User Guide

SIC43NT PC Software User Guide

This document descripts how to use SIC43NT PC software with SIC PI931 for evaluating and exploring various features of SIC43NT.

Revision History

Revision	Date	Software Version	Description/Change/Updated/Comment	Product Code
1.0	May 2017	1.1.1	1st Release	SIC43NT
1.1	June 2017	1.1.4	Adding authenticate	

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1. Introduction

The Pi-931 is a series of miniaturized 13.56MHz RFID reader module. Based on high-performance RFID contactless reader IC SIC9310 from Silicon Craft Technology.

Figure 1 Pi-931 X34CC SIC Reader

This manual describes how to use demonstration software with Pi931-X34CC for evaluating SIC43NT transponder. This software is based on basic command in the standard ISO14443A.

2. Getting Start

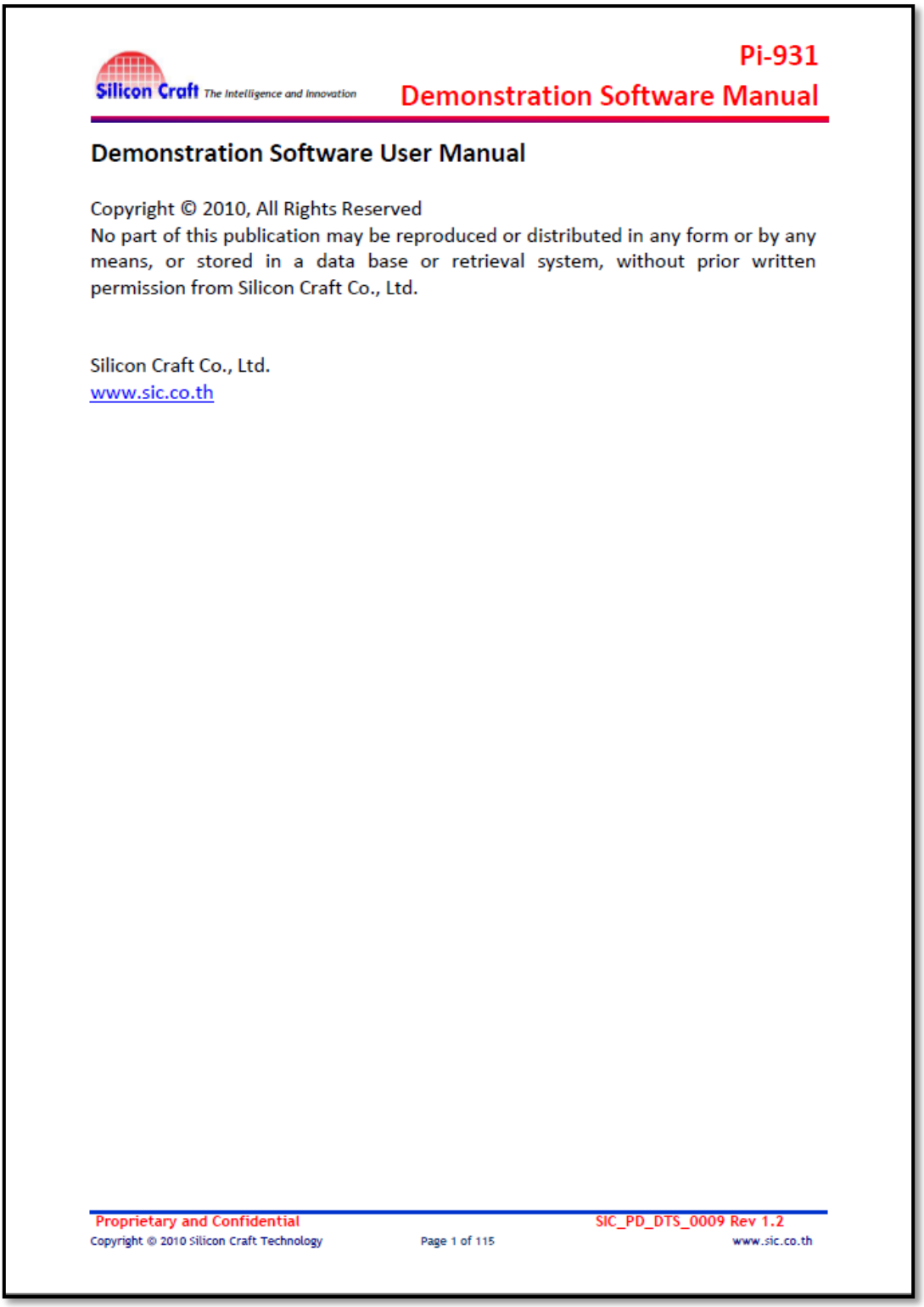
Before user can operate the demonstration, proper operational environment and the following requirements must be prepared.

