rf IDEAS

Remote Reader Management
CLI User Manual

Trust begins here. ™

Table of Contents

Glossary of Terms

TERMS	DEFINITIONS
RRM	Remote Reader Management.
CLI	Command Line Interface.
WAVE ID	The rf IDEAS brand name given to all 125 kHz proximity and 13.56 MHz contactless smart card readers.
SDK	Software Developer's Kit. Software Developer's Kits from rf IDEAS provide the high level command capabilities to integrate software applications with our readers.

Information Symbols

SYMBOL	MEANING	DEFINITION
	Note	Notes are useful information related to the text.
	Tip	Tips can provide hints and pointers in addition to the text.
	Important	Important information can include prerequisites, limitations, and caution.

Overview

Remote Reader Management CLI

The purpose of the Remote Reader Management (RRM) CLI is to remotely load secure HWG+ configuration files, secure Blob *INI configuration files, and secure BLE HWG+ files individually.

Below is a brief description of different type of files that can be loaded using the RRM CLI.

- **Secure HWG+ File:** A secure HWG+ file contains all the configuration settings of the reader and an iEndOfHwgFile token which will be unique for that file. The token will validate if the secure HWG+ file has been compromised while loading it.

- **Secure BLE HWG+ File:** A secure BLE HWG+ file contains BLE configuration settings of the Mobile Reader and an iEndOfHwgFile token which will be unique for that file. The token will validate if the secure BLE HWG+ file has been compromised while loading it.

- **Secure Blob *INI File:** A secure Blob * INI file contains all the configuration settings (configured using the rf IDEAS Smart Card Manager utility) for Legic, MIFARE Secure and other smartcard readers, and an iEndOfiniFile token which will be unique for that file. The token will validate if the secure Blob *INI file has been compromised while loading it.

Supported Platforms

The following operating systems and chip architectures are supported:

1. Windows 10 and above (64 Bit)
2. Ubuntu 20 and above (64 Bit)
3. Mac OS Monterey and Above (Intel/M1/M2 based)
4. Raspberry Pi (Arm 64 bit)

Supported Examples

Supported examples for languages like .NET, Python, Perl, Bat and Bash are provided with the RRM CLI.

Set-up of RRM CLI

Installation for Windows platform

Please follow the below instructions to extract the package:
1. Download and extract the RRM_Tool package.
2. Open Command Prompt by giving "cmd" in the address bar from the location where it is stored and run the application (RRMTool_CLI.exe).

Installation for Mac Platform

Please follow the below instructions to extract the package:
1. Download and extract the RRM_Tool package.
2. Go to the location in the system where the application (RRMTool_CLI) is stored and open the Terminal.
3. Now run the command export DYLD_LIBRARY_PATH=./

Installation for Linux Platform

Please follow the below instructions to extract the package:
1. Download and extract the RRM_Tool package.
2. Go to the location in the system where the application (RRMTool_CLI) is stored and open the Terminal.
3. Now run the command export LD_LIBRARY_PATH=./

Permission Required on Linux Platform:

Whenever rf IDEAS readers are connected to a Linux machine, users have to give the appropriate permissions to readers to communicate with them. However, when giving permissions manually, even though it is not a hard task, the user has to connect and disconnect various readers frequently, and quickly becomes a burdening task. To improve this situation, there is onetime setup approach to give permission to all readers. After performing this process the user will never have to give permissions to any rf IDEAS reader (devices with VID: 0c27) on that Linux machine. This step requires creating a rules on Linux systems (works with any Linux based machines like Raspberry Pi machines too).

Please follow below steps:

1. Open the terminal: First Step is to install libudev1 using below command:
   apt-get install libudev1

2. Now depending on the system architecture move to appropriate directory using below command:

(for 64-bit)
cd /lib/x86_64-linux-gnu/

(for 32-bit)
cd /lib/i386-linux-gnu/

3. Then create a softlink by using this command:
    ln -s libudev.so.1 libudev.so.0

4. Now, Run the below command to create rules for rf IDEAS Reader:
    sudo vi /etc/udev/rules.d/rfideas.rules

5. Type the following lines in the rfideas.rules file and save it.
    KERNEL=="hidraw*", ATTRS{idVendor}=="0c27", MODE="0666"
    KERNEL=="hidraw*", ATTRS{idVendor}=="0c27", ATTRS{idProduct}=="3bfa", MODE="0666"
    SUBSYSTEM=="tty", ATTRS{idVendor}=="0c27", MODE="0666"
    SUBSYSTEM=="tty", ATTRS{idVendor}=="0c27", ATTRS{idProduct}=="3bfa", MODE="0666"
    SUBSYSTEM=="tty*", ATTRS{idVendor}=="0403", ATTRS{idProduct}=="6001", MODE="0666"
    SUBSYSTEM=="tty*", ATTRS{idVendor}=="067b", ATTRS{idProduct}=="2303", MODE="0666"

6. After typing this, press 'Esc' key and type ':wq' then press 'Enter' to save the rules.

7. Type the following command to activate the newly created rules for RFIDeas devices:

    sudo udevadm trigger

    After following the above steps, whenever an rf IDEAS reader is connected, it will have the appropriate permissions to communicate with the operating system.

