDS by TAG ID in the RRAM.

Command
• AtmMPTool APT <DevID> DUT RRAM DUMP NVDS <addr> <size> TAG <id>

Parameter	
<addr>	The address of NVDS start address.
<size>	The size of the NVDS area

<id>	Tag ID, please refer to Common OTP/NVDS Tag ID
Result	NVDS value for the tag and the command result of SUCCESS or FAIL

10.9.2 View Secure Journal NVDS

Display the value of NVDS by TAG ID in the Secure Journal.

Command	
• AtmMPTool APT <DevID> DUT SECJRNL TAG <ID>	
Parameter	
<id>	Tag ID, please refer to Common OTP/NVDS Tag ID
Result	NVDS value for the tag and the command result of SUCCESS or FAIL

10.9.3 View Crystal CAP in Secure Journal NVDS

Display the crystal CAP in the Secure Journal.

Command	
• AtmMPTool APT <DevID> DUT SECJRNL CAP	
Parameter	
No parameters	
Result	Crystal CAP and the command result of SUCCESS or FAIL

10.10. ATM File Modifier

10.10.1 Show ATM File Information

Show the information from the ATM file.

Command

- AtmMPTool FILE ATM <file> SHOW

Parameter	
<file>	Input atm file path
Result	Display the information on the console

10.10.2 Export FW Bin File from ATM File

Export FW bin file from the ATM file.

Command

- AtmMPTool FILE ATM <in_file> EXP_FW <out_file>

Parameter	
<in_file>	input atm file path
<out_file>	output bin file path
Result	Export FW bin to file path

10.10.3 Export NVDS Bin File from ATM File

Export the NVDS bin file from the ATM file.

Command

- AtmMPTool FILE ATM <in_file> EXP_NVDS <out_file>

Parameter	
<in_file>	input atm file path
<out_file>	output bin file path
Result	Export NVDS bin to file path

10.11 Flash/RRAM NVDS File Modifier

10.11.1 NVDS File Content Display

This command shows the content of NVDS (.bin) files.

Command

- AtmMPTool FILE NVDS <file> SHOW

Parameter	
<file>	The file path that was used to be read and displayed
Result	Shows the content of the file with rows of tags

10.11.2 Create Blank Flash/RRAM NVDS File

This command can create NVDS files.

Command

- AtmMPTool FILE NVDS <file> BLANK

Parameter	
<file>	The path used to generate the new file
Result	Shows the content of the file with rows of tags

10.11.3 NVDS Tag Addition with File

This command adds a specific TAG and its data from the content of the NVDS (.bin) file and output to a new file.

For Tag ID, refer to the section Common OTP/NVDS Tag ID.

Command

- AtmMPTool FILE NVDS <file> TAG ADD <tag> <hex data> <new file>

Parameter	
<file>	File path of the original file
<tag>	Tag number Hex format, e.g., 01, 45, ...
<hex data>	Data with a hex format, e.g, 6-byte data, would be input by 112233445566
<new file>	File path to save
Result	<new file> will be saved and show success

10.11.4 Flash/RRAM NVDS File Merge

This command merges two NVDS (.bin) files.

Command

- AtmMPTool FILE NVDS <file> MERGE <add file> <new file>

Parameter	
<file>	File path of the original file
<add file>	File path of the added file
<new file>	File path to save
Result	<new file> will be saved and show success

10.12 OTP NVDS File Modifier (For ATM2/ATM3)

10.12.1 OTP NVDS File Content Display

This command shows the content of OTP (.nvm) files.

Command

- AtmMPTool FILE OTP <file> SHOW

Parameter	
<file>	File path that used to be read and displayed
Result	Shows the content of the file with rows of tags

10.12.2 OTP NVDS Tag Addition with File

This command adds specific TAG and its data from the content of the OTP (.nvm) file and output to a new file.

For Tag ID, refer to the section Common OTP/NVDS Tag ID.

Command

- AtmMPTool FILE OTP <file> TAG ADD <tag> <hex data> <new file>

Parameter	
<file>	File path of the original file
<tag>	Tag number Hex format, e.g., 01, 45, ...
<hex data>	Data with hex format, e.g, 6 bytes data would be input by 112233445566
<new file>	File path to save
Result	<new file> will be saved and show success

10.12.3 OTP NVDS File Merge

This command merges two OTP (.nvm) files.