2.1 System and Hardware requirements

- Computer : PC with USB Port
- Operating System : Window XP, Window 7, 8, 10
- RFID Reader : Pi-931 Reader
- Software Requirement: : .NET framework version higher than 4.0 Installed
- Others : Card, Tag, DC Adaptor (if it is required in some model)

2.2 Software Installation

Refer to document “SIC_PD_DTS_0009_Pi93_DemoSWManual_Rev2_0_20121115”



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Pi-931
Demonstration Software Manual

Demonstration Software User Manual

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Figure 2 Pi931 DemoSWManual

3. Quick Stat with Demonstration Software

The demonstration software is “” SIC43NT Configuration Software.exe” There is no software setup required. The demonstration software can run either from hard drive. The GUI of software is shown in Figure 22 and ready to use.

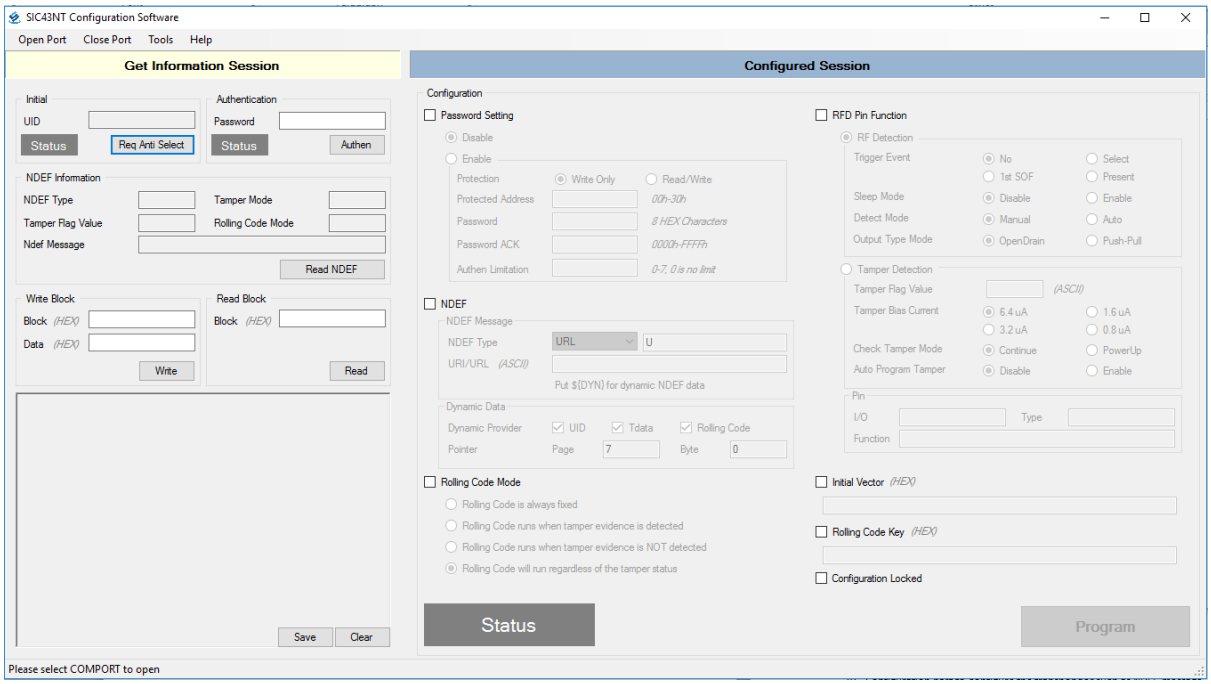

Figure 3 Demonstration Software 1

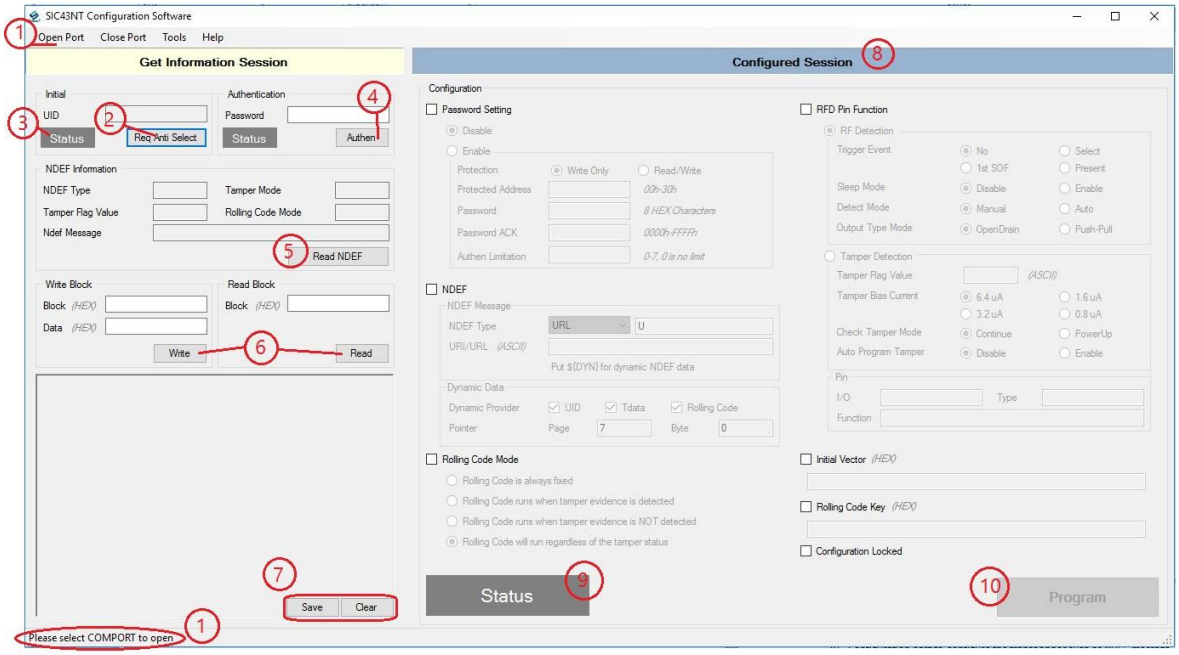

Figure 4 Demonstration Software 2

1) Connect a Pi-931 device to comport and wait until computer recognize COMPORT as shown in Figure 24. Then, click “OPEN PORT” Manu tap to query available COMPORT in computer.

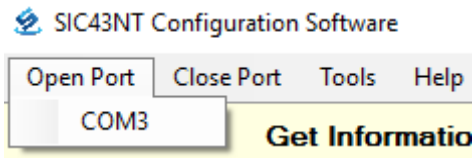

Figure 5 COMPORT