Supported Readers List

The RRM CLI supports all readers with WNC or LNC firmware, as well as these specific low band single configuration reader models: RDR-6012AKU-v2, RDR-6012AKU and RDR-6082AKU.

Commands

Generic Commands

The RRM CLI has some generic commands which can be executed irrespective of any functionality.

-help

The '-help' can be used to see what all commands are implemented in the application.

```
E:\RFIDEAS\remote-reader-management-tool\build\src\Release>RRMTool_CLI.exe -help

        -version    : Display Version of the Application
        -about      : Display Information of the Connected Reader
        -reset      : Reset Reader to factory defaults
        -help       : Display Help Menu of the Application

        -s -displayhwg                          : Display a SecureHwg file
        -s -savehwg -f [FileLocation]           : Save a SecureHwg file
        -s -loadhwg -f [FileLocation]           : Load a SecureHwg file
        -s -loadblehwg -f [FileLocation]        : Load a Ble SecureHwg file
        -i -loadini -f [FileLocation]           : Load a Ini file
```

Help Command

-about

Shows the information of the connected reader to the RRM CLI.

```
C:\Users\ankush.tank\Downloads\RRM_Tool_WIN_v2.1.0\RRM_Tool_exe>RRMTool_CLI.exe -about

About Information:-
Part-Number             :- RDR-80Mx1AxU
SDK-Version             :- 7.7.2
Firmware Filename       :- LNC220200UPX7M0
USB-Firmware            :- 2.2.2.0
Maximum Configuration:- 4
CPU0-Application        :- 2.2.2.0 13047
CPU0-Boot Loader        :- 0.1.5.1
CPU0-RF Modem           :- 0.1.5.0
CPU1-Application        :- 0.2.5.0
CPU1-Boot Loader        :- 0.1.4.7
Full Firmware Version:- 22.02.0-13047
Vendor Name             :- 0C27:3BFA RF IDeas
ESN                     :- BD908D0C11EAC75F985A88880CB4AEF8
LUID                    :- 0/0x0000
```

About Command

-version

Shows the version of RRM CLI.

```
C:\Users\ankush.tank\Downloads\RRM_Tool_WIN_v2.1.0\RRM_Tool_exe>RRMTool_CLI.exe -version

RRM Tool Version :- 2.1.0
```

Version Command

-reset

Reset a reader back to the factory defaults.

```
D:\RRM_Tool_v1.0.6\RRM_Tool_exe>RRMTool_CLI.exe -reset
[2023-07-15 23:52:12.025] [info] Your operation is successfully executed

D:\RRM_Tool_v1.0.6\RRM_Tool_exe>
```

Reset Command

Error message if the reader is not reset.

```
D:\RRM_Tool_v1.0.6\RRM_Tool_exe>RRMTool_CLI.exe -reset

[2023-07-15 23:59:25.540] [error] 7:- Unable to reset Reader. Please try again.

Please use -help command for help menu or contact rf IDEAS tech support for more information...
D:\RRM_Tool_v1.0.6\RRM_Tool_exe>
```

Unable to Reset

Error Message for Reader Not Connected

If the reader is not connected properly, it will throw the below error.

```
D:\RFID\Development Task\remote-reader-management-tool\build\src\Debug>RRMTool_CLI.exe -about

[2023-06-28 11:30:59.163] [error] 2:- Reader Not Connected

Please use -help command for help menu or contact rf IDEAS tech support for more information...

D:\RFID\Development Task\remote-reader-management-tool\build\src\Debug>
```

Error Message - Reader Not Connected

Error Message for Reader Not Supported

If the reader is not supported, it will throw the below error message.

```
D:\RFID\Development Task\remote-reader-management-tool\build\src\Debug>RRMTool_CLI.exe -about

[2023-06-28 11:30:27.012] [error] 4:- Reader Not Supported

Please use -help command for help menu or contact rf IDEAS tech support for more information...

D:\RFID\Development Task\remote-reader-management-tool\build\src\Debug>_
```

