Advanced Card Systems Ltd.
Card & Reader Technologies

ACR1251U
USB NFC Reader
with SAM Slot

Technical Specifications V1.11

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1.0. Introduction

The ACR1251U is a PC-linked NFC smart card reader developed based on the 13.56 MHz contactless technology. Following the ACR122U, ACS's successful NFC reader and also the world's first CCID-compliant contactless reader, the ACR1251U offers more and advanced features. It is designed to support not only ISO 14443 Type A and B cards, but also MIFARE®, FeliCa and all four types of NFC tags and devices.

The ACR1251U is ideal for implementing contactless applications with added security functions in the system. Equipped with an ISO 7816-compliant SAM (Secure Access Module) slot that can be used together with a SAM card, key diversification and mutual authentication are made possible, restricting the exposure of keys and limiting the possibility of keys being stolen. This provides a high level of security in contactless operations.

ACR1251U is suitable for any contactless smart card applications such as personal identity verification, network login, online banking, and micropayment. With enhanced NFC features, ACR1251U is also ideal for non-conventional NFC applications like Smart Posters for advertising and marketing purposes, and communication with most NFC-enabled mobile phones in the market.

Furthermore, ACR1251U is PC/SC-compliant, giving it interoperability across different applications and platforms. ACR1251U also supports post-deployment firmware updates through remote firmware upgrade, eliminating the need for additional hardware modification. With its compact size, trendy design and rich features, ACR1251U lets you fully enjoy the convenience of using NFC applications.

2.0. Features

- USB Full Speed Interface
- CCID-compliant
- Smart Card Reader:
    - Contactless Interface:
        - Read/Write speed of up to 424 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, MIFARE Classic®, FeliCa, and all four types of NFC (ISO/IEC 18092 tags)
        - Built-in anti-collision feature (only one tag is accessed at any time)
        - Supports extended APDU (max. 64 KB)
        - NFC Support:
            - Card Reader/Writer mode
            - Peer-to-Peer mode
    - SAM Interface:
        - One SAM Slot
        - Supports ISO 7816 Class A, B, and C SAM cards
- Built-in Peripherals:
    - User-controllable bi-color LED
    - User-controllable buzzer
- Application Programming Interface:
    - Supports PC/SC
    - Supports CT-API (through wrapper on top of PC/SC)
- USB Firmware Upgradeability
- Supports Android™ 3.1 and later[1]
- Compliant with the following standards:
    - EN 60950/IEC 60950
    - ISO 7816 (SAM Slot)
    - ISO 14443
    - ISO 18092
    - FeliCa Performance Certification
    - PC/SC
    - CCID
    - CE
    - FCC
    - RoHS
    - REACH
    - J-LIS (Japan)
    - VCCI (Japan)
    - MIC (Japan)
    - KC (Korea)
    - Microsoft® WHQL

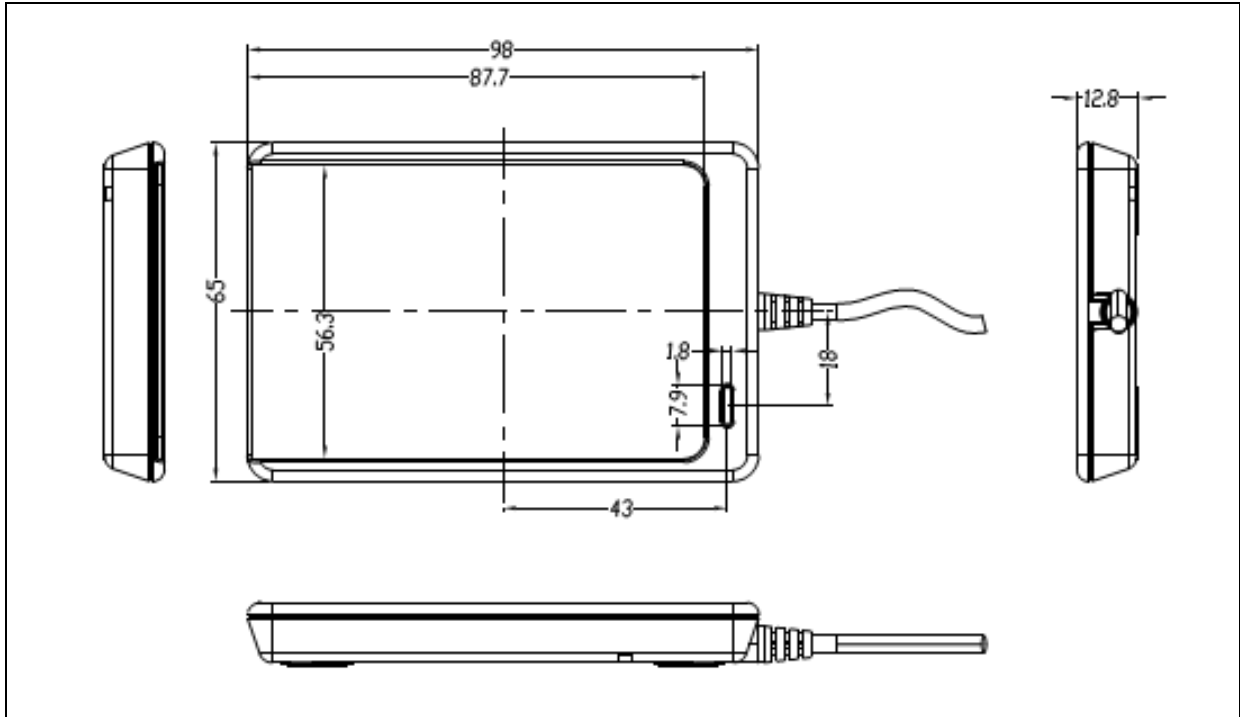[1] *Uses an ACS-defined Android Library*

3.0. Typical Applications

- e-Government
- e-Banking and e-Payment
- e-Healthcare
- Transportation
- Network Security
- Access Control
- Loyalty Program
- Smart Poster/URL Marketing

4.0. Technical Specifications

Physical Characteristics

Dimensions .... 98.0 mm (L) × 65.0 mm (W) × 12.8 mm (H)
Weight... 81 g
Color .... Matte Black

USB Host Interface

Protocol... USB CCID
Connector Type............................. Standard Type A
Power Source................................ From USB port
Speed.. USB Full Speed (12 Mbps)
Supply Voltage.............................. 5 V
Supply Current .... Max. 200 mA
Cable Length................................. 1 m, Fixed

Contactless Smart Card Interface

Standard .... ISO/IEC 18092 NFC, ISO 14443 Type A & B, MIFARE, FeliCa
Protocol... ISO 14443 T=CL for ISO 14443-4–compliant cards
.... T=CL Emulation for MIFARE Classic, ISO 18092, FeliCa and NFC tags
Operating Frequency .... 13.56 MHz
Operating Distance .... Up to 50 mm (depending on tag type)
Smart Card Read/Write Speed....... 106 Kbps, 212 Kbps, 424 Kbps
Antenna Size................................. 50 mm × 40 mm

SAM Card Interface

Number of Slots .... 1 Standard SIM-sized Card Slot
Standard .... ISO 7816, Class A, B, and C (5 V, 3 V, 1.8 V)
Protocol... T=0; T=1
Smart Card Read/Write Speed....... 9.6 Kbps – 420 Kbps
Card Connector Type..................... SAM Slot 0: Contact

Built-in Peripherals

LED .... 1 bi-color: Red and Green
Buzzer... Monotone

Other Feature

Firmware Upgrade .... Supported

Application Programming Interface

PC-linked Mode............................. PC/SC
.... CT-API (through wrapper on top of PC/SC)

Operating Conditions

Temperature .... 0 °C – 60 °C
Humidity .... Max. 90% (non-condensing)
MTBF .... 500,000 hrs

Certifications/Compliance

EN 60960/IEC 60950, ISO 7816 (SAM Slot), ISO 14443, ISO 18092, USB Full Speed,
FeliCa Performance Certification, PC/SC, CCID, CE, FCC, RoHS, REACH
J-LIS (Japan), VCCI (Japan), MIC (Japan), KC (Korea), Microsoft® WHQL

Device Driver Operating System Support

Windows® CE 5.0, Windows® CE 6.0, Windows® Embedded Compact 7, Windows® XP, Windows® Vista™, Windows® 7, Windows® 8, Windows® 8.1, Windows® 10
Windows® Server 2003, Windows® Server 2003 R2, Windows® Server 2008, Windows® Server 2008 R2, Windows® Server 2012, Windows® Server 2012 R2, Windows® Server 2016
Linux®, Mac OS®, Solaris, Android™ 3.1 and later

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info@acs.com.hk
www.acs.com.hk