User Manual

Developer Guide

Moway 1

Version 1.0.6.0

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The specifications contained in this document are subject to change without notice.

Documentation Improvement

Any suggestion to this manual from you are welcome, we are glad to hear any feedback from you which will help us to continuously improve the documents quality and support and serve the developer to protect software products more efficiently.

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About this Manual

Objective

This manual is designed to help software developer to learn about the principle, protection scheme of Moway 1 and how to use Moway 1 and associated tools to design the software protection scheme and protect their software.

Notes

Caution: The content with this mark in the manual indicates that you need to pay highly attention, otherwise may cause serious consequences.

Mark: The content with this mark in the manual indicates that you need to pay attention to read.

Table of Contents

1 Overview 3

1.1 Introduction to Moway 1 3

1.2 Product Features 3

1.3 Solution Advantage 5

1.4 Glossary 6

2 Virbox Protector (For Moway 1) & Moway 1 Tool chains 9

2.1 Development and Testing Tool (DevTestTool.exe) 10

2.1.1 Function Menu 12

2.1.2 Basic Information Tab 12

2.1.3 File Management 13

2.1.4 PIN Setting 17

2.2 Volume Setting Tool (BatchTool.exe) 18

2.3 Cryptographic Algorithm Tool (CrytoTool.exe) 20

2.4 Virbox Protector: The Protection Tool 26

2.5 How to prepare a "License update" by use of MakePackageTool 29

2.6 Import update package file to Moway device in software User premise 30

3 Basic Functions and Typical application of Moway 1 32

3.1 Use the Moway 1 to store the security data to protect application 32

3.2 Use the Moway 1 to store the cryptographic Algorithm & key to protect application 32

3.3 Identity Authentication 33

3.4 Virbox Protector 34

3.5 Designing your comprehensive protection scheme 34

3.6 Integrate Moway API with your project 35

4 Moway API Function Summary 37

Overview 37

4.1 API for Basic Operations 37

4.2 API for device Initialization 38

4.3 API for File Operation 38

4.4 API for Cryptographic and Algorithm 39

4.5 API for Remote update 39

Appendix I: Technical Parameter 41

Appendix II: End-User License Agreement 42

1 Overview

1.1 Introduction to Moway 1

Moway 1 is the latest hardware based USB Dongle developed by Beijing Senseshield Technology Co., Ltd and equipped with 32-bit smart card inside with most cost of effective protect solution to Software Developer to protect their software project to against software piracy; With 32 bits smart card inside, Moway I support developer to design protection scheme with the most security, fast execution performance and large capacity varies from 8K/32K.

Moway 1 is the hardware product and developed based in secure smart card technology, all data, key or license can be stored inside of secure smart card to prevent software from piracy or being copied illegally;

The cryptographic algorithm of Moway 1 supported includes: AES, DES and RSA, developer may integrate and combined use these cryptographic algorithm with project in building phase to increase the software protection and security level dramatically.

Virbox Protector (Code hardening/App shielding tool) also available in the Moway SDK, as a latest generation protection solution, it help developer to protect the software without additional code effort to achieve to high level security to software developed.

On the other hand, Moway 1 provides standard algorithm of HMAC-SHA1, HMAC-SHA256 and HMAC-MD5, developer may use Moway 1 to be the token of identification in network authentication.

1.2 Product Features

- **32-bit Smart Card inside**

Moway 1 equipped with 32 bits smart card which dramatically increase the performance and security level to software developer, together with a series tools, it supports software developer to complete an absolutely reliable protection scheme to your software.

- **Advanced Cryptographic algorithm**

Moway 1 supports following advanced cryptographic algorithm: AES, DES, TDES, RSA and ECC. The key or protected data can be stored inside of smart card with file format, the file can be used inside of smart card and cannot be read out to keep the security of key and protected data.

- **Large Capacity of smart card**

There are 2 version of Moway 1 available: 8K and 32K version and both version support the file system, so software developer may select a suitable version to store the data file or key file depends on protection requirement.

- **Secured Communication Tunnel**

  To protect the communication between dongle and protected software, Moway 1 use AES algorithm to establish the secured communication tunnel to prevent the data leakage when protected software communicate with Moway 1 dongle. And random scrambling technology used to prevent cracker insert the probe to detect and obtain the valid information when communicated and enhance and improve the security level of protected software.

- **Driverless Mode**

  Moway 1 support both HID and USB mode, Moway 1 will be recognized as a HID mode if no driver installed, when Moway 1 driver installed as per your special request, USB mode will be supported.

- **Virbox Protector for Moway 1**

  Virbox Protector, A highly secured protector provided to developer together with Moway 1, it will help developer to save most of workload to protect your software without any coding work, the protected software program by use of Virbox protector can be closed bound with Moway 1 USB dongle, the protected software program will be executed only when the Moway 1 hardware lock is plugged in.

- **UUID**

  Universal Unique ID has been set to each Moway 1 hardware USB dongle which is hardware serial ID before Moway 1 shipped to the software developer, you can use this UUID to bind with your protected software and use the UUID to trace and track your software program.

- **Highly Integrated Technology of Moway 1**

  All critical components of Moway 1, includes CPU, RAM, ROM and non-volatile memory are all integrated in single chipset which guarantee the Moway 1 quality and stability in high level and minimizing the risk coming from hardware damage.

- **HMAC Algorithm**

  Moway 1 provides HMAC-SHA1, HMAC-SHA256, HMAC-MD5 algorithm to developer, and support to be used for the authentication mode with the "**challenge-response**" which guarantee the identification of authentication user. So developer may also use this function and related algorithm to develop your application in authentication.

- **Manageable LED Status**

LED status may be set to switch on/off, so software developer or software end user may use this function to flexible viewing and checking the Moway 1 execution status.

- **High Access Speed**

  Full Speed USB Access: USB 2.0 version

- **Remote Update Support**

  Secure key inside, supports developer to sign software update package remotely in secured and convenient way.

- **Batch Tools Available for Volume Setting the Moway 1 dongle**

  Moway 1 SDK provides the Batch tools to developer for volume setting the dongle which support developer quickly "manufacturing" the dongle for user.

1.3 Solution Advantage

Why Choose Moway 1 to protect your software and critical data

Large storage Capacity

Moway 1 provides large storage capacity to developer with file management system inside of Moway 1, so developer may store the critical data, license into the memory of Moway 1, and use the Moway 1 API to call when software use these critical data, after validate the authorization and license, read these critical data. Then the protected software and Moway 1 are closed be bound together to protect the software and critical data.
You also may store the key or data as file format to save into the Moway 1, the data and key cannot be read out of dongle, You can only use the API interface provided by us to use these key file in the Moway 1 after verify the authorization or license, then encryption/decryption or sign digital signature or verify the signature can be executed. In combined use with data memo function of dongle, high security level can be achieved to the protected software.
Virbox Protector for Moway 1, provides to software developer which helps developer to protect the software with "one click" protection, then the protected software will be bound with your Moway 1 dongle, the protected software will be executed only when the Moway 1 dongle plugin.

Identification Authentication

Moway 1 provides the standardize HMAC-SHA1, HMAC-SHA256, HMAC-MD5 algorithm to developer, the key can be stored inside of Moway 1 dongle as file format and cannot be read out of dongle. And the key can be used to calculate HAMC via call API interface to achieve the authentication identification with "Challenge-Response" mode and guarantee the security and reliability of identification.

1.4 Glossary

- **UUID**

  Universal Unique ID has been set to each Moway 1 USB dongle which is hardware serial ID setting before Moway 1 shipped to the software developer, you can use this UUID to bind with your protected software and use the UUID to trace and track your software program.

- **Seeds code**

  Seeds code used for setting PID, Seeds code is critical data to generate the product PID, please keep the seeds code in security and safety, the same PID may only be generated and available by use of the same seeds code.

- **PID**

  Product Identification ID, generated by use of Seeds Code, developer use the PID to identify each of product, or each of sub developer, PID is the key identification and differentiated from the other software product which also used Moway 1 protected. So please set your dedicate PID for your product before using Moway 1.

- All the PIDs of Moway 1 in factory setting are same, on default is "0", please make sure to modify the PID before use, otherwise you cannot use any functions except of dongle initialization.
- Developer Right(Access Right) is required to set the PID, you can re set the PID when obtain the developer right;
- The PID is unique ID generated by one seeds code, and The PID generated by different Seed code is different, so, when setting a certain type of product, be sure to use the same seed code for PID setting. Otherwise, different PIDs will be generated in dongle for same product.

With PID and Virbox Protector, Developer will capable to design and complete a customized and secure protection and license scheme. Even without in house license system.

Usually, software developer use a license system (no matter build up by themselves or purchase/subscribe cloud license system) and issue the different license to their software users. That means developer may invest workload, resource to build up, to maintain a license system. To sell their application to different market segment. But for some developer lack of resource, it would be challenge to maintain a in house or Cloud license system.

With Moway PID, and Virbox Protector, Developer may easily to use similar license concept to use different PID to differentiate the software product and store the relevant PID to the Moway device and sell the software product to different market in different price strategy.

PIN code and Access Right to Moway 1

Moway 1 uses the PIN code to manage different Access Right. After the PIN code is verified, the corresponding Access Right can be obtained. The Moway 1 has three kind of Access Right, which includes: Developer Rights, User Rights and Default Rights.

- **Developer Rights**

The Developer Rights is the right for developer to manage the Moway 1 USB dongle. You must verify the master PIN (Developer PIN) to access the highest right to operate the Moway 1 device. After the verification is passed, the file inside of Moway 1 can be read and written, deleted, and set, reset the PIN code, restore the factory setting operations.

- **User Rights**

After verified the user access right with user PIN code, you can read the data stored in the dongle with the user right, and able to read and write the file which may accessed by users, or call API interface to use the key stored in the dongle.

- **Default Access Right**

No need to verify the PIN code for default access right, you can call Moway 1 API directly to obtain some information and status of device by use of "default right"

- When you received the Moway 1, please ensure modify the Developer PIN with your own PIN code, then Moway 1 related function may be activated and used.
- Since the Developer right is the highest access right to manage the device, it has all the operating rights to the Moway 1. Therefore, please save the modified developer PIN code in safety. This is one of the important guarantees to protect the security of your encryption scheme.

As to other attributes of the above definition, please refer to the description in Figure 1-1.

Item	Length	Initial Value	Uniqueness	Modified by Developer
UUID	16 bytes	Each Moway 1 has different UUID value	Global unique value	No
Seed Code	4~32 Bytes	None	Set by Developer	Make sure to keep it safe, after verified the developer access right, you can use the new seed code
PID	4 bytes	0	Generated by seed code and random algorithm	Developer may reinitialize PID
Developer (Master) PIN	24 bytes 24“0”	“000000000000000000000000”	Set by developer	Developer may modify later
User PIN	8 bytes 8 “0”	“00000000”	Set by developer	May modify later

Figure 1-1

2 Virbox Protector (For Moway 1) & Moway 1 Tool chains

Tool chains

In order to design a customized protection and license scheme quickly and easily, Moway SDK provides a series tool chains that supports developer to complete whole protection process to protect your application by using Moway 1 device. With the Moway 1 tool chains, Software developer may quickly complete design, development, testing and evaluation and production for your application, in conveniently and quickly way.

The Moway 1 tool chain includes following tools:

Device (Moway 1) Testing Tool: DevTestTool.exe

Cryptographic Tool: CryptoTool.exe

Batch Tool: BatchTool.exe

Create update package tool: MakePackageTool.exe

Remote update Tool: UpdateTool.exe

Protection Tool: virboxprotector.exe

Moway Tool	Tool name	Functionality & Description	Operate by
DevTestTool.exe	Development and Testing Tool for Moway 1	Initialize the Moway 1 device, such as generate or modify the PID; File Operation to Moway device, such as create new file, import, delete and edit file in the Moway device, etc.	Developer
CryptoTool.exe	Cryptographic Algorithm Tool	Test the different kind of Cryptographic algorithm which use in Moway 1 device, or create the key file to Moway 1.	Developer
BatchTool.exe	Batch setting Tool for Moway 1 Lock setting	Volume production (setting) of the Moway 1 device with the same PID by using the created template.	Developer

MakePackageTool.exe	Create License update package to Moway 1 device	Developer to create License update file package in developer premise, and distribute this update file (package) to user.	Developer with Master lock
UpdateTool.exe	Update Tool used to import the user update package into the Moway 1	When developer issue license update package to software user, then software user will use this tool in user premise to import this update package into the Moway 1 dongle.	Software User
virboxprotector.exe	Professional Protection tool to protect/wrap your software.	As a Fast, easy to use and Secured protection tool, Developer may use Virbox Protector to protect software quickly with codeless effort.	Developer

Table 2-1 Tool chain of Moway 1

Note:

Tool location

Virbox Protector, located at the Moway SDK installation directory\tool

The other tools: located at the Moway SDk installation directory\shell

2.1 Development and Testing Tool (DevTestTool.exe)

This Development and Testing Tool (DevtestTool.exe) is most frequently used tool for software developer, developer may use this tool to initialize setting the Moway 1 device, also be used to develop and test the protection and encryption scheme. To execute this tool, just plug in a Moway 1 dongle, and double click the "DevTestTool.exe which located in the "tools" directory, the GUI is shown in Figure 2-1.