Available COMPORT in computer is shown. Click the COMPORT number belonging to reader hardware. If connection successful, there will be the connected comport with communication speed displayed at the bottom of the GUI.

2) Click “**Req Anti Select**” to get transponder UID. UID will be shown in the UID tab above.

3) Show status of Req-Anti-Coll command. Green means transponder has been requested. Red means it cannot get transponder UID.

4) Authenticate transponder to access the configuration or memory. Fill password and then click “**Authen**” for authentication.

5) Read NDEF information part by click “Read NDEF”. Example NDEF data is shown in Figure 25

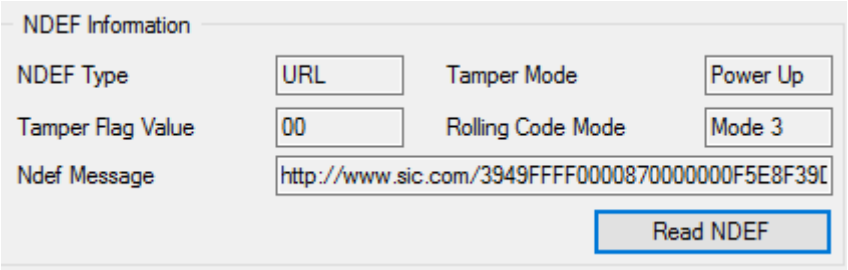

Figure 6 Example NDEF information

6) Read others information in transponder or write data to transponder.
7) Save LOG or clear LOG
8) Configuration part to configure the transponder such as NDEF message, Password setting, Tampering mode etc.
9) Show status of configuration part. Green means successful configuration. Red means configuration is fail.
10) Click “**Program**” to set up transponder.

4. Demonstration Software

This software mainly consists of four sections as shown in Figure 26 namely.

1) Port setup and software information
2) Get transponder information
3) Configuration transponder
4) Transaction logs

