



IDENTIVE

User Manual

Multi-ISO Keyboard Configurator

Document history

Revision	Date	Author	Description
1.0	April 2013	Timo Baur	Initial version
1.1	September 2013	Timo Baur	Added info about default keys (ch. 8.2) Added info why a tag is needed (ch. 2) Added description for reversed UID option Added workflow description (ch. 5) Added settings examples (ch. 10) Added continous page/block read (ch. 8.2) Updated screenshots for GUI V1.3 Renamed file name

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1. Abstract

The “Identive Multi-ISO Keyboard Configurator” tool enables you to change several settings of the reader’s keyboard interface behaviour as well as tag keys and tag memory location to be read. It provides the following features:

- Enable/disable HID interface
- Enable tag UID (Unique Identification number for chips) reading
- Enable tag memory reading for user defined tag data
- Set access keys in the reader for MIFARE Classic, DESFire and Ultralight C
- Change the default delimiter and character delay to a custom value

2. Requirements

Operating System:	any OS with Java Runtime Environment (JRE)
Screen resolution:	1280x800 or higher
CCID/HID reader firmware:	1.22 or higher
For tag memory reading function:	tag compliant to ISO15693 or ISO14443 (MIFARE Classic 1k/4k, MIFARE Ultralight/Ultralight C, MIFARE DESFire, NTAG 203 or Topaz)
For UID reading function:	all ISO14443 & ISO15693 compliant tags

The configurator needs a card just to connect to the reader before writing the configuration inside the reader’s flash memory. No data from the card is accessed during this process.

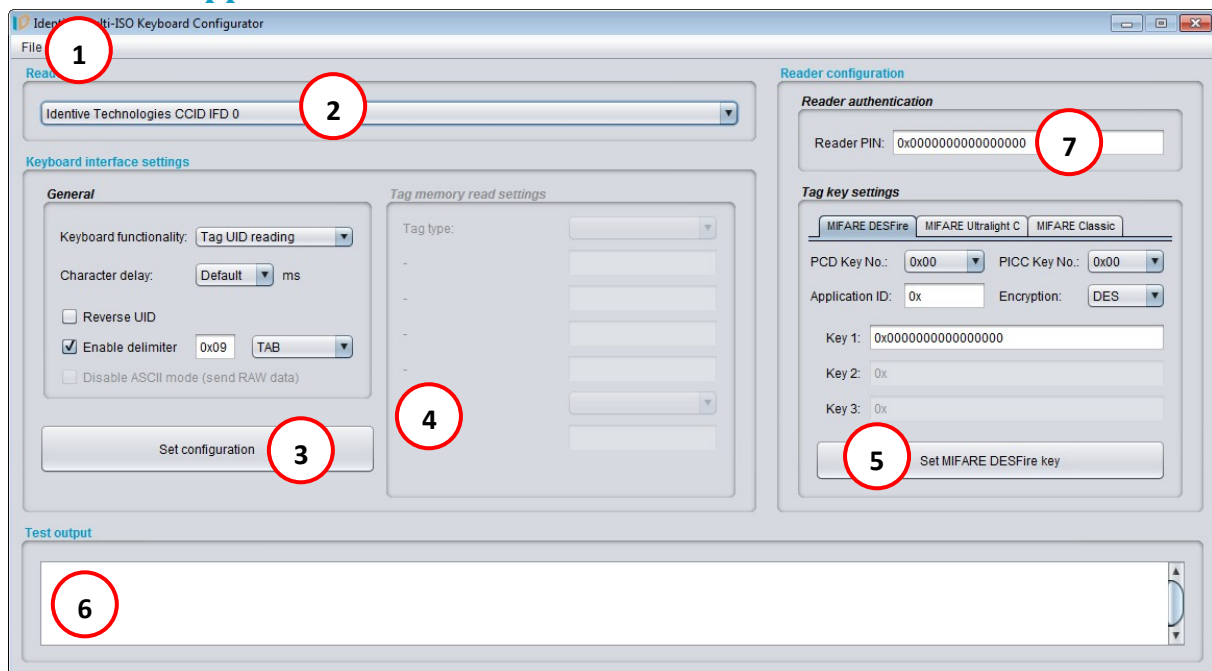
3. Application start

Double click on the application icon (Multi-ISO_Keyboard_Configurator.jar). No installation required, the application will start without further user interaction, if the device is already connected to the host system.