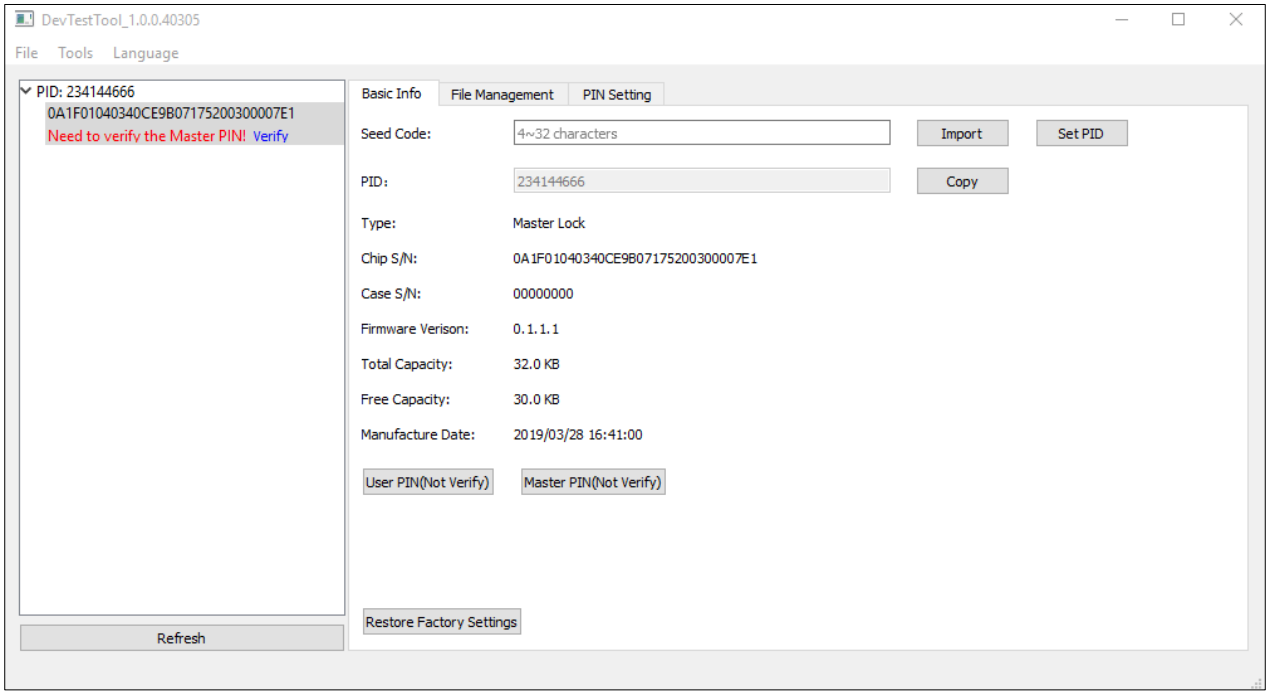


Figure 2-1

When Development and Testing Tool started, you will find all the Moway 1 device connected to your computer will be listed in the left panel, you can select the Moway 1 device to operate from left panel, and select the operation from right panel. There are 3 tabs in the right panel:

Basic Info

File Management

PIN Setting

In the Basic Info tab,

The Moway device information you selected will be displayed, you can view these info includes Device S/N, PID, and case No. You may set the Device PID, restore the Factory Setting, Verify the PIN code and other operation.

In the File Management tab,

You may operate the file inside of Moway 1: view the file attributes, create new file, import file or delete file. You also can use the key file to verify the cryptographic algorithms.

In the PIN Setting tab,

You may modify Master PIN code, User PIN code, or set of limitation to the times of Error to PIN code enter.

2.1.1 Function Menu

Function menu includes exit of tool, open the other associated tool and language setting

- **File**

Operate to this tool, Exit the tools.

- **Tools**

You may open and execute the other tools: Cryptographic Algorithm Tool, Batch Setting Tool, Update Package tool. You will find more detail and description to these tools in later chapter.

- **Language Setting**

You may set the GUI language here, Chinese and English available currently.

2.1.2 Basic Information Tab

The **Basic Info** Tab is shown in Figure 2-1. It displays the basic information of the device, verifies the operation of the PIN code, and provides the PID setting function.

The information displayed includes PID, device (Chipset) S/N, Case S/N (Laser engrave number in the shell of device), Firmware version, Capacity, Free capacity and Manufacture date.

Some of operations for developing and testing tools require "Developer or User access right". The two buttons under the bottom of the basic info Panel are used to verify User Access right and Developer Access right. When the Access Right is verified, the corresponding buttons will be changed from "unverified" to "Verified". And the status of device selected in the "Device Panel" on the left will also change to "User PIN verified" or "Master PIN verified" status.

Set the PID in **Basic Info** Tab:

◆ Seed Code is the unique information for generating the PID. Only the same seed code can generate the same PID. Therefore, please keep the seed code properly to avoid leaking or lost it.

you can input 4~32 bytes length data directly in the **Seed code box** and click **"Set PID"** button to set the PID , or use the **Import** button to import the seed code file data, and click the **Set PID** button used to complete the device PID setting.

2.1.3 File Management

Developer may set and store the PID, as identifier to execute the application, besides of saving PID in Moway device, Developer also may store the another two kind of file into the Moway 1: Data files and key files.

Data files includes two types: User Read-only files and User Read-Write files. Developers can create different types of data files to manage the file's read-write attributes in user-side.

The key file is unreadable and can only be used. Even the developer rights cannot be read to ensure the security of the key.

The function of the **File Management** Tab is to manage/operate the file inside of Moway 1 device, you may edit the data file via **File Management** tab or use the key file inside of Device to test and verify the cryptographic algorithm. As shown in Figure 2-2:

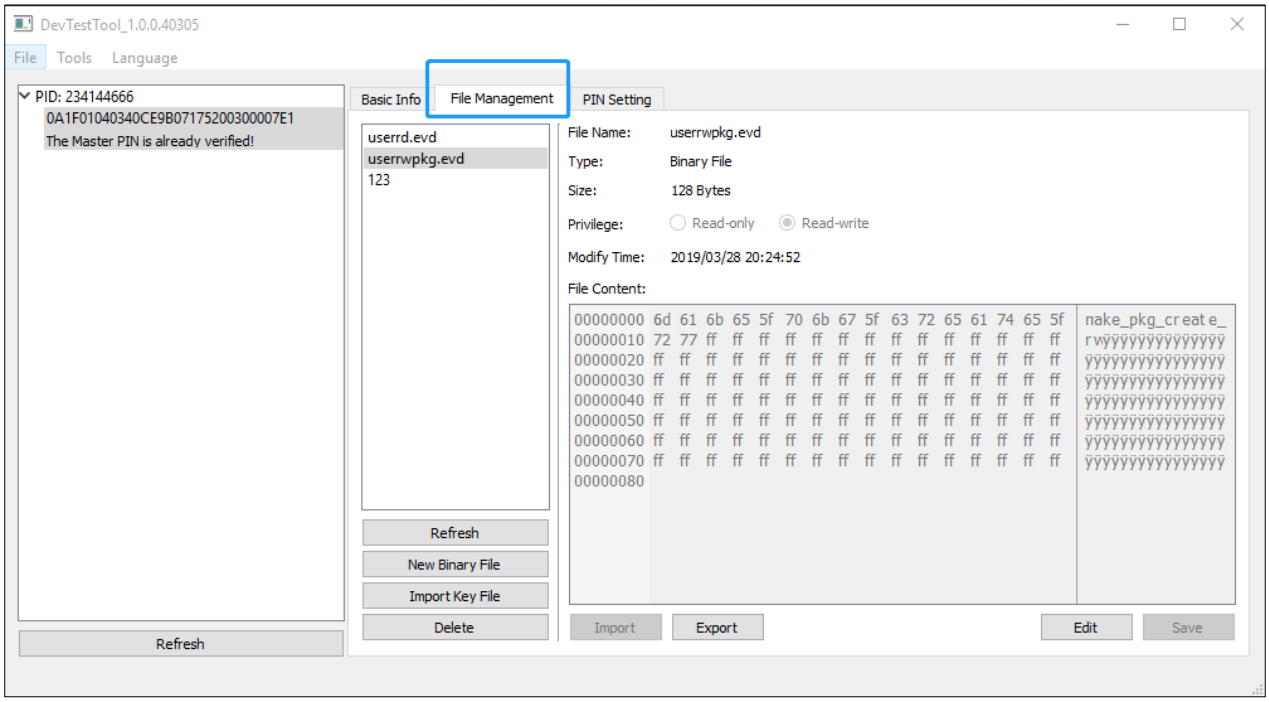


Figure 2-2

All the operation to this **File Management** tab require Developer Access Rights, so you need to verify the Master PIN (Developer PIN) on the **Basic Information** tab and obtain the Developer Rights before you can use the relevant management functions of this tab.

The files inside of device will be listed in the left panel of **File Management** Tab, when a file selected, the associated file attributes, information will be shown in the right panel: file name, type, size, create time; and other operation functional button: edit, import, export are also displayed on the right panel depending on different file type.

Some Operation Button are located under the bottom of **File Management** tab: you may refresh the file list, create a new file in the device (Moway 1 dongle), import the key file into the device or delete a selected file.

When the data file is selected on the left panel, the display is as shown in Figure 2-3. The file data content is displayed. The data file includes User read-only files and User read-write files according to different Access right. According to the selected data file access right and the currently operated device access right status, the data in the data edit box will display two status: editable or non-editable. If the developer right available, or the file is a user read/write right, the data in the data edit box can be modified. You can edit and save data into the inside of the device, or the edited data file can also be exported to a local computer.

Tips: you may edit the data in the edit box directly, and use ctrl+c and ctrl+v to copy and paste the data, or import external data.

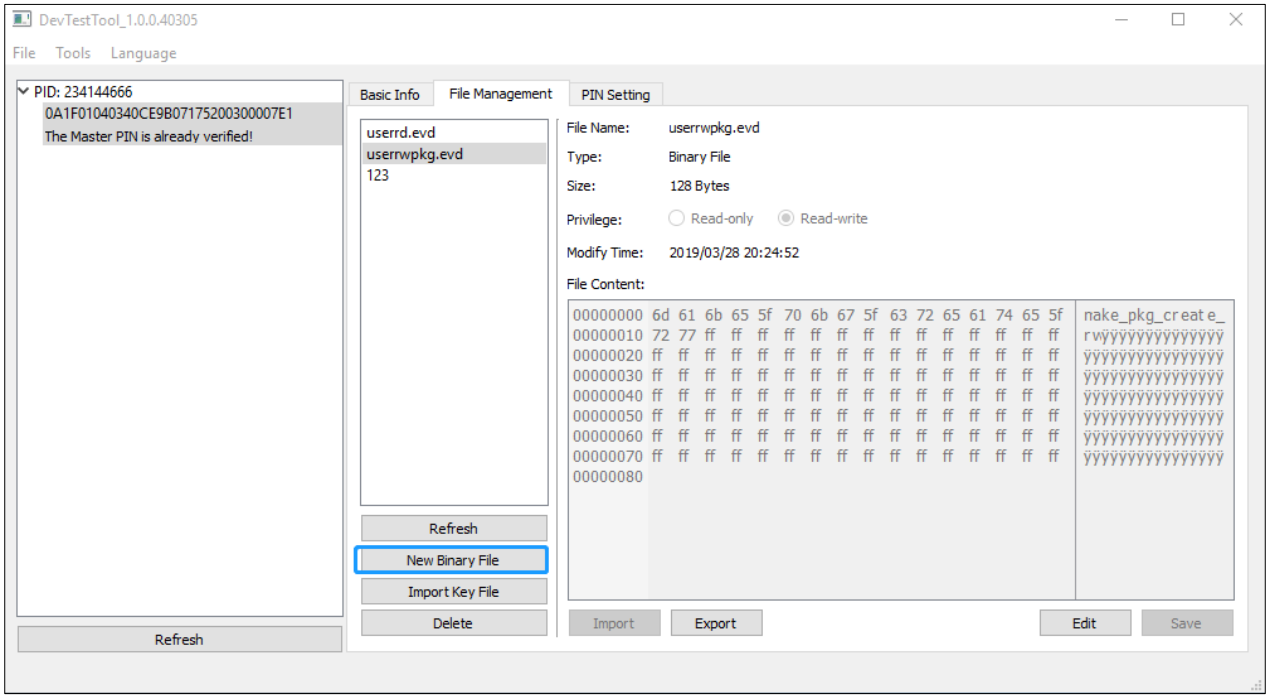


Figure 2-3

If you select the key file from left panel, as shown in Figure 2-4, then the "Key Test" button will displayed, click the "Key Test" button, entry the "Key Test" page, you can test the key file with following test: Signature/Verify Signature, Encryption/Decryption and HMAC Test. as shown in figure 2-5, 2-6, 2-7.