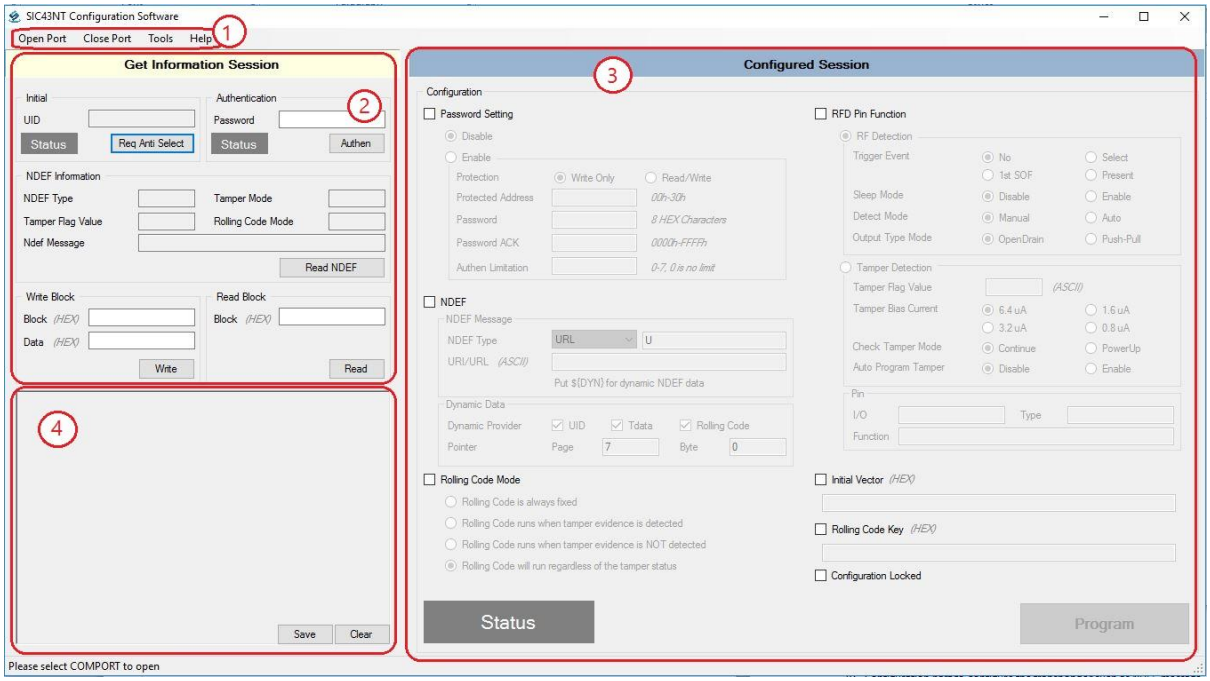

Figure 7 Section in Demonstration Software

4.1 Port setup and software information

This section consists of Menus related to hardware setup namely OPEN PORT, CLOSE PORT, GET FW VERSION and ABOUT.

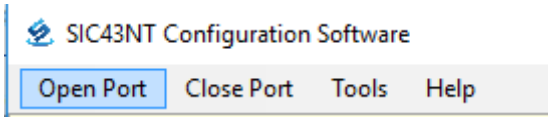

Figure 8 Port setup and software information

4.1.1 Open Port

Open Port is used to query and open communication port to the reader device.

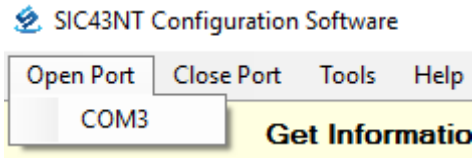

Figure 9 Open Port Menu

Following steps describe opening the communication port with Pi-931.

- Click **Open Port** menu to search available com port present in computer.
- Available COM ports are shown in menu content under **open Port** menu.
- Click on the COM port number belonging to reader hardware being operated to open communication.
- If connection is successful, there will be a connected comport with communication speed displayed at bottom of the GUI, as shown in Figure 29.

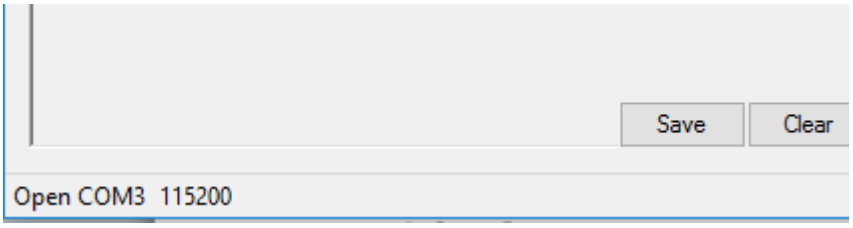

Figure 10 connected com port and communication speed (kbps)

4.1.2 Close Port

Close Port is used to close current communication port.

- Click **CLOSE PORT** to close current operating COM port.
- The connection shown at bottom of the GUI indicated that the comport was closed, as shown in Figure 30.

