rf IDEAS

Configuration Utility User Manual

WAVE ID® Readers

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Glossary of Terms

TERMS	DEFINITIONS
ASCII	The American Standard Code for Information Interchange codes represent text in computers, communications equipment, and other readers that use text.
Contactless	The high frequency 13.56 MHz smart card technology.
FAC	Facility Access Code.
OEM	The card and badge reader without case. Available in self-contained modules for easy system integration.
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.
CSN	Also known as the Card Serial Number, is part of the ISO 15693 standard for vicinity cards operating at the 13.56 MHz frequency.
UID	The User ID, User Identification, or Unique ID is a number based on all bits of the card data.

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.

Chapter 1

Reader Basics

1.1 Difference between Single Configuration and Multi Configuration Reader

The WAVE ID Plus is a dual frequency programmable reader that combines 125 kHz and 13.56 MHz technologies into the same reader. It's the only reader in the industry that reads multiple cards of your choice among many different card types, delivering flexibility to any customer struggling with different card technologies. In contrast to the WAVE ID Plus reader, our standard WAVE ID Solo proximity and contactless readers function on a single frequency and single card type, which is either 125 kHz proximity or 13.56 MHz contactless.

1.2 Reader Setup

To setup the reader:

1. Connect the reader to the workstation using RS-232, USB, or Ethernet (must be in the same Subnet as the workstation).
2. The workstation should detect new hardware for USB connections. Verify the workstation recognizes this connection using Device Manager.

Chapter 2

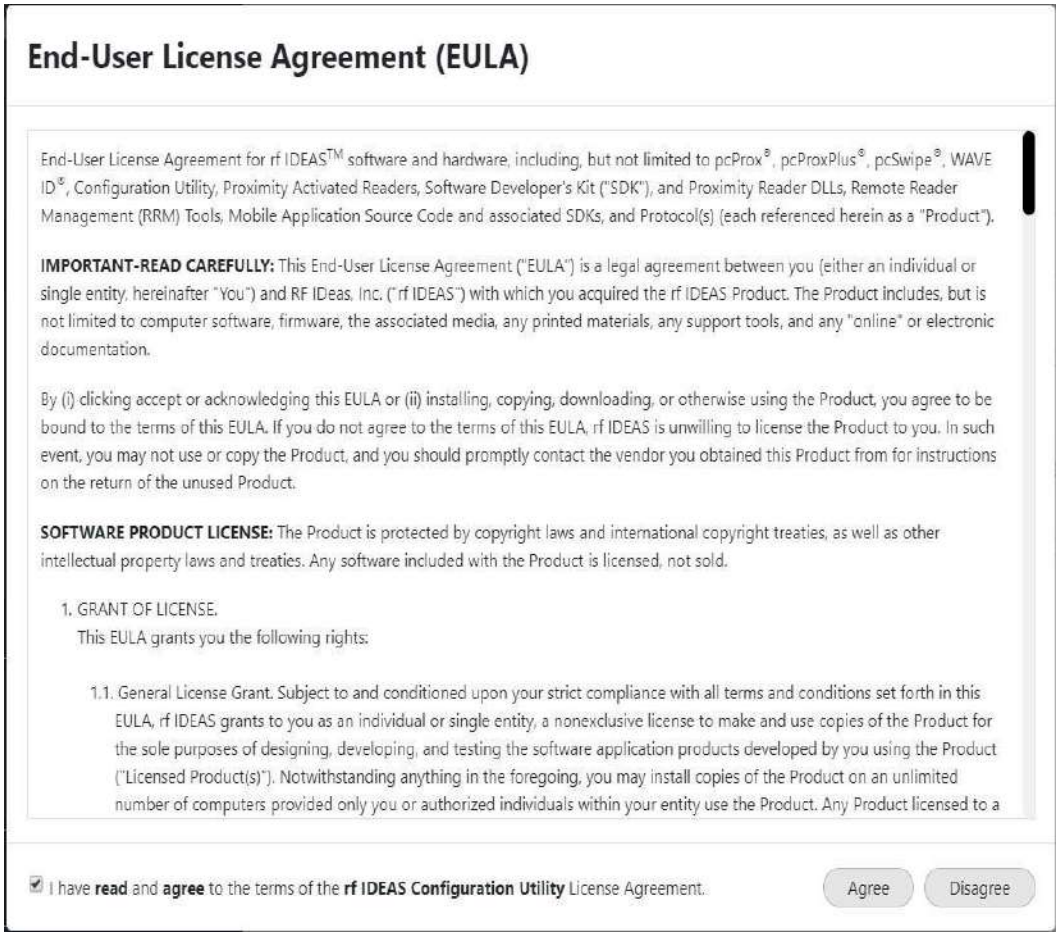
Software

2.1 rf IDEAS Configuration Utility

The rf IDEAS Configuration Utility provides users with the ability to configure their WAVE ID Solo and WAVE ID Plus readers.

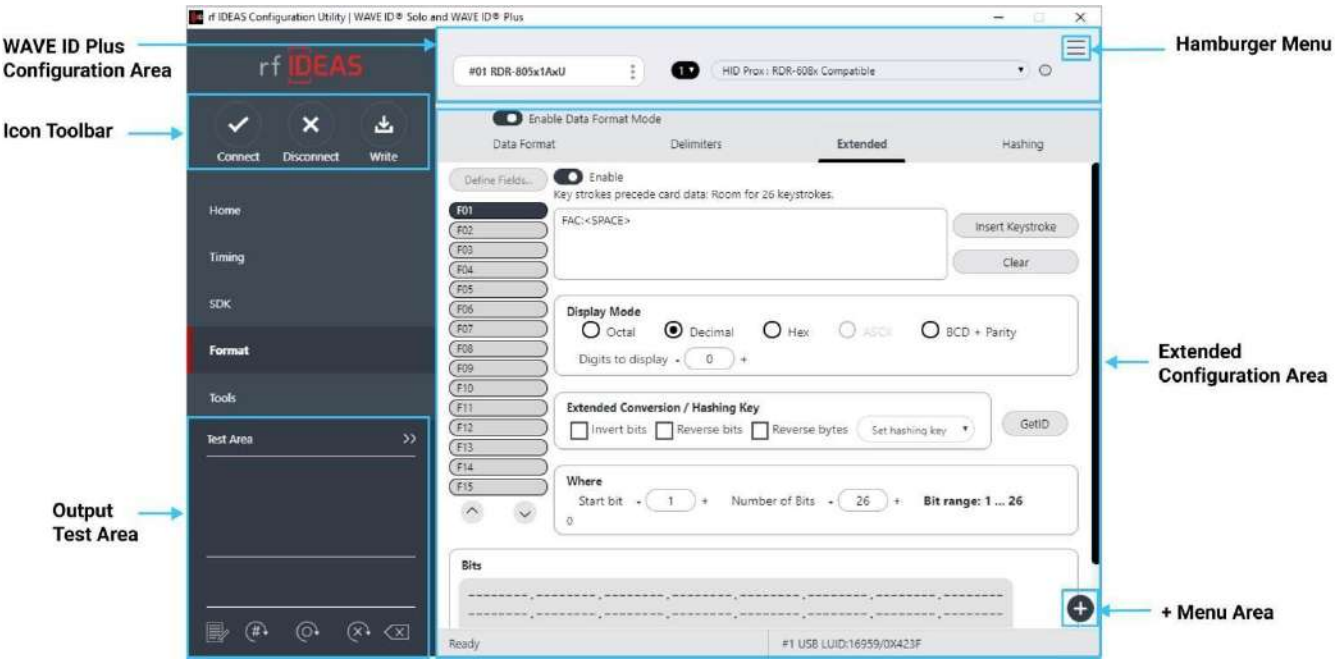
The Utility allows WAVE ID Plus to be configured for 2 or 4 (depending on model) card types. rf IDEAS WAVE ID Plus readers with extended functionality can operate in one of two modes, “Data Format” mode ID processing or the **“Extended”** mode ID processing for output generation. The default mode of processing is Data Format mode.

The utility can be downloaded from the website and while opening the application after installation for the first time, user will need to accept the ‘End User License Agreement (EULA)’ as shown in image below:



End User License Agreement (EULA)

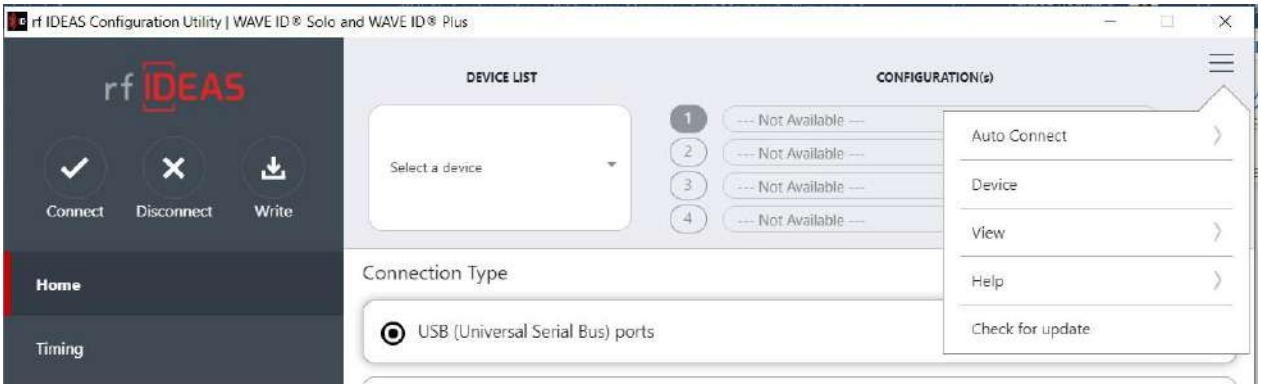
2.2 Utility Overview



Utility Overview

Please note that any unsupported functions will be greyed out.

2.3 Hamburger Menu



Hamburger Menu

The Hamburger Menu contains all the basic configuration options for the utility.

Auto Connect Menu

Auto Connect Menu

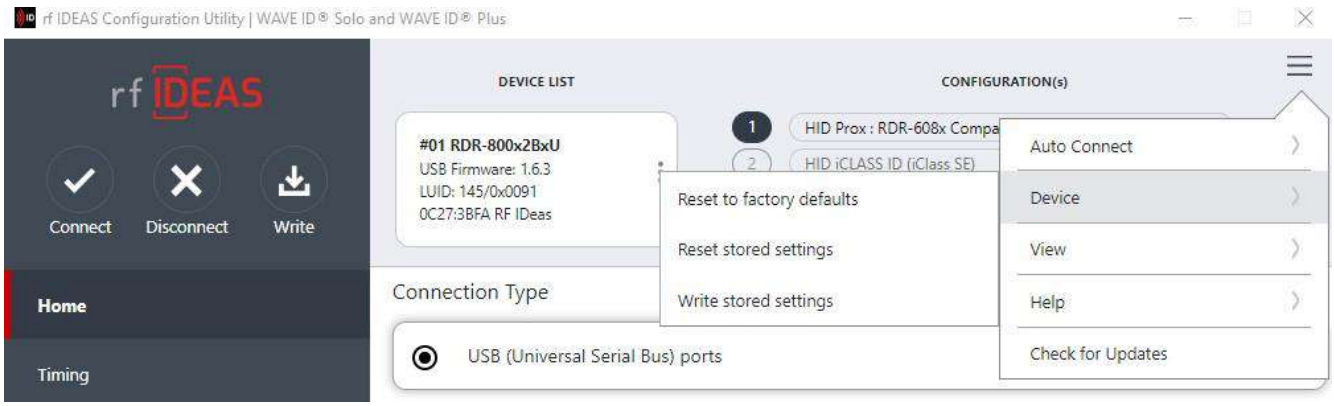
The Auto Connect menu provides options for reader to utility connections.

USB: The utility searches for all USB connected readers at start-up.

Serial: The utility searches for all serial connected readers at start-up.

Ethernet: The utility searches for the Ethernet connected reader to the IP Address and Port provided by user.

Device Menu



Device Menu

The Device menu lists the options for resetting the reader to factory defaults and resetting the stored settings.

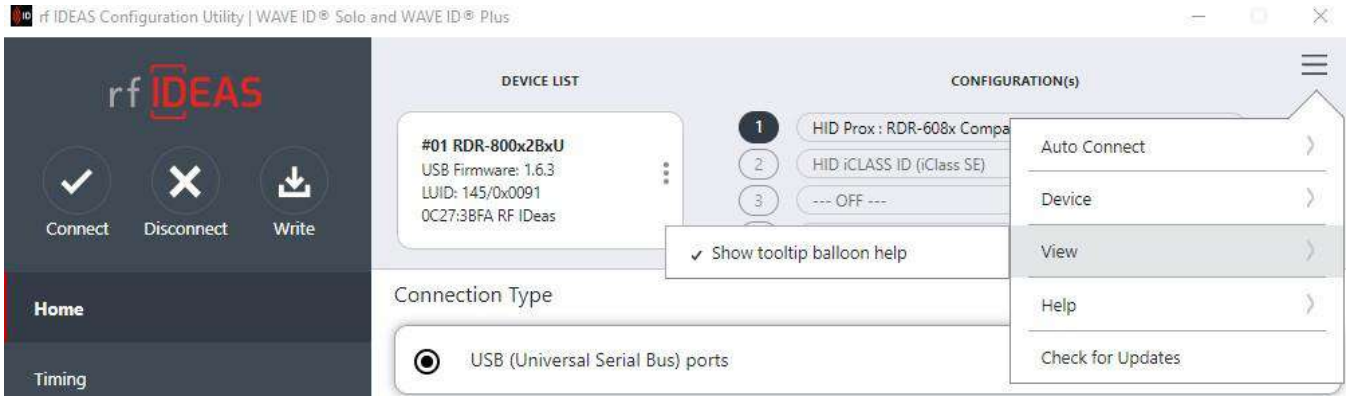
Reset to factory defaults: Resets all configuration parameters to defaults.

Reset to Stored Settings: This selection allows users to reset the reader to their own personally defined stored settings.

Write Stored Settings: Writes the current configuration settings to stored settings.

The last two options from the Device menu will not be available for single configuration readers.

View Menu



View Menu

The view menu provides options for altering the appearance of certain functions of the utility. All the options in this menu are set to appear by default.

Show Tooltip Balloon help: Menu option for displaying or not displaying the tooltip pop-up balloon. The application default is set to Show tooltips.

Help Menu

Help Menu

The Help menu provides information for which users can seek out additional assistance using the utility and/or reader.

Read User Manual: Opens the user manual that is provided in the download with the rf IDEAS Configuration Utility.

Read End-User License Agreement (EULA): Opens the end user license agreement which

user has accepted while launching the application for the first time after installation.

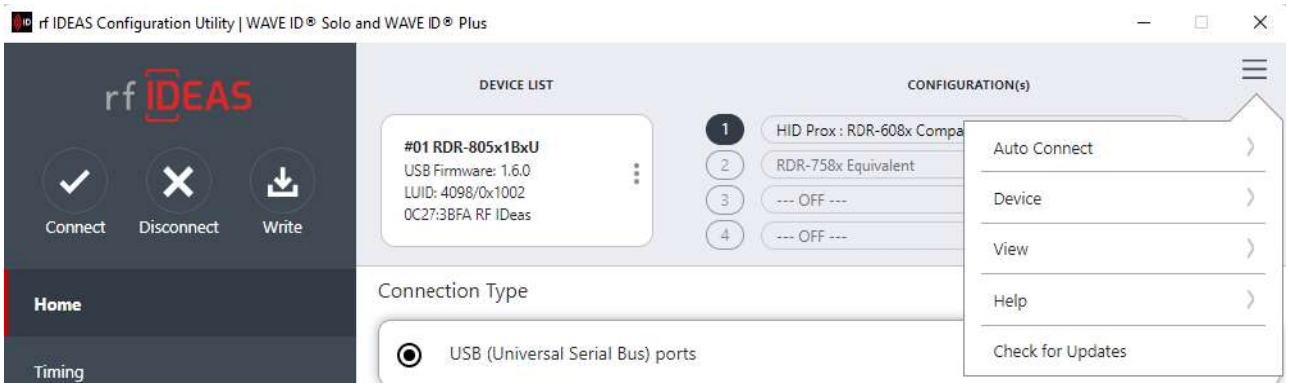
www.rfideas.com: This operation will open a new window to the rf IDEAS website.

About: This menu options differ when a reader is connected to the utility vs. when there is no reader connected. Without a connected reader, the "About" informational content simply displays the utility version. When a reader is connected, the firmware information is also provided. The rf IDEAS website address is displayed in both modes.

Submit Support Ticket: Opens a new window where user will be able to submit a support ticket.

Check for Updates Menu

The Check for Updates selection will allow user to download latest Card list, Reader List, and VidPid list.

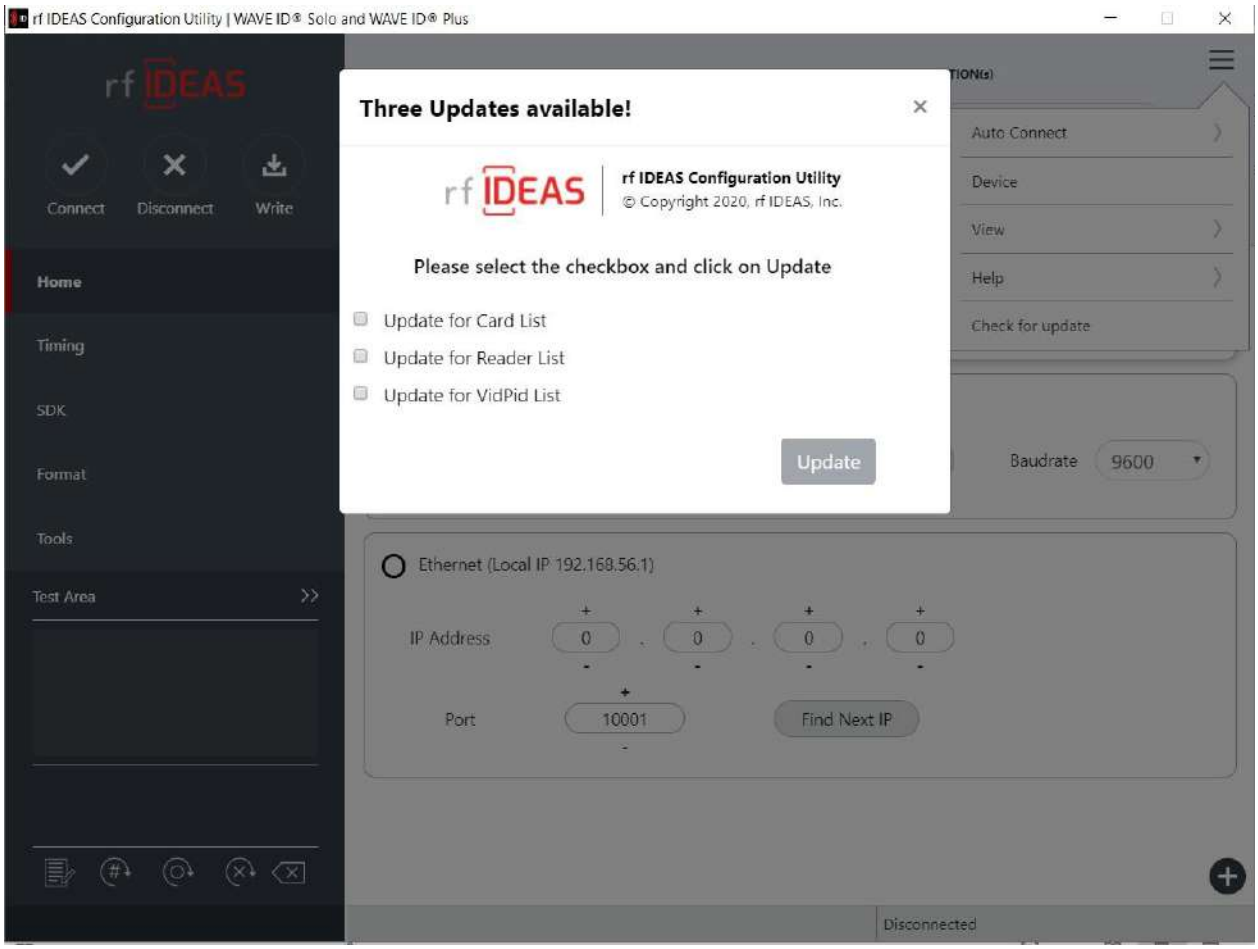


Check for Updates

User must be connected to the internet to update the Card List, Reader List, and VidPid List.

Please follow the below steps to download latest Card List, Reader List, and VidPid List.

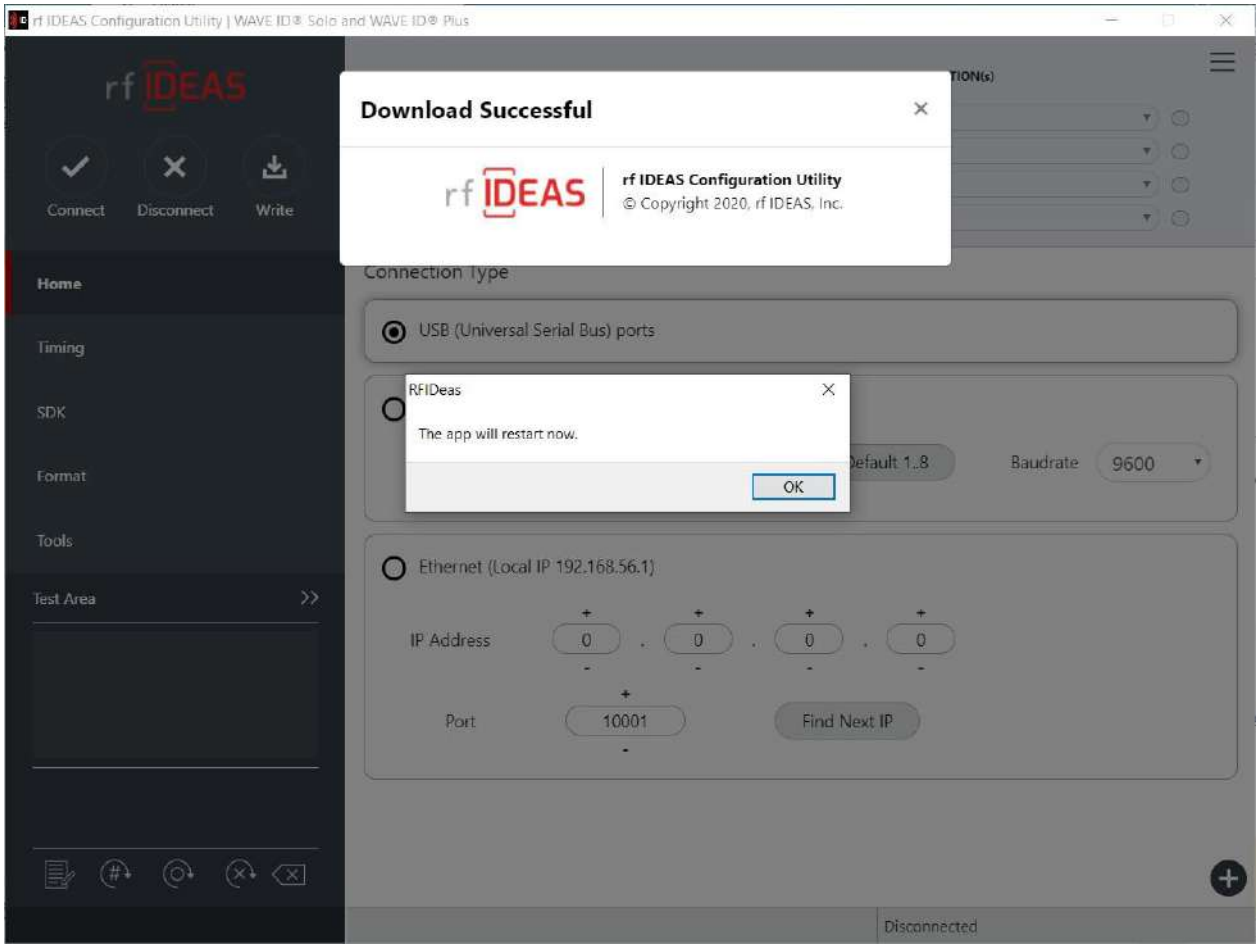
1. Click on Hamburger Menu in the utility and click Check for Updates.
2. The latest updates will be shown in the below screenshot.



Updates Available

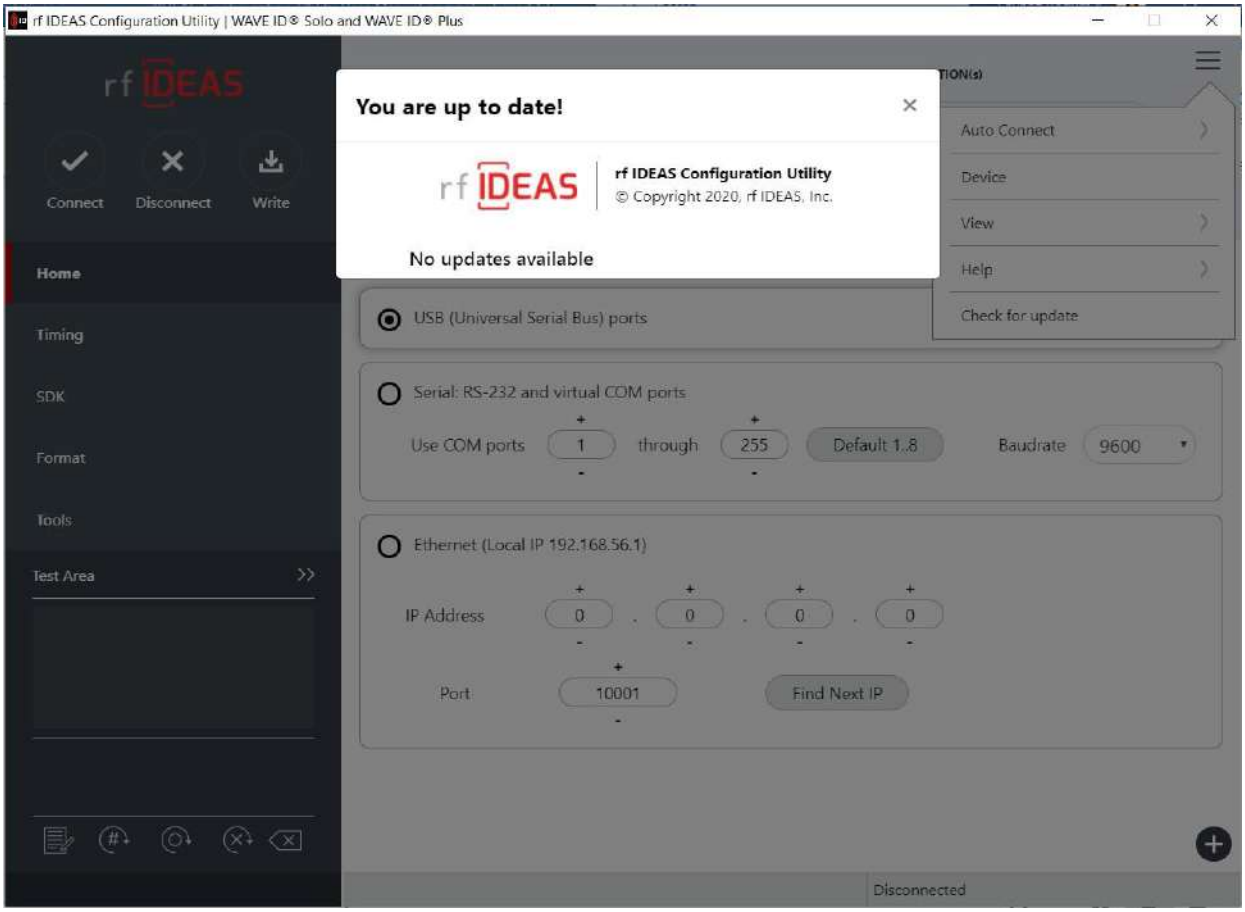
3. User must select the desired checkboxes and click the Update button.

4. After the latest updates are downloaded, the Download Successful pop-up message will be shown, and the application will restart once user clicks on OK



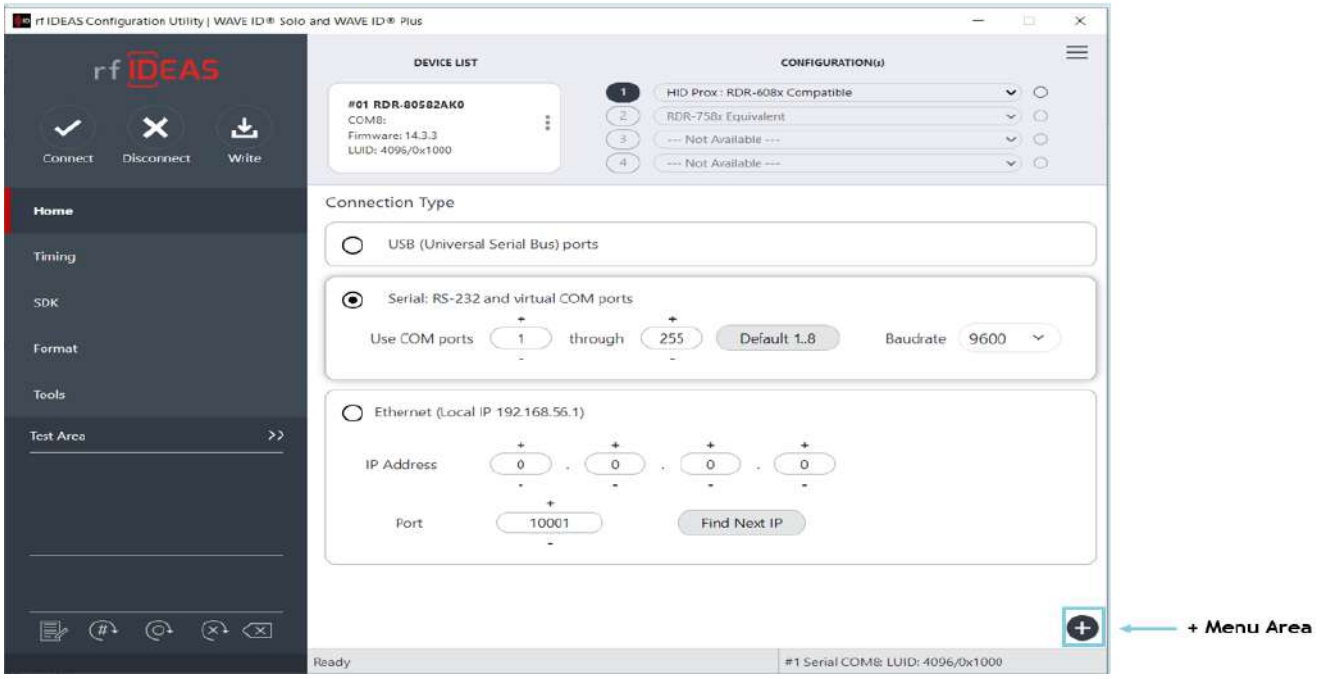
Download Successful and App restarts

5. After the app is restarted, click on the Check for Updates to show you are up to date.

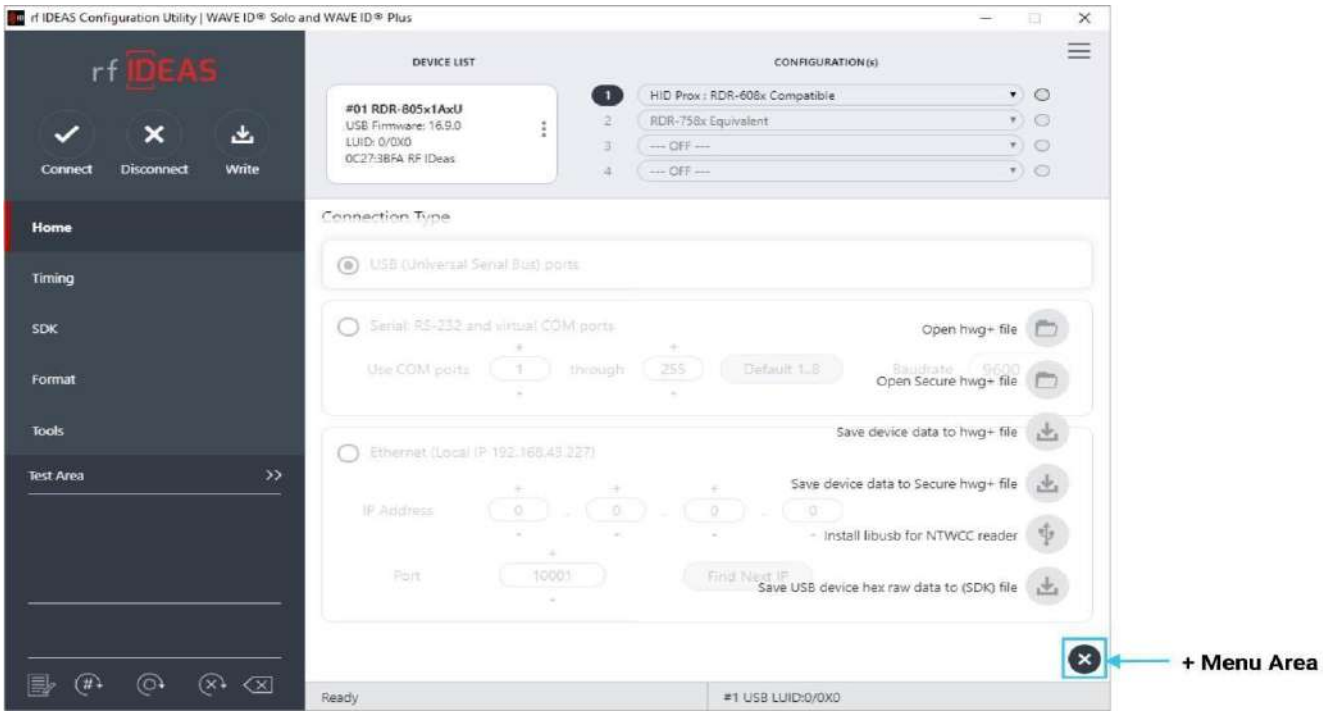


No Updates are Available

2.4 Plus (+) Menu



Plus (+) Menu Overview



The Plus (+) menu lists the following options:

Open hwg+ file: Opens a “.hwg+” or ".hwg+" file. These files contains the standard configuration settings for the reader.