Command

- AtmMPTool FILE OTP <file> MERGE <add file> <new file>

Parameter	

<file>	File path of the original file
<add file>	File path of the added file
<new file>	File path to save
Result	<new file> will be saved and show success

10.12.4 Set 16 MHz Crystal Capacitor to OTP NVDS File

Use this command to replace 11.13.2 OTP NVDS Tag Addition with File.

Command

- AtmMPTool FILE OTP <file> TAG SET_CAP <value> <new file>

Parameter	
<file>	File path of the original file
<value>	0~31
<new file>	File path to save
Result	<new file> will be saved and show success

10.13 Secure Journal File Modifier

10.13.1 Generate a Blank Secure Journal Binary File

Command

- AtmMPTool FILE SECJRNL <file> BLANK

Parameter	
<file>	The file path of the target file.
Result	SUCCESS or FAIL

10.13.2 Secure Journal Tag Addition with File

This command adds a specific TAG and its data from the content of the Secure Journal (.bin) file and output to a new file.

For Tag ID, refer to the section Common OTP/NVDS Tag ID.

Command
• AtmMPTool FILE SECJRNL <file> TAG ADD <tag> <hex data> <new file>

Parameter	
<file>	File path of the original file
<tag>	Tag number Hex format, e.g., 01, 45, ...
<hex data>	Data with a hex format, e.g, 6-byte data, would be input by 112233445566
<new file>	File path to save
Result	<new file> will be saved and show success

10.13.3 Set 16 MHz Crystal Capacitor to Secure Journal File

You can use this command.

Command
• AtmMPTool FILE SECJRNL <file> TAG SET_CAP <value> <new file>

Parameter	
<file>	File path of the original file
<value>	0~255
<new file>	File path to save
Result	<new file> will be saved and show success

10.14 Hardware Configuration Programming

10.14.1 Disable SWD (For ATM2/ATM3)

Program DUT HW OTP data.

Command
• AtmMPTool APT <DevID> DUT FLASH NSWD

Parameter	
No parameters	
Result	SUCCESS or FAIL

10.14.2 Set No 32 kHz Crystal on Board (For ATM2/ATM3)

Command
• AtmMPTool APT <DevID> DUT FLASH N32C

Parameter	
No parameters	
Result	SUCCESS or FAIL

10.14.3 DUT Set OTP Bits (For ATM33/e, ATM34/e)

Set OTP bits to 1.

Command
• AtmMPTool APT <DevID> DUT OTP_SET <BIT LIST>

Parameter	
<BIT LIST>	The list for the OTP index (e.g. 24,25,51,52)

Result	SUCCESS or FAIL

10.15 Secure Debug

10.15.1 Set Secure Debug PEM File

To execute a CLI command on the DUT with secure debug enabled, the user must configure the PEM file to authenticate the DUT.

Command

- AtmMPTool GLOBAL SET_SECURE_DEBUG_PEM <pemfile>

Parameter	
<pemfile>	The file path of the PEM file, which can authenticate the DUT.
Result	SUCCESS or FAIL

10.15.2 Clean Secure Debug PEM File

After you set the PEM file, you can call this command to clear the setting.

Command

- AtmMPTool GLOBAL CLEAN_SECURE_DEBUG_PEM

Parameter	
No parameters	
Result	SUCCESS or FAIL

10.15.3 Set Secure Debug PEM File for Programmed ATM

Command

- AtmMPTool GLOBAL SET_PROGRAMMED_PEM <pemfile>

Parameter	
<pemfile>	The file path of the PEM file, which can authenticate the DUT after programming the new FW.
Result	SUCCESS or FAIL

10.15.4 Clean Secure Debug PEM File for Programmed ATM

After you set the PEM file for the program, you can call this command to clear the setting.

Command

- AtmMPTool GLOBAL CLEAN_PROGRAMMED_PEM

Parameter	
No parameters	
Result	SUCCESS or FAIL

11. Multiple DUT Testing in CLI Mode

The Atmosic CLI command can execute testing or programming a maximum of eight DUTs at the same time.

Multiple DUT testing under CLI mode:

```
C:\AtmosicMP\bin>AtmMPTool APT 89 DUT FLASH RAM
RUN "get_rom_version" script
============================================================
Success
============================================================
```

Figure 11-1 Multiple DUT testing under CLI mode

12. Advanced Features and Operational Insights

12.1 Power Control

12.1.1 Using the MP Tool GUI

The GUI power control is automatic. The GUI options and configuration are similar to previous versions.

