



**80137503-001**

**SREDKey**

**User Manual**

Rev. H

Revised: 7/31/2019

## SREDKey User Manual

| Revision | Date                     | Description                                                                                                   | By         |
|----------|--------------------------|---------------------------------------------------------------------------------------------------------------|------------|
| A        | 05/07/2014               | Initial Release                                                                                               | Candy Han  |
| B        | 06/20/2014               | Added data sample for original format<br>Added commands bytes                                                 | Candy Han  |
| C        | 05/26/2015               | Added LRC calculation<br>Added Card Format check                                                              | Candy Han  |
| D        | 07/20/2015               | Added Battery Life info.<br>Added Enable/Disable Admin Key                                                    | Ginger Wu  |
| E        | 09/15/2015               | Updated "KeyedOptID" Section in Appendix A<br>on page 11<br>Updated Manually-Keyed Conf. Options on page<br>6 | Ginger Wu  |
| F        | 08/04/2017               | Add Foreign Language options (Command 24)                                                                     | Kas Thomas |
| G        | 05/16/2018               | Add mounting instructions, section 5.                                                                         | KT         |
| H        | 07/08/2019<br>07/31/2019 | Added SRED Decommissioning text<br>Added Configuration byte 8D controls Keyed in<br>timeout command           | CB         |

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## **1 Introduction**

SREDKey™ by ID TECH is an encrypted key pad with an LCD and an encrypted MagStripe reader that offers retailers a complete and reliable security solution that meets the PCI 3.0 certification. This intelligent reader delivers superior reading performance while encrypting sensitive MagStripe and keyed-in data so as to reduce the PCI-DSS scope. The SREDKey ensures all data transactions are protected through secure point-to-point encryption, reducing fraud and protecting against data compromise.

## **2 Product Configurations**

| Model Number   | Configuration                         |
|----------------|---------------------------------------|
| IDSK-534833AEB | USB-KB;AES;Enhanced Encryption;Black  |
| IDSK-534833TEB | USB-KB;TDES;Enhanced Encryption;Black |

## **3 Features**

- Encrypted numeric keypad with 2x20 LCD and optional encrypted MSR
- 1,000,000 swipe, industry proven Magnetic Stripe Reader
- 1,000,000 manual key entry
- 4,000,000 key operations for each key
- Meets FCC Class B & CE regulatory requirements
- Plug-n-Play operation for USB-Keyboard and USB-HID interface
- PCI 3.0 certified with SRED function supported
- ROHS 2 and REACH certified
- Mounting option
- TDES/AES with DUKPT Key Management
- MSR support Track 1,2,3 reading
- MSR support ISO 7810 and 7811-1 through -6 cards. Reads AAMVA driver license cards
- Minimum Battery Life of 5-Years

## **4 Definition of Terms & Applicable Documents**

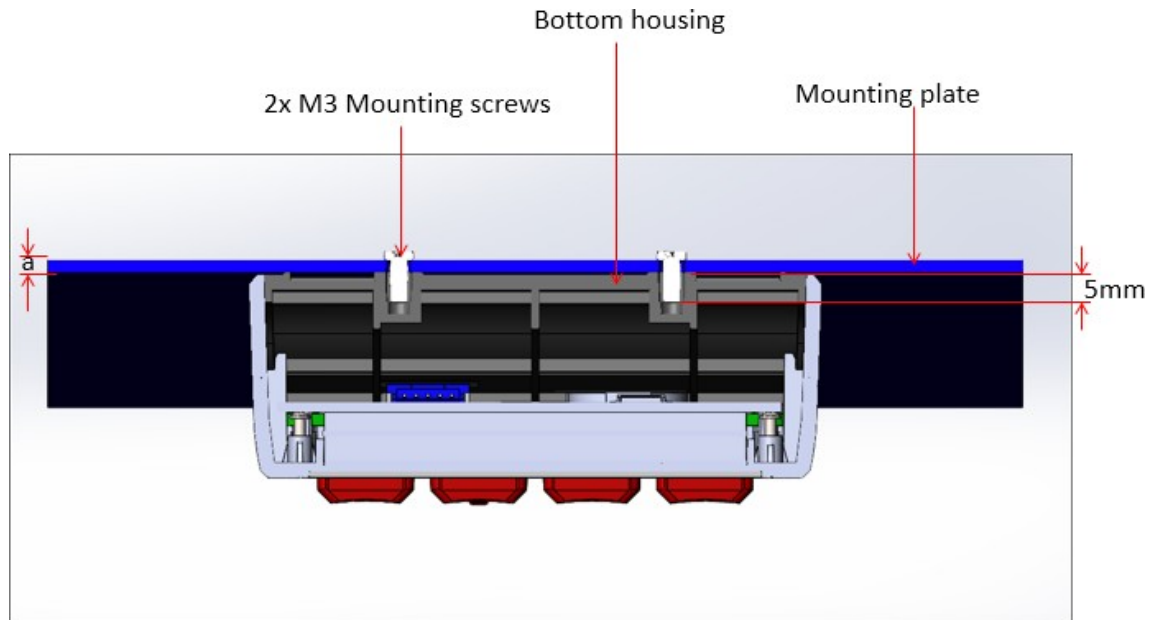
|              |                                                 |
|--------------|-------------------------------------------------|
| ANSI         | American National Standard Institute            |
| ESD          | Electrostatic Discharge                         |
| HOST         | A Personal Computer or Similar Computing Device |
| ISO          | International Standards Organization            |
| MTBF         | Mean Time Between Failures                      |
| USB          | Universal Serial Bus                            |
| SRED         | Secure Reading and Exchange of Data             |
| ISO/IEC 7813 | – Identification cards, Physical Characteristic |

ISO/IEC 7811 – Identification cards, Recording Techniques, Magnetic Stripe

## 5 Mounting

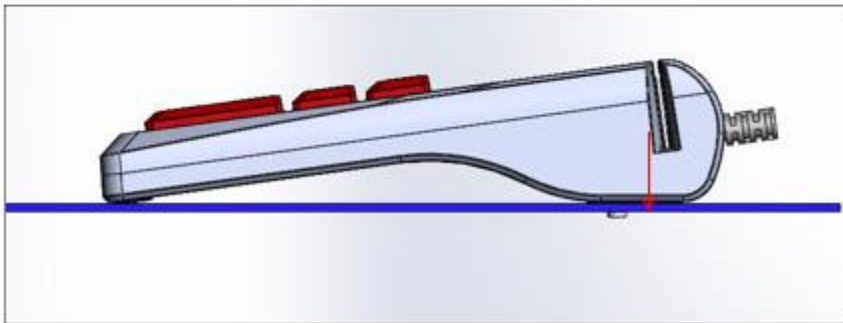
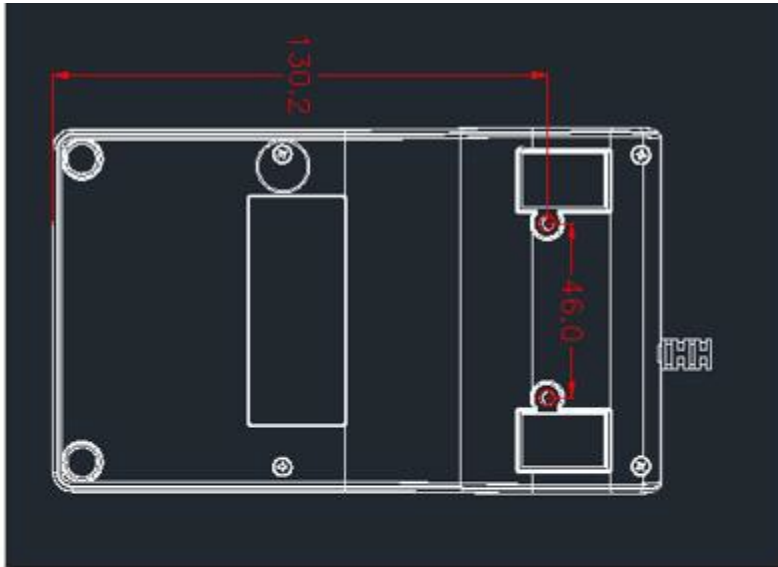
Normally, for portability, the SREDkey rests on non-skid rubber footpads and is not otherwise mounted to anything. However, it is possible to mount the SREDkey securely to a surface.

