

## Remote Reader Management Tool User Manual



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## Glossary of Terms

TERMS	DEFINITIONS
RRM	Remote Reader Management.
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

## 1.1 Remote Reader Management Tool

Remote reader management is a Command Line tool and its purpose is to remotely load HWG+ configuration files and INI configuration files individually. (The Remote integration would be handled by end user).

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

- **Secure Hwg+ File:** A secured 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 hwg+ file has been compromised while loading it.
- **INI File:** An INI file contains all the configuration settings (configured using the Smart Card Manager utility) for the Legic & Secure reader and an iEndOfiniFile token which will be unique for that file. The token will validate if the INI file has been compromised while loading it.

## 1.2 Supported Platforms

The following operating systems and chip architectures are supported:

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

## 1.3 Supported Examples

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

# Set-up of RRM Tool

## 2.1 Installation for Windows platform

Please follow the below instructions to extract the package:

1. Download and extract the RRM\_Tool package.
2. Open CommandPrompt by giving “cmd” in the address bar from the location where it is stored and run the application (RRMTool\_CLI.exe).

## 2.2 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=./`

## 2.3 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 rfIDEAS 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 rfIDEAS 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

Please see below the list of readers supported by the RRM tool.

Part Number	Firmware
RDR-80xx1AxU	16 and above
RDR-80Mx1AxU	22 and above
RDR-805x1AxU-NT	16 and above
RDR-7Lx2AxU	21.0.3
RDR-305x1BxU	17.0.0
RDR-70x1AxU	16.2.0
RDR-8X5x1AxU	16.9 and above
RDR-80xx1BxU	1.0.0 and above
RDR-80xx2BxU	1.0.3 and above
RDR-80Lx1BxU	20 and above
RDR-300x1CxU	21.7.0
RDR-30531EKU	1.4.0
RDR-30M31ExU	1.3.0
RDR-6012AKU-v2	9.7.3
RDR-6012AKU	9.3.3
RDR-6082AKU	8.1.3

# Commands

## 5.1 Generic Commands

The tool 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.

```
D:\RRM>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
-i -loadini -f [FileLocation]  : Load a Ini file
```

Image 1: Help Command

### -about

Shows the information of the connected reader to the tool.

```
D:\RRM>RRMTool_CLI.exe -about

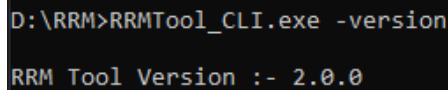
About Information:-
Part-Number      :- RDR-800x2BxU
SDK-Version      :- 7.7.0
Firmware Filename :- WNC010403UPX700
USB-Firmware     :- 0.1.4.3
Maximum Configuration:- 4
CPU0-Application :- 0.1.4.3 16728
CPU0-Boot Loader :- 0.1.0.1
CPU0-RF Modem    :- 0.1.5.0
Full Firmware Version:- 01.04.3-16728
Vendor Name      :- 0C27:3BFA RF IDEas
ESN              :- 51002800165036354134312000000000
LUID             :- 0/0x0000
```

Image 2: About Command



## -version

Shows the version of RRM Tool.

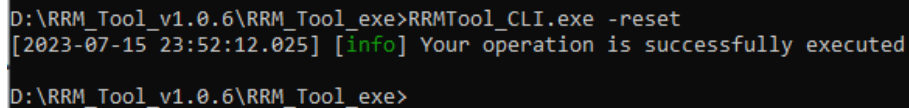


```
D:\RRM>RRMTool_CLI.exe -version  
RRM Tool Version :- 2.0.0
```

Image 3: Version Command

## -reset

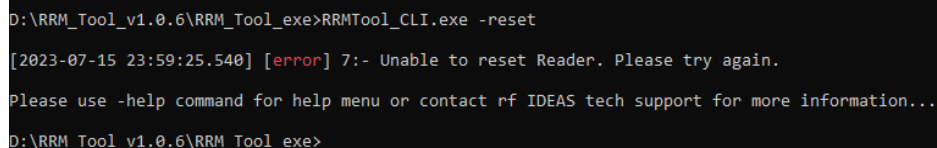
It allows the user to reset a reader back to the factory defaults.



```
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>
```

Image 4: Reset Command

The pop error message will throw if the reader is not reset.

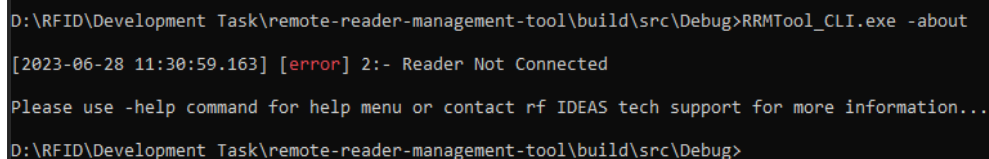


```
D:\RRM_Tool_v1.0.6\RRM_Tool_exe>RRMTool_CLI.exe -reset  
[2023-07-15 23:59:25.540] [error] 7:- Unable to reset Reader. Please try again.  
Please use -help command for help menu or contact rf IDEAS tech support for more information...  
D:\RRM_Tool_v1.0.6\RRM_Tool_exe>
```

