



ClarIDy UHF USB Reader Demo Program for WinCE

ClarIDy UHF USB Reader Demo Program User's Manual for WinCE

Product Name: UHF USB Reader Module

Model No.: UEE006

Applicant: ClarIDy Solutions, Inc.

Version: A.1

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ClarIDy Solutions, Inc.



ClarIDy UHF USB Reader Demo Program for WinCE

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ClarIDy UHF USB Reader Demo Program for WinCE

Change Log

Revision	Date	Author	Description
A.1	2008.12.03.	Jun-Rong Chang	Create the ClarIDy UHF Demo Program User's Manual for WinCE.

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1. Introduction

This document describes the demo program for ClarIDy UHF RFID Reader. The demo program provides “Setting”, “Algorithm”, “Inventory”, “Read/Write”, “Filter Inventory”, “Filter Read/Write” and “Lock/Kill” functions. Users can use these applications to control the ClarIDy UHF RFID Reader to communicate with EPC RFID tags. The operational procedures are described as the following chapters.

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2. Installation

Before Installing the USB Driver and ClarIDy UHF Demo program, please see prerequisites first.

2.1 Prerequisites to Installation

In order to run ClarIDy UHF Demo program as smoothly as possible, we recommend some conditions as following.

2.1.1 Hardware Platform Requirements

The following hardware Platforms are supported by ClarIDy UHF RFID Reader..

- Marvel® pxa270 processor. validation was carried out on a RLC Enterprises Inc.'s* XScale Mini board.

2.1.2 Operating System Requirements

The following host operating systems are supported by ClarIDy UHF RFID Reader:

- Windows CE® 5.0 on a Marvel PXA270 platform with a USB host controller.
Development and testing of the RFID Library on Windows CE® 5.0 were performed on RLC Enterprises Inc.'s XScale Mini board.

2.1.3 Other Software Requirements

The following other systems are supported by ClarIDy UHF RFID Reader:

- Microsoft® .Net Compact Framework® Release 2.0

2.2 Setup the USB Driver

First time using the ClarIDy's UHF RFID Reader (USB Interface), you must install the driver. (The Driver programs are located in the "driver" folder of the disc.)

The ClarIDy UHF Reader is an USB Plus-and-Play device. Installation of the driver on Windows CE is a simple procedure:

1. Deploy the usbharv.dll and clp.dll files to the Windows CE device. They must be deployed to an area that Windows CE will automatically search when trying to find the appropriate driver file for the ClarIDy UHF Reader. Note that usbharv.dll requires that cpl.dll be in a directory that is in windows CE's DLL search path (or in the same directory).
2. Plus the ClarIDy UHF Reader into an USB Bus port on the Windows CE device. If Windows CE does not find the driver for the ClarIDy UHF Reader, it will prompt for the

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location, in which case you either have to provide the location or move the before mentioned files to a location that is automatically searched by Windows CE. If the ClarIDy UHF Reader driver is successfully loaded, you should be able to find the entry for the driver in the Windows CE device's registry. Look under the key HKEY_LOCAL_MACHINE\Drivers\Active. Under one of the keys (most likely one the higher-numbered keys), you should see a driver whose "Name" value is "RFTn:" (where n is a number).

2.3 Install .Net Compact Framework 2.0

Install .Net Compact Framework 2.0 step by step as the following instructions:

1. Copy the cab file "NETCFv2.wce5.armv4i.cab" in Windows CE Device or Copy the "NETCFv2.wm.armv4i.cab" in Windows Mobile Device, as figure 1.
2. Click "NETCFv2.wce5.armv4i.cab" or "NETCFv2.wm.armv4i.cab".
3. Select a location where to install .Net Compact Framework 2.0, as figure 2.
4. Wait the installation, as figure 3.
5. Restart the device to complete installation, as figure 4.