Open Secure hwg+ file: Opens secured “.hwg+” file into the reader. A secured hwg+ file contains all the configuration settings for 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 opening the file.

Save device data to hwg+ file: Saves the configuration settings of the reader.

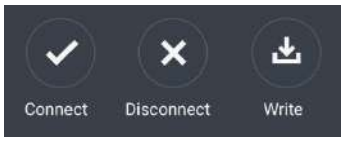
Save device data to Secure hwg+ file: Saves the configuration settings of the reader in a secured configuration file utilizing a unique iEndOfHwgFile token.

Install libusb for NTWCC reader: It will install the driver needed to operate a NTWCC type reader.

Please note that any unsupported functions will be greyed out.

Save USB device hex raw data to (SDK) file: Report configuration block trace for USB connection.

2.5 Icon Toolbar



Icon Toolbar

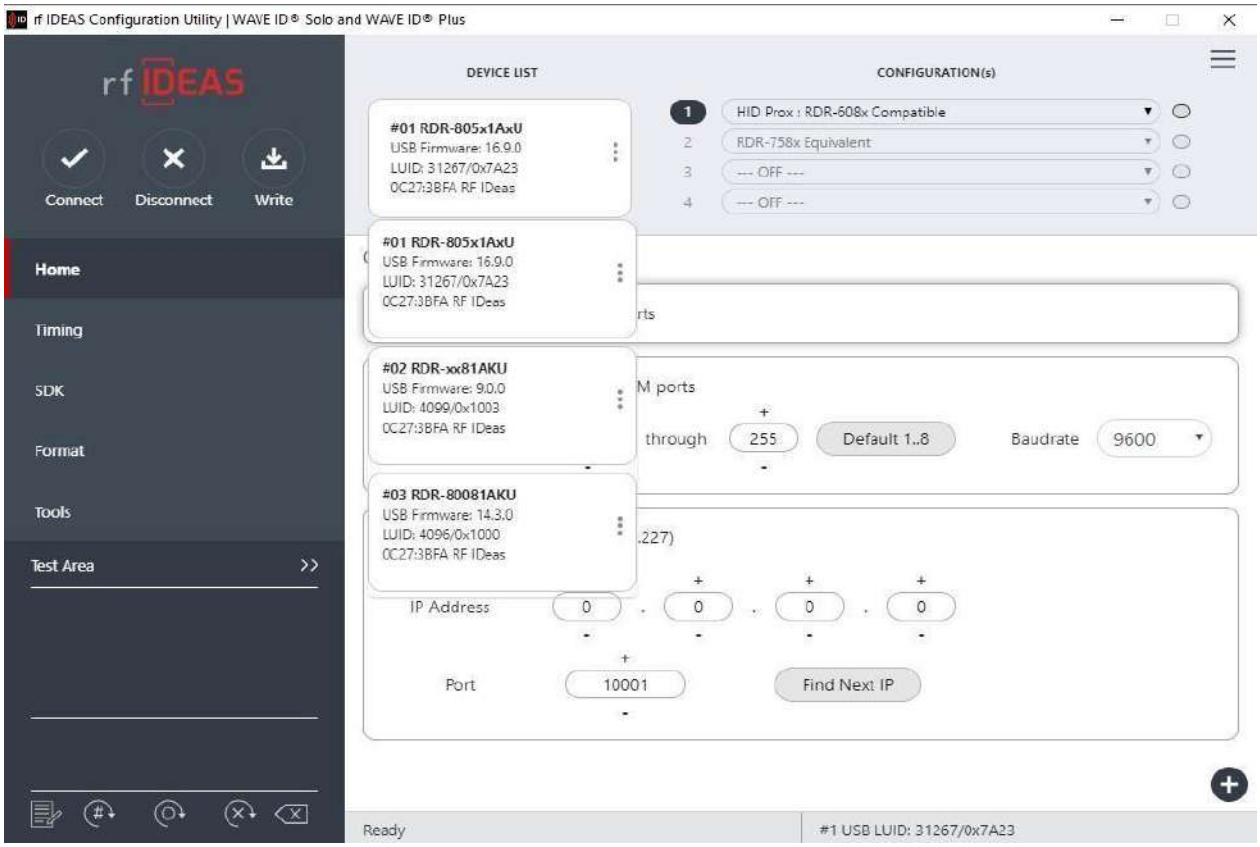
The Icon Tool Bar contains the three most general configuration controls for the utility.

Connect

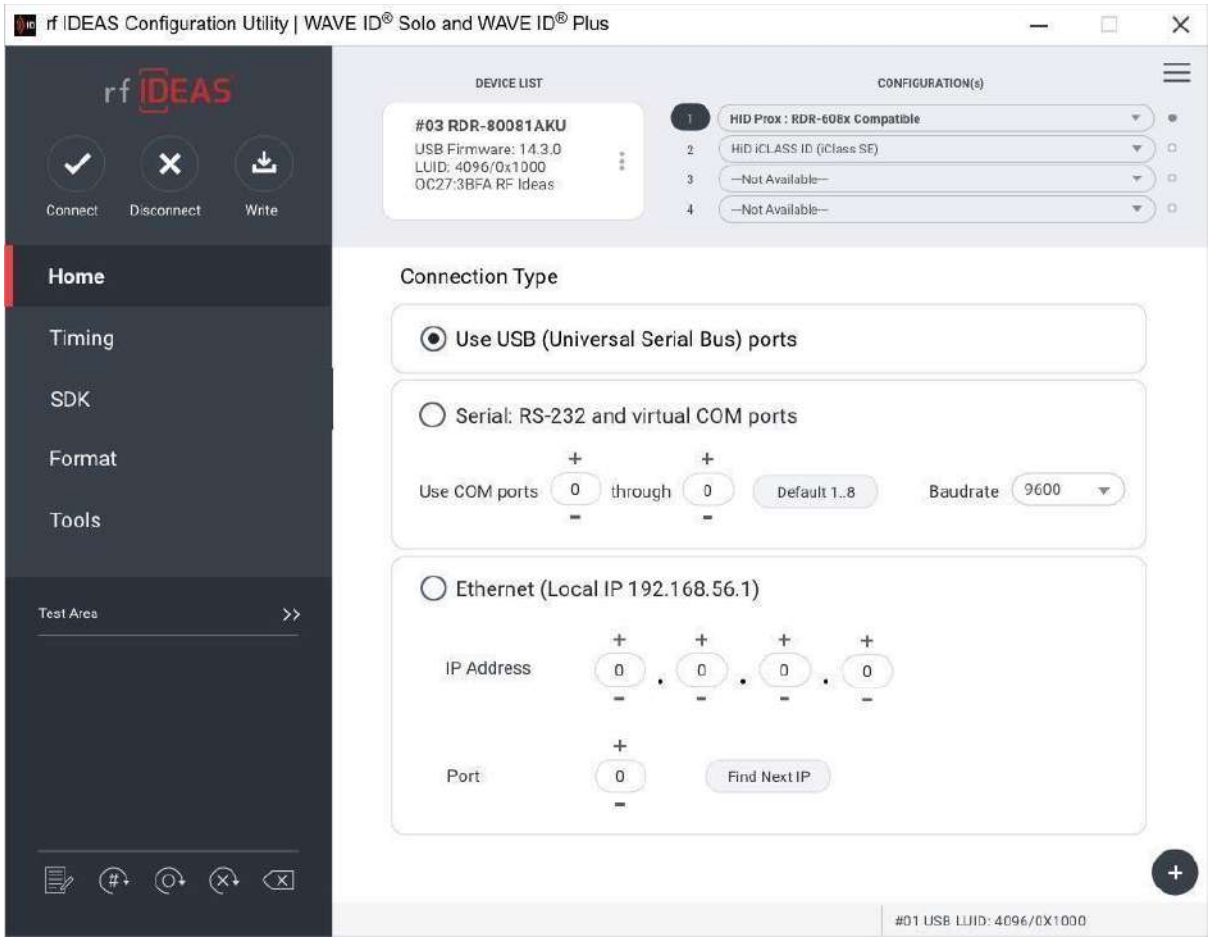
Connect Button

Clicking the Connect icon button commands the utility to search for all the readers on the selected ports.

Once the utility detects a reader, the Device List pull-down menu in the Standard Configuration Area displays the interface connection, firmware, and LUID information for the connected reader. Below images show how the device list is updated once reader(s) get connected to utility.

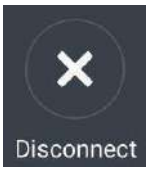


Multiple Device Connection



Device List Output

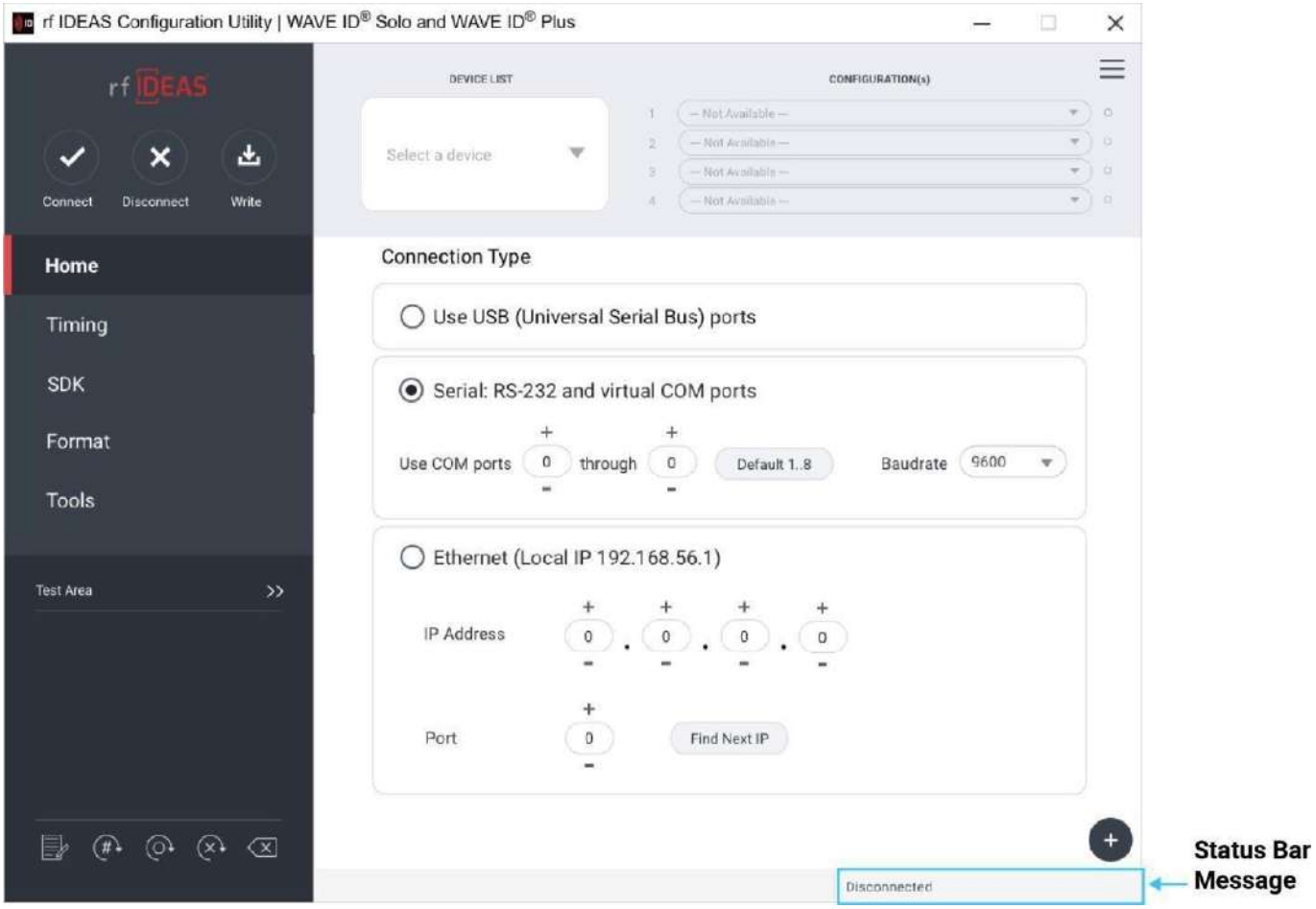
Disconnect



Disconnect Button

Pressing the disconnect button, commands the utility to disconnect from all readers connected through the available ports.

After the utility disconnects from all the readers, the device list pull-down menu will clear.
The status bar will display a disconnected message, as shown in image below:



Disconnected Message

Write

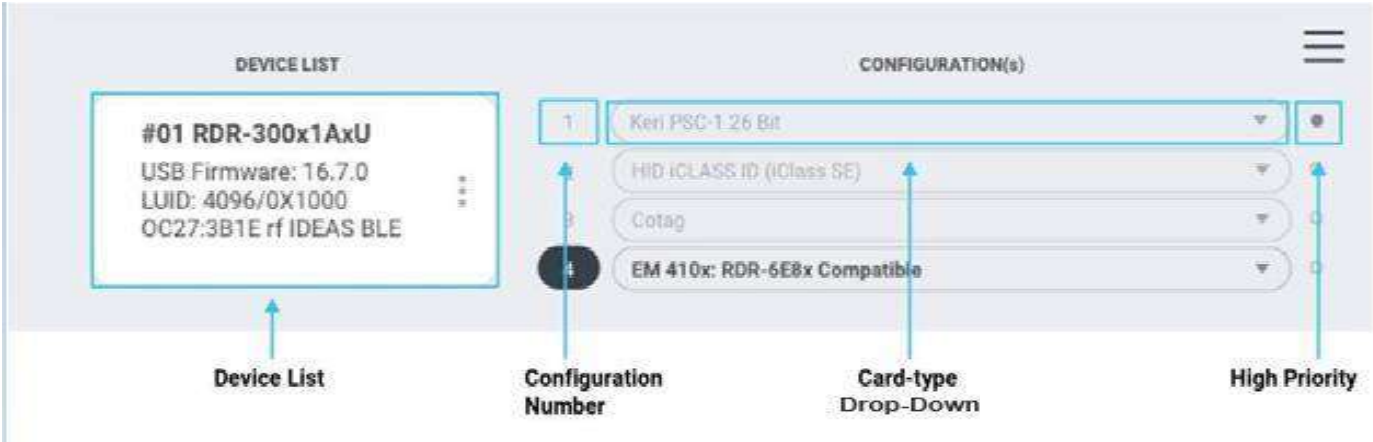
Pressing the Write button, writes the configuration settings to the reader.

Write Button

2.6 WAVE ID Plus Configuration

WAVE ID Plus Configuration Area

Device List



WAVE ID Plus Configuration Header

Device List Pull-down: Contains a list of readers found by the utility.

Configuration(s)

Configuration Number: This option provides the ability to switch between configurations. Users can set and edit settings for two or four separate configurations quickly and easily. The active configuration on utility at any particular moment will be highlighted.

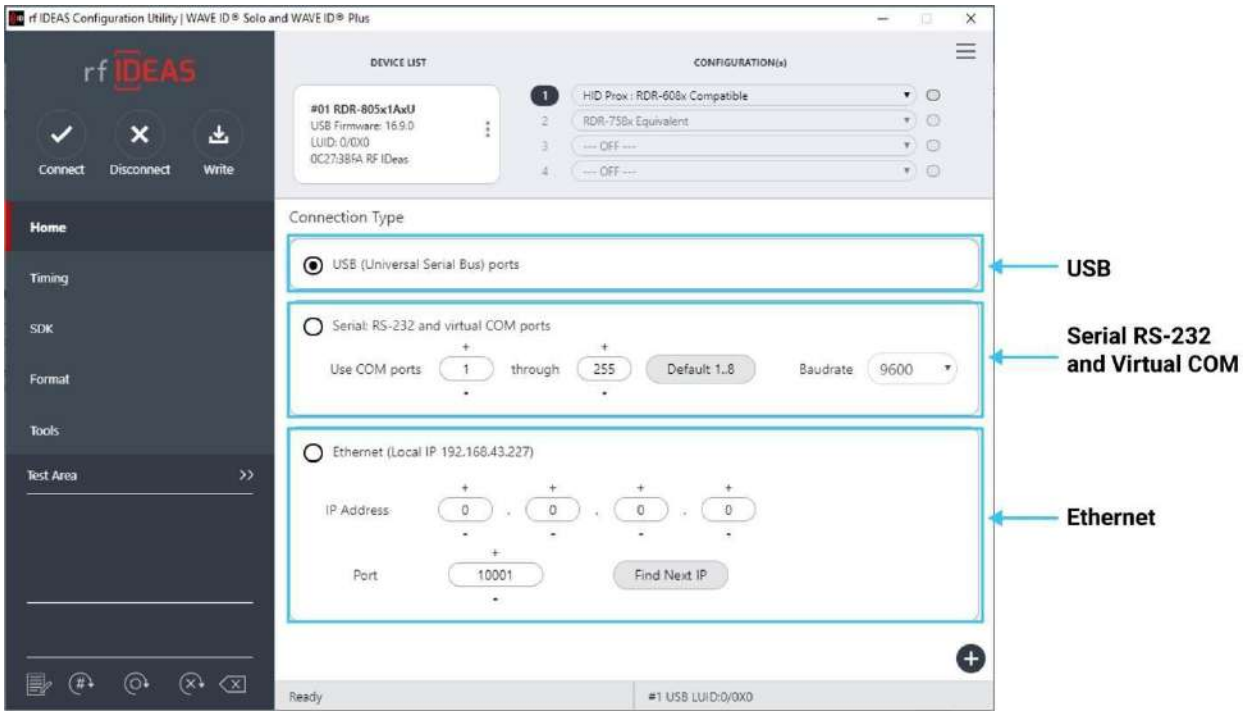
Card Type Drop-Down Menu: This drop-down menu allows users to select the required card type for their own configuration settings. Each configuration has the ability to have separate card types.

High Priority: Provides a WAVE ID Plus user the ability to give a certain configuration a higher priority than another. This is useful when the user has a population of multi-technology card consisting of a combination of 13.56 MHz/125kHz cards.

If multiple configurations have High Priority selected, only the first one (by configuration order) is considered High Priority.

2.7 Home Tab

Connection Types



Home Tab

The Home tab offers various ways, a reader can connect to the rf IDEAS Configuration Utility. The different selections allow the user to choose the connection type for the specific logical protocol of their reader.

USB: Make this selection if the connected reader has a USB logical protocol. The utility will search the USB bus for connected readers.

RS232 COM Ports and USB Virtual COM Ports: The utility will search for readers connected to RS232 COM Ports or Virtual COM Ports

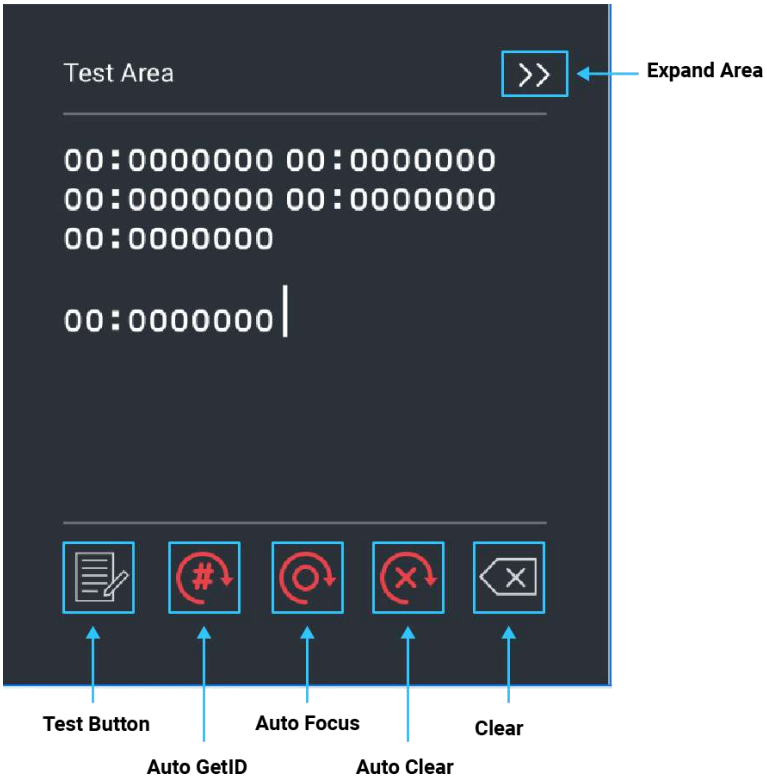
Default 1.8: Pressing this button will reset the COM port search range (COM1 through COM8).

Ethernet: Connects to an Ethernet reader at the given IP address and creates a TCP/IP path to the reader. The first, second, third, and fourth byte of the TCP/IP address and the port number must be entered.

Port Option: Allows for changing the Internet socket port numbers.

Find Next IP Button: Looks for other readers on the same Ethernet connection.

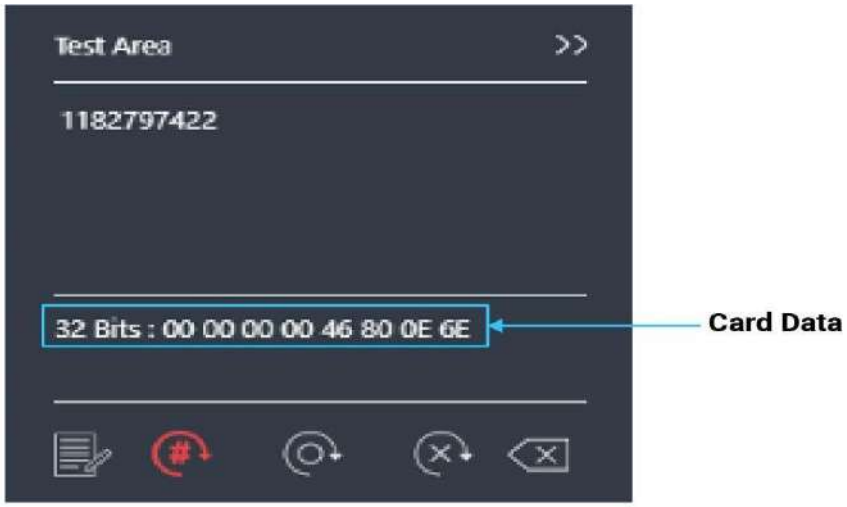
Output Test Area



Output Test Area

This is the test area for the keystrokes entered by the reader. On serial readers, this displays the unsolicited serial port data.

The Auto GetID icon can be selected for the utility to poll the reader for raw data and displays the results in the lower section of the test area.



Auto GetID

The Auto Focus icon (when selected) keeps the cursor in the test area box to capture the keystrokes output. If you need to make any configuration changes you will need to turn off Auto Focus.

The Auto Clear box clears all text in the Output Test Area after each card scan.

The Clear button erases all text in the Output Test Area each time the user manually presses the clear button.

The Test button will open a text editor. This will allow a user to see the card data output from a keystroking reader.

Status Bar

Status Bar

The status bar reports status on the state of the reader, connected or disconnected. If a reader is connected it will display the connection type and the LUID value. If the reader is disconnected the status bar will read ‘Disconnected or No Devices Found’. It also shows many other status in utility of different activities like ‘Write’, ‘Reset to Stored’, ‘Cloning’ etc.

2.8 Timing Tab

Use this tab to configure the reader's card hold time (ID) and USB keystroke timing. The timing is presented in milliseconds.

Card Data Hold Time: This option determines how long the ID is held after the card is removed from the reader. The LED will remain green until the card hold time expires, then turn red indicating a new card can be presented.

The timing options can range from 50ms to 9950ms min/max (increments of 50 milliseconds). The default is set to 1000ms.

Continuous Read, Sends Data upon Read: The reader will continuously read and send the ID from the presented card.

Lock-Out Time for Repetitive Reads: The time it takes the reader to read another card must be equal to or greater than the hold time and is only done in 50 milliseconds increments.

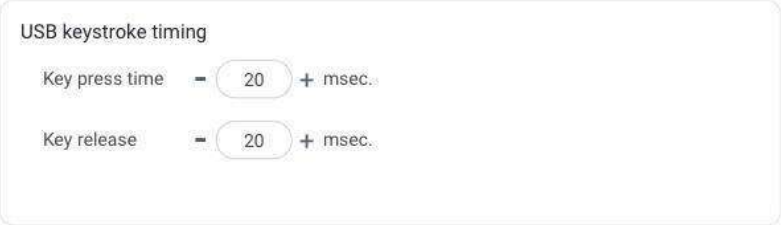
Lock-out time will be enabled only for single configuration readers.

Card Read Timing

Key Press Time: The length of time the key is held down. The minimum value is 0. The maximum is 640. The default is 20.

Key Release Time: Enter the time delay between keystrokes. If set to 0, the reader will output as fast as possible. The minimum value is 0. The maximum is 640. The default is 20.

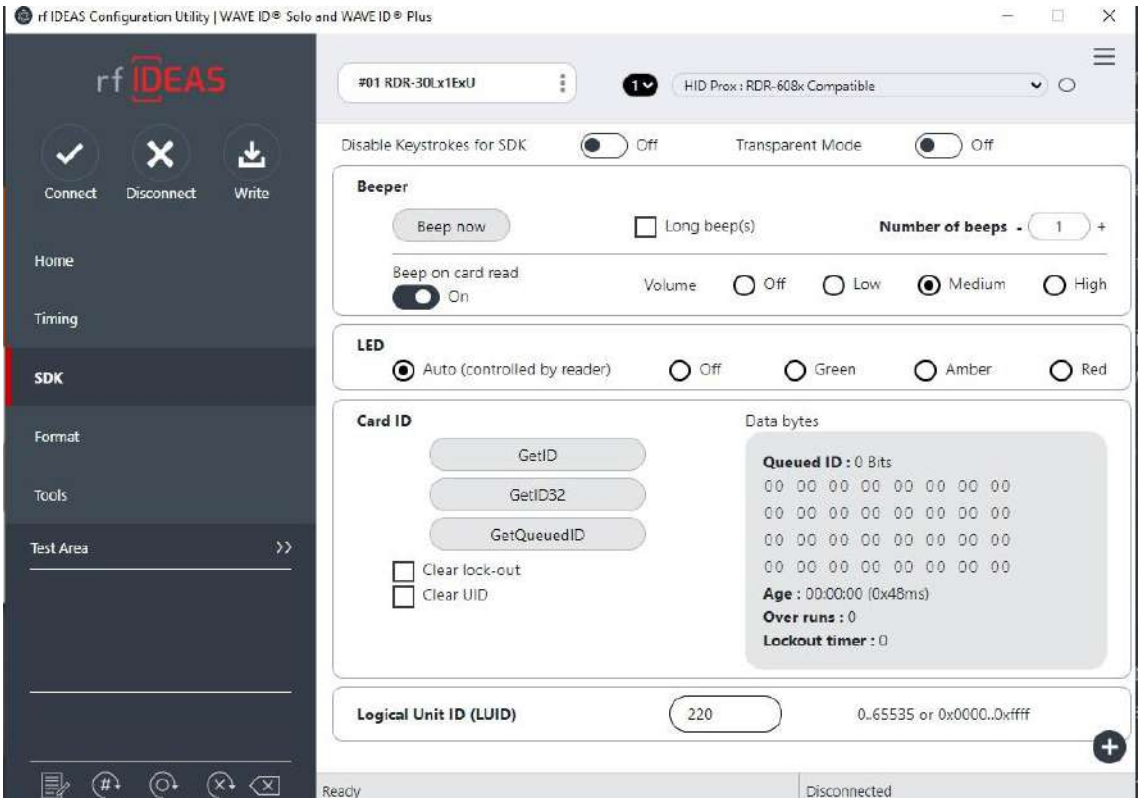
Setting the key press and key release time too high may result in digits in the card data to be sent more than once; Setting the key press and key release time too low may result in missed digits in card data.



USB Keyboard Emulation Timing

2.9 SDK Tab

Use this tab to configure the Software Developer's Kit (SDK) Get ID functions, enable and disable keystroking, enable and disable transparent mode, control BEEPER and LED behavior, and define device Logical Unit ID.



SDK Tab

Disable Keystrokes for SDK

Disable Keystrokes for SDK allows a user to turn keystroking on or off. It is always enabled for SDK type readers and cannot be disabled so this option is applicable only for keystroking type readers.

Transparent Mode

Transparent Mode functionality is only compatible with LEGIC 6300 readers. Users will only see the Transparent Mode toggle switch if a LEGIC 6300 reader is connected to the Configuration Utility.

The rf IDEAS LEGIC 6300 line of readers can be placed into Transparent Mode to allow users to interface directly with the LEGIC 6300 module. When the rf IDEAS reader is in Transparent Mode, users can connect to the LEGIC 6300 module using LEGIC applications like LEGIC Flasher Pro and LEGIC Development Kit Software (DKS).

Note that when an rf IDEAS LEGIC 6300 reader is placed into Transparent Mode, card polling is suspended. When the rf IDEAS reader is taken out of Transparent Mode, card polling resumes.

- The value shown in the toggle will be the current Transparent Mode status of the reader.
    - If the reader's Transparent Mode status is Off, then the toggle will be set to Off.
    - If the reader's Transparent Mode status is On, then the toggle will be set to On.
- Setting the Transparent Mode toggle to On or Off without writing to flash will temporarily place the reader in/out of Transparent Mode.
    - If user disconnects reader and then reconnects, then the Transparent Mode toggle will render the value in the reader's flash memory that was set before the user set the Transparent Mode toggle value.
- Setting the Transparent Mode toggle to On or Off, then writing to flash will set the Transparent Mode setting to the reader's flash memory.

LED

The desktop, surface mount, NANO, and non-housed model readers can be equipped with a LED.

Auto- Reader automatically sets the LED color: Red = Standby, Green = Credential Read, Amber = Device Enumerating or Firmware Updating.

Off- LED is OFF.

Red- LED is set to always be red.

Green- LED is set to always be green.

Amber- LED is set to always be amber.

Logical Unit ID

A user defined 16-bit number used to identify one reader from another.

Logical Unit ID

Beeper

If equipped, the reader can be configured to produce a beep when a credential is detected by the reader.

Enable Beep on Card Read- Enable this to set the reader to beep when a card is read. Default is set to ON.

Beep Now- Simulates BEEPNOW SDK Command to BEEP the reader according to “Long Beep” and “Number of Beeps.” It is reader configuration independent.

Long Beep(s) - By default, the beep is set to a short beep. 2 long beeps or 5 short beeps are allowed.

Number of beeps- The minimum is 1 beep and the maximum are 5 beeps. Default is set to 1 beep.

Volume

Applicable only for readers equipped with Volume Control.

OFF- Turns volume off

Low- Sets beeper volume to minimum level

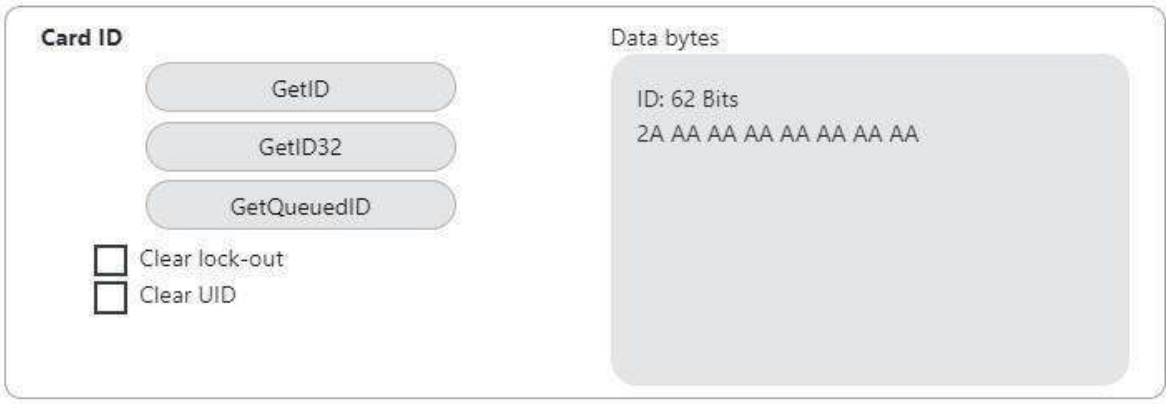
Medium- Sets beeper volume to mid-range level

High (Default) - Sets beeper volume to maximum level

Beeper

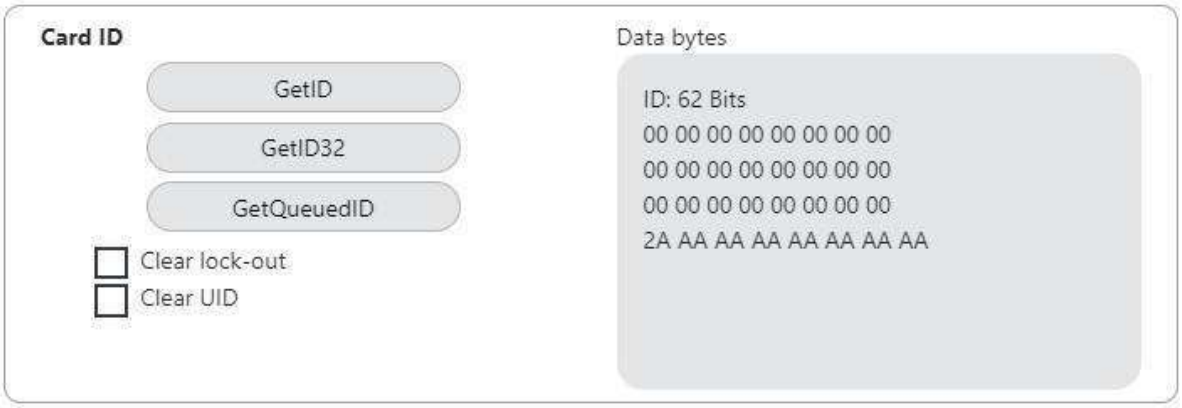
Card ID

GetID- Press while presenting a card. The ID will be displayed in the “Data bytes” window, 64 bits maximum.



