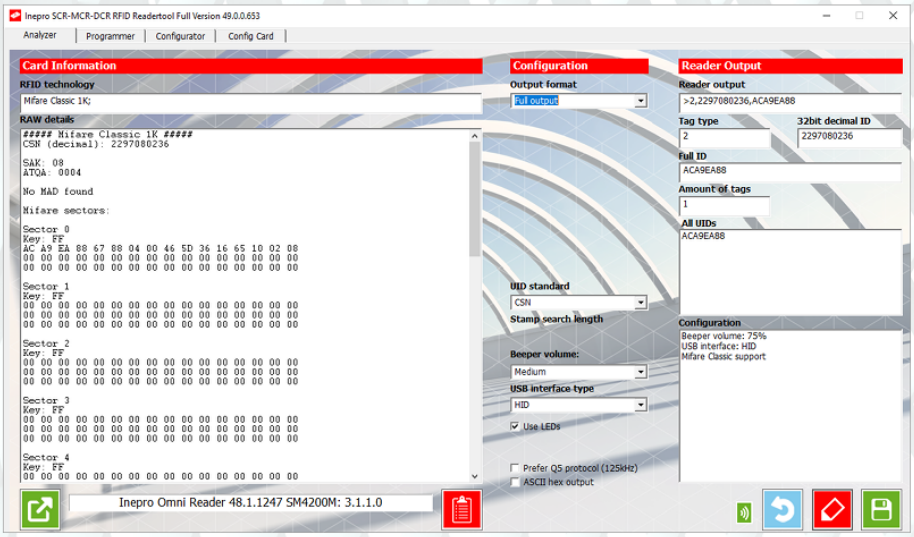

Congratulations on your selection of the Inepro Spider-SCR-MCR-DCR Reader Tool. We are certain you will be pleased with your purchase of one of the flexibele solutions of the market.

We want to help you get the best result from your Spider-SCR-MCR-DCR Reader Tool. This manual contains information on how to do that; please read it carefully. Due to continuous product improvements this manual is subject to changes without notice.

We strongly recommend you read the license agreement to fully understand its coverage and your responsibilities of ownership.

Your Inepro dealer is dedicated to your satisfaction and will be pleased to answer your questions and your concerns.

Best wishes,
inepro B.V..

Revision number R 5. This revision of the manual can be applied to products with version 1.0. or higher.

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Table of Contents

Directives

ATTENTION!!

Read this manual carefully before installing the Spider-SCR-MCR-DCR Reader Tool!

Guarentee

No guarantee can be given if safety regulations are not followed.

Changes and/or modifications

Changes and/or modfications whch have not been approved by the responsible party can void the user's authorty to operate the equitement.

Security

Always disconnect the power supply before handling anything inside the device.

For Indoor Use Only

This device may only be used indoors.

FCC Federal Communications Commission - US

This device is complies with part 15 of the FCC rules, operation is subject to two conditions:
(1) This device may not cause harmful interference.
(2) This device must accept any interference received, includng interference that may cause undesired operation.

CE Conformité Europeéne (Conform European Norm)

This device is in conformity with the EMC directive and low-voltage directive.

Industry Canada

Conformité d'Industrie Canada

Appareil concernés:
Spider

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence.
L'exploitation est autorisée aux deux conditions suivantes :
(1) l'appareil ne doit pas produire de brouillage, et
(2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Confirm Canada Industries

Relevant Devices:
Spider

This device complies with Industry Canada's licence-exempt RSSs. Operation is subject to the following two conditions:
(1) This device may not cause interference; and
(2) This device must accept any interference, including interference that may cause undesired operation of the device.

RCM Regulatory Compliance Mark

This device is in conformity with Australian law.

End of life directives

Inepro is paying a lot of attention to environmentally-friendly production. Your new device contain materials which can be recycled and reused. At the end of its life specialised companies can dismantle the discarded device to recycle the reusable materials and to minimise the amount of materials to be disposed of. Please observe the local regulations regarding the disposal of packaging materials, exhausted batteries and old requipment.

Introduction

This manual describes the Spider/SCR/MCR/DCR Full Reader Tool, which can be used to read out different Inepro card readers. This manual focuses on the Spider and SCR708 but can be used for the other readers as well.

The Spider and SCR708 RFID Reader reads out RFID tags and cards from the entire 125kHz and 13,56MHz range simultaneously.
When the reader is connected to a laptop, it can be read out by the Spider-SCR-MCR-DCR reader tool. The reader reads out a card's
UID and sends it to the host USB host (MFP or computer).
The communication takes place via keyboard mode (Human Interface Device driver called HID, also known as keyboard
emulation). The biggest advantage is that in this single housed reader RFID technologies from 125 kHz and 13,56MHz will both be
read. The Spider and SCR708 RFID reader do it all. The reader prioritizes a specific RFID technology above another i.e. 125kHz versus
13,56,MHz (called Q5 protocol).

Our latest readers are also capable of reading encrypted cards.
Please read the specifications for supported RFID ISO standards, RFID technologies, any security elements.

Requirements

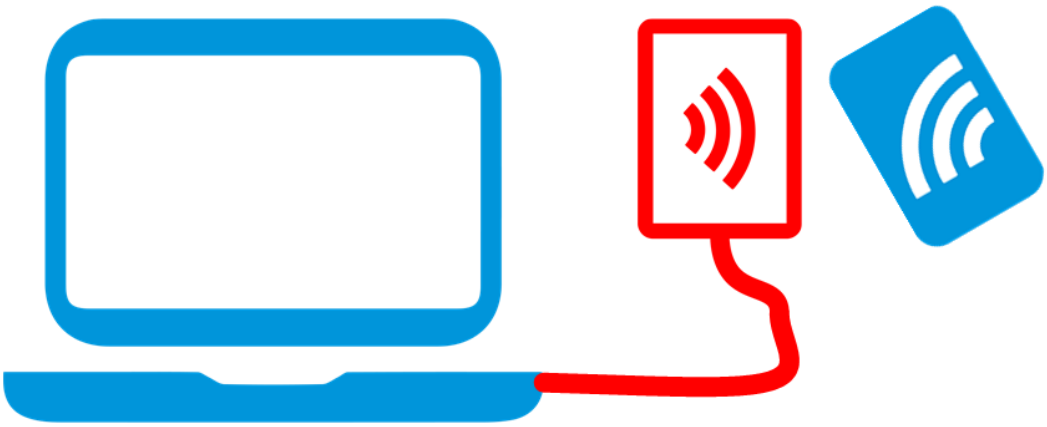
- **A laptop**
- **A Spider / SCR / MCR / DCR Reader**
- **(Optionally) Cards to analyse**
- **(Optionally) Mifare DESFire cards to create Configuration Card.**

Terminology

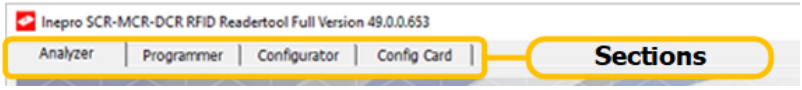
Card

When the term card is used, any RFID tag can be used instead. For a list of examples of RFID tags, look at: https://www.hidglobal.com/sites/default/files/resource_files/hid-idt-tag-products-ct-en_2.pdf
We support RFID tags in the 125KHz and 13.56MHz frequency range.