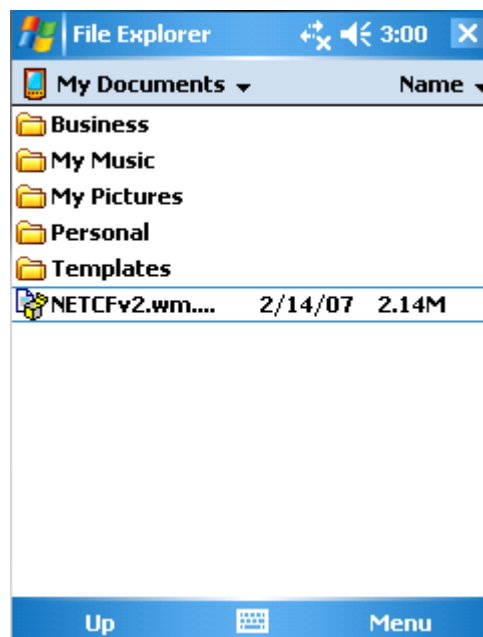


Figure 1

ClarIDy UHF USB Reader Demo Program for WinCE



Figure 2

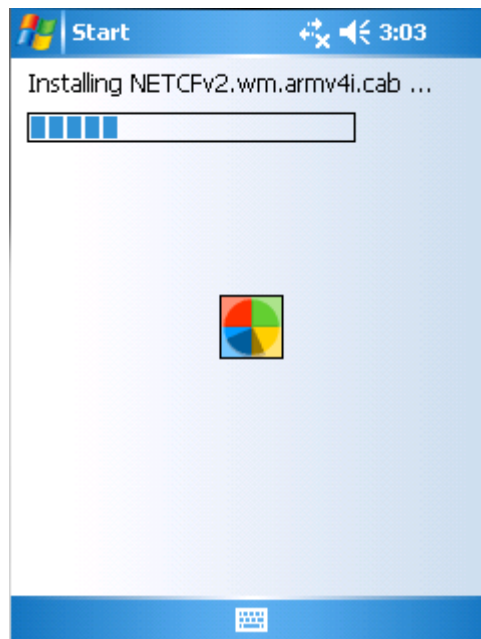


Figure 3

ClarIDy UHF USB Reader Demo Program for WinCE

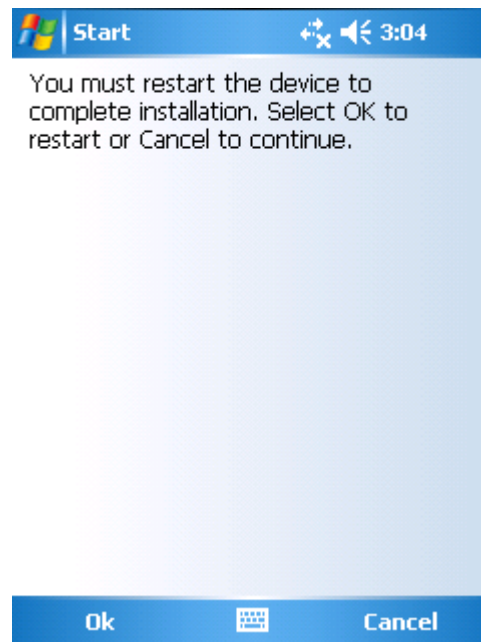


Figure 4

2.3 Install ClarIDy UHF Demo

Install ClarIDy UHF Demo step by step as the following instructions:

1. Copy the cab file "ClarIDy_UHF_Demo_Setub.cab" to Windows CE or Windows Mobile Device.
2. Click "ClarIDy_UHF_Demo_Setub.cab".
3. Select a location where to install ClarIDy UHF Demo Program, as figure 5.
4. Wait the installation, as figure 6.
5. ClarIDy UHF Demo Program Was successfully installed on your device, as figure 7.

