# 2N PICard Commander

User Manual

Card encryption
Credential ID for new card (hex)
548354527183CC4AA80A5EB482AB167B
Card successfully encrypted.
Remove the card and place another one card on the reader.
Encrypt
Automatically encrypt cards upon presentation to the reader
View card list (1 cards personalized)

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# Symbols and Terms Used

The following symbols and pictograms are used in the manual:

**DANGER**
**Always abide** by this information to prevent persons from injury.

**WARNING**
**Always abide** by this information to prevent damage to the device.

**CAUTION**
**Important information** for system functionality.

**TIP**
**Useful information** for quick and efficient functionality.

**NOTE**
Routines or advice for efficient use of the device.

# Product Overview

PICard Commander is a software application used for the encryption of login data on access cards. The application creates projects that generate a set of encryption and reading keys. The reading keys can be imported to 2N devices or Access Commander for distribution to the connected 2N devices.

The 2N PICard technology is designed for the encryption of MIFARE® DESFire® EV2 a MIFARE® DESFire® EV3 cards.

You can delete the uploaded access card data using 2N PICard Commander.

The 2N PICard Commander function is licensed.

## Associated Products

**Part No. 91379601**

Axis Part No. 02722-001

**2N PICard Commander Licence**

The license is always issued for a specific USB card reader based on the reader Device key. Refer to 2N PICard Commander for the reader Device key before uploading the license. See below for the supported USB card readers.

**Part No. 9137421E**

Axis Part No. 01400-001

**USB NFC/HCE + 13.56 MHz, 125 kHz RFID card reader**

External RFID card reader connectable to a PC via a USB interface. Suitable for system administration and adding of 13.56 MHz, 125 kHz cards and NFC/HCE supporting Android platform devices using the 2N IP intercom web interface or Access Commander. Suitable for uploading of MIFARE DESFire cards into the 2N PICard Commander encryption application[a.]. It reads the same types of cards and devices as card readers in the **2N IP intercoms**:

Supported RFID cards 125 kHz:

- EM4x02
- NXP HiTag2

Supported RFID cards 13.56 MHz:

- **ISO14443A** (MIFARE Classic, MIFARE Plus, MIFARE Mini, MIFARE Ultralight, MIFARE DESFire CSN only)
- **PicoPass** (HID iClass CSN, Picopass)
- **FeliCa** (Standard, Lite)
- **ST SR** (SR, SRI, SRIX)
- **Mobile Key**

**Part No 9137424E**

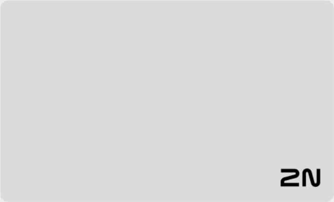
Axis Part No. 01527-001

**Secured USB NFC/HCE + 13.56 MHz, 125 kHz RFID card reader**

External secured RFID card reader connectable to a PC via a USB interface. Suitable for system administration and adding of 13.56 MHz, 125 kHz cards and Android platform devices supporting NFC/HCE using the 2N IP intercom web interface or Access Commander. Suitable for uploading of MIFARE DESFire cards into the 2N PICard Commander encryption application[a.]. It reads the same types of cards and devices as card readers in the 2N IP intercoms:

**125 kHz**

- EM4xxx
- HID Prox

| | |
|---|---|
| | **13.56 MHz**<br>• ISO14443A (MIFARE DESFire)<br>• PicoPass (HID iClass)<br>• FeliCa<br>• ST SR(IX)<br>• 2N Mobile Key<br>• HID SE (Seos, iClass SE, Mifare SE) |
|  | **Part No 11202601**<br>Axis Part No. 02787-001<br>**2N RFID card Mifare Desfire EV3 4K 13.56MH 10 pcs**<br>10 pcs per package<br>MIFARE DESFire EV3 (ISO14443A) |
| | **Part No 11202602**<br>Axis Part No. 02788-001<br>**2N RFID fob Mifare Desfire EV3 4K 13.56MHz 10 pcs**<br>10 pcs per package<br>MIFARE DESFire EV3 (ISO14443A) |

[a] The 2N PICard technology is designed for the encryption of MIFARE DESFire EV2 and MIFARE DESFire EV3 cards.