Multi-ISO_Keyboard_C
onfigurator.jar

4. Main application screen



- (1) Import/export keyboard emulation configuration & show application version
- (2) List of connected readers
- (3) Set interface options for keyboard emulation
- (4) Set options for tag memory reading function, if enabled in (3)
- (5) Set authentication options for MIFARE DESFire, Classic and Ultralight C
- (6) Test reader output for the chosen configuration
- (7) Set PIN for reader authentication

5. Workflow description

Numbers in () refer to the description of the main application screen shown in chapter 4).

5.1. Tag UID reading

1. Select "Tag UID reading" as keyboard functionality in the "General" section (3)
2. Set the values and options in the "General" section (3)
3. Store the settings in the reader by clicking on "Set configuration" (3)

5.2. Tag memory reading

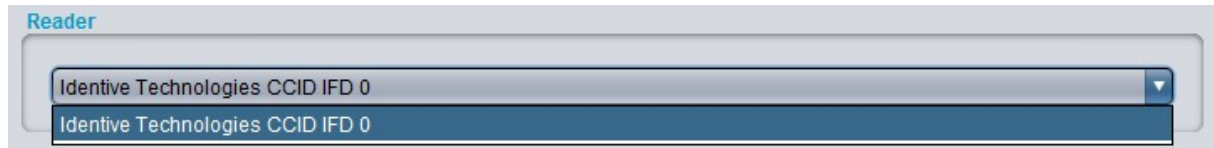
1. Select "Tag memory reading" as keyboard functionality in the "General" section (3)
2. Set the values and options in the "General" section (3)
3. Select your tag type in the dropdown list (4) and input appropriate values (4)
4. Store the settings to the reader by clicking on "Set configuration" (3)
5. Set values for the reader PIN and tag authentication key (7) + (5)
6. Store the authentication key in the reader by clicking on "Set [tag type] key" (5)

If the authentication key has been set during a previous pass then please skip step 5 & 6.

6. Reader selection

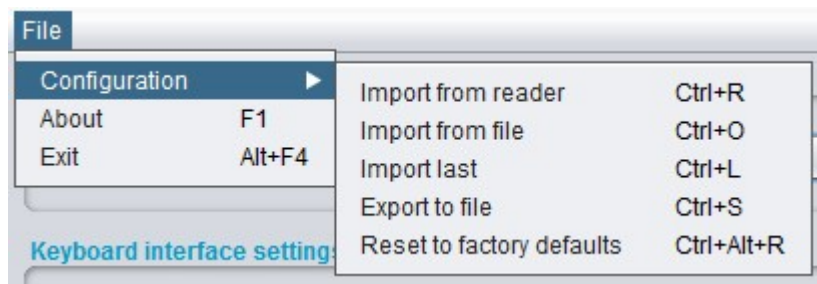
Choose and select the Identive Multi-ISO CCID reader in the “Reader” dropdown menu enumerated as “Identive Technologies CCID IFD x” where ‘x’ indicates the reader number if multiple devices are connected.

Note: Multi-ISO readers with PC/SC firmware loaded will not be listed.



7. Import/export configuration

To import or export configurations for the keyboard emulation function please click on “File” in the menu bar and select “Configuration”:



Options in the “Configuration” sub-menu:

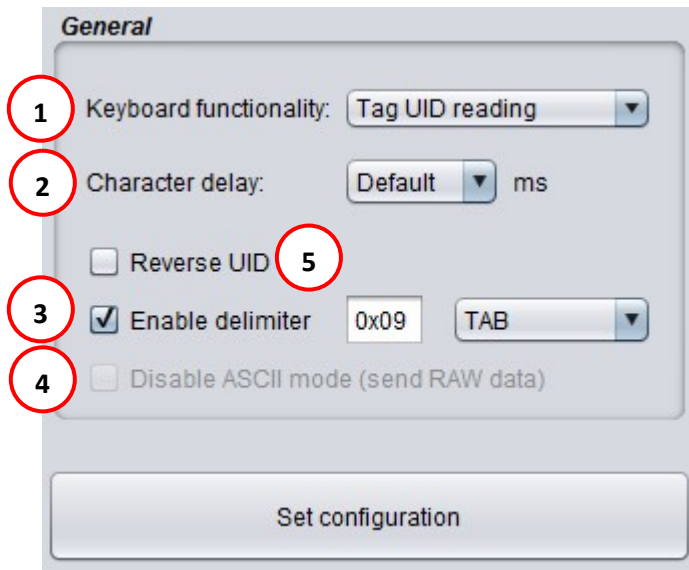
- | | |
|-----------------------------|--|
| ▪ Import from reader | import configuration from the selected reader |
| ▪ Import from file | import configuration from *.cfg file |
| ▪ Import last | import recently used configuration automatically saved as last.cfg in the application folder |
| ▪ Export to file | save the current configuration as *.cfg file |
| ▪ Reset to factory defaults | resets the configuration to firmware default values |

Instead of clicking on a menu item you could also use the respective keyboard shortcut.

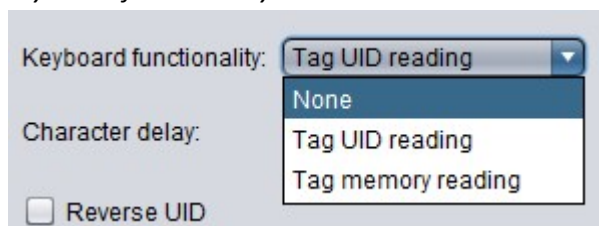
8. Keyboard interface settings

Describes available options for the keyboard interface and how to configure the data output.

8.1. General

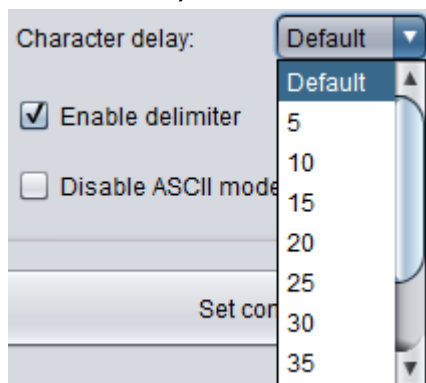


(1) *Keyboard functionality:*

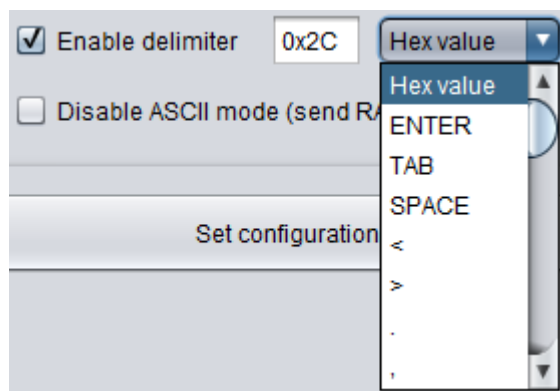


- None = keyboard emulation disabled – CCID still available
- Tag UID reading = automatic output of tag UID (in ASCII)
- Tag memory reading = automatic output of user defined tag memory location (for settings see chapter 8.2)

(2) *Character delay:*



Select the delay to display each character of the data output in milliseconds. Default value set in the firmware is 5 ms.

(3) *Delimiter:*

If you do not want the reader to add a delimiter at the end of each keyboard output untick the checkbox next to “Enable delimiter”. If checkbox is ticked, you can choose the delimiter either by entering the hex value of the desired ASCII code (select “Hex value” in the dropdown list) in the text box (e.g. 0x00 for no delimiter) or select one of the predefined delimiters in the drop down list. The delimiter is always added directly at the end of the sent data. Default delimiter is “TAB”.

Examples:

Tag UID	Delimiter	Keyboard output
D034381	#	D034381#
D034381 & D034382	SPACE	D034381 D034382
D034381 & D034382	ENTER	D034381 D034382

Note: With OS keyboard layout different from English (US) the output may show a different delimiter than the one selected in the application. This is not an error of the reader but a result of the ASCII table for the selected keyboard layout. Technically the application that would wait for the keystrokes would receive the intended hex value as the delimiter.