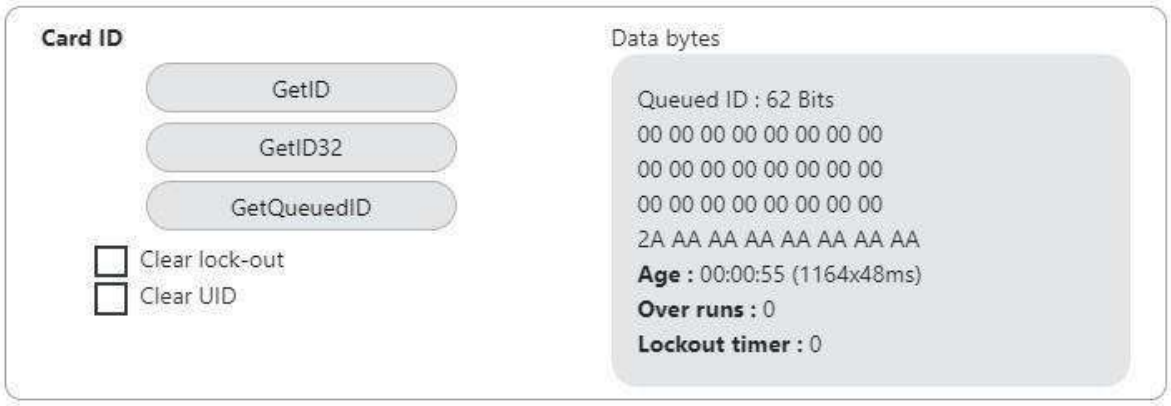
GetID Data Display

GetID(32)- Press while presenting a card. The ID will be displayed in the “Data bytes” window, 255 bits maximum.



GetID (32) Data Display

GetQueuedID- Pressing this button will return the data bytes for the last card read, 255 bits maximum.



GetQueuedID Data Display

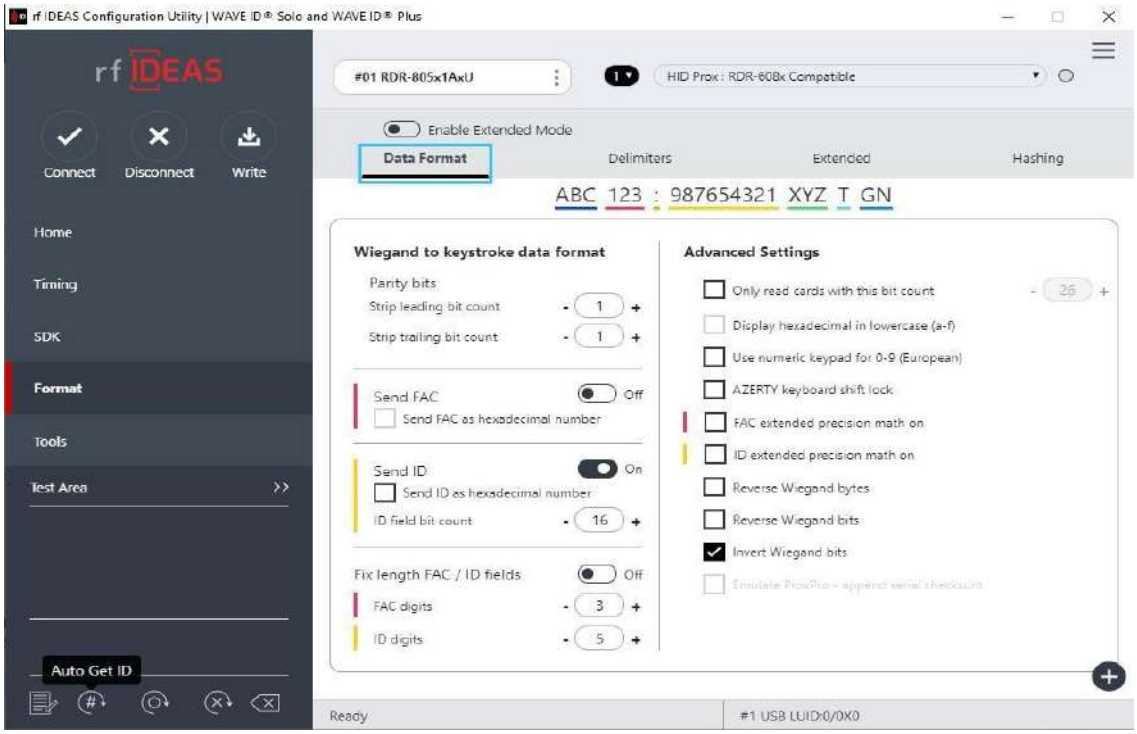
Clear Lockout- Check to clear the time remaining to allow the reader to read the next card immediately.

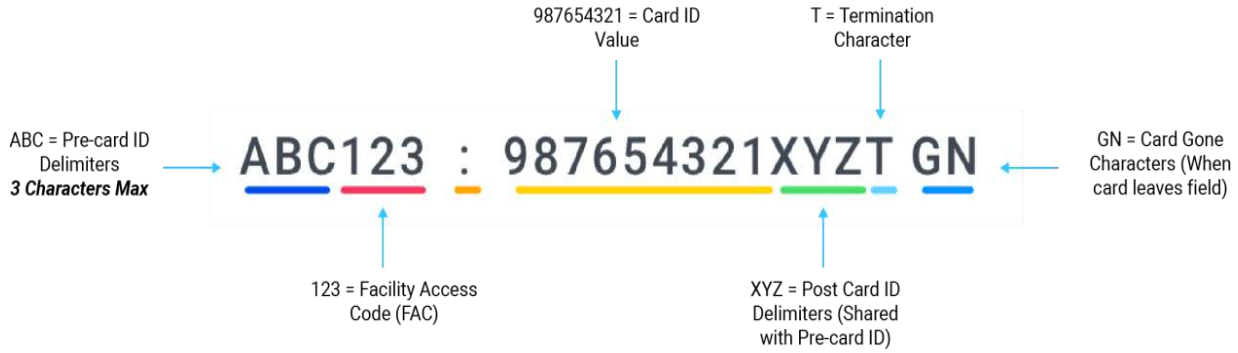
Clear UID- If Clear UID is checked, the card and the overrun counters will be cleared for the next read. If Clear lock-out is checked, the reader can read another card.

Age Format = HH:MM:SS displays - 00:00:55 Time since the last card read.

2.10 Format Tab

Data Format Tab





Data Format Tab & Data Character

Above image illustrates the various positions delimiter characters can be added to the card data. The numbered portions of the diagram are values FAC/ID from the presented card. The letter portions of the character diagram are created by the user by modifying the pre and post data delimiters in the utility and are keystroked with the FAC/ID.

Wiegand to Keystroke Data Format:-

Strip Leading and Trailing Bit Count: By altering the numbers in the leading and trailing bit count, users have the option to strip and discard bits from the card data. The leading and trailing bit counts can be set to range from 0 to 15 for single configuration readers and 0 to 142 for dual/four configuration readers.

Send FAC (Facility Access Code): Enables FAC out when the card is presented.

Send FAC as Hexadecimal Number: Sends FAC as a hex number, the default is decimal.

Send ID: Enables the reader to send the ID portion of the card data.

Send ID as Hexadecimal Number: Sends ID in hex format.

ID Field Bit Count: Sets the number of bits used for the ID, range is 8 to 80.

Fix length FAC/ ID Fields: Enables the FAC and ID to be set to a fixed length.

FAC Digits: The FAC output is set to a length of digits between 1 and 32. Zeros are added to the front (of the FAC portion) of the data to create a specific length.

ID Digits: The ID output is set to a length of digits between 1 and 32. Zeros are added to the front (of the ID portion) of the data to create a specific length.

Advanced Settings:-

Only Read Cards With This Bit Count: Only reads cards with the specified BIT Count, range adjustable 26 to 255.

Display Hex in Lowercase: Displays the FAC/ID in lowercase Hex format.

Use Numeric Keypad: Defines which keypad the reader will use.

AZERTY Keyboard Shift Lock: Displays the output as if it were being output from an AZERTY keyboard.

FAC Extended Precision Math On: Enables TRUE 64 bit math.

ID Extended Precision Math On: Enables TRUE 64 bit math.

Reverse Wiegand Bytes: Reverses data in byte chunks (8 bits = 1 byte). Example using 26bit card output in Hexadecimal:

Non-Reverse Wiegand Bytes: 37C3E80-
Reverse Wiegand Bytes: 803E7C03

Reverse Wiegand Bits: Reverses each bit. Example is shown below:

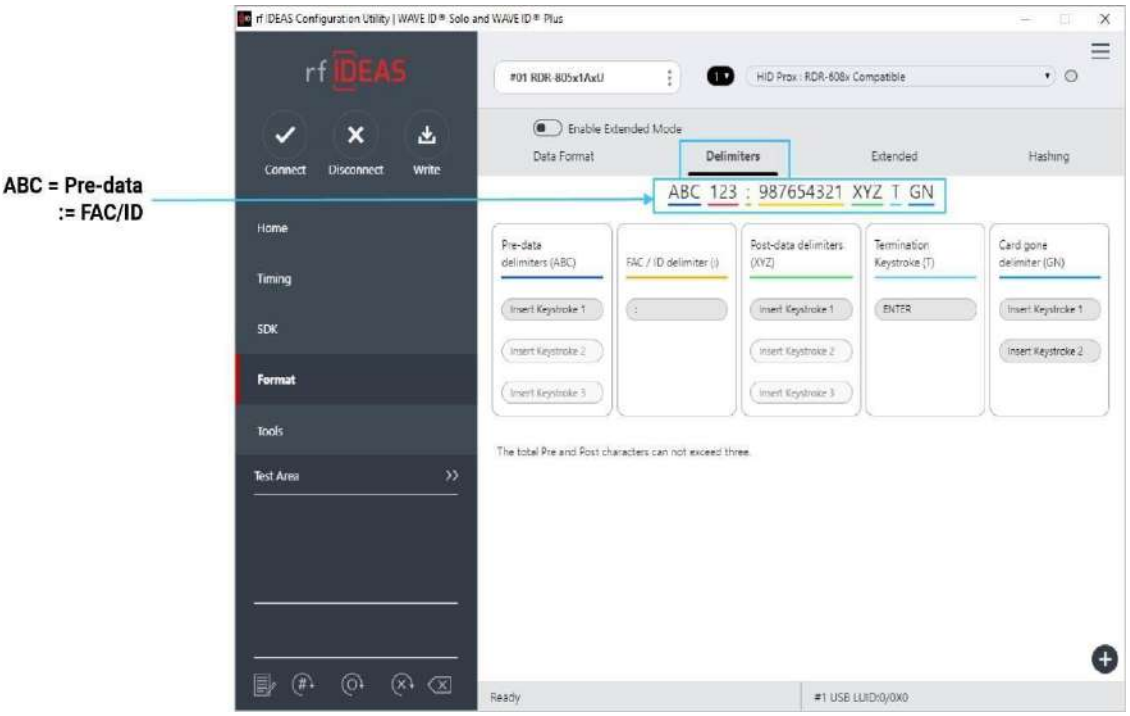
Non-Reverse Wiegand Bits: 37C3E80 = 11011111000011111010000000
Reverse Wiegand Bits: 05F0FB = 00000001011111000011111011

Invert Wiegand Bits: Inverts each bit. When looking at the binary string, it will change the 1's to zeroes and 0's to ones.

Emulate ProxPro-Append Serial Checksum: This option is only for serial readers. It adds a digit to the end of the serial data. It emulates the serial data format to match HID Corp. Prox Pro reader by sending a 2-byte checksum after the card data.

Delimiters Tab

The delimiter tab provides a way for users to add pre or post keystrokes to the card data. Click the appropriate keyboard icon to select the appropriate corresponding delimiters.



Delimiters Tab

Pre-data Delimiters (ABC): Select from 0 to 3 characters to display at the beginning of the card data. These characters are shared with the post string of characters.

FAC/ID Delimiter (:): Select a character to display between and separate the FAC and ID data.

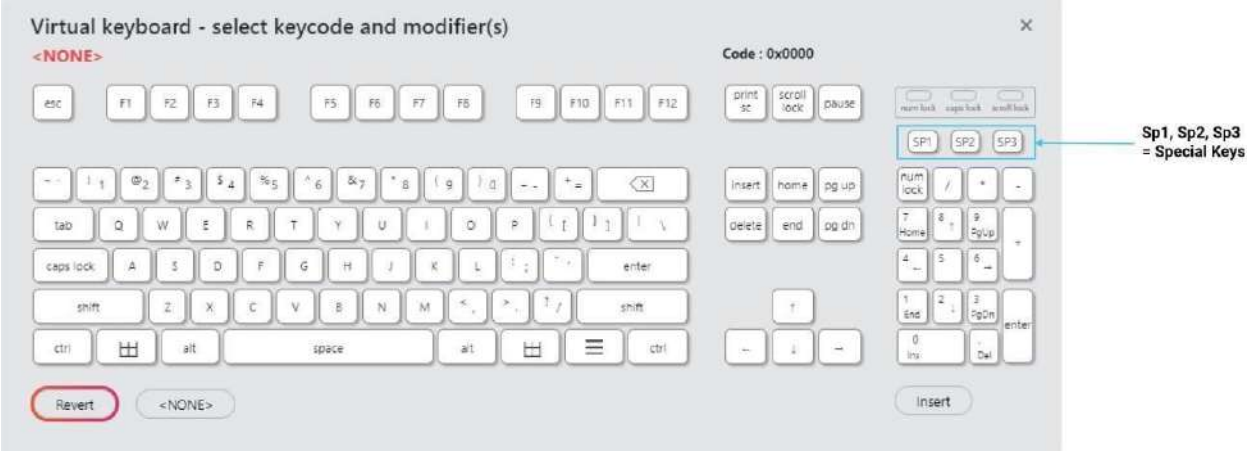
FAC/ID Delimiter

Post-data Delimiters (XYZ): Select from 0 to 3 characters to keystroke to the end of the card data. These characters are shared with the pre string of characters.

Termination Keystroke (T): Adds a keystroke to the end of the card data to signify the end of the card data.

Card gone delimiters (GN): Adds a keystroke to the end of the card data when the card is removed.

Delimiter Keyboard:



Delimiter Keyboard

The Delimiter Keyboard is used to select user defined delimiters (keys). Once opened users can:

Left Click: Selects desired delimiter (key).

Revert: Takes user back to previously inserted delimiter choice.

<None>: Deletes any selected/inserted delimiter.

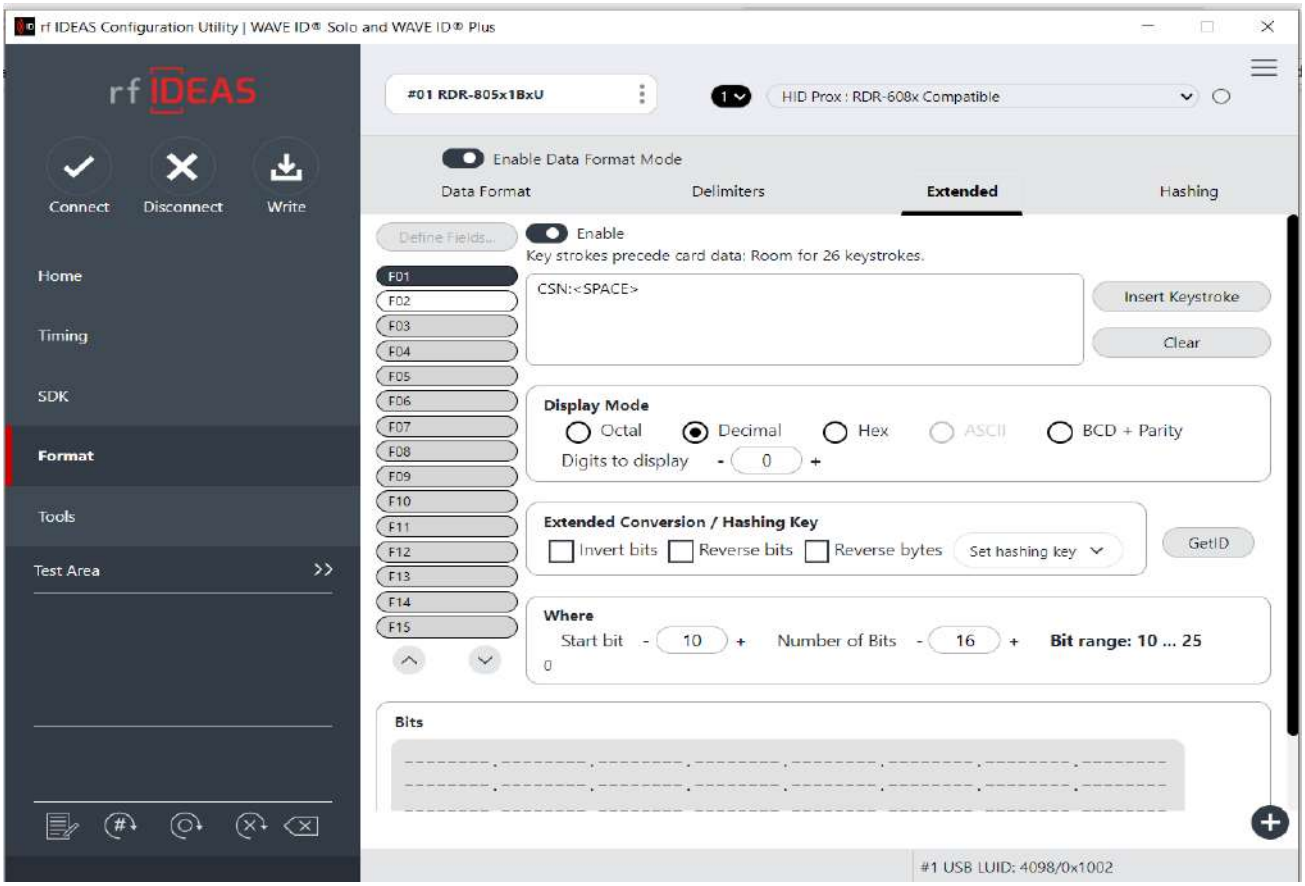
Insert: Applies selected delimiter to be used.

Special Keys - Sp1, Sp2, and Sp3

There are some additional measures that can be taken to make it more difficult for unauthorized users to reproduce passwords, such as, by adding additional keystroke characters to the card information that is difficult to reproduce, while configuring the data. These additional characters are labelled Sp1, Sp2, and Sp3 on the delimiters Virtual Keyboard. The Sp1, Sp2, and Sp3 keys are used only for keystroking environments to send unprintable characters to a specified application.

Extended Tab

The Extended feature gives the user the ability to break the raw card data into multiple fields, create pre and post delimiters for each field, and perform data conversion on the raw data in each field. The user can create up to 31 delimiters depending on the number of enabled fields and the number of delimiters per field. Please note that only one mode can be enabled at a time of Data Format & Extended.



Extended Tab

Enable- Press the button to enable or disable the selected field. This allows the delimiters to be created and sent when the selected bits are processed.

The settings made on different field(s) will persist only when 'Write' button is clicked to save them.

- When any of the field(s) is disabled and 'Write' operation is not performed, settings of that particular field will not recover on enabling it again so it is best advised to always save the settings via ‘Write’ button present in Icon Toolbar. However, in case of above scenario, you may re-connect the reader. It will bringthe reader to its last saved settings from where you will need to do the settings allover again.
- If you would like to do extend settings from scratch follow the steps mentioned below:-
    A. Bring the WaveID reader to its defaults from (Hamburger Menu > Device Menu > Reset to Factory Defaults).Move to desired configuration #.

    B. Enable the extend mode on that configuration#. Click on ‘Write’ to save extend mode in the reader.
    C. Open the Get ID and present the card. The GetID box will close automatically in few seconds.
    D. Start making changes in extended settings afterward and click on ‘Write’ in the end to save those.

GetID – Press the button and present the new card to the reader, this must happen each time a new card is used. The information is used to set the max number of bits on the card and the bits displayed in bit window of the utility.

Define Fields- It is only available for the FIPS 201 RDR-7P71AKU and OEM chuid board reader types. Pressing this button will let the user select from the list of predefined card formats.

Start Bit- Enter a number to define the left most significant starting bit for the field.

Number of Bits- Enter the number of bits used for the field data. This value is added to the Start Bit to define the range of bits used in the field.

Insert Keystroke- Enter the delimiters in the delimiter text box (USB readers). Delimiters for serial readers are entered using the virtual keyboards.

Clear- Pressing the clear button will clear the delimiters in the delimiter text box.

Decimal- Enables the reader to output the card field in decimal format.

Hex- Enables the reader to output the card field as a base 16 number in uppercase hex.

ASCII- Displays Card Data in ASCII Character Mode, where every byte represents a printable ASCII Character. The ASCII data bit field shall be in multiples of 8 bits and each field bit pattern must define a printable ASCII character (0x20 thru 0x7F); otherwise, warnings (?…) will be displayed in the lower left portion of the "Where" box on the rf IDEAS Configuration Utility Extended TAB screen.

NOTE:-

- ASCII Extended Mode is available only for Secure Type Readers that are compatible with MIFARE DESFire EV1/EV2 Cards, LEAF Smart Cards, and similar technologies. For readers supporting ASCII Character Mode, contact Sales@rfideas.com. See ASCII Extended Procedure in the Appendix to configure reader for ASCII Extended Mode Configuration.
- Before the reader can be configured in the ASCII Display mode, the reader must be preconfigured in advance using the Smartcard Manager Utility. Contact techsupport@rfideas.com for more information.

BCD/Parity- Enables the reader to output the card data in binary coded decimal, where each 5 bits represent 1, 2, 4, 8, and parity.

Octal- Enables the reader to output the card data in Octal.

Invert Bits- Inverts the bits from the card.

Reverse Bits – Reverses the bits from the card.

Reverse Bytes- Reverses the bytes from the card.

Hashing Key- The Hashing Key selection box allows the user to select the key they created to use for encrypting the selected field. The options are “Off, “A” or “B”.

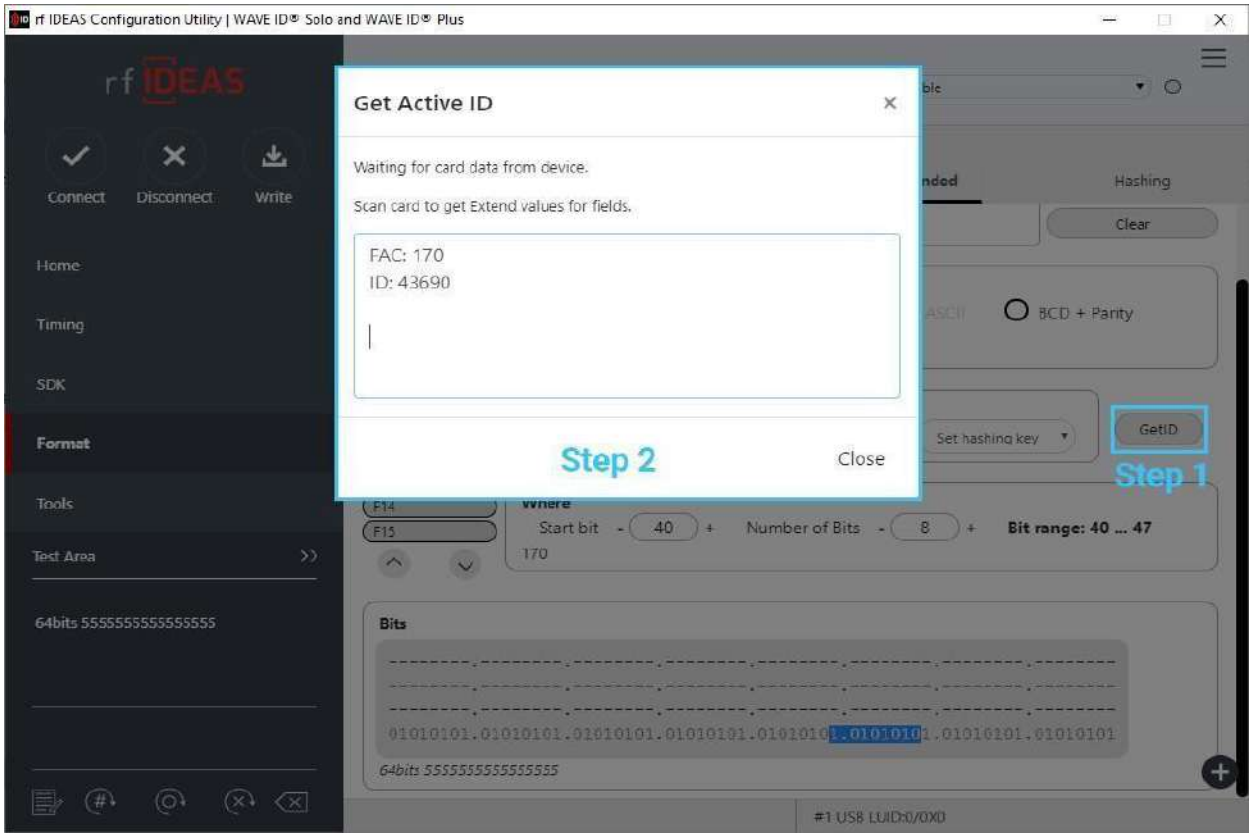
Digits- Used to set the number of digits the reader will output for the selected field.

Up arrow- Click to move the highlighted field up one position.

Down arrow- Click to move the highlighted field down one position.

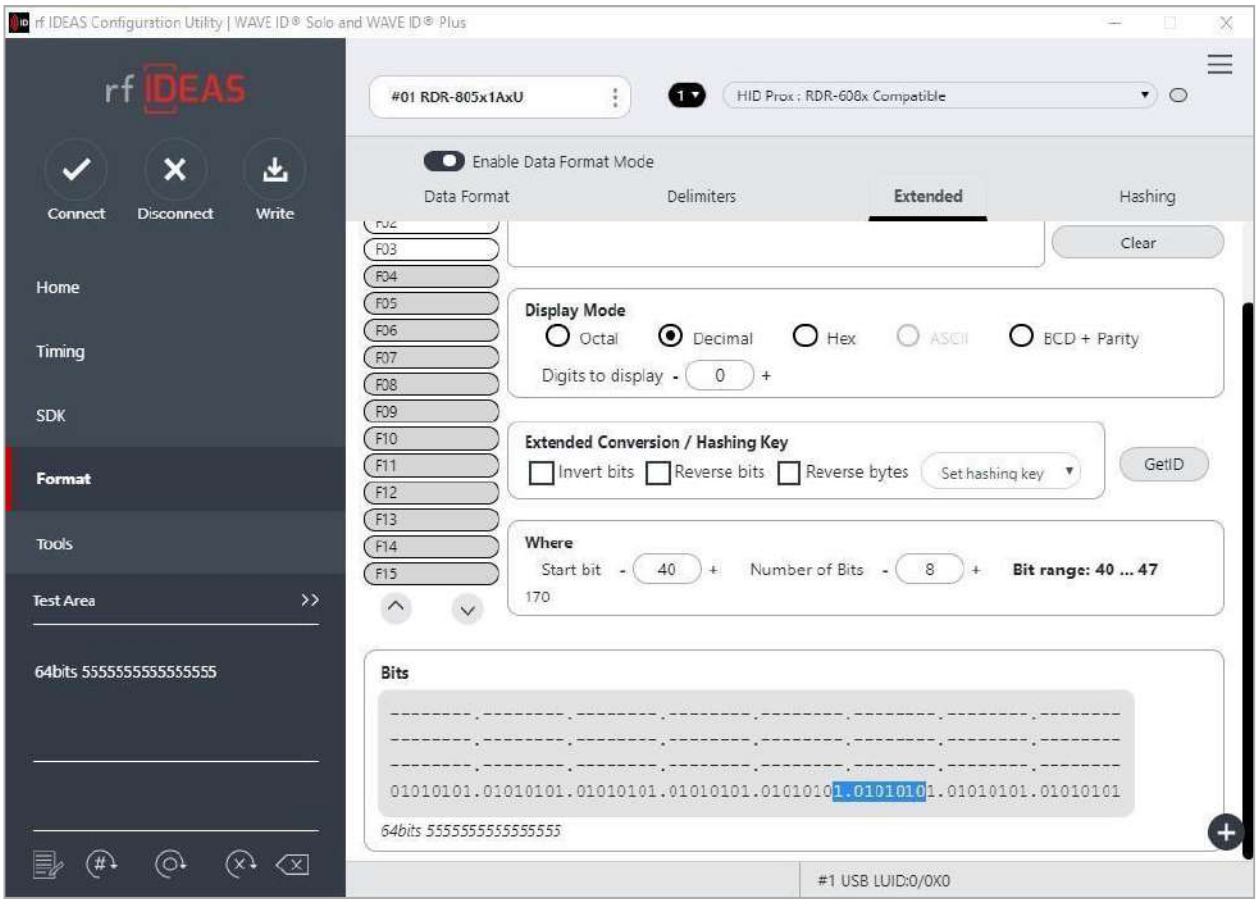
Example Configuring WAVE ID Plus Reader using Extend:

1. Enable extended mode. Select the card type from list and save it using Write button.
   Click GET ID and present the badge.



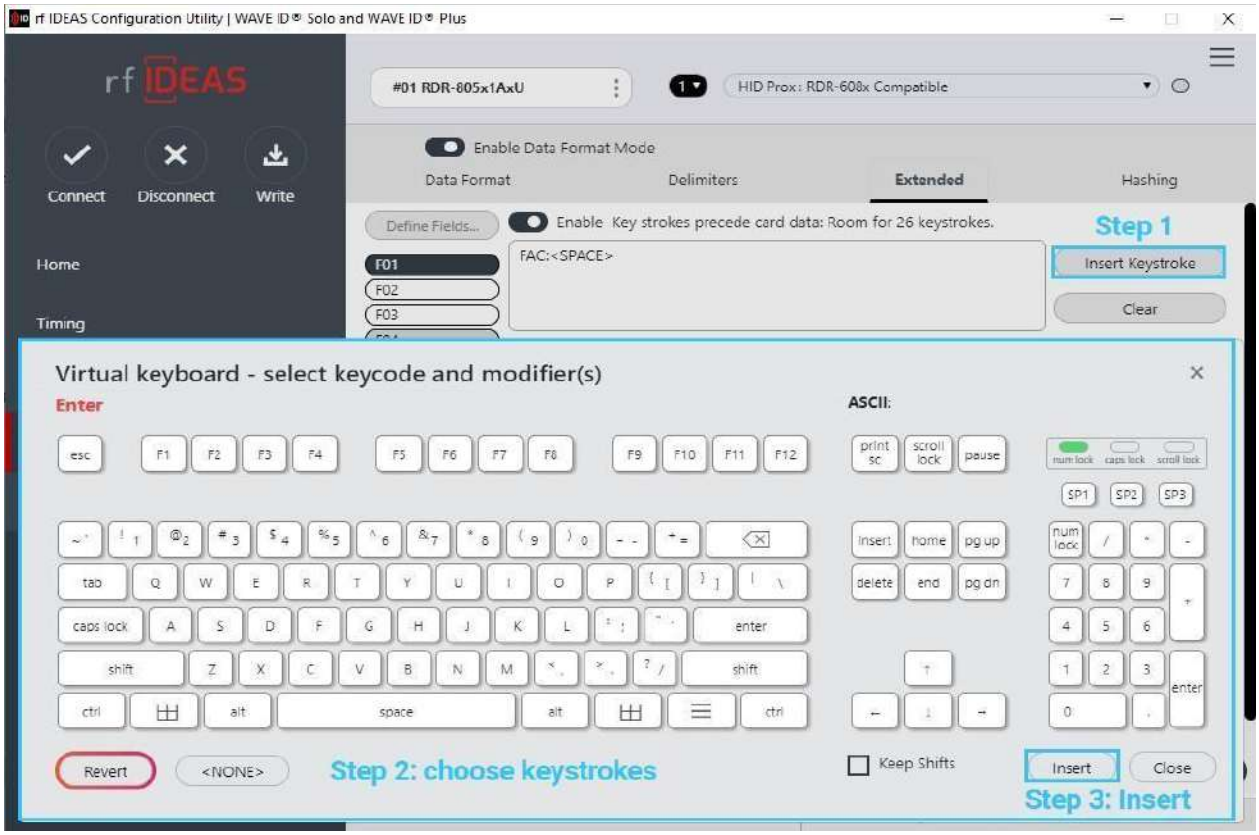
Taking output on GetID box

2. Click Close. You will then see your card data in Binary in the grey field.



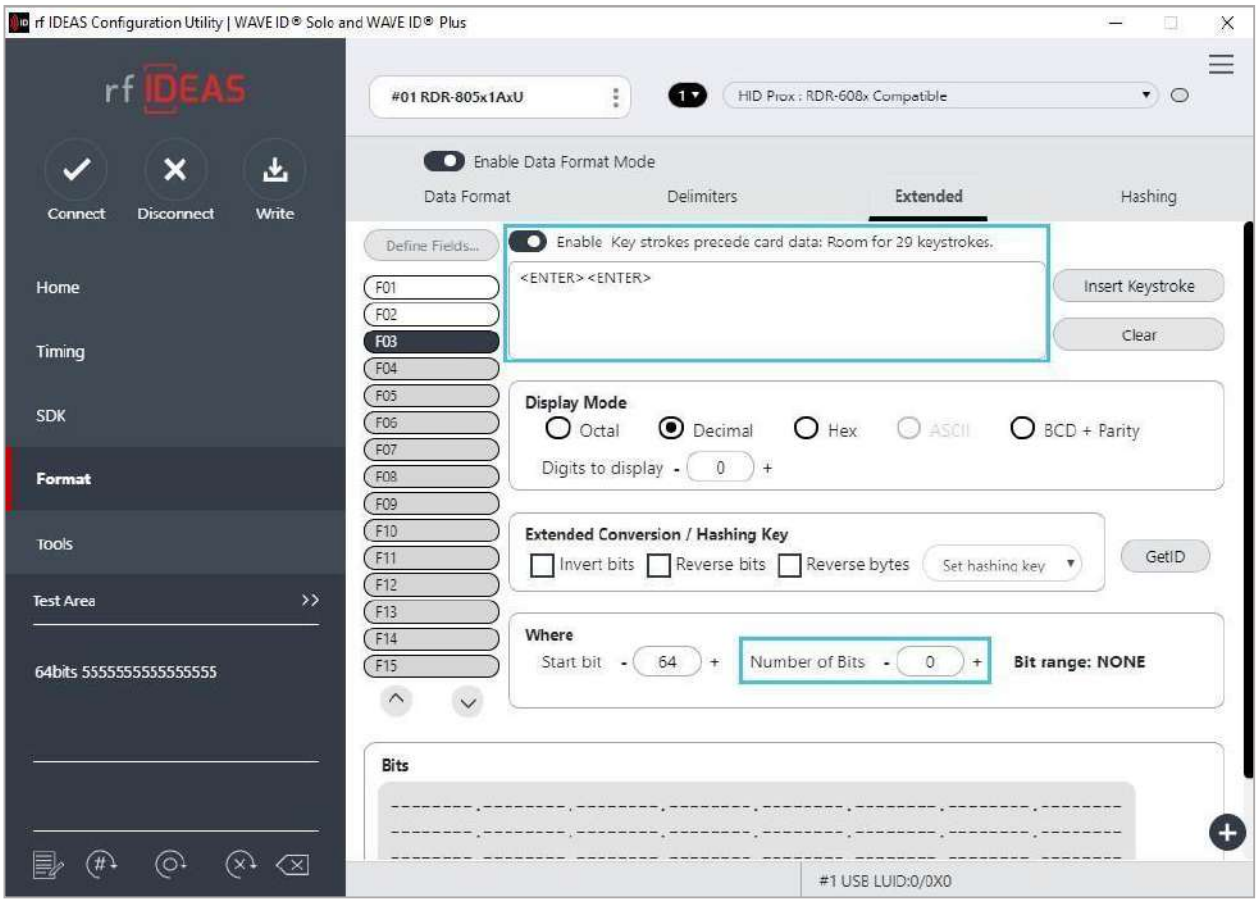
Bits area after taking output on GetID box

3. Choose your start bit and number of bits for each field that is enabled.
4. Add keystrokes to the field as needed by clicking on the virtual keyboard. These keystrokes will precede the card data for the selected field.