The unit has two M3 screw holes on the bottom surface as shown below. (Note: In this drawing, the unit is inverted, keypad-down.)



The M3 inserts are 5mm deep. Thus, if the thickness of the mounting plate is 'a', the length of the screw  $L$  should be  $(a+3)\text{mm} < L < (a+5)\text{mm}$ . Torque to 3 kg-cm.

Refer also to the diagram below, which shows that the mounting holes are 46 mm (1.811 in.) apart.



## 6 Decommissioning SRED Devices

All PCI devices require proper decommissioning prior to device disposal in order to ensure the protection of all sensitive financial card data. For instructions on decommissioning your device, see [Decommissioning of SRED Devices](#) on the ID TECH Knowledge Base.



## **7 Function & Operation**

On power-on the device will go into its data capture mode. In data capture mode, the device will prompt the user to enter data.

The device will display “Key is not injected!” if the device is not key-injected with encryption enabled after a key is pressed. The evaluation unit is injected with the ID TECH demo key by default and the data can be decrypted using the ID TECH SecureKey demo software.

### **5.1 Function Keys Operation:**

Clear:

- Pressing the “Clear” key allows users to remove all entered data at the current level. The current transaction would not be cancelled.

BS:

- Pressing the “BS” (backspace) key allows users to remove the entered data one character at a time.

**#Admin:**

- Pressing the “#Admin” key when the screen displays “Swipe or Hand-Key Card Number” or “Enter Card Number then press Enter” allows user to enter the Admin Menu. Pressing the “#Admin” key in other screens puts the device in the Help Mode.

**Cancel:**

- Pressing the “Cancel” key once allows users to remove all the input in the current as well as the previous level. The device then goes back to the previous prompt of the current transaction. If the “Cancel” key is pressed twice, the current transaction would be cancelled and the device goes back to the initial mode.

## **5.2 Admin Menu**

When the “Admin” key is pressed, the screen will display "**Select manual config 1-6**" to prompt the user to select one of six manual entry modes.

### **Manually-Keyed Configuration Options**

*Configuration #1:* Card Number, Expiration Date

*Configuration #2:* Card Number, Expiration Date, Zip Code

*Configuration #3:* Card Number, Expiration Date, Street Number of the Address, Zip Code

*Configuration #4:* Card Number/Expiration Date/Security Code/Zip Code

*Configuration #5:* Card Number/Expiration Date/Security Code/Street Number/Zip Code

*Configuration #6:* Card Number/Expiration Date/Security Code

## 8 Firmware Commands

### 7.1 Command Structure

See table below (just before Section 7.2) for the meanings of <STX> and other symbols.

1. Commands sent to keypad/reader:

a. Setting Command:

<STX><S>[<FuncID><Len><FuncData>...]<ETX><LRC>

b. Read Status Command:

<STX><R><FuncID><ETX><LRC>

c. Function Command:

<STX>[<FuncID><Len><FuncData>...]<ETX><LRC>

2. Response from SREDKey:

a. Setting Command

|                 |    |                |
|-----------------|----|----------------|
| <b>Host</b>     |    | <b>SREDKey</b> |
| Setting Command | →  |                |
|                 | ←  | <ACK> if OK    |
|                 | or |                |
|                 | ←  | <NAK> if Error |

b. Read Status Command

|                     |    |                            |
|---------------------|----|----------------------------|
| <b>Host</b>         |    | <b>SREDKey</b>             |
| Read Status Command | →  |                            |
|                     | ←  | <ACK> and <Response> if OK |
|                     | or |                            |
|                     | ←  | <NAK> if Error             |

c. Other Commands

|               |    |                            |
|---------------|----|----------------------------|
| <b>Host</b>   |    | <b>SREDKey</b>             |
| Other Command | →  |                            |
|               | ←  | <ACK> and <Response> if OK |
|               | or |                            |
|               | ←  | <NAK> if Error             |

<Response> format:

The current setting data block is a collection of many function-setting blocks <FuncSETBLOCK> as follows:

<STX><FuncSETBLOCK1>...<FuncSETBLOCKn><ETX><LRC>

Each function-setting block <FuncSETBLOCK> has the following format:

<FuncID><Len><FuncData>

Where:

<FuncID> is one byte identifying the setting(s) for the function.

<Len> is a one byte length count for the following function-setting block <FuncData>

<FuncData> is the current setting for this function. It has the same format as in the sending command for this function.

<FuncSETBLOCK> are in the order of their Function ID<FuncID>

Where:

|            |                                                                                    |
|------------|------------------------------------------------------------------------------------|
| <STX>      | 02h                                                                                |
| <S>        | Indicates setting commands. 53h                                                    |
| <R>        | Indicates read setting commands. 52h                                               |
| <FuncID>   | One byte Function ID identifies the particular function or settings affected.      |
| <Len>      | One byte length count for the following data block<FuncData>                       |
| <FuncData> | data block for the function                                                        |
| <ETX>      | 03h                                                                                |
| <LRC>      | LRC: The overall Modulo 2 (Exclusive OR) sum (from <STX> to <LRC>) should be zero. |
| <ACK>      | 06h                                                                                |
| <NAK>      | 15h                                                                                |

## 7.2 General Commands

The SREDKey is shipped from the factory with the default settings already programmed.

In the following sections, the default settings are shown in **boldface**.

For a table of default settings, see Appendix A.

This group of configuration settings defines the basic operating parameters of SREDKey.

### Enable/Disable Admin Key

#### Enable Admin Key

CMD: 02 **30 8F 01 20** 03 9F

OUT: 06

#### Disable Admin Key

CMD: 02 **31 8F 01 20** 03 9E

OUT: 06

*Note: Admin Key Enabled is the Default*

### **Change to Default Settings**

Command: <STX><S><18h><ETX><LRC>

Response: <ACK> if OK, <NAK> if Error

This command does not have any <FuncData>. It returns most settings to their default values.

### **MSR Reading Settings**

Command: <STX><S><1Ah><01h><MSR Reading Settings><ETX><LRC>

Response: <ACK> if OK, <NAK> if Error

Enable or Disable the SREDKey swipe reader. If the swipe reader is disabled, no data will be sent out to the host.

#### **<MSR Reading Settings>:**

0x30 MSR Reading Disabled

**0x31 MSR Reading Enabled**

### **MSR Swipe Direction Settings**

Command: <STX><S><1Dh><01h><Option><ETX><LRC>

Response : <ACK> if OK, <NAK> if Error

#### **<Option>:**

0x30 Raw Data Decoding in Both Directions.

**0x31 Decode in Both directions.**

0x32 Moving Stripe Along Head in Direction of Encoding.

0x33 Moving Stripe Along Head Against Direction of Encoding.

### **Review Settings**

Command: <STX><R><1Fh><ETX><LRC>

Response <ACK> and <Response>

This command does not have any <FuncData>.

### **Security Level**

Command: <STX><R><7Eh><ETX><LRC>

Response: <ACK> and <Response>

<Response>: <STX><7Eh><Len>< security level><ETX><LRC>

< security level>:

0x30 - Security level 1 No key injected and no encryption

0x31 - Security level 3 encrypted reader with key injected

### **Review Serial Number**

Command: <STX><R><4Eh><ETX><LRC>

Response: <ACK> and <Response>

<Response>: <STX><4Eh><total length><Length of Serial Number>< Serial Number ><ETX><LRC>

This command is to get device serial number.

### **Preamble Setting**

Command: <STX><S><D2h><Len><Preamble><ETX><LRC>

Response: <ACK> if OK, <NAK> if Error

Where:

<Len> is the number of bytes of preamble string

<Preamble> is {string length} {string}

Where, {string} is 0x20~0x7E.