12.1.2 Using the MP Tool Console Mode

Using Download Board

The download board DL_V5 (or later) and the MP Tool version v2.0.14 (or later) support the DUT's power control. It is important to update the following 3 processes:

- On application opening
  Run this command before setting the DUT on the fixture (same as power-off)

```
AtmMpTool APT <DevID> POWER_OFF
```

Figure 12-1 Power off before setting the DUT on the fixture

- Before testing, power on

```
AtmMpTool APT <DevID> POWER_ON
```

Figure 12-2 Power on before testing

- After testing, power off

```
AtmMpTool APT <DevID> POWER_OFF
```

Figure 12-3 Set FTDI pins to low

For more information about the FTDI pins control command, refer to the FTDI Pin Control section.

12.2 Protect Bootloader for Secure Boot Support

12.2.1 Protect Bootloader in GUI Mode

To protect the Bootloader in GUI Mode, follow these two steps:

1) Flash the firmware containing MCUboot.

2) Configure OTP to disallow RRAM write access.

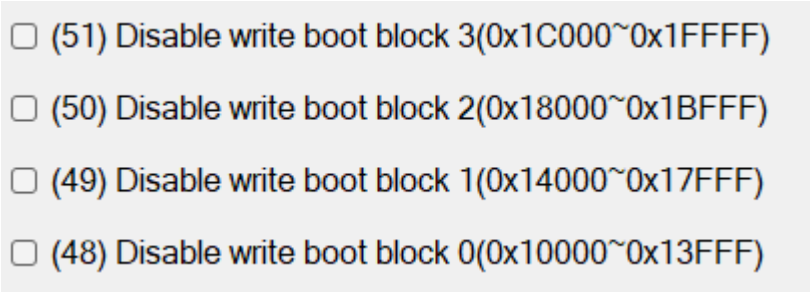


Figure 12-4 Configuring OTP Settings to Disallow RRAM Writes

By completing these steps, users will successfully enable the Secure Boot feature.

12.2.2 Protect Bootloader in Console Mode

To protect the Bootloader in Console Mode, follow these two steps:

1) Use the RRAM Flash Command to flash an ATM file containing MCUboot.

```
AtmMPTool APT <DevID> DUT RRAM FW <atm file>
```

Figure 12-5 MCUboot file

2) Use the Set OTP bits Command to burn bits 48 to 51 as needed.

```
AtmMPTool APT <DevID> DUT OTP_SET 48,49,50,51
```

Figure 12-6 Set OTP bits

By completing these commands, users will successfully enable the Secure Boot feature in Console Mode.

12.3 Lock Always-on SWD for Secure Debug Support

12.3.1 Lock Always-on SWD in GUI Mode

To lock always-on SWD in GUI Mode, follow these two steps:

1) Flash the firmware containing Secure Debug.

2) Configure OTP to set Secure Debug to `Authenticated Debug`.

Figure 12-7 Configuring OTP settings to limit SWD use

By completing these steps, users will successfully enable the Secure Debug feature.

12.3.2 Lock Always-on SWD in Console Mode

To lock always-on SWD in console Mode, follow these two steps:

1) Use the RRAM Flash Command to flash an ATM file containing Secure Debug.

```
AtmMPTool APT <DevID> DUT RRAM FW <atm file>
```

Figure 12-8 RRAM Flash Command

2) Use the Set OTP bits Command to burn bit 61 as needed.

```
AtmMPTool APT <DevID> DUT OTP_SET 61
```

Figure 12-9 Set OTP bit-61

12.4 Programming in Secure Debug Mode

For re-programming the OTP with Secure Debug enabled, use the following steps to re-program the DUT.

12.4.1 In GUI Mode

In the Settings page of the GUI mode, there are 3 options:

- User firmware: Select a new FW to program to the DUT.
- Secure Debug status: Set to `AlreadyEnableSecureDebug` when the DUT has already enabled the OTP bit.
- PEM for Secure Debug: select the PEM file that can be used to authenticate the new FW and the current DUT.

