



# **NCoder**

## **Desktop Reader Manual**

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Distribution: SALTO Customers



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## Document revisions

Version	Date	Description
01.00	2020/06/01	First version

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### 1. Object of this document

This document is the User Manual of the NCoder device to configure it as Desktop Reader. It covers the functions of the versions:

- SPACE 6.1
- Mifare Series, ECB04B0: FwN0164 v01.03 & FwN0172 v01.03
- iClass Series, ECJ04B0: FwN0164 v01.03 & FwN0173 v01.00

It is intended to help the PMS and T&A developers to connect their systems to the SALTO access control system.

### 2. Desktop Reader

The purpose of the Desktop Reader functionality is to read some data from the cards and give them in a simple manner to an external device, usually a Point Of Sale (POS) terminal.

The Desktop Reader functionality is achieved using the NCoder device. It is equipped with an USB interface that can be connected to the POS terminal. NCoder device has an USB 2.0 type-B female connector and it is provided by a cable to be connected to the POS USB type-A female terminal.

The POS operating system must support USB-HID keyboards due to NCoder is enumerated as USB-HID Keyboard.

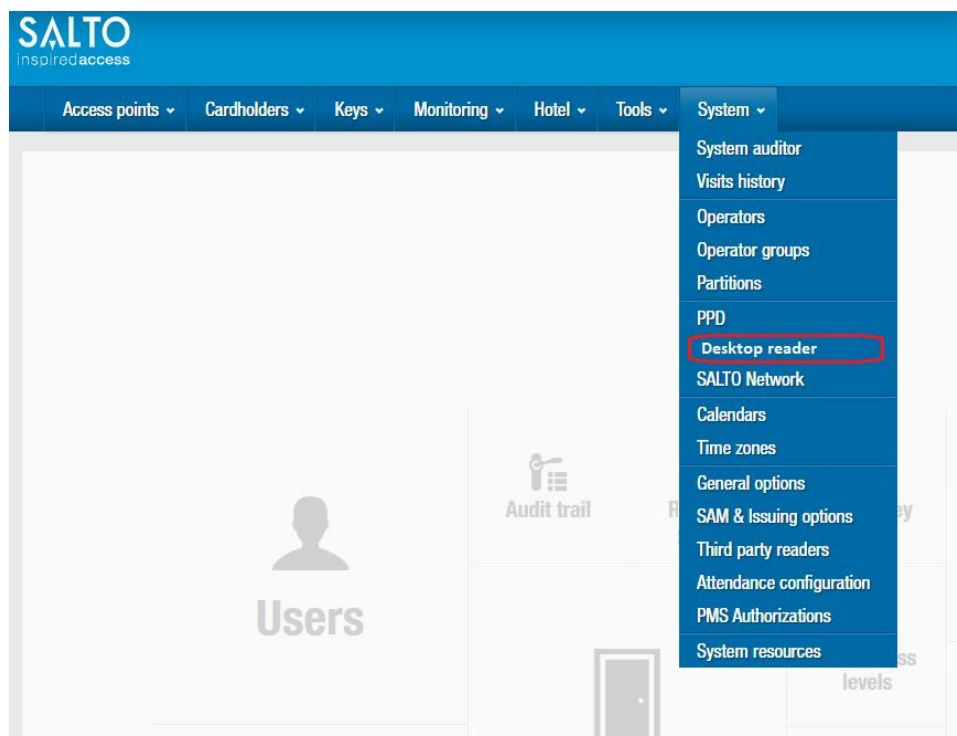
There are many NCoders with Desktop Reader functionality as technologies (Mifare and iClass) with references **ECB04B0** and **ECJ04B0**.

## 2.1 Desktop Reader Setup

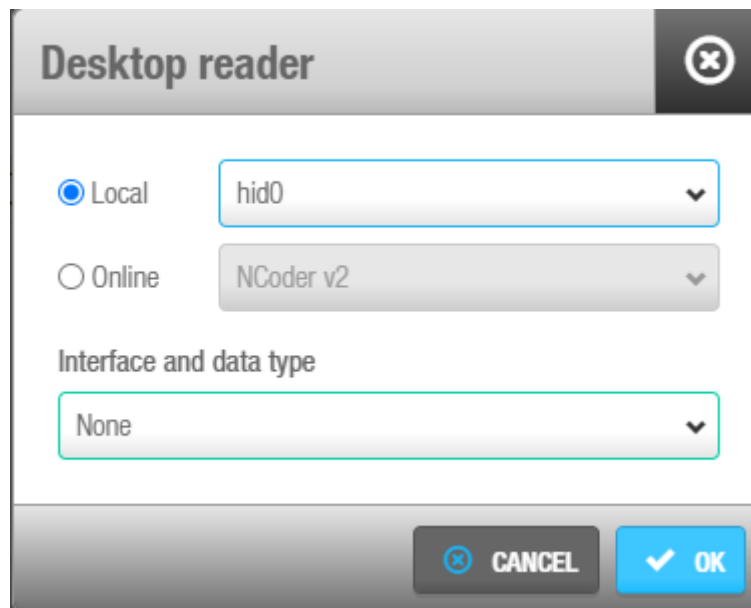
The Desktop Reader functionality in an NCoder must be configured through SPACE. First, the NCoder must be initialized in a SPACE SW. And after that, we can activate and choose the Desktop Reader configuration.