Image 5: Unable to reset

## 5.2 Error Message for Reader Not Connected

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

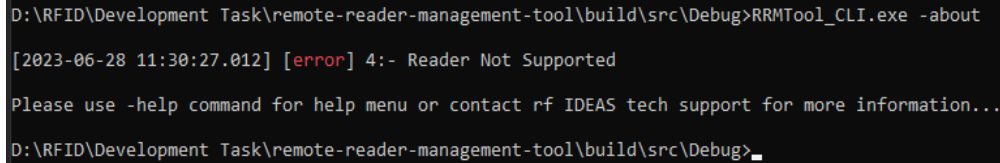


```
D:\RFID\Development Task\remote-reader-management-tool\build\src\Debug>RRMTool_CLI.exe -about  
[2023-06-28 11:30:59.163] [error] 2:- Reader Not Connected  
Please use -help command for help menu or contact rf IDEAS tech support for more information...  
D:\RFID\Development Task\remote-reader-management-tool\build\src\Debug>
```

Image 6: Error Message- Reader Not Connected

## 5.3 Error Message for Reader Not Supported

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

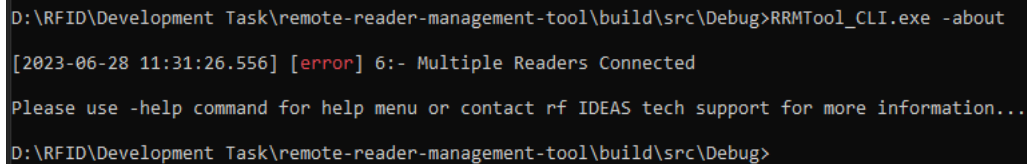


```
D:\RFID\Development Task\remote-reader-management-tool\build\src\Debug>RRMTool_CLI.exe -about
[2023-06-28 11:30:27.012] [error] 4:- Reader Not Supported
Please use -help command for help menu or contact rf IDEAS tech support for more information...
D:\RFID\Development Task\remote-reader-management-tool\build\src\Debug>_
```

Image 7: Error Message- Reader Not Supported

## 5.4 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>
```

Image 8: Error Message- Multiple Reader Connected

## 5.5 Command for Displaying Reader's Configuration Settings

RRM tool will allow user to display the reader's configuration settings on to 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 msec (4msec gran.)
iUSBKeyRlsTm = 20        / Sets USB inter-key 'Release' time in msec (4msec gran.)

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

Image 9a: Displays the HWG file



## 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>
```

Image 10: Saving the 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>
```

Image 11: File already exist in location

## 5.7 Command for Loading Secure HWG+ File

The RRM tool can be used to load a secure Hwg+ file into different readers. The tool throws the result if the operation was successful or not. If the operation fails, it will throw the corresponding error.

### 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>
```

Image 12: Command for Secure HWG+ Loading

## How to generate secure .hwg+ file

The secure .hwg+ file can be generated for all Wave ID readers supported in RRM tool.

To generate the secure .hwg+ file please follow the steps mentioned below

1. Download and install rfIDEAS Configuration Utility from [here](#).
2. Open the utility and connect the reader.
3. Once connected, save all the settings in the reader.
4. Click the push (+) 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 where secure hwg+ file need to be saved.
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 tool.



Please DO NOT change anything in the secure hwg+ file.

## 5.8 Command for Loading Secure INI File

The RRM tool can be used to load secure .INI files created by Smartcard Manager Utility (v1.16.5 or newer) to RDR-80Mxxx and RDR-80Lxxx 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>
```

Image 13: Command for Secure INI Loading

## How to generate secure .ini file

The secure .ini file can be generated for secure readers (RDR-80Mxxx) and legic readers (RDR-80Lxxx, RDR-7LxxBxU). To generate the secure .ini file please follow the steps mentioned below:

1. Download and install Smartcard Manager Utility from [here](#).
2. Open the Smart Card Manager Utility and connect the secure/logic reader.
3. Under 'General Settings' tab, select the secure /logic stamp card and save it.
4. Click on File menu and select 'Create Blob \*.ini File', choose the location where secure .ini file need to be saved and select 'OK' on pop up.
5. Configure the reader with required settings.
6. Select 'End Blob \*.ini File' once all the settings are done & saved.
7. Go to the location chosen in step 4 and check the secure .ini file. It can be used to load to different readers on different platforms using RRM tool.



**Please DO NOT change anything in the secure ini file.**

# Error Codes

## 6.1 List of Error Codes

Below is the list of error codes which the RRM tool 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 multiple readers 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 isincorrect	RRMTool_CLI.exe -i -load -f [FileLocation]
302	Entered File Command for INI isincorrect	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.	RRMTool_CLI.exe -i -loadini -f [D\\legic.in]
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
Hard Disk Space	32GB
I/O	1 USB “A” port for USB device, and 1 USB port for serial device
Operating System	Windows 10 and above, Linux (Ubuntu 20.4 and Above), Mac OS (Monterey and above), Raspberry Pi (Arm 64 bit).