Error Message - Reader Not Supported

Error Message for Multiple Readers Connected

If multiple readers are connected, it will throw the below error message.

```
D:\RFID\Development Task\remote-reader-management-tool\build\src\Debug>RRMTool_CLI.exe -about

[2023-06-28 11:31:26.556] [error] 6:- Multiple Readers Connected

Please use -help command for help menu or contact rf IDEAS tech support for more information...

D:\RFID\Development Task\remote-reader-management-tool\build\src\Debug>
```

Error Message - Multiple Readers Connected

Command for Displaying Reader's Configuration Settings

RRM CLI will allow user to display the reader's configuration settings on the terminal.

Syntax

-s -displayhwg

Example

```
D:\RRM_Tool_v1.0.6\RRM_Tool_exe>RRMTool_CLI.exe -s -displayhwg
/--- pcProx and OEM Reader Configuration Template File ---
:Library Version: 7.6.4
:Device FW Version: 20.50

/ AZERTYShiftLock
AZERTYShiftlock = 0      / 0= off, 1 = on

/ ExtendedPrecisionMath
ExtendedPrecisionMath = 0     / 0= off, 1 = on

/ tsIDBitCnts
iLeadParityBitCnt = 0      / Wiegand Leading Parity bit count to be stripped
iTrailParityBitCnt = 0      / Wiegand Trailing Parity bit count to be stripped
iIDBitCnt = 64      / if bStripFac, this determines bit count of ID and FAC
iTotalBitCnt = 26      / if bFrcBitCntEx, card read (including parity) must match this

/ tsCfgFlags
bFixLenDsp = 0      / Send as fixed length with leading zeros as needed
bFrcBitCntEx = 0      / Force Rx'd bit count to be exact to be valid
bStripFac = 0      / Strip the FAC from the ID (not discarded)
bSndFac = 0      / Send the FAC (if stripped from data)
bUseDelFac2Id = 1      / Put a delimiter between FAC and ID on send
bNoUseELChar = 0      / Don't use a EndLine char on send (default to ENTER)
bSndOnRx = 0      / Send valid ID as soon as it is received (iIDLockOutTm timer not used)
bHaltKBSnd = 0      / Don't Send keys to USB (Get ID mechanism)

/ tsIDDispParms
iFACIDDelim = 179      / if bStripFac & bSndFac & bUseDelFac2Id, this char sent between FAC & ID
iELDelim = 40      / if NOT bNoUseELChar, this char sent at end of ID
iIDDispLen = 5      / if bFixLenDsp, ID padded with zeros to this length
iFACDispLen = 3      / if bFixLenDsp, FAC padded with zeros to this length
iExOutputFormat = 0      / 0 = Data Format Mode, 1 = Extended Mode

/ tsTimeParms
iBitStrmTO = 80      / Wiegand read times out after this msec time (4msec gran.)
iIDHoldTO = 1000      / Card ID remains valid for this msec time (50msec gran.)
iIDLockOutTm = 1200      / Squelch repetitive reader reports (usually > 1000) in msec (50msec gran.)
iUSBKeyPrsTm = 20      / Sets USB inter-key 'Press' time in msecs (4msec gran.)
iUSBKeyRlsTm = 20      / Sets USB inter-key 'Release' time in msecs (4msec gran.)

/ tsCfgFlags2
bUseLeadChrs = 0      / Use leading chars in ID KB send
```

Display the secure HWG+ file

```
/ Note: DO NOT change the name "sFldSepData"!
/ Comment and Blank Lines between data bytes are optional.
/ ASCII Hex data bytes may be separated by Comma, Period, Space or Tab.

BEGIN sFldSepData

/ FldSepHdr[2] =
24.41.22.10

/ FldDefs[][4] =
80.00.01.10

/ SepDefs[][2] =
85.00
82.05

/ SepData[] =
86.96.91.B3.2C.28.28.00
FF.FF.FF.FF.FF.FF.FF.FF
FF.FF.FF.FF.FF.FF.FF.FF
FF.FF.FF.FF.FF.FF.FF.FF
FF.FF.FF.FF.FF.FF.FF.FF
FF.FF.FF.FF.FF.FF.FF.FF
FF.FF.FF.FF.FF.FF.FF.FF
FF.FF.FF.FF.FF.FF.FF.FF
FF.FF.FF.FF.FF.FF.FF.FF
FF.FF.FF.FF.FF.FF.FF.FF
FF.FF.FF.FF.FF.FF.FF.FF
FF.FF.FF.FF.FF.FF.FF.FF
FF.FF.FF.FF.FF.FF.FF.FF
FF.FF.FF.FF.FF.FF.FF.FF
FF.FF.00.1A.

END sFldSepData
CardType: 0 / Card type code
CardPriority: 0 / 0=Low, 1=High Priority
##NEXTCONFIG##
[2023-07-15 23:53:17.993] [info] Your operation is successfully executed

D:\RRM_Tool_v1.0.6\RRM_Tool_exe>
```

