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1.0. Introduction

ACR1281U-C2 is a contactless card UID (Unique Identification Number) reader especially designed to get the UID of any ISO 14443 Parts 1-4 Type A and B–compliant contactless card in an efficient way. Its sole focus is to retrieve the card’s UID and display it directly in any text editor such as Notepad, Microsoft® Excel and Microsoft® Word.

When a contactless card (e.g., MIFARE® DESFire® card) is tapped onto the ACR1281U-C2, the reader retrieves the UID and automatically returns the UID to the computer. Since it is HID (Human Interface Device)–compliant, this device does not require any additional driver to be installed in the computer. The ACR1281U-C2 also has an anti-collision feature that ensures only one card is accessed when multiple cards are presented at the same time.

ACR1281U-C2 Card UID Reader can support Windows®, Linux®, Mac OS®, and other embedded systems.

This document will discuss the commands and instructions on how the ACR1281U-C2 Reader Card UID output can be configured using escape commands.

![Figure 1: ACR1281U-C2 Sample Application](image)
2.0. Features

- USB 2.0 Full Speed Interface
- USB HID Keyboard Class Emulation
- Smart Card Reader:
  - Contactless Interface:
    - Read/Write speed of up to 848 Kbps
    - Built-in antenna for contactless tag access, with card reading distance of up to 50 mm (depending on tag type)
    - Supports ISO 14443 Part 4 Type A and B cards, and MIFARE® cards
    - Built-in anti-collision feature (only one tag is accessed at any time)
- USB Firmware Upgradability
- Compliant with the following standards:
  - ISO 14443
  - USB HID
  - CE
  - FCC
  - RoHS 2
3.0. Typical Applications

- e-Government
- e-Banking and e-Payment
- e-Healthcare
- Transportation
- Network Security
- Access Control
- Loyalty Program
4.0. Reference Documents
The following documents may provide assistance in configuring the UID.

4.1. HID Related Specifications
The HID Related Specifications page contains links to various HID documents, including the HID Usage Tables.

The HID Related Specifications may be accessed here.

4.2. HID Usage Tables
The Universal Serial Bus (USB) HID Usage Tables v1.12 defines constants that can be interpreted by an application to identify the purpose and meaning of a data filed in the HID report.

The HID Usage Tables may be accessed here.

Note: For keyboards, look at the usage table sections in both the HID Specifications and Usage Table document.

<table>
<thead>
<tr>
<th>Usage ID (Dec)</th>
<th>Usage ID (Hex)</th>
<th>Usage Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
<td>28</td>
<td>Keyboard Return (Enter)</td>
</tr>
<tr>
<td>41</td>
<td>29</td>
<td>Keyboard Escape</td>
</tr>
<tr>
<td>43</td>
<td>2B</td>
<td>Keyboard Tab</td>
</tr>
<tr>
<td>44</td>
<td>2C</td>
<td>Keyboard Spacebar</td>
</tr>
</tbody>
</table>

Figure 2: Sample HID Usage Table
5.0. UID Output Settings

5.1. Output Format

Command to configure: E0 00 00 40 02 AB XX

Parameter Detail:

A – Read Mode Configure

- Letter Case
  - = 1xxxb -> Reserved
  - = 00x0b -> Lowercase
  - = 00x1b -> Uppercase

- Length of UID
  - = 000xb -> Only Support 4 bytes UID
  - = 001xb -> Support 4, 7, 10 bytes UID

B – Output Format/Display Mode

- = 0000b = 0h-> Hex
- = 0001b = 1h-> Dec (byte by byte)
- = 0010b = 2h-> Dec

XX – Output Order

- = 00h -> Default order (UID Byte 0, UID Byte 1 … UID Byte N)
  Example: aa cc bb dd (original /actual UID order)
- = 01h -> Reverse order (UID Byte N, UID Byte N-1 … UID Byte 0)
  Example: dd bb cc aa (reverse the UID order)
5.2. Character between each UID bytes

Command to configure: E0 00 00 41 02 YY ZZ

Parameter Detail:

YY - the character between each UID
  = FFh means no character in between
  = For other character tables, refer [here](#) (p53 - p59).

**Note:** On the ACR1281U-C2 Configuration Tool setting, only the characters “; “ ; “ “ ; “ “ ; “ “ are supported in the AZERTY keyboard layout for the characters in between. Zero (0) and Backspace are NOT supported.

