

OEM-LF-M890
125 & 134.2 kHz OEM RFID Module
Installation Manual

iDTRONIC GmbH
Ludwig-Reichling-Straße 4
67059 Ludwigshafen
Germany/Deutschland

Phone: +49 621 6690094-0
Fax: +49 621 6690094-9
E-Mail: info@idtronic.de
Web: idtronic.de

Issue 0.3
– 02. April 2020 –

Subject to alteration without prior notice.
© Copyright iDTRONIC GmbH 2020
Printed in Germany

Contents

1	Introduction	4
1.1	Key Features	4
2	Electrical Installation	5
2.1	Pinout OEM-LF-M890-TTL.....	5
2.2	Pinout OEM-LF-M890-USB.....	6
3	Operating the Demo Software	7
3.1	Introduction	7
3.2	Hardware Connection	7
3.3	Functions Operation	8
3.3.1	Software connection	8
3.3.2	System command	9
3.3.3	ID card--GetUID.....	10
3.3.4	Hitags card-Request.....	10
3.3.5	Hitags card-Select	10
3.3.6	Hitags card-Quiet	11
3.3.7	Hitags card-ReadPage	11
3.3.8	Hitags card-WritePage	12
3.3.9	Hitags card-LockPage	12
3.3.10	FDX-B for Animal tag management	13
3.3.11	Hitags format to ID card.....	13
3.3.12	Hitags format to FDX-B	14
3.3.13	ReadFDX-B	15
4	Technical Specifications.....	17
5	Tag Information.....	19
5.1	EM4100 (64 bits), EM4102 (64 bits), EM4200 (128 bits)	19
5.2	Hitag S2048 (2 kbits, 256 Bytes, 64 blocks)	19
5.3	Hitag S256 (256 bits, 32 Bytes, 8 blocks)	19
5.4	Hitag S64 (64 bits, 8 Bytes, 2 blocks)	19
5.5	Hitag 1 (2 kbits, 256 Bytes)	20
5.6	Hitag 2 (256 bits, 32 Bytes)	20
5.7	EM4450/4550 (1 kbits)	20
	Table of Figures.....	21

1 Introduction

1.1 Key Features

- Frequency available with 125KHz, 134.2KHz
- 3.3V ~ 5V DC Power supply, UART-TTL interface
- Compatible with ISO11784,11785 Standard
- R/W HITAGS 64, HITAGS 256, HITAGS 2048, EM4100/4200, TK4100 cards
- External antenna, reading range up to 5~7 cm

2 Electrical Installation

2.1 Pinout OEM-LF-M890-TTL

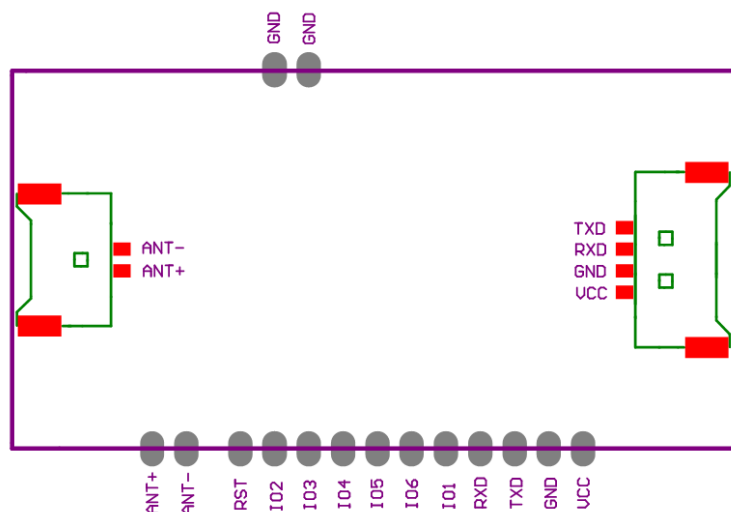


Figure 1 Pinout

Connector J1

PIN	Name	Description
1	Ant-	
2	Ant+	

Connector J2

PIN	Name	Description
1	TXD	Transmit Data (Green)
2	RXD	Receive Data (Yellow)
3	GND	Power Supply – (Black)
4	VCC	Power Supply + (Red)

Solder Joints

PIN	Name	Description
1	Antenna+	
2	Antenna–	
3	RST	Low-Power Reset
4	IO2	Output Group for RGB Light Control
5	IO3	
6	IO4	
7	IO5	External LED
8	IO6	External LED
9	IO1	External Buzzer
10	RXD	Receive Data
11	TXD	Transmit Data
12	GND	Power Supply –
13	VCC	Power Supply +