## Compatible Devices

PICard credentials can be read by following 2N devices:

**2N IP Style**

- 2N IP Style main unit
  (2N Part No. 9157101, Axis Part No. 02407-001)
- 2N IP Style main unit, secured
  (2N Part No. 9157101-S, Axis Part No. 02407-001)

**2N IP Verso**

- 2N IP Verso – 13.56MHz secured card reader, NFC, reads UID + PACS ID
  (2N Part No. 9155086/9155042, Axis Part No. 01712-001/01264-001)
- 2N IP Verso Bluetooth & RFID reader 125kHz, 13.56MHz, NFC
  (2N Part No. 91550945, Axis Part No. 02778-001)
- 2N IP Verso Bluetooth & RFID reader 125kHz, secured 13.56MHz, NFC
  (2N Part No. 91550945-S, Axis Part No. 02444-001)
- 2N IP Verso Touch keypad & RFID reader 125kHz, 13.56MHz, NFC
  (2N Part No. 91550946, Axis Part No. 02779-001)
- 2N IP Verso Touch keypad & RFID reader 125kHz, secured 13.56MHz, NFC
  (2N Part No. 91550946-S, Axis Part No. 02443-001)

**2N Access Unit**

- 2N Access Unit 2.0 13.56 MHz, NFC
  (2N Part No. 9160342, Axis Part No. 02143-001)
- 2N Access Unit 2.0 secured 13.56 MHz, NFC
  (2N Part No. 9160342-S, Axis Part No. 02142-001)

- 2N Access Unit 2.0 125kHz, 13.56MHz, NFC
  (2N Part No. 9160344, Axis Part No. 02138-001)
- 2N Access Unit 2.0 125kHz, secured 13.56MHz, NFC
  (2N Part No. 9160344-S, Axis Part No. 02146-001)
- 2N Access Unit 2.0 Bluetooth & RFID – 125kHz, 13.56MHz, NFC
  (2N Part No. 9160345, Axis Part No. 02772-001)
- 2N Access Unit 2.0 Bluetooth & RFID – 125kHz, secured 13.56MHz, NFC
  (2N Part No. 9160345-S, Axis Part No. 02773-001)
- 2N Access Unit 2.0 Touch keypad & RFID – 125kHz, 13.56MHz, NFC
  (2N Part No. 9160346, Axis Part No. 02774-001)
- 2N Access Unit 2.0 Touch keypad & RFID – 125kHz, secured 13.56MHz, NFC
  (2N Part No. 9160346-S, Axis Part No. 02775-001)

**2N Access unit M**

- 2N Access Unit M 13.56 MHz, NFC ready
  (2N Part No. 916112, Axis Part No. 02393-001)
- 2N Access Unit M RFID – 125kHz, 13.56MHz, NFC
  (2N Part No. 916114, Axis Part No. 02394-001)
- 2N Access Unit M Bluetooth & RFID – 125kHz, 13.56MHz, NFC
  (2N Part No. 916115, Axis Part No. 02395-001)
- 2N Access Unit M Touch keypad & RFID – 125kHz, 13.56MHz, NFC
  (2N Part No. 916116, Axis Part No. 02396-001)

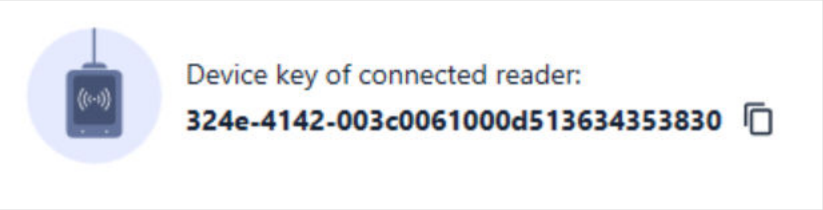
**2N IP Force**

- 2N IP Force 13.56MHz card reader, NFC ready, reads UID
  (2N Part No. 9151031, Axis Part No. 02522-001)
- 2N IP Force 13.56MHz card reader, NFC ready, reads UID + PACS ID
  (2N Part No. 9151031S, Axis Part No. 01730-001)

# Installation and License Reading

1. Install 2N PICard Commander in a standard way using the installer.
2. Once the application is launched, click Load License on the orange bar (or in Help → License) to upload the license. Now read the license file from the disk. Make sure that the card reader is connected to your PC to make the license upload successful.

> **NOTE**
> The license is tied to a specific USB card reader. To get the license, complete the reader Device key, which can be found in the 2N PICard Commander (*Help* > *License*) license info section. Make sure that the card reader is connected to your PC before displaying the key.



Device key of connected reader:
**324e-4142-003c0061000d513634353830**

## Connection of Another Reader

If you connect a card reader other than the one paired with the license, 2N PICard Commander will notify you of this upon the launch. You can upload a new license in the *Help* > *License* box.