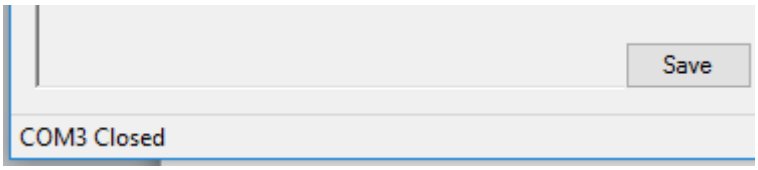

Figure 11 closed com port

4.1.3 Tools

Tools is used to control the field of SIC PI931 → on field, off field or reset field

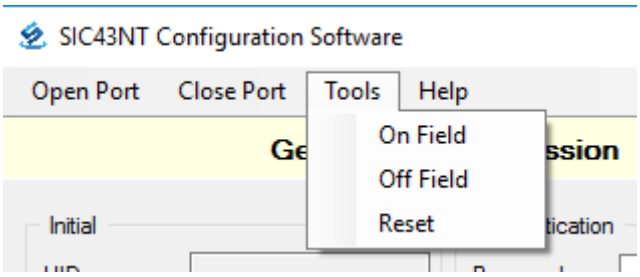

Figure 12 Tools menu

4.1.4 Help

Help is shown about software information

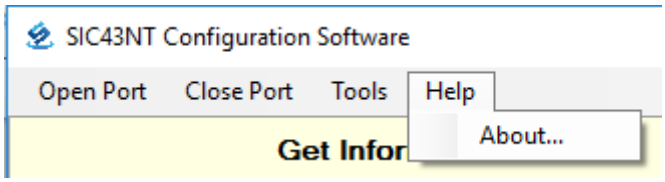

Figure 13 Help menu

- Show firmware version
- Show software version
- Can access to our website

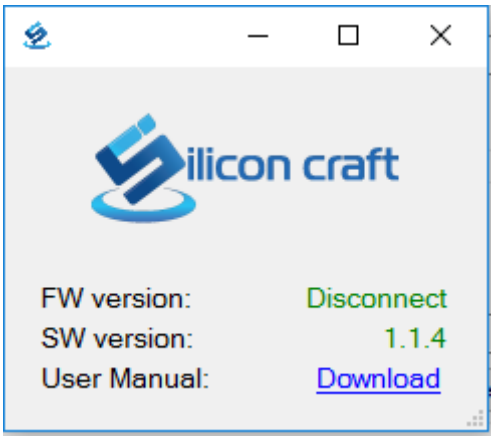

Figure 14 Firmware and Software information

4.2 Get transponder information

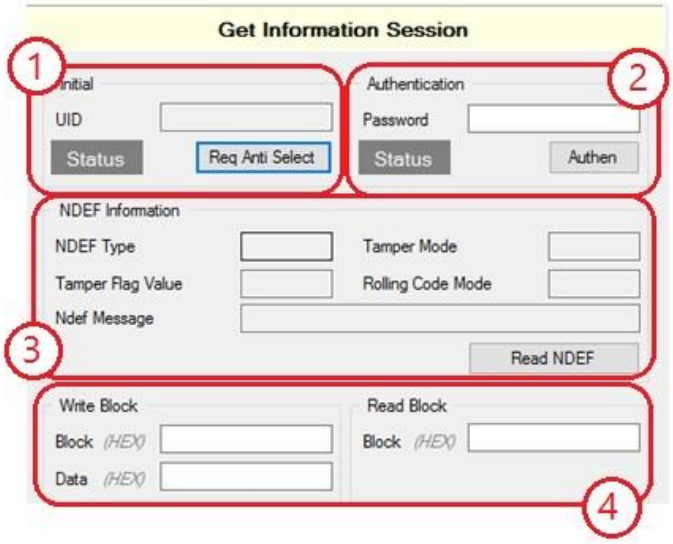

Figure 15 Get Information Session

4.2.1 Initial

"**Req Anti Select**" button to get UID of transponder

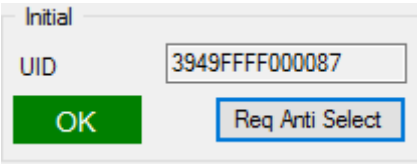

Figure 16 Get UID of transponder

4.2.2 Authentication

Fill password and then click "**Authen**" button to authenticate transponder in order to access its memory.