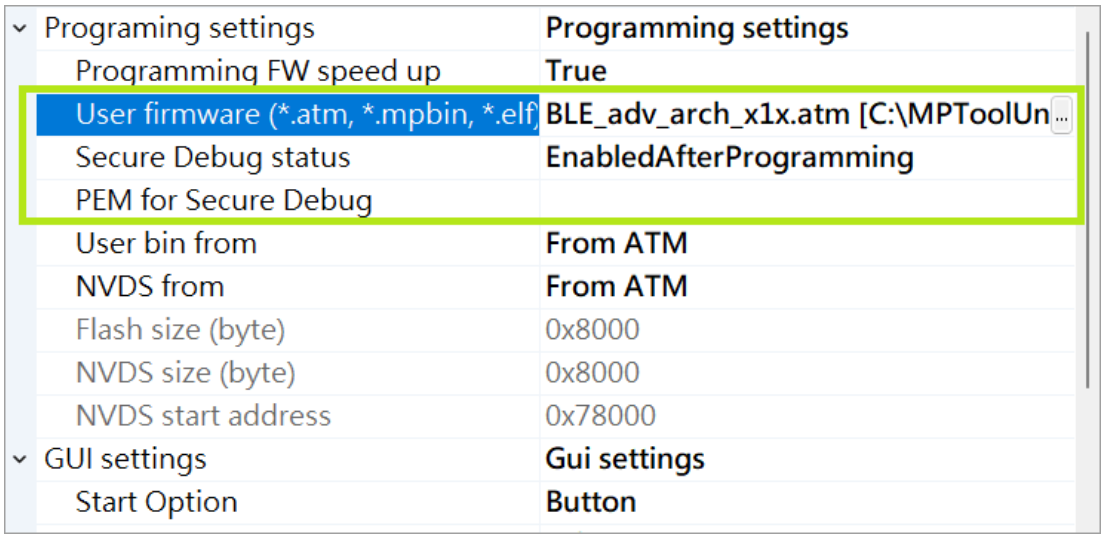


Figure 12-10 Secure Debug setting options

12.4.2 In CLI mode

There are 4 commands:

- SET_SECURE_DEBUG_PEM: set the PEM file used to authenticate with the current DUT.
- CLEAN_SECURE_DEBUG_PEM: clean the PEM file used to authenticate with the current DUT.
- SET_PROGRAMMED_PEM: set the PEM file used to authenticate after programming the new FW.
- CLEAN_PROGRAMMED_PEM: clean the PEM file used to authenticate after programming the new FW

After these settings are completed, use the original CLI command to program the new FW.

13. Common NVDS/Secure Journal Tag ID

In sections 10.11.3 NVDS Tag Addition with File and 10.12.2 Secure Journal Tag Addition with File.

NVDS and Secure Journal	
BD address	0x01
NVDS	
Device name	0x02
Secure Journal	
CAP	In OTP data, the CAP value is a part of Tag 0xBD and is not an independent byte; it is recommended to use 10.12.3 Set 16 MHz Crystal Capacitor to Secure Journal File to modify the CAP value.

14. Advanced GUI Mode Settings

In the root directory of MP Tool, there is a folder called xml_setting, which contains various XML configuration files.

14.1 Startup Setting

Within xml_setting, the file StartupSettings.xml defines the XML configuration corresponding to the Startup dialog. By modifying this file, you can change the options available in the Startup dialog.

```
<GuiOptions>
    <option name="Atm2/Atm3" path="xml_setting\GuiXmlSetting_atm2_atm3.xml" />
    <option name="Atm33" path="xml_setting\GuiXmlSetting_atm33.xml" />
</GuiOptions>
```

Figure 14-1 GUI options

Under the <GuiOptions> element, the <option> elements contain the following attributes:

- name: The name displayed on the Startup dialog.
- path: The path to the configuration file.

14.2 GUI Settings

Within the GUI settings, the following tags are available for configuration or adjustment:

14.2.1 <chip_family>

Ensures the chip being tested matches the settings. Acceptable values are:

- ATM33xx
- ATM34xx

14.2.2 <baudrate>

Specifies the UART baud rate when using the HCI vendor.

14.2.3 <uart_hard_flowcontrol>

Determines whether to use flow control when using the HCI vendor.

14.2.4 <check_device_count>

Check the number of connected DUTs before starting the test.

- enable: Set to true to use, false to disable.
- count: Specifies the number of DUTs, with values ranging from 1 to 16.

14.2.5 <test_flows>

Defines the test list. For adjustments, consult MP Tool developers.

- using_pretest_hook: Set to true to enable task `Pretest Hook`.

15. GUI Mode Testing Hooks

In GUI mode, users can designate external processes, scripts, or batch files as Hook processes.

During the standard testing procedures in MP Tool, these hook processes are invoked at appropriate times, offering greater flexibility to align with the customer's production workflow.

