Advanced Card Systems Ltd.
Card & Reader Technologies

ACR123U
Intelligent
Contactless Reader

Technical Specifications V1.06

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1.0. Introduction

The ACR123U is the USB version of the cost-effective, flexible, and intelligent contactless reader ACR123S. It can be integrated to existing POS (Point-of-Sale) terminals or cash registers to offer the convenience of a cashless payment system. Developed based on the 13.56 MHz contactless RFID (Radio Frequency Identification) technology, it supports any contactless card following the ISO 14443-4 standard.

Similar with its serial predecessor, the ACR123U is equipped with a large graphical LCD screen that lets merchants display messages, as well as a large tapping area with backlight which guides customers in carrying out their payment transactions. ACR123U has a built-in ISO 7816–compliant SAM (Secure Access Module) slot which can be used together with a SAM card.

The ACR123U is compliant with major payment and safety standards such as MasterCard®, Visa®, American Express®, and EMV™ Levels 1 and 2 (Contactless), making it compatible with EMV-based contactless payment applications such as MasterCard® PayPass™, Visa payWave®, and American Express® ExpressPay. The ACR123U is also Apple Pay™ ready.

Using either the serial or USB version of the ACR123, movement in checkout counters is faster as customers complete their payment by simply tapping their cards. This presents an opportunity to revolutionize shopping experience in a faster and convenient payment world.
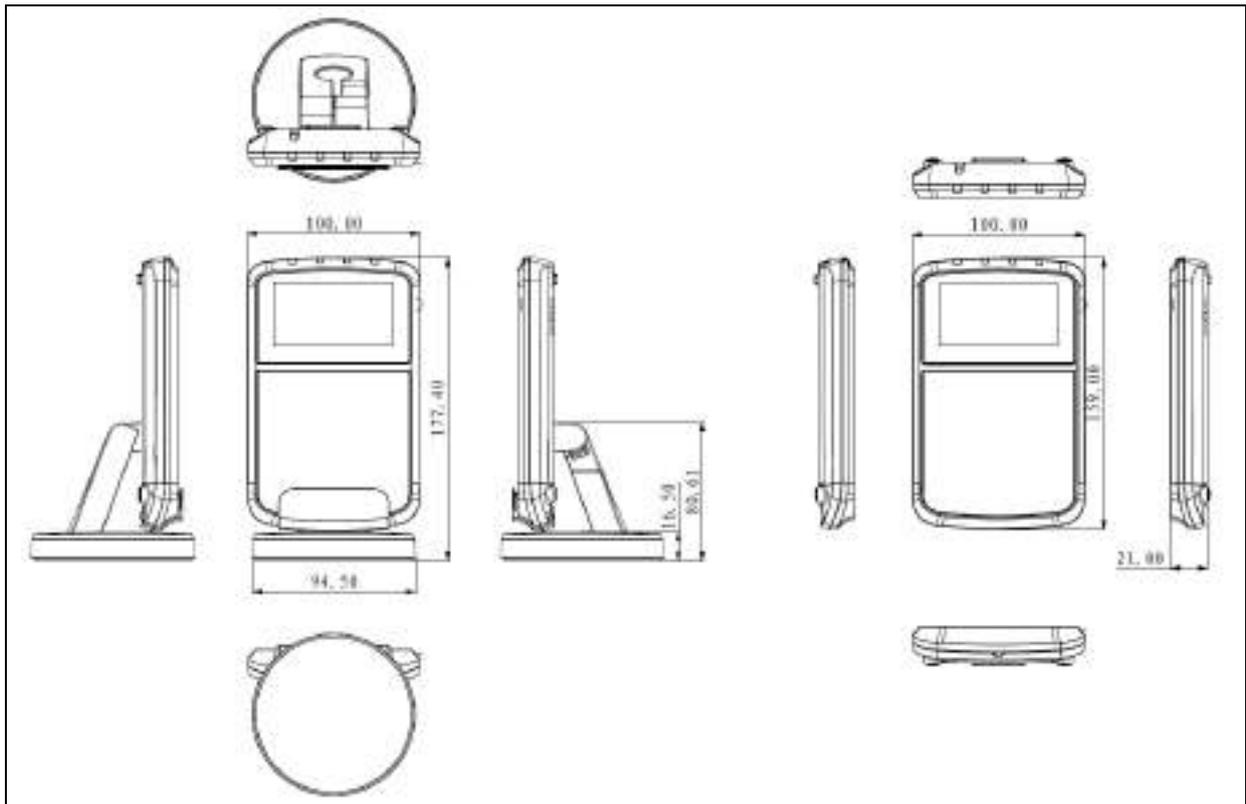
2.0. Features