System Overview



User Interface



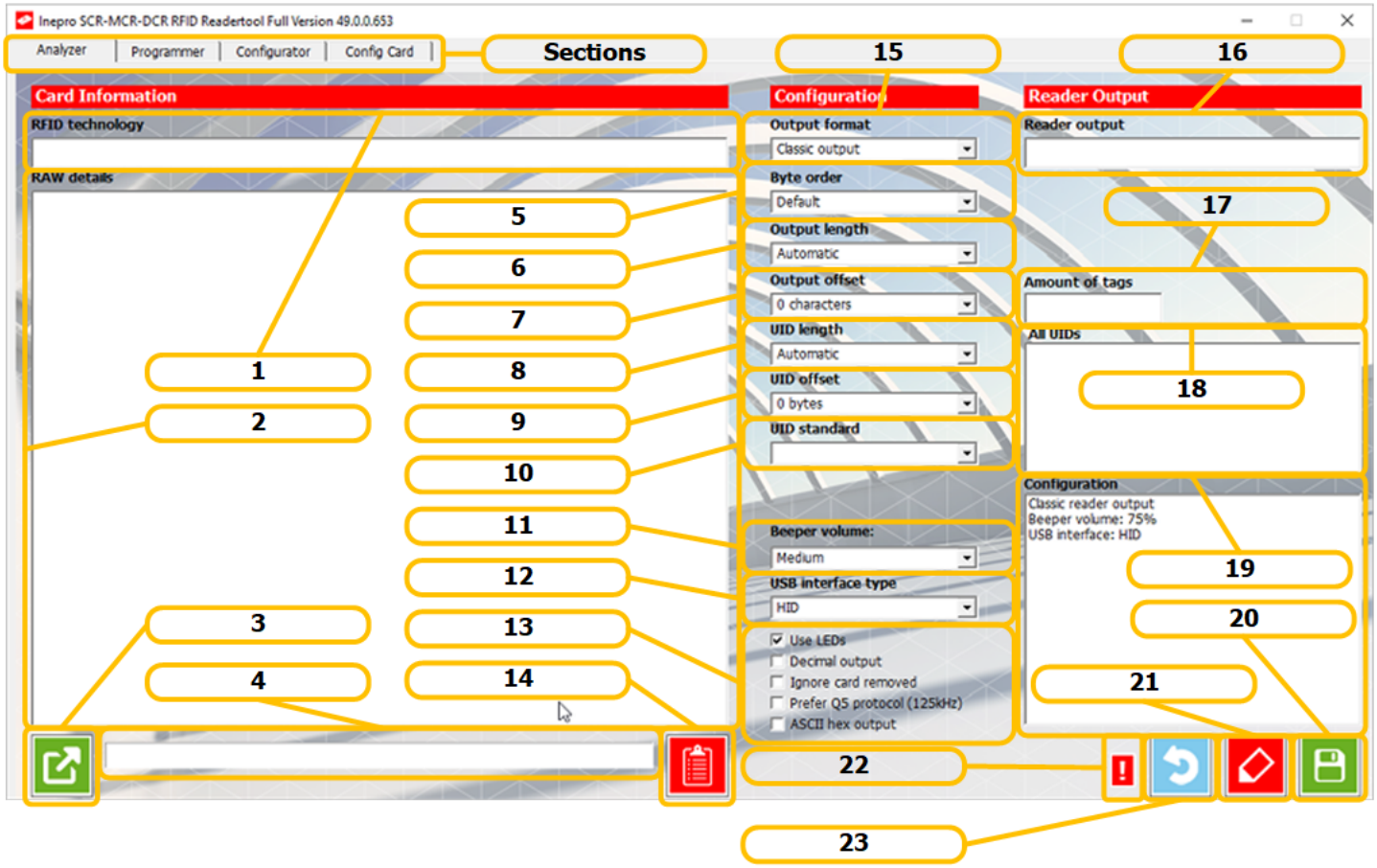
The 'Spider-SCR-MCR-DCR Reader Tool - Full Version' consist of multiple other tools that where in the past separate tools.
In this version the tool, there are four pages or sections:

- Analyser - Used to analyse your card.
- Programmer - Used to program a reader with a firmware, or a configuration.
- Configurator - Used to create a new configuration by selection of configuration items.
- Config Card - Used to one-time write a config on a card.

Each section is a separate unit that does not share information with the other sections. But you can save a configuration and use
it in another section

Analyser

The Analyser can analyse cards so you can examine if the card data and especially the Card Serial Number (CSN), a serial
number given to a card by the manufacturer, is what is expected by the devices and other systems that you use to identify your
users by these cards.
Once a successful configuration has been defined, the configuration must be stored AND in a second step written to the card
reader with the programmer.