Virtual Keyboard in Extended mode

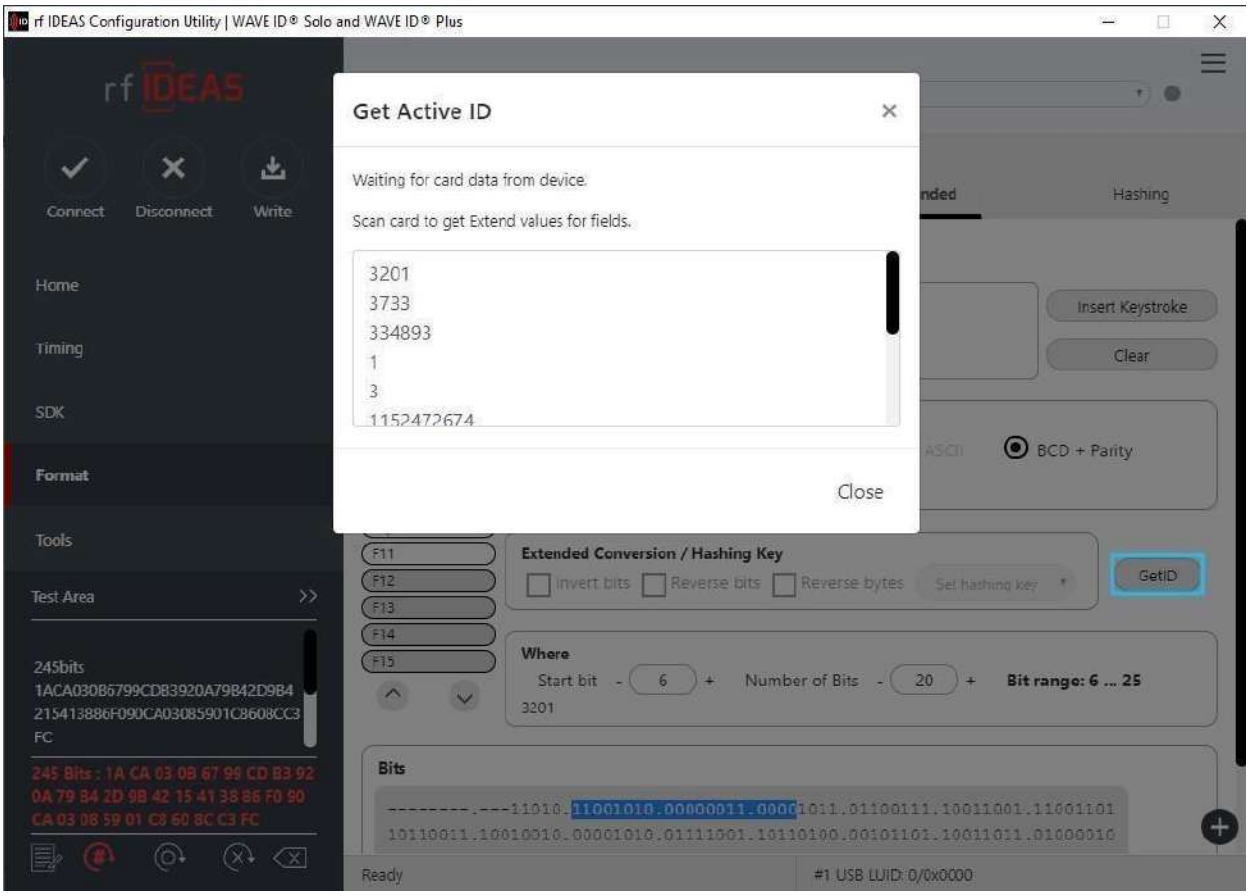
HINT: If you need an ENTER key after the card data, enable the next field and set number of bits to ZERO. Add an enter in the keystrokes box. See example below:



Inserting ENTER at end of data in last enabled field

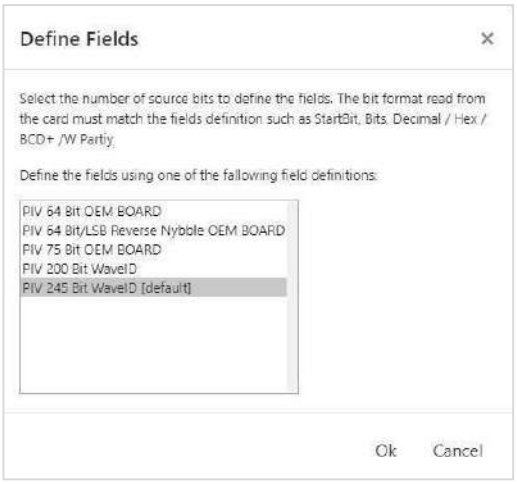
Example configuring FIPS201 Reader using Extend:

1. Click “GetID” and present the card to the reader.



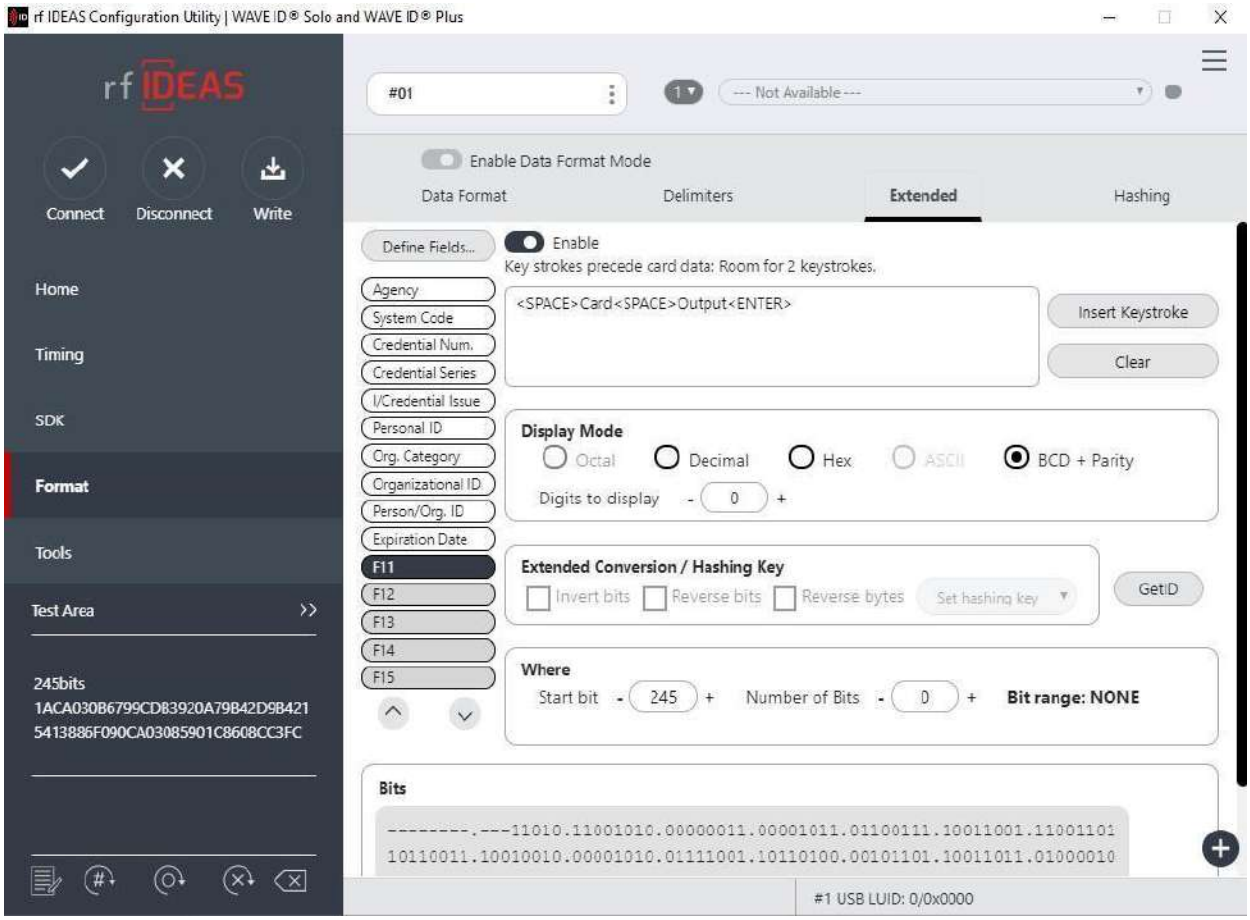
Get Active ID Pop

2. Define the fields to match the specific output. There are 5 predefined configurations for FIPS201 cards.



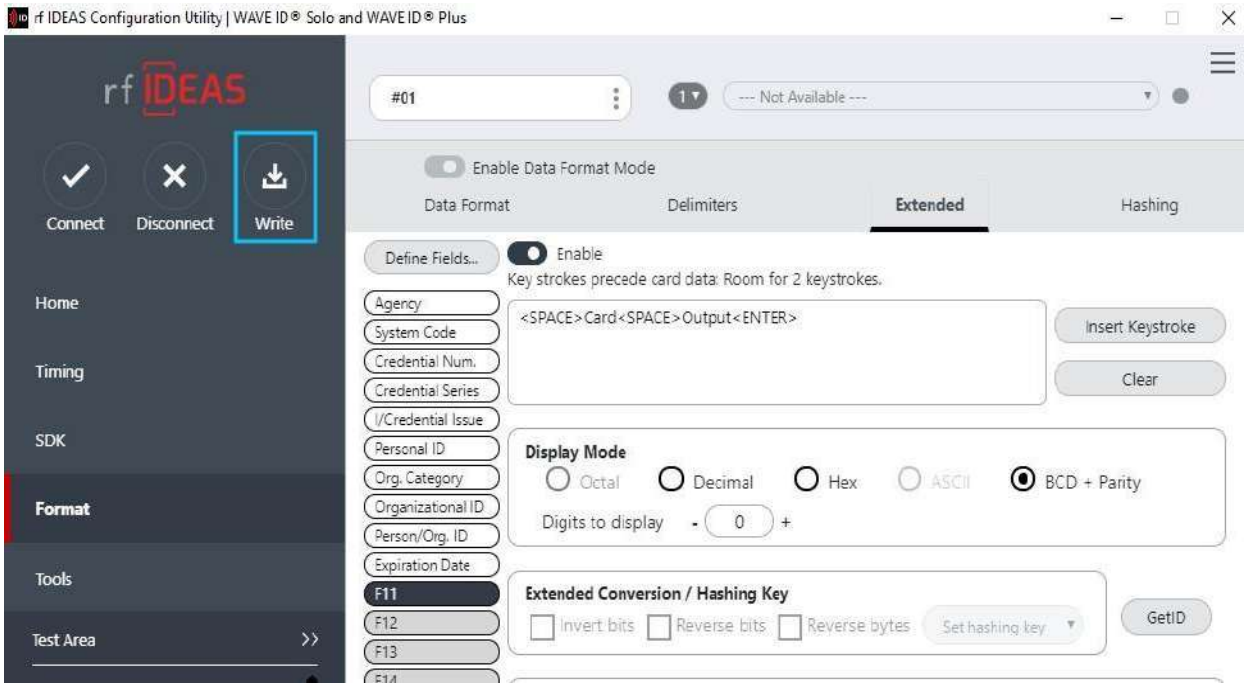
Define Fields Dialogue Box

3. Configure any additional fields as appropriate.



Configuration of Additional Fields

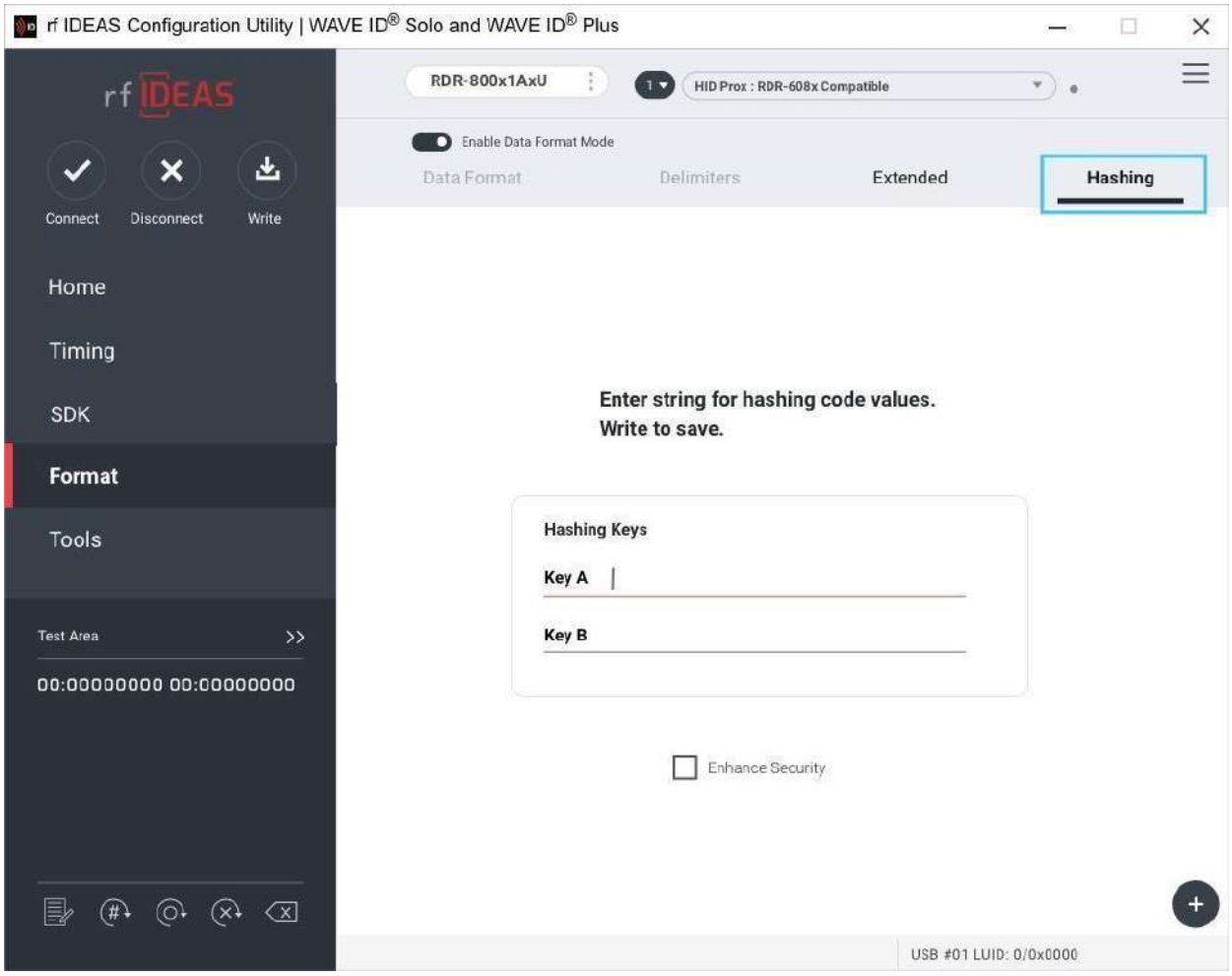
4. Save the configuration to memory.



Saving Configuration to Memory

Hashing Tab

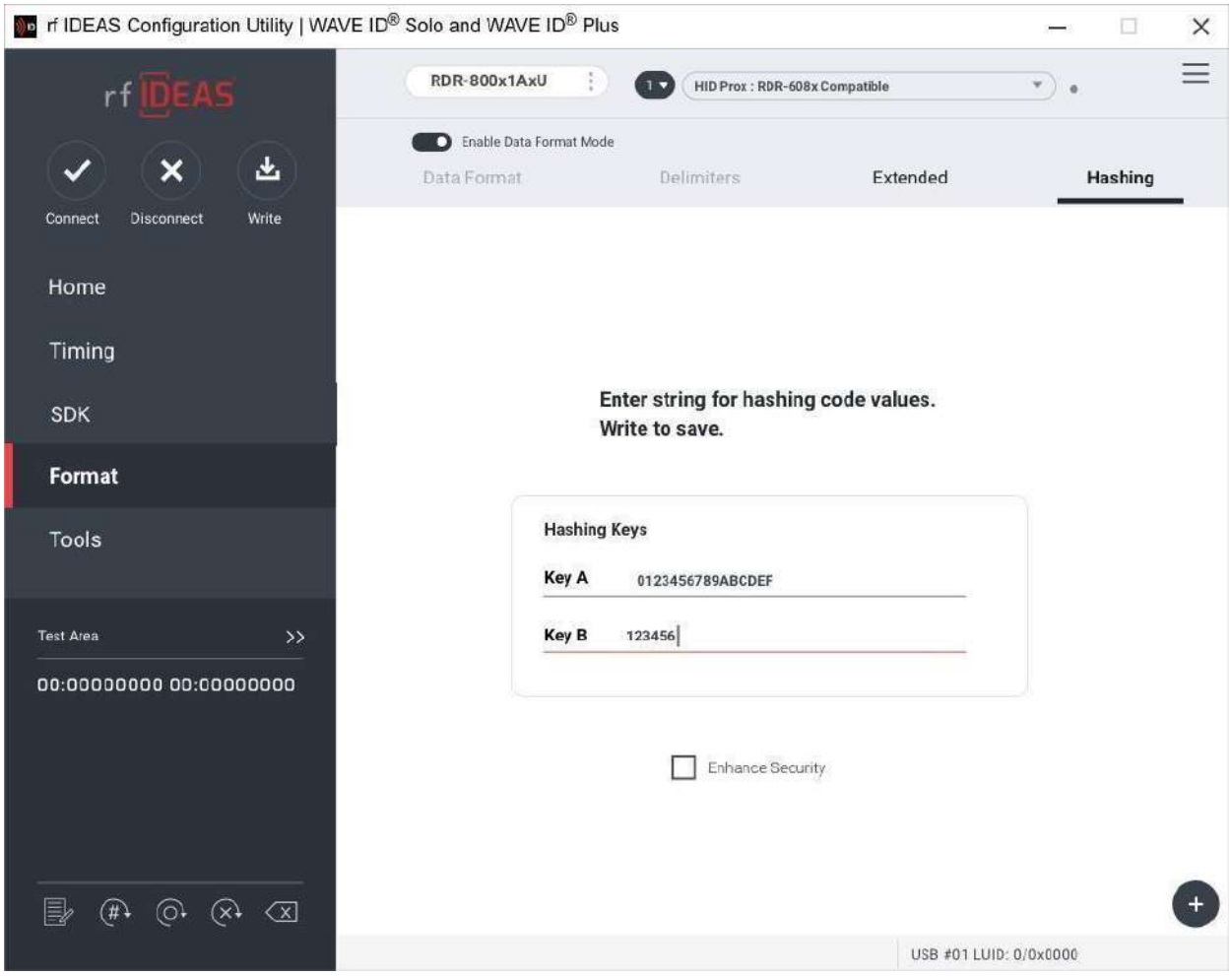
Hashing tab is used to store two configurable 16-character Hash Keys to the readers memory. The Hashing Keys can be selected using the Hashing Key drop down box available on the Format tab to enable hashing for the selected field data. The keys are used to encrypt the selected field data and protect the reader from unauthorized changes.



Hashing Tab

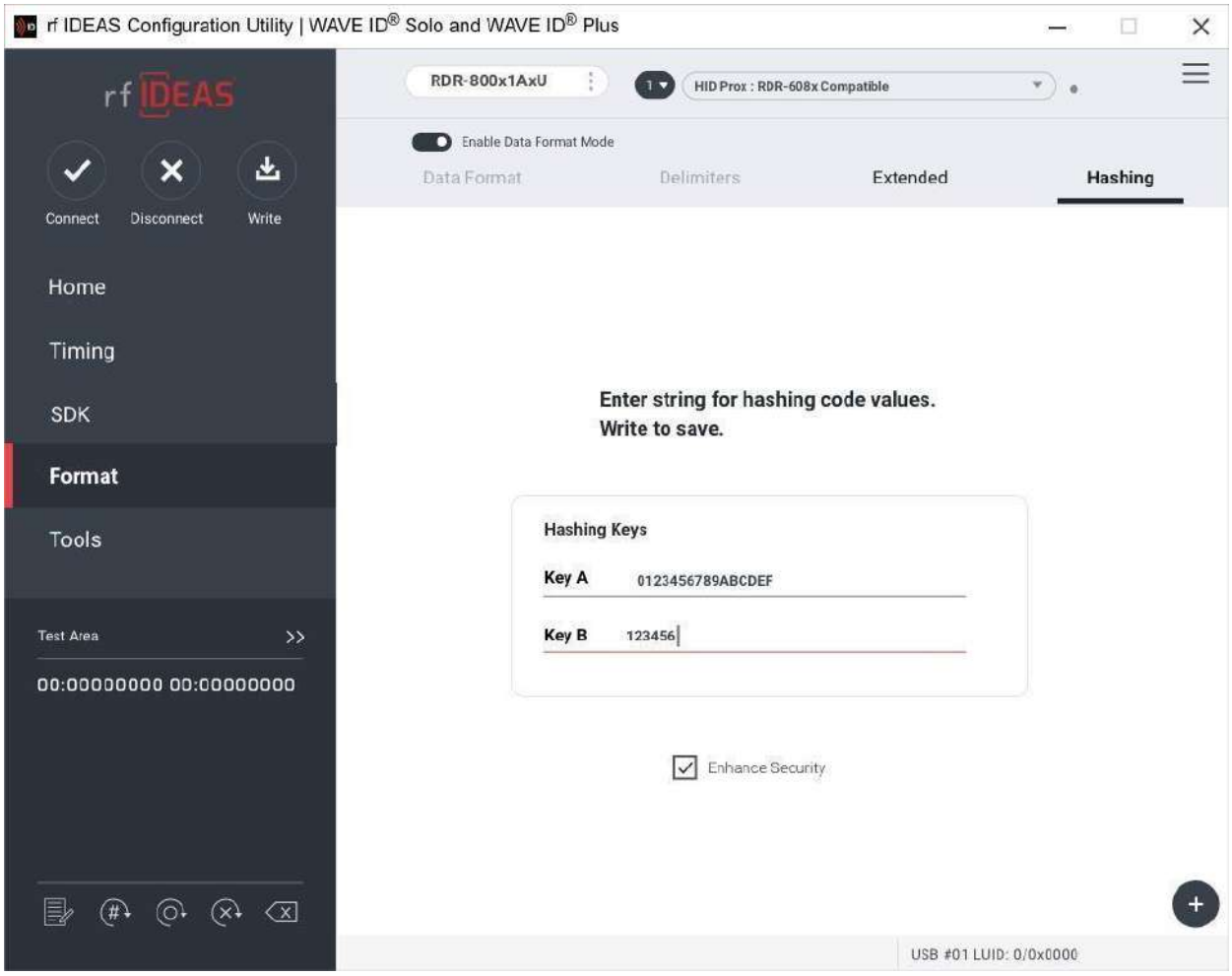
Only the WAVE ID Plus with extended feature supports the hashing feature.

FUNCTION	DEFINITION
Key A	Sixteen-character hashing key A.
Key B	Sixteen-character hashing key B.
Enhance Security	Erase the security keys if the user does a reset to defaults or tries to write new keys



Hashing Code Values

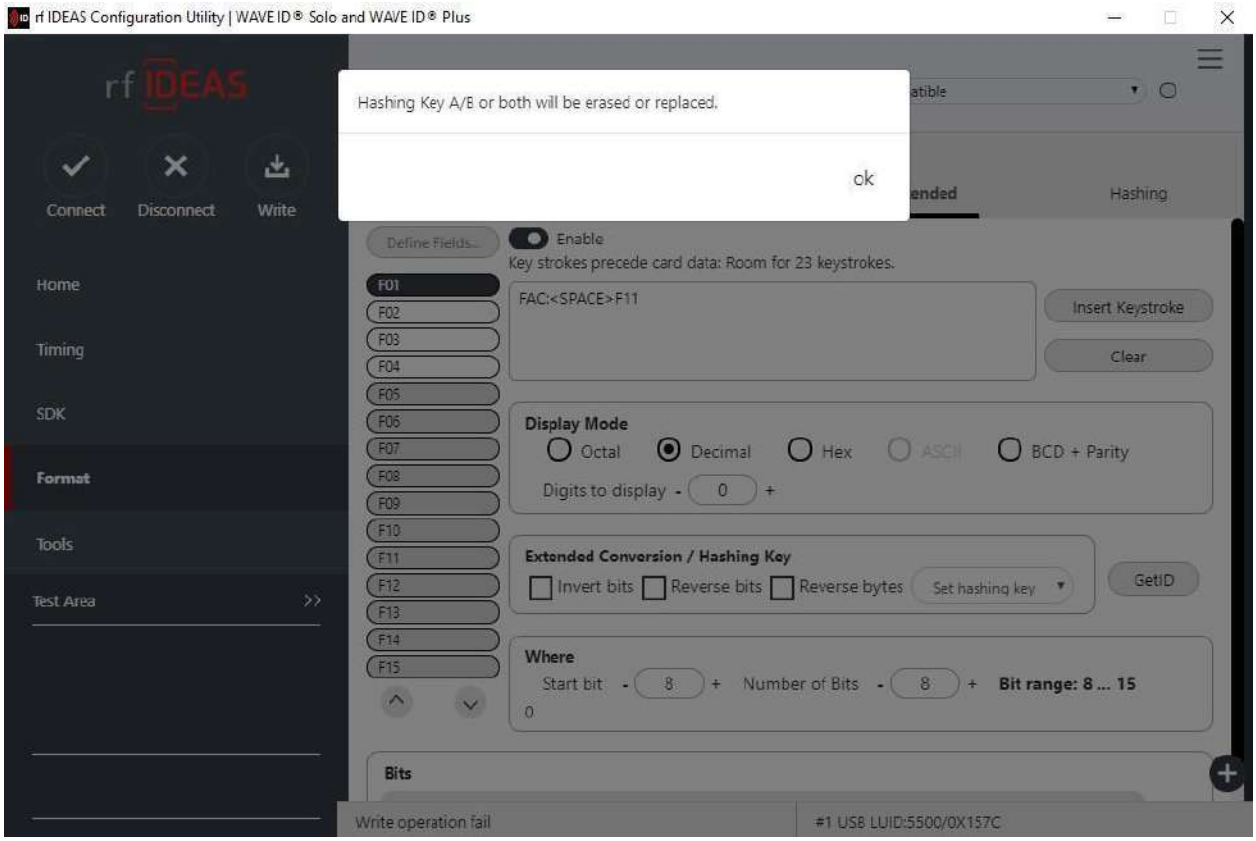
The user can enter a maximum 16 characters string in one or both fields to create the new hashing key or keys. If a user enters less than 16 characters, the string will be padded with null values. After successful write operation, the application will clear the hashing text boxes.



Enhance Security Enable Box

Entering the Hashing Key or Keys, checking the Enhance Security box, and pressing the Write button enables the Enhance Security feature.

The user can enter the keys or enable the security function separately.



Write Warning

The Enhance security feature removes the Hashing Keys if the user tries to reconfigure the reader after the security feature is enabled. Pressing the "Write" button after the security flag is set, will cause the application to reset the Hashing keys and write the new configuration. A warning popup window will appear (as shown above).

The user can change the extended fields without resetting the Hashing Keys, when the reader is in extended mode and the security feature disabled.

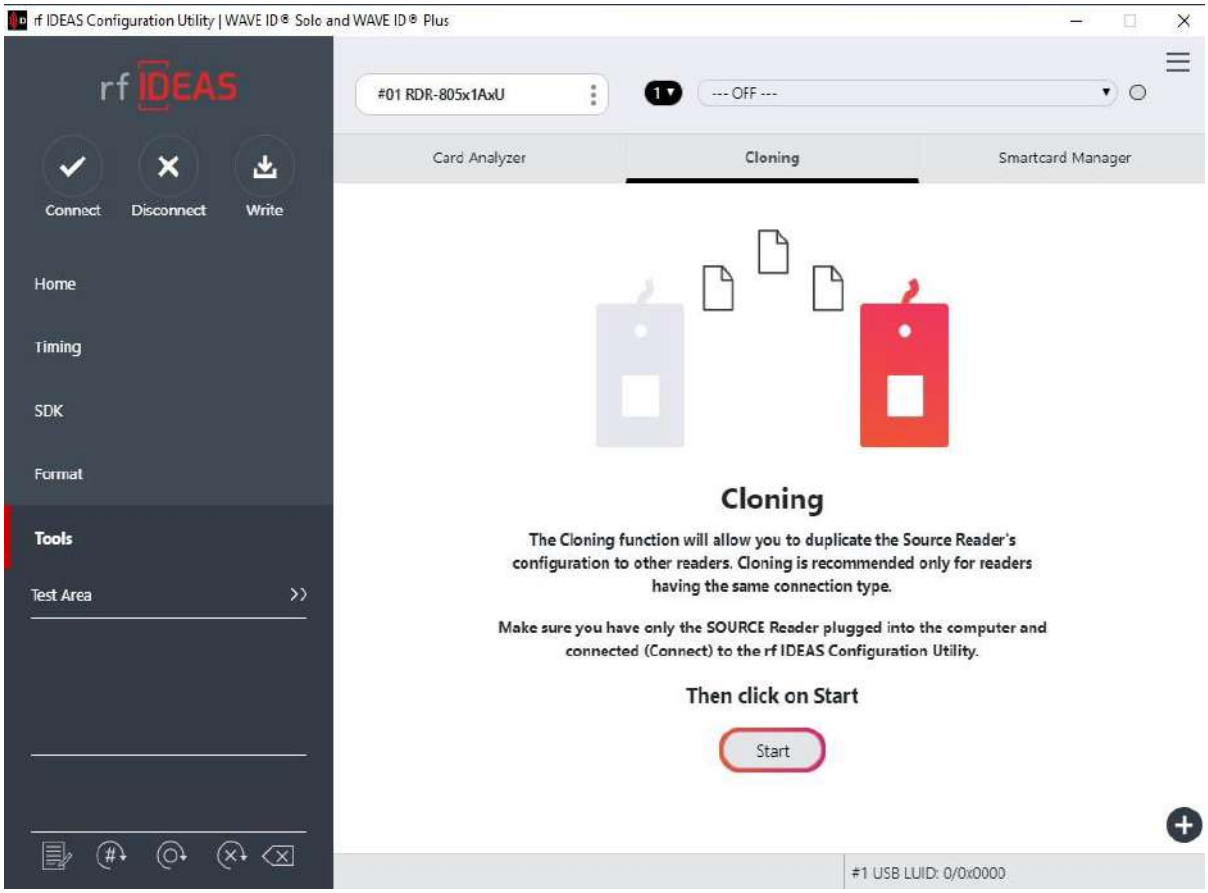
The "Reset to default" operation will clear the both Hashing Keys and the Enhance Security flag.