(4) *Disable ASCII mode (send RAW data):*

If checkbox is ticked, the keyboard output is transferred without ASCII conversion. This function is needed only if the content to be read from the tag memory is already stored in ASCII format and hence the reader need not perform further ASCII conversion but rather could just send the RAW data that is received from the tag to the host.

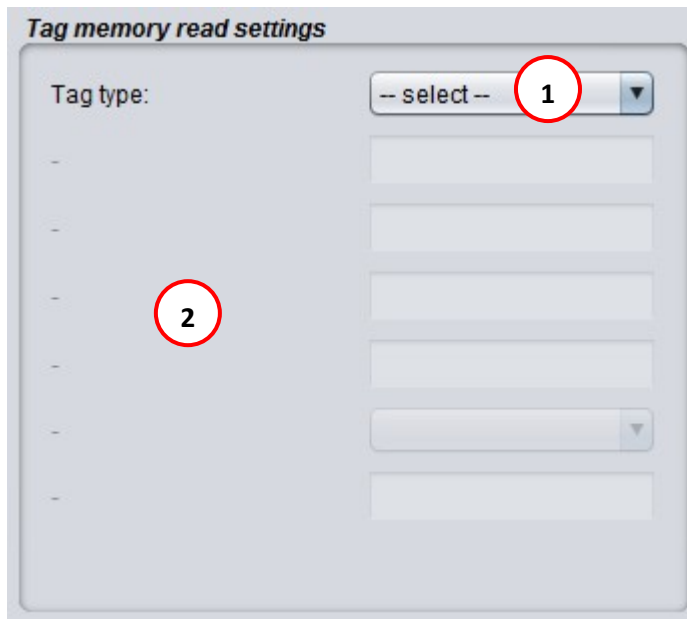
(5) *Reverse UID*

If checkbox is ticked, the UID output is byte-reversed, e.g. if the chip UID is 4CEA3271 the output will be 7132EA4C. This option only works with CCID+HID firmware version 1.24 or newer.

8.2. Tag memory read settings

If this option was selected in chapter 7.1, step (1) you can define the location of the data you want to output at the cursor position, else continue with chapter 8.3. Inputs are allowed as hexadecimal (e.g. 0x0A) and decimal values.

It is possible to setup the device to read multiple pages (MIFARE Ultralight/Ultralight C) or blocks (MIFARE Classic) to send as a single keyboard output. This can be done by configuring the “number of bytes to read” larger than the respective tag's individual page/block size. Please see chapter 10 for examples. Doing this on a MIFARE Classic tag means that the access bits and keys are the same for all the sectors.



(1) *Card type:*

Select chip type you want to use with the reader. Available options are:

- ISO15693
- MIFARE Classic 1K
- MIFARE Classic 4K
- MIFARE Ultralight
- MIFARE Ultralight C
- MIFARE DESFire
- NTAG 203
- Topaz

(2) *Tag memory settings:*

Depending on the selection made in (1) various options will be shown. Please refer to the respective tag IC documentation for details.

Tag IC independent settings:

- **Byte offset within block:**
sets the number of bytes to skip until start of reading; enter 0 for no offset
- **Number of bytes to read:**
sets the number of bytes read

(a) **ISO15693:**

Card type:	ISO15693 ▼
Block number:	<input type="text"/>
Byte offset within block:	<input type="text"/>
Number of bytes to read:	<input type="text"/>

(b) **MIFARE Classic 1k / 4k:**

Card type:	MIFARE Classic 1k ▼
Block number:	<input type="text"/>
PCD key number:	<input type="text"/>
Byte offset within block:	<input type="text"/>
Number of bytes to read:	<input type="text"/>

(c) **MIFARE Ultralight / Ultralight C:**

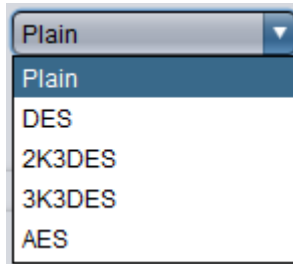
Card type:	MIFARE Ultralight ▼
Page number:	<input type="text"/>
Byte offset within page:	<input type="text"/>
Number of bytes to read:	<input type="text"/>