5.3. Character at the end of UID bytes

Command to configure: E0 00 00 41 02 YY ZZ

Parameter Detail:

ZZ - the character end of output
  = FFh means no character follows
  = For other character tables, refer [here](#) (p53 - p59).

**Note:** On the ACR1281U-C2 Configuration Tool setting, only the characters “; “ ; “ “ ; “ “ ; “ “ are supported in the AZERTY keyboard layout for the characters at the end. Zero (0) and Backspace are NOT supported.

Current Output Settings:

Below are the commands used in order to check the current UID output settings saved in the EEPROM of ACR1281U-C2 UID Reader:

E0 00 00 40 00
E0 00 00 41 00
6.0. Configure the UID Using the Escape Command

To configure the UID using the escape command:

1. Connect the ACR1281U-C2 smart card reader to your computer.
2. Run the PCSC Direct Command Application.
3. Under Connection – Share Mode, select Direct and then click Connect.
4. In the Data field, enter the Commands to configure and click Send.
6.1. Example 1

Here’s the example of the output data given the following settings:

- Display Mode: Hex Bytes
- Length of UID: Supports 4, 7, 10 bytes UID
- Letter Case: Lowercase
- Order: Default order
- Character: Space character between UID, "Enter" later all the UID

1. **Command to configure:** E0 00 00 40 02 AB XX
   
   A = 0010b = 2h  \( B = 0000b = 0h \)  \( XX = 00h \)

2. **Command to configure:** E0 00 00 41 02 YY ZZ
   
   From "HID Usage Table," p53 - p59
   
   YY = “Spacing” = Keyboard Spacebar = 2Ch
   ZZ = “Enter” = Keyboard Return = 28h

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
<td>28</td>
<td>Keyboard Return (ENTER)$^5$</td>
<td>43</td>
<td>✓ ✓ ✓ ✓ 1/101/104</td>
</tr>
<tr>
<td>41</td>
<td>29</td>
<td>Keyboard ESCAPE</td>
<td>110</td>
<td>✓ ✓ ✓ ✓ 1/101/104</td>
</tr>
<tr>
<td>42</td>
<td>2A</td>
<td>Keyboard DELETE (Backspace)$^13$</td>
<td>15</td>
<td>✓ ✓ ✓ ✓ 1/101/104</td>
</tr>
<tr>
<td>43</td>
<td>2B</td>
<td>Keyboard Tab</td>
<td>16</td>
<td>✓ ✓ ✓ ✓ 1/101/104</td>
</tr>
<tr>
<td>44</td>
<td>2C</td>
<td>Keyboard Spacebar</td>
<td>61</td>
<td>✓ ✓ ✓ ✓ 1/101/104</td>
</tr>
</tbody>
</table>

Commands to configure:

- E0 00 00 40 02 20 00
- E0 00 00 40 02 20 01
- E0 00 00 41 02 2C 28
- Display Result (UID = 34 CC F9 A6)
6.2. Example 2

Display Mode: Hex Bytes
Length of UID: Supports 4, 7, 10 bytes UID
Letter Case: Uppercase
Order: Reverse order
Character: No character between UID, "Enter" later all the UID

1. **Command to configure**: E0 00 00 40 02 ABXX  
   A = 0010b = 2h  B = 0000b = 0h  XX = 01h

2. **Command to configure**: E0 00 00 41 02 YYZZ
   From "HID Usage Table," p53 - p59
   YY = “No character between UID” = FFh
   ZZ = “Enter” = Keyboard Return = 28h

Commands to configure:
- E0 00 00 40 02 20 01
- E0 00 00 41 02 FF 28

- Display Result (UID = 34 CC F9 A6)
6.3. Example 3

Display Mode: Dec Bytes
Length of UID: Supports 4, 7, 10 bytes UID
Letter Case: Lowercase
Order: Default
Character: Space character between UID, "Enter" later all the UID

1. **Command to configure**: E0 00 00 40 02 AB XX
   \[ A = 0010b = 2h \quad B = 0001b = 1h \quad XX = 00h \]

2. **Command to configure**: E0 00 00 41 02 YY ZZ
   From "HID Usage Table," p53 - p59
   \[ YY = \text{"Spacing"} = \text{Keyboard Spacebar} = 2Ch \]
   \[ ZZ = \text{"Enter"} = \text{Keyboard Return} = 28h \]