2.11 Tools Tab

Cloning

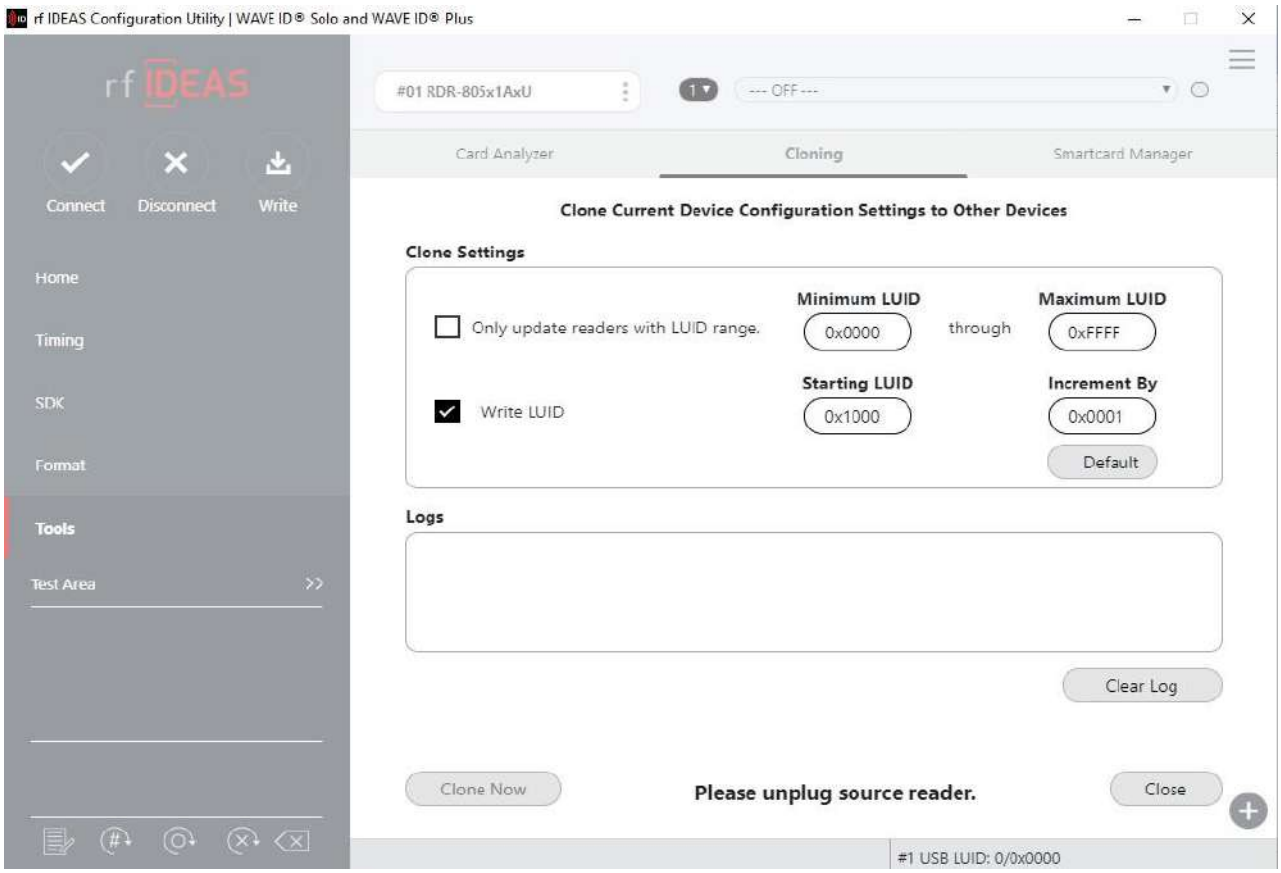
The Cloning feature clones the current reader configuration settings to other readers.

1. Plug in only source reader to system and click the “connect” button to connect the reader to utility.
2. Under the “Tool” tab, select Cloning and click on “Start” button.



Starting the Cloning Process

3. The cloning window will appear as shown below:



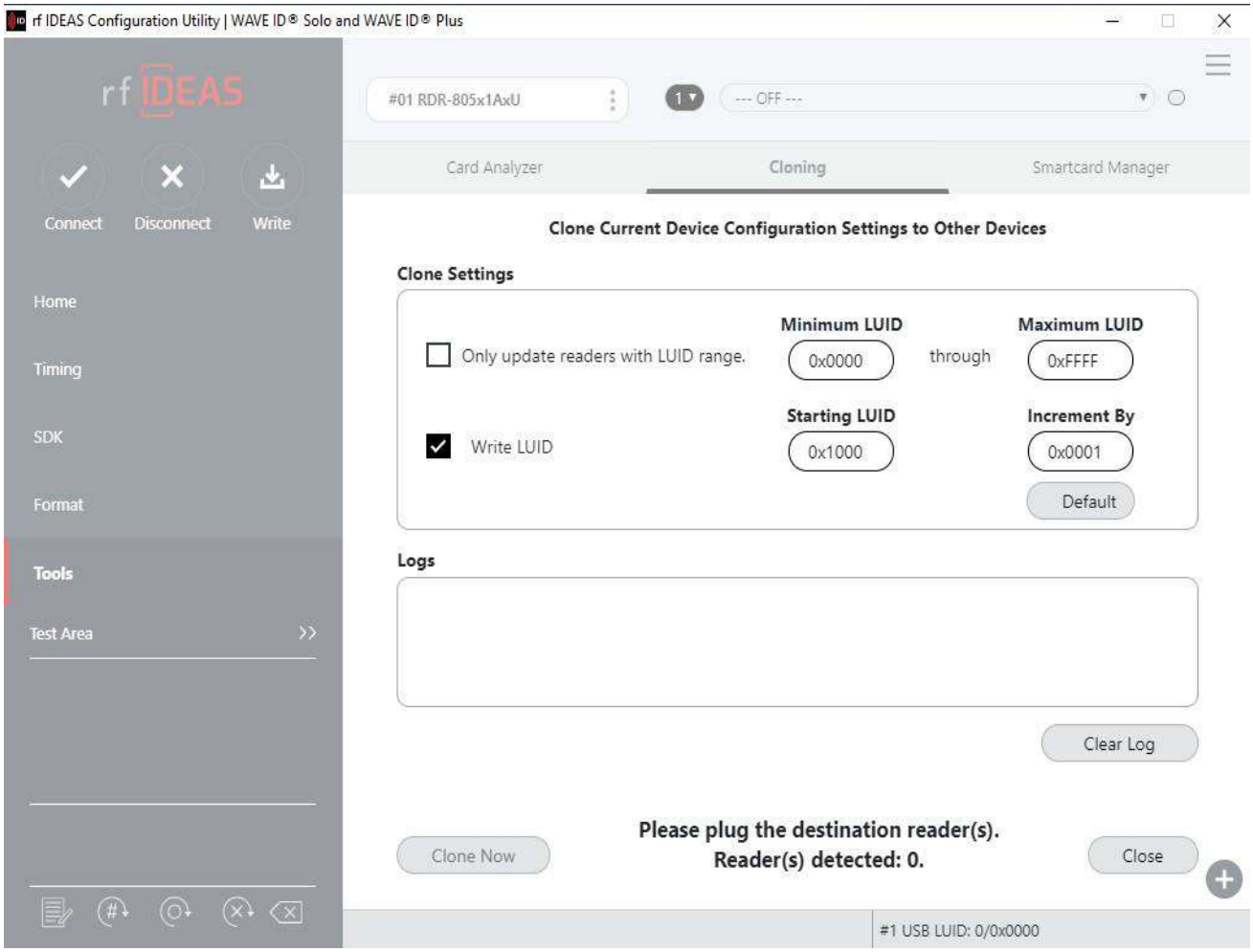
Clone Configuration Reader Dialogue Box

To enter LUID value in hex use '0X' prefix.

The range displayed in the Minimum LUID and Maximum LUID fields will only come in effect when the "Only update readers within the LUID range" option is selected. Starting LUID and Increment by fields will be written in the new readers only when the "Write LUID" field is checked.

4. Disconnect the source reader.

FUNCTIONS	DESCRIPTIONS
Only update readers within the LUID range	Check to filter which readers will be cloned. Uncheck to clone all readers.
Minimum LUID	Minimum LUID value to filter a range of readers to be cloned. Default is 0x0000.
Maximum LUID	Maximum LUID value to filter which readers will be cloned. Default is 0xFFFF.
Write LUID	Check to write a new LUID to the reader after cloning.
Starting LUID	The next LUID value to be written. Default is 0x1000.
Increment by	Adds Increment by value to the LUID after writing to the reader. Default is 0x0001.
Default	Reset the fields to their default value.
Log	Logs of cloning process.
Clear Log	Clears all log info from Log area.

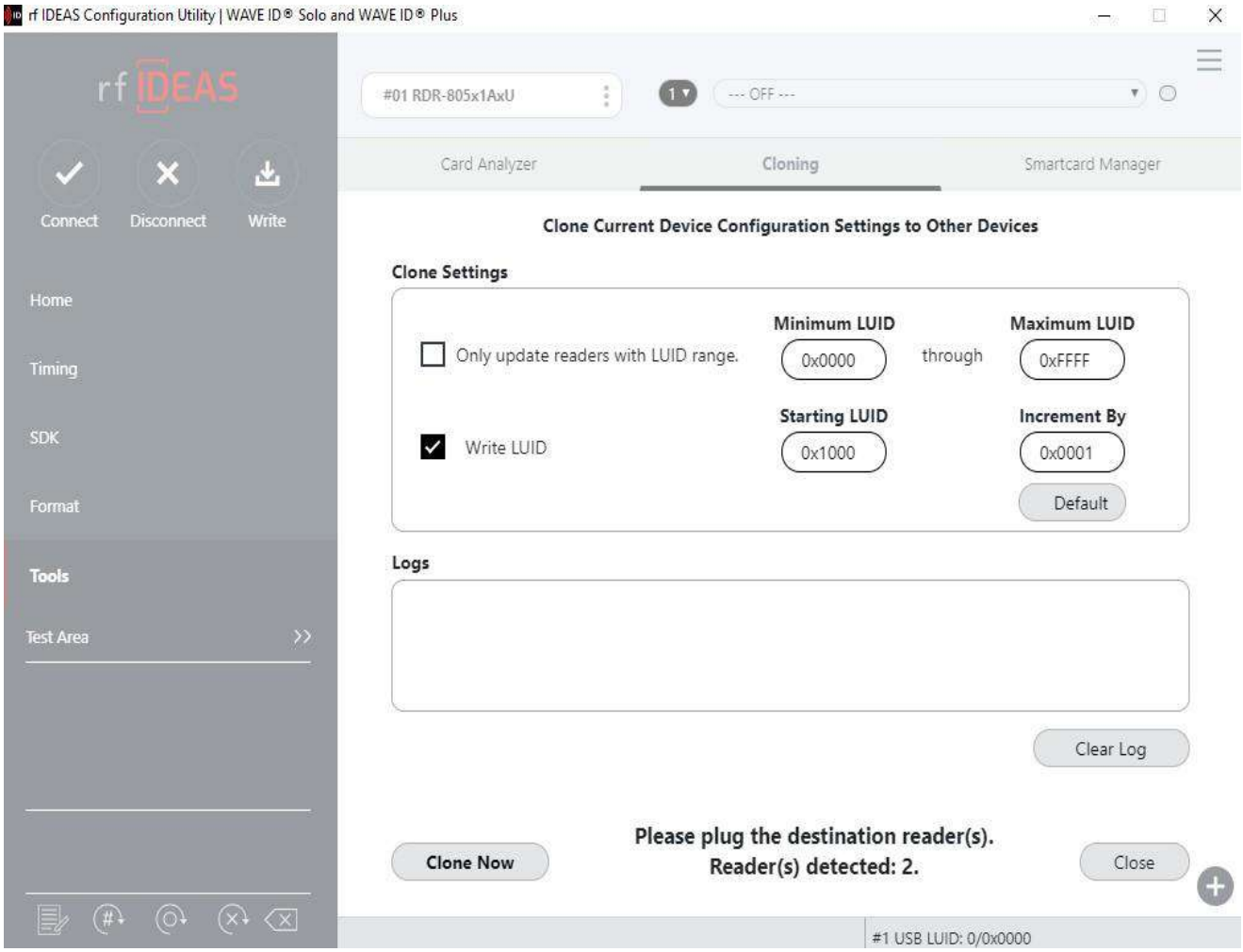


Reader Disconnected

If there are multiple readers to be cloned, it is recommended a HUB be utilized.

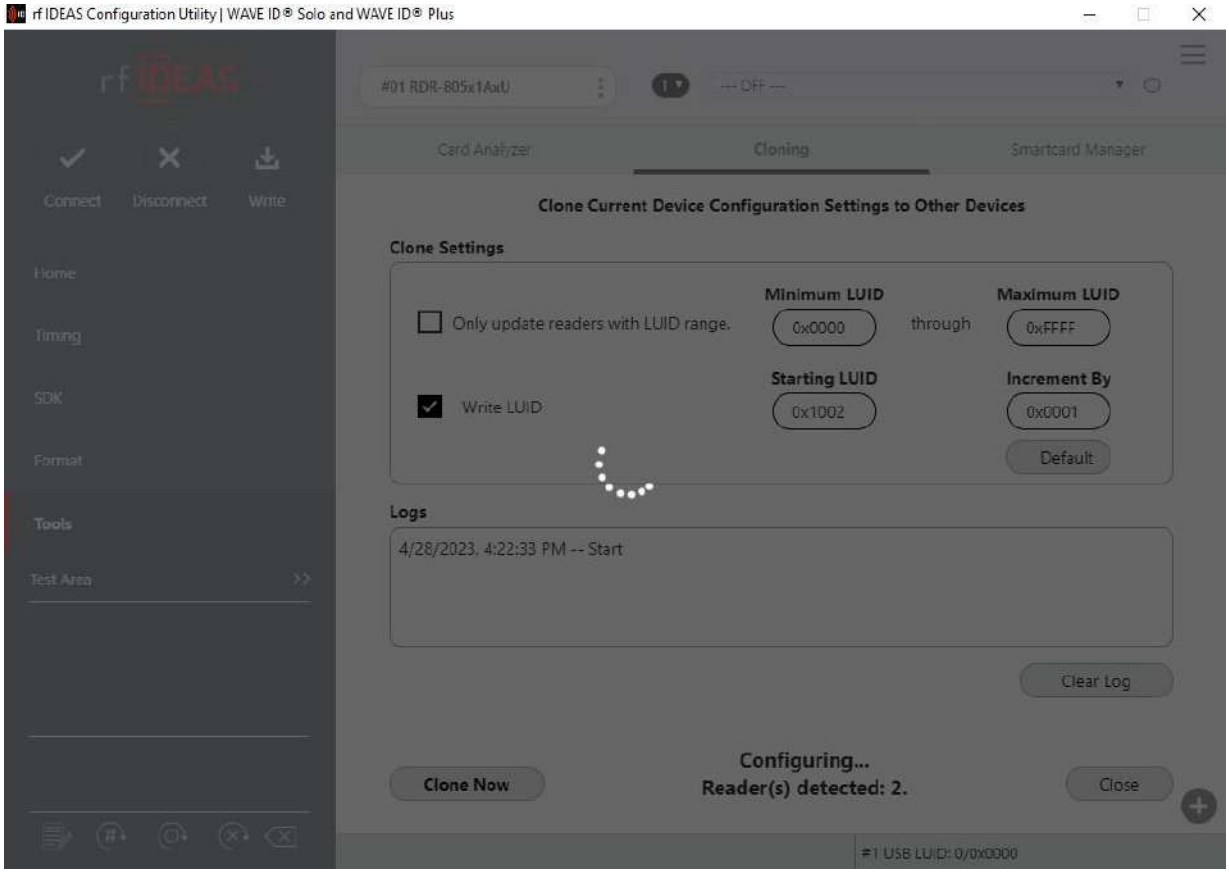
In case of serial readers the cloning process will be a little slower.

5. Connect the destination reader(s) that will be undergoing the cloning process and click on 'Clone Now' button in the end.



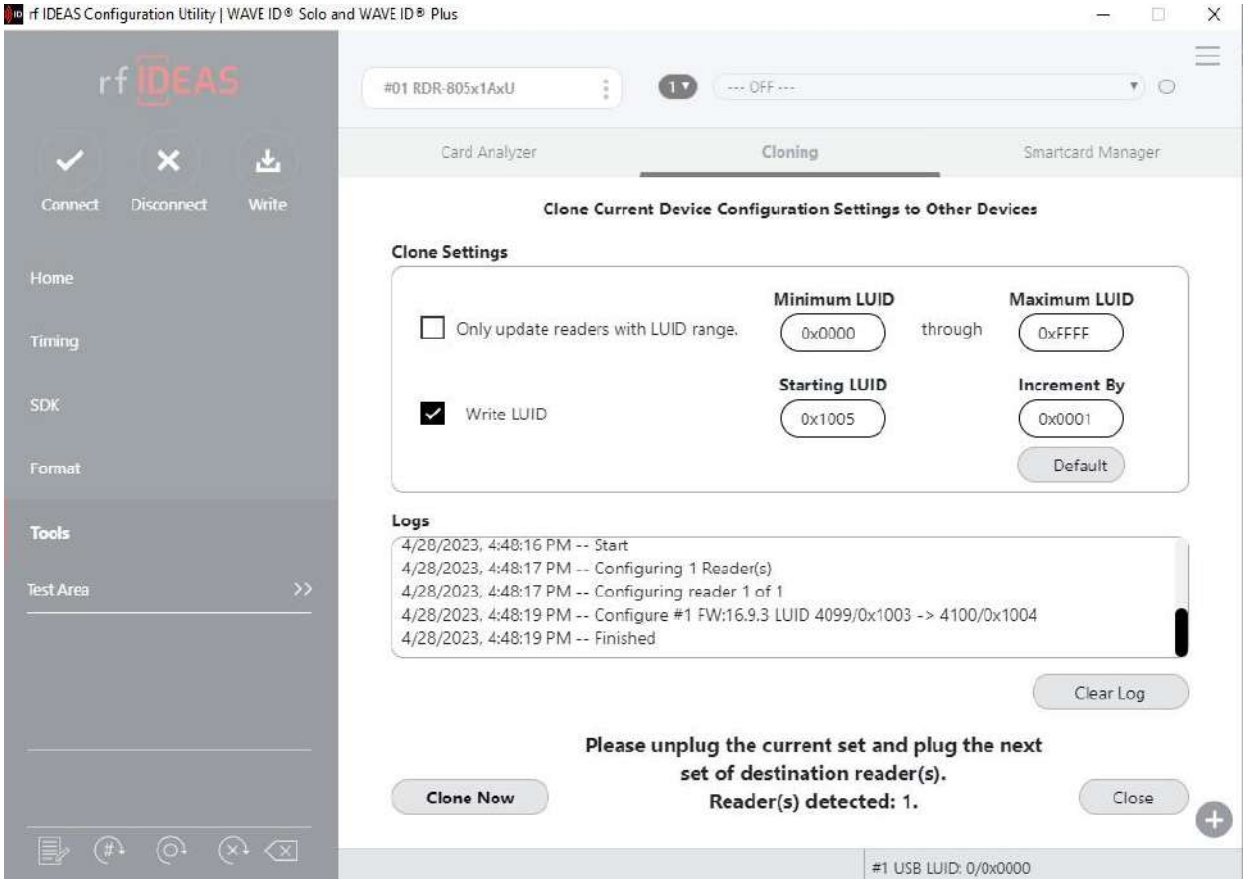
Connecting Other Readers

More than one reader can be configured. Cloning will be done in reader(s) one by one and can be seen in Logs section.



Configuring Reader(s)

Once the configuration process has finished, the below message will be displayed.

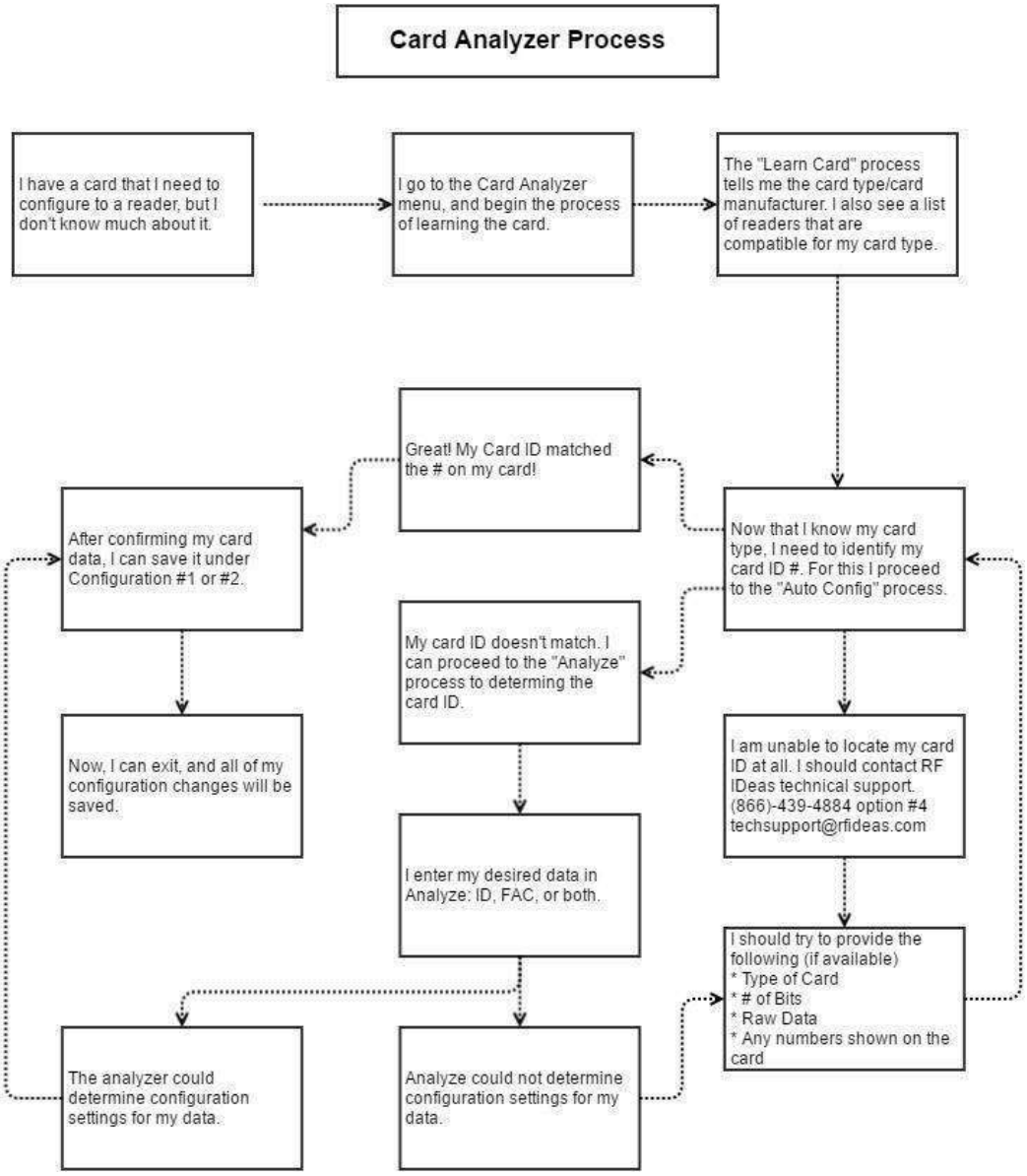


Configuration Finished

6. Click the 'Close' button to close the "Cloning" dialogue box. Click the "Connect" button in the 'rf IDEAS Configuration Utility' to check the new cloned configuration of the connected readers. OR
7. Unplug the current set of destination reader(s) and plug in next set of readers(s) to be cloned and repeat the process by clicking 'Clone now' button.

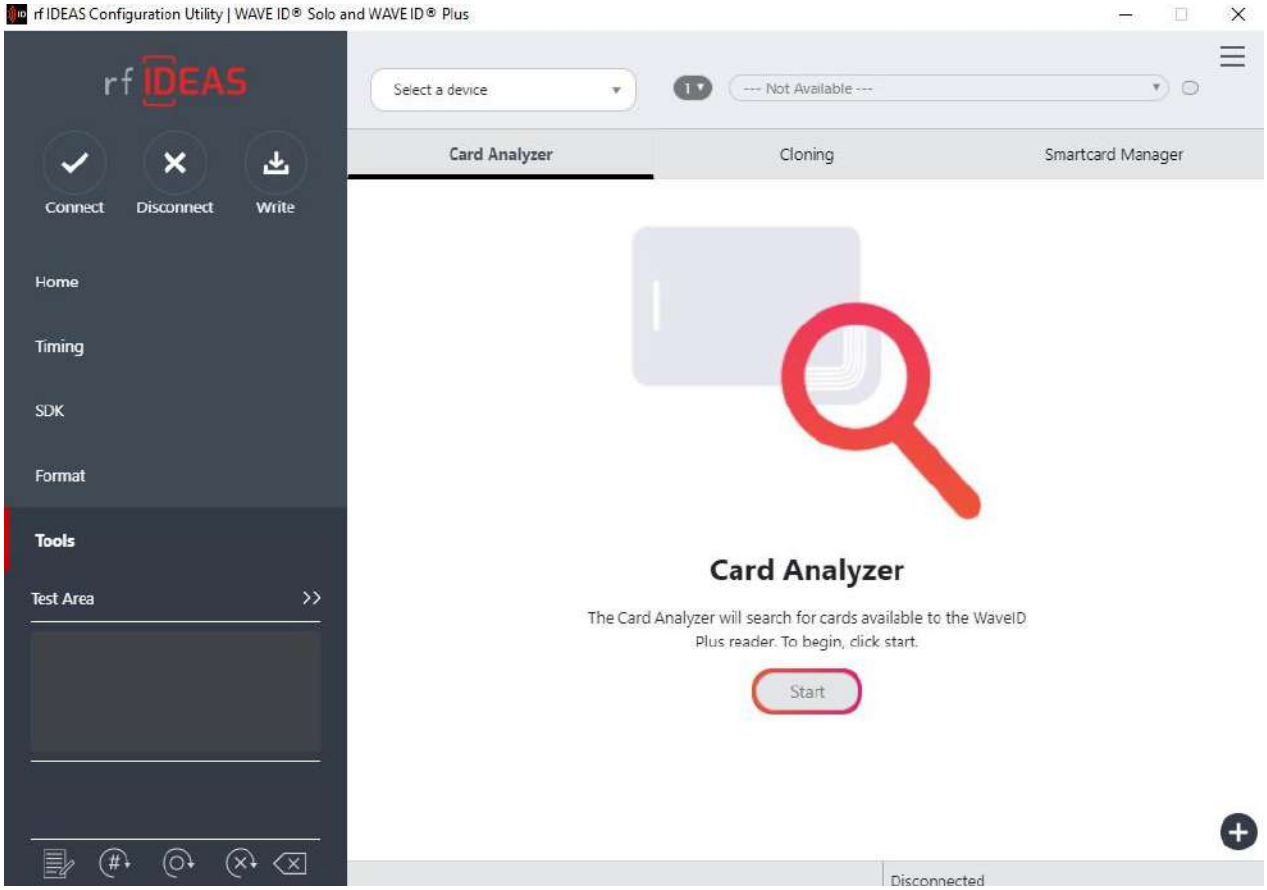
Card Analyzer

The Card Analyzer makes it easy to learn and analyze a card in order to configure it into a reader. The Card Analyzer will learn the card and allow the reader to be configured based on the analysis of the card.



Card Analyzer Process

To begin, navigate to Card Analyzer from the Tool menu on the utility.

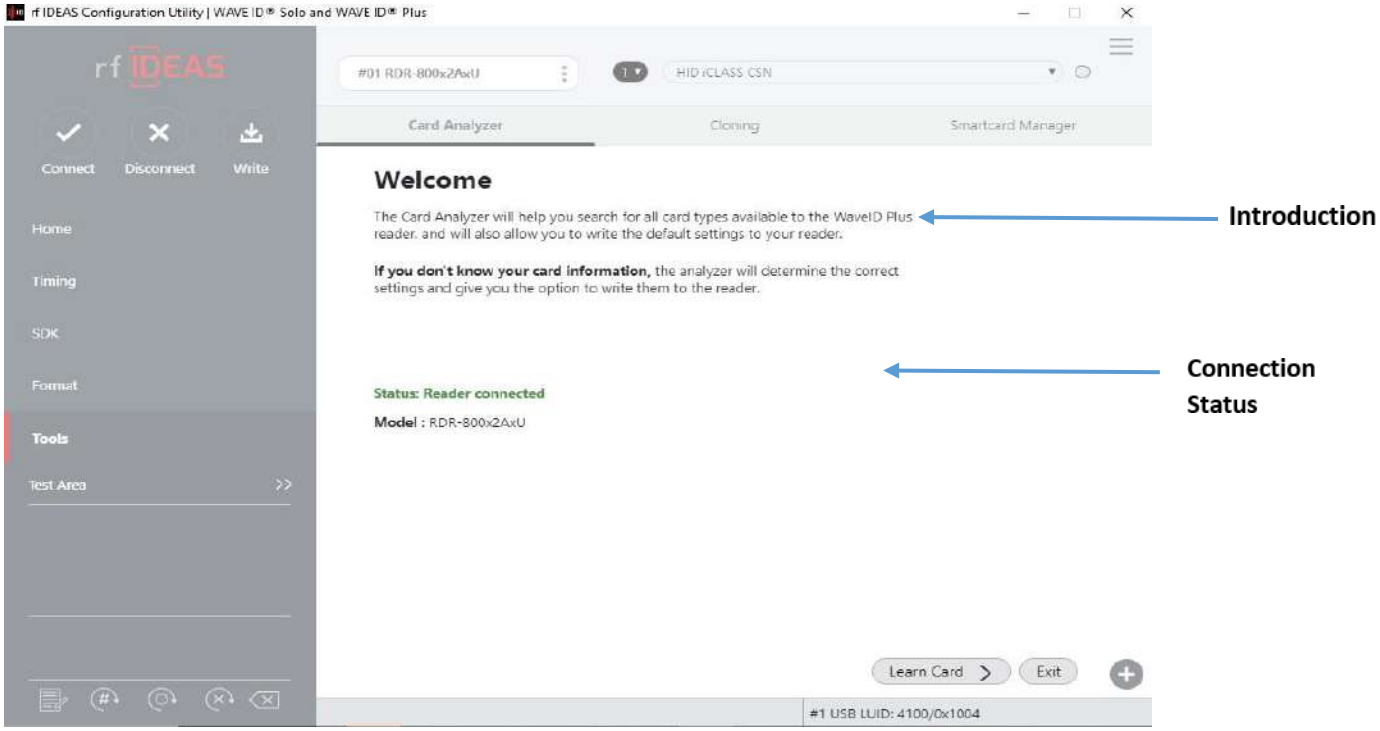


Card Analyzer Start Screen

The Card Analyzer feature will not work correctly if multiple devices are connected on rfIDEAS Configuration Utility.

Detecting the Reader

The Welcome screen provides a brief introduction and provides the reader connection status.



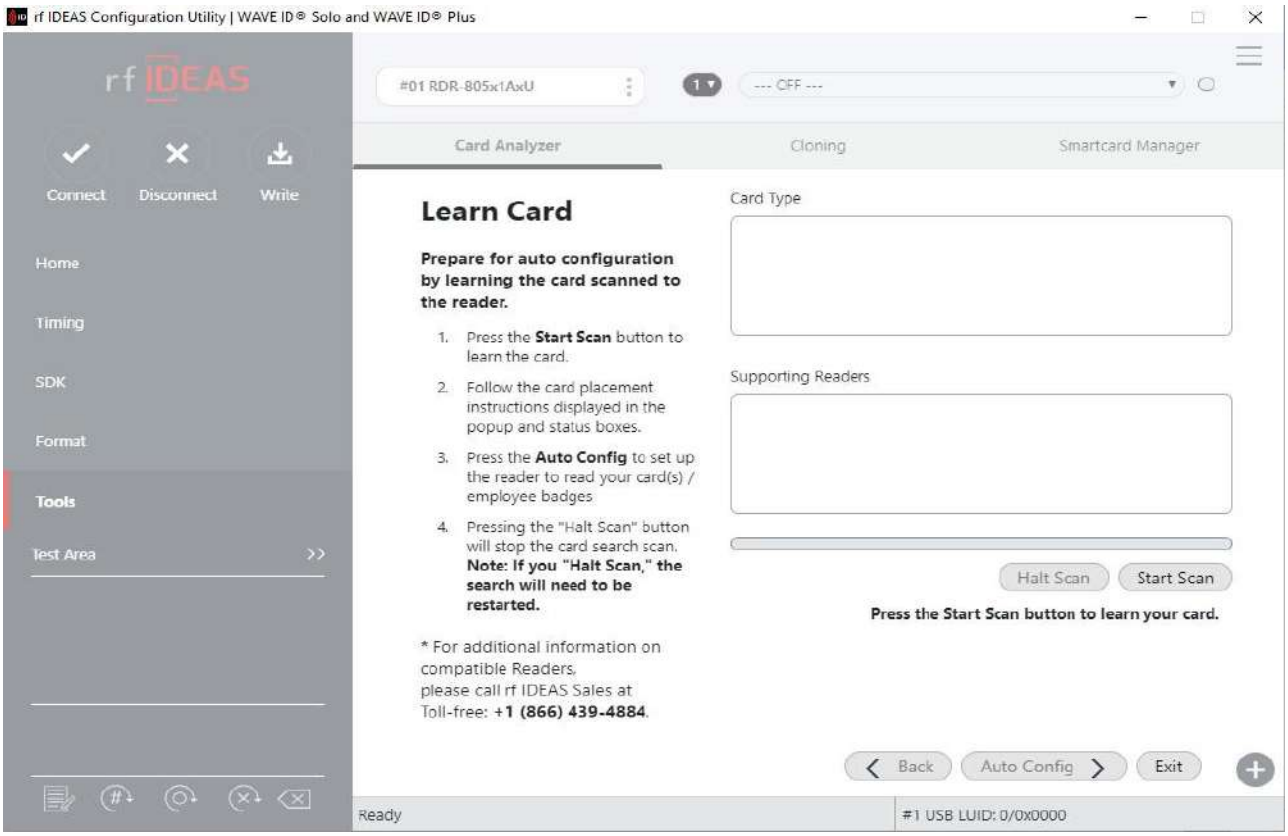
Detecting the Reader

FUNCTION	DESCRIPTION
Status	The status may display the following: • "Reader not connected". Ensure the reader is connected properly. • "Incorrect reader connected." The Card Analyzer feature is only compatible with following WAVE ID® Plus Readers (RDR-80081AKU, RDR-80082AKU, RDR-80581AKU, RDR-80582AKU, RDR-800x1AxU, RDR-800x2AxU, RDR-805x1AxU, RDR-805x2AxU, RDR-800x1AxU-NT, RDR-805x1AxU-NT, RDR-305x1AxU, RDR-305x2AxU, RDR-300x1AxU, RDR-300x2AxU, RDR-305x1BxU, RDR-305x2BxU, RDR-300x1BxU, RDR-300x2BxU, OEM-805x2BxU-LNV, RDR-80581AKU-RA, RDR-805x1AxU-RA, RDR-300x1CxU, RDR-30Mx1CxU-MXS, RDR-8XMx1AxU, RDR-800x1BxU, RDR-805x1BxU, RDR-800x2BxU, RDR-805x2BxU, RDR-805x6AxU, RDR-800x6AxU. • "Reader connected".
Learn Card	Press to transition to the Learn Card screen. This button becomes active only when connected to the correct reader.
Exit	Returns the user back to main Card Analyzer window.