# Project

Starting projects makes it possible to encrypt groups of access cards in variable modes. You can set every project for a specific card purpose. The project generates a set of encryption and reading keys. You can load the reading keys of just one project into a device or Access Commander.

## Starting New Project

Once the application is open, press **Start new project** to create a new project.

Alternative path: *File > New project*.

After the project setting wizard opens, follow the instructions mentioned in Project Settings [9].

## Opening Project

1. Click Open project in the application introductory interface and select a disk file to open the project.
   Alternative path: *File > Open project*

The last opened projects are shown in the bottom section of the application introductory interface.

## Project Settings

Set the required parameters while creating the project.

You can change the settings later in **Project configuration** in the application introductory interface (alternative path: *Project → Change configuration).*

### Basic Settings

- **Project name** – set the project name.
- **Project description** – add notes to the project.

### Main Encryption Key

Create a unique ans sufficiently secure main encryption key (MEK) for 2N PICard Commander to generate a set of card access data encryption keys. As the key set is based on the main encryption key, projects with the same main encryption keys generate the same sets of keys. If a project gets lost, a new project can be created with the same main encryption key for further card encryption. The reading keys of the lost project already uploaded into the 2N device will be valid for newly encrypted cards too.

⚠ **WARNING**
The main encryption key cannot be **displayed or changed** later.

**TIP**
It is important to keep both the project file and the main encryption key (MEK) to enhance security. The ideal solution is to store the main encryption key (MEK) in a safe offline space, e.g. a vault, safe box, etc.

## Card Mode

Select a card encryption mode:

- **Card may be used for other applications later on (best compatibility)** – the cards will be used primarily by the 2N systems. The card data will be encrypted, but the UIDs will be readable by third party applications. The cards can be reformatted to the original state.
- **Card will be used only for access control with 2N devices (best privacy)** – the cards will be used exclusively in the 2N systems. The card parameters will be reset permanently. The Random ID function is activated on the card upon encryption.
- **Card is already used for other applications (advanced settings)** – third party applications are loaded to the cards. In the next step, set the selected parameters of the MIFARE DESFire cards whose access data are to be encrypted by 2N PICard in the project.

  **NOTE**
  The selection of the **Card is already used for other applications** mode is irreversible.

  Now complete the following:

  - **Application ID (AID)** – 2N PICard code on the card. AID is preset to 53324E.
  - **PICC master key type** – PICC master key type for the cards to be encrypted by 2N Picard.
  - **PICC master key** – PICC master key value for the cards to be encrypted by 2N Picard.
  - **Enable randomization of readable card ID** – make sure that the card UID changes randomly upon every reading. Thus, an unauthorized person cannot misuse the card for user identification.
  - **Encrypt cards in factory default state (change default PICC master key)** – upload the set PIVCC master key on other empty cards while encryption in the project. If this option is unselected, 2N PICard Commander refuses to encrypt an empty card.

**WARNING**

- After the cards are encrypted under a new AID, export the encryption keys again. The earlier encrypted cards with an old AID become unreadable for the 2N devices.
- By changing the PICC master key in a project with earlier encrypted cards you will lose the possibility to edit and delete these cards later in the project. The change does not affect the validity of the authentication cards in the 2N devices.
- The selection of the Random ID function is irreversible. The original card UID remains unreadable even after the card is formatted.

## Disk Storage

The project file is saved onto a disk as *Projectname*.picprj.

Select **Protect project file with password** to set a protective password for project opening. Change the password later if necessary in Project > Change protection password.

**WARNING**
The forgotten password cannot be **displayed or restored** later.

# Card Encryption and Reading

Here is what you can find in this section:

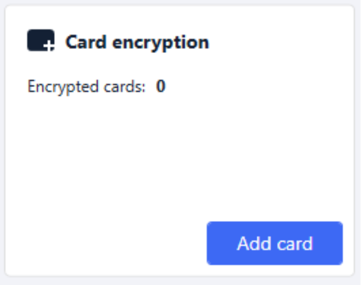
- Card Encryption [11]
- Reading Key Export [12]
- Card Information Reading [13]
- Card Data Deletion [14]

## Card Encryption

The card encryption process in 2N PICard Commander assigns a unique 128-bit identifier to every card, which is subsequently encrypted using the project encryption keys. It is possible to read a card to find its identifier or additional information and learn whether it is possible to encrypt the card in the project.