<table>
<thead>
<tr>
<th>Decimal</th>
<th>Hex</th>
<th>Description</th>
<th>Code1</th>
<th>Code2</th>
<th>Code3</th>
</tr>
</thead>
<tbody>
<tr>
<td>28</td>
<td>40</td>
<td>Keyboard Return (ENTER)</td>
<td>43</td>
<td>❌</td>
<td>❌</td>
</tr>
<tr>
<td>29</td>
<td>41</td>
<td>Keyboard ESCAPE</td>
<td>110</td>
<td>❌</td>
<td>❌</td>
</tr>
<tr>
<td>2A</td>
<td>42</td>
<td>Keyboard DELETE (Backspace)</td>
<td>15</td>
<td>❌</td>
<td>❌</td>
</tr>
<tr>
<td>2B</td>
<td>43</td>
<td>Keyboard Tab</td>
<td>16</td>
<td>❌</td>
<td>❌</td>
</tr>
<tr>
<td>2C</td>
<td>44</td>
<td>Keyboard Spacebar</td>
<td>61</td>
<td>❌</td>
<td>❌</td>
</tr>
</tbody>
</table>

Commands to configure:
- E0 00 00 40 02 21 00
- E0 00 00 41 02 2C 28

- Display Result (UID = 34 CC F9 A6)
7.0. Changing the Keyboard Layout Support

The following keyboard layouts are supported:

1. QWERTY (English Language) – Default
2. AZERTY (French Language)

*Note:* To change keyboard layout support, the UID needs to be configured first. For instructions, see [Configure the UID Using the Escape Command](#).

7.1. AZERTY Keyboard Layout

Command to configure: E0 00 00 42 01 01
Response: E0 00 00 00 01 01

**Notes:**

1. Zero and Backspace (characters in between) settings on the ACR1281U-C2 Configuration Tool are not supported in this keyboard layout.
2. To change keyboard layout support, the ACR1281U-C2 needs to be configured first. For instructions, see [Configure the UID Using the Escape Command](#).

7.2. QWERTY Keyboard Layout

Command to configure: E0 00 00 42 01 00
Response: E0 00 00 00 01 00

*Note:* To change keyboard layout support, the ACR1281U-C2 needs to be configured first. For instructions, see [Configure the UID Using the Escape Command](#).
### Appendix A. Example of Output Data Table

Below is an example of output data based on the settings configuration.

<table>
<thead>
<tr>
<th>Output Settings</th>
<th>Output Data</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Letter Case</strong></td>
<td><strong>Order</strong></td>
</tr>
</tbody>
</table>
| Lower Case      | Actual | Hex (Default) | 4, 7, 10 (Default) | Space (Default) | Enter (Default) | ba 89 8a a2  
|                 |         |              |            |                |               | ba 89 8a a2  
|                 |         |              |            |                |               | ba 89 8a a2  
| Upper Case      | Actual | Hex (Default) | 4, 7, 10 (Default) | Space (Default) | Enter (Default) | BA 89 8A A2  
|                 |         |              |            |                |               | BA 89 8A A2  
|                 |         |              |            |                |               | BA 89 8A A2  
| Upper Case      | Reverse | Hex (Default) | 4, 7, 10 (Default) | No Spacing | Enter (Default) | A28A89BA  
|                 |         |              |            |                |               | A28A89BA  
|                 |         |              |            |                |               | A28A89BA  
| Lower Case      | Actual | DEC in Byte  | 4, 7, 10 (Default) | Space (Default) | Enter (Default) | 186 137 138 162  
|                 |         |              |            |                |               | 186 137 138 162  
|                 |         |              |            |                |               | 186 137 138 162  
| Upper Case      | Reverse | Hex (Default) | 4, 7, 10 (Default) | TAB      | Enter          | A2 8A 89 BA  
|                 |         |              |            |               |               | A2 8A 89 BA  
|                 |         |              |            |               |               | A2 8A 89 BA  
| Upper Case      | Reverse | Hex (Default) | 4, 7, 10 (Default) | TAB      | TAB            | A2 8A 89 BA  
|                 |         |              |            |               |               | A2 8A 89 BA  
|                 |         |              |            |               |               | A2 8A 89 BA  

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