Number	Name	Description
1	RF ID Technology	The active RFID Technology.
2	RAW Details	All the raw data obtained from the card or tag.
3	Save raw output to file	Save all the raw data to a file.
4	Reader Identity	The name of the reader type, firmware version and if applicable the firmware of SM4200 (the LEGIC Chip).
5	Byte Order	The 'default' is the 'Big Endian' order, 'reversed' is the opposite Little Endian'.
6	Output Length	Length, counted from the 'beginning' (depending on the 'Byte Order' setting).
7	Output Offset	Start counting with this offset from the 'beginning' (depending on the 'Byte Order' setting).
8	UID Length	The Output will become the UID, how long is the UID.
9	UID Offset	Shift a number of bytes in the Output.
10	UID Standard	The UID standard (usually CSN).
11	Beeper Volume	Set the volume to O ff, Low, Medium or High.
12	USB Interface Type	'HID', 'HID RAW without driver', 'CDC ACM virtual comport', 'USB Ethernet'. See HID or HID 13
13	Additional Options	Toggle 'Use LEDs', 'Decimal output', 'Ignore card removed', 'Prefer Q 5 protocol (125kHz)', 'A SC II hex output'. See "Additional Options" 4
14	Copy raw details to clipboard	Copy all raw data to the clipboard.
15	Output Format	'Classic output', 'Full output'.
16	Reader Output	The Output after the UID settings are applied.
17	Amount of tags	The amount of tags on the card.
18	All UIDs	All the UIDs
19	Configuration	The configuration elements (if the setting is the default settings it might not be listed).
20	Save Current Configuration	Save the current configuration.
21	Edit Current Configuration	Edit the enabled card technologies in the reader.
22	Reader status	The reader status is shown by this icon, hover over it to get a more detailed status.
23	Clear Data	Remove the analytic data retrieved from the last card.

USB Interface Type (Number 12)

Name	Description
HID	Human Interface Device or USB-HID specification. A bi-directional communication standard.
HID RAW without driver	Human Interface Device or USB-HID specification but without generating key board output.
CDC ACM virtual comport	Emulates a serial COM port.
USB Ethernet	Not implemented.

Additional Options (Number 13)

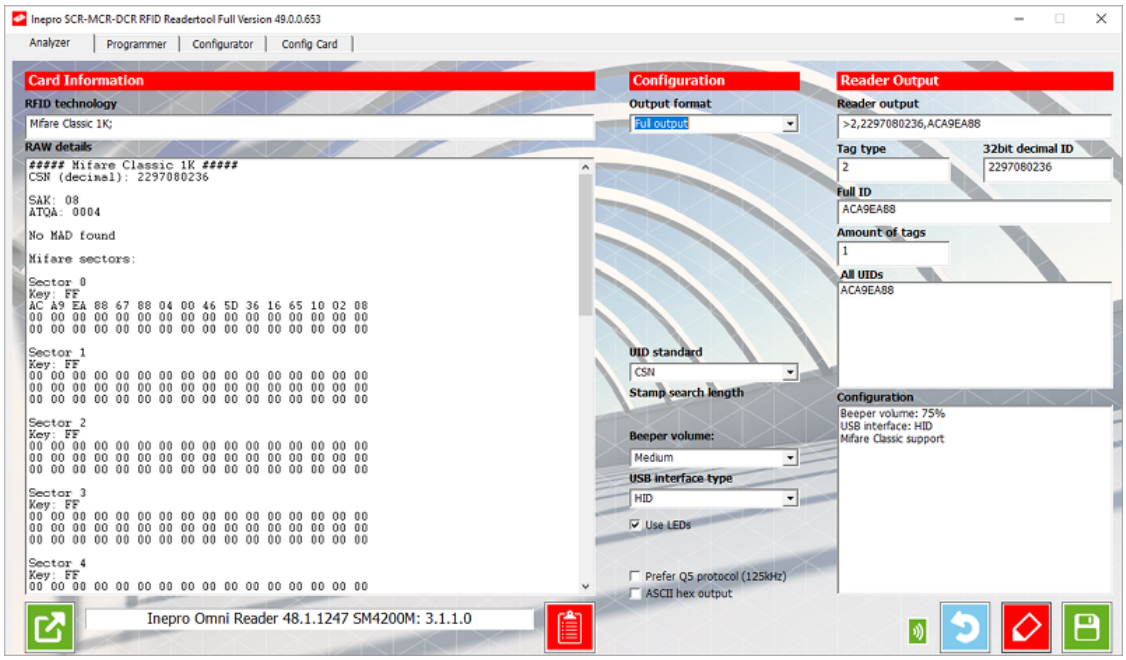
Name	Description
Use LEDs	Use LED functions
Decimal output	Will output in a decimal format.
Ignore card removed	If enabled only one card data set will be send, when presenting a card. If disabled you can tell the difference between a card entering or exiting the field.
Prefer Q 5 protocol (125kHz)	Prefer the 125KHz frequency over the 13.56MHz frequency .
ASCII hex output	Every ASCII character in the card data has a value. These values each converted to hexadecimal numbers will make up the ASCII hex output.

Edit Card Technologies (Number 21)

If you need to change the enabled card technologies in the reader, open the 'Edit Current Configuration' (Number 21 in the layout overview) window and check the card technologies you need and click OK.
The supported card technologies are added to the configuration (Number 19 in the lay-out overview).

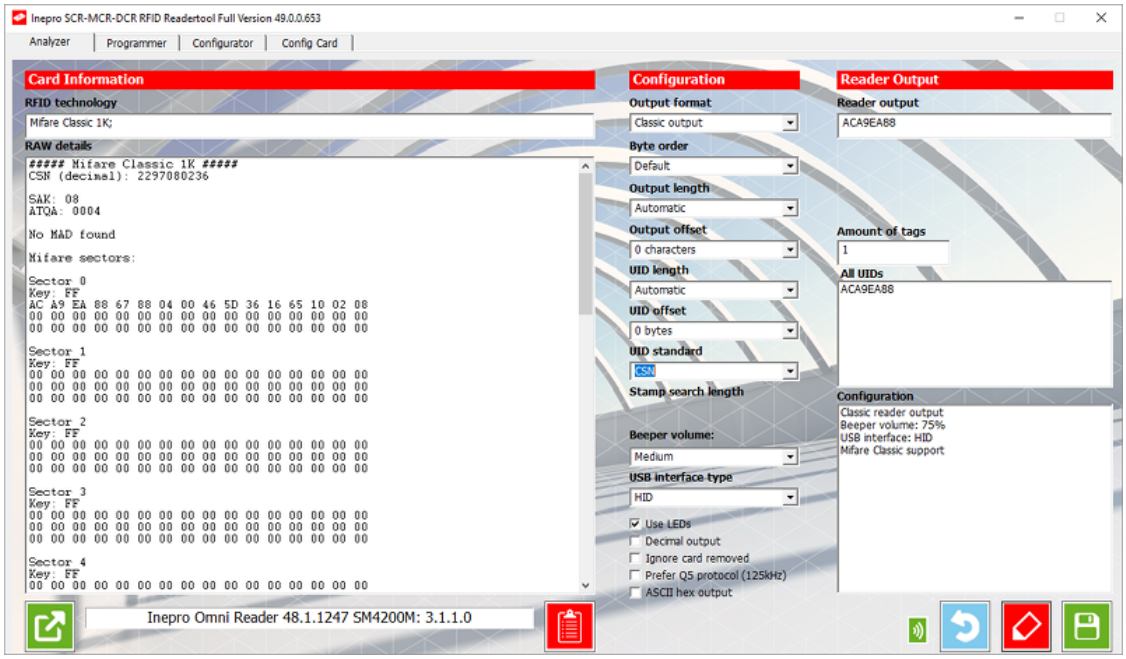
Full Format (Chosen at number 15)