### Encryption Process

1. Click **Add card** in **Card encryption** in the application introductory interface.
   Alternative path:*Project > Encrypt New Card*

   **Credential ID for new card** – new card identifier.
2. Tap the card on the card reader. Press **Encrypt** to assign encrypted access data to the card.

> **TIP**
> Select the box to the right to start automatic encryption of other tapped cards without repressing **Encrypt**.

The application informs you of a successful card encryption.

If the encryption failed, the application provides the causes:

- **Card cannot be encrypted** – PICard Commander has no access to the card PICC master key. To encrypt a card with a preset PICC master key, select the appropriate card mode in Subs. Project Settings [9].
- **Not enough free space on card** – here is not enough space on the card for the 2N PICard upload. The required minimum memory is 512 B.
- **Unsupported card** – the application does not support this card type. The 2N PICard technology is designed for the encryption of the MIFARE DESFire EV2 and EV3 cards.
- **Only MIFARE DESFire EV2 or EV3 are supported** – the application does not support this card type. The used card is MIFARE DESFire EV1.
- **Communication failure with card** – the reader failed to read the card. Tap the card on the reader and do not remove it before the encryption process is completed.

**TIP**

There is a pop-up list of encrypted card IDs in the box bottom section. Copy the list before closing the box to be able to keep it. By closing the box you will delete the list. You will be able to display the ID of each card only later.

## Reading Key Export

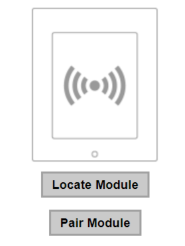
To access the data on encrypted cards, the 2N devices need to know the reading keys of the selected project. It is possible to export the reading keys from **PICard Commander** to a 2N device or **Access Commander** for distribution to all of the connected 2N devices. Once the reading keys are uploaded, the devices will also be able to read the cards that are encrypted in the selected project after the reading key export.

1. Click **Export** in **Reader keys export** in the application introductory interface.
2. There two project reading key exporting options:

- Export keys to file [12]
- Upload keys to Access Commander [13]

**CAUTION**

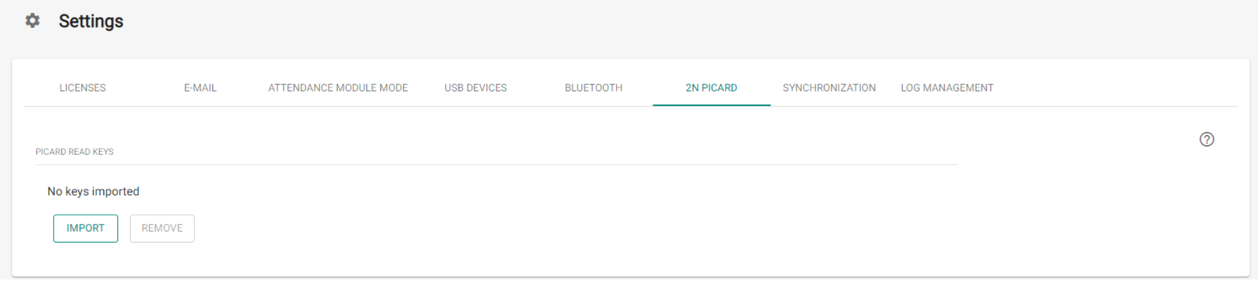
If you use connect an extending RFID card reader module via the VBUS cable to the 2N device where the reading keys have been uploaded, remember to pair this module with the device. Pair the extending reader module using Hardware - Extending modules via the web interface.



## Export keys to file

The application generates a key file and saves in onto the disk. Import the file into the 2N device settings or Access Commanderu via the respective web interfaces. Now you can set the file protecting password.

- **Import to Access Commanderu (version 3.00 and higher)** via web interface: Settings > PICard key > Import
- **Import to 2N Access Commander** via web interface: *System settings* > *2N PICARD* > **IMPORT**



- **Import to 2N device** via web interface: Services > Access control > PICard > ⬆

## Upload keys to Access Commander

2N PICard Commander uploads the reading keys directly into Access Commander for subsequent distribution to the connected 2N devices. In the next step, enter the administrator login data to the Access Commander license.

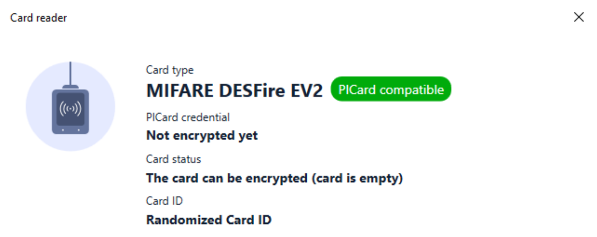
**Address** – HTTP address of the Access Commander web interface.