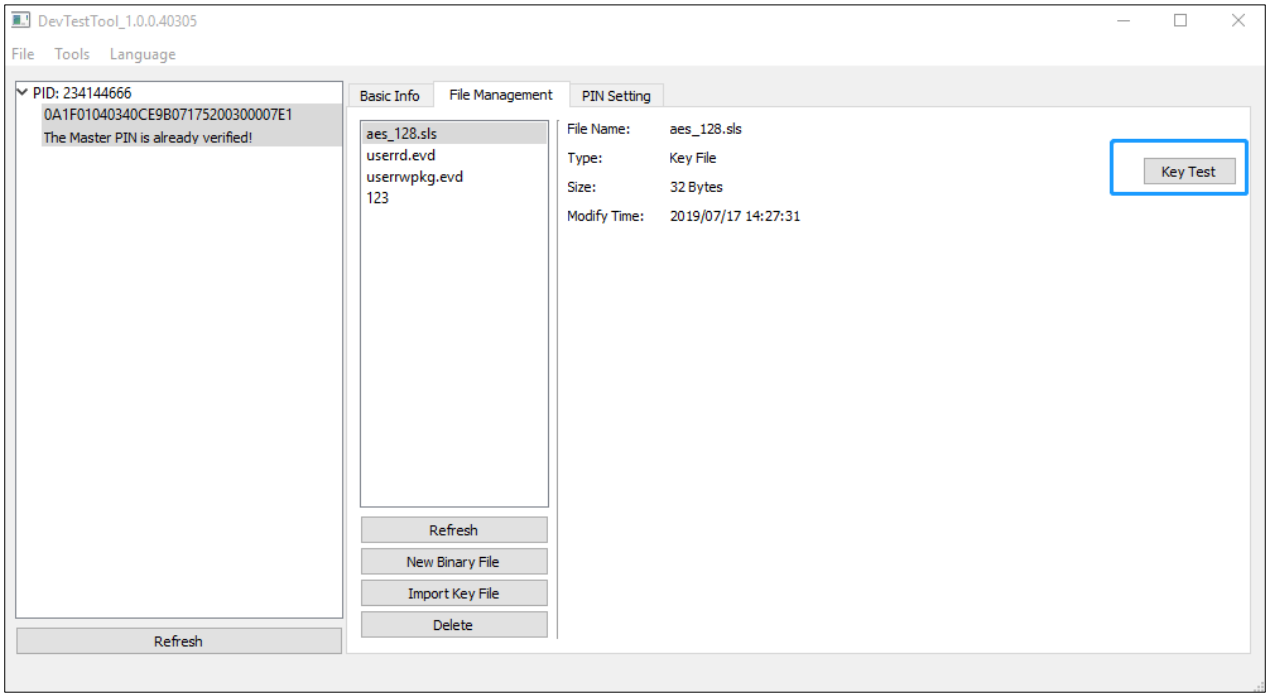
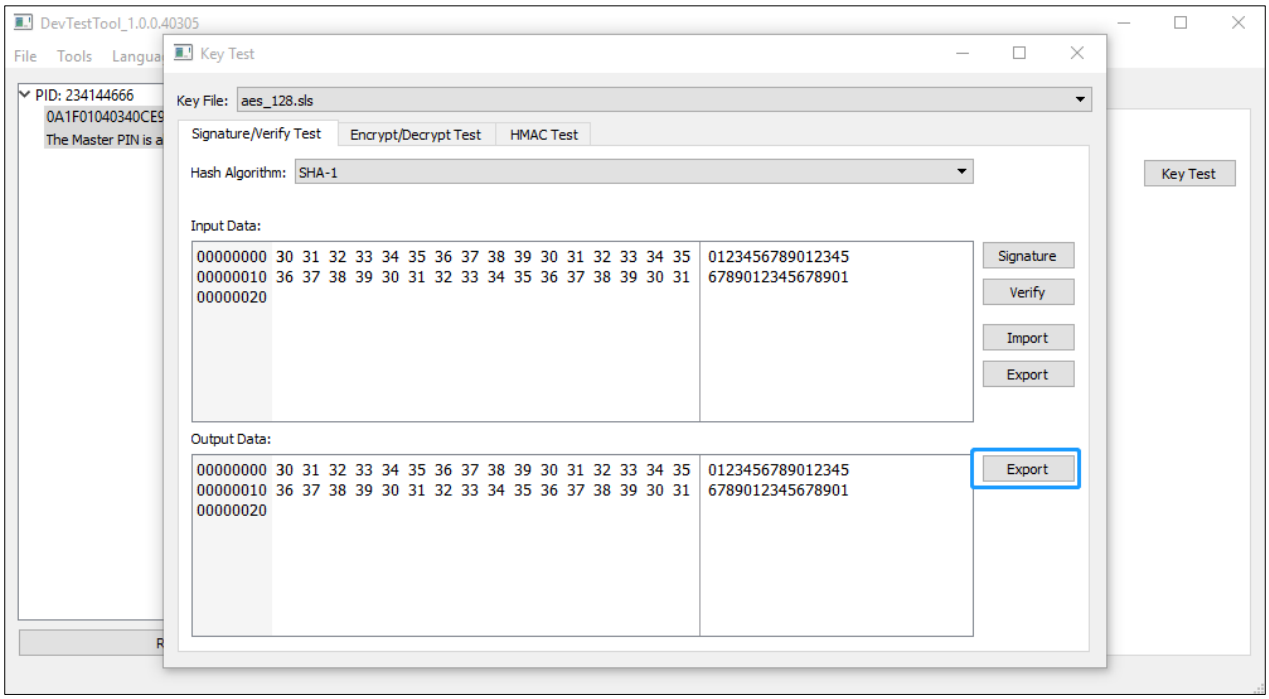


