



**Advanced Card Systems Ltd.**  
Card & Reader Technologies

# ACR123U Intelligent Contactless Reader

Technical Specifications V1.04





## Table of Contents

1.0.	Introduction .....	3
2.0.	Features .....	4
3.0.	Typical Applications.....	5
4.0.	Technical Specifications.....	6



## 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 (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) 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 that allows merchants to 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 and certified with major payment and safety standards such as MasterCard®, Visa®, American Express®, EMV™ Levels 1 and 2 