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Figure 5

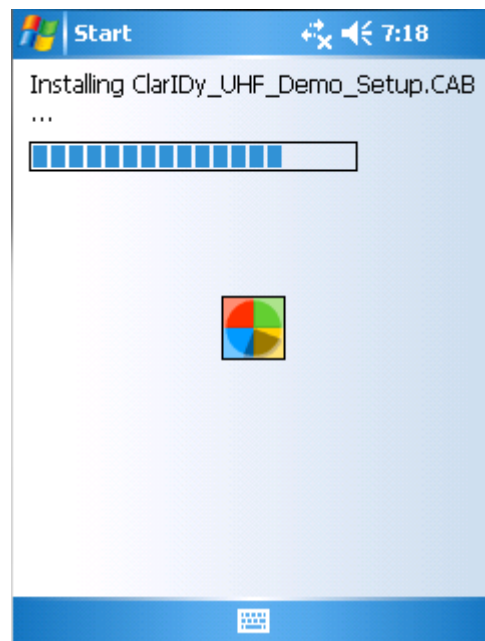


Figure 6

ClarIDy UHF USB Reader Demo Program for WinCE

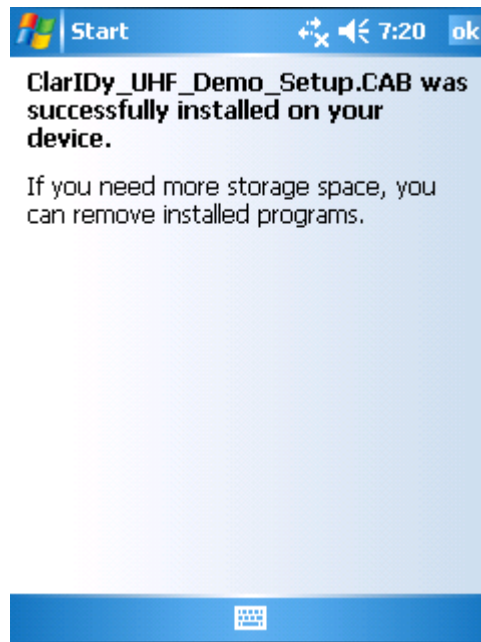


Figure 7

ClarIDy UHF USB Reader Demo Program for WinCE

3. Demo Program Operation Guide

The following sections will describe the usage of the ClarIDy UHF Demo application. The application is include seven Controls, “Setting Control”, “Algorithm Control”, “Inventory Control”, “Read/Write Control”, and “Lock/Kill Control”.

3.1 Setting Control

Click the “Setting” page of the main form, as figure 8. The Settings Page is displayed. This page allows the user to configure the following items:

- Link Profile
- Data Format (Compact, Normal or Extended)
- Operational Mode (Continuous Mode or Discontinuous Mode)
- Inventory Algorithm (Fixed “Q”, Variable “Q”, Variable “Q” Adjustable or Variable “Q” Threshold)

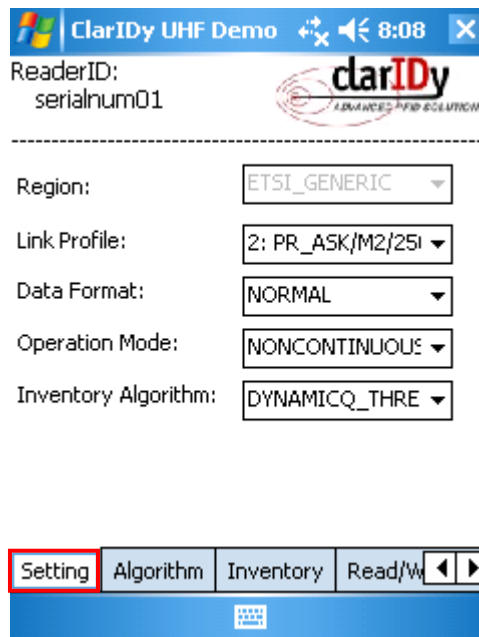


Figure 8 Setting View Panel

1. Link Profile: Sets the current link profile for the reader module, as figure 9. The option is as follows:

- 0: DSB ASK / MO / 40 khz**
- 1: DSB_ASK / M1 / 160 khz**
- 2: PR_ASK / M2 / 25U khz**
- 3: PR_ASK / M2 / 300 khz**
- 4: DSB_ASK / MO / 400 khz**
- 5: PR_ASK / M1 / 250 khz**

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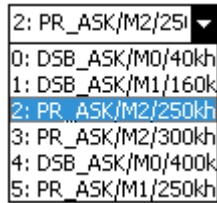


Figure 9

2. Data Format: Sets the operation response data reporting mode for tag-protocol operations, as figure 10. The option is as follows:

COMPACT: The response data is limited to provide the application with the pertinent tag-access operation data, but minimize the amount of MAC-to-host communication overhead.

NORMAL: The response data builds on the compact mode to provide the application with status and contextual information to give additional finer-grained feedback such as the beginning of inventory cycles, etc.

EXTENDED: The response data builds on the normal mode by providing additional diagnostics and statistical information.

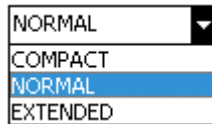


Figure 10

3. Operation Mode: Sets the reader's operation mode, as figure 11. The option is as follows:

CONTINUOUS: In continuous mode, when a tag-protocol-operation cycle (i.e., one iteration through all enabled antenna ports) has completed, the reader module will begin a new tag-protocol-operation cycle with the first enabled antenna port and will continue to do so until the operation is explicitly cancelled by the application.

NONCONTINUOUS: In non-continuous mode, only a single tag-protocol-operation cycle is executed upon the reader module.

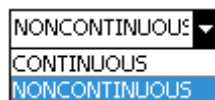


Figure 11

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4. Inventory Algorithm: Allows the application to set the currently-active singulation algorithm, as figure 12. The option is as follows:

0: ALGORITHM_FIXEDQ

1: DYNAMICQ

2: DYNAMICQ_ADJUST

3: DYNAMICQ_THRESHOLD

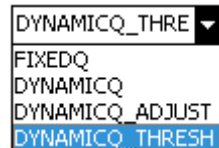


Figure 12

ClarIDy UHF USB Reader Demo Program for WinCE

3.2 Algorithm Control

Click the “Algorithm” page of the main form, as figure 13. The Algorithm pane is used to view, the parameters for the selected singulation algorithm. The user may select Fixed Q, Dyanmic Q, Dynamic Q Adjustable and Dynamic Q Threshold from the Active Algorithm combo box. Then, you can edit parameters and click “save” button to refresh the values displayed in the Algorithm Settings View panel.