Note: String length is one byte, maximum fifteen <0Fh>. **Default is 0x00.**

### **Postamble Setting**

Command : <STX><S><D3h><Len><Postamble><ETX><LRC>

Response: <ACK> if OK, <NAK> if Error

Where:

<Len> is the number of bytes of postamble string

<Postamble> is {string length} {string}

Where, {string} is 0x20~0x7E, 0x0D(carriage return)

NOTE: String length is one byte, maximum fifteen <0Fh>. **Default is 0x00.**

### **Review KSN (DUKPT Key management only)**

Command : <STX><R><51h><ETX><LRC>

Response: <ACK> and <Response>

<Response>: <ACK><STX><51h><Len of KSN>< KSN ><ETX><LRC>

This command is to review DUKPT key KSN.

### **Leading PAN digit to display**

Command: <STX><S><49h><01h><N ><ETX><LRC>

Response: <ACK> if OK, <NAK> if Error

N: 00~06h, **default 04h**

First N Digits in PAN which can be clear data.

### **Trailing PAN digits to display**

Command: <STX><S><4Ah><01h><M ><ETX><LRC>

Response: <ACK> if OK, <NAK> if Error

**M:** 00~04h, **default 04h**

Last M Digits in PAN which can be clear data.

### **MASKChar**

Command: <STX><S><4Bh><01h><Maskcharacter ><ETX><LRC>

Response: <ACK> if OK, <NAK> if Error

**maskcharacter:** 20h~7Eh, **default 2Ah**

Set the mask character to for the PAN number in the output. The default is “\*”.

### **Encryption Settings**

**NOTE: AES/3DES can only be set once in factory. Once the encryption is turned on, the encryption method cannot be changed, otherwise it will return error code 15h 03h 01h.**

### **Display Expiration Date**

Command: <STX><S><50h><01h>< Expiration Settings><ETX><LRC>

Response: <ACK> if OK, <NAK> if Error

Expiration Settings:

0x30 Display expiration data as mask data

**0x31 Display expiration data as clear data**

### **Hash Option**

Command: <STX><S><5Ch><01h>< Hash Settings><ETX><LRC>

Response: <ACK> if OK, <NAK> if Error

Hash Settings:

0x30 not send hash

0x31 send tk1 hash

0x32 send tk2 hash

0x33 send tk1 & tk2 hash

0x34 send tk3 hash

0x35 send tk1 & tk3 hash

0x36 send tk2 & tk3 hash

**0x37 send tk1 & tk2 & tk3 hash**

Note: The hash data will be all zeros to reserve the hash data space in output data, which is also called null hash data later.

### **Encryption Option Setting (for enhanced encryption format only)**

Command: <STX><S><84h><01h><Encrypt Settings><ETX><LRC>

Response: <ACK> if OK, <NAK> if Error

<Encrypt Settings>(0 – 0x1F)

- bit0: 1 – track 1 force encrypt
- bit1: 1 – track 2 force encrypt
- bit2: 1 – forces encryption on track 3 and there would be no mask data
- bit3: 1 – encrypt trk3 if card type 0
- bit4 : 1 – encrypt trk3 if card type 0 only and allow trk1, trk 2, trk3 masked data to be sent as well.

**Note:**

- 1) When force encrypt is set, this track will always be encrypted, regardless of card type. No clear/mask text will be sent.
- 2) If and only if in enhanced encryption format, each track is encrypted separately. Encrypted data length will round up to 8 or 16 bytes.
- 3) When force encrypt is not set, non-bank card will be sent in clear text. For all type 0 cards (ABA/ISO bank cards) , all tracks will be encrypted.
- 4)Bit 2 is valaid for all type cards.
- 5) When bit4 is set to 1:  
If bank card and track 3 is ISO-4909 with PAN format, T3 will have mask data.  
If bank card and track 3 is not ISO-4909 without PAN format, T3 mask data can not be sent

**Typical settings:**

1) 00 (**default**):

Bank card: All three tracks will be encrypted. T1 and T2 can have mask. If bank card and track 3 is ISO-4909 with PAN format, T3 will have mask data. If bank card and track 3 is not ISO-4909 without PAN format, T3 mask data can not be sent .  
Non-bank card: Will be sent in clear text.

2) 07

Force encryption for all type cards. All three tracks will be encrypted without mask/clear,

2) 17

Bank card: All three tracks will be encrypted. T1 and T2 can have mask. If bank card and track 3 is ISO-4909 with PAN format, T3 will have mask data. If bank card and track 3 is not ISO-4909 without PAN format, T3 mask data can not be sent .  
Non-bank card: All three tracks will be encrypted.

**Swipe Encrypt Structure**

Command: <STX><S><85h><01h><Encrypt Settings><ETX><LRC>

Response: <ACK> if OK, <NAK> if Error

<Encrypt Settings>:

- 0x30            original
- 0x31            enhanced

Note: setting will be different based different part numbers. For any new development, please choose the part number with enhanced format.



### **Manual Entry Encrypt Structure**

#### **Configuration byte 8F controls Keyed in options**

Command: <STX><S><8Fh><01h>< Settings Option><ETX><LRC>

Response : <ACK> if OK, <NAK> if Error

< Settings Option> :

0x00 Original manual entry format

0x01 Enhanced manual entry format

Note: Setting will be different based on different part numbers. For any new development, please use enhanced output.

### **Mask Option**

Command: <STX><S><86h><01h>< Mask Settings><ETX><LRC>

Response: <ACK> if OK, <NAK> if Error

< Mask Settings>:

0x00 not send mask data

0x01 send mask trk1

0x02 send mask trk2

0x03 send mask tk1 & tk2

0x04 send mask trk3

0x05 send mask tk1 & tk3

0x06 send mask tk2 & tk3

**0x07 send mask tk1 & tk2 & tk 3**

### **Firmware Version**

Command: <STX><R><22h><ETX><LRC>

Response : <ACK> <STX><firmware version string><ETX><LRC>

<firmware version>: For example,

ID TECH SREDKey USB HID KB Reader V 1.00

### **Serial Number Settings**

Command: <STX><S><30h><01h>< Settings Option><ETX><LRC>

Response: <ACK> if OK, <NAK> if Error

< Settings Option>:

bit0-Level 3/4 Non-CC send as Level 1

bit1-Level3: No empty pkt when not enough sampling bits

bit2- Enhanced Secured Output will have SN after hash

Default is 04.

**Configuration byte 8D controls Keyed in timeout**

Command: <STX><S><8Dh><01h>< Timeout ><ETX><LRC>

Response: <ACK> if OK, <NAK> if Error

<Timeout>: 1 byte, show the timeout value for key press interval when in manual entry process. When timeout, the data user input before will be cleared, and return to the enter card number state.

The timeout value is <Timeout> \* 4, for example, if the <Timeout> value is 1, the real timeout is 4 seconds. The real timeout value is 4/8/12/16/.../900 seconds.

The value range is 1~225, means 4~900 seconds.

**Get MiniFirmware Version(NGA Format)**

Command: <02><03><00><78><46><31><0F><EF><03>

Response : <STX><Len\_L> <Len\_H><06h><minifirmware version><CheckLRC>  
<CheckSUM><ETX>

<minifirmware version>: For example,  
ID TECH SREDKey USB HID KB Reader V 1.00.01

**Get Model Number (NGA Format)**

Command: <02><03><00><78><46><20><CheckLRC> <CheckSUM><03>

Response : <STX> <Len\_L> <Len\_H><06h>< model number><CheckLRC>  
<CheckSUM><ETX>

< model number>:

|                |                                       |
|----------------|---------------------------------------|
| IDSK-534833AOB | USB-KB;AES;Original format;Black      |
| IDSK-534833AEB | USB-KB;AES;Enhanced Encryption;Black  |
| IDSK-534833TOB | USB-KB;TDES;Original format;Black     |
| IDSK-534833TEB | USB-KB;TDES;Enhanced Encryption;Black |

**Restart Command(NGA Format)**

Command: <02><03><00><78><46><CC><CheckLRC> <CheckSUM><03>

Response: <STX> <Len\_L> <Len\_H><06h><CheckLRC> <CheckSUM><ETX>

This command is to restart the device.