Use Full Output to analyse the card data in combination with Inepro devices:



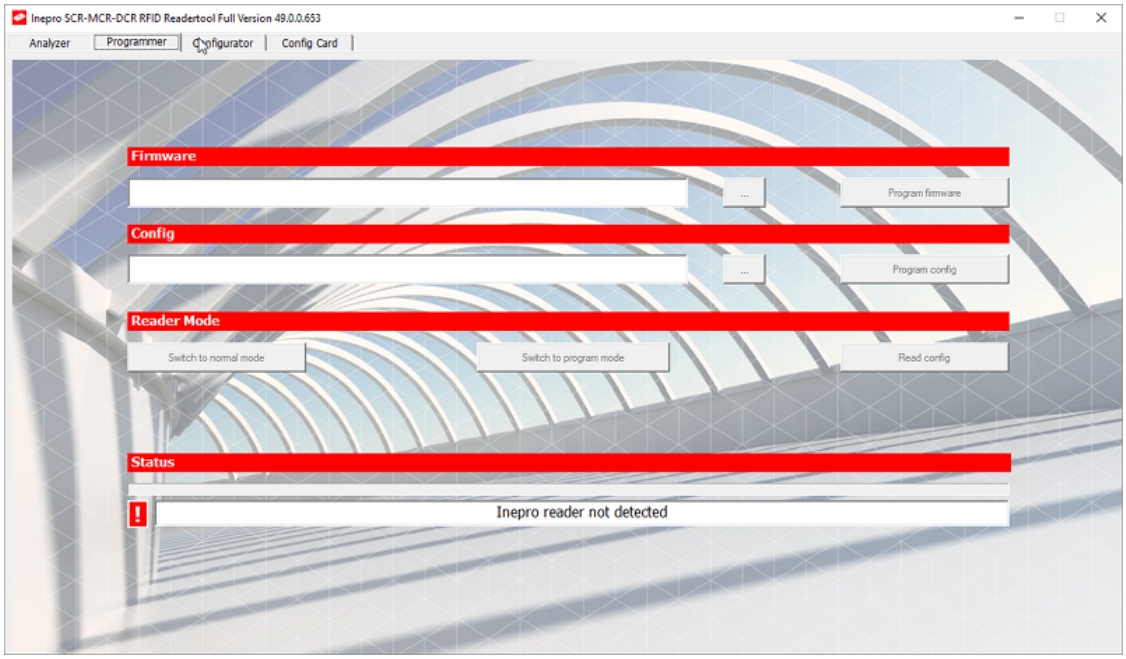
Classic Output (Chosen at number 15)

Use classic output to analyse map data in combination with non-inepro devices



Programmer

The programmer can program the card reader with firmware and a configuration.
To program the card reader it must first be in program mode.

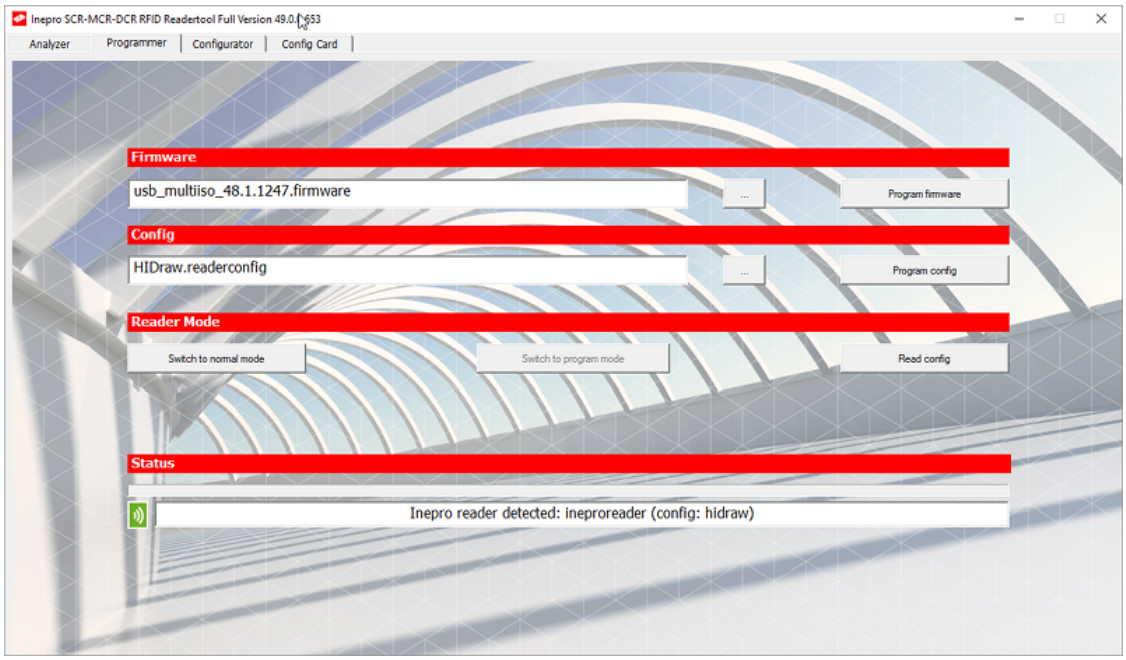


1. Connect a reader.
2. Click 'switch to program mode' to set the reader to 'program mode'. The reader's LEDs will show that it is in program mode.

The status icon will turn green and the status line will read 'Inepro reader detected'.

'Read Config' - Will extract the current configuration in the reader and allows you to save it to a file.
'Switch to normal mode' - Will switch a reader in program mode to normal mode.
'Switch to program mode' - Will switch a reader in normal mode to program mode.