2.2 Pinout OEM-LF-M890-USB

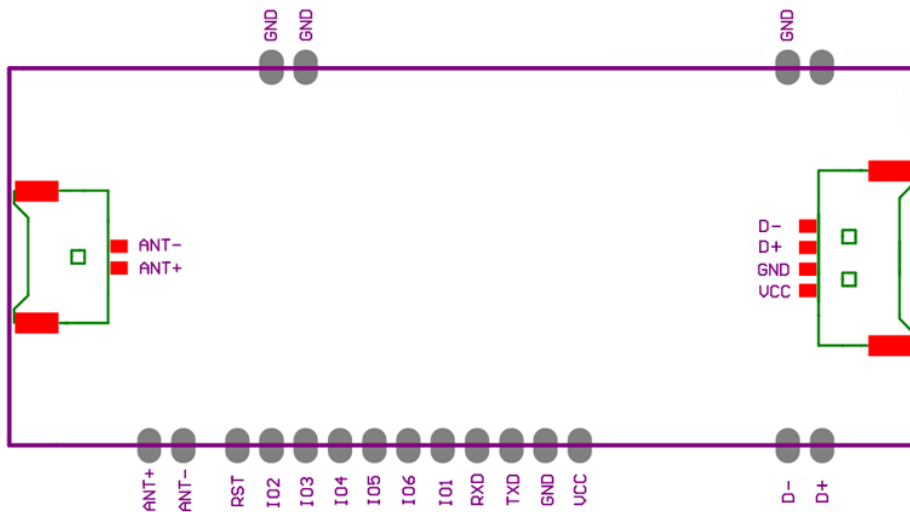


Figure 2 Pinout

Connector J1

PIN	Name	Description
1	Ant-	
2	Ant+	

Connector J2

PIN	Name	Description
1	D-	USB Data – (White)
2	D+	USB Data + (Green)
3	GND	Power Supply – (Black)
4	VCC	Power Supply + (Red)

Solder Joints

PIN	Name	Description
1	Antenna+	
2	Antenna-	
3	RST	Low-Power Reset
4	IO2	Output Group for RGB Light Control
5	IO3	
6	IO4	
7	IO5	External LED
8	IO6	External LED
9	IO1	External Buzzer
10	D-	USB Data – (White)
11	D+	USB Data + (Green)
12	GND	Power Supply –
13	VCC	Power Supply +

3 Operating the Demo Software

3.1 Introduction

This testing demo is offered for the basic functions available in the HITAGS series Modules and Reader products designed by CHIEK, and it supports of UART-TTL, RS232, RS485 and USB(COM) port products.

This demo is programmed basing on C# language and run under WINDOWS system.

Any other specific function not showing in this demo, can be realized by customize if there need, please contact our sales persons for details requesting.

3.2 Hardware Connection

For Modules series product, please firstly refer to datasheet of the specified Module using for their PIN definition and connect them with correspond mid-ware tool when testing with PC.

For Reader product with USB COM port, just plug USB connector to the PC side.

Then please check the COM port if be recognized in PC successfully, the way to check it is: Open Computer Manager--Device Manager--COM and LPT, as below:

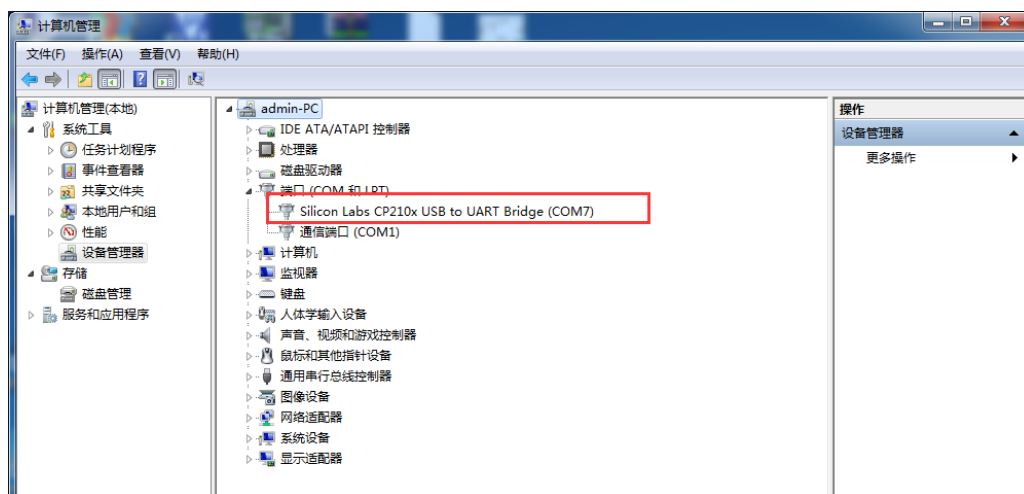


Figure 3 USB VCP in the Windows Device Manager

3.3 Functions Operation

3.3.1 Software connection

Firstly double click the Hitags.exe file to open demo software, and enter into connection interface as below:

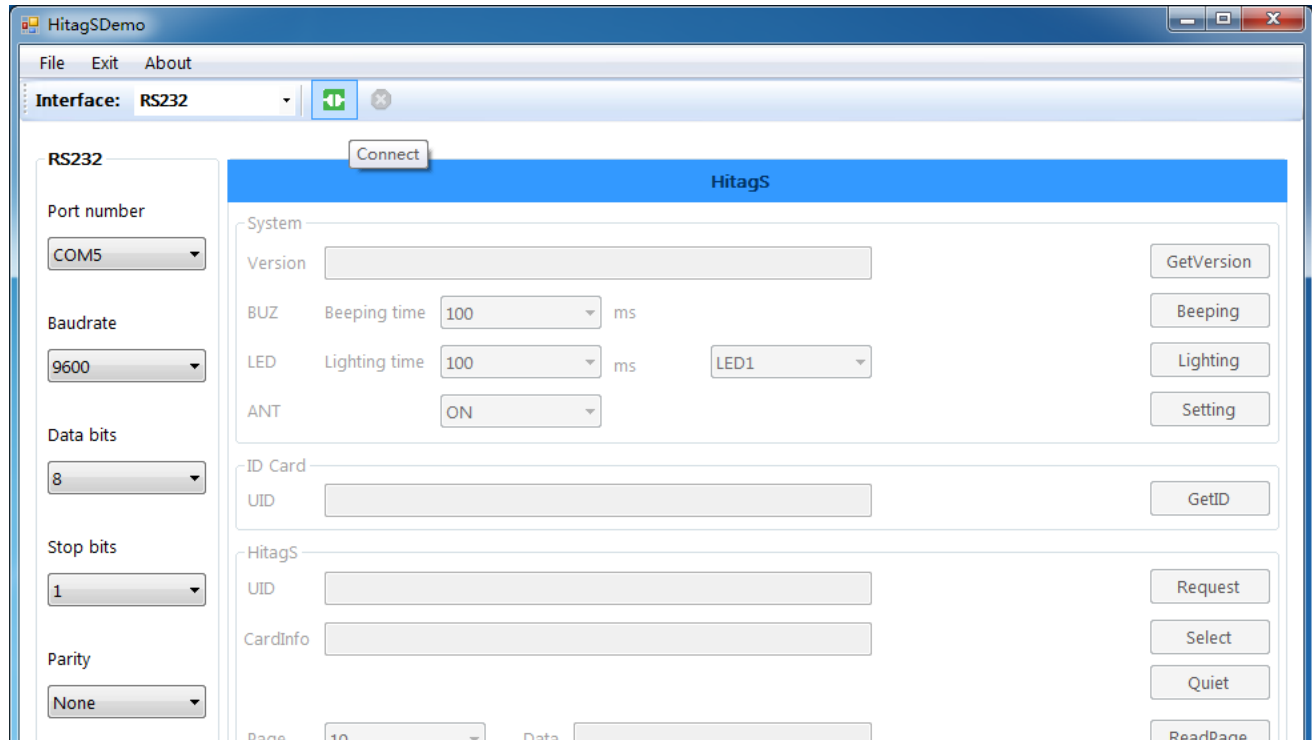


Figure 4 Set up of serial connection

Serial Connection Parameters

- Port number Refer to Device Manager--COM&LPT, which on listing
- Baudrate Available from 9600bps ~ 115200bps, default 9600bps;
- Data bits 8
- Stop bits 1
- Parity none

Make sure above parameters in right, then click Connect button to enter functions interface:

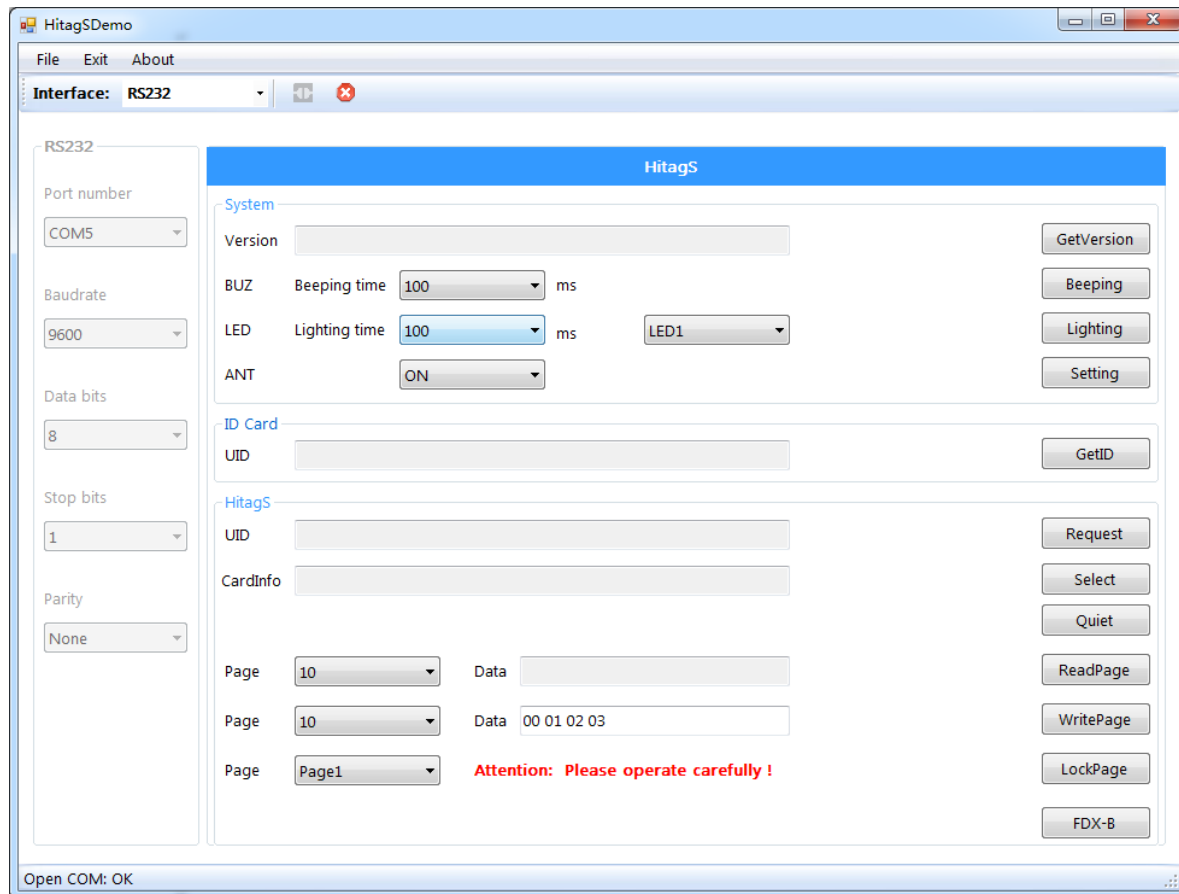


Figure 5 Demo software with connection established

3.3.2 System command

The commands open to operate BUZ, LED and ANT, which they can work of:

- BUZ: setup buzzer's beeping time;
- LED: setup LED's lighting time and which LED to be worked;
- ANT: ON or OFF antenna

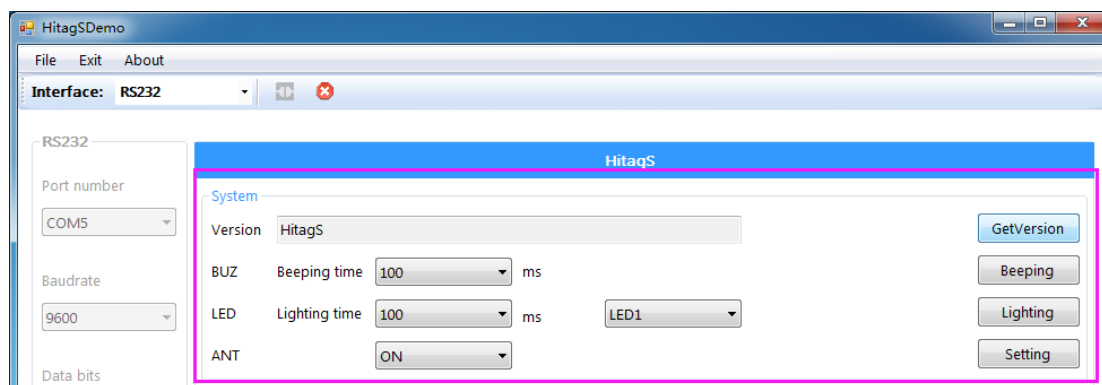


Figure 6 System commands (need extra hardware)

3.3.3 ID card--GetUID

This function is to get the UID of ID cards, which the card compatible with 125KHz EM 4100, EM4200, TK 4100, or any other cards be formatted 125KHz compatible.

The UID information will be shown on the Message box as below:

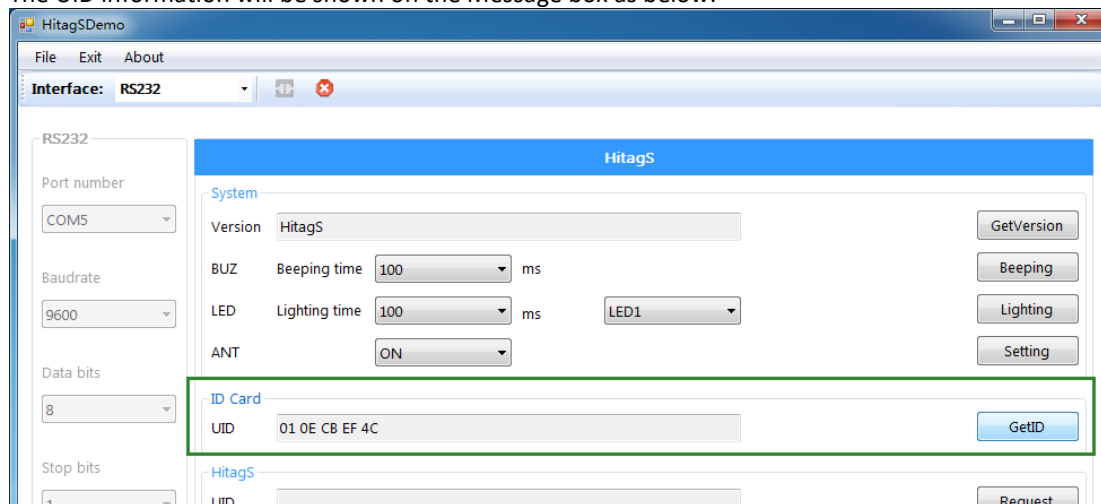


Figure 7 Read UID of read-only tag

3.3.4 Hitags card-Request

The Request button is to get UID of HITAGS series cards, which supports chipset of HITAGS 64, HITAGS 256, HITAGS 2048.