- USB Interface for Data Communication and Power Supply
- ARM® Cortex®-M3 32-bit Processor
- Payment Applications:
  - MasterCard PayPass Mag Stripe and M/Chip
  - Visa payWave MSD and qVSDC
  - American Express ExpressPay 3.0
  - Apple Pay ready
- Smart Card Reader:
  - Contactless Interface:
    - Read/Write speed of up to 848 Kbps
    - Built-in antenna for contactless card 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 Classic® series
    - Supports MasterCard PayPass, Visa payWave, and American Express ExpressPay compliant cards
    - Built-in anti-collision feature
  - SAM Interface:
    - Three SAM Slots
    - Supports ISO 7816 Class A, B and C (5 V, 3 V, 1.8 V) SAM cards
- Built-in Peripherals:
  - 16 characters × 8 lines Graphical LCD (128 pixels × 64 pixels)
  - Four user-controllable LEDs (Blue, Yellow, Green, and Red)
  - User-controllable tapping region backlight (Red, Green, and Blue)
  - User-controllable speaker (Monotone indication)
- Certifications/Compliance:
  - ISO 14443
  - ISO 7816 Class A, B and C (SAM Slot)
  - EMV™ Levels 1 and 2 (Contactless)
  - MasterCard PayPass
  - Visa payWave
  - American Express ExpressPay
  - CE
  - FCC
  - RoHS 2
  - REACH
  - VCCI (Japan)
  - KC (Korea)
  - Microsoft® WHQL

3.0. Typical Applications

- Banking and Payment
- e-Healthcare
- Transportation
- e-Purse and Loyalty
- Contactless Mobile Payment

4.0. Technical Specifications

Physical Characteristics

Dimensions	Main Body: 159 mm (L) × 100 mm (W) × 21 mm (H)
	With Stand: 177.4 mm (L) × 100.0 mm (W) × 94.5 mm (H)
Weight	Main Body: 281 g
	With Stand: 506 g
Color	Black

Processor

Core	ARM 32-bit Cortex-M3 CPU

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. 500 mA
Cable Length	1.5 m, Fixed

Contactless Smart Card Interface

Standard	ISO 14443-4 Type A and B Parts 1-4
Protocol	ISO 14443 T=CL for ISO 14443-4–compliant cards
	T=CL Emulation for MIFARE Classic
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, 848 Kbps
Antenna Size	75 mm × 75 mm

SAM Card Interface

Number of Slots	3 Standard SIM-sized Card Slots
Standard	ISO 7816, Class A, B, C (5 V, 3 V, 1.8 V)
Protocol	T=0; T=1
Smart Card Read/Write Speed	9.6 Kbps – 344 Kbps
Card Connector Type	SAM Slot 0: Contact
	SAM Slot 1: Contact
	SAM Slot 2: Contact

Built-in Peripherals

LCD..	Graphic LCD with white backlight
....	128 pixels × 64 pixels
....	Number of characters: 16 characters × 8 lines
LED..	4 single-color: Blue, Yellow, Green, and Red
Speaker...	Audio tone indication
Tapping Region..............................	Tri-color backlight: Red, Green and Blue

Other Features

Security	Tamper Switch (Internal anti-intrusion detections and protection)
Firmware Upgrade	Supported
Real-time Clock.............................	Supported

Operating Conditions

Temperature...................................	0 °C – 50 °C
Humidity	Max. 90% (non-condensing)
MTBF	240,000 hrs

Certifications/Compliance

ISO 14443, ISO 7816 (SAM Slot), EMV Levels 1 and 2 (Contactless), MasterCard PayPass, Visa payWave, American Express ExpressPay, PC/SC, CCID, CE, FCC, RoHS 2, REACH
VCCI (Japan), KC (Korea), Microsoft® WHQL

Device Driver Operating System Support

Windows® CE 5.0, Windows® CE 6.0, Windows® Embedded Compact 7, Windows® 2000, Windows® XP, Windows Vista®, Windows® 7, Windows® 8, Windows® 8.1, Windows® 10
Windows® Server 2003, Windows® Server 2008, Windows® Server 2008 R2, Windows® Server 2012, Windows® Server 2012 R2
Linux®

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