(d) **MIFARE DESFire:**

Card type:	MIFARE DESFire ▼
Application ID:	<input type="text"/>
PICC key number:	<input type="text"/>
File number:	<input type="text"/>
Byte offset within block:	<input type="text"/>
Auth. type:	Plain ▼
Number of bytes to read:	<input type="text"/>

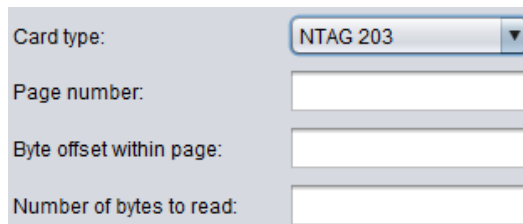
Auth. type:

Please choose the used encryption for authentication with the chip in the pulldown list or select "Plain" in case of no encryption.



A dropdown menu with a blue header bar. The current selection is "Plain". The menu is open, showing a list of options: "Plain", "DES", "2K3DES", "3K3DES", and "AES".

(e) **NTAG 203:**



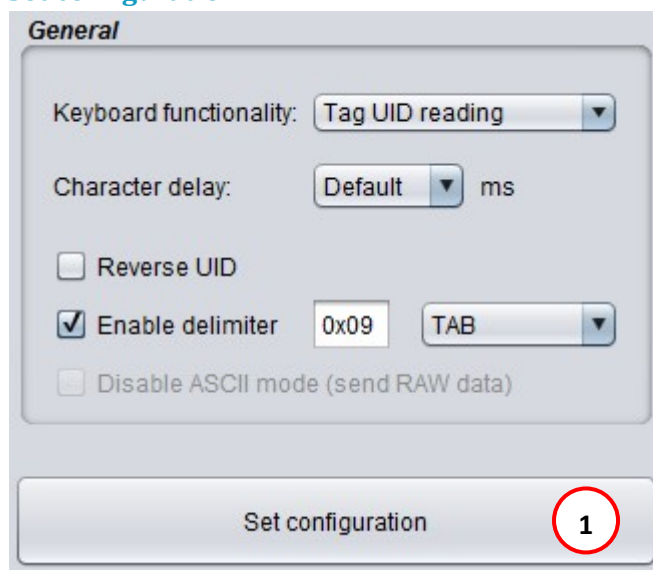
A form for NTAG 203 configuration. It includes a "Card type:" dropdown menu set to "NTAG 203", and three text input fields for "Page number:", "Byte offset within page:", and "Number of bytes to read:".

(f) **Topaz:**



A form for Topaz configuration. It includes a "Card type:" dropdown menu set to "Topaz", and three text input fields for "Block number:", "Byte offset within block:", and "Number of bytes to read:".

8.3. Set configuration



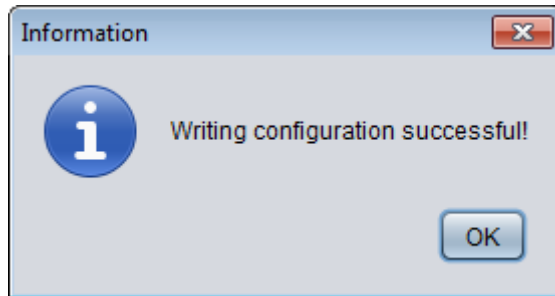
A "General" configuration window. It contains the following settings:

- Keyboard functionality: Tag UID reading (dropdown menu)
- Character delay: Default (dropdown menu) ms
- ☐ Reverse UID
- ☒ Enable delimiter: 0x09 (text input) TAB (dropdown menu)
- ☐ Disable ASCII mode (send RAW data)

At the bottom, there is a "Set configuration" button, which is circled in red with the number "1" inside.

(1) Set configuration:

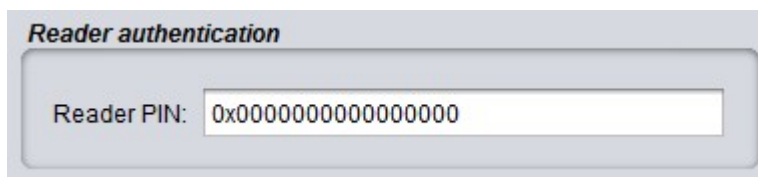
To store the configuration parameters (done in steps 1 – 4) into the reader's configuration sector into you need to place a supported tag on the reader before you click on the "Set configuration" button. If no tag is present an error message is shown. A success message is displayed when the configuration has been stored correctly:



9. Reader configuration

9.1. Reader authentication

To make changes to the tag key settings (see chapter 9.2) the reader PIN is required for authentication purpose. PIN only accepted as hexadecimal value.