15.1 NVDS Hook

To write some NVDS with custom rules, refer to this chapter:

1) Change Tags customization to Call external process.

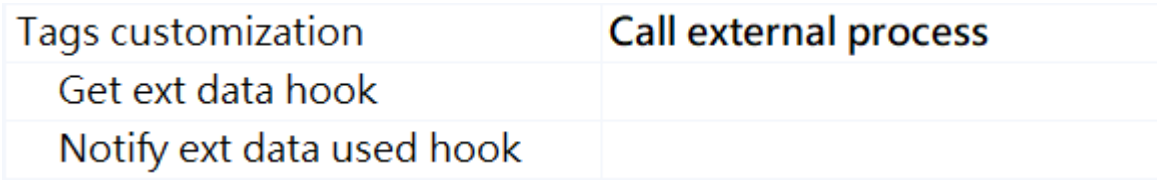


Figure 15-1 Get Custom data with Call External Process

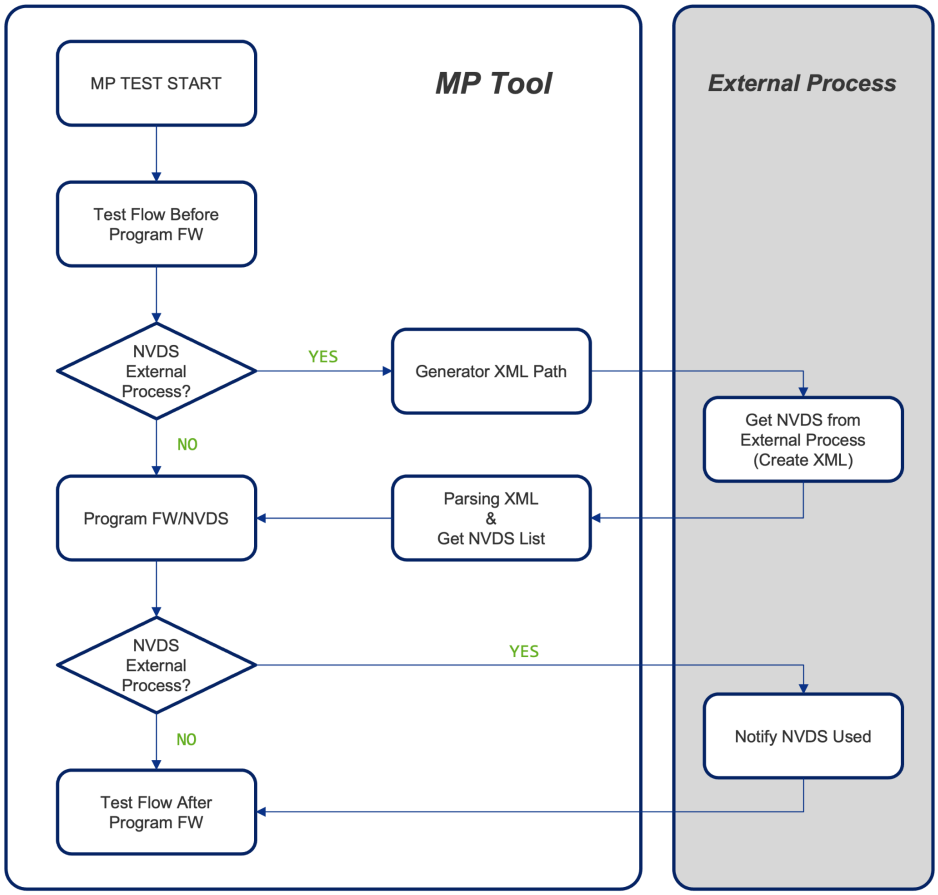


Figure 15-2 Flow chart for External Data Hook

15.1.1 Get External NVDS

When setting the command from the MP Tool, the MP Tool will call it before writing NVDS or OTP with the command:

- <the command in option> <XML file path of input argument from MP Tool> <the XML path that MP Tool want external process write>

If the user sets the command external.exe arg1, the MP Tool will call the process by external.exe arg1 xxxx.xml and expect external.exe to write NVDS information in the xxxx.xml.