Learning Card

After the reader is detected, proceed to Learn Card process. This is where the Card Analyzer will attempt to learn the type of card by scanning for matches. Each screen of the Card Analyzer also gives a general overview of the process, and the steps being performed in each phase.

The first part is the scanning phase, where the application will scan the card for matches.



Learn Card Screen

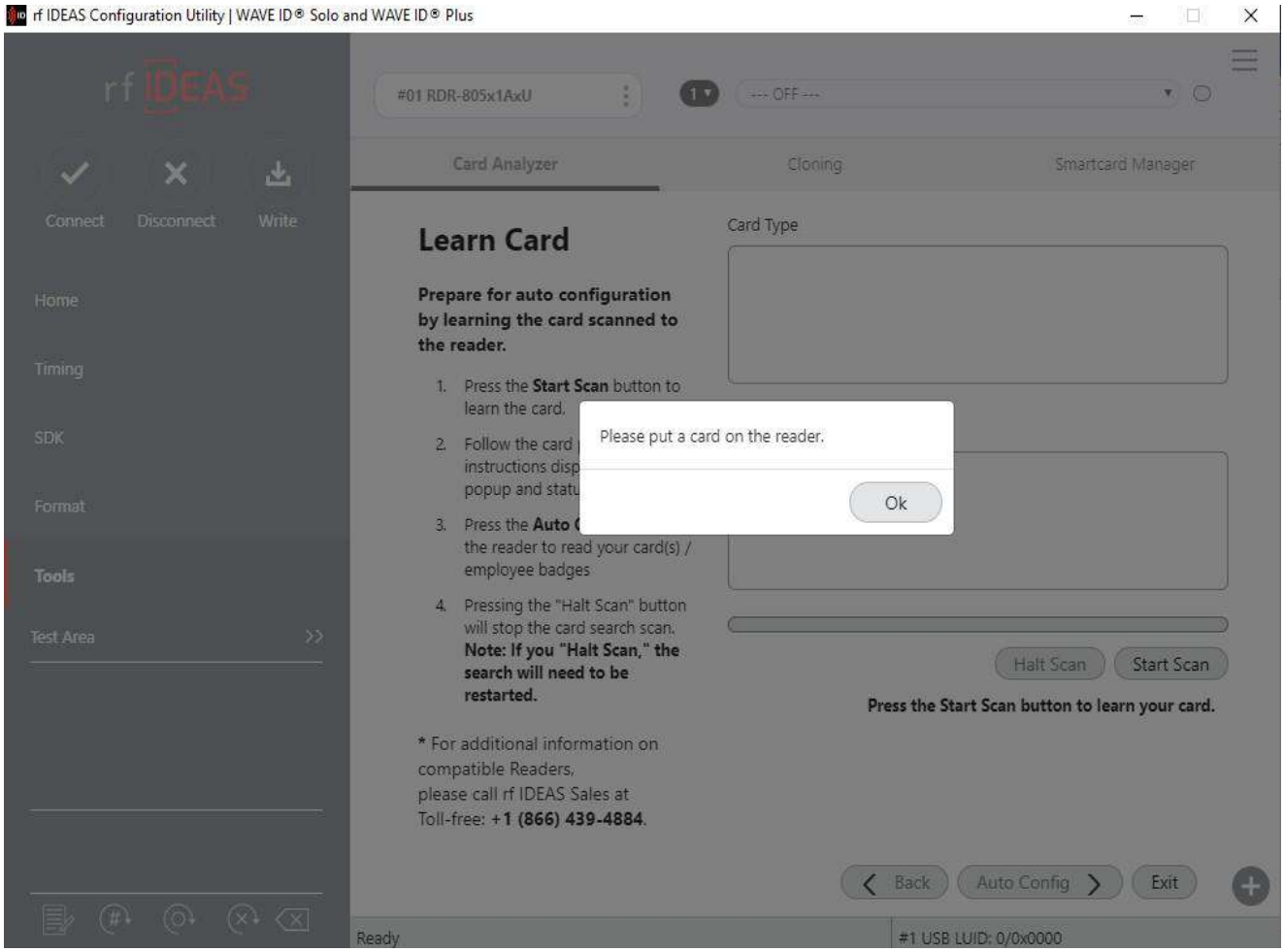
FIELD/BUTTON	DESCRIPTION
Card Type	Card type matches are displayed here.
Supporting Readers	Displays the supported rf IDEAS readers when a card type is selected.
Start Scan	Start the scan function.
Halt Scan	Stop the scan. This button becomes active after the “Start Scan” button is pressed, and the scanning starts.
Auto Config	Takes the user to the “Auto Config” screen. This screen allows the user to configure the reader using the default Card Type settings.
Exit	Returns user back to main Card Analyzer window.

Every time the Start Scan button is pressed, the application scans for the Contactless 13.56 MHz and Proximity 125 KHz Card Types.

To learn a card:

The application saves the current reader settings prior to scanning. They are restored if the user exits without writing the discovered settings.

1. Click the “Start Scan” button. The “Pop-up Window” appears.

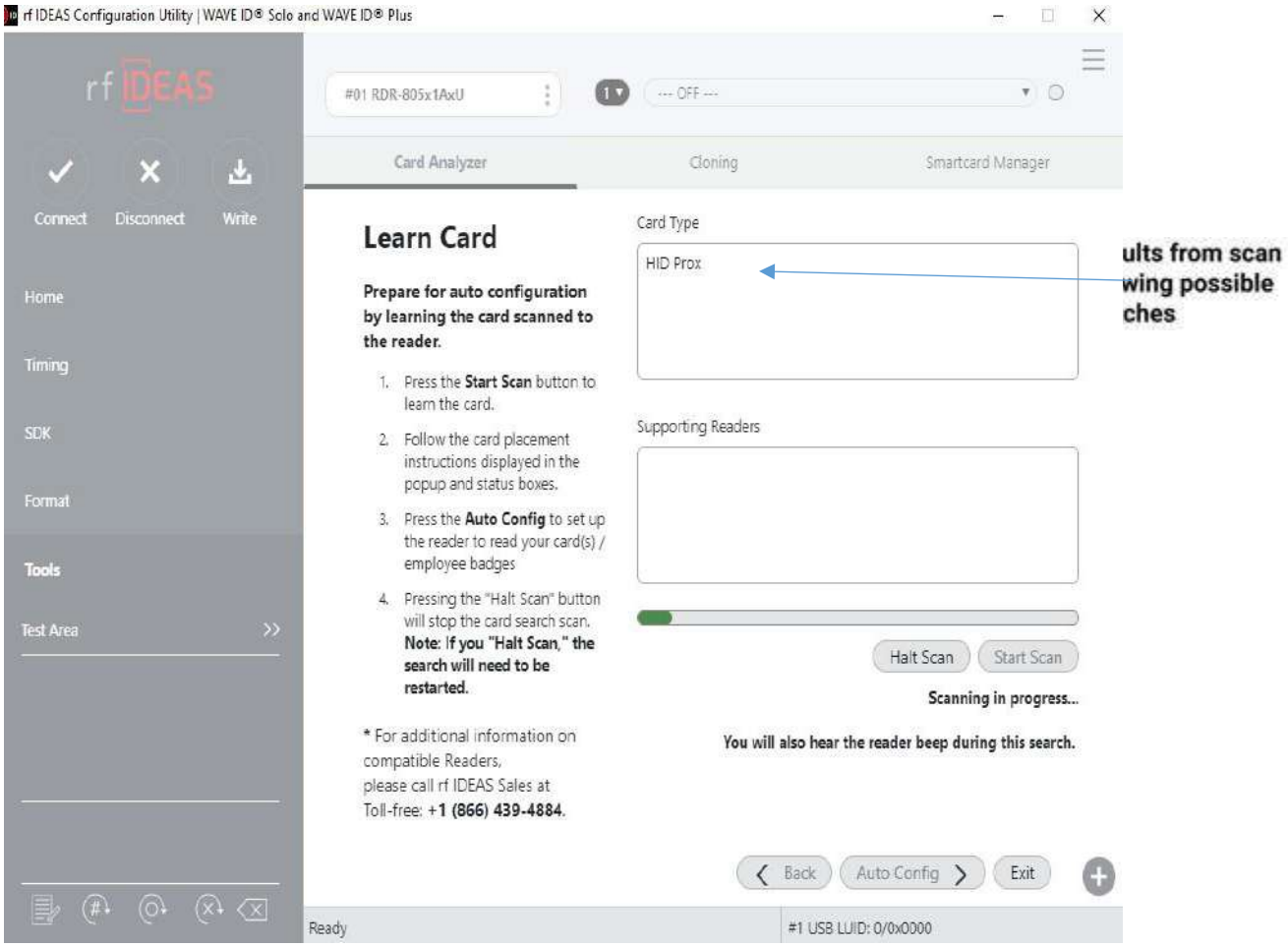


Starting the Scan

The “Back” button is disabled and the “Auto Config” button is unavailable during scanning.

2. When prompted, place a card on the reader, click the “OK” button.

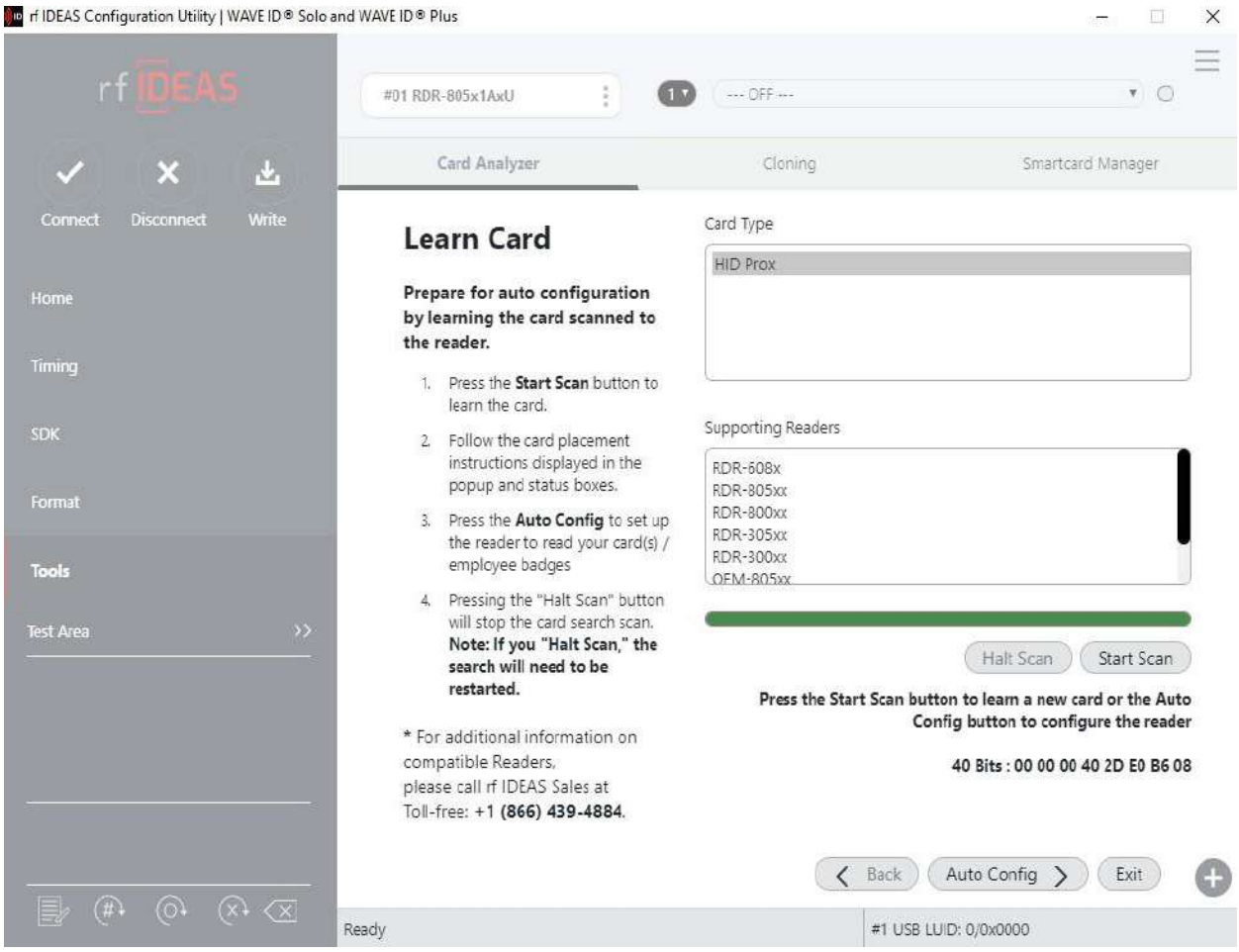
3. The analyzer will begin scanning the card for potential card type matches. Matches are displayed in the “Card Type” field.



Scanning Process

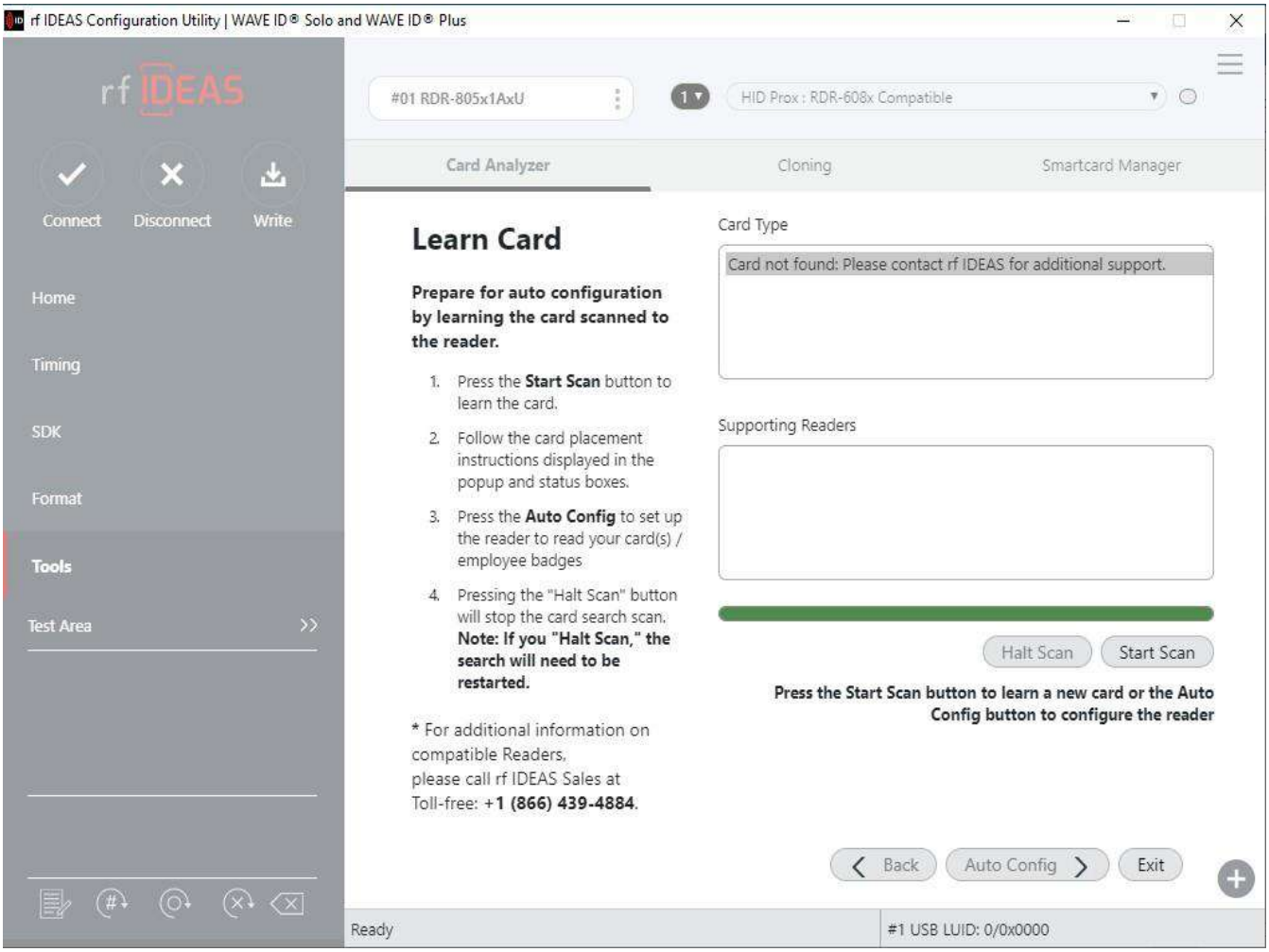
"Start Scan" button will be unavailable during the scan process. User can use the "Halt Scan" button to stop the scan process.

After the scan is complete, the following information will be displayed:



Scanning Complete

4. Select any card type to view the list of supporting readers. If no Card Type is detected, the application will display “Card not found: Please contact rf IDEAS for additional support”.



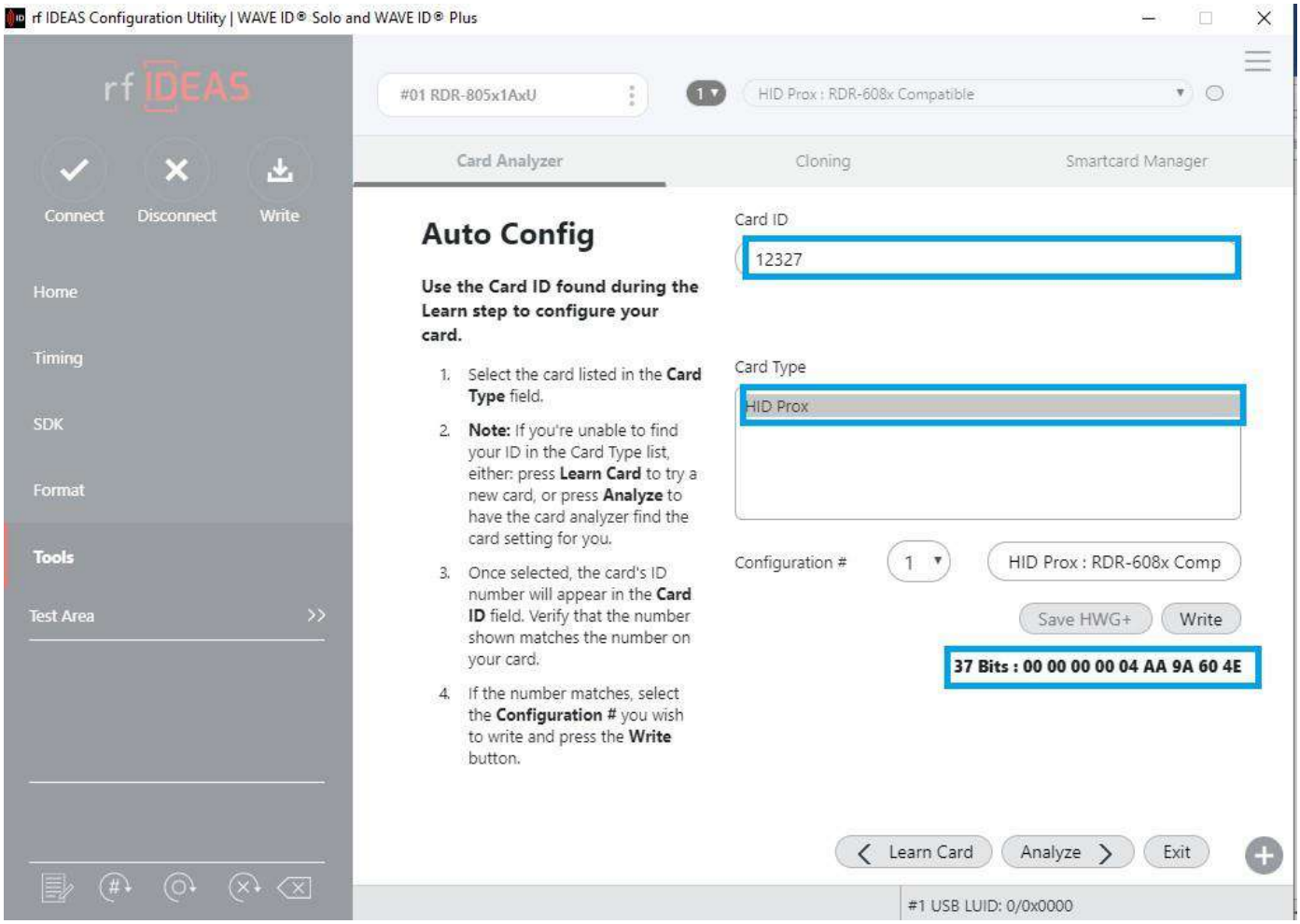
Card Not Found Scenario

5. To scan a new card, click the “Start Scan” button, and repeat the process.

6. To configure the reader, click the “Auto Config” button.

Auto Config

After Learn Card has determined the card type from the card scan, the reader can be configured to send the Card ID displayed in the Card ID status window. The utility displays the Card ID found based on the default reader settings. The user can highlight each listed Card Type and validate the Card ID number to the card. It’s also possible to double-click the bit string at the bottom and copy it to the clipboard.



Auto Config Screen

It is not possible to jump directly to the “Auto Config” feature without first performing the “Learn Card” feature.

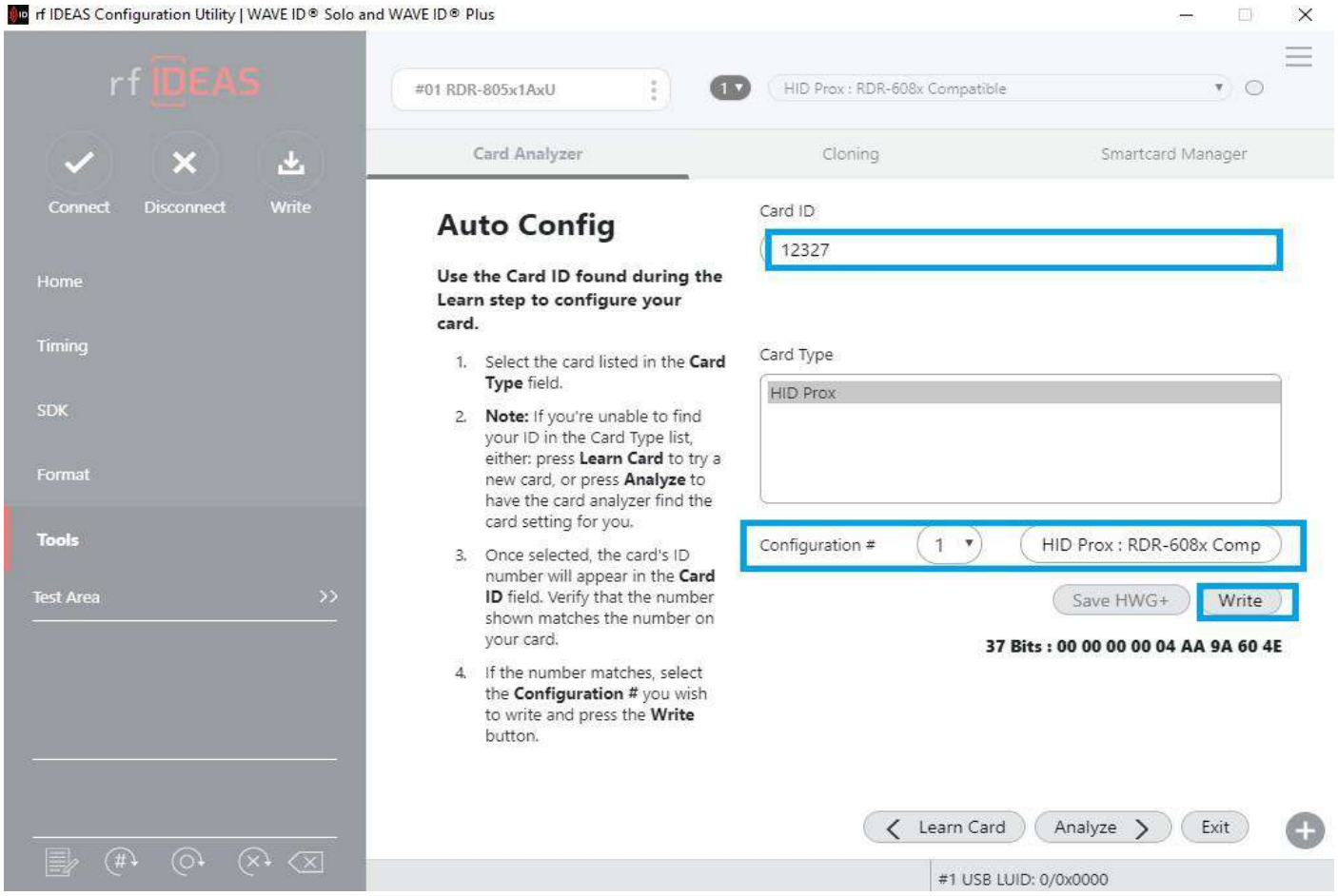
For some cases ‘Auto Config’ button may be disabled based on reader type or scanned card type.

Auto Config is only supported by Keystroking readers.

FIELD/BUTTON	DESCRIPTION
Card ID	Contains the Card ID based on the default settings for the selected Card Type.
Card Type	When the user selects a “Card Type”, the application displays the Card ID based on the most popular default settings for the selected card type.
Configuration#	Write multiple configurations to the reader by selecting the configuration# from the dropdown and clicking the “Write” button.
Write	Writes the configuration to the reader for the selected card type. Writing one of the scanned cards from card type list into reader will enable ‘Save Hwg+ File’ button.
Learn Card	Go back to the “Learn Card” screen.
Analyze	Move to the “Analyze Card” screen.
Exit	This button has the following functions – • If the user has not written any configurations, pressing the “Exit” button will restore the reader to its original settings prior to starting the Card Analyzer. Then returns the user to main Card Analyzer window. • If the user has written configurations, pressing the “Exit” button will return user to main Card Analyzer window with the new card settings.

To auto configure:

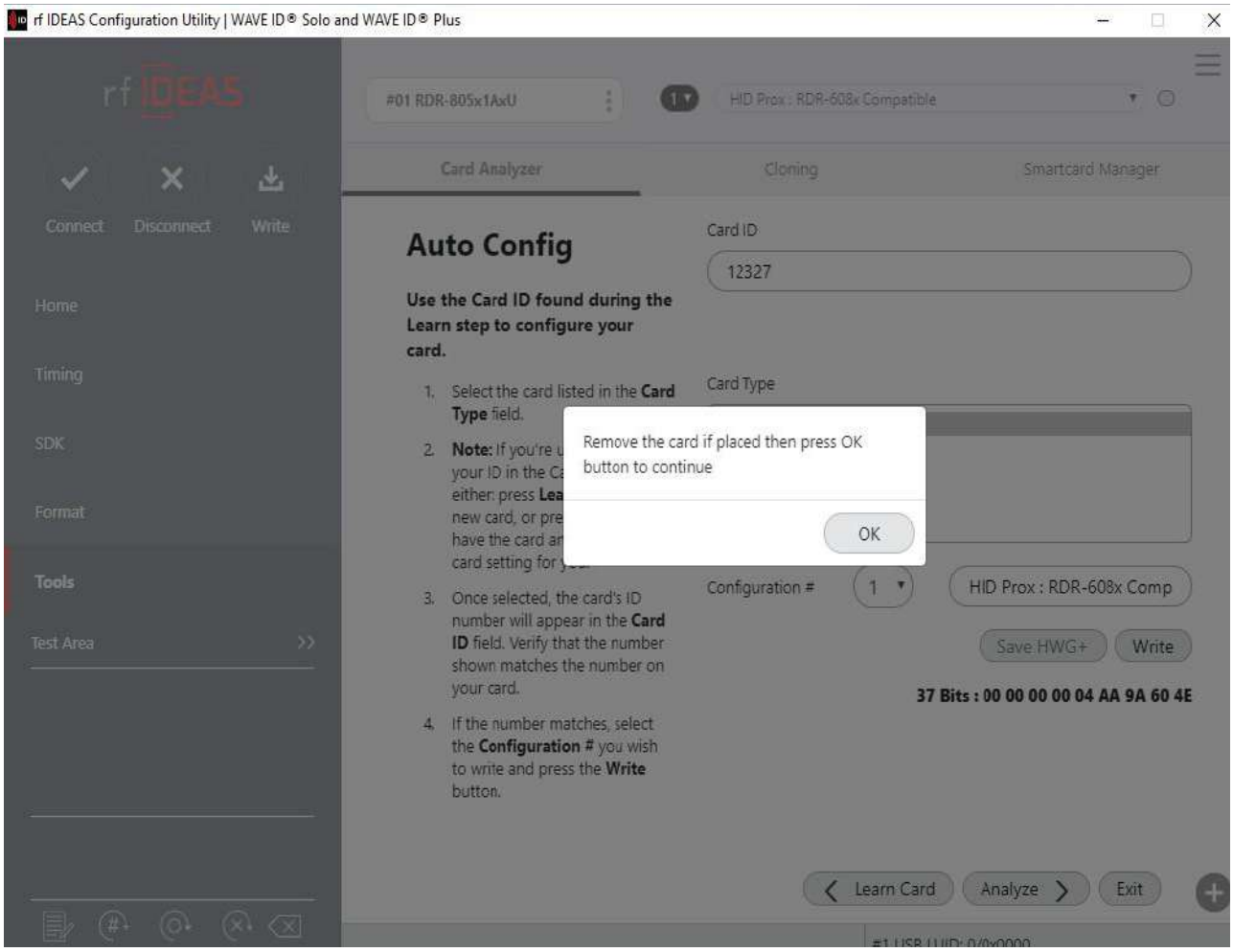
1. Select each card type and match the Card ID listed with the ID on the card.



Writing Configuration Settings to the Reader

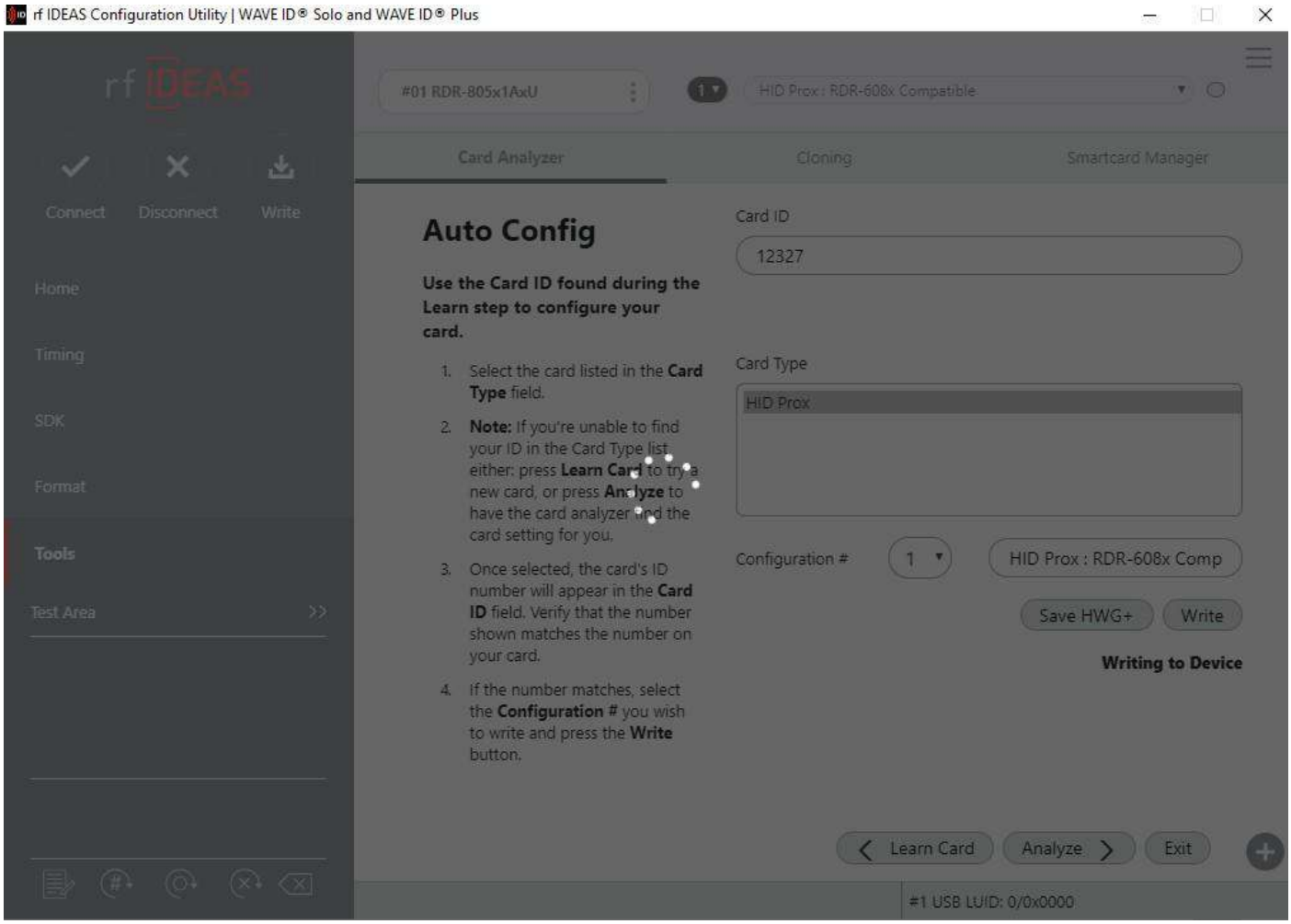
If you're unable to locate the ID listed on the card, you can click the "Learn" button and try a new card, or press the "Analyze" button to find the card settings.