The buttons 'Program firmware', 'Program config', 'Read config' and 'Switch to normal mode' are made available when the
reader is in 'Program Mode'.



3. Use '...' to browse for a firmware or configuration file.
4. Then use 'Program firmware' or 'Program config' to program the firmware or configuration respectively.
5. Finally use 'Switch to normal mode' to let the reader switch back to normal mode and use the chosen firmware and configuration ■

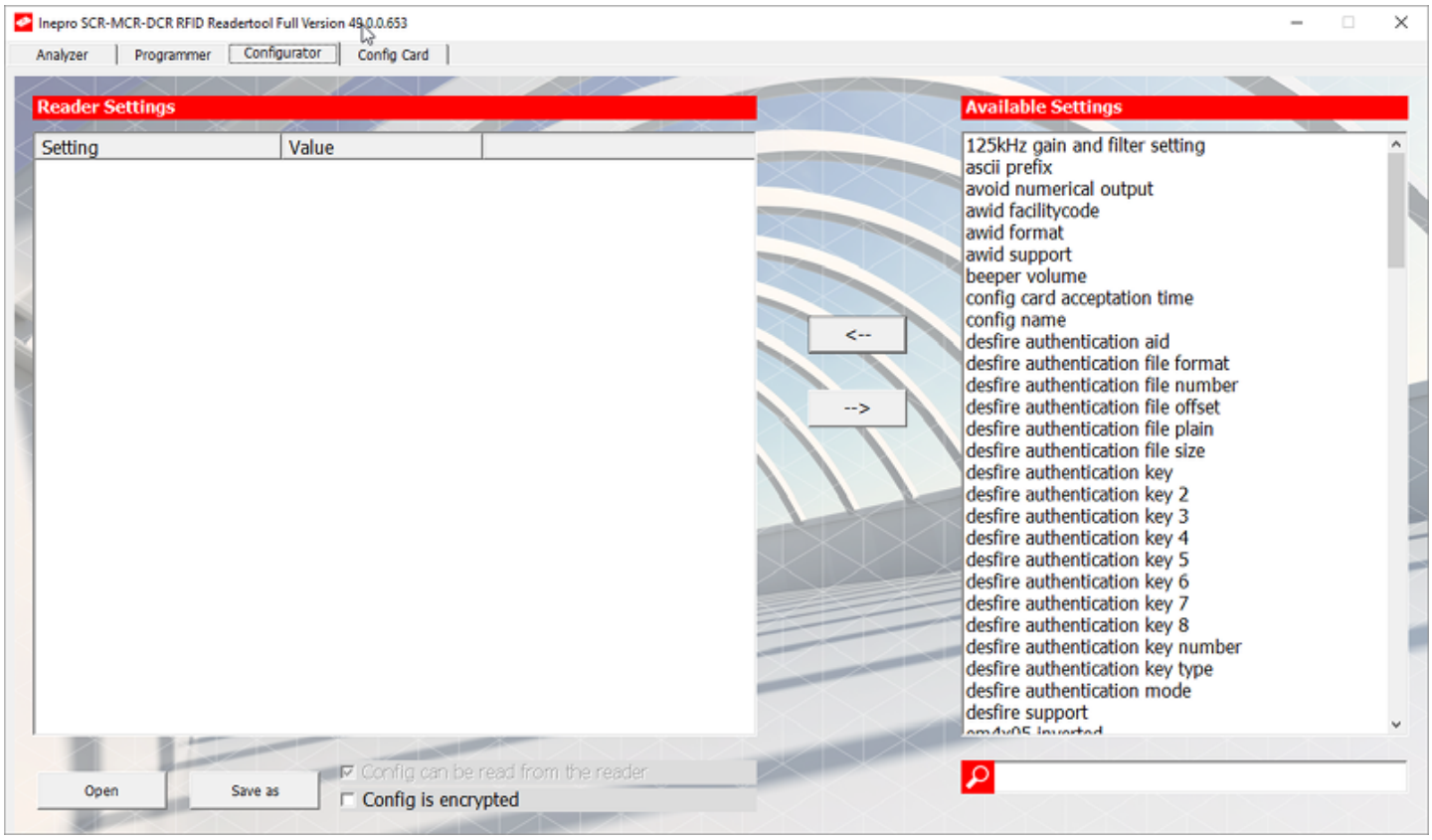
Configurator

The Configurator is used to create new configuration files, by piecing them together from the configuration settings. To do this move the desired settings from the right to the left, and then save the configuration. You can also open a configuration file to see what settings are inside and build from there. In the programmer section, you can read out the configuration currently in the reader and save that configuration. Be aware that a configuration file can be forbidden to read out, or encrypted in which case you will not be able to see it's contents.

Note: A configuration file has a property that determines if it can be extracted from the reader. If that is false, it can not be shown or be edited.