## 8 Data Output Format

SREDKey has the enhanced Magstripe reader and key in format as default.

<STX><DataLenL><DataLenH><Card Data><CheckLRC><CheckSum><ETX>

<STX> = 02h, <ETX> = 03h

<LenL><LenH> is a two byte length of <Card Data>.

<CheckLRC> is a one byte Exclusive-OR sum calculated for all <Card Data>.

<Checksum> is a one byte sum value calculated for all <Card Data>.

### **8.1 ID TECH Swipe Data Original Encryption Output Format ISO/ABA Card**

0      STX (02)

- 1 Data Length low byte
- 2 Data Length high byte
- 3 Card Encode Type (note 1)
- 4 Track 1-3 Status (note 2)
- 5 T1 clear/mask data length
- 6 T2 clear/mask data length
- 7 T3 clear/mask data length
- 8 T1 clear/mask data
- 9 T2 clear/mask data
- 10 T3 clear/mask data
- 11 T1, T2, T3 encrypted data
- 12 20 bytes 0x00 (if T1 encrypted, T1 null hash data)
- 13 20 bytes 0x00 (if T2 encrypted, T2 null hash data)
- 14 20 bytes 0x00 (if T3 encrypted, T3 null hash data)
- 15 KSN (10 bytes)
- 16 CheckLRC
- 17 CheckSum
- 18 ETX (03)

- Field 10 Present only ISO-4909 card

### **Non-Financial Card**

- 0 STX (02)
- 1 Data Length low byte
- 2 Data Length high byte
- 3 Card Encode Type (Section 7.5 note 1)
- 4 Track 1-3 Status (Section 7.5 note 2)
- 5 T1 clear data length
- 6 T2 clear data length
- 7 T3 clear data length
- 8 T1 clear data
- 9 T2 clear data
- 10 T3 clear data
- 11 CheckLRC
- 12 CheckSum
- 13 ETX (03)

## **8.2 ID TECH Swipe Data Enhanced Encryption Output Format**

**For the new development, please use enhanced encryption format.  
ISO/ABA Card Data Output Format**

Field   Field Description

|    |                                                                           |
|----|---------------------------------------------------------------------------|
| 0  | STX (02)                                                                  |
| 1  | Data Length low byte                                                      |
| 2  | Data Length high byte                                                     |
| 3  | Card Encode Type (Section 7.5 note 1)                                     |
| 4  | Track 1-3 Status (Section 7.5 note 2)                                     |
| 5  | T1 clear/mask data length                                                 |
| 6  | T2 clear/mask data length                                                 |
| 7  | T3 clear/mask data length                                                 |
| 8  | Mask data sent status (Section 7.5 note 3)                                |
| 9  | Encrypted/Hash data sent status (Section 7.5 note 4)                      |
| 10 | T1 clear/mask data                                                        |
| 11 | T2 clear/mask data                                                        |
| 12 | T3 clear/mask data                                                        |
| 13 | T1 encrypted data - (Track 1 encrypted data)                              |
| 14 | T2 encrypted data - (Track 2 encrypted data)                              |
| 15 | T3 encrypted data - (Track 3 encrypted data)                              |
| 16 | 20 bytes 0x00 (if T1 encrypted and hash tk1 allowed, T1 null hash data)   |
| 17 | 20 bytes 0x00 (if T2 encrypted and hash tk2 allowed, T2 null hash data)   |
| 18 | 20 bytes 0x00 (if T3 encrypted and hash tk3 allowed, T3 null hash data)   |
| 19 | 10 bytes serial number (if any track encrypted and serial number allowed) |
| 20 | KSN (10 bytes)                                                            |
| 21 | CheckLRC                                                                  |
| 22 | Checksum                                                                  |
| 23 | ETX (03)                                                                  |

**Non ISO/ABA Data Output Format**

Field   Field Description

|    |                                       |
|----|---------------------------------------|
| 0  | STX (02)                              |
| 1  | Data Length low byte                  |
| 2  | Data Length high byte                 |
| 3  | Card Encode Type (Section 7.5 note 1) |
| 4  | Track 1-3 Status (Section 7.5 note 2) |
| 5  | T1 unencrypted data length            |
| 6  | T2 unencrypted data length            |
| 7  | T3 unencrypted data length            |
| 8  | Clear/mask data sent status *         |
| 9  | Encrypted/Hash data sent status *     |
| 10 | T1 clear data                         |
| 11 | T2 clear data                         |
| 12 | T3 clear data                         |
| 13 | CheckLrc                              |
| 14 | Checksum                              |
| 15 | ETX (03)                              |

Note:

- Field 10, 11, 12

For financial card, it will output mask data.

For non-financial card, it will output clear data.

- Field 19

If serial number is not set in the unit, this field should be padded with 0x30, and if the length of serial number is less than 10 bytes, 0x30 will be padded behind. The serial number will be sent out as default setting.

### **8.3 ID TECH Manual Entry Original Data Output Format**

Field Usage Name

- 0 STX (0x02)
- 1 Data Length low byte
- 2 Data Length high byte
- 3 Card type always 85—keyed in (Section 7.5 note 1)
- 4 Always 0
- 5 Always 0
- 6 Always 0
- 7 Always 0
- 8 Status (1 byte) bit set if field is present in output (range 0-7)  
     bit 7 bit 6 bit 5 bit 4 bit 3      bit 2 bit 1 bit 0  
     0 0 0 0 SessionID EXP ADR ZIP
- 9 The length of unencrypted field 10 (PAN=EXP=CVV)
- 10 Encrypted card data (max: 180 bytes) PAN=EXP=CVV
- 11 20 bytes 0x00 (Null hash data)
- 12 EXP one byte length+ASCII Expiration date (len: 1+4 bytes)
- 13 ADR one byte length+ASCII Street number (max: 1+20 bytes)
- 14 ZIP one byte length+ASCII Zip code (max: 1+10 bytes)
- 15 KSN (10 bytes)
- 16 CheckLrc
- 17 CheckSum
- 18 ETX (0x03)

Encrypted data sent status:

- Data Length low byte/high byte should be in length of characters.
- Data include encrypted card key-in PAN=EXP (YYMM) and 3-4 digit security code (CVV).

The format should be:

(Security level 3) PAN=YYMM=[CVV]

Each field is separated by delimiter '=', this should always present even CVV is not keyed-in.

- Format of the fields: EXP, ADR and ZIP is:

|                             |      |
|-----------------------------|------|
| 1 byte field length in hex) | Data |
|-----------------------------|------|

The length byte ASCII not including length

#### 8.4 ID TECH Manual Entry Enhanced Data Output Format

**For the new development, please use enhanced encryption format.**

##### Field Usage Name

- 0 STX (0x02)
- 1 Data Length low byte
- 2 Data Length high byte
- 3 Card Encode Type always C0 ABA format (Section 7.5 note 1)
- 4 Field 4 see description (0x17 track2 only) or 37 track 2 and track 3 (Section 7.5 note 2)
- 5 Always 00
- 6 Length of field 10 unencrypted manual input data PAN; EXP [and CVV]
- 7 Length of field 11 unencrypted manual input additional data ZIP and/or ADR
- 8 Field 8 see description (Section 7.5 Note 3)
- 9 Field 9 see description (Section 7.5 Note 4)
- 10 Keyed-in data presented as track-2—;PAN=EXP[:CVV]?LRC
- 11 Additional keyed-in data in ASCII presented as track 3 [1ADR=][0ZIP=]
- 12 Encrypted data of field 10
- 13 Null hash data (20 bytes 00)
- 14 Device serial number (10 bytes)
- 15 KSN (10 bytes)
- 16 LRC
- 17 Check Sum
- 18 ETX (0x03)

##### Note:

- Data Length low byte/high byte should be in length of characters.
- Field 11 includes encrypted PAN, EXP (YYMM) and 3-4 digit (CVV).