**Login name** – login name of the administrator account in Access Commander.

**Password** – login password to the account in Access Commander.

# Card Information Reading

Display the assigned card ID and other info and encryption options in *Project > Read card.* Tap the card on the reader to read the information.



Card reader ×

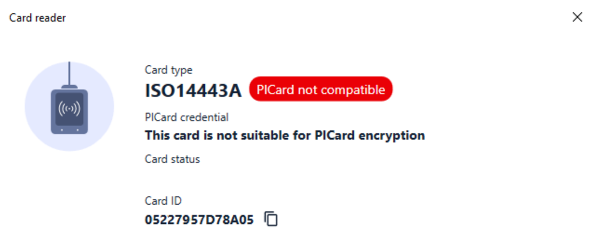
Card type
MIFARE DESFire EV2 PICard compatible

PICard credential
Not encrypted yet

Card status
The card can be encrypted (card is empty)

Card ID
Randomized Card ID

This card can be encrypted in the application.



Card reader ×

Card type
ISO14443A PICard not compatible

PICard credential
This card is not suitable for PICard encryption

Card status

Card ID
05227957D78A05

This card cannot be encrypted in the application.

**PICard credential** reads the card identifier assigned during encryption. If the card has no ID, the following options are displayed:

- **Not encryptable** – the card type is compatible with the 2N PICard technology, but the project has no access to its PICC master key.
- **This card is not suitable for PICard encryption** – the application does not support this card type. The 2N PICard technology is designed for the encryption of the MIFARE DESFire EV2 and EV3 cards.
- **Not encrypted yet** – the card can be encrypted.
- **Unknown** – the card is encrypted in another project under a different main encryption key. The card may be also be corrupted.

**Card Status** displays the card state or encryption options.

- **Valid PICard credential** – the card is encrypted in this project.
- **The card can be encrypted (card is empty)** – the card is not encrypted. The card has factory default settings.
- **The card can be encrypted** – the card is not encrypted. A project compatible PICC master key is set on the card.
- **Different PICC Master Key detected. Card's current PICC Master Key required for encryption** – the card cannot be encrypted in this project. The set PICC master key is different.
- **PICard application created in a different project, so cannot be read in this project**
- **Only Mifare DESFire EV2 or EV3 are supported** – the card cannot be encrypted. The application does not support this card type. The used card is MIFARE DESFire EV1.
- **INVALID CREDENTIAL (there's a problem with the digital signature)** – the encrypted access data cannot be displayed. The authenticity confirmation has failed. The digital signature is invalid.

**Card ID** displays the card UUID and informs that the Random ID function is enabled.

# Card Data Deletion

The 2N PICard Commander application helps you format cards or delete their access data. The cards can only be deleted and formatted in the project in which they were encrypted.

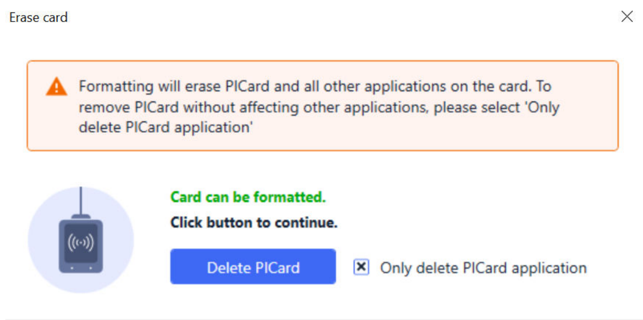
## Card Formatting

⚠ **WARNING**
By formatting a card you delete all the card data including the third party data.

1. Open *Project* > *Format card.* Tap the card on the reader. Press **Format card** to format the card.

**NOTE**
If Random ID is enabled on the card, card formatting will not restore the readability of the original UID.

## Access Data Deletion



Erase card

⚠ Formatting will erase PICard and all other applications on the card. To remove PICard without affecting other applications, please select 'Only delete PICard application'

Card can be formatted.

Click button to continue.

1. Open *Project* → *Format card.* Select **Only delete PICard application**. Tap the card on the reader. Press **Delete PICard** to delete the encrypted card access data.
2. Select **Only delete PICard application**.
3. Tap the card on the reader.
4. Press Delete PICard to delete the encrypted card access data.

# Third party license

Refer to *Help* > *About* for a long list of the third party library licenses used.

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