Display the secure HWG+ file

Command for Saving Secure HWG+ File

The RRM CLI will allow user to save a HWG file and then display the same HWG file to the screen. The RRM CLI returns whether the operation was successful or not. If the operation fails, it will throw an error - please see the list of all error codes in the Error Code table at the end of the manual.

Syntax

-s -savehwg -f [FileLocation]

Example

```
D:\RRM_Tool_v1.0.6\RRM_Tool_exe>RRMTool_CLI.exe -s -savehwg -f [D:\RRM_Tool_v1.0.6\NewHwgFiles\File1.hwg+]
[2023-07-15 23:55:06.729] [info] Your operation is successfully executed

D:\RRM_Tool_v1.0.6\RRM_Tool_exe>
```

Saving the secure HWG+ file

If the same file name already exists in that location, then it will throw an error.

```
D:\RRM_Tool_v1.0.6\RRM_Tool_exe>RRMTool_CLI.exe -s -savehwg -f [D:\RRM_Tool_v1.0.6\NewHwgFiles\File1.hwg+]

[2023-07-15 23:55:28.667] [error] 100:- A file with this name already exists in this location. Please use a different name.

Please use -help command for help menu or contact rf IDEAS tech support for more information...
D:\RRM_Tool_v1.0.6\RRM_Tool_exe>
```

File already exists in location

Command for Loading Secure HWG+ File

The RRM CLI can be used to load a secure HWG+ file into readers. The RRM CLI returns whether the operation was successful or not. If the operation fails, it will throw an error result - please see the list of all error codes in the Error Code table at the end of the manual.

Syntax

-s -loadhwg -f [FileLocation]

Example

```
D:\remote-reader-management-tool\build\src\Debug>RRMTool_CLI -s -loadhwg -f [.\RDR-80532BKU.hwg+]
[2023-04-14 14:52:02.224] [info] Your operation is successfully executed

D:\remote-reader-management-tool\build\src\Debug>
```

Command for loading secure HWG+ file

How to generate a secure .HWG+ file

The secure .HWG+ file can be generated for all readers supported in RRM CLI.

To generate the secure .HWG+ file, please follow the steps mentioned below:

1. Download and install rf IDEAS Configuration Utility from here.
2. Open the Configuration Utility and connect the reader.
3. Once connected, save all the settings in the reader.
4. Click the plus (+) icon at the bottom right of the Configuration Utility and select 'Save device data to Secure HWG+ file', click OK on pop up and choose the location   to save the secure HWG+ file.
5. Go to the location chosen in step 4 and check the secure .HWG+ file. It can be used to load to different readers on different platforms using RRM CLI.

⚠️ **DO NOT change anything in the secure HWG+ file.**

Command for Loading BLE Secure HWG+ File

The RRM CLI can be used to load a secure BLE HWG+ file into BLE mobile readers. There can be 2 different BLE HWG files to update:

- One for BLE data settings

- One for BLE keys

This command will support both files, but requires each file to be sent separately (not combined).

The tool returns whether or not the operation was successful or not. If the operation fails, it will throw an error result - please see the list of all error codes in the Error Code table at the end of the manual.

Syntax

-s -loadblehwg -f [FileLocation]

Example

```
E:\RRM2.1.0>RRMTool_CLI.exe -s -loadblehwg -f [C:\Users\Sarita.sharma\Downloads\blehwg.hwg+]
[2024-04-04 16:23:17.663] [info] Your operation is successfully executed

E:\RRM2.1.0>_
```
Command for loading Secure BLE HWG+ file

How to generate a secure BLE .HWG+ file

The secure BLE .HWG+ file can be generated for BLE mobile readers supported in RRM CLI. To generate the secure BLE .HWG+ file, please follow the steps mentioned below:

1. Download and run Wave ID Mobile Configurator Utility from here.
2. Open the utility and connect the mobile reader.
3. Once connected, change required BLE configuration settings in the reader and save them in reader by Write Config button.
4. Go to the file tab at top left of the Wave ID Mobile Configurator Utility and select save secure HWG+ file option for saving BLE .HWG+ file, and if required, select save secure HWG+ key file option for saving BLE .HWG key file
5. Click OK on pop up and choose the location where the secure BLE .HWG+ file, and if required, where the BLE .HWG+ key file needs to be saved.
6. Go to the location chosen in step 5 and check the secure BLE .HWG+ file. It can be used to load to mobile readers on different platforms using RRM CLI.