Below is the reference of XML format:

```
<root>
  <device index="{index from external process}">
      <NVDS type="Flash" tag="0x{tag1 hex}">{data of tag1}</NVDS>
      <NVDS type="OTP" tag="0x{tag2_hex}">{data of tag2}</NVDS>
```

```
  </device>
</root>
```

Figure 15-3 XML Format reference

15.1.2 Notify External NVDS Used

When the user sets the command for the MP Tool, the MP Tool will call it after writing NVDS and OTP with the command:

```
<the command in option> <the index in the XML created when called get external NVDS command> <PASS or FAIL>
```

If the user sets the command external.exe arg2, the MP Tool will call the process by external.exe arg2 <index> PASS when writing information success and external.exe arg2 <index> FAIL when writing information failure.

15.2 Test Result Hook

After the testing is finished, MP Tool will write results into the .csv file (refer to Atmosic Mass Production Tool User Interface) for each DUT tested. This feature can also be used to update this information in the external process.

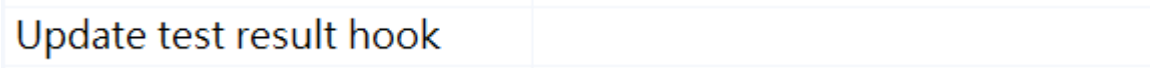


Figure 15-4 Update Test Result with Call External Process

If you set a command in this option, when testing is finished, MP Tool will call the process with the command:

```
<the command in option> <.csv file>
```

The .csv file is the test report created from DUT testing. This feature allows users to develop a process to analyze the test results after each test and store them in the users' database.

15.3 External Test Item Hook

In the tag<test_flows> in the GUI setting file, users can add new test tags as shown below to include external test items:

```
<test name="External Process" topic="External_Test1"
            log_topics="External_Test1, External_Test1_ExitCode" />
```

```
<test name="External Process" topic="External_Test2"
            log_topics="External_Test2, External_Test2_ExitCode" />
<test name="External Process" topic="External_Test3"
            log_topics="External_Test3, External_Test3_ExitCode" />
<test name="External Process" topic="External_Test4"
            log_topics="External_Test4, External_Test4_ExitCode" />
<test name="External Process" topic="External_Test5"
            log_topics="External_Test5, External_Test5_ExitCode" />
```

Figure 15-5 Add new test tags

After adding these lines and restarting the MP Tool in GUI mode, users will see the corresponding test items added to the settings page.

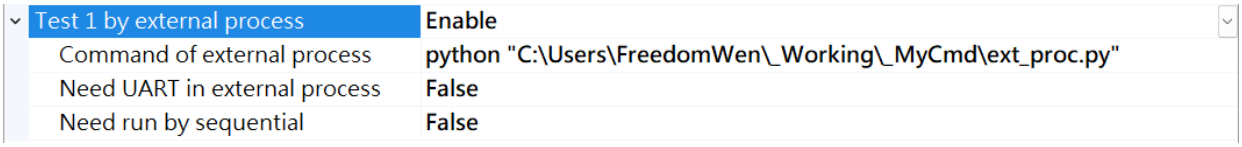


Figure 15-6 Update Test Result with Call External Process

When you input the external process command, the test will invoke the following command at the appropriate times:

```
<Command from GUI setting page> <File path for output parameters to external test>
<File path for requested external test reply>
```

Figure 15-7 External process command

15.3.1 Parameter File

Before invoking the external process, MP Tool will generate the following file in the temp folder:

```
{
  "mp_test_start_time": "2023_08_30_06_18_24",
  "current_task_start_time": "2023_08_30_06_18_27",
  "comport": 71,
  "sn": "",
  "barcode_text": "",
  "bd_address": "F5B0ADEE1E85",
  "atm_file_path": "C:\\Users\\username\\_Working\\AG_image\\NewAG.atm",
  "board_id": 7
}
```

Figure 15-8 Parameter File

15.3.2 External Test Result File

```
{
  "reply_message": "test for reply"
}
```

Figure 15-9 External Test Result File

Upon test completion, the reply_message will be displayed in the UI log area.

15.3.3 External Test Process Output

MP Tool will display the external process output in the UI log area.

15.3.4 Checking External Test Process Exit Code

The exit code can have one of the three results:

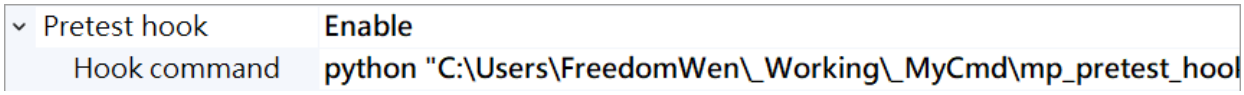
1) exit code = 0: Test passed.
2) exit code = 1: Test passed, and all the tests after this test will be skipped.
3) Any other exit code: Test failed.