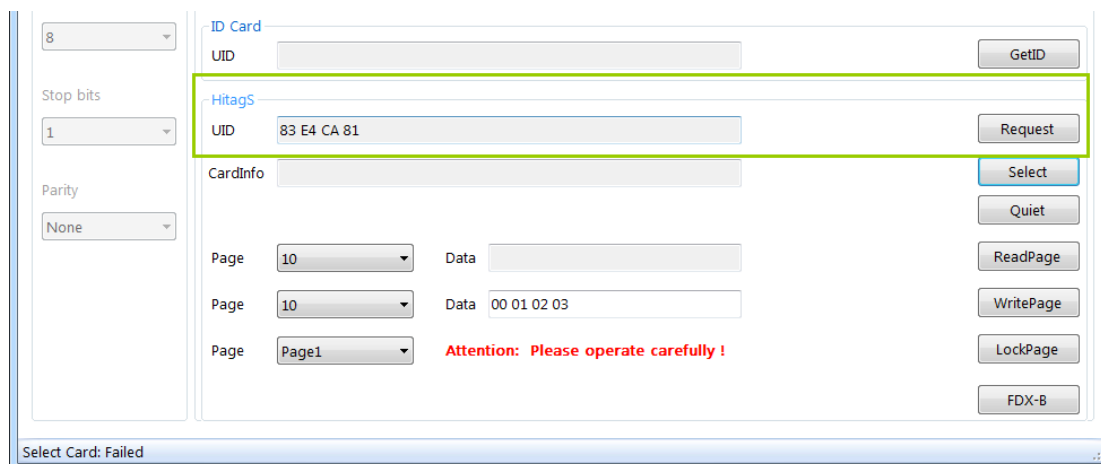


Figure 8 Read UID of Hitag-S tag

3.3.5 Hitags card-Select

This function is to select card before operating of Read/Write page of the card.

(Note: when operate this command, please make sure firstly to Request testing card and not remove it from detective area).

Figure 9 Get card info

3.3.6 Hitags card-Quiet

Figure 10 Quiet a tag

This function is to make card to be Quiet status, after enter into Quiet status, the card cannot be operated to Read or Write page.

3.3.7 Hitags card-ReadPage

This is to read the page data in the card, it can select which page to be read from drop-down menus, and cannot read multiple pages in one time, as following:

Figure 11 Read pages from the tag

3.3.8 Hitags card-WritePage

This is to write data into HITAGS card, it can select which page to be written from drop-down menus, and cannot write into multiple pages in one time, as below:

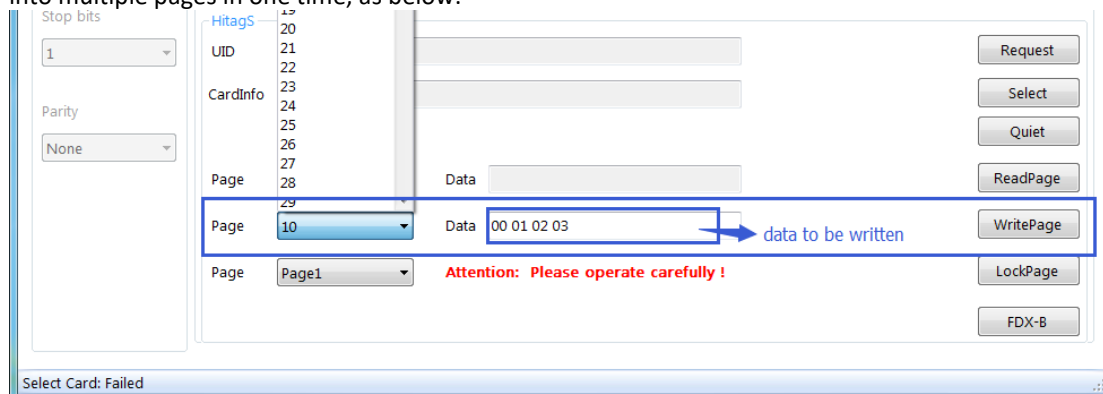


Figure 12 Write pages onto tag

NOTE: The data format to be written is in 4bytes HEX only.

3.3.9 Hitags card-LockPage

This is to Lock page of the HITAGS series card, it can select which page to be locked, and the page be locked cannot be written again. Please operate carefully.