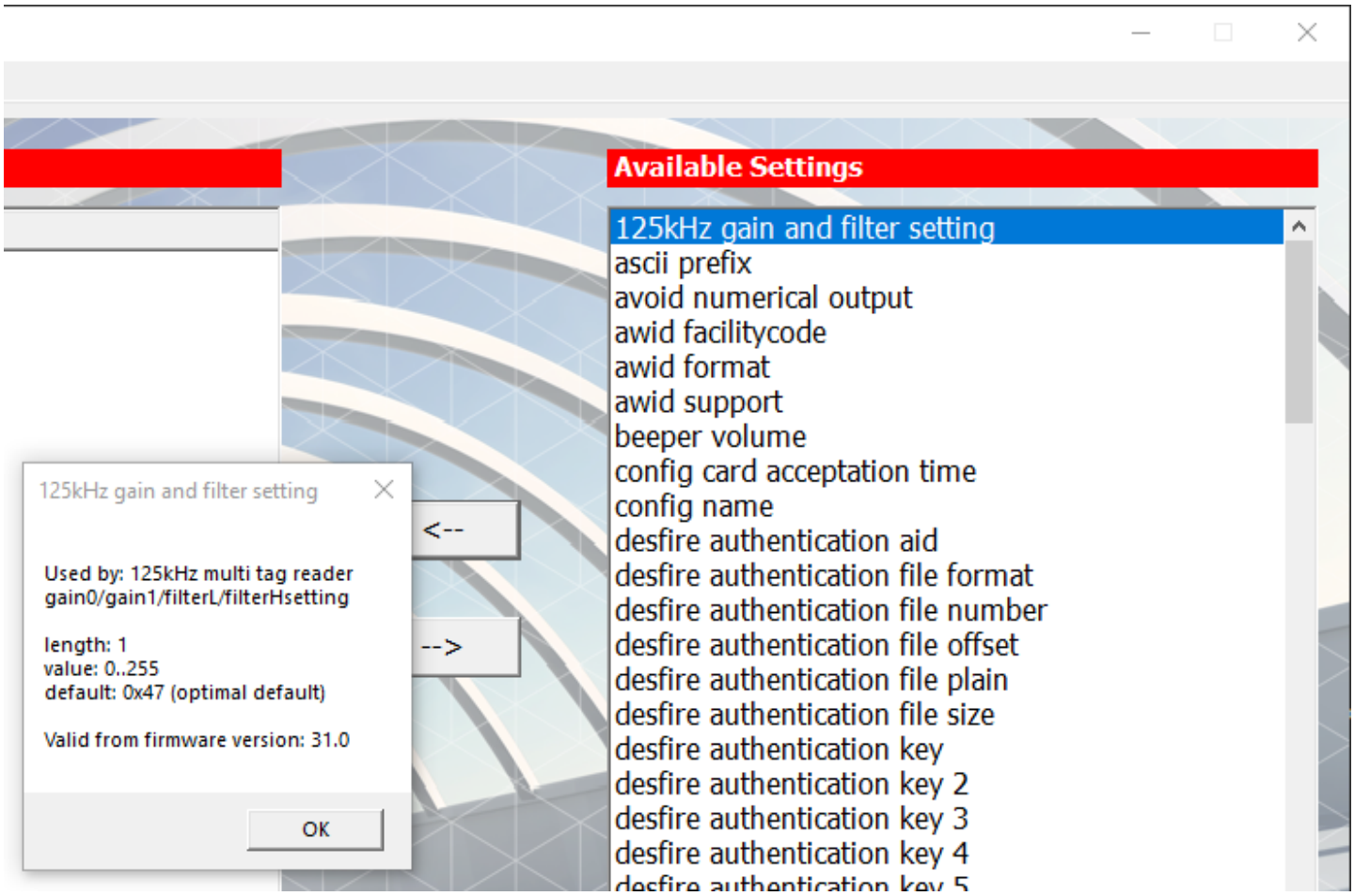
Note: A configuration file has a property that determines if it is encrypted. If it is encrypted the file cannot easily be read outside of the Spider-SCR-MCR-DCR Reader Tool.

Note: If a configuration file may not be read from the reader, it shall be encrypted. If the configuration is not encrypted, it can always be read from the reader.



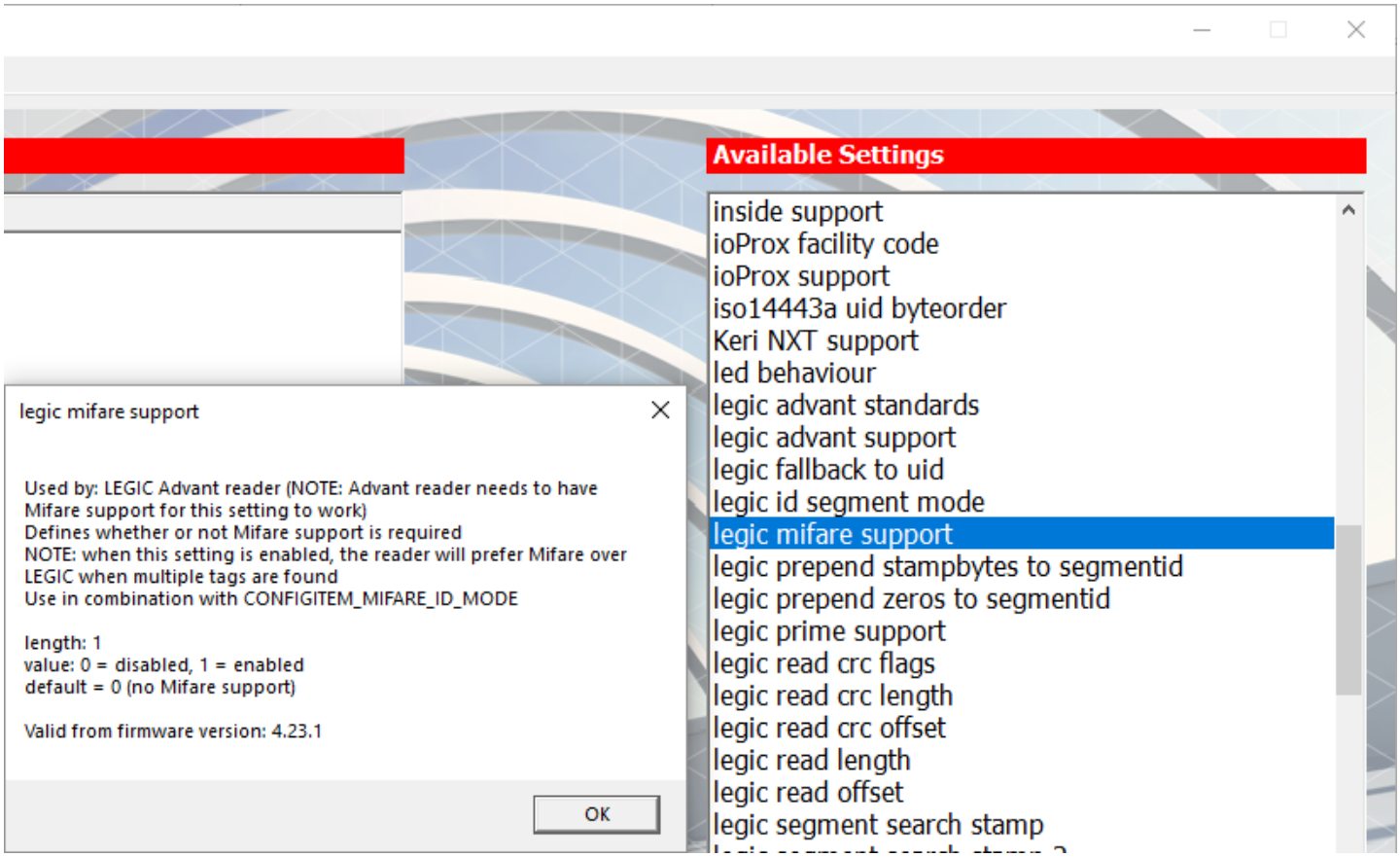
If you double-click a setting, a pop-up appears with a short description of the setting, the value(s) available to you, in this case the value has a length of 1 byte, the range of that value, and the default value; 1 byte[13] written as an octet[14] (see Appendix II: Bits, bytes, nibbles and hexadecimals) , lastly the lowest version number needed to use the setting is given.