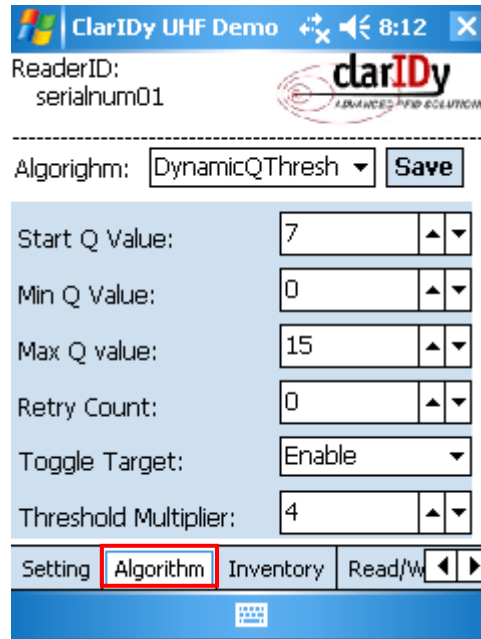


Figure 13 Algorithm View Panel

1. **FixedQ** : Fixed Q algorithm. The items as follows:
 - 1: **qValue**: The Q value to use. Valid values are 0 to 15, inclusive.
 - 2: **retryCount**: Specifies the number of times to try another execution of the singulation algorithm for the specified session/target before either toggling the target (if toggleTarget is non-zero) or terminating the inventory/tag access operation. Valid values are 0-255, inclusive.
 - 3: **toggleTarget**: A flag that indicates if, after performing the inventory cycle for the specified target (i.e., A or B), if the target should be toggled (i.e., A to B or B to A) and another inventory cycle run. A non-zero value indicates that the target should be toggled. A zero value indicates that the target should not be toggled. Note that if the target is toggled, retryCount and repeatUntilNoTags will also apply to the new target.
 - 4: **repeatUntilNoTags**: A flag that indicates whether or not the singulation algorithm should continue performing inventory rounds until no tags are singulated. A non-zero value indicates that, for each execution of the singulation algorithm,

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inventory rounds should be performed until no tags are singulated. A zero value indicates that a single inventory round should be performed for each execution of the singulation algorithm.

2. **DynamicQ:** Adjusts the Q value based on the presence or absence of tags. The items as follows:
 - 1: **startQValue:** The starting Q value to use. Valid values are 0 to 15, inclusive.
 $\text{minQValue} \leq \text{startQValue} \leq \text{maxQValue}$
 - 2: **minQValue:** The minimum Q value to use. Valid values are 0 to 15, inclusive.
 $\text{minQValue} \leq \text{startQValue} \leq \text{maxQValue}$
 - 3: **maxQValue:** The maximum Q value to use. Valid values are 0 to 15, inclusive.
 $\text{minQValue} \leq \text{startQValue} \leq \text{maxQValue}$
 - 4: **retryCount:** Specifies the number of times to try another execution of the singulation algorithm for the specified session/target before either toggling the target (if toggleTarget is non-zero) or terminating the inventory/tag access operation. Valid values are 0-255, inclusive.
 - 5: **maxQueryRepCount:** The maximum number of ISO 18000-6C QueryRep commands that will follow the ISO 18000-6C Query command during a single inventory round. Valid values are 0-255, inclusive.
 - 6: **toggleTarget:** A flag that indicates if, after performing the inventory cycle for the specified target (i.e., A or B), if the target should be toggled (i.e., A to B or B to A) and another inventory cycle run. A non-zero value indicates that the target should be toggled. A zero value indicates that the target should not be toggled. Note that if the target is toggled, retryCount and repeatUntilNoTags will also apply to the new target.

3. **DynamicQAdjust:** This algorithm modifies the previous dynamic Q algorithm by issuing ISO 18000-6C Query Adjust commands instead of ISO 18000-6C Query commands when adjusting the Q value. The items as follows:
 - 1: **startQValue:** The starting Q value to use. Valid values are 0 to 15, inclusive.
 $\text{minQValue} \leq \text{startQValue} \leq \text{maxQValue}$
 - 2: **minQValue:** The minimum Q value to use. Valid values are 0 to 15, inclusive.
 $\text{minQValue} \leq \text{startQValue} \leq \text{maxQValue}$
 - 3: **maxQValue:** The maximum Q value to use. Valid values are 0 to 15, inclusive.
 $\text{minQValue} \leq \text{startQValue} \leq \text{maxQValue}$
 - 4: **retryCount:** Specifies the number of times to try another execution of the singulation algorithm for the specified session/target before either toggling the target (if toggleTarget is non-zero) or terminating the inventory/tag access operation.