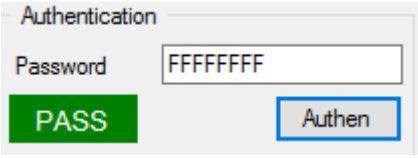

Figure 17 Authenticate

4.2.3 NDEF Information

NEFD information is shown NDEF message in transponder

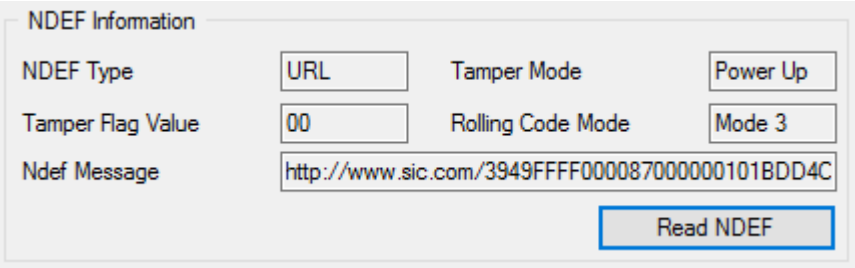

Figure 18 Example NDEF Information

4.2.3.1 NDEF Type NFC Data Exchange Format Type is shown in the table 1

Table 4-1 NDEF Types

NDEF Type	Description
URI/URL	Open URL via default browser
Plaintext	Record containing UTF-8 text data.
Application	Use Package name to Open Application.
Mail	NDEF record used to prompt the creation of a new email on the device.
Contact	Share contact data using the vCard 2.1 data format.
Phone number	Record phone number.
SMS	Write message and prepare to send to
Location	Display a geographic point in a mapping application on the device.
Address	Record address
Bluetooth connection	Pairing device via Bluetooth by using MAC address
Wi-Fi direct	Connect Wi-Fi
Custom record	Customize NDEF message

4.2.3.2 Tamper Flag Value Tamper status that store in the memory. This value is recommended to be in readable ASCII format.

4.2.3.3 Ndef Message NDEF message that store in transponder's memory

4.2.3.4 Tamper Mode Tampering checking mode can be 2 modes; Check Tampering Continuously and Check Tampering at Power up.

4.2.3.5 **Rolling Code Mode** Rolling Code rule is shown in table 4-2.

Table 4-2 Rolling Code Mode

Mode	Description
0	Rolling Code is always fixed
1	Rolling Code runs when tamper evidence is detected
2	Rolling Code runs when tamper evidence is **NOT** detected
3	Rolling Code will run regardless of the tamper status(default)

4.2.4 Write Block and Read Block

Figure 19 Write Block and Read Block

Write or read data in memory of transponder. The user memory is separated in to 36 blocks. Each block is 4 bytes. Read block command are shown data 16 bytes start at that block number as in Figure 39.