Figure 2-4



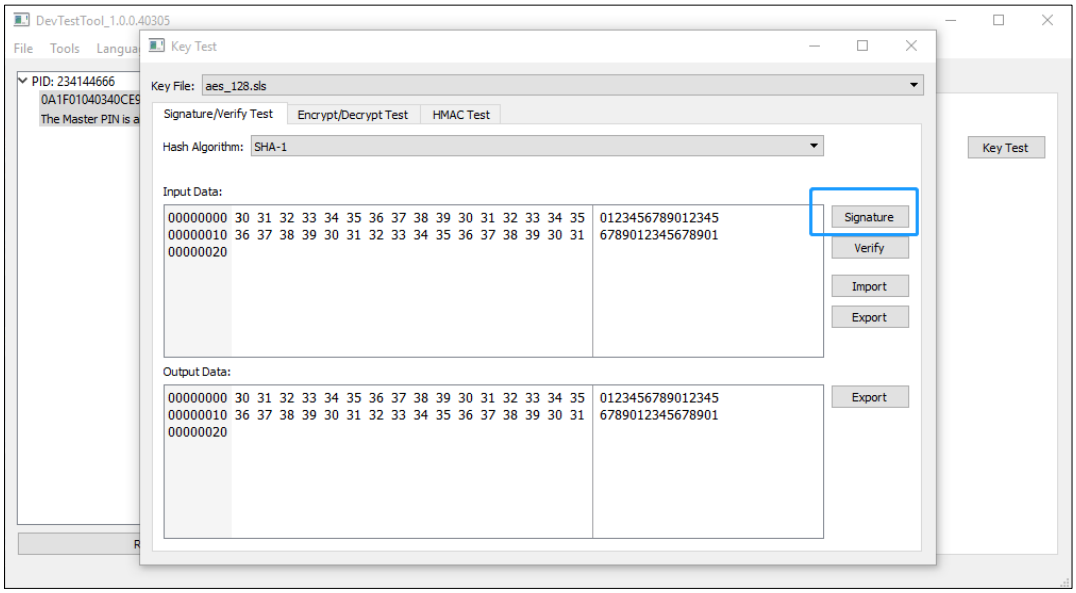


Figure 2-5

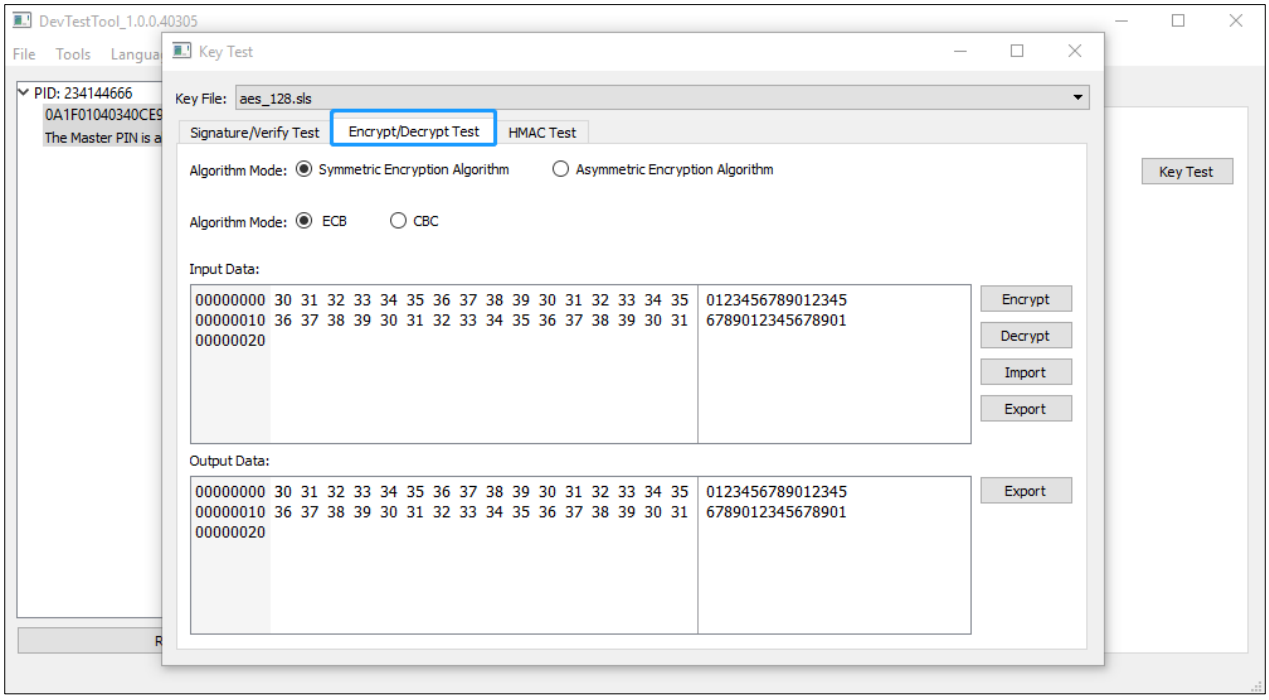


Figure 2-6

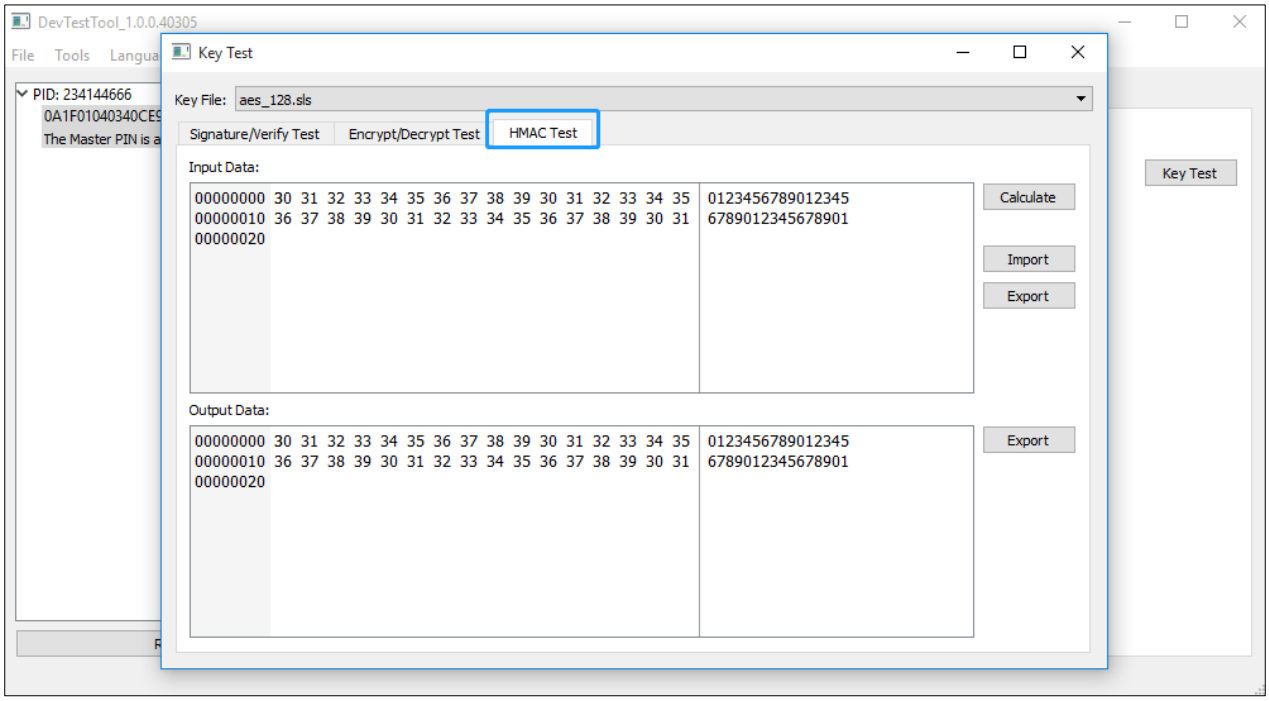


Figure 2-7

In the "Key Test" box, you can select the internal key file of the currently selected device in the Key File drop-down list to test the algorithm of the internal key file of the device. In the Signature/Verify test, encryption/decryption test, and HMAC test tabs, there are separate algorithm-related modes and parameter selections, data import boxes, and data export boxes, which can be easily and flexibly complete the test to each mode and data. In addition, the page also provides the import and export function of the data box, which can be used and tested with other tool programs.

2.1.4 PIN Setting

The function of **PIN Setting** is manage the Master PIN (Developer PIN) and User PIN which described in Chapter 1.4, Here we introduce how to set or modify Master PIN and User PIN, Operation details as shown in figure 2-8

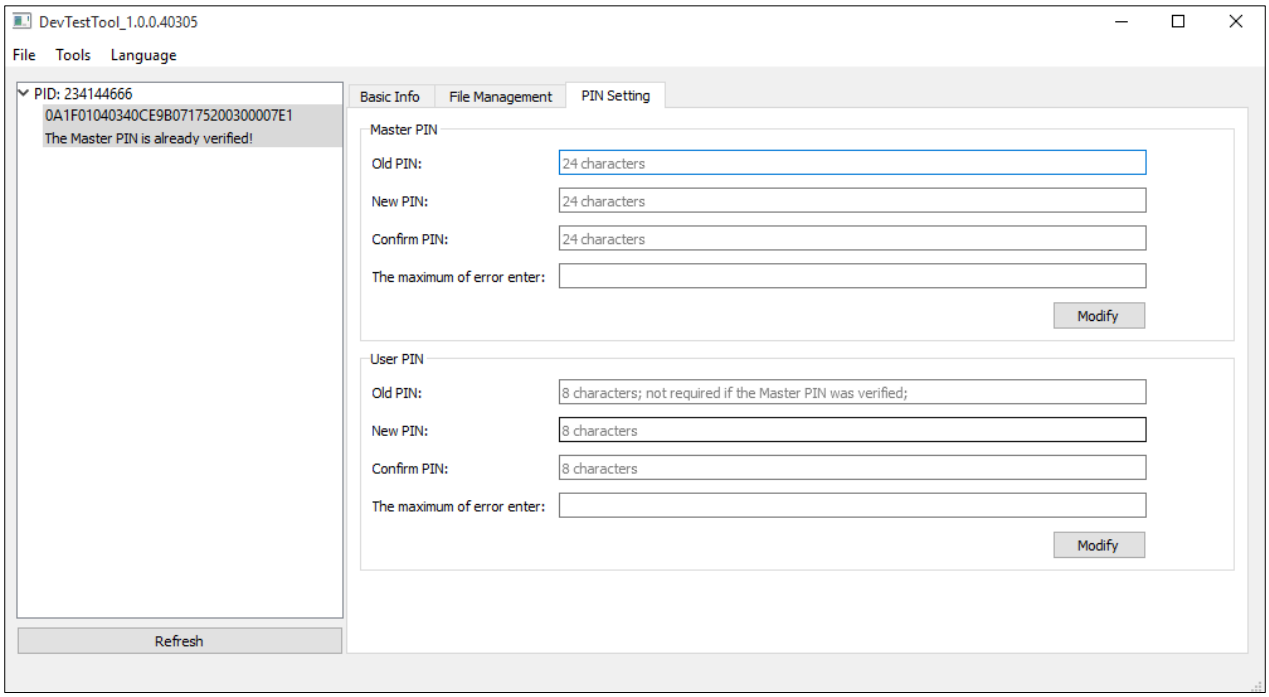


Figure 0-1

- Maximum Error enter Times to PIN code varies from 1~15, If you do not input it when modify the PIN, default will not to set the error attempt limit.

2.2 Volume Setting Tool (BatchTool.exe)

The Volume Setting Tool help the developer to setup the completed protection/encryption scheme into the Moway 1 device in volume for mass production of Moway. When developer complete your protection/encryption scheme in this Volume Setting Tool, developer use this protection scheme and setting in one Moway 1 dongle or setting to multiple dongles at same times. Developer also can save your protection/encryption scheme in the tool as a template for setting up in next times. Developer may import the template which has been saved before use, click the "Start Batch" Button in the bottom, and it is not necessary to redesign your encryption scheme again in the tool.

Double click the "BatchTool.exe" which located in the Tool directory to start the Volume Setting Tool, The GUI is shown in the figure 2-9, The left panel list all the dongle device hosted by local computer, the dongle device with red colors indicates that volume setting is not performed yet. To design and complete a new

encryption/protection scheme, developer need to verify the seed code first, which means, developer may either input the seed code or import the seed code file externally. Then click the "Generate PID Test" button to verify if the PID generated by the seed code is the product type for Volume Setting the Dongle for mass production. When PID verified, you may input the old and new PIN Code in the PIN code setting box, and also set the maximum error PIN code input times limitation. If you do not want to set the limitation, you can leave the box with empty. The encryption scheme file is set in the File setting tab, and the data file and the key file can be imported externally. The data file needs to be set with associated access right according to your encryption scheme, when data file is set. You will complete the encryption scheme, and then click "Start Batch" button in the bottom. The mass production can be started. When the production is completed, the red mark of the device in the left Device panel turns green, the mass production is successful, and the production count is updated.

There are two buttons to manage the template on the right top of tool: "Import Template File" and "Save as Template File", you may save current protection/encryption scheme as a template file or import a template from external and start Volume setting dongle for mass production quickly.

Attn: To Verify the seed code, the host Computer needs at least one device (Moway 1 Dongle) existed, used to verify the generate PID; For normal Moway 1, the factory default PIN setting is 24 bytes "0", so, for old PIN input, please use 24 bytes "0" to input. If it is volume setting in second time, the old PIN code needs to input the current master PIN code of the device;

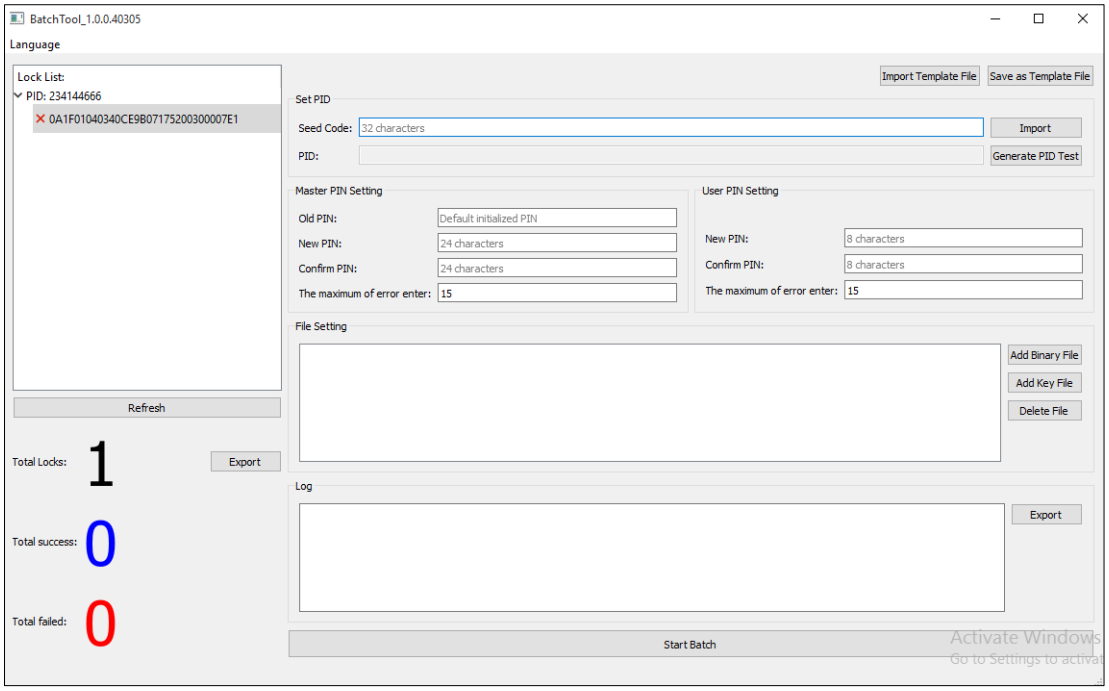


Figure 2-9

2.3 Cryptographic Algorithm Tool (CrytoTool.exe)

The Cryptographic Algorithm tool is a software-based tool. All functions are implemented by computer, and independent of the Moway USB device.

The main function of the cryptographic algorithm tool is to generate a key file and test the key file.

ATTN:

The Key file of Moway 1 has special key format, it must be generated by this Cryptographic Algorithm Tool;

Double-click "CryptoTool.exe" in the Tools sub-directory to start the Cryptography Algorithm tool, The GUI is shown in Figure 2-10. The tool menu has two functions: **File** and **Language**. You can select Chinese or English. The Algorithm tools includes 4 functional modules: Sign/Verify, Encryption/Decryption, HASH/HMAC, and random data, as shown in the left function selection panel.

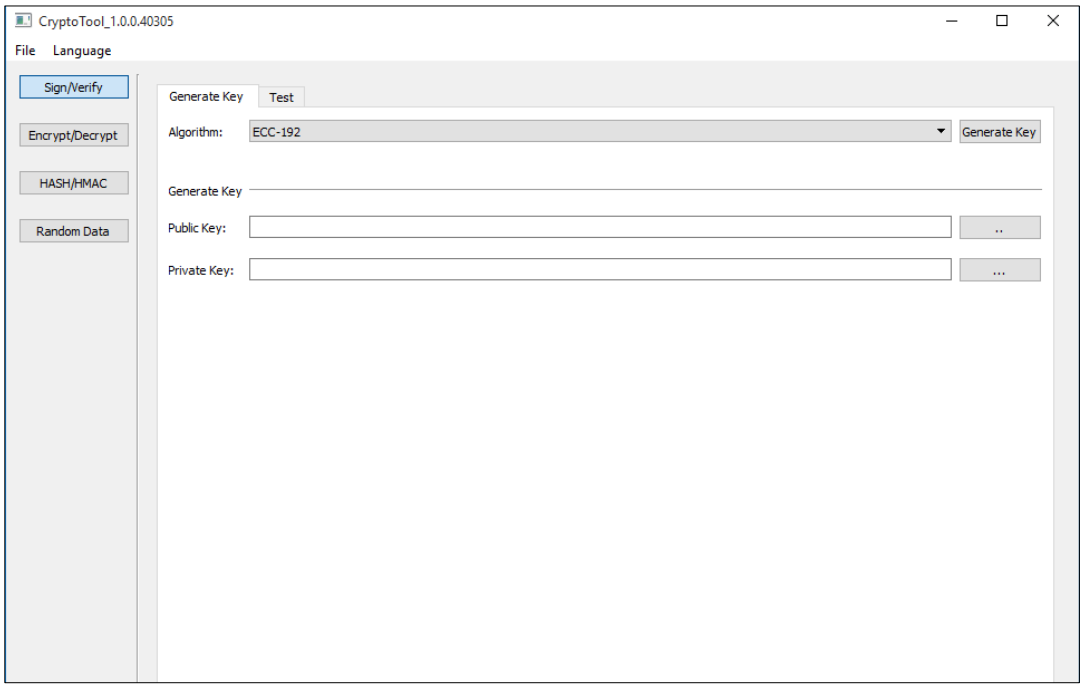


Figure 2-10

- Signature and Verify Signature

Select "Sign/Verify" button, then the right panel is shown in Figure 2-11. Select the type of algorithm for the key file to be generated in the drop-down menu. ECC-192, ECC-256, RSA-1024, and RSA-2048 are supported currently.