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Valid values are 0-255, inclusive.

- 5: maxQueryRepCount:** The maximum number of ISO 18000-6C QueryRep commands that will follow the ISO 18000-6C Query command during a single inventory round. Valid values are 0-255, inclusive.
- 6: toggleTarget:** A flag that indicates if, after performing the inventory cycle for the specified target (i.e., A or B), if the target should be toggled (i.e., A to B or B to A) and another inventory cycle run. A non-zero value indicates that the target should be toggled. A zero value indicates that the target should not be toggled. Note that if the target is toggled, retryCount and repeatUntilNoTags will also apply to the new target.

4. **DynamicQThreshold:** This algorithm uses a Q-modification algorithm that allows the application to control the change of the Q-adjustment-threshold value. The items as follows:

- 1: startQValue:** The starting Q value to use. Valid values are 0 to 15, inclusive.
 $\text{minQValue} \leq \text{startQValue} \leq \text{maxQValue}$
- 2: minQValue:** The minimum Q value to use. Valid values are 0 to 15, inclusive.
 $\text{minQValue} \leq \text{startQValue} \leq \text{maxQValue}$
- 3: maxQValue:** The maximum Q value to use. Valid values are 0 to 15, inclusive.
 $\text{minQValue} \leq \text{startQValue} \leq \text{maxQValue}$
- 4: retryCount:** Specifies the number of times to try another execution of the singulation algorithm for the specified session/target before either toggling the target (if toggleTarget is non-zero) or terminating the inventory/tag access operation. Valid values are 0-255, inclusive.
- 5: toggleTarget:** A flag that indicates if, after performing the inventory cycle for the specified target (i.e., A or B), if the target should be toggled (i.e., A to B or B to A) and another inventory cycle run. A non-zero value indicates that the target should be toggled. A zero value indicates that the target should not be toggled. Note that if the target is toggled, retryCount and repeatUntilNoTags will also apply to the new target.
- 6: thresholdMultiplier:** The multiplier, specified in units of fourths (i.e., 0.25), that will be applied to the Q-adjustment threshold as part of the dynamic-Q algorithm. Valid values are 0-255, inclusive.

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3.3 Inventory Control

Click the “Inventory” page of the main form, as figure 14. The Inventory panel is used to read tag data and view tag data. Click the “Start” button to read tags, as figure 15.

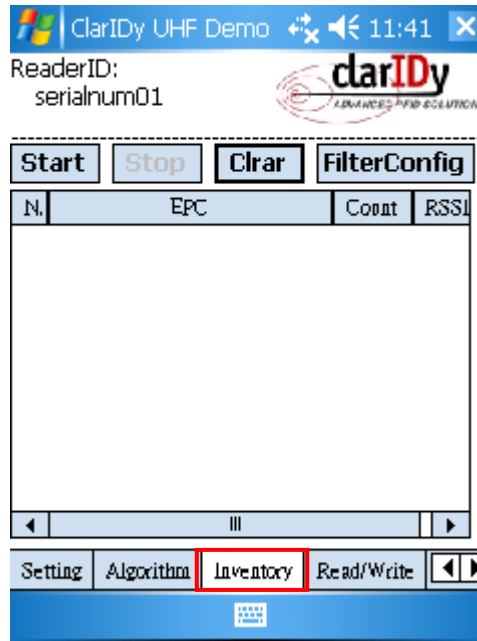


Figure 14 Inventory Control.

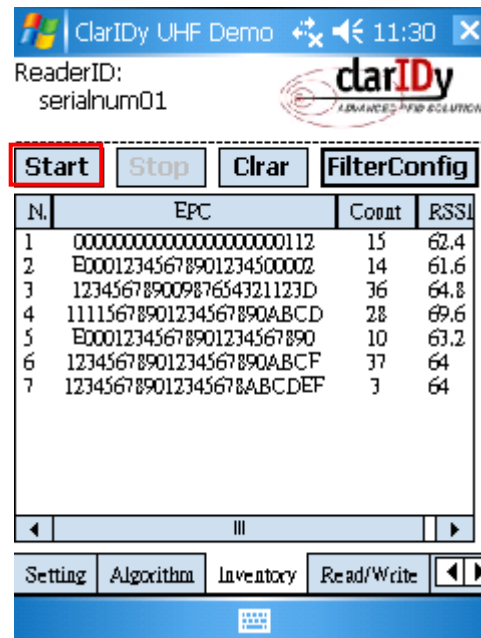


Figure 15: Start Read Tags

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If you want to use filter function, then Click “FilterConfig” button. The Filter is used to read tag EPC. The user may select to read tag UID by filter value. If the user selects “NONE” from the rule combo box, the reader will read all cards. If the user selects “NOT EQUAL” from the rule combo box, the reader will read card which is not match filter value. If the user selects “EQUAL” from the rule combo box, the reader will read card which is match filter value.