The format should be:

1) ;PAN=YYMM[:CVV]?LRC ‘;’—

start sentinel

‘=’—field separator between PAN and EXP

‘:’—field separator between EXP and CVV if there is a CVV

‘?’—end sentinel

- The format of the fields ADR and ZIP is:

|                                             |            |                         |
|---------------------------------------------|------------|-------------------------|
| 1 byte field identifier<br>‘1’—ADR; ‘0’—ZIP | ASCII Data | field terminator<br>‘=’ |
|---------------------------------------------|------------|-------------------------|

- Field 10 LRC—calculated track 2 longitudinal redundancy check from ';' to '?'  
This LRC is calculated on the data before conversion to ASCII as it would be encoded on a card, so that the keyed-in data can be checked identically to the card data.

## 8.5 Notes

### Note 1: Card Encode Type

Card Encode Type starts with 0: original encryption format

Card Encode Type starts with 8: enhanced encryption format

#### Value Encode Type Description

00 / 80 ISO/ABA format

01 / 81 AAMVA format

03 / 83 Other

04 / 84 Raw; un-decoded format

85 manual entry mode (default)

C0 manual entry mode (new)

Below is the method SREDKey reader uses to check the card encode type:

- ISO/ABA (American Banking Association) Card

#### Encoding method

Track1 is 7-bit encoding.

Track1 is 7-bit encoding. Track2 is 5 bits encoding. Track3 is 5-bit encoding.

Track1 is 7-bit encoding. Track2 is 5 bits encoding.

Track2 is 5-bit encoding.

If only track3 and it is 5 bit encoding, ISO4909 and has PAN

#### Additional checks

Track1 2<sup>nd</sup> byte is 'B'.

There is at least one '=' in track 2 and the position of '=' is between 12<sup>th</sup> ~ 20<sup>th</sup> character.

Total length of track 2 is above 19 characters.

Total of 4 digits after the separator character for expiration date or a second separator to indicate no expiration date

Card number range in PAN will be used to identify bank card.

- AAMVA (American Association of Motor Vehicle Administration) Card

#### Encoding method

Track1 is 7 bits encoding. Track2 is 5 bits encoding. Track3 is 7 bits encoding.

- Others (Customer card)



**Note 2: Track 1-3 status byte**

Field 4:

- Bit 0: 1— track 1 decoded data present
- Bit 1: 1— track 2 decoded data present
- Bit 2: 1— track 3 decoded data present
- Bit 3: 1— track 1 sampling data present
- Bit 4: 1— track 2 sampling data present
- Bit 5: 1— track 3 sampling data present
- Bit 6, 7 — Reserved for future use

**Note 3: Clear/mask data sent status**

Field 8 (Clear/mask data sent status) and field 9 (Encrypted/Hash data sent status) will only be sent out in enhanced encryption format.

Field 8: Clear/masked data sent status byte:

- Bit 0: 1 —track 1 clear/mask data present
- Bit 1: 1— track 2 clear/mask data present
- Bit 2: 1—track 3 clear/mask data present or additional data present (in manual entry mode)
- Bit 3: 1—reserved for future use (always 0)
- Bit 4: 0— TDES encryption; 1— AES encryption
- Bit 5: 0— reserved for future use
- Bit 6: 1—PIN Key encryption
- Bit 7: 1— reader serial number present

**Note 4: Encrypted/Null Hash data sent status**

Field 9: Encrypted data sent status

- Bit 0: 1— track 1 encrypted data present
- Bit 1: 1— track 2 encrypted data present
- Bit 2: 1— track 3 encrypted data present
- Bit 3: 1— track 1 hash data present
- Bit 4: 1— track 2 hash data present
- Bit 5: 1— track 3 hash data present
- Bit 6: 1—session ID present
- Bit 7: 1—KSN present

**8.6 Data Sample**

The data sample below is encrypted with IDTECH demo key with TDES encryption method. SREDKey device is tested with USBKB interface.

Card Number: 5150 7102 0010 7903

**Credit Card Swipe Original Format**

```
028801001F372300%*5150*****7903^PAYPASS/MASTERCARD^*****  
***?*,5150*****7903=*****?*F43947D860D5BCA3732EB67A2ECB
```



Data length low byte: A0  
 Data length high byte: 01  
 Card encode type: 80  
 Track 1-3 status: 1F  
 T1 clear/mask data length: 37(hex) => 55 in decimal  
 T2 clear/mask data length: 23(hex) => 35 in decimal  
 T3 clear/mask data length: 00  
 Mask date sent status: 83  
 Encrypted data sent status: 9B  
 Track 1 clear/mask data(55 characters):  
 %\*5150\*\*\*\*\*7903^PAYPASS/MASTERCARD^\*\*\*\*\*?\*

Track2 clear/mask data (35 characters):  
 ;5150\*\*\*\*\*7903=\*\*\*\*\*?\*

T1 encrypted data (T1 length 55 rounded up by 8 => 56 bytes):  
 2B52196519901212715ABADDA6DA18FDA5B50219A0FC9341BFB0633C3F33874F  
 FE7B5F2B63897E0023710D5F6C6BF7BE8B937A515E3A7903

T2 encrypted data(T2 length 35 rounded up by 8 => 40 bytes):  
 182519B07422A5DFA329AF47F4B4728C5410105661B3DF35C0234582B983F710877  
 1314DF807077D

T1 Null hash: 0000000000000000000000000000000000000000000000000000  
 T2 Null hash: 0000000000000000000000000000000000000000000000000000  
 Serial Number: 303030303030303030303030  
 KSN: 62994900000000000000E  
 LRC: BE  
 CheckSum: EC  
 ETX: 03

Decrypted Data:  
 Track1 Clear Data:  
 %B5150710200107903^PAYPASS/MASTERCARD^090910140000631??  
 Track2 Clear Data:  
 ;5150710200107903=090910140000631?0

**Manual Entry Original Format**

0284008500000000416780C3AF77E5CC55F1362DC46086A17EED23D053FD161CF  
 5F00000000000000000000000000000000000000000000000000431323132629949000000000001  
 2B73303

STX: 02  
 Data length low byte: 84  
 Data length high byte: 00  
 Card Encode Type: 85  
 Always 0: 00  
 Always 0: 00

Always 0: 00

Always 0: 00

Status bit: 04

Length of unencrypted field 10 (PAN=EXP=CVV): 16 => 22 bytes in decimal

Encrypted Data (PAN=EXP=CVV) 22 bytes rounded up by 8 => 24 bytes:

780C3AF77E5CC55F1362DC46086A17EED23D053FD161CF5F

20 bytes Null: 0000000000000000000000000000000000000000

Length+ EXPDate: 0431323132

KSN: 62994900000000000012

CheckLRC: B7

Checksum: 33

ETX: 03

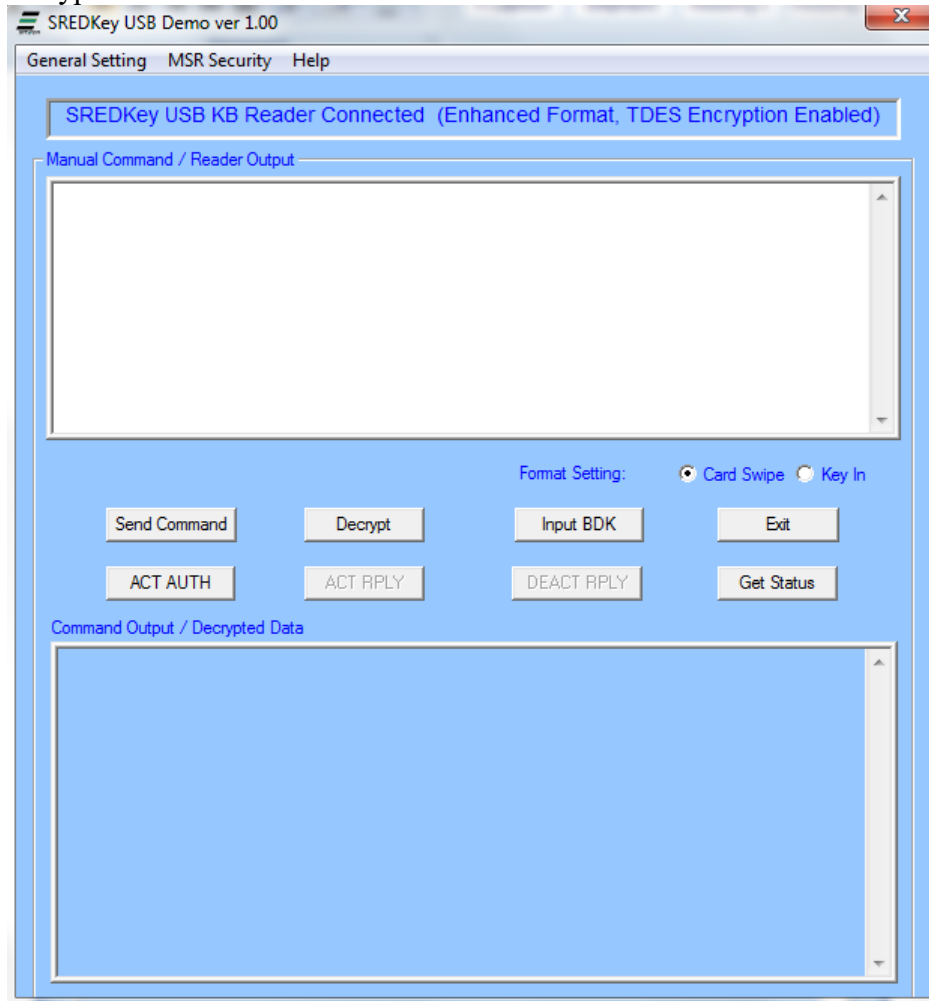
Decrypted Data:

Data in ASCII Format

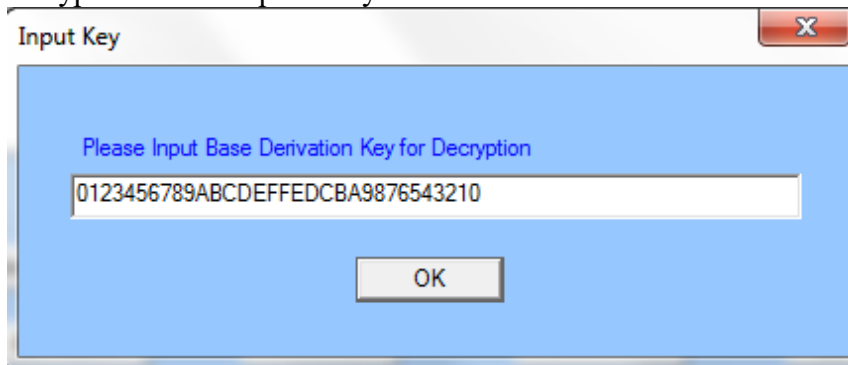
5150710200107903=1212=



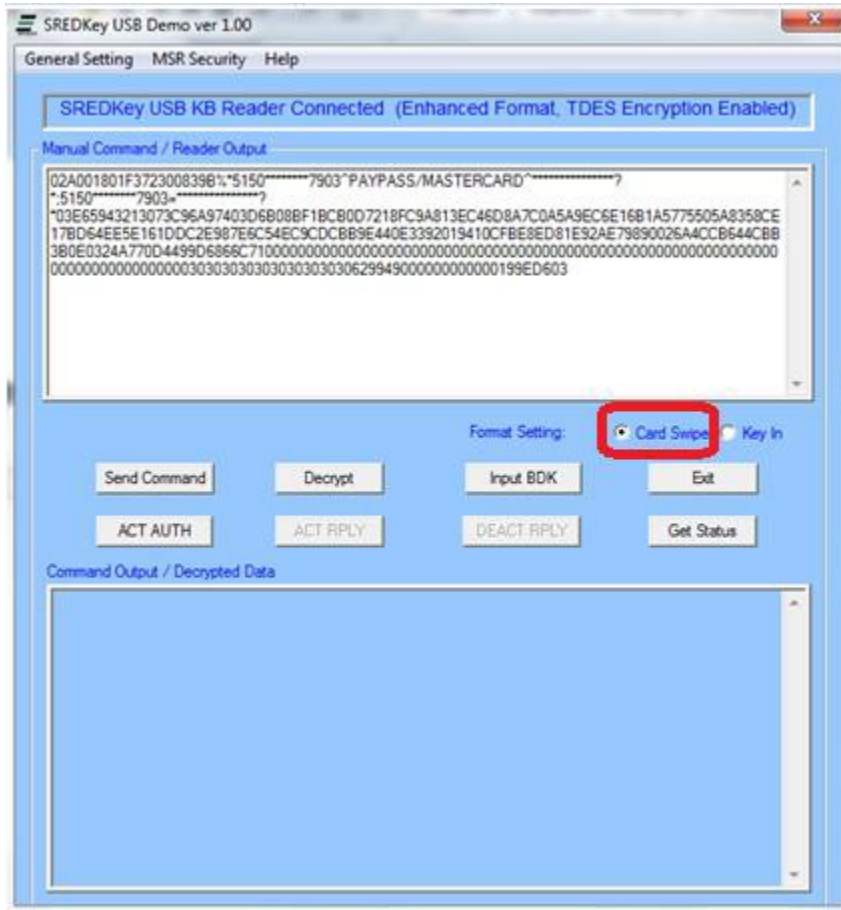
1. After plug in the SREDKey units to PC, it takes a few seconds to build the initialization between the software and SREDKey. After it's done, the top bar on the demo software will show the units connected, encryption format and encryption method.



2. Input the BDK by clicking [Input BDK] button, and input the BDK to test decryption after swipe or key in the card data