Click the "Generate Key" tab, you can select the directory of the key file to save, and then save the generated public and private key file to the specified directory.

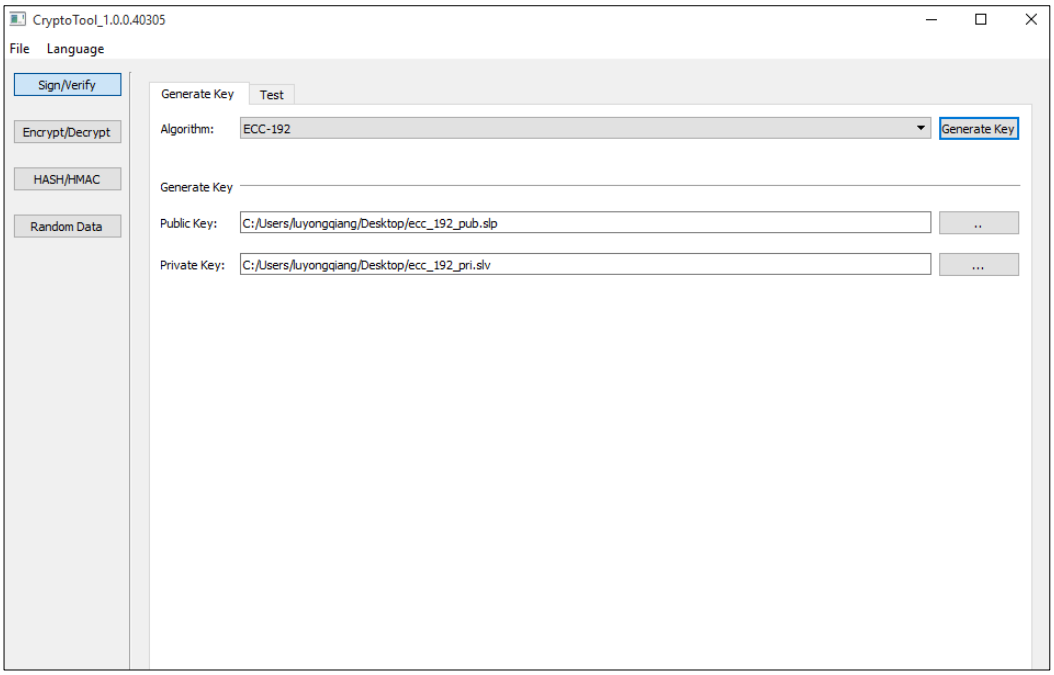


Figure 2-11

Select the "Test" tab on the right panel. As shown in Figure 2-12, the Public and Private key files generated by the "Generated Key" tab will be displayed. You can also re-select the key file to be verified, and then select the hash algorithm to be used for the signature. For convenient to operate, the "Signature" box data and the "Verify" box data can be directly edited or imported and exported, which makes the signature verification more convenient and flexible. When the data editing is completed, click the "Signature" or the "Verify" to complete the test, and the tool will prompt the test result.

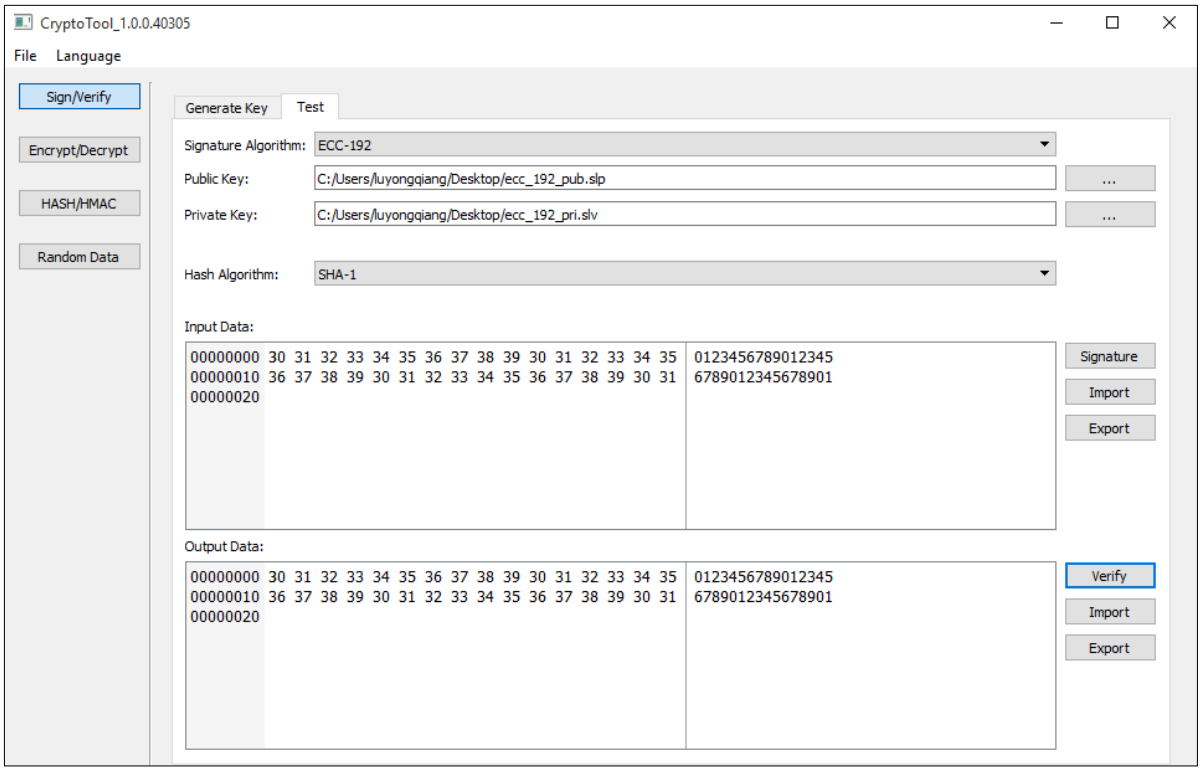


Figure 2-12

Attn: when you use the Cryptographic Algorithm tool to verify the key generated, please select the file which match with associated cryptographic algorithm, otherwise the test will failure and report with error of file type. You can use ctrl+c and ctrl+v to edit the Data Box which more convenient in practical.

- Encrypt/Decrypt

Click "Encrypt/Decrypt" button, The right panel is shown in Figure 2-13. Select the type of algorithm to be generated in the drop-down menu. Currently, ECC-192, ECC-256, RSA-1024, and RSA-2048 are supported.

Click the "Generate Key" button, you can select the directory of the key file to save, and then to save the generated key file to specified directory;

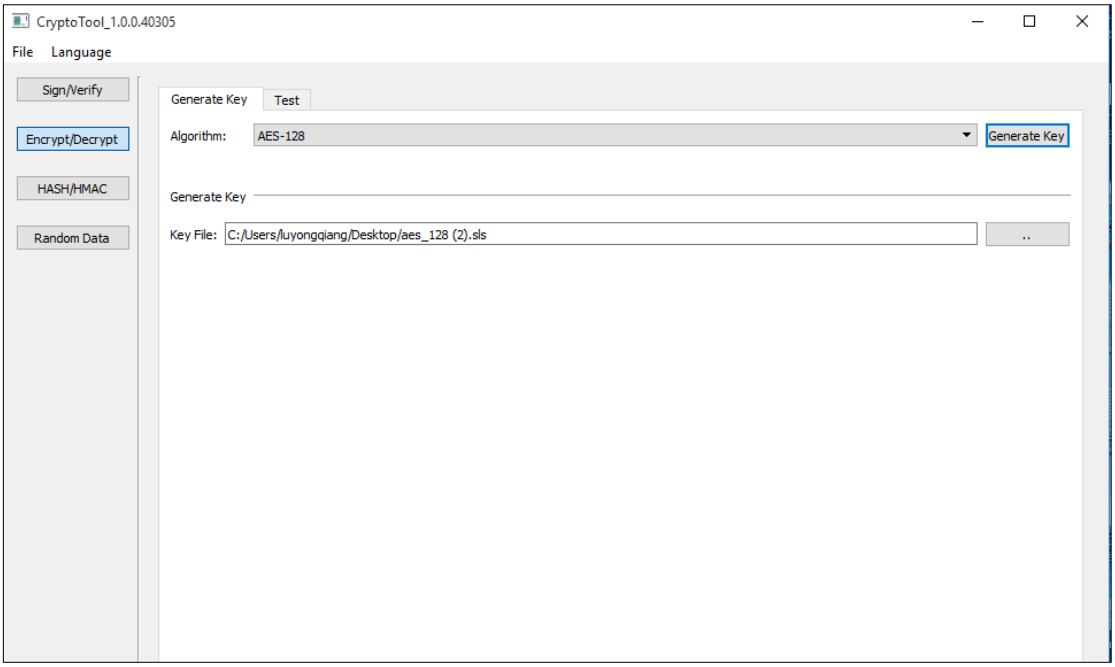


Figure 2-13

Select the "Test" tab on the right panel. As shown in Figure 2-13, the key files generated by the "Generated Key" tab will be displayed. You can also re-select the key file to be verified, and then select the encryption algorithm to be used. the mode selection option has different modes to be select according to the Encryption mode your selected. For convenient to operate, the "Encrypt" box and the "Decrypt" box can be directly edited or imported and exported, which makes the signature and verification more convenient and flexible. When the data editing is completed, click the "Encrypt" or the "Decrypt" to complete the test, and the tool will prompt the test result.

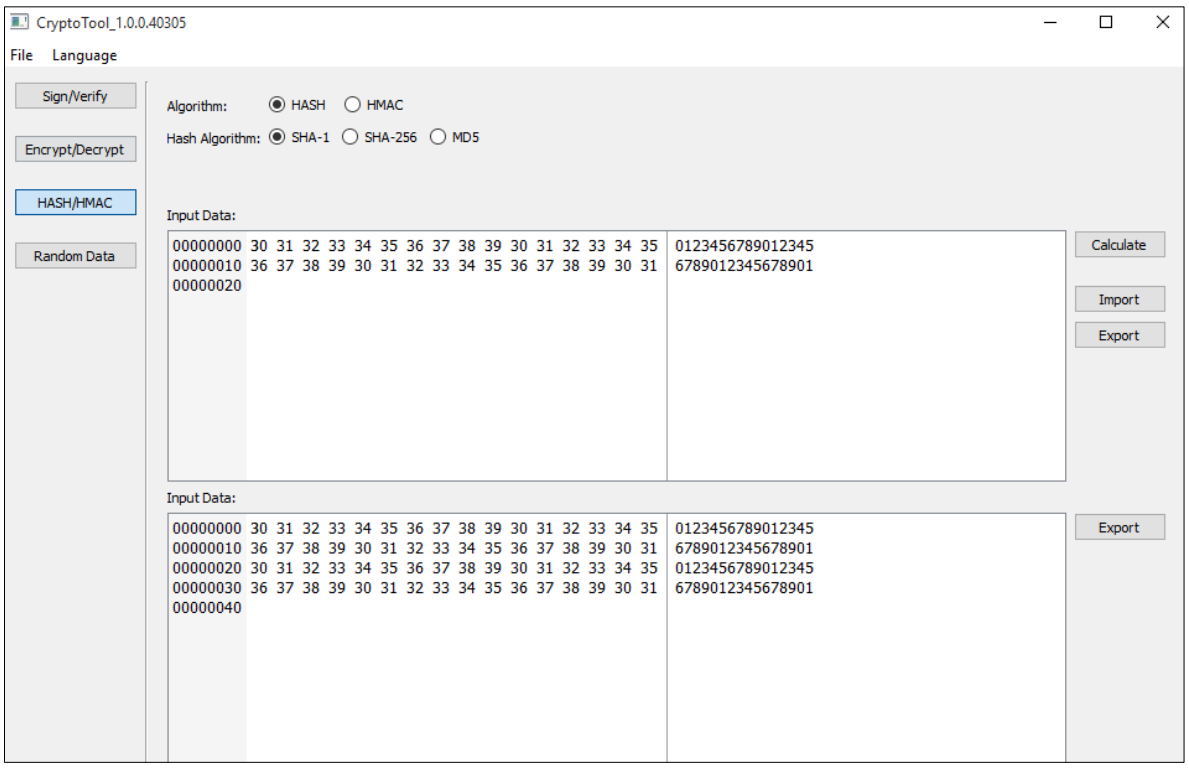


Figure 2-14

- HASH/HMAC

Click the "HASH/HMAC" button, the right panel is shown in Figure 2-14. Both HASH and HMAC algorithms support the hash algorithm SHA-1, SHA-256 and MD5.

