ACR122U
USB NFC Reader

Software Development Kit User Manual V2.00

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1.0. Introduction

The ACR122U USB NFC Reader is a PC-linked contactless smart card reader/writer developed on the 13.56 MHz contactless technology. It is the world's first CCID-compliant contactless card reader/writer that follows both ISO 14443 and ISO 18092. ACR122U is also PC/SC-compliant which allows interoperability across different applications and platforms.

This user manual serves as a guide about the components and functions of the ACR122U Software Development Kit. Sample codes and utility programs included in the kit are listed and described to guide developers in building NFC-enabled and contactless smart card applications using the ACR122U USB NFC Reader.

2.0. Software Development Kit Specifications

To ensure optimal use of this Software Development Kit, make sure your system is running with the following supported specifications:

2.1. System Requirements

- Minimum of 1 GHz Pentium Processor or higher
- Minimum of 500 MB RAM
- Minimum of 600 MB Free Hard Disk Space
- CD-ROM Drive
- USB Port

2.2. Supported Smart Cards

- MIFARE Classic® 1K Cards
- ACOS3 Contactless Cards

2.3. Supported Smart Card Reader

- ACR122U-A9 USB NFC Reader

2.4. Supported Operating Systems

- Windows® 7 (x86 and x64)
- Windows® 8.1 (x86 and x64)
- Windows® 10 (x86 and x64)

3.0. Software Development Kit Components

3.1. Driver Installer

The ACS Unified PC/SC Driver is a single driver installer that enables all generic ACS Smart Card Readers to run with various Windows® operating systems. It is certified by Microsoft® WHQL and allows automatic download updates when you are connected to the internet.

3.2. Sample Codes

The ACR122U sample codes are executable files that feature the coding functionalities of ACR122U USB NFC Reader. They serve as a guide when building your own projects using the ACR122U. These sample codes are provided to show the following card and device programming:

- ACOS3 Contactless – creates mutual authentication and ensures secure messaging.
- MIFARE – changes key and programming for MIFARE Classic 1K cards.
- Other PICC – enables programming functions for other contactless (PICC) cards.
- Device Programming – tests the peripherals of ACR122U USB NFC Reader.
- NFC Data Exchange Format (NDEF) – provides data communication between NFC-enabled devices.
- PC/SC Card Polling – displays card type, card status, and Answer-To-Reset output.
- Simple PC/SC – performs different PC/SC commands.

The sample codes are written in the following programming languages:

- Java (x86 and x64)
- Microsoft Visual Basic .NET 2008 (x86 and x64)
- Microsoft Visual C# .NET 2008 (x86 and x64)
- Microsoft Visual C++ .NET 2008 (x64)
- Microsoft Visual C++ 6.0 (x86)

Note: *Using Microsoft Visual C++ 6.0 may require you to download the following dll files from the Internet:*

- *MFC42D.dll*
- *MFCO42D.dll*
- *MSVCP60D.dll*
- *MSVCRTD.dll*

To locate the sample codes:

From the **ACR122U SDK v2.00** folder, go to **Sample Codes** and select the intended programming language. From there, you will find the sample codes from the following folders:

- **Device Programming** folder – contains Basic Device Programming and Device Polling Configuration sample codes for each programming language.
- **Card Programming** folder – contains ACOS3 Contactless, MIFARE, and Other PICC Cards sample codes for each programming language.
- **Others** folder – contains NDEF, PCSC Card Polling, and Simple PCSC sample codes for each programming language.

3.3. ACS Smart Card and Reader Tool

The ACS Smart Card and Reader Tool is the integration of ACR122U-A9 Reader Tool and card tools as one utility program which enables you to perform smart card reader and card-related commands.