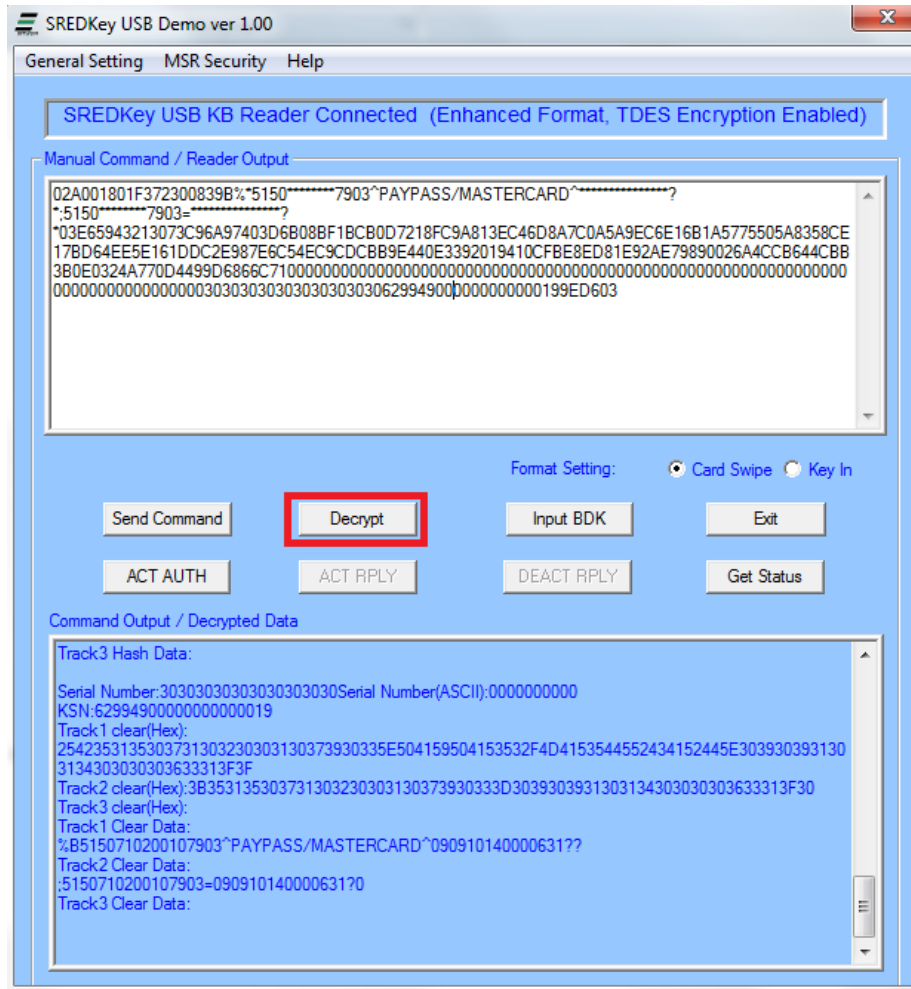


3. Swipe card  
Before swipe card, please double check the radio button [Card Swipe] is selected within the red box below.



Click the [decrypt] button, the decrypted data will show in the lower window in the demo.

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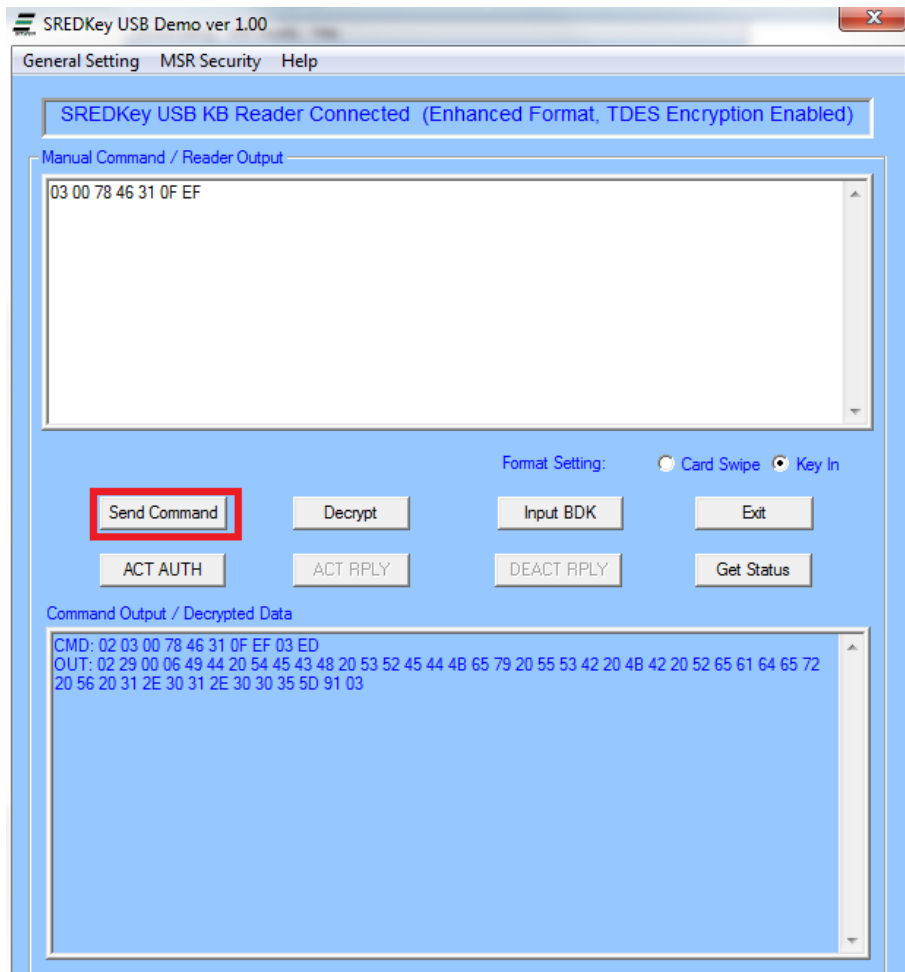


4. Key-in data  
Delete the swipe data in the upper window. Select the [Key In] radio button to switch to key-in format.









## 6. Other settings

By click [General settings] on the top bar of the demo, there are a couple of options to change the settings or get the settings from SREDKey device.

## Appendix A    Setting Configuration Parameters and Values

Following is a table of default setting and available settings (value within parentheses) for each function ID.

| Function ID       | Hex | Description         | Default Setting      | Description                                                                                                                                                                                                                           |
|-------------------|-----|---------------------|----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| TrackSelectID     | 13  | Track Selection     | '0'                  | Any Track 0-any                                                                                                                                                                                                                       |
| PollingIntervalID | 14  | Polling Interval    | 1 (1 ~ 255)          | USB HID Polling Interval                                                                                                                                                                                                              |
| TrackSepID        | 17  | Track Separator     | <b>0x0D=CR/Enter</b> | CR for RS232, Enter for KB any character supported except 00 which means none.                                                                                                                                                        |
| MSRReadingID      | 1A  | MSR Reading Setting | '1' ('0', '1')       | '0' MSR Reading Disabled<br><b>'1' MSR Reading Enabled</b>                                                                                                                                                                            |
| DecodingMethodID  | 1D  | Decoding Direction  | '1' ('0'~'3')        | Reading Direction<br>0x30 – Raw Data Decoding in Both Directions.<br>0x31 – Decode in Both directions.<br>0x32 – Moving Stripe Along Head in Direction of Encoding.<br>0x33 – Moving Stripe Along Head Against Direction of Encoding. |
| ReviewID          | 1F  | Review All Settings | None                 |                                                                                                                                                                                                                                       |
| TerminatorID      | 21  | Terminator          | 0x0D (any)           | CR for RS232, Enter for KB; '0' for CRLF                                                                                                                                                                                              |
| FmVerID           | 22  | Firmware Version    | None                 |                                                                                                                                                                                                                                       |
| ForeignKBID       | 24  | Foreign KB          | '0' ('0' ~0x3A)      | Foreign Language Keyboard<br>Allowable options are:<br>US 0x30<br>SWISS 0x31<br>SWEDISH 0x32<br>SPANISH_MEX 0x33<br>NORWAY 0x34<br>ITALIAN 0x35<br>GERMAN 0x36<br>FRENCH 0x37                                                         |