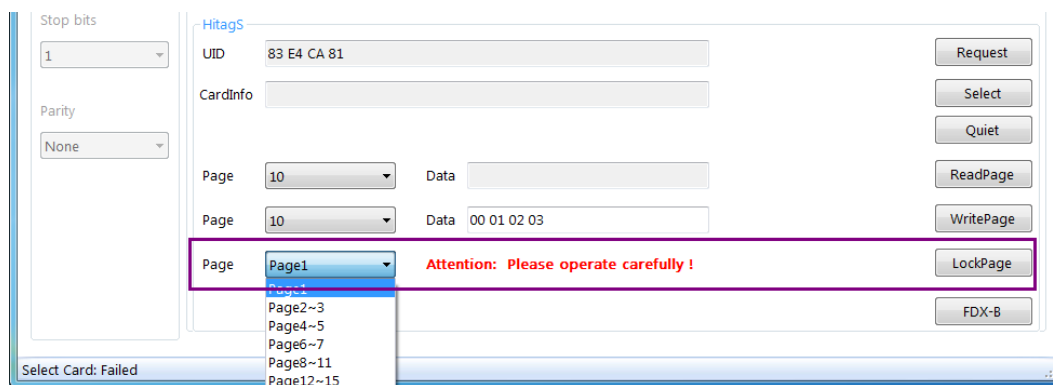


Figure 13 Lock pages on tag

3.3.10 FDX-B for Animal tag management

Please click button of FDX-B to enter detail operation interface:

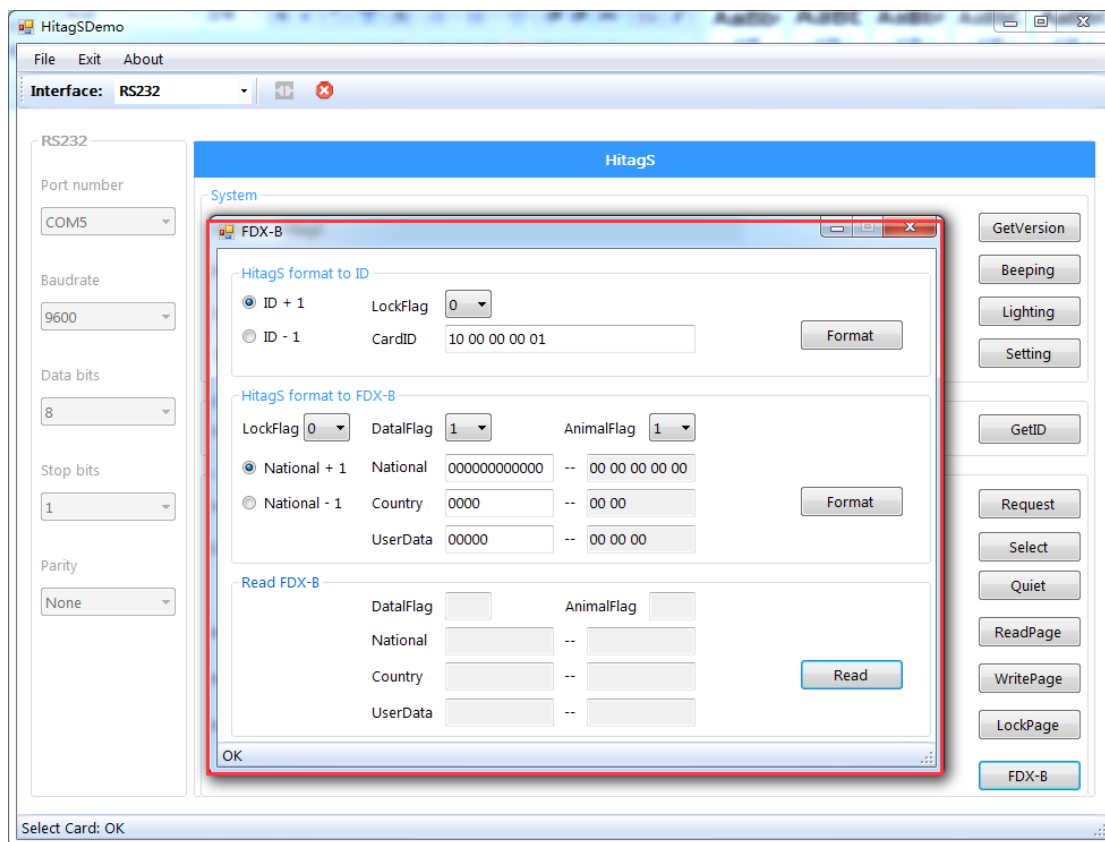


Figure 14 FDX-B dialog popup on software

3.3.11 Hitags format to ID card

This function is opened to format HITAGS series card to be ID card.

The functions include

- CardID Message box the data of UID to be formatted (5byte Decimal)
- ID + 1 the input data in the CardID message box plus 1 for next card formatting
- ID - 1 the input data in the CardID message box minus 1 for next card formatting
- LockFlag when it is 0, it is not to lock flag, then the card can be re-formatted again
when it's 1, it is to lock flag, then the card cannot be re-formatted again

Figure 15 Format Hitag-S to ID

3.3.12 Hitags format to FDX-B

The following table offering how to set the basic functions of the HITAGS cards, and what data need to be operated when formatted HITAGS cards to be FDX format.