15.4 Pretest Hook

In the tag <test_flows> in the GUI setting file, setting using_pretest_hook=true can enable the task.

```
<test_flows using_pretest_hook="true">
```

After changing the option and restarting the MP Tool in GUI mode, users will see the corresponding test items added to the settings page.



When you input the external process command, the test will invoke the following command at the appropriate times:

```
<Command from GUI setting page> <File path for output parameters to external test>
<File path for requested external test reply>
```

Figure 15-10 Command from the GUI setting page

15.4.1 Parameter File

Before invoking the external process, the MP Tool will generate the following file in the temp folder:

```
{
  "mp_test_start_time": "2024_01_11_04_13_13",
  "current_task_start_time": "2024_01_11_04_13_14",
  "atm_file_path": "xxx.atm",
  "devices": [
      {
        "board_id": 7,
        "comport": 6,
        "sn": "",
        "barcode_text": ""
      }
  ]
}
```

15.4.2 External Test Result File

```
{
  "reply_message": "test for reply"
}
```

Figure 15-11 External Test Result File

Upon test completion, the reply_message will be displayed in the UI log area.

15.4.3 External Test Process Output

MP Tool will display the external process output in the UI log area.

15.4.4 Checking External Test Process Exit Code

The exit code can have one of the two results:

1) Exit code = 0: Test passed.

2) Any other exit code: Test failed.

16. Troubleshooting

1) Figure 16-1 shows the error log: No board found

```
[16:12:34] -----> Boot <-----
[16:12:34] FactoryState = InitMPSoftware
[16:12:34] FactoryState = SearchingMPBoard
[16:12:36] FactoryState = BoardNotFound
[16:12:36] No board found!
```

Figure 16-1 No Board Found

Ensure the USB cable is connected. Open the device manager to check if libusbK USB Devices exist. If not, refer to the section Install MFx Interface to install the USB driver.

2) Figure 16-2 shows the error log of different types of boards found simultaneously.

```
[16:13:39] ----> Boot <-----
[16:13:39] FactoryState = InitMPSoftware
[16:13:39] FactoryState = SearchingMPBoard
[16:13:39] Different types of board found simultaneously
[16:13:39] Please connect only one type of board
[16:13:41] FactoryState = BoardNotFound
[16:13:41] No board found!
```

Figure 16-2 Different Types of Boards Found Simultaneously Error Log

Refer to the Install MFx Interface section to install the USB drivers.

3) Figure 16-3 shows an Invalid board <num> found, and the num is bigger than 32768.

```
[16:18:22] ----> Boot <-----
[16:18:22] FactoryState = InitMPSoftware
[16:18:22] FactoryState = SearchingMPBoard
[16:18:22] Found board 32808 without MFX driver installed.
[16:18:24] FactoryState = BoardNotFound
[16:18:24] No board found!
```

Figure 16-3 Invalid Board <num> Found

Refer to the Install MFx Interface section to install the USB drivers.

Revision History

Date	Version	Description
March 11, 2026	0.76	Updates for MP Tool v2.1.15.0
February 2, 2026	0.75	Updates for MP Tool v2.1.14.0
November 5, 2024	0.74	Updates for MP Tool v2.1.12.0
February 9, 2024	0.73	Updated for v2.1.11.0
January 12, 2024	0.72	Updated for v2.1.10.0
October 24, 2023	0.71	Updated Overview, Supported Hardware, Supported Software, Supported OS, Environment Setup for Download (DL) Board Only Added 10.17 Check BD address, Using Console Mode by Running AtmMPTool.exe, Figure 17-2 Flow chart for NVDS Hook
August 31, 2023	0.70	Updated Overview, Table 2-1 APT, DL and AG Kit Information, Table 2-2 Supported Atmosic Devices, Supported Software, Environment Setup for the APT, Download (DL) Board and Atmosic Golden Device (AG), DL_V6 Jump Connection with 2.5 V or 1.8 V I/O Voltage, Figure 9-1 Select ATM File, Figure 9-3 Burn_RAM Process, Figure 9-4 Select ATM File, Figure 10-6 Run Tab Before Testing, Figure 10-7 Run Tab Under Testing, Figure 10-8 Run Tab After Testing Success, Figure 10-9 Run Tab After Testing Fails, Figure 10-26 UART0 Pin Modification, Figure 10-28 Start Option, Settings Tab, Atmosic MP Tool Console Mode, Common OTP/NVDS Tag ID sections. Added Figure 2-2 Download Board (DL) Kit, Figure 2-3 Atmosic Golden Device (AG) Kit, Environment Setup for Download (DL) Board + Atmosic Golden Device (AG) Hardware Setup, Startup Dialog, Programming OTP (ATM33), OTP/NVDS File Content Display, Set Chip Type through Power Off, Advanced Features and Operational Insights, Advanced GUI Mode Settings, GUI Mode Testing Hooks sections.
July 24, 2023	0.61	Added DUT Set OTP Bits (Only For ATM33/e) section.