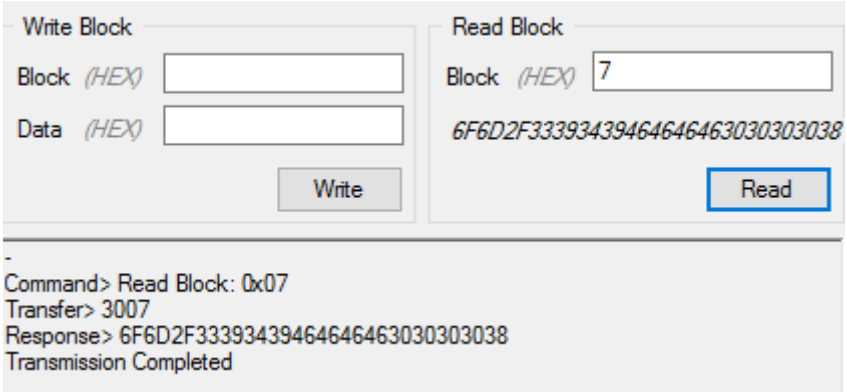

Figure 20 Example Read Block

4.3 Configuration transponder

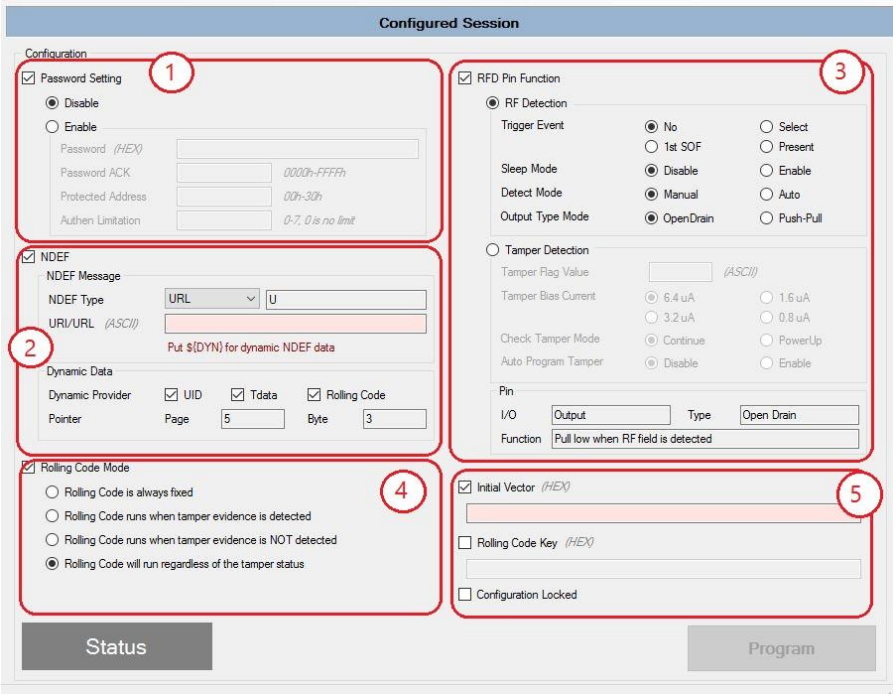

Figure 21 Configured Session

4.3.1 Password Setting

This password will protect memory from unauthorized modification. It consists of 4 parts in this setting.

Figure 22 Password Setting

4.3.1.1	**Protection**	Protection Configure
4.3.1.2	**Password**	4 Bytes data
4.3.1.3	**Password ACK**	The respond when SIC43NT receive a matched password
4.3.1.4	**Protected Address**	Start protected area
4.3.1.5	**Authen Limitation**	Limitation of negative password

4.3.2 NDEF

NDEF message is stored in SIC43NT's memory including rolling code.

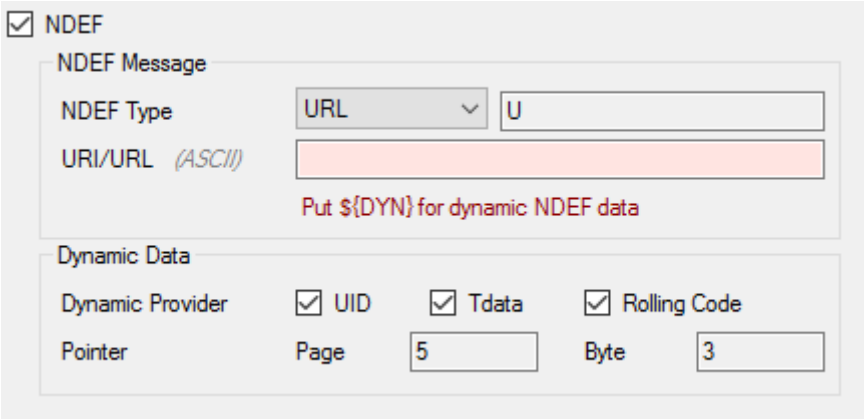

Figure 23 NDEF Setting

4.3.2.1 NDEF Message

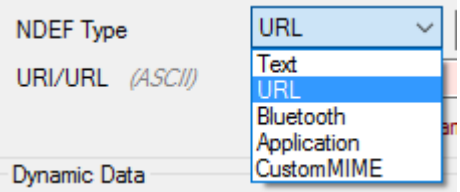

Figure 24 NDEF Type

The NDEF message can be many types. In this software can set NDEF message be URL, Text, Bluetooth, Application or CustomMIME.

4.3.2.2 Dynamic Data

Choose Dynamic data that is a part in NDEF message. Tdata is tamper status and Rolling Code is generated from rolling code key and time stamp.

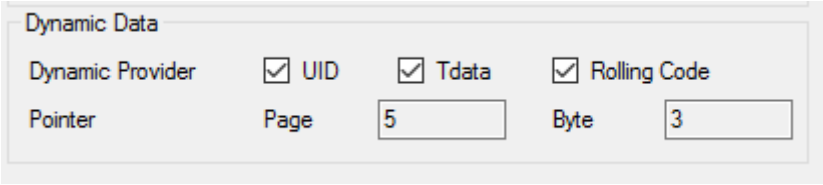

Figure 25 Dynamic Data

4.3.3 Rolling Code Mode

Rolling code mode is for controlling the dynamic NDEF message. Rolling Code action can be controlled by refer to tamper status.

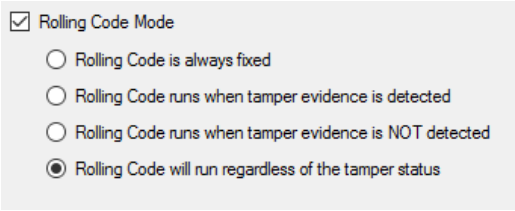

Figure 26 Rolling Code Mode

4.3.4 RFD Pin Function

SIC43NT RFD Pin can be set as 2 functions.

4.3.4.1 RF Detection

RF detection is detected when the transponder is in represent field of reader or NFC phone.