When selecting the HASH algorithm, as shown in Figure 2, select the type of hash algorithm to be used. For the convenience of operation, the input data box can be directly edited or imported and exported. The output data can be directly exported. After editing the input data, Click the "Calculate" button to complete the calculation test of the algorithm.

When the HMAC algorithm is selected, as shown in Figure 2-15, select the type of hash algorithm to be used, and input the key length, click "Generate" Button to generate the HMAC key to the specified folder, or you may select the local HMAC key file to import. For easy operation. "Input Data" Box can be directly edit or import and export data. The "Output Data" box can be directly exported. After editing the input data, click the "Calculation" button to complete the HMAC calculation test, and the tool will prompt the calculation result;

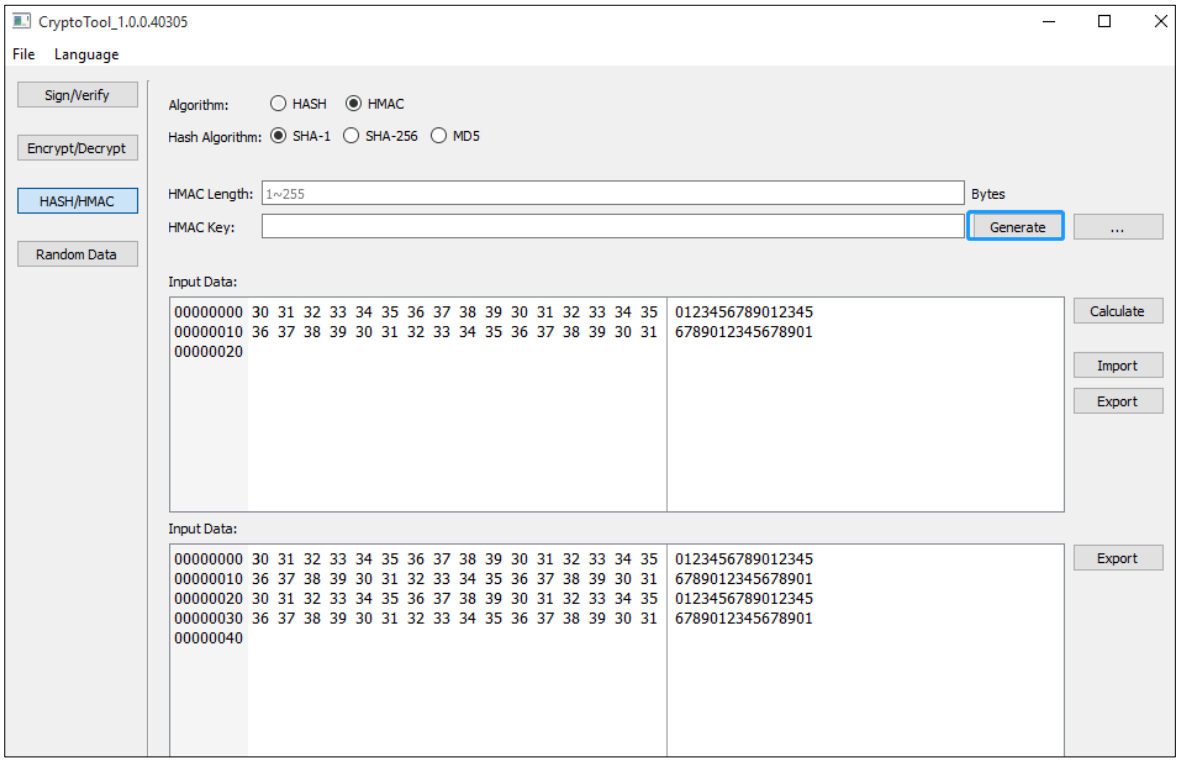


Figure 2-15

- Random Data

Software Developer may use this "Random Data" function to generate a random data with specified data length.

Random data may be used as the key, password, and challenge/response data. Click the Random Data Button, The Random Data panel is as shown in Figure 2-16. Fill in the Random data length in the "Data Length" box, then click the "Generate" button on the right. And generate the random data you specified length in the Data Panel. Random data can be exported and saved in local.

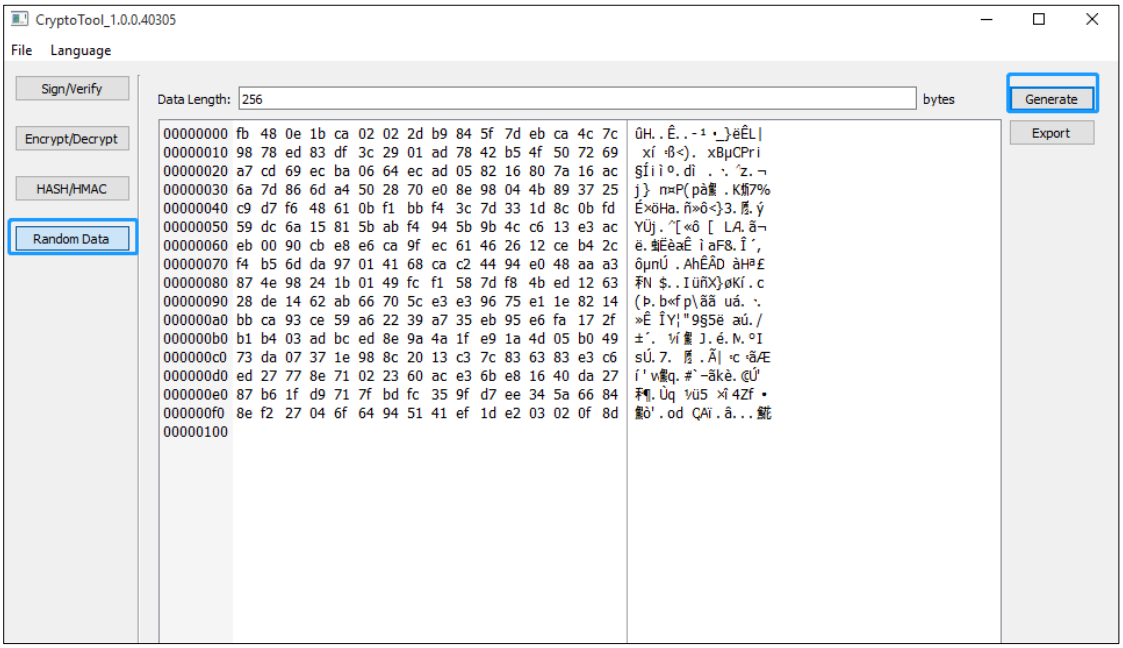


Figure 2-16

2.4 Virbox Protector: The Protection Tool

Virbox Protector for Moway 1

Virbox Protector (For Moway 1), is the latest enveloper tools for Software protection, and support developer to complete the protection more easily, quickly and without additional workload.

Virbox provides basic (free) version and professional (pro) version of Virbox Protector for Moway 1.
Virbox Protector (For Moway 1) free version can provide Compression, Import Table Protection, and Function Name Obfuscation to protect the application.
Developer can find the Virbox Protector free version in the Moway SDK.
Virbox Protector (For Moway 1) Professional version not only can protect the software with Compression, Import Table Protection, and Function Name Obfuscation but also integrated multi latest security technology to protect software functions, Algorithm, with Virtualization, Code Logic Obfuscation, Encrypt and decrypt the data and resources. With the Professional version of Virbox Protector, the protected application will capable to defend the third party attacker reverse engineering, decompiling behavior and also prevent the dynamic analysis for further repackaging and tampering.

The security level of Software protected by Virbox Protector will be top level without any coding competence requirement and workload for software developer.

You can contact Virbox team for which Virbox Protector version you want to use and get the related installation package and the corresponding user manual document.

Blow is the basic steps to set up the free version Virbox Protector.

Double click the "Virbox Portector.exe" which located in the "bin" of "shell" sub-directory of SDK directory to start Virbox Protector, then GUI shown as in Figure 2-17. Virbox Protector support PE and .Net format file currently.

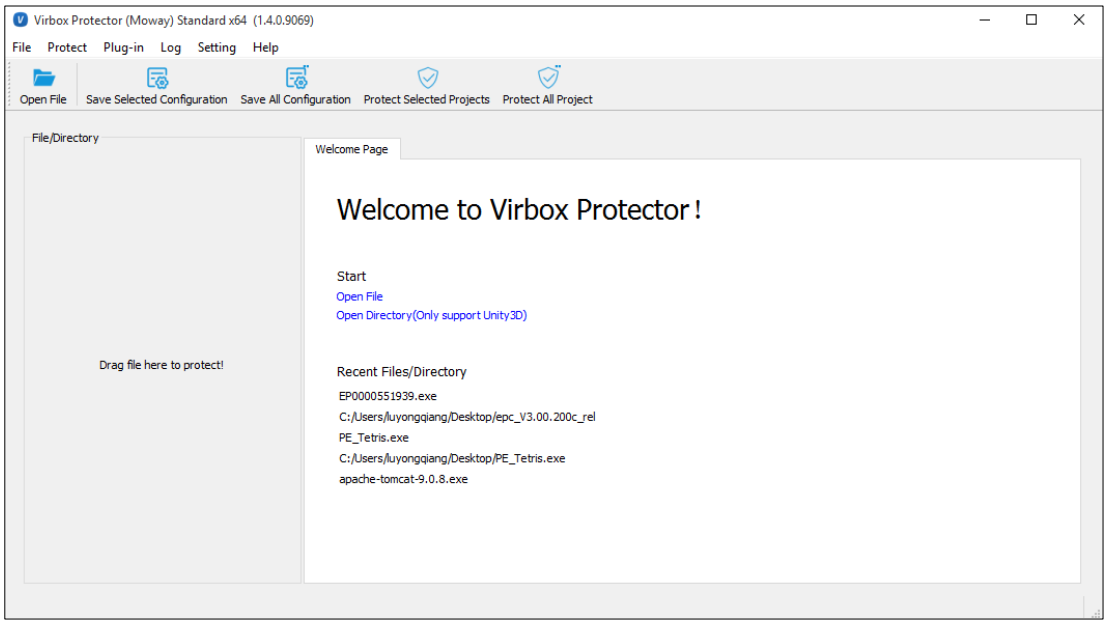


Figure 2-17

Select the file/program you want to protect, and open this program, shown as below figure 2-18

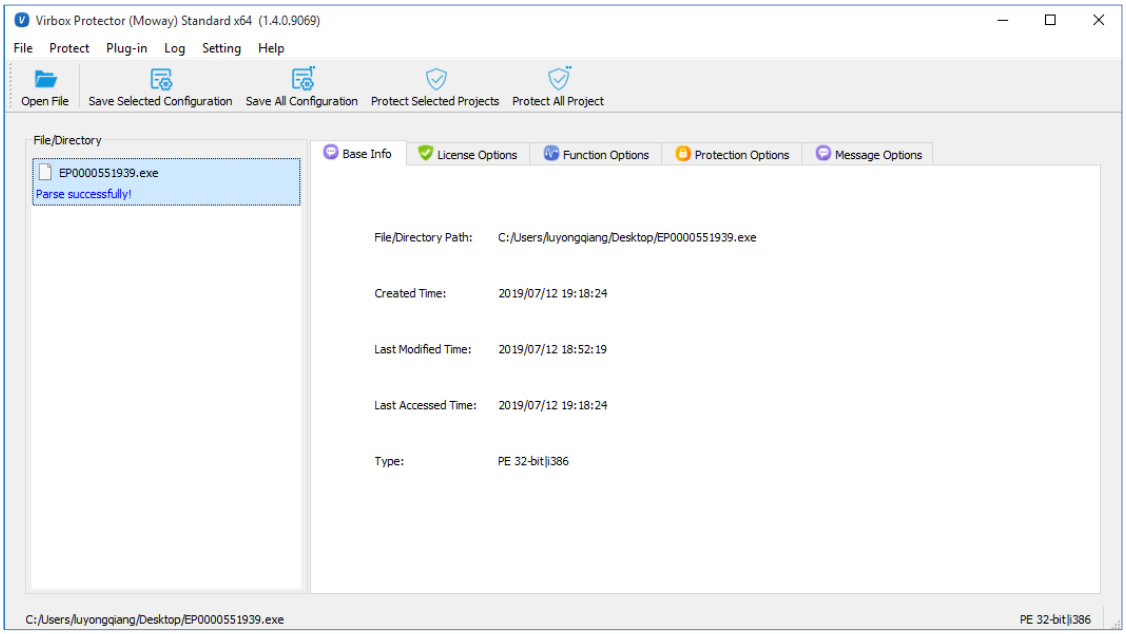


Figure 2-18

Select the "License Option" tab, input the **same PID** which Moway device has been set and the user PIN code. If you want to bind the software with specified Moway device, you need to fill in the SN number of chipset of Moway Device, click the “Protect Selected Item” button to complete the protection, as shown below.