2. Select the Configuration # and click the "Write" button. The "pop-up" window appears.



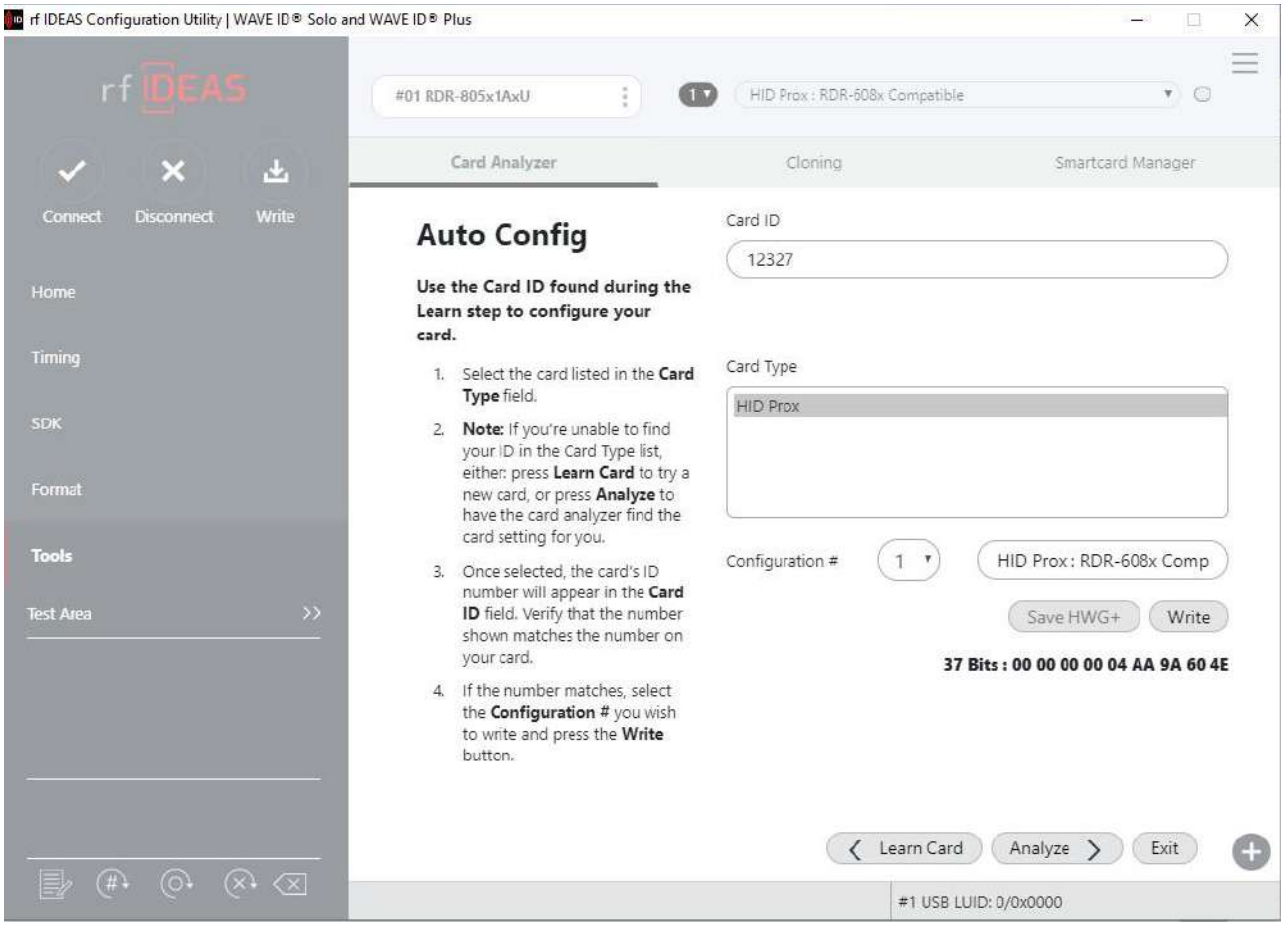
Pop-up Window for Removing the Card

3. After the card is removed from the reader, click the "OK" button to continue writing the configuration to the reader.
4. The Card Analyzer will then automatically begin writing the chosen configuration to the reader.



Writing the Configuration to Reader

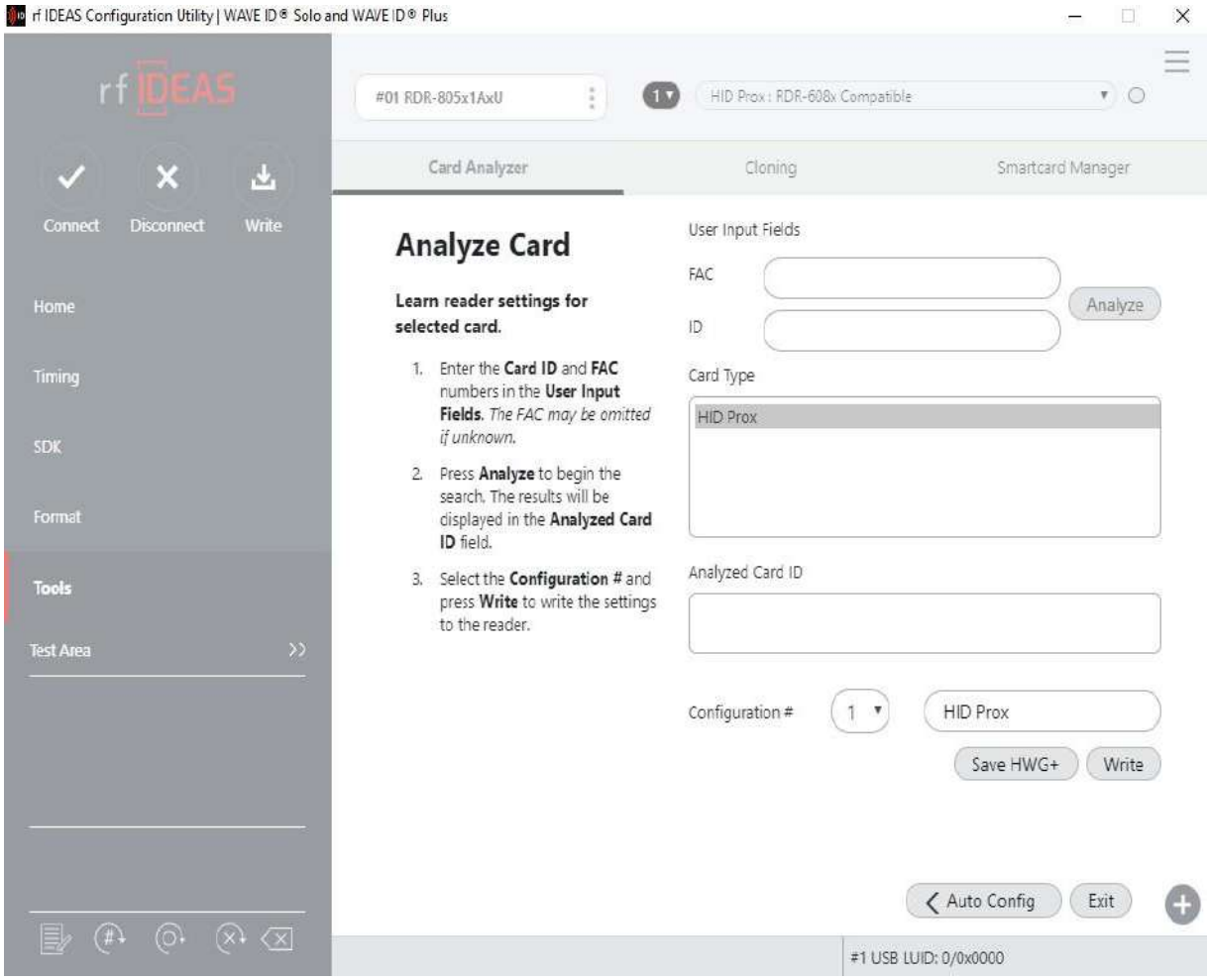
5. After writing the new settings to the reader, the status of the write will appear on the status bar.



Writing Process Complete

Analyze Card

The Analyze Card section should be used when the user knows the FAC/ID and there is a concern about the range of one or both. The user must enter the ID number printed on the card and the FAC if they know it. The feature will attempt to calculate the “ID field bit count”, then the TP and LP.



Analyze Card Screen

FIELD/BUTTON	DESCRIPTION
FAC	Field to enter a Facility Access Code (FAC).
ID	Field to enter a card ID.
Analyze	Starts the card analyze function. The application will attempt to learn the settings for the selected Card Type.
Card Types	Displays learned Card Types. Each card type is selectable.
Analyze Card ID	Displays status to the user: “Card ID found”, or “Contact rf IDEAS for additional support” if no results are found.
Configuration #	Write multiple configurations to the reader by selecting the configuration # from the drop-down and clicking the “Write” button.

Write	Writes the configuration to the reader.
Auto Config	Go back to the “Auto Config” screen.
Exit	This button has the following functions: • If the user has not written configurations, pressing the “Exit” button will return user to rfIDEAS config utility without making any changes. • If the user has written configurations, pressing the “Exit” button will return user to rfIDEAS config utility with new card settings.

To analyze a card:

1. Enter the “ID” or “FAC” or both numbers (A) in the “User Input Fields” section.

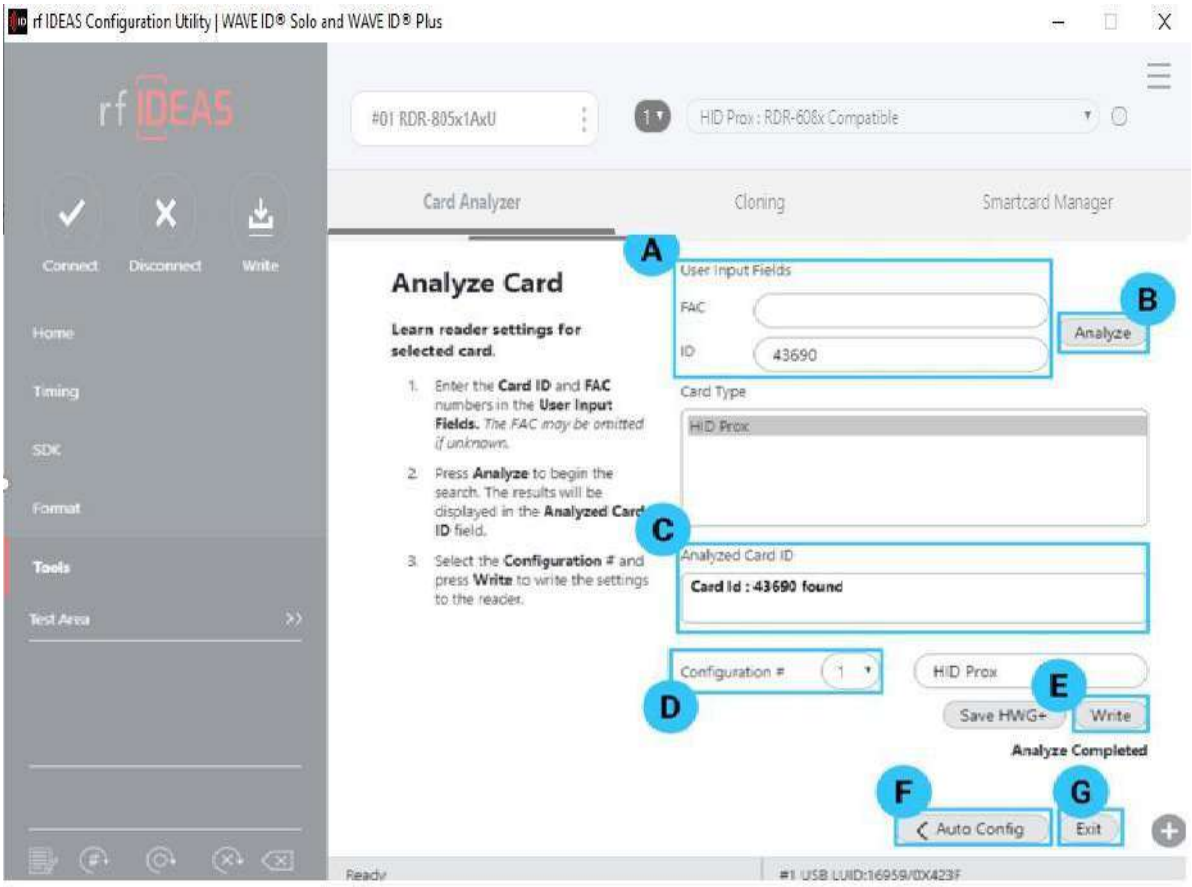
> “ID” field is mandatory to analyze the card. FAC is optional, omit if unknown. The fields support numeric data.

2. Click the “Analyze” button (B) to begin the search.

The result is displayed in the “Analyzed Card ID” (C) field.

> After the completion the status changes to “Analyze Completed”. If Card ID is not found, a “Card ID not found” message is displayed in the “Analyzed Card ID “field.

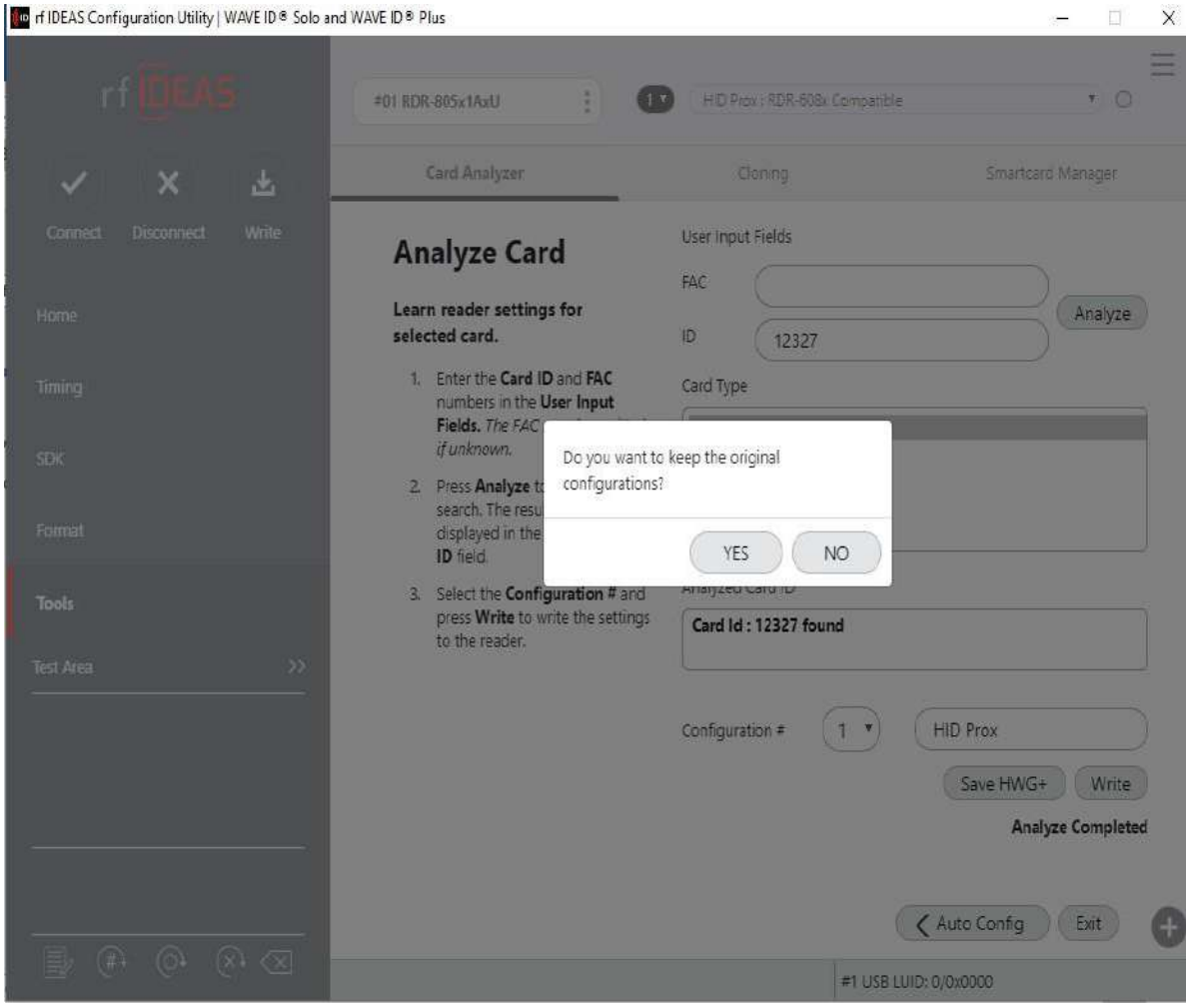
3. Select the Configuration # from the “Configuration #” drop-down (D) and press the “Write” (E) button to write the settings to the reader.
4. If “Card ID not found” is displayed, retry with a different card by pressing “Auto Config” button (F) and moving back to “Learn Card” screen, or proceed to step 5.
5. After writing the configurations to the reader, Press the “Exit” button (G) to stop the Card Analyzer and return to the main Card Analyzer window



Analyzing the Card

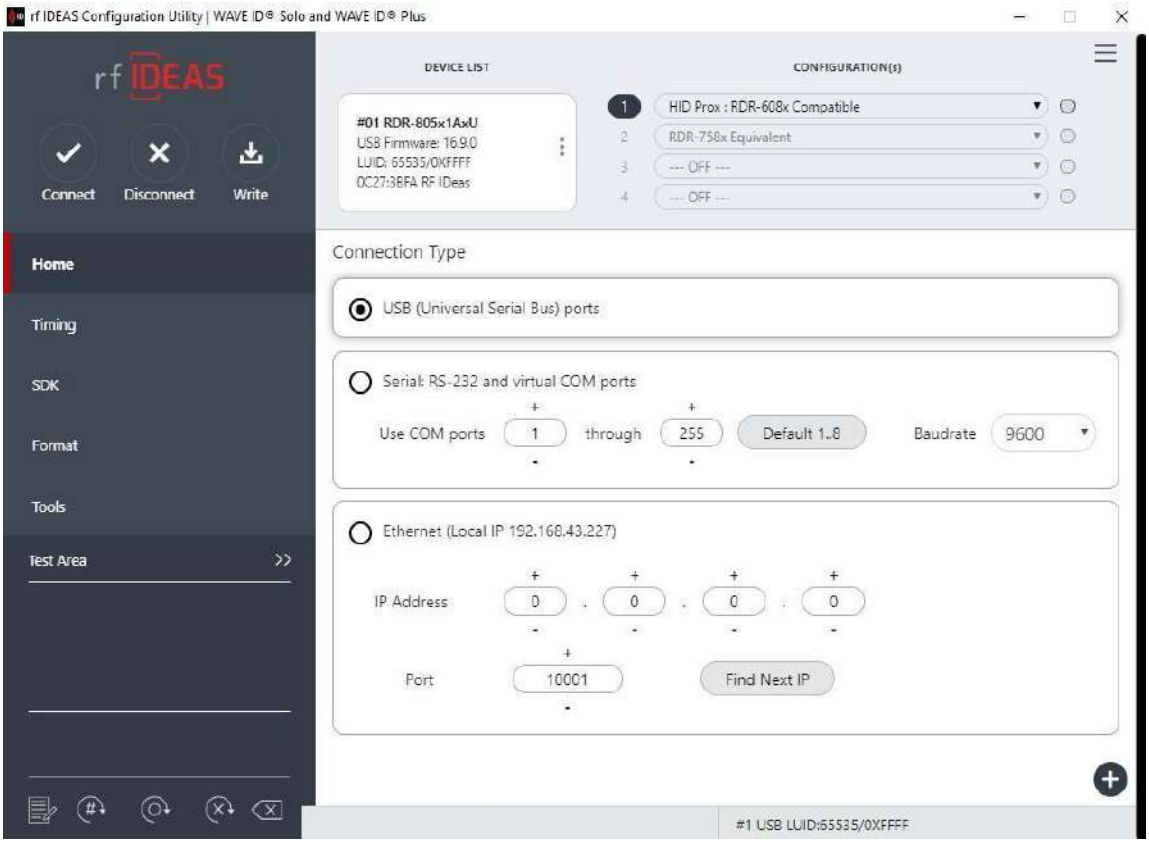
Exiting

It's easy to exit the Card Analyzer at any time. If no configurations have been written, the reader will return to the original state. If configurations have been written during the "Auto Configuration" or "Analyze" processes, while exiting from the window user is asked if he wants to keep original configuration (which were there before starting card analyze process) or he wants to keep the new written configurations into the reader.



Pop-up on clicking Exit Button on Screen

After exiting, the main Card Analyzer screen appears. Either continue with analyze process again or come back to main utility.



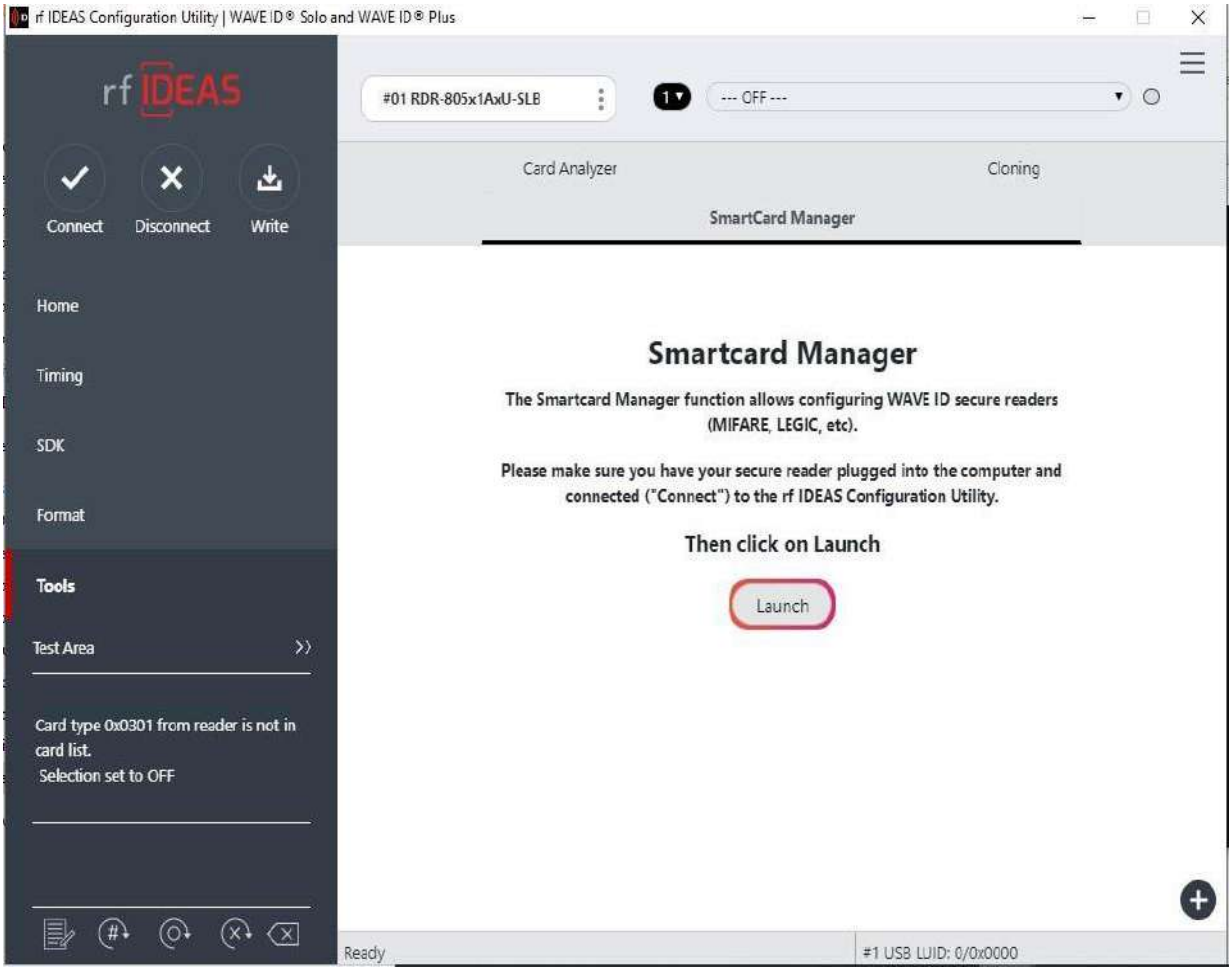
New Configuration in the Utility

Smartcard Manager

The Smartcard Manager function allows for the configuration of WAVE ID secure reader (MIFARE, LEGIC, etc).
Make sure you connect the secure reader to the PC and to the rf IDEAS utility. Below is the screenshot for Smartcard Manager Tab screenshot.

To initiate the Smartcard Manager utility:

- Plug in Secure reader to system and click the "Connect" button to connect reader to utility.
- Under the Tools tab, select Smartcard Manager and click on the Launch button.

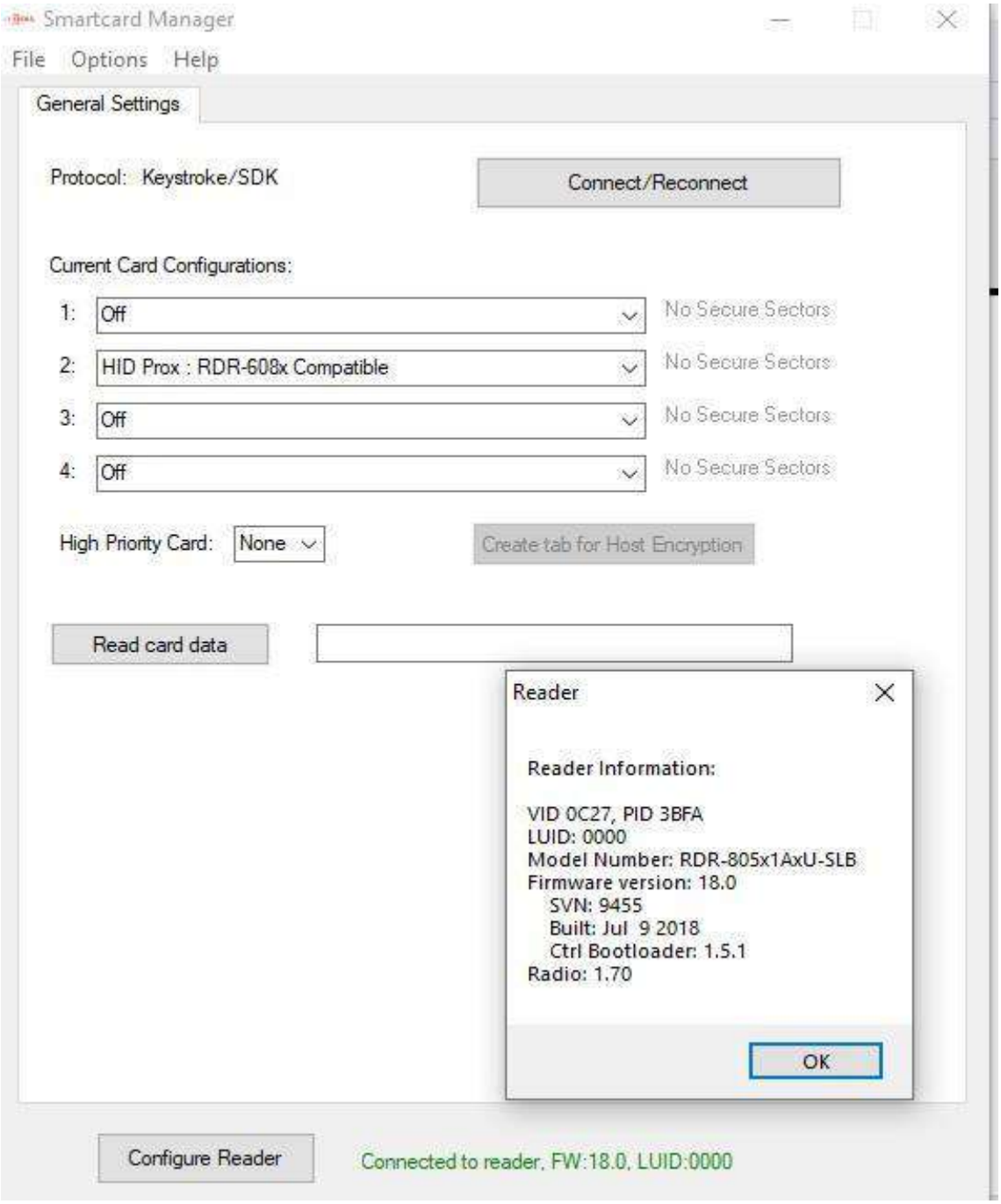


Smartcard Manager Launch Screen

To learn about the reader's info from the Smartcard Manager utility:

- Click on Help
- Click on About Reader

The reader's information will be displayed in the dialogue box as shown below.



Smartcard Manager Utility Screen with Reader Information

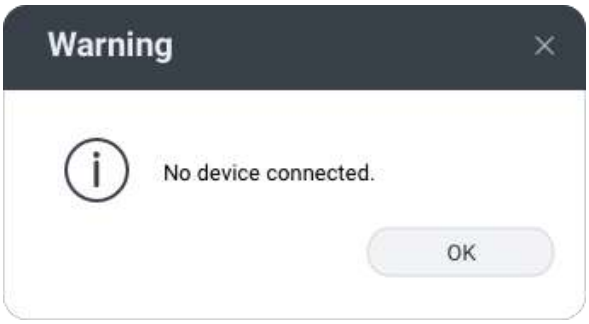
NOTE: For more information regarding the Smartcard Manager utility please contact techsupport@rfideas.com.

Chapter 3

Troubleshooting

3.1 Troubleshooting

If the reader is not working or the following error message is displayed:



No Reader Connected

1. Check to be sure the reader is connected to the USB or RS-232 port. When no card is being read, the LED is red. A valid proximity card causes the LED to turn green.

   Only one COM port application can own the RS-232 port at a time. Make sure there is not another COM port application running. This prevents our software from seeing the reader.

2. If the reader still does not work, disconnect it, remove 'General USB Reader' using Windows 'Control Panel' 'Add/Remove' Hardware. Then reboot the workstation. When the workstation boots up, re-attach the reader USB and the OS should re-install the Windows driver automatically.