9.2. Tag key settings

In this section you can manage the authentication settings for MIFARE Classic, MIFARE DESFire and MIFARE Ultralight C which are needed to communicate with the tag. For DESFire tags you can set authentication keys for each application on the tag. Please check your tag IC documentation for details. Keys are written into the reader's internal flash memory. A fresh reader from the manufacturer is pre-programmed with default keys of the respective card IC. If no keys are set in this section the default keys will be used by the reader.

9.2.1. MIFARE DESFire

MIFARE DESFire MIFARE Classic MIFARE Ultralight C

PCD Key No.: 0x00 PICC Key No.: 0x00

Application ID: 0x Encryption: DES

Key 1: 0x0000000000000000

Key 2: 0x

Key 3: 0x

Set MIFARE DESFire key

Inputs only allowed in hexadecimal values. After all inputs are made, put a supported tag on the reader and click on “Set MIFARE DESFire key” to load the configuration into the reader. If configuration was successfully written a confirmation is shown, else you will see an error message (see chapter 10).

Notes:

AES in the “Encryption” dropdown list is only available with DESFire EV1 tags. Greyed out key numbers are not supported by the selected encryption method. PCB

9.2.2. MIFARE Classic

MIFARE DESFire MIFARE Classic MIFARE Ultralight C

Key number: 0x00 Key type: Type A

Key: 0xFFFFFFFF

Set MIFARE Classic key

Inputs only allowed in hexadecimal values. After all inputs are made, put a supported tag on the reader and click on “Set MIFARE Classic key” to load the configuration into the reader. If configuration was successfully written a confirmation is shown, else you will see an error message (see chapter 10)

9.2.3. MIFARE Ultralight C

Inputs only allowed in hexadecimal values. After all inputs are made, put a supported tag on the reader and click on “Set MIFARE Ultralight C key” to load the configuration into the reader. If configuration was successfully written a confirmation is shown, else you will see an error message (see chapter 10).

10. Sample settings for tag memory reading

Configuration files (*.cfg) for each example in this chapter are available in the application folder. For safety reasons we have not made the configuration file to store the reader keys.

10.1. Reading data from one MIFARE Ultralight page

Ultralight_Read_2_Bytes_With_Offset.cfg

Function	Setting
Keyboard functionality	Tag memory reading
Character delay	Default
Enable delimiter	0x23 (#)
Tag type	MIFARE Ultralight
Page number	0x04
Byte offset within page	0x01
Numbers of bytes to read	0x02

Example:

Sample tag data in page 4	12AC59FF
Data output	AC59#

10.2. Reading the complete 768 bytes user memory of MIFARE Classic 1k

Classic_Read_Complete.cfg

Function	Setting
Keyboard functionality	Tag memory reading
Character delay	Default
Enable delimiter	0x23 (#)
Tag type	MIFARE Classic 1k
Block number	0x00
PCD key number ¹⁾	0x02
Byte offset within block	0x00
Number of bytes to read	0x300

¹⁾ assuming NXP default transport key of the tag is FFFFFFFF and the key type is A

Note:

- 1) Access bits and keys of the tag need to be the same for all sectors
- 2) Reading duration for 768 bytes is ~15s. Please do not remove the tag until completed.
- 3) The 768 bytes includes the manufacturer block '0x00'. If you only want to read the writable user memory then use '0x01' as block number and '0x02F0' (=752 bytes) as number of bytes to read

10.3. Reading NDEF data from a MIFARE Ultralight tag (NFC Tag Type 2)

Ultralight_Read_NDEF.cfg

To read and output a NDEF message with the data below please use the settings in the second table. But please notice that the numbers of bytes to read may vary depending on the NDEF message length. For details please refer to the NFC Forum NDEF Specification.