### 2.1.1 Set NCoder as Destop Reader

Select System> Desktop Reader option:



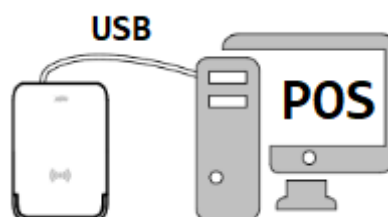
In the new screen (Desktop reader configuration), select the NCoder to be configured as Desktop Reader (Local - USB, or Online). Select the Interface and data type (Destop Reader Mode) or None for remove the Desktop Reader functionality, and press OK.



NCoder will signalize, yellow and green with a beep. It means Desktop Reader is active. From this point NCoder is keeping the Desktop Reader configuration, and it can be unplugged from SPACE reachable machine to plug to the POS. Anytime we decide, we can go back, connecting Desktop Reader to SPACE again and deactivate de Desktop Reader configuration or set a new one.

## 2.2 Desktop Reader Connector

It is equipped with an USB 2.0 Type-B Female. NCoder is provided with a Type-A Male end cable and must be connected directly to the POS. It is powered by the USB (5V, 500mA max).



The Desktop Reader is continuously looking for a card and when one is presented it sends the data to the external device giving simultaneously a valid signal (green led and beep).

## 3. CLR Button

The CLR Button is used for NCoder purposes:

- Push while the power cycle: erase all previous configuration and restores to factory.
- 5 second pulse for ethernet adressing mode (for SPACE connecting purpose).

## 4. SAM programming process

SAM programming is done automatically through SPACE, when Desktop Reader mode is selected.

## 5. Desktop Reader MODES

Next table shows the provided modes:

Desktop Reader Mode	Sent data
Modes 1, 5, 9	Track 1
Modes 2, 6, 10	Track 2
Modes 3, 7, 11	Track 3
Modes 4, 8	% + ROM14 + ?
Mode 12	ROM14

## 6. Data

There are two types of data to be read by the Desktop Reader:

ROM code or Serial Number	This is a factory programmed code particular for each card
TRACKS	Emulates the Tracks 1, 2 and 3 of the magnetic stripe cards.

### 6.1 ROM code

The Salto ROM code is a 7 byte code different for each card. Normally each byte is expressed as a double hexadecimal character so the total ROM code will be 14 ASCII characters (called ROM14).

**Example:**

Format	ROM6	ROM5	ROM4	ROM3	ROM2	ROM1	ROM0
Bytes	0x11	0x22	0x33	0x44	0x55	0x66	0x77
ROM14	"11223344556677"						

#### 6.1.1 ROM code and Serial Number

The relation between the ROM code and the card Serial Number depends on the technology of the card. This table shows the

Card Technology	ROM6	ROM5	ROM4	ROM3	ROM2	ROM1	ROM0
Mifare	UID0	UID1	UID2	UID3	0x00	0x00	0x00
Desfire Vicinity	UID0	UID1	UID2	UID3	UID4	UID5	UID6
JustinMobile HCE & BLE	0	0	0	0	0	0	0

**Mifare:** The first four bytes are the Unique Identifier (UID) also called Serial Number (SN) of the Mifare card starting by the LSB. Followed by three null bytes (0x00).

**Desfire:** The seven bytes of the card UID (or Serial Number SN) starting by the LSB.

**ISO15693 Vicinity Cards:** The seven lower bytes of the UID (or Serial Number SN) starting by the LSB and removing the UID7 that is always 0xE0 in ISO15693 cards. PicoPass cards are included in this type.

**JustinMobile:** JustinMobile keys, HCE and BLE, doesn't define any kind of UID or SN. Then, if ROM code is required, the key responses all '0'-s ROM code. If this kind of keys are used, Tracks must be used.

## 6.2 Tracks

They emulate the tracks of the magnetic stripe cards. There are three Tracks available, TRACK1, TRACK2 and TRACK3. The information in the emulated tracks are ASCII characters. However, in the magnetic stripe cards, TRACK1 carries alphanumeric data and TRACK2 and TRACK3 only carry numeric data.

## 7. Format

The Desktop Reader is identified as a Keyboard by the POS operating system. The Desktop Reader converts the Track and ROM bytes in Unicode and send through the USB-HID interface.

Supported Unicode characters from U+0020 (Space) to U+00FF (ÿ).

Non-printable ASCII characters are filtered, except of the special characters of the next table. In that cases, that characters are mapped to common keyboard key strokes:

ASCII			Keyboard
Dec	Hex	Char	
8	0x08	BS	Back Space
9	0x09	TAB	Tab key
13	0x0D	CR	Keyboard Return (Enter)
27	0x1B	ESC	Keyboard ESCAPE

**Example**

If the Track is defined as '0aA\$ASC(13)'.



In the card next bytes are written: 0x30 0x61 0x48 0x13.

The Desktop Reader will throw the proper Unicode characters for the printable ASCII characters, U+0030, U+0061, U+0048 and the ENTER for the non-printable 'Carriage Return' (\$ASC(13)) character.

It is the same effect if you push ALT plus the decimal values of each character in your keyboard: ALT + 48, ALT + 65, ALT + 97; and finally ENTER key.

## 8. Card Technologies

The Desktop Reader is available for next RW technologies:

- **ECB04B0:** Mifare series: Mifare, Mifare Plus, Desfire, Ultralight C, ICODECS20, VTI256, SKIDATA FlexSpace and JustinMobile (HCE and BLE).
- **ECJ04B0:** iClass series: HID iClass, iClass SEOS and JustinMobile (HCE and BLE).