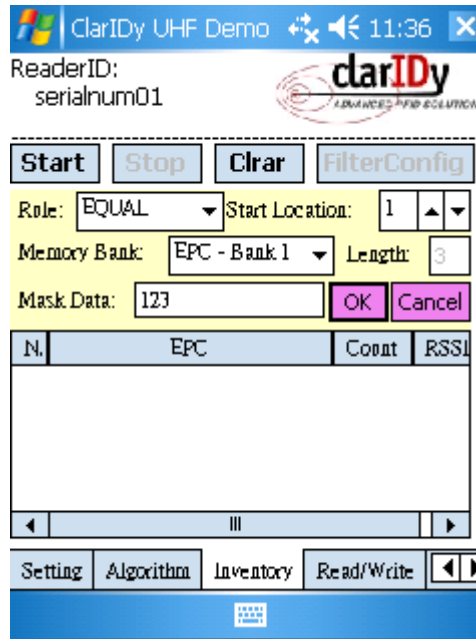


Figure 16: Set Inventory Filter

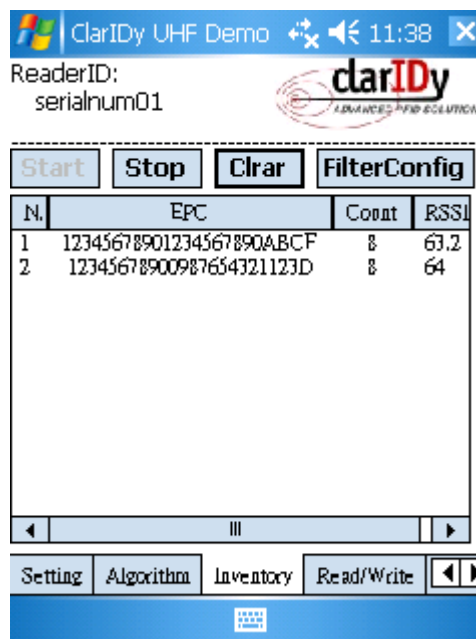


Figure 17 Run the Filter Inventory

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3.4 Read/Write Control

Click the “Write/Read” page of the main form, as figure 18. The “Write/Read” panel is used to read and write tag. The user may select to read and write by filter value. If the user selects “NONE” from the rule combo box, the reader will read or write one of cards. If the user selects “NOT EQUAL” from the rule combo box, the reader will read or write one of cards which is not match filter value. If the user selects “EQUAL” from the rule combo box, the reader will read or write one of cards which are match filter value.

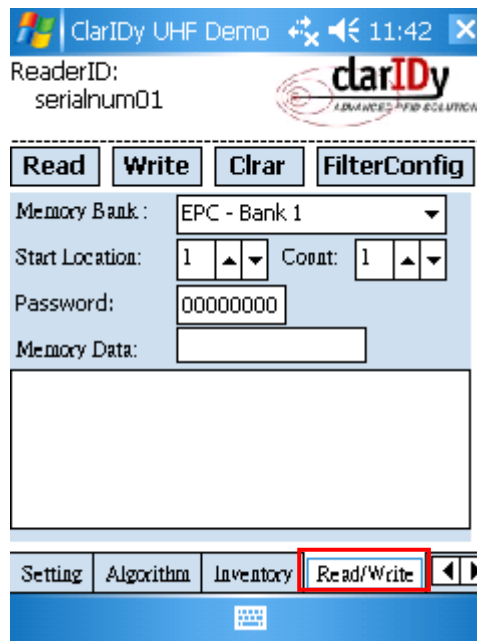


Figure 18 Read/Write Control

Follow the instructions step by step as following:

1. If you want to use filter function, then Click “FilterConfig” button, else go to step 7.
2. Select “Rule”
3. Select start location of filter value
4. Select “Mask Memory Bank”
5. Input “Mask Data”
6. Click the “OK” button”, as Figure 19.