Payload type	55 = URI record type ("U")
Type name format (TNF)	03 = absolute-URI
Payload	6964656E746976652D67726F75702E636F6D = identive-group.com

Function	Setting
Keyboard functionality	Tag memory reading
Character delay	Default
Enable delimiter	none
Tag type	MIFARE Ultralight
Page number	0x04
Byte offset within page	0x00
Numbers of bytes to read	0x1A

Data output: 0317D1011355036964656E746976652D67726F75702E636F6DFE

Note: A NDEF parser is needed on the host side to process the data output

10.4. Read one TOPAZ page or ISO15693 page

We have also added the following sample configurations to the application folder to show the settings to read a single block or page of the respective tag:

TOPAZ_Read_1_Block.cfg

ISO15693_Read_1_Block.cfg

11. Troubleshooting

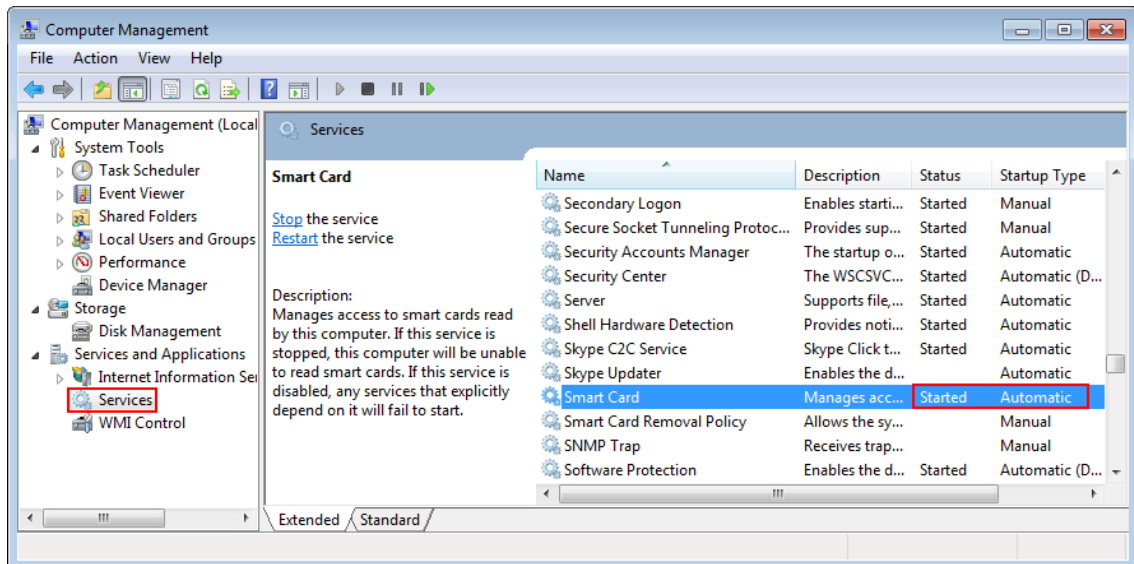
1. Problem:

The Multi-ISO reader with Keyboard Emulation is not shown in the reader list of the tool.

Solution:

Please verify that the “Smart Card” service is *enabled* and start mode is *automatic*.

Right click on the “Computer” icon on the desktop and choose “Manage”. Then move to the services section of the “Computer Management” on the left side and search for “Smart Card” service. Double click on the service entry and make the above mentioned changes:



2. Problem:

When I click on “Set Configuration” I get the error message “Could not create valid APDU command: Invalid Index!”.

Solution:

Please make sure that the reader is connected. If the reader is connected please refer to solution described in 1)

12. Terms & Abbreviations

Terms & Abbreviations	Description
2K3DES	2 Key Triple Data Encryption Standard
3K3DES	3 Key Triple Data Encryption Standard
AES	Advanced Encryption Standard
ASCII	American Standard Code for Information Interchange
CCID	Chip Card Interface Device
DES	Data Encryption Standard
IFD	Interface Device
HF	High Frequency (13.56 MHz)
HID	Human Interface Device
PCD	Proximity Coupling Device
PC/SC	Personal Computer/Smart Card
PICC	Proximity Integrated Chip Card
PIN	Personal Identification Number