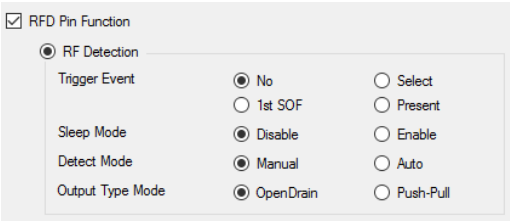

Figure 27 RF Detection

Table 4-3 RF Detection Mode

RF Detection Mode

RF detection	Items	Description
Trigger Event	No Field Detect	No RF field present
	1st SOF	First Start of Frame
	Select	Select state
	Field Present	RF field present
Sleep Mode	Disable	None sleep
	Enable	Sleep Enable
Detect Mode	Manual	Manual Configuration Pin behavior define from Output Type
	Auto	Auto Detect
Output Type Mode	Open Drain	Pull low when RF field is detected
	Push Pull	Logic high when RF field is detected

4.3.4.2 Tamper Detection

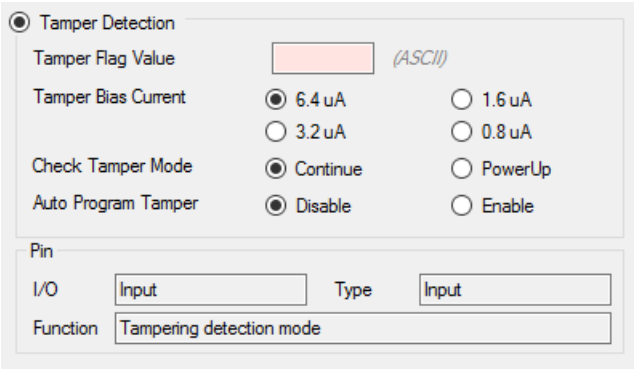

Figure 28 Tamper Detection

Table 4-4 Tamper Detection Mode

Tamper Detection Mode

TP detection	Items	Description
Tamper Flag	-	HEX data for Tamper status
Tamper Bias Current	6.4 uA	Current detect tamper status
	3.2 uA	
	1.6 uA	
	0.8 uA	
Check Tamper Mode	Continue	Always check tamper pin
	Power up	Check only power up
Auto Programing Tamper	Disable	Doesn't program status to EEPROM
	Enable	Program status to EEPROM

4.3.5 Initial Vector, Rolling Code Key and Configuration Lock

4.3.5.1 Initial Vector

The 32 bits Initial Vector **IV** serves an initial value for the Time Stamp. The data in this address will be automatically updated for generating next rolling code

Figure 29 Initial Vector

4.3.5.2 Rolling Code Key

The rolling code generator uses 10 bytes of **KEY**

Figure 30 Rolling Code Key

4.3.5.3 Configuration Lock

Lock the configuration to ensure that no one can change the setting.

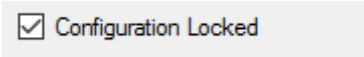

Figure 31 Configuration Locked

4.4 Transaction logs

Transaction log is shown each command that send through reader to SIC43NT and respond from transponder

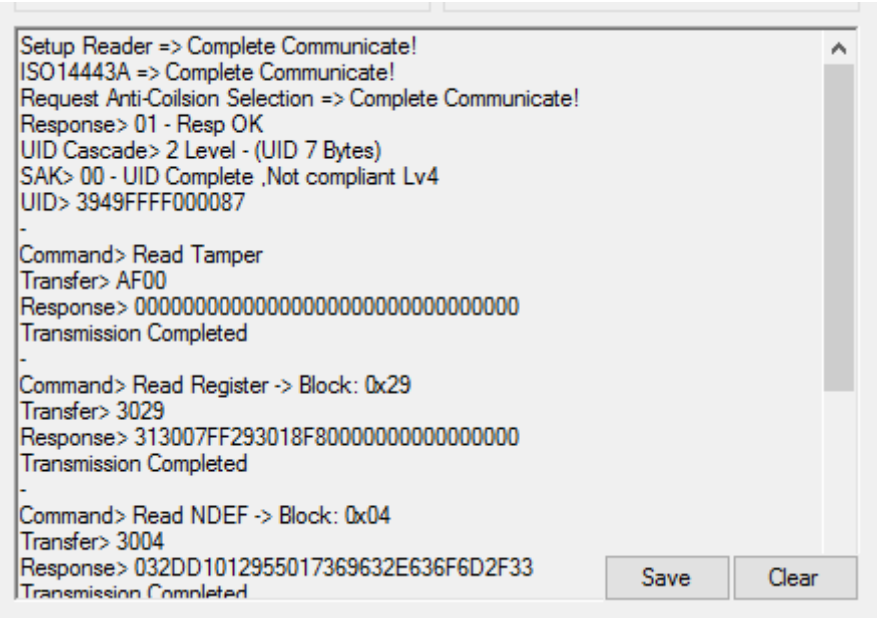

Figure 32 Example Transaction logs