Among them:

- LockFlag:** When it's 0, means not to lock the flag, so that this card can be re-formatted again;
When it's 1, means to lock the flag, then the flag will be fixed and cannot be re-formatted again.
- Dataflag:** this is for indicate that if there is additional data block or not
When it's 0, means there is no data block
When it's 1, means there exists additional data block.
- AnimalFlag:** this is to set the tag used for animal identification or not.
When it's 0, for non-animal application;
When it's 1, for animal application.
- National:** the National identification code, it's the unique number within a country. Data format: 12 numbers only.
National + 1, it's the National code plus 1 based on the value inputted on the National message box;
National -1, it's the National code minus 1 based on the value inputted on the National message box;
- Country:** ISO 3166 numeric-3 country code, range from 900 to 998 may be used to refer to individual manufacturers of transponders. Country code 999 is used to indicate that the transponder is a test transponder and need not contain a unique identification number.
- UserData:** data field for customer's own used, and the data set in this field will be not output when read this formatted FDX-B transponder in the common system application.

After input the correspond value in the left message box, then Click Format button to FDX-B (note: the right message box are only for HEX output indication of the formatting value in left side)

The screenshot shows a software window titled 'FDX-B'. It contains three main sections:

- HitagS format to ID:** Includes radio buttons for 'ID + 1' (selected) and 'ID - 1'. A 'LockFlag' dropdown is set to '0'. A 'CardID' text field contains '10 00 00 00 01'. A 'Format' button is present.
- HitagS format to FDX-B:** This section is highlighted with a green border. It includes dropdowns for 'LockFlag' (0), 'DataFlag' (1), and 'AnimalFlag' (1). Below these are radio buttons for 'National + 1' (selected) and 'National - 1'. There are text fields for 'National' (000000000000), 'Country' (0000), and 'UserData' (00000). Each field has a corresponding output field separated by '--'. A 'Format' button is on the right.
- Read FDX-B:** Includes empty text fields for 'DataFlag', 'AnimalFlag', 'National', 'Country', and 'UserData', each with a corresponding output field separated by '--'. A 'Read' button is on the right.

An 'OK' button is located at the bottom left of the window.

Figure 16 Format Hitag-S to FDX-B

Remarks:

1. The length of the national identification code was chosen to have enough combinations available for all animals in a large country. Moreover, the uniqueness of a code is expected to be maintained over thirty years.
2. It is a national responsibility to ensure the uniqueness of the national identification code. if necessary number series may be allocated to species and/or manufacturers, but this will not be standardized. Ideally every country should maintain a central database in which all issued codes are stored, together with a reference to the database where the information concerning the associated animal can be retrieved.

3.3.13 ReadFDX-B

This is to read data of the FDX-B transponder be formatted.

Just put the FDX-B formatted transponder under antenna detecting area, and Click Read to the get the data, the result will be shown on the corresponding message box as below:

The screenshot shows the FDX-B software interface with three main sections:

- HitagS format to ID:** Includes radio buttons for 'ID + 1' (selected) and 'ID - 1'. A 'LockFlag' dropdown is set to '0'. A 'CardID' text field contains '10 00 00 00 01'. A 'Format' button is present.
- HitagS format to FDX-B:** Includes 'LockFlag' (0), 'DataFlag' (1), and 'AnimalFlag' (1) dropdowns. Radio buttons for 'National + 1' (selected) and 'National - 1' are present. Text fields for 'National' (000000000001), 'Country' (0000), and 'UserData' (00000) are shown, each with a corresponding 16-bit hex representation to its right. A 'Format' button is present.
- Read FDX-B:** This section is highlighted with a red box. It contains 'DataFlag' (1) and 'AnimalFlag' (1) dropdowns. Text fields for 'National' (000000000000), 'Country' (0000), and 'UserData' (00000) are shown, each with a corresponding 16-bit hex representation to its right. A 'Read' button is present.

At the bottom of the window, a status bar displays 'Get FDX-B: OK'.

Figure 17 Read data from RDX-B

4 Technical Specifications

Other functions and details to be continued and upgraded.

Electrical Specifications

Power Supply	3.3...5 Vdc
Power Consumption	< 45 mA
Operating Frequency	125 & 134.2 kHz
Baudrate	9600...115200 bit/s, default: 9600 bit/s
Antenna	external, Molex connector or stamp hole
Reader IC	Atmel Mega 8A-MU
RF TX Speed	5.2 kbs
RF RX Speed	2, 4, 8 kbs
Interfaces	UART TTL, RS232, RS485, USB VCP
Connectors	UART TTL: Molex PicoBlade Series, 53261 PCB connector, 51021 cable connector RS232, RS485, USB VCP: Molex PanelMate Series, 53780 PCB connector, 51146 cable connector
Read Range	Up to 100 mm depending on tag and antenna size
Antenna Inductivity	375 µH nominal value

* Human Interface Device

Mechanical Specifications

Dimensions	39.2 × 19.3 × 4,6 mm
Weight	3 g
Material	FR4, blue

Environmental Conditions

Operating Temperature	-20 °C ... +80 °C
Storage Temperature	-40 °C ... +85 °C
Humidity	up to 95 %, non condensing
MTBF	200'000 h