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|                |     |                                  |                |                                                                                                                                                           |
|----------------|-----|----------------------------------|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
|                |     |                                  |                | JAPAN 0x38<br>UK 0x39<br>UNIVERSAL 0x3A                                                                                                                   |
| USBHIDFmtID    | 23* | USB HID Fmt (HID rdr only)       | '8' ('0', '8') | '0' ID TECH Format;<br>'8' HIDKB format                                                                                                                   |
| CustSetID      | 30  | Custom Customer Settings         | 04(00 - 07)    | bit0-Level 3/4 Non-CC send as Level 1<br>bit1-Level3: No empty pkt when not enough sampling bits<br>bit2- Enhanced Secured Output will have SN after hash |
| Track1PrefixID | 34  | Track 1 Prefix                   | 0 (any string) | No prefix for track 1, 6 char max                                                                                                                         |
| Track2PrefixID | 35  | Track 2 Prefix                   | 0 (any string) | No prefix for track 2, 6 char max                                                                                                                         |
| Track3PrefixID | 36  | Track 3 Prefix                   | 0 (any string) | No prefix for track 3, 6 char max                                                                                                                         |
| Track1SuffixID | 37  | Track 1 Suffix                   | 0 (any string) | No suffix for track 1, 6 char max                                                                                                                         |
| Track2SuffixID | 38  | Track 2 Suffix                   | 0 (any string) | No suffix for track 2, 6 char max                                                                                                                         |
| Track3SuffixID | 39  | Track 3 Suffix                   | 0 (any string) | No suffix for track 3, 6 char max                                                                                                                         |
| KeyTypeID      | 3E* | data or pin key                  | 0              | 0-data key; 5A-pin key                                                                                                                                    |
| PrePANID       | 49  | PAN to not mask                  | 4 (0-6)        | # leading PAN digits to display                                                                                                                           |
| PostPANID      | 4A  | PAN to not mask                  | 4 (0-4)        | # of trailing PAN digits to display                                                                                                                       |
| MaskCharID     | 4B  | mask the PAN with this character | '*' 20-7E      | any printable character                                                                                                                                   |
| CrypTypeID     | 4C* | encryption type                  | '1' ('1'-'2')  | '1' 3DES '2' AES                                                                                                                                          |
| SerialNumberID | 4E* | device serial #                  | any 8-10 bytes | 8-10 digit serial number; Can be set only once                                                                                                            |
| DispExpDateID  | 50  | mask or display expiration date  | '1' '0'-'1'    | '0' mask expiration date; '1' display expiration date                                                                                                     |
| SessionID      | 54  | 8 byte hex                       | None           | always init to all '0xFF'                                                                                                                                 |
| Mod10ID        | 55  | include mod10 check digit        | '0' ('0'-'2')  | <b>'0' don't include mod10,</b><br>'1' display mod10,<br>'2' display wrong mod10                                                                          |

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|                 |     |                                                                     |                      |                                                                                                                                                       |
|-----------------|-----|---------------------------------------------------------------------|----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| HashOptID,      | 5C  |                                                                     | '7' ('0'-'7')        | Send tk1-2 hash bit 0:1 send tk1 hash; bit 1:1 send tk2 hash; bit2:1 send tk3 hash.                                                                   |
| T17BStartID     | 61  | Track 1 7 Bit Start Char                                            | '%' (any)            | '%' as Track 1 7 Bit Start Sentinel                                                                                                                   |
| T15BStartID     | 63  | T15B Start                                                          | ',' (any)            | ',' as Track 1 5 Bit Start Sentinel                                                                                                                   |
| T27BStartID     | 64  | Track 2 7 Bit Start Char                                            | '%' (any)            | '%' as Track 2 7 Bit Start Sentinel                                                                                                                   |
| T25BStartID     | 65  | T25BStart                                                           | ',' (any)            | ',' as Track 2 5 Bit Start Sentinel                                                                                                                   |
| T37BStartID     | 66  | Track 3 7 Bit Start Char                                            | '%' (any)            | '%' as Track 3 7 Bit Start Sentinel                                                                                                                   |
| T35BStartID     | 68  | T35BStart                                                           | ',' (any)            | ',' as Track 3 5 Bit Start Sentinel                                                                                                                   |
| T1EndID         | 69  | Track 1 End Sentinel                                                | '?' (any)            | '?' as End Sentinel                                                                                                                                   |
| T2EndID         | 6A  | Track 2 End Sentinel                                                | '?' (any)            | '?' as End Sentinel                                                                                                                                   |
| T3EndID         | 6B  | Track 3 End Sentinel                                                | '?' (any)            | '?' as End Sentinel                                                                                                                                   |
| T1ERRSTAR TID   | 6C  | Track 1 error code                                                  | '%' (any)            | start sentinel if track 1 error report                                                                                                                |
| T2ERRSTAR TID   | 6D  | Track 2 error code                                                  | ',' (any)            | start sentinel if track 2 error report                                                                                                                |
| T3ERRSTAR TID   | 6E  | Track 3 error code                                                  | '+' (any)            | start sentinel if track 3 error report                                                                                                                |
| SecureLrcID     | 6F  | Secured output format track LRC option enhanced only                | '1' ('0'-'1')        | '1' to send track LRC in secured output data;<br>'0' don't send track LRC<br><br>Note:<br>This command is valaid for level1                           |
| SyncCheckID     | 7B  | check for track sync bits-can allow poorly encoded cards to be read | '2' ('0'-'2')        | check leading & trailing sync bits<br>'0' 13 bits;<br>'1' 13 bits, but allow if valid through track LRC;<br>'2' 9 bits ABA; 13 bits IATA; 16 bits JIS |
| SecurityLevelID | 7E* | Reader's encryption level                                           | '1' or '3' ('0'-'4') | '1' no encryption; '2' key loaded; '3' encrypted reader; '0' DUKPT exhausted; '4'                                                                     |

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|                |     |                                   |                                      |                                                                                                                                                                                                                                                                                                                                                                                       |
|----------------|-----|-----------------------------------|--------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| EncryptOptID   | 84  | encryption options, enhanced only | <b>0</b> encrypt card type 0; (0-1F) | bit 0: encrypt trk1;<br>bit 1: encrypt trk2;<br>bit 2: forces encryption on track 3 and there would be no mask data. It is valid both for Non – CC and card type 0;<br>bit 3: encrypt trk3 if card type 0;;<br>bit 4: encrypt trk3 if card type 0 only and allow trk1, trk 2, trk3 masked data to be sent as well.                                                                    |
| EncryptStrID   | 85* | encrypt structure                 | '1'                                  | '0' original; '1' enhanced                                                                                                                                                                                                                                                                                                                                                            |
| MaskOptID      | 86  | clear / mask data options         | 7                                    | bit 0: send clear/mask trk1<br>bit 1: send clear/mask trk2<br>bit 2: send clear/mask trk3                                                                                                                                                                                                                                                                                             |
| T3ExpDatePosID | 89  | expire date position              | <b>0x34</b> (0x34, 0x36)             | track 3 expiration date position offset                                                                                                                                                                                                                                                                                                                                               |
| AdminLvID      | 8E  | Admin Level                       | <b>B</b> , 15, 1F, 29, 33, 3D        | B-Admin 1;<br>15-Admin 2;<br>1F-Admin 3;<br>29-Admin 4'<br>33-Admin 5;<br>3D-Admin 6                                                                                                                                                                                                                                                                                                  |
| KeyedOptID     | 8F* | Keyed Options                     | 0                                    | <b>bit 0:</b><br>if 0: output in original keyed output<br>if 1: output in enhanced keyed-in output<br><b>bit 1:</b><br>if 0: allow empty CVV entry<br>if 1: require 3 or more CVV digits<br><b>bit 2:</b><br>if 0: allow empty ZIP entry<br>if 1: require 5 or more ZIP digits<br><b>bit 3:</b><br>if 0: allow empty ADR entry<br>if 1: require 1 or more ADR digits<br><b>bit 4:</b> |

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|                              |     |                                    |                  |                                                                                                                                                                                                                                           |
|------------------------------|-----|------------------------------------|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                              |     |                                    |                  | if 0: do mod-10 check on keyed-in PAN<br>if 1: don't check PAN mod-10<br><b>bits 5-7:</b> reserve all zero<br><b>bits 5:</b><br>if 0: Admin Key Enabled<br>if 1: Admin Key Disabled<br><b>bits 6-7:</b> all zero; reserved for future use |
| Non-financialEncryptOptionID | 90* | Non-financial card encrypt options | '0'              | '0' non-financial card output plaintext at level 3.<br>'1' non-financial card output as financial card at level 3                                                                                                                         |
| SetDeviceColorID             | 91* | Set device color                   | '0'              | '0' black<br>'1' red                                                                                                                                                                                                                      |
| Equip2ID                     | AE* | special settings                   | special settings | If bit 4 is high, then send serial number during enumeration                                                                                                                                                                              |
| PrefixID                     | D2  | Preamble                           | 0 (any 15)       | No Preamble, 15 char max                                                                                                                                                                                                                  |
| PostfixID                    | D3  | Postamble                          | 0 (any 15)       | No Postamble, 15 char max                                                                                                                                                                                                                 |

\* These settings do not change with a default all command.