July 19, 2023	0.60	Updated for MP Tool version 2.1.8.18: Added Programming User Data to External Flash (ATM33 only) section.
March 17, 2023	0.59	Updated for MP Tool version 2.1.8.1: Added Hardware and Software Requirements, DUT Design Requirements for Manufacturing sections, Figure 10-34 PV Test Setup. Updated Select ATM File, Testing Options, Help Menu, Run Tab, Crystal Trim, RX Sensitivity, User Firmware (.atm, .mpbin) / NVDS file (.bin) / Tags Customization, OTP File (.nvm) (ATM2/ATM3 Only), Write MP Region, PV Harvesting Test, Calibration Settings, Atmosic Production Tool Console Mode, DISPLAY Content of NVDS and OTP file.
November 11, 2022	0.58	Added support for MP Tool v2.1.7.3 and ATM33/e. Added PV Harvesting Test, External NVDS Process, and Update Test Result with External Process sections. Updated Overview, Crystal Trim, User Firmware (.atm, .elf) / NVDS file (.bin) / Tags Customization, UART0 Pin Modification, Command Mode, DUT Firmware Programming, DUT Get PV Count sections.
September 15, 2022	0.57	Added support for MP Tool v2.1.0.0. Added DL Board Versions, Uninstall Any Previous Versions of the MP Tool, GUI Mode Quick Start, Set 16M Crystal Capacitor, FTDI Pin Control, DUT RRAM Firmware, Programming, DUT Secure Journal Dump or Push, DUT RRAM Erase sections. Updated Install MFx Interface, Set 16M Crystal Capacitor, DUT RRAM Firmware Programming sections, Figure 8-2 USB Serial Port Properties, Figure 8-3 Advanced Setting for COM Ports, Figure 9-2 Choose Test Options, Figure 9-3 Burn_RAM Process, Figure 10-1 Atmosic Mass Product Tool User Interface, Run Tab, Settings Tab, Crystal Trim, Frequency Test sections, changed format, corrected typos.
December 14, 2021	0.56	Format change. Added Dump Flash to Bin File, Flash Chip Erase, and Show ATM File Information sections.
November 10, 2021	0.55	Updated section NVDS/MP Region Create Blank File. Added sections System Environment Variable, Pull MP region, and Set UART baud rate setting.
October 25, 2021	0.54	Updated Setting Tab, Figure 19 Run Tab Before Testing, Figure 20 - Run Tab Under Testing, Figure 21- Run Tab After Testing Success, Figure 22 - Run Tab

		After Testing Fail, Figure 23 - Setting Tab, Figure 24 - Crystal Trim Setting, Figure 34 - User Firmware/Tags Setting, Figure 39 - Start Option, added Figure 41 - MP Region Information, Figure 42 - Write Calibration Data to MP Region, Figure 64 - CLI Command Detail Logs, Multiple DUT Testing in CLI Mode, Common OTP/NVDS/MP Region Tag ID, updated NVDS Tool section.
September 30, 2021	0.53	Updated Figure 8 - Start Menu Shortcuts, Figure 19 - Run Tab Before Testing.
July 23, 2021	0.52	Format change; updated Setting Menu, Figure 14 - MP Tool Setting, Help Menu, Figure 18 - MP Tool Help Menu, Figure 20 - Setting Tab, Figure 34 - User Firmware/Tags Setting, User Firmware (.elf)/NVDS file (.bin)/Tags Customization; added sections Environment Setup for Download Board (DL), Adjust Serial Port Latency Timer, NVDS Tool.
May 11, 2020	0.51	Added sections OTP file (.nvm), Troubleshooting.
March 25, 2020	0.50	Initial version created.

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