Chapter 4

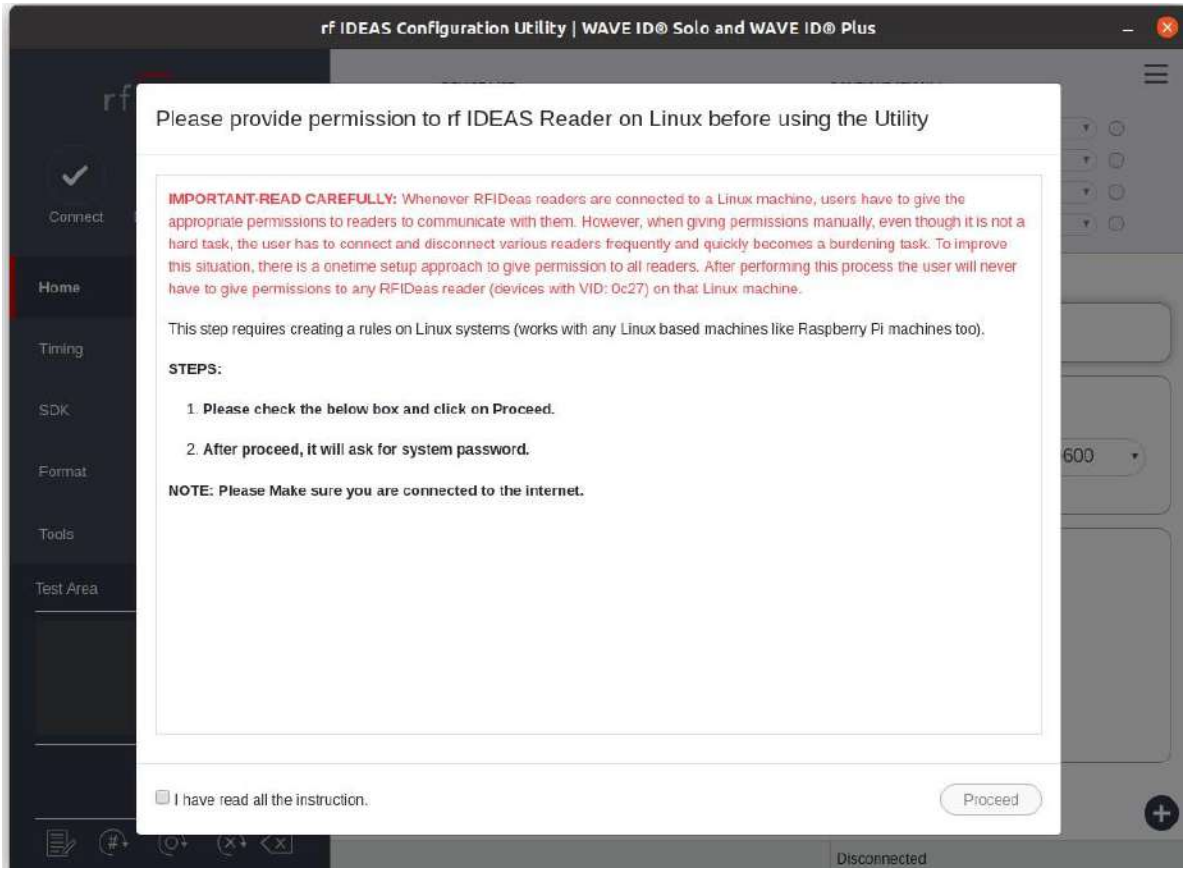
Linux and Mac Permissions Setup

4.1 Linux Platform

Installation and Usages:

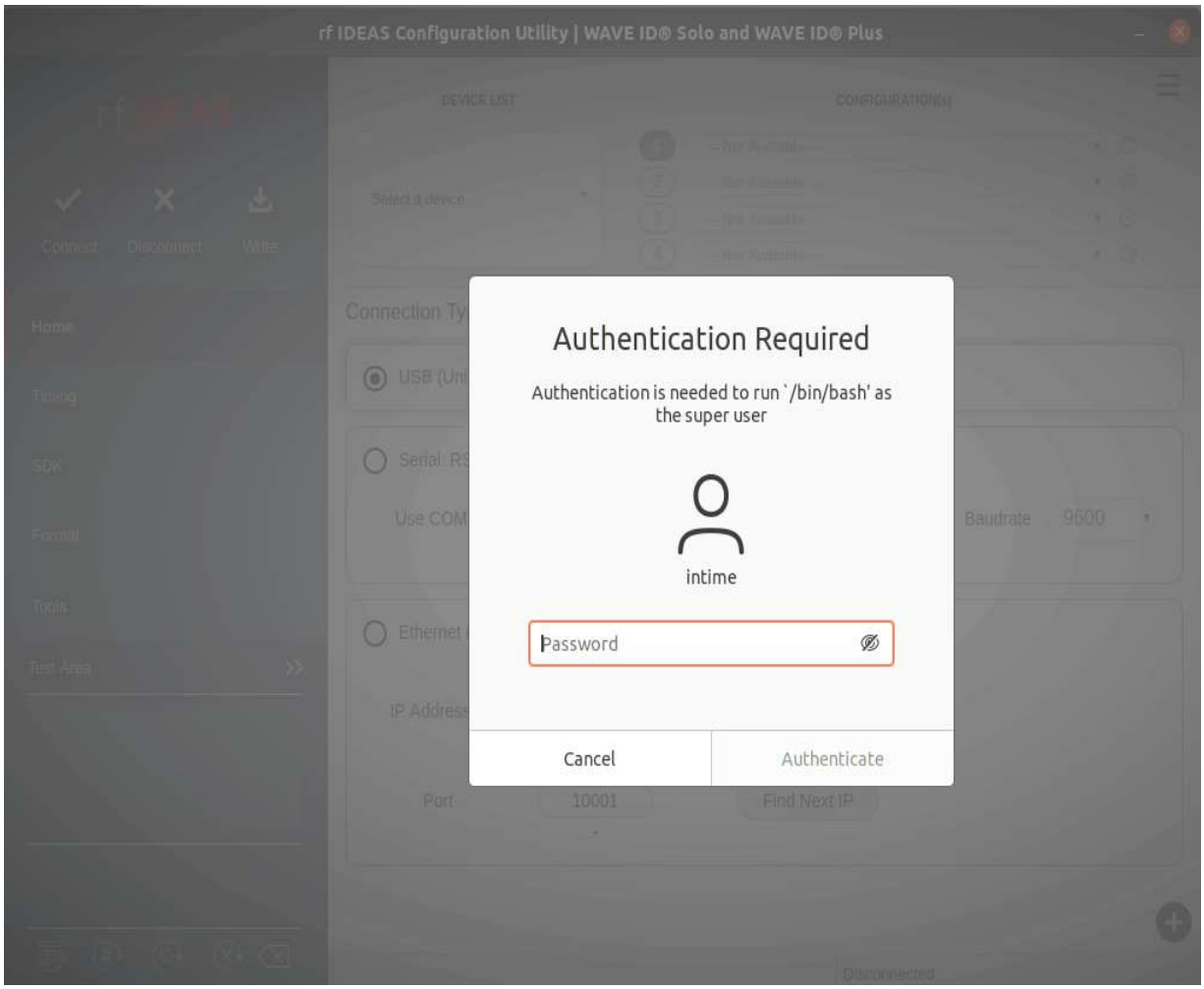
1. To install the application directly from the package on Linux platform, internet connection is required. If no internet connection is possible, run the following command on Command Line Interface to install:
   E.g. sudo dpkg –i location of package
   sudo dpkg -i Downloads/rfideasconfigurationutility6.5.0.deb

2. Permission Pop-up: The Linux PC requires user to give permission to rfIDEAS reader. Instructions will be shown to the user at the time of running the application for first time after installation.
   Here is the screenshot for reference:



Providing permission to rf IDEAS reader on Linux.

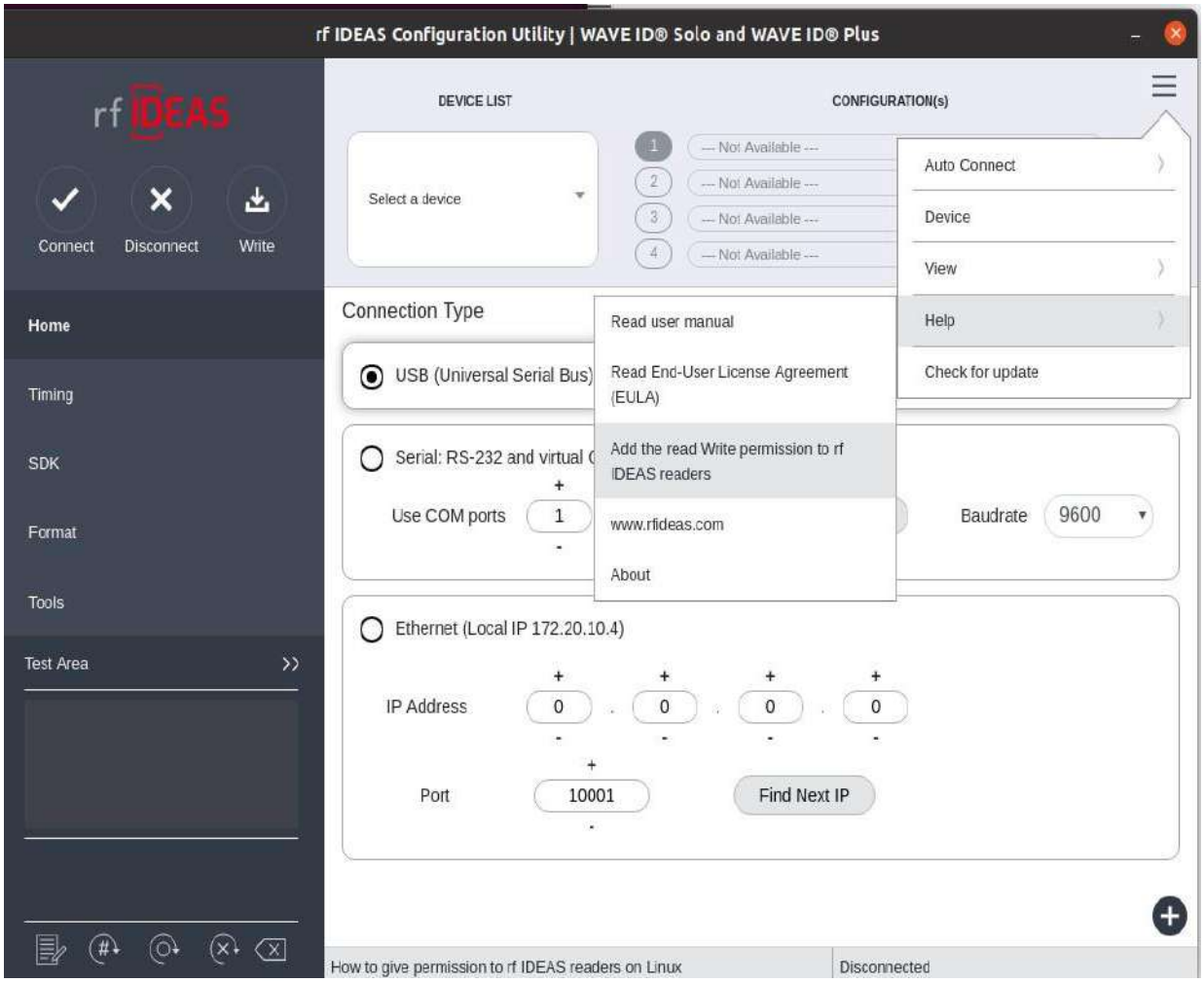
3. User need to provide system password and click on Authenticate as shown below:



Providing system password

NOTE: - User may also provide permission later by under ‘Help’ menu.

4. If User clicks Cancel button or encounters any internet issues during providing permission, then please follow below step.
5. Go to Hamburger menu -> Help and click on "Add read-write permission to RFIDEAS readers." after clicking, user will get a popup for system password for providing the permission to rf IDEAS readers..



Steps to provide permission to rfIDEAS readers.

Manual steps to provide permission required on Linux Platform

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

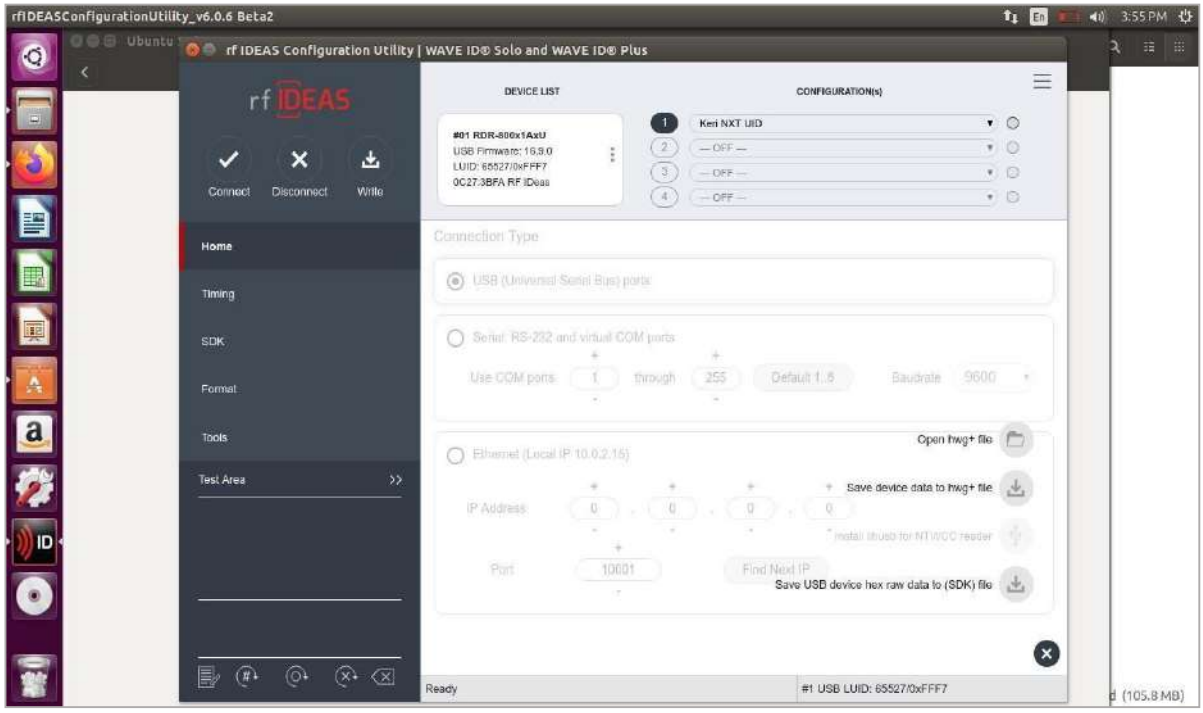
5. Type the following lines in the rfideas.rules file and save it.
KERNEL=="hidraw*", ATTRS{idVendor}=="0c27", MODE="0666"
KERNEL=="hidraw*", ATTRS{idVendor}=="0c27", ATTRS{idProduct}=="3bfa", MODE="0666"
SUBSYSTEM=="tty", ATTRS{idVendor}=="0c27", MODE="0666"
SUBSYSTEM=="tty", ATTRS{idVendor}=="0c27",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



Installation of libusb for NTWCC reader disabled.

6. Linux O/S does not support NTWCC type readers therefore “Install libusb for NTWCC reader” option will be disabled (greyed out).

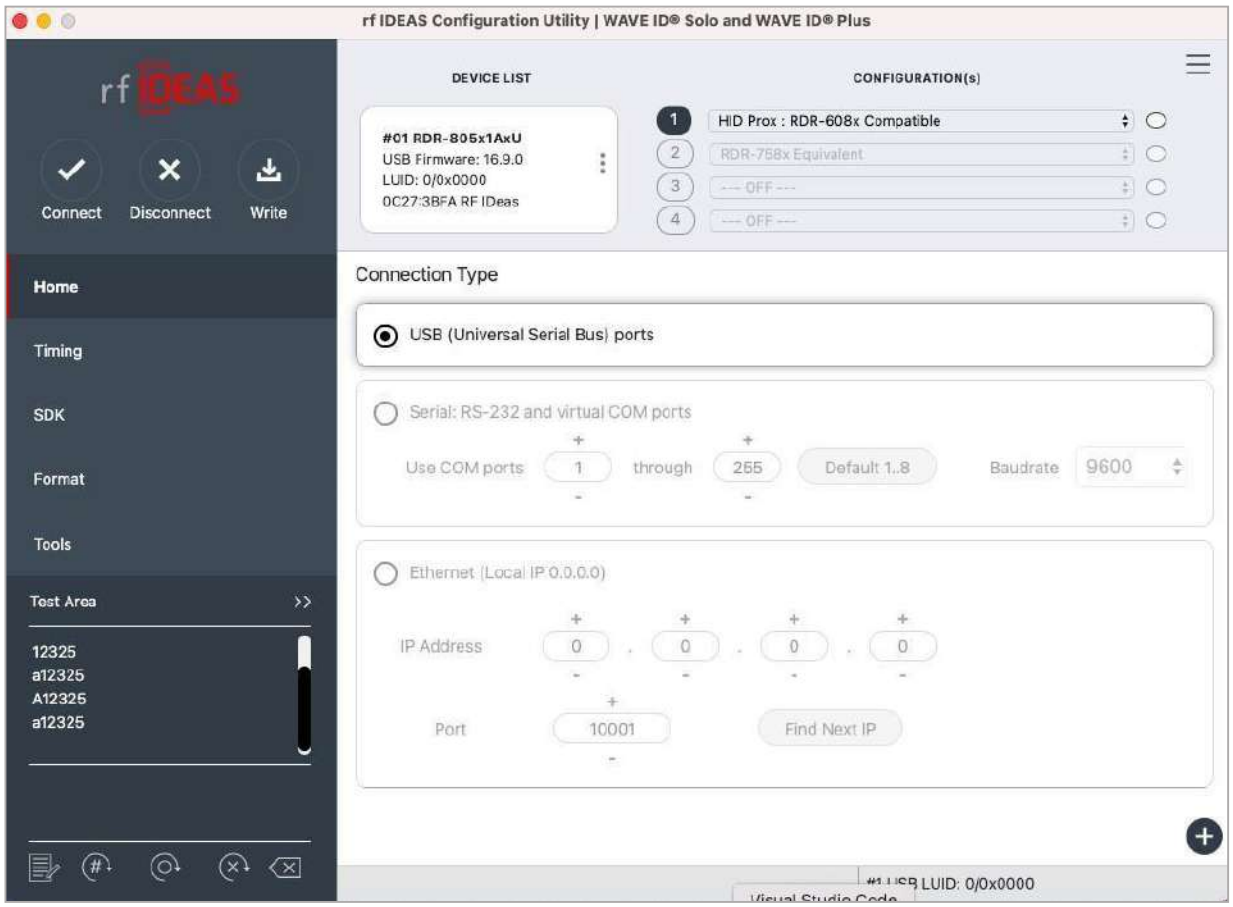
7. User cannot print special characters on Linux PC using virtual keyboard.

4.2 MAC Platform

Installation and Usages:

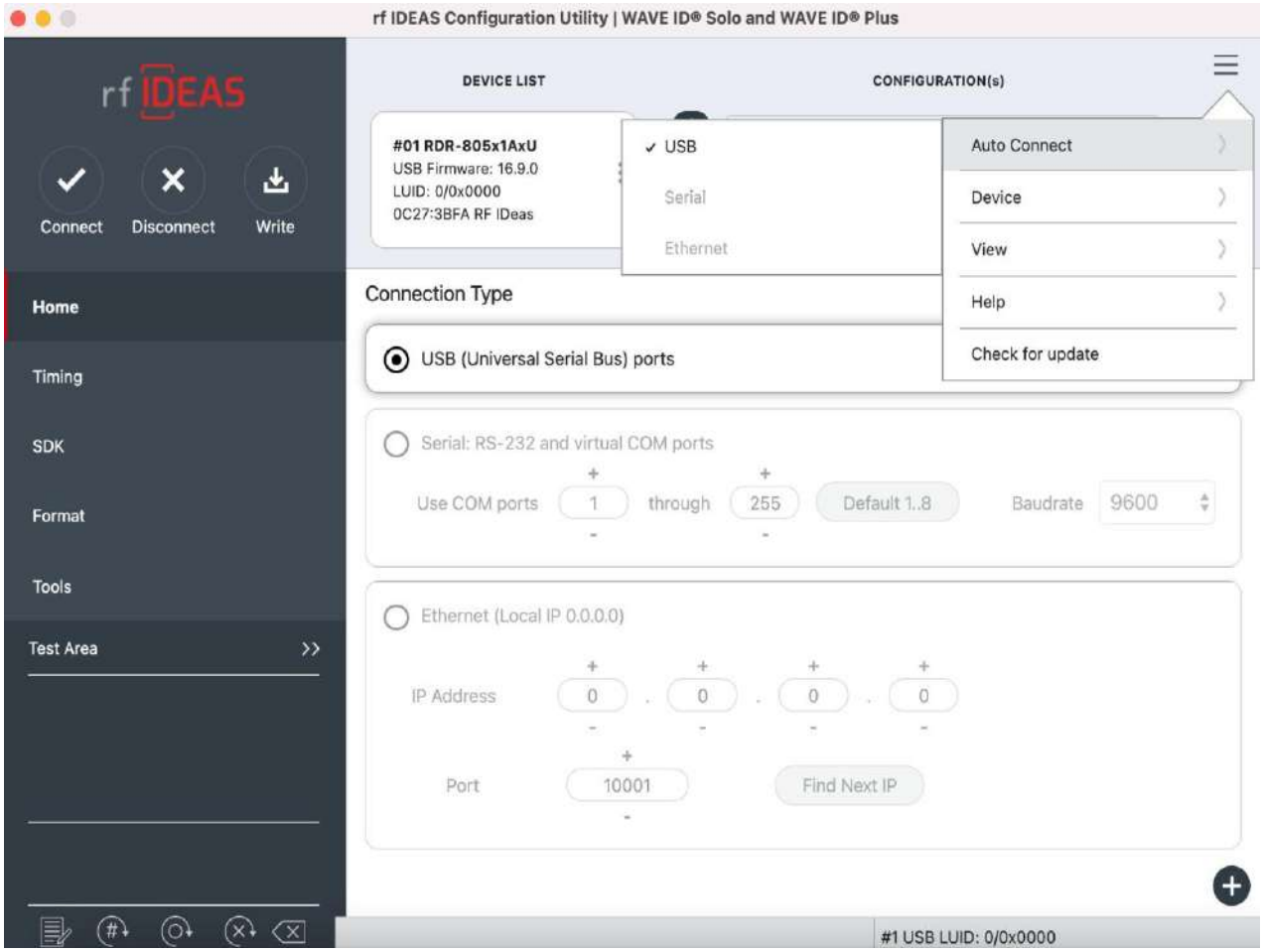
1. If the reader is not getting connect on the Mac application, please modify control permissions for the rf IDEAS Config application under system preferences: System Preferences > Security & Privacy > Input Monitoring
   A. Unlock to edit.
   B. Under “Allow apps below to control your computer,” select rf IDEASConfiguration Utility. C. Lock to disable edits.

2. Mac versions of rf IDEAS configuration utility does not support Serial and Ethernet reader connection therefore these options will be disabled (greyed out).



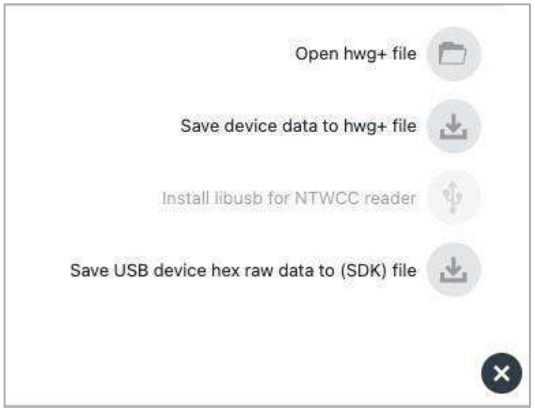
Serial & Ethernet readers not supported.

NOTE: - The auto-connection for serial & Ethernet readers will also remain OFF.



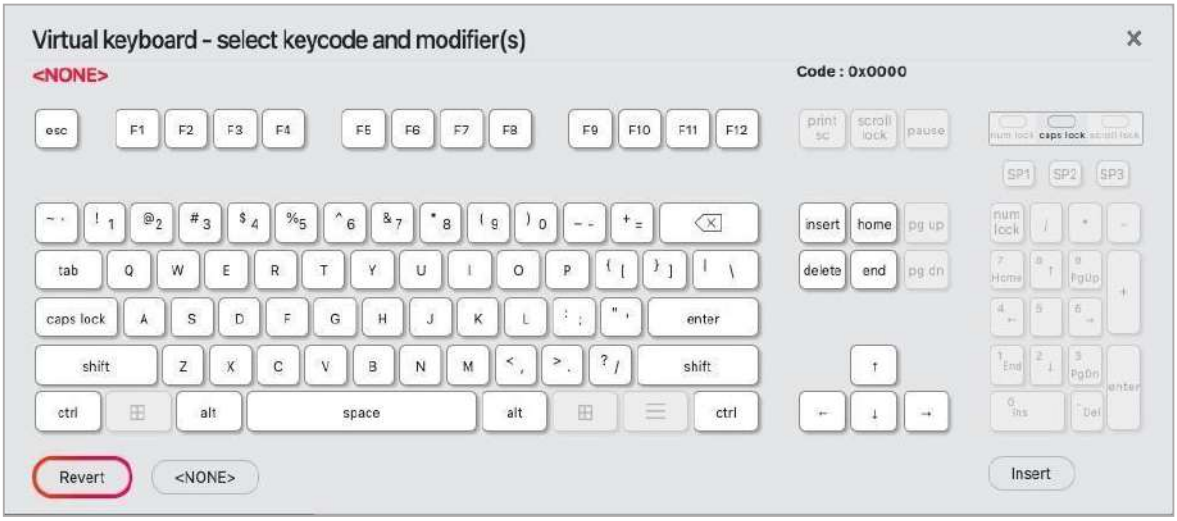
Auto connection OFF for Serial & Ethernet readers

3. The Mac utility does not support connection of NTWCC type readers therefore this option will be disabled (greyed out).



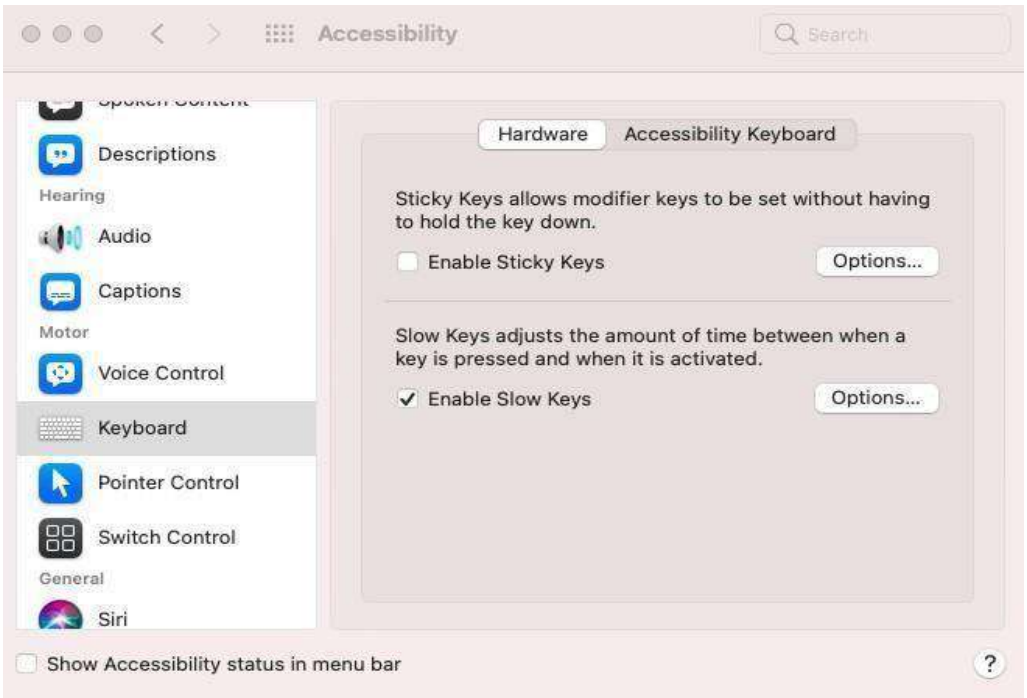
Installation of libusb for NTWCC reader disabled.

4. There are several Keys that are disabled (greyed out) on virtual keyboard of the Mac rf IDEAS configuration utility as shown in below diagram.



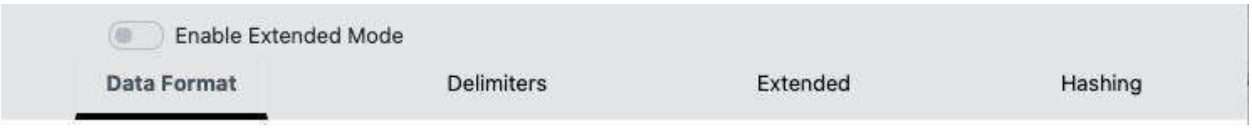
Virtual Keyboard of Mac rf IDEAS Configuration Utility

5. The 'caps lock' key of virtual keyboard will work only when 'Key Press Time' is 80 mS or greater OR the user will need to enable the slow keys from the settings as shown below.



Enabling Slow Key

6. The ‘Enable Extended Mode’ is temporarily disabled on Mac rf IDEAS Configuration Utility for key-stoking (81 series) readers.



Extended mode disabled

END-USER LICENSE AGREEMENT

LICENSE AGREEMENT

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1.6 Example Code and Dynamic Link Libraries. rf IDEAS grants you the right to use and modify the source code version of those portions of the underlying software identified as “examples” in the software (“Example Code”), as well as the Dynamic Link Libraries (“DLL”) for the sole purposes of designing, developing, and testing your software product(s), and to reproduce and distribute the DLL and Example Code, along with any modifications of the Example Code, only in object code form.

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Appendix

COMPONENTS	MINIMUM SYSTEM REQUIREMENTS
Hardware	Intel® Pentium™ E5400 processor
Memory	2 GB RAM
Hard Disk Space	400 MB
I/O	1 USB port for USB device, 1 RS-232, and 1 USB port for serial device
Operating System	Windows 10 & above, Linux (Ubuntu 20.4) & MAC Big Sur / Monterey

Use the WAVEID Plus Reader for Password Security - Complex Passwords

It is possible with certain limitations, to use the proximity token as a password for an application or operating system log on. The unique card bit-stream converted to either decimal or hexadecimal becomes the entire or a portion of the password. Enroll this card data to the password of the operating system application for the user.

Since the proximity token has no read/write memory, there is no way to change this or write alphanumeric characters such as a user name to the proximity token.Please see rf IDEAS WAVE ID Playback Starter Kit or call the Sales Department if this capability is needed.

Several companies have adopted a policy that requires users to change their password every xx number of days to increase security. The PIN is the portion of the password the user changes every xx number of days. Since the card data is completely numeric, any alpha and upper/lower case letter constraints are handled in the user supplied PIN.

A two-factor authentication system is made up of:

1. Card ID data
2. Personal Identification Number (PIN)

The reader may be configured to allow operation under either a one or two-factor authentication system.

One-Factor

In a one-factor system, the user simply scans the ID card. The reader may be configured to add TAB keystrokes ahead of the data as well as a TAB or ENTER keystroke after the card data.

Two-Factor

The two-factor approach is especially useful when insisting on password construction rules or periodic changing of passwords.

In a two-factor system, the user may enter the PIN either before or after the card data. If the user adds the PIN before the card data, the reader may be configured to append the ENTER keystroke.

Pre and Post Characters

There are some additional measures that can be taken to make it more difficult for unauthorized users to reproduce passwords.

Adding additional keystroke characters to the card information, that is difficult to reproduce, while configuring the data. These additional characters are labelled as Sp1, Sp2, and Sp3 on the Delimiters Tab menu selections.

ASCII Extended Procedure

STOP! Before proceeding, please validate that the reader has been properly preconfigured with the Smartcard Manager Utility. Contact techsupport@rfideas.com for more information.

Referring to the figure below, use the following procedure to configure the Reader to output ASCII keystroking:

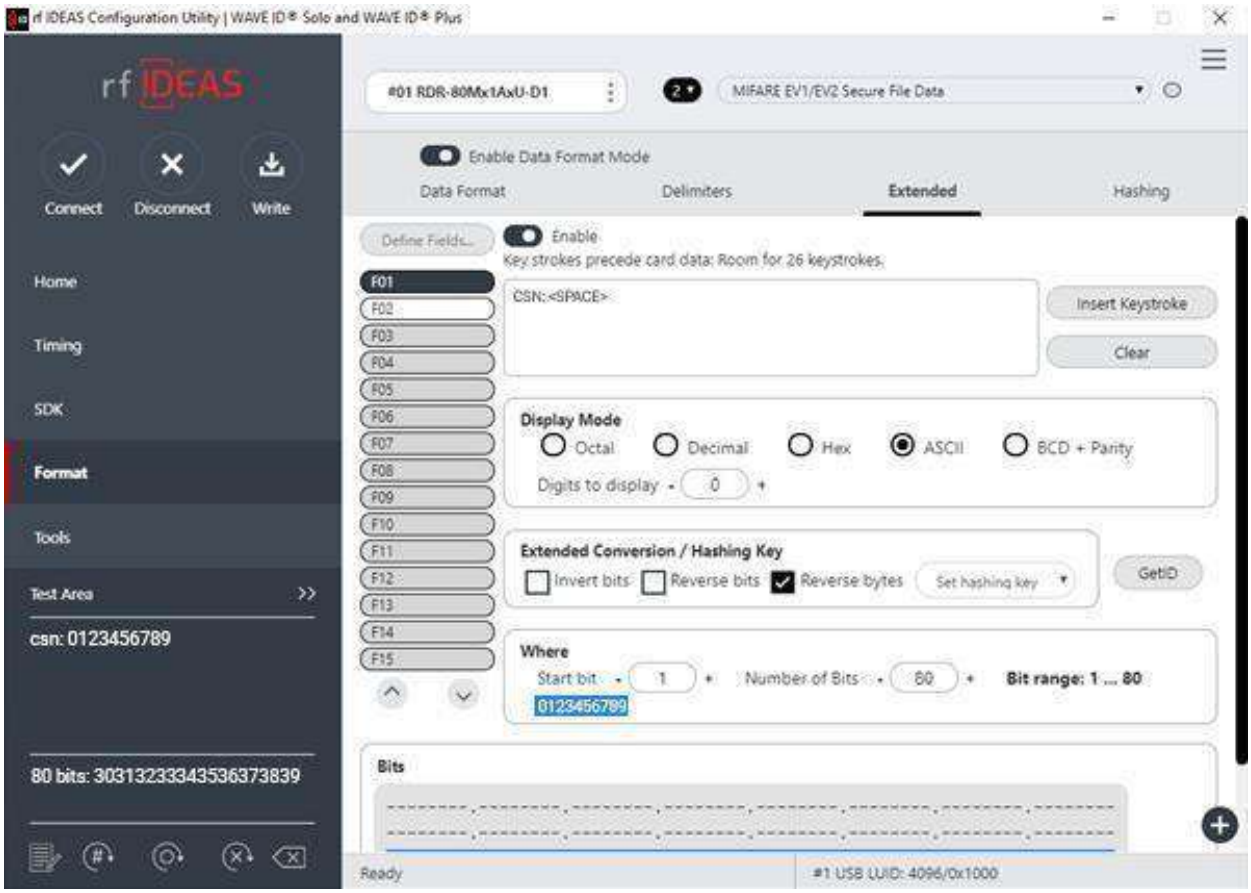
In this example, 30313233343536373839 will output as 0123456789.

1. Connect to the Secure Reader and insure one of the configurations has a Secure Card types configured, such as MIFARE EV1/EV2 Secure File Data.
2. Click on the Format tab and enable Extended mode.
3. In the text box on top, click Clear to remove CSN, if preferred.
4. Click on ASCII as Display mode.
5. Click on Get ID and present the Secure Card so the full range of data shows up in the Bits field.

6. Click on Reverse Bytes, change Start bit to 1 and Number of bits that represent the length of the desired bit field (number of ASCII characters *8)

7. ‘Write’ settings to the reader.

8. When a Secure Card is presented to the properly configured reader, it will keystroke "YOUR ASCII DATA" as required.



ASCII Extended Mode

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