Note: In order for this tool to operate, it requires having at least Microsoft .NET Framework 3.5 Service Pack 1 installed in your computer. You may download the framework from this link:

http://www.microsoft.com/downloads/en/details.aspx?FamilyID=ab99342f-5d1a-413d-8319-81da479ab0d7&displaylang=en

3.3.1. ACR122U-A9 Reader Tool

The ACR122U Reader Tool is a utility widget that lets you access, control, and execute most of the commands available in the ACR122U USB NFC Reader. Check the **Help** menu to know more on how to use this tool.
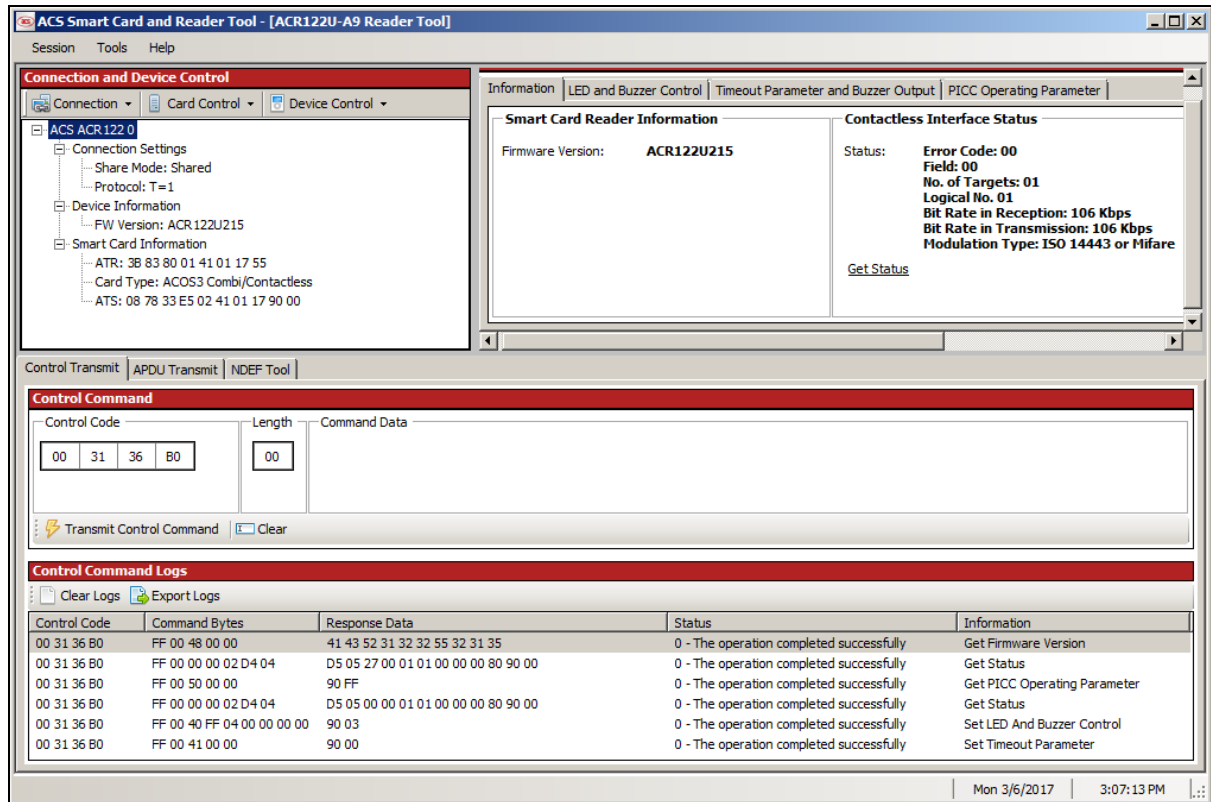