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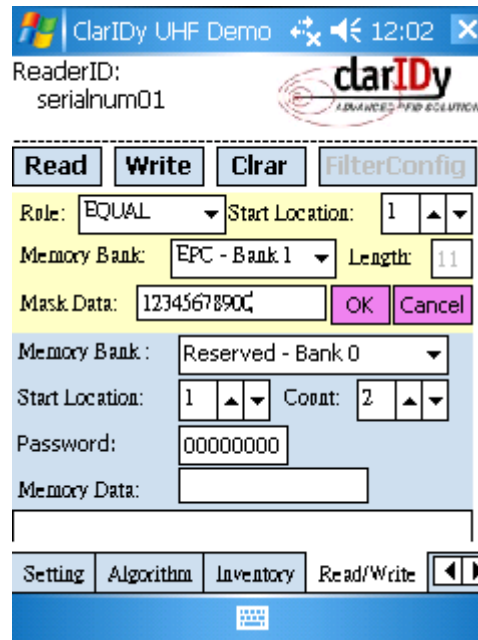


Figure 19 Set Read/Write Filter

7. Select Memory Bank.
8. Select the start location and Count (unit is Word).
9. Input the password.
10. If you want to write data, please input the value in the memory data.
11. Click the “Read” button or “Write” button, as Figure 20 and Figure 21.

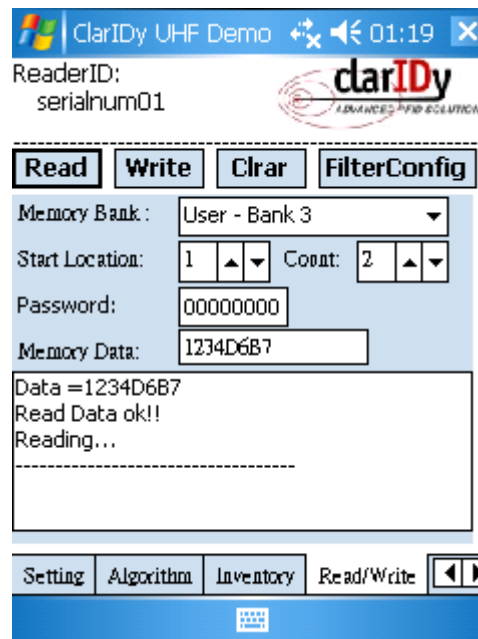


Figure 20 Read the Tag Data of User Memory

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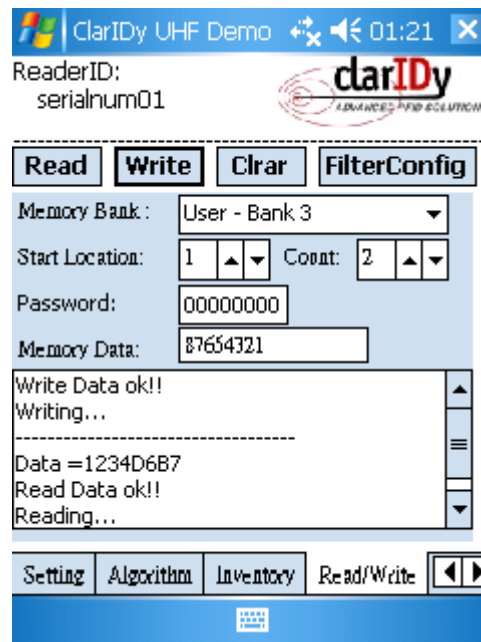


Figure 21 Write the Tag Data of User Memory

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3.5 Lock/Kill Control

Click the “Lock/Kill” page of the main form, as figure 22. The “Lock/Kill” panel is used to Lock tag data and Kill tag.

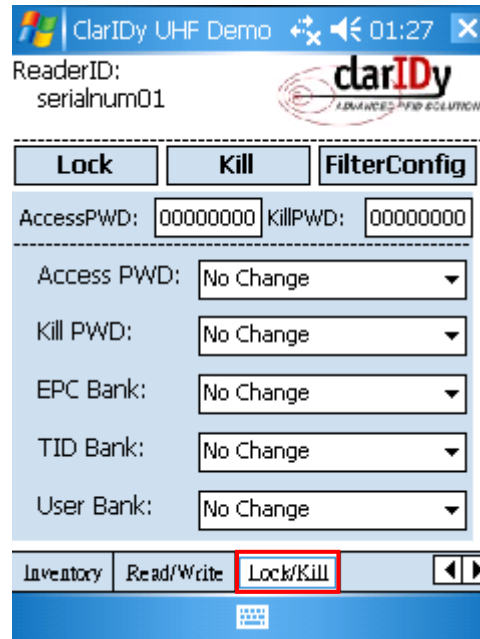


Figure 22

Follow the instructions step by step as following:

1. Click “FilterConfig” button.
2. Select “Rule”
3. Select start location of filter value
4. Select “Mask Memory Bank”
5. Input “Mask Data”
6. Click the “OK” button, as Figure 23”
7. Input “AccessPWD” and KillPWD”. But if you want to lock the tag, please input “AccessPWD”
8. If you want to kill or lock the tag, please select “OK”, as Figure 24.
9. The kill and lock function would not be change permanently, please confirm again as figure 25.