Note: To use a setting, the firmware in the reader must be equal to or higher than the settings required version.



A setting description can be a little more complex, like in the example below. The 'Legic Mifare support' setting needs a LEGIC Advant reader that has Mifare support as explained in the setting. The description also explains that if this setting is enabled the Mifare technology is preferred over the LEGIC technology. It also tells you there is a relation with the CONFIG_MIFARE_ID_MODE setting (which translates to (stripping off CONFIG_ and all underscores); 'mifare id mode').

The length is 1 byte long again, the value range is a bit, it either 1 or 0 and the default is 0. This setting is valid from
firmware version 4.23.1.



Assemble a configuration

1. Move the desired settings to the left side of the window.
2. Make sure to include the setting 'config name', in order to create a unique name for your configuration.
3. Save the file with the same name as you labelled the configuration to avoid confusion.

You can now use the stored file to load the configuration in one of the other sections

Config Card

It is possible too quickly program card readers with a certain configuration, without having to connect them to your laptop.
A card is used to transfer the configuration. This card can currently only be a Mifare DESFire card.

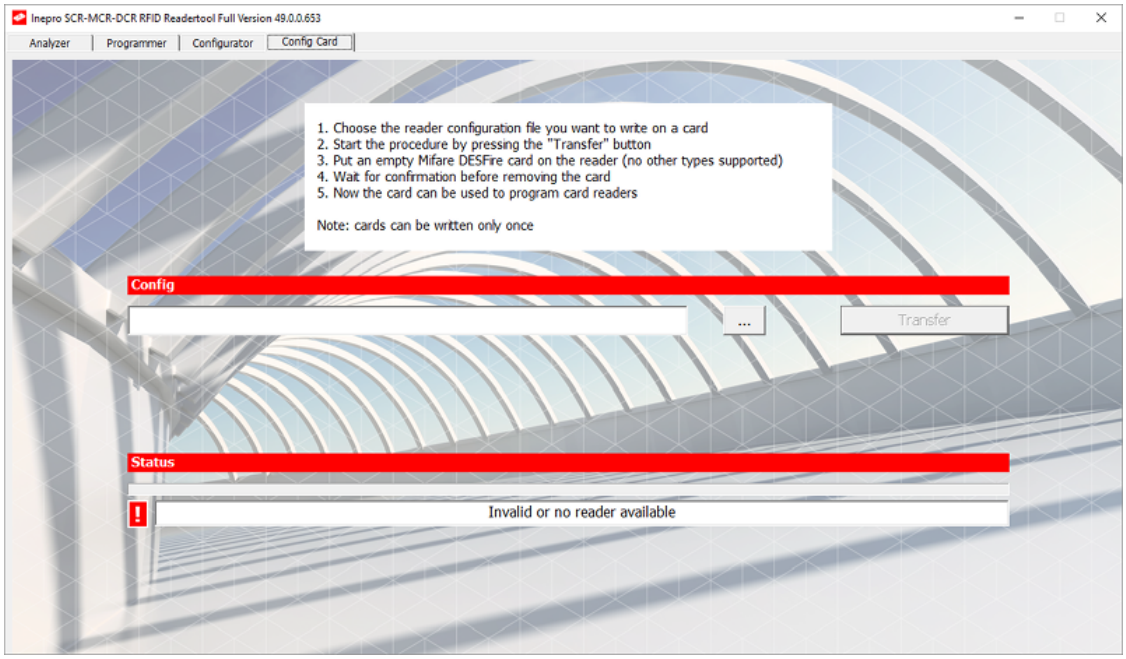
Note: On a card a configuration can be written only once. It can not be overwritten later. A new card must be created in that case.

Note: The Config Card functionality can only be used on Mifare DESFire cards. Other card technologies are currently not supported.

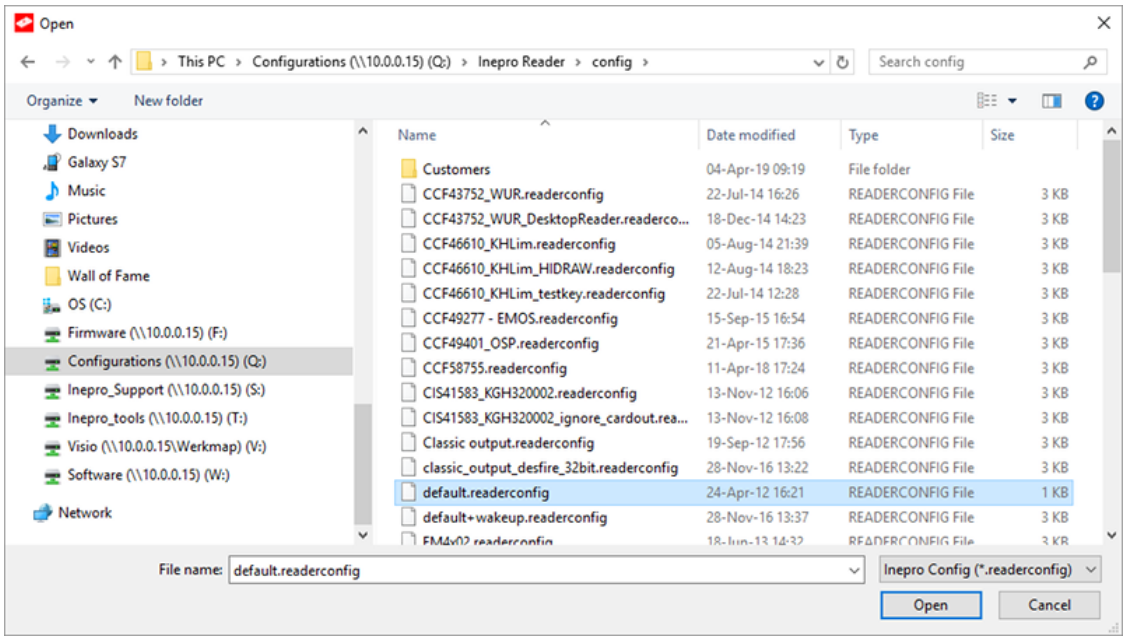
Config Card

Note: Make sure the connected card reader has the HIDRAW (Card Analyzer Mode) configuration loaded.