Figure 1: ACR122U-A9 Reader Tool

3.3.2. ACOS3 Contactless Card Tool

The ACOS3 Contactless Card Tool is a widget plug-in file that gives you access to most of the ACOS3 Contactless Card commands. It can handle multiple connections to different smart card readers and supports PC/SC-compliant smart card readers only. Check the **Help** menu to know more on how to use this tool.
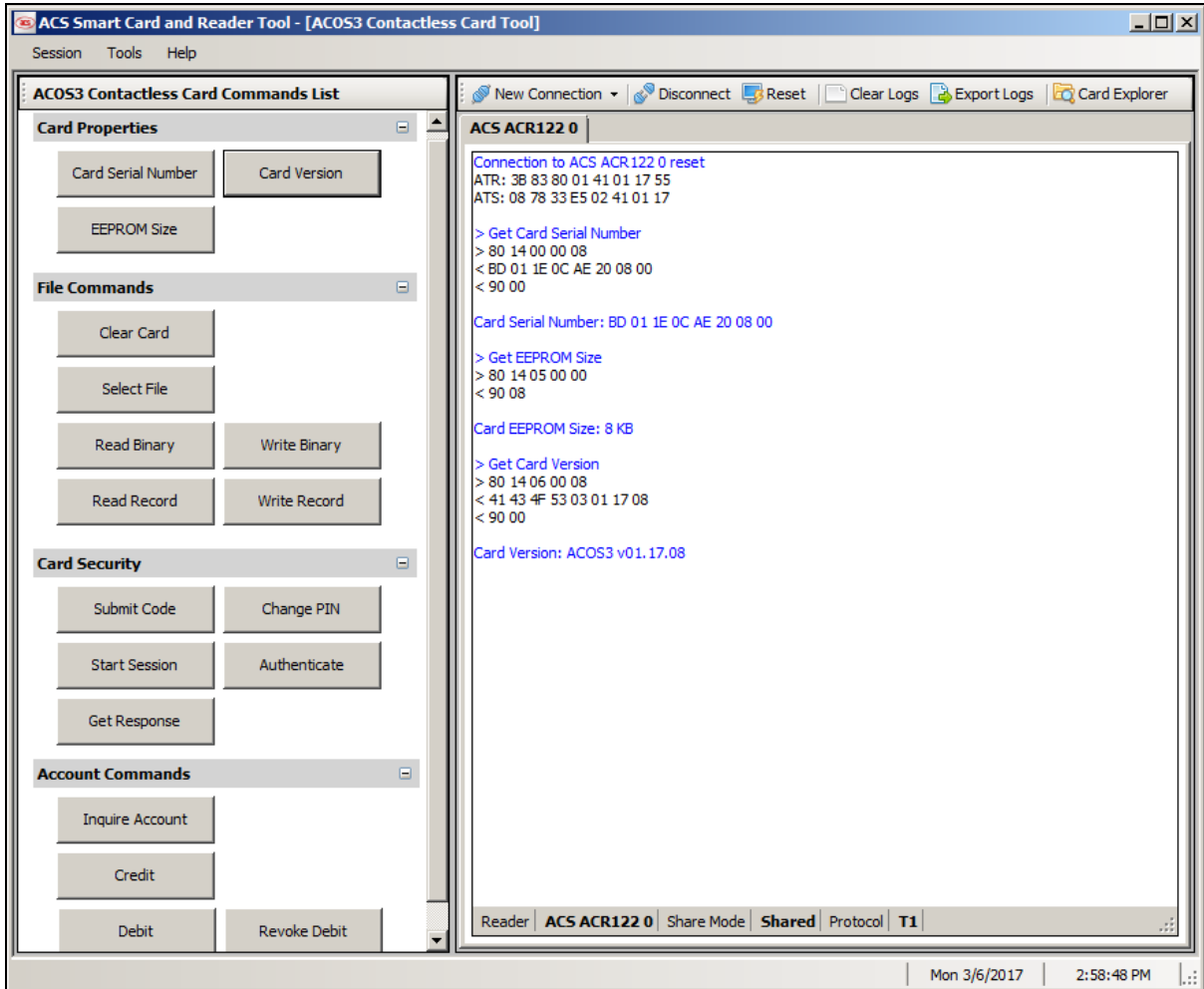