Supported Standards / Tags

Read-only	EM4100, EM4200, TK4100
ISO/IEC 11784/11785	Hitag-S 64, Hitag-S 256, Hitag-S 2048

Applicable Standards

EMC	EN 301489-1:2012-04 (v1.9.21) EN 301489-3:2013-12 (V1.6.1)
Radio Regulation	EN 300330-1:2015-08 (V1.8.1) EN 300330-2:2015-08 (V1.6.1)
Safety	EN 60950-1:2014-08 EN 62369-1:2010-03 EN 50364:2010-11
RoHS	EC Guideline 2011/65/EU
Certificates	

SDK Information

Supported OS by Silabs USB VCP Driver	Windows 7/8/8.1/10 (v6.7.3) Windows XP/Server 2003/Vista/7/8/8.1 (v6.7)
--	--

	Windows 2K (v6.3a) WinCE (5.0, 6.0) Macintosh OSX (v4) Linux (3.x.x., 2.6.x) Android 4.2
Supported OS	Windows XP, Vista, 7, 8, 8.1, 10
Supported Languages	C#
Demo Software	Windows

5 Tag Information

5.1 EM4100 (64 bits), EM4102 (64 bits), EM4200 (128 bits)

This are read-only chip types, so you can only retrieve a UID.

5.2 Hitag S2048 (2 kbits, 256 Bytes, 64 blocks)

Memory blocks (pages) of 32 bits/4 Bytes.

Block #	Hex Address	Access	Description
1	00	Read-only	UID
2	01	Read/write	Configuration Word (Hitag S: CA0000AA)s
3	02	No access	—
4	03	Read/write	Configuration Word, password protected, default PW: 0000 0000 h
5	04	Read/write	User Memory
...	User Memory
64	3F	Read/write	User Memory

5.3 Hitag S256 (256 bits, 32 Bytes, 8 blocks)

Memory blocks (pages) of 32 bits/4 Bytes.

Block #	Hex Address	Access	Description
1	00	Read-only	UID
2	01	Read/write	Configuration Word (Hitag S: CA0000A9)s
3	02	No access	—
4	03	Read/write	Configuration Word, password protected, default PW: 0000 0000 h
5	04	Read/write	User Memory
6	05	Read/write	User Memory
7	06	Read/write	User Memory
8	07	Read/write	User Memory

5.4 Hitag S64 (64 bits, 8 Bytes, 2 blocks)

Memory blocks (pages) of 32 bits/4 Bytes.

Block #	Hex Address	Access	Description
1	00	Read-only	UID
2	01	Read/write	Configuration Word (Hitag S: CA0000A8)

5.5 Hitag 1 (2 kbits, 256 Bytes)

Memory blocks (pages) of 32 bits/4 Bytes.

Block #	Hex Address	Access	Description
1	00	Read-only	UID
2	01	Read/write	Configuration Word (Hitag 1: FF77AA00)
3	02	No access	—
...	...	No access	—
16	0F	No access	—
17	10	Read/write	User Memory
...	User Memory
64	3F	Read/write	User Memory

5.6 Hitag 2 (256 bits, 32 Bytes)

Memory blocks (pages) of 32 bits/4 Bytes.

Block #	Hex Address	Access	Description
1	00	Read-only	UID
2	01	Read/write	Password RWD, default 4D494B52h
3	02	No access	—
4	03	Read/write	Configuration Word, password protected, default PW: 0000 0000 h
5	04	Read/write	User Memory / 64 bits read-only memory layout for read-only emulation
6	05	Read/write	User Memory / 64 bits read-only memory layout for read-only emulation
7	06	Read/write	User Memory
8	07	Read/write	User Memory

5.7 EM4450/4550 (1 kbits)

Memory blocks (pages) of 32 bits/4 Bytes.

Block #	Hex Address	Access	Description
1	00	Read-only	Password, default 00000000h
2	01	Read-only	Protection Word
3	02	Read-only	Control Word
4	03	Read/write	User Memory
...	User Memory
31	1F	Read/write	User Memory
32	20	Read-only	Device Serial Number (UID)
33	21	Read-only	Device Identification

Table of Figures

Figure 1 Pinout	5
Figure 2 Pinout	6
Figure 3 USB VCP in the Windows Device Manager	7
Figure 4 Set up of serial connection	8
Figure 5 Demo software with connection established	9
Figure 6 System commands (need extra hardware)	9
Figure 7 Read UID of read-only tag	10
Figure 8 Read UID of Hitag-S tag	10
Figure 9 Get card info	11
Figure 10 Quiet a tag	11
Figure 11 Read pages from the tag	11
Figure 12 Write pages onto tag	12
Figure 13 Lock pages on tag	12
Figure 14 FDX-B dialog popup on software	13
Figure 15 Format Hitag-S to ID	14
Figure 16 Format Hitag-S to FDX-B	15
Figure 17 Read data from RDX-B	16