Then when software user executed the protected application, the software will check if the Moway device with same PID available before execution.

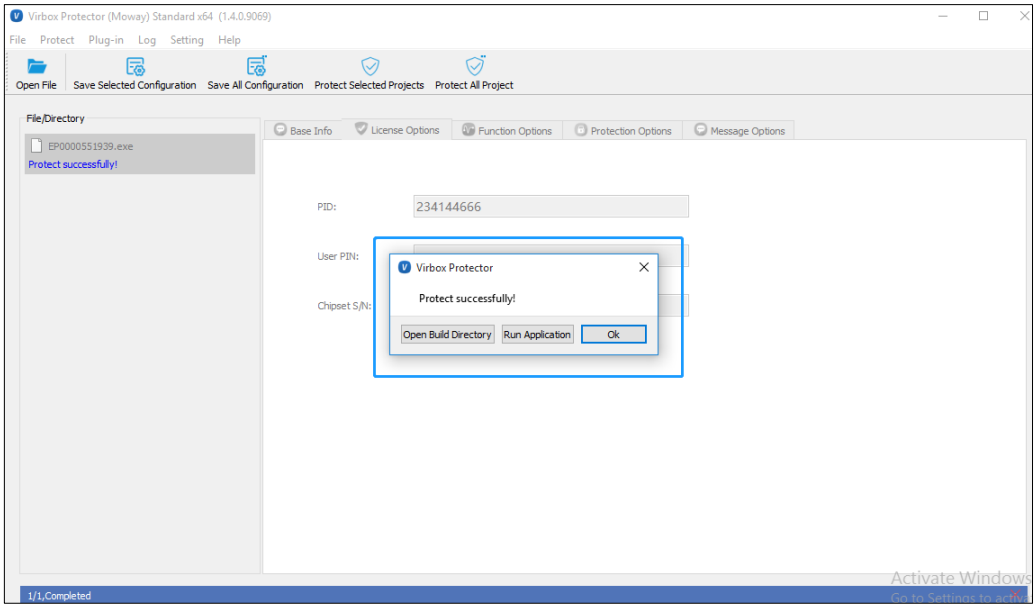


Figure 2-19

Developer also may select (add) function and set the protection to specific functions in “Function Option” tabs, to against cracker to decompile (static analysis tools) to critical function, algorithm or Intellectual property;

Developer may set protection option to protect the application in general in “Protection Option” tab, to against the dynamic attack/analysis by use of debug tool, other tools when application executed in runtime environment;

The above is the basic function of the Virbox Protector. Virbox Protector also supports more advanced protection functions. If you want to use these advance functions and protection options, please contact us: support@senselock.com

2.5 How to prepare a "License update" by use of MakePackageTool

Developer sometimes need to prepare a license update package to software user when license need to be update, Moway 1 provides a license update solution to software developer:

Developer use the “Make Package tools to create the license update package in developer premise: MakePackageTool.exe

Software user use the license update tools to import the update package into the Moway device in user premise:

UpdateTool.exe

Developer create the license update package:

Prerequisite:

1. Moway Master lock to create license update package;
2. MakePackageTool.exe

   With the Master lock and MakePackageTool, Moway support developer to create following license update package to remote user. To create the license update package to specified S/N or not specified S/N Moway device.

   1. Update PID
   2. Update License (data file)
   3. Update key

      Here we introduce how to use these 2 tools in developer and user premise respectively.

   Plug in the Moway Master lock in your machine, Double click the "MakePackageTool.exe" which located in the "tool" sub directory to start this license update package tool. The Tool GUI shown as in Figure 2-20.

The "Lock" tab shows the list of Master Lock hosted by local computer, select the master lock for which the PID

update package need to be created, and input the Developer PIN code to this master lock need to be update. If the update package is made for specified user lock (with S/N, then you need to click the "Set Lock S/N" check box and input the S/N of the dongle that need to be update.

The three function buttons ("Add Binary File", "Add Key File", "Delete File") on the right can edit the files in the device that need to be updated. After completing the settings, click "Start Make" Button on the bottom of panel, select the directory to be saved by the update package, and complete the update package.

Then, distribute this update package file to your software user.

Notes: To Make the Update Package which need to use the master lock, the normal user lock doesn't has access right to issue the license update package to other user lock. The master lock need to be initialized before issue the license update package then the master lock may issue license update package to the user lock which has same PID type with the master lock.

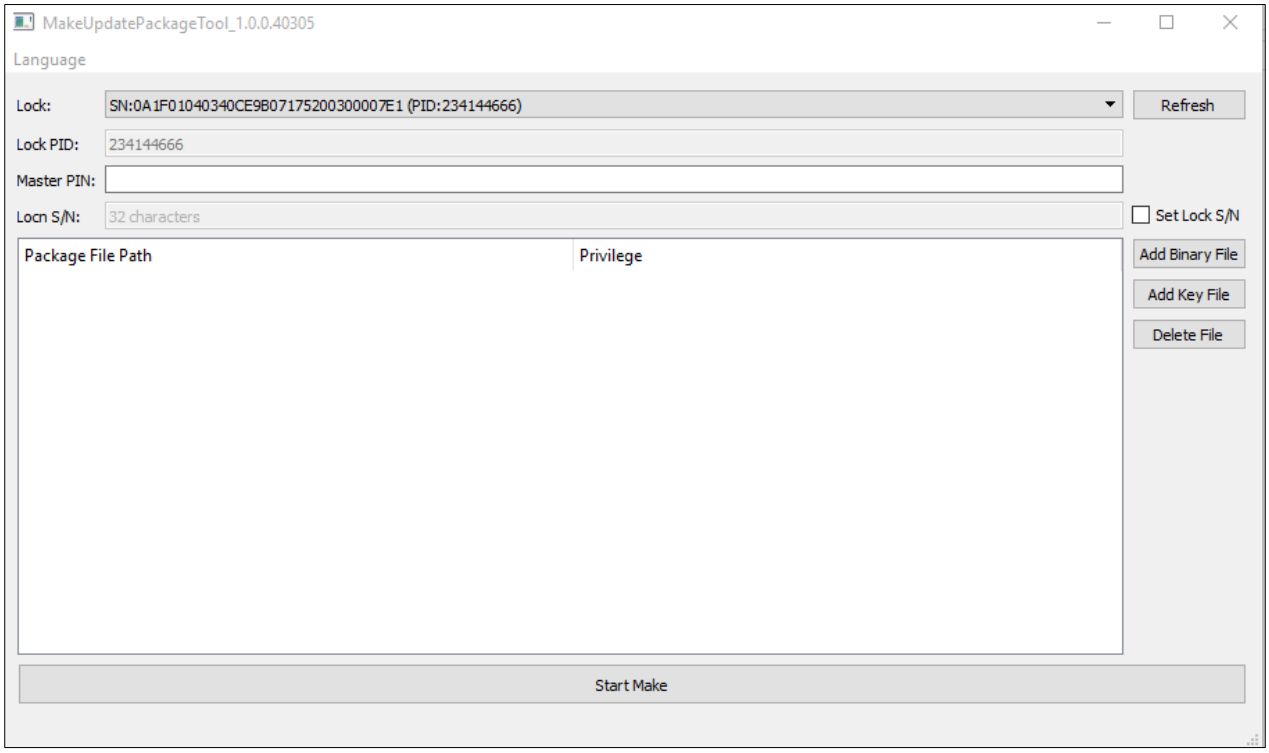


Figure 2-20

2.6 Import update package file to Moway device in software User premise

When software user got the update package file, Double Click the "UpdateTool.exe" which located in the "tools" sub directory of SDK to start this Update tool, the GUI interface show as below: Figrure-2-21

Select the lock (Moway 1 USB device) need to be update from the "Lock" tab, input User PIN code into the "User PIN" tab, then select the Update package from your machine, then click the "Update" button to complete update process.

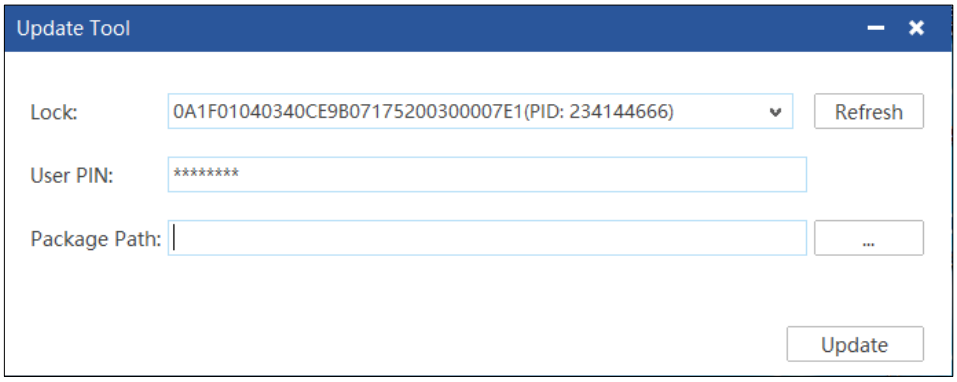


Figure 2-21

3 Basic Functions and Typical application of Moway 1

We have given brief introduction to Moway 1 feature, tools in Chapter 1 and 2. We will introduce the functions, and typical application to Moway 1 in detail in this chapter.

3.1 Use the Moway 1 to store the security data to protect application

Usually, the common way of using Moway 1 is use it as a secure data storage device. You can store the critical data or license file that needs to be used in software execution into Moway 1. When the application start execution, the application will check the Moway which inset into the machine, if the security data existed or not. If the data not available in the Moway device, the application cannot execute. For example, you can store the PID, or the license file or other data file in the Moway 1 device. Since the application needs to use this critical data (PID, License) in execution, without Moway 1, the application cannot be executed, so the software and Moway 1 are closely combined together. You can also use the Moway 1 file access and management mechanism to create readable and writable files and store as temporary data during the executing of the software. This also increases the binding of the software and Moway 1.

In practical project, you may follow below 3 steps to quickly complete the protection scheme:

1. You can use the tool (DevTestTool), to set & store the PID, or License file or other security data into Moway Device.
2. Use Virbox Protector to set the link (set the same PID which store the Moway in step 1) between the Moway USB dongle and applications and protect the application.
3. Execute the protected applications, The protected app will check if the Moway existed or not (Check if PID available in the Moway device) which accomplish the protection purpose.

3.2 Use the Moway 1 to store the cryptographic Algorithm & key to protect application

In addition to using Moway 1's storage function to protect the critical data (PID or License) which required when application execution, you can use the cryptographic algorithms to make the application more closely integrated with Moway 1 to increase the security of the protected software.

Moway 1 supports a variety of advanced standard cryptographic algorithms. The standard cryptographic algorithm is characterized in that security does not depend on the algorithm itself, but on the key used, without the key, there is no way to complete encryption/decryption process. The key, with form of file, saved inside the Moway 1. The smart card chipset in the Moway 1 ensures the security of the key storage. The key can only be used via secure API interface from external (application), so without a Moway 1 dongle, the cryptographic calculation of this key cannot be simulated.

The cryptographic algorithms currently supported by Moway 1 includes:

Symmetric algorithms: DES, TDES, AES128, AES256,

Asymmetric algorithms: RSA1024, RSA2048, ECC192, ECC256.

The cryptographic algorithm tool (CryptoTool.exec) can generate a key file of the specified algorithm, download the key into the Moway 1 dongle device, and use the key file through the API interface to implement data encryption, decryption and signature verification process. According to the difference of key file types, encryption and decryption can be divided into symmetric encryption/ decryption and asymmetric encryption/decryption. At present, asymmetric encryption and decryption only supports RSA algorithm. Signature verification can also be implemented by using asymmetric key files.

Basically, Developer may use the symmetric and asymmetric algorithm to design your own encryption/decryption scheme.

Use CrytoTool.exe to generate the related key and store key in the Moway 1 device.

Integrate related Moway Crypto API into your applications, to access the key store in the Moway device to complete encryption/decryption or Sign/sign verification process.

For details, you may refer the samples. Or contact with Virbox team.

3.3 Identity Authentication

Moway 1 supports HMAC-MD5, HMAC-SHA1, and HMAC-SHA256 symmetric algorithms, which can be used for authentication with "challenge-response" mode, to replace the traditional "username-password" way with more reliable identity authentication.