⚠️ **DO NOT change anything in the secure BLE .HWG+ file.**

Command for Loading Secure Blob *INI File

The RRM CLI can be used to load secure Blob *.INI files created by Smartcard Manager Utility (v2.2 or newer) to smartcard readers supporting card configuration and keys for MIFARE desfire, classic, plus and ultralight and as well as LEGIC advent and prime.

Syntax

-i -loadini -f [FileLocation]

Example

```
D:\remote-reader-management-tool\build\src\Debug>RRMTool_CLI -i -loadini -f [.\ClassicSCM_bwg.ini]
[2023-04-14 15:06:25.242] [info] Your operation is successfully executed

D:\remote-reader-management-tool\build\src\Debug>
```

*Command for loading Secure Blob *INI file*

How to generate a secure Blob *INI File

To generate a secure Blob* .INI file, please follow the steps mentioned below:

1. Download and install Smartcard Manager Utility from [here.](#)
2. Open the Smartcard Manager utility and connect the smartcard reader.
3. Under 'General Settings' tab, select the appropriate card type, write it to the connected reader.
4. Click on File menu and select 'Create Blob *.INI File', choose the location where secure Blob *.INI file need to be saved, and select 'OK' on pop up.
5. Configure the reader with required settings and write them to the connected reader.
6. Select 'End Blob *.INI File' once all the settings are done and saved.
7. Go to the location chosen in step 4 to get the secure Blob *.INI file.

⚠ **DO NOT change anything in the secure Blob *INI file.**

Error Codes

List of Error Codes

Below is the list of error codes which the RRM CLI can throw as per the operation outcome.

Error Codes	Error Description	Examples
1	The entered main command is wrong	RRMTool_CLI.exe -a
2	Reader Not Connected	When usbconnect API will fail or when reader is not connected properly.
4	Reader Not Supported	When unsupported reader is connected.
6	Multiple Readers Connected	When multiplereaders are connected.
7	Unable to reset reader	When reader us unable to reset.
11	The file was either modified or tampered	When CRC is invalid
100	A file with this name already exists in this location. Please use a different name.	When HWG file name is same in the location.
101	Entered Sub Command for Secure HWG+ is incorrect	RRMTool_CLI.exe -s - load -f [FileLocation]
102	Entered File Command for Secure HWG+ is incorrect	RRMTool_CLI.exe -s - loadhwg -g [FileLocation]
103	Entered File Location for Secure HWG+ is incorrect	RRMTool_CLI.exe -s - loadhwg -f [D:\secure.hwg+]
104	Entered file extension for Secure HWG+ is incorrect(Only .hwg+ is supported))	RRMTool_CLI.exe -s - loadhwg -f [D\\secure.hw]
105	Secure API Failed	When API returns 0
106	Entered File Location Command for Secure HWG+ is incorrect. Please use [] bracket for fileLocation	RRMTool_CLI.exe -s -loadhwg -f [D\\secure.hwg+

301	Entered Sub Command for INI is incorrect	RRMTool_CLI.exe –i – load -f [FileLocation]
302	Entered File Command for INI is incorrect	RRMTool_CLI.exe –i – loadini -g [FileLocation]
303	Entered File Location for INI is incorrect	RRMTool_CLI.exe –i – loadini -f [D\\::legic.ini]
304	Entered file extension for INI is incorrect(Only .ini is supported)	RRMTool_CLI.exe –i – loadini -f [D\\legic.in]
305	INI API Failed	When API returns 0
306	Entered File Location Command for INI is incorrect. Please use [] bracket for fileLocation	RRMTool_CLI.exe –i – loadini -f [D\\legic.ini]
307	Reader can only accept secure HWG+ configuration updates.	
308	Entered file is not supported for the given sub command	RRMTool_CLI.exe –s – loadblehwg -f [D\\secure.hwg+]
500	API Failed for About Command	

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Appendix

COMPONENTS	MINIMUM SYSTEM REQUIREMENTS
Hardware	1 gigahertz (GHz) or faster processor or SoC.
Memory	2 GB RAM.
I/O	1 USB port for connecting USB device.
Operating System	Windows 10 and above, Linux (Ubuntu 20.4 and Above), MacOS (Monterey and above), Raspberry Pi (Arm 64 bit).