1. Click "..." to browse for a configuration file.

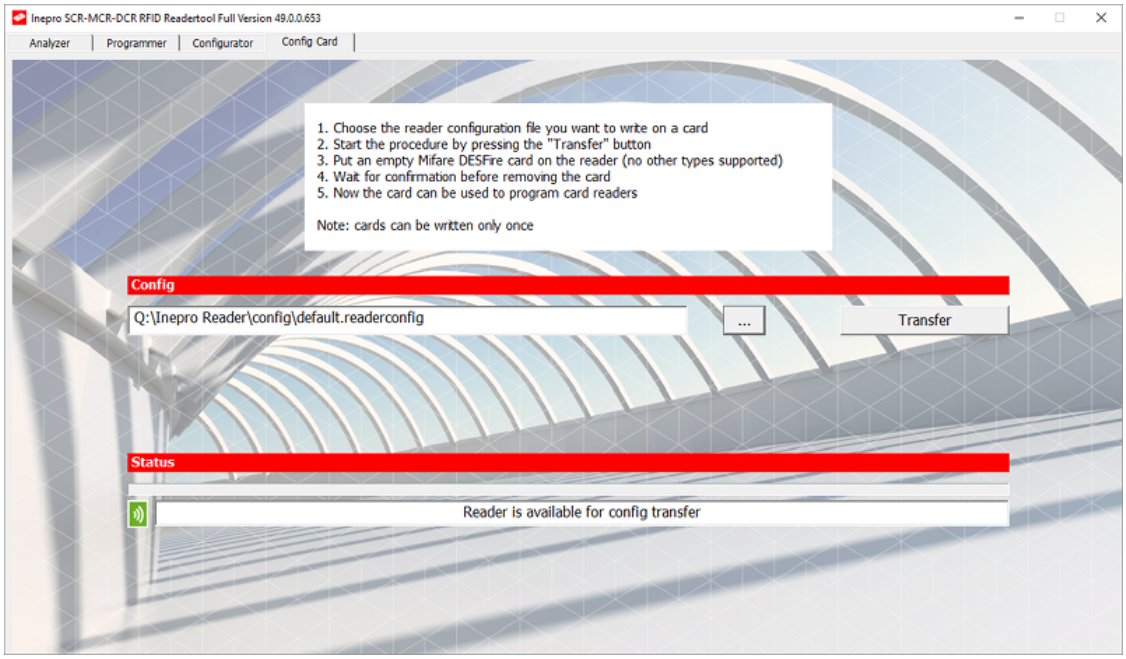


2. Select the desired configuration file. The HIDRAW (Card Analyzer Mode) configuration should be loaded in the reader.



3. Click 'Transfer'.
4. Put a Mifare DESFire card on the the reader, to start the transfer.
5. Wait for confirmation that the process has been completed before removing the card.

Config Card



The card can now be used to program card readers

FAQ

How does the Spider or SCR708 RFID reader communicate with the host device?
The reader communicates via HID (Human Interface Device) protocol emulating keystroke input.

Is there a difference in speed when the Spider or SCR708 reader needs to read specific data on the card compared to reading the CSN?
Due to the powerful processors in the readers there is no noticeable time difference reading the ID.

What communication protocol is used?
When a configuration file is created the HID keystroke communication protocol is used by default.

Can the Spider or SCR708 RFID reader work with dual RFID technologies (cards with both a 13,65MHz and a 125kHz antenna on board)?
Yes, since the 13,65MHz has got the strongest antenna this ID will be used by default. But the configuration allows you to set up the reader to read out the 125 kHz ID first and use this ID

Appendix I: HID or HID?

HID or HID ?

When working with card readers the term 'HID' will emerge, so what does it mean?
Well, the complex issue with this question is, that there are two concepts that both are called 'HID' and both are related to the
card reader. Therefore both will be explained:

HID

Hughes Identification Devices, or HID is often a reference to one or more card technologies developed by the Hughes
Identification Devices company, like HID Prox or HID iClass SE.

HID

A Human Interface Device, or HID is a type of computer device that interacts directly with humans. In this manual the card reader
is such a HID, as it acts as a keyboard in those cases.

Appendix II: Bits, bytes, nibbles and hexadecimals

Bit

The bit is a basic unit of information in information theory, computing, and digital communications. The name is a portmanteau of binary digit. It's either 0 or 1.

Hexadécimal

In mathematics and computing, hexadecimal (also base 16, or hex) is a positional numeral system with a radix, or base, of 16. It uses sixteen distinct symbols, most often the symbols "0"–"9" to represent values zero to nine, and "A"–"F" (or alternatively "a"–"f") to represent values ten to fifteen.

Hexadecimal numerals are widely used by computer system designers and programmers, as they provide a more human-friendly representation of binary-coded values. Each hexadecimal digit or hex digit represents four binary digits. Two hexadecimal digits are often used to represent one Byte as an Octet.

Nibble

Each hexadecimal digit represents four binary digits, also known as a nibble, which is half a byte. A nibble has sixteen possible values. A nibble can be represented by a single hexadecimal digit called a hex digit. One nibble can be 0 trough 15 (or 0 trough F).

Byte

The byte is a unit of digital information that most commonly consists of eight bits, representing a binary number. Historically, the byte was the number of bits used to encode a single character of text in a computer and for this reason it is the smallest addressable unit of memory in many computer architectures.

Appendix II: Bits, bytes, nibbles and hexadecimals

The modern de-facto standard of eight bits, as documented in ISO/IEC 2382-1:1993, is a convenient power of two permitting the values 0 through 255 for one byte (2 in power of 8 = 256, where zero signifies a number as well). It can be 0 trough 255.

? Octet

A full byte (octet) is represented by two hex digits; therefore, it is common to display a byte of information as two nibbles. For example, a single byte can have values ranging from 0000 0000 | (0) to 1111 1111 | (255) in binary form, which can be more conveniently represented as 00 to FF in hexadecimal. So an Octet is a byte written as two hex digits (each the size of a nibble)

	Maximum capacity		
Name	Binairy	Decimal	Hex
Zero	00000000	0	0x00
Bit	00000001	1	0x01
Hex decimal	00001111	15	0x0F
Nibble	00001111	15	0x0F
Byte / Octet	11111111	255	0xFF