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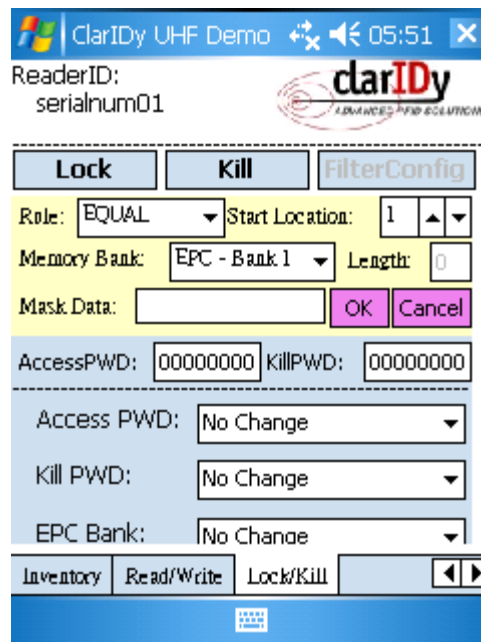


Figure 23



Warning:
The tag would be killed.



Figure 24

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Warning:

The setting can not be changed permanently after selecting "Writeable Permanently" and "Not Writeable Permanently".



Figure 25

Note:

For individual passwords, the access permissions that can be set are:

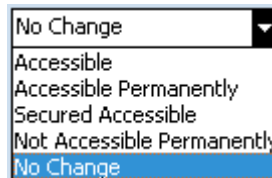


Figure 26

Accessible: The password may be read and written when the tag is in either the open or secured states.

Accessible Permanently: The password may be read and written when the tag is in either the open or secured states and this access permission should be set permanently.

Secured Accessible: The password may be read or written only when the tag is in the secured state.

Not Accessible Permanently: The password may not be read or written and this access permission should be set permanently.

No Change: The password's access permission should remain unchanged.

The memory bank is writeable when the tag is in either the open or secured states.

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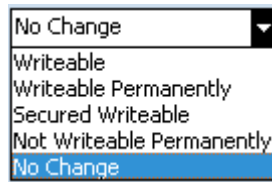


Figure 27

Writeable: The memory bank is writeable when the tag is in either the open or secured states.

Writeable Permanently: The memory bank is writeable when the tag is in either the open or secured states and this access permission should be set permanently.

Secured Writeable: The memory bank is writeable only when the tag is in the secured state.

Not Writeable Permanently: The memory bank is not writeable and this access permission should be set permanently.

No Change: The memory bank's access permission should remain unchanged.

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4. Error Code

The following lists provide error codes of UHF Reader Demo Program. These values are defined in the description.

Code (dec)	Description
0	Success
-9999	Attempted to open a reader that is already open
-9998	Buffer supplied is too small
-9997	General failure
-9996	Failed to load reader bus driver
-9995	Library cannot use version of reader bus driver present on system
-9994	Operation cannot be performed while library is in emulation mode
-9993	Antenna number is invalid
-9992	Reader handle provided is invalid
-9991	One of the parameters to the function is invalid
-9990	Attempted to open a non-existent reader
-9989	Library has not been successfully initialized
-9988	Function not supported
-9987	Operation was cancelled by call to cancel operation, close reader, or shut down the library
-9986	Library encountered an error allocating memory
-9985	The operation cannot be performed because the reader is currently busy
-9984	The underlying reader module encountered an error
-9983	The reader has been detached from the system
-9982	The RFID library function is not allowed at this time.
-9981	The reader module's MAC firmware is not responding to requests.
-9980	The MAC firmware encountered an error while initiating the nonvolatile memory update. The MAC firmware will return to its normal idle state without resetting the reader module.
-9979	An attempt was made to write data to an address that is not in the valid range of reader module nonvolatile memory addresses.
-9978	The MAC firmware encountered an error while trying to write to the reader module's nonvolatile memory region.
-9977	The underlying transport layer detected that there was an overflow error resulting in one or more bytes of the incoming data being dropped. The operation was aborted and all data in the pipeline was flushed.

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-7999	Fail to find reader
-7998	Fail to allocate memory
-7997	WriteData failure
-7996	ReadData failure