The authentication principle is: pre-store the key Kn in the Moway 1 device, the key cannot be read from the Moway 1, and can only be used, and also the security of the key stored in the Moway1 is guaranteed, the server sends a random number in authentication (challenge) to the client's Moway 1 device, and verify whether the calculation result (response) returned by the device is calculated by the key Kn. If the calculation result is correct, the client has the key Kn, because the key Kn was saved in the client's Moway 1 device and cannot be copied. In

this case, the client is considered to be the client corresponding to the key Kn. The implementation principle is shown in Figure 3-1.

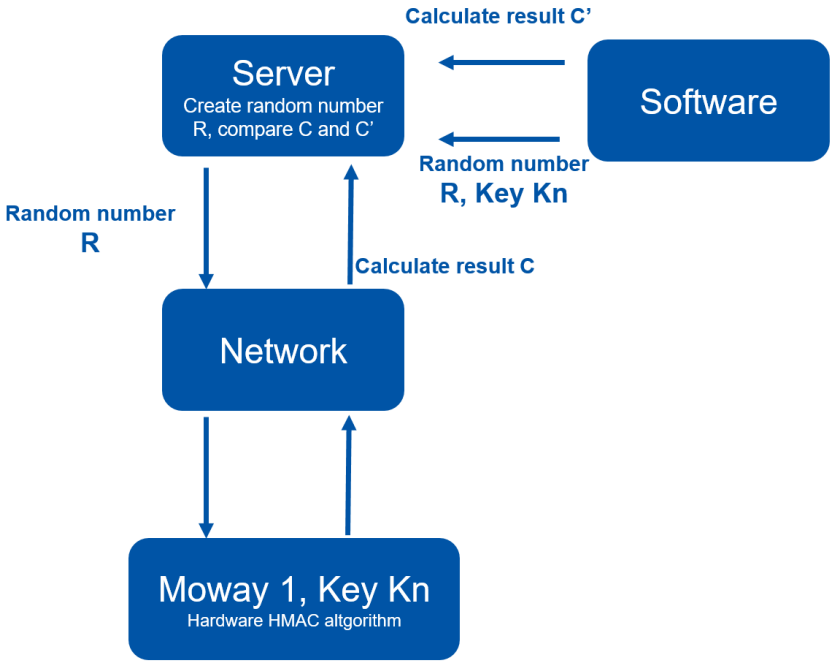


Figure 3-1

3.4 Virbox Protector

Virbox Protector, an easily used, high secured protection and wrap tool provides to software developer which helps developer to complete the software protection quickly and effortless workload. Even without coding effort involved in protection process.

Execute the Virbox Protector and input your PID, then you can protect the software with Virbox Protector, you can select and use some protection options (algorithm and logic) to integrate the Moway 1 and your software, after protection completed, the software will only be executed when plug in the Moway 1 with corresponding PID that you settings for protection.

3.5 Designing your comprehensive protection scheme

We have introduced to use different tools, cryptographic algorithms, protection option to protect your application in above chapters. if you want to implement the more secure protection scheme to your application

by use of Moway 1 solution and tools in practical project, you may flexible combine and integrate these Moway 1 tools, Moway API and refer the sample provided in the Moway SDK to design your dedicate protection scheme. Here is example to design a more secured protection scheme:

When you use Moway device to store the PID or other security data to protect your application, usually developer store the critical data with plain text into the Moway 1 device which may be obtained with illegal way to analysis the data structure and resulting in leakage of security information.

To enhance the security of data store in the device, you may design the comprehensive protection scheme to protect the critical data, the data can be encrypted by a key file stored inside of Moway 1 device, and then the encrypted data is saved to the inside of the device also. In the process of using, the data is decrypted by the key in the Moway 1 device for using plain text data. In this way, even if the data is obtained by illegal way, without the key decryption, the effective data information cannot be obtained, and the security of such data is guaranteed. If you are still worried about data security on the software side, you can use the Virbox Protector to protect the software, so that you can implement a more secured protection scheme to your software;

3.6 Integrate Moway API with your project

Developer may use the Moway 1 Volume Setting tool (BatchTool.exe) to set the moway 1 device in volume, and also may use API functions to complete the initialization of Moway 1 device. We will introduce the process of how to use Moway 1 API functions to access Moway 1 device in this chapter.

There are 2 access right can be set for software to access the Moway 1 device:

Developer access right which reserved for software developer;

User access right reserved for normal users.

Developer access right owned by software developer which is the access right used in software development and protection phase; To access the developer right, it is necessary to verify the Developer PIN code first. After the verification passed, you have the highest right to Moway 1. There are no restrictions on any operation of the dongle device.

The user access right is the right owned by software user. To access Moway 1 with user right, you need to verify the user PIN code first. After the verification passed, Operations with user right includes: operate the file with the operation right. Encrypt and decrypt data and update license packages.

The process to access the Moway 1 with developer right shown as figure 3-2

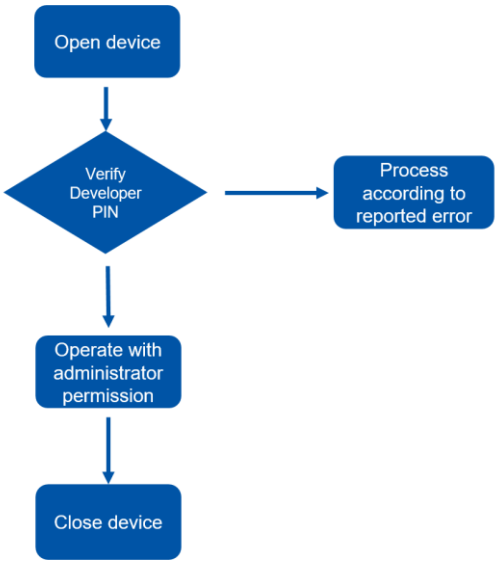


Figure 3-2

The process to access the Moway 1 with user right shown as figure 3-3

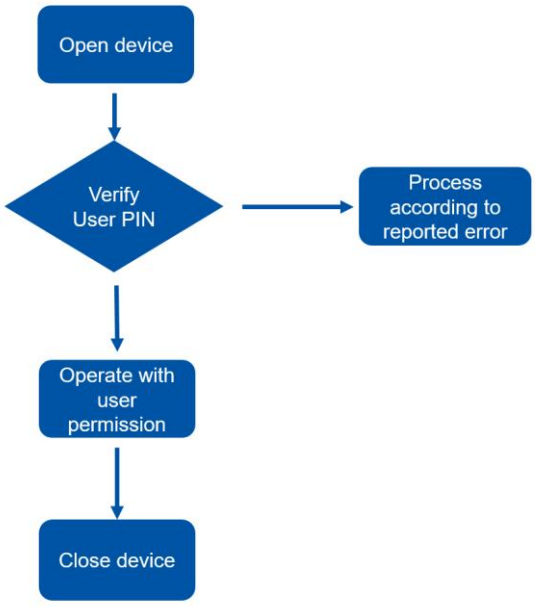


Figure 3-3

4 Moway API Function Summary

Overview

The Moway provides a serial API to developer to integrate with their project, includes 5 categories, according to API functions:

- Basic Operation,
- Initialization,
- File Operation,
- Cryptographic Algorithm
- Remote Update.

This document provides a summary of the basic uses of each API. For a detailed API interface description, for more details to each API, please refer to the API documentation:

Moway API reference manual & "mowayAPI.chm";

Moway Cryptographic API Manual;
You may also take a reference from API sample with different language in **Intallation path**\Moway\samples\api\. Includes: C, C#, Java & delphi

4.1 API for Basic Operations

Those API are basic functions to operate the device (Moway 1 dongle) and mainly use to open/close the Moway 1 device and obtain the device information.

- mw_enum

  Enumerate all the Moway 1 devices of the current computer

- mw_open

  Open the specified Moway 1 device;

- mw_close

  Close the specified Moway 1 device

- mw_verify_pin

  Verify the PIN code of Moway 1 and obtain the access right to operate device corresponding to the PIN code;

- mw_control

  Reset device status, control LED status On/Off

- mw_get_device_info

  Obtain basic info of Moway 1 device

- mw_get_device_status

  Obtain current Moway 1 device status;

- mw_error_help

  Use this API to get an analysis of the error when the calling API returns an error;

4.2 API for device Initialization

All Moway 1 device factory setting is on default setting before shipment, developer need to initialize it before you can use it. Initialization mainly to modify the default PIN and set the device ID.

- mw_change_Pin

  Modify the Moway 1 device PIN code;

- mw_set_pid

  Set device PID

4.3 API for File Operation

Use these kind of API to operate the file stored inside of Moway 1 Device (dongle)

- mw_enum_file

  Enumerate all file stored inside of the current Moway 1;

- mw_create_file

  Create a file inside of Moway 1;

- mw_read_file

  Read the data of the specified file inside the Moway 1;

- mw_write_file

  Write data to the specified file inside of Moway 1;

- mw_delete_file

  Delete the specified file inside of Moway 1;

- mw_get_file_property

  Obtain the specified file attribute inside of Moway 1;

4.4 API for Cryptographic and Algorithm

- Use these cryptographic algorithm API, to complete the cryptographic operation by using key file stored inside of the Moway 1.

  mw_sym_encrypt

  Encryption operation by using a symmetric key stored inside Moway 1;

- mw_sym_decrypt

  Decryption operation by using a symmetric key stored inside Moway 1;

- mw_rsa_encrypt

  Encryption operation by using a RSA key stored inside Moway 1;

- mw_rsa_decrypt

  Decryption operation by using a RSA key stored inside Moway 1;

- mw_signature

  Signature operation by using an asymmetric key stored inside Moway 1;

- mw_verify_sign

  Signature verification operation by using an asymmetric key stored inside Moway 1;

- mw_hmac_calc

  HMAC operation by using HMAC key stored inside of Moway 1;

4.5 API for Remote update

- Developer use these API to create the remote update package and update the file inside of Moway 1 remotely

- mw_make_update_pkg

  The developer uses the master lock to create the remote update package, and later the software user uses the update package to update the user lock remotely.

- mw_update

  The user updates the Moway 1dongle by using this remote update package;

  Developer may have more detail information for how to use Moway API and integrate with project from the Document: Moway API reference.

Appendix I: Technical Parameter

A. Program Language Support:

C、C#、Java、Delphi etc.

B. Operation System Support

Windows 2000 or above

Linux (32 bit, 64 bit)

MAC (32 bit, 64 bit)

C. Technical Specification

Item	Description	Note
Working voltage	DC 4.5 ~ 5.5V	/
Maximal power consumption	150mW	/
Working temperature	-10 ~ 70℃	/
Data storage time	10 years	Typical value
Erase/Write cycle	100000	Typical value
Device Interface	USB 2.0 full speed	Full speed device, compliance with HID

Appendix II: End-User License Agreement

End-User License Agreement ("Agreement")

IMPORTANT: Please read the terms and conditions of Virbox Software Application set out below carefully before installation, and use the Virbox Software Application.

Welcome to use Virbox Software, this End-User License Agreement ("Agreement") is a legal contract between you (either (a) an individual user or (b) a business entity ("you") and Licensor (as designated below) for the Virbox software, including any associated materials (the "Software").

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Your upgrade to "Standard Developer" in Virbox LM or:

Your payment of the Virbox Software License fee and acceptance of terms and conditions of this agreement or:

Your registration in Virbox User Center:

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2. You fail to comply with the terms of the agreements, rules, notices and other related regulations of Virbox's

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3. Other conditions that Virbox finds that you have violated any of the terms of this Agreement

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You agree to release, indemnify, defend and hold harmless Virbox and any of its employees, shareholders, affiliates and assigns from all liabilities, claims, damages, costs and expenses, including reasonable attorney's fees and expenses, of third parties relating to or arising out of (a) your entering into this Agreement, or your breach of the terms or obligations of this Agreement, (b) your use or misuse of the Software or the use or misuse of the Software by a third Party under your control, or (c) your infringement upon any intellectual property or other proprietary right of any person or entity. Virbox may, at its own expense, assume the exclusive defense and control of any matter otherwise subject to indemnification by you, but its doing so shall not excuse your indemnity obligations in this EULA. The terms of this paragraph will survive any termination or cancellation of this Agreement.

Article 14 Applicable Law

This agreement shall be governed by the laws of Singapore. Without regard to its conflict of laws principles.

Article 15 Force majeure

Both parties shall acknowledge that this is a force majeure event if it is due to a hacker attack or government control or paralysis of the network communication and so on. Both parties should decide whether to cancel this Agreement or waive part of the obligations of this Agreement or delay the Agreement according to the degree of influence.

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