Figure 2: ACOS3 Contactless Card Tool

3.3.3. MIFARE Classic Card Tool

The MIFARE Classic Card Tool is a utility widget that lets you access all MIFARE Classic Card commands. It can handle multiple connections to different smart card readers and supports PC/SC-compliant smart card readers only. Check the **Help** menu to know more on how to use this tool.
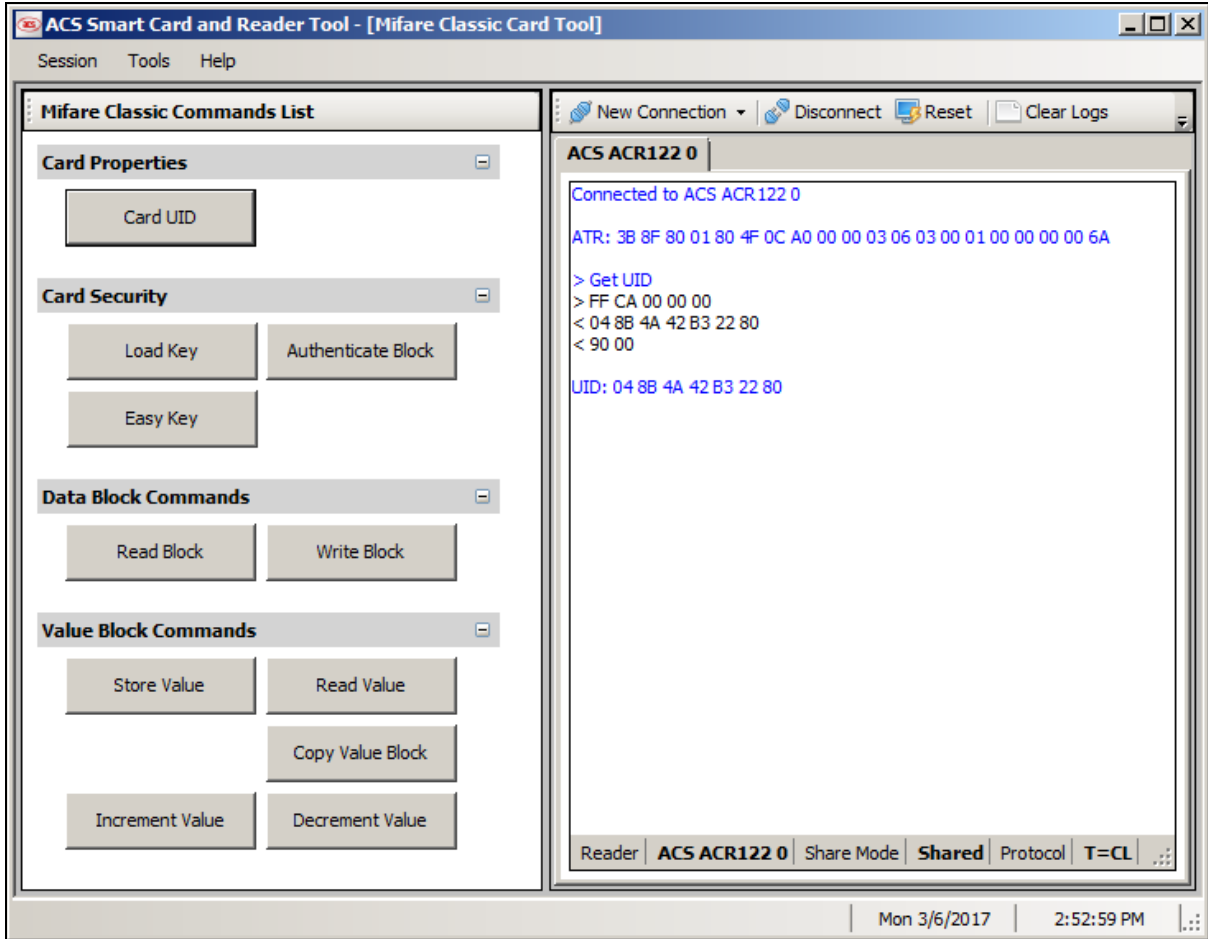

Figure 3: MIFARE Classic Card Tool

3.4. Tools and Utilities

Below are the utility programs included in this kit:

3.4.1. PC/SC Learning Tool

This tool lets you execute different PC/SC-compliant Windows Application Programming Interface (API) smart card functions. Check the **Help** menu to know more on how to use this tool.
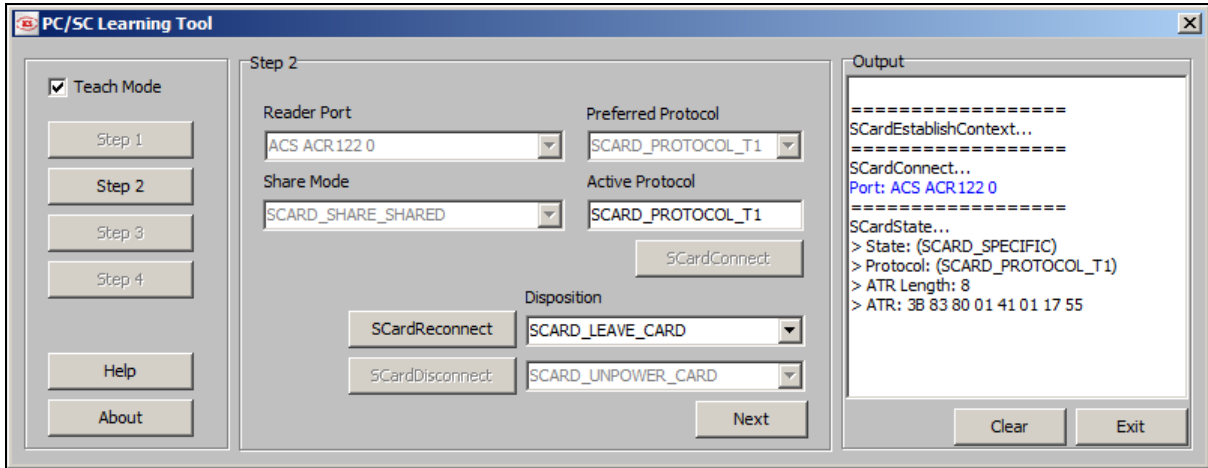

Figure 4: PC/SC Learning Tool

3.4.2. QuickView

This tool lets you check if the ACR122U USB NFC Reader is properly installed in your system. Check the **Help** menu to know more on how to use this tool.
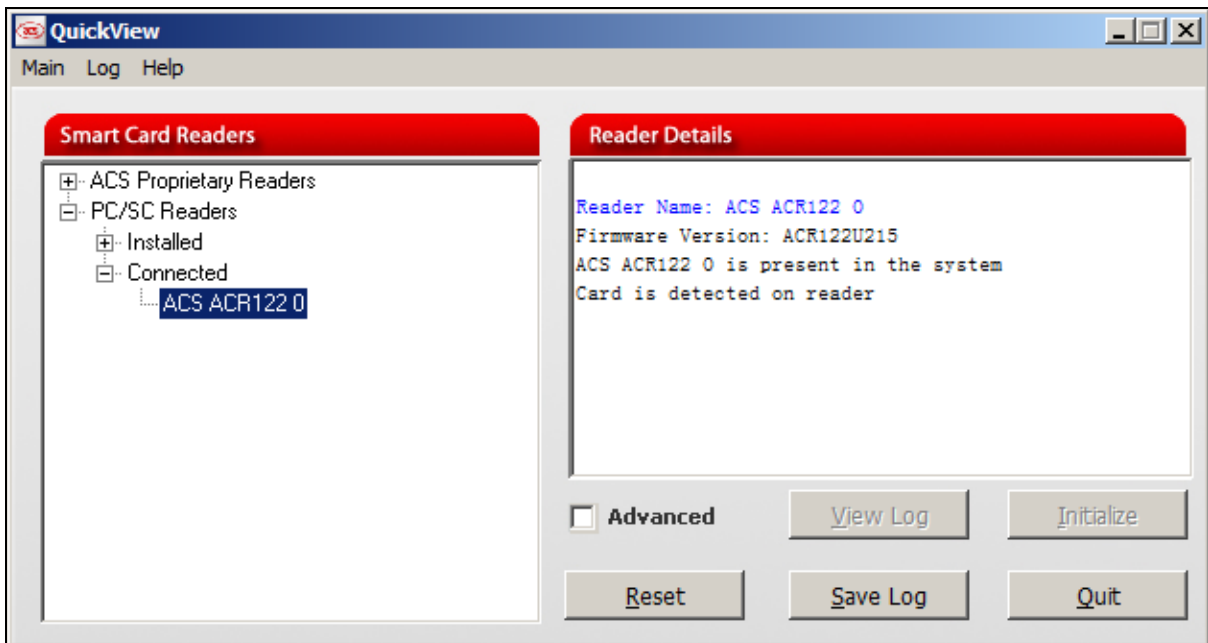

Figure 5: QuickView

3.4.3. Script Tool 4

This tool lets you execute various commands and communicate with a smart card with the help of script command files. Check the **Help** menu to know more on how to use this tool.
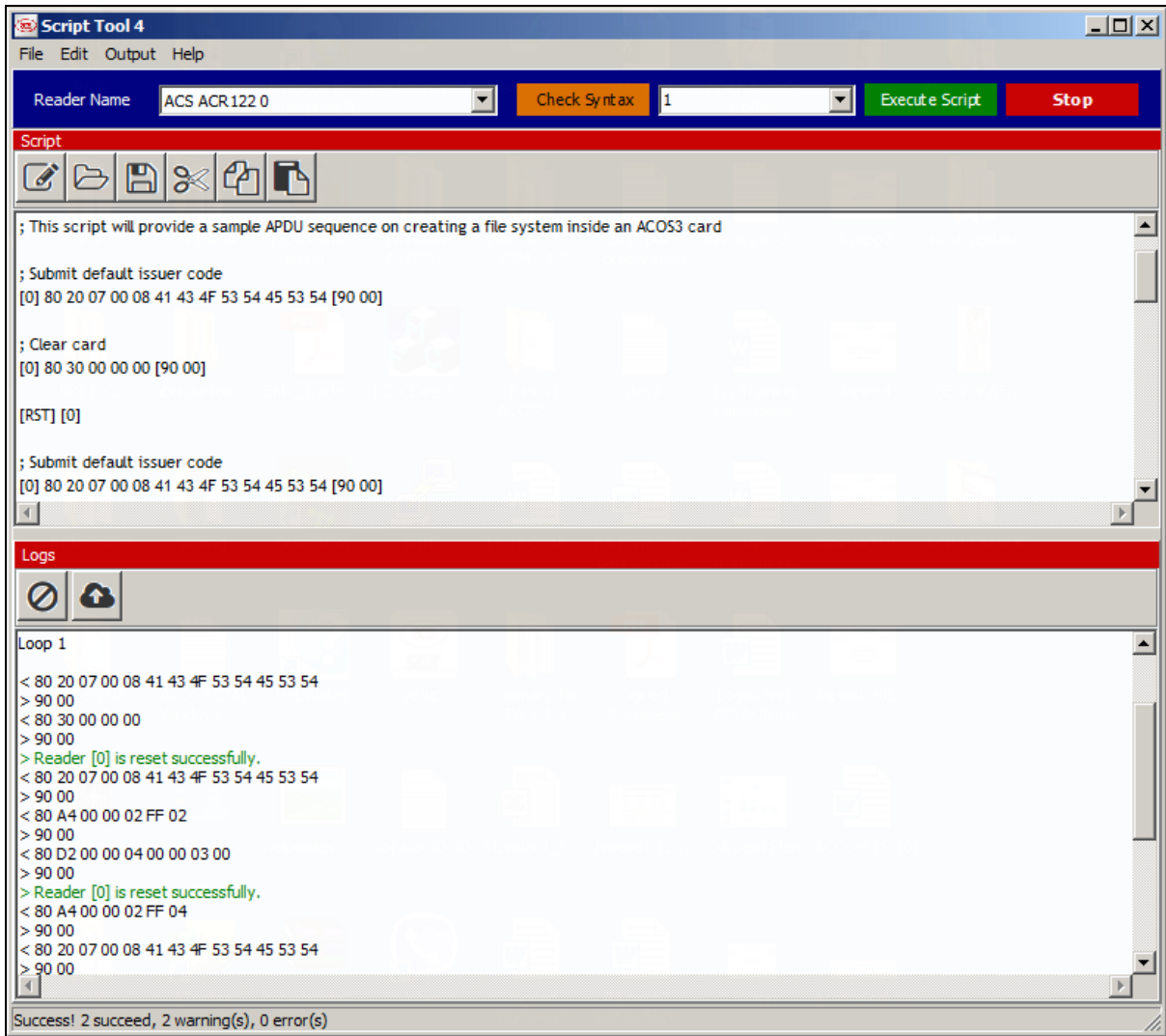

Figure 6: Script Tool 4

3.5. User Manuals and Reference Materials

The following documents are included in this kit:

- ACR122U Software Development Kit User Manual

- ACR122U Application Programming Interface

- ACR122U Technical Specifications

- ACOS3 Contactless Card Reference Manual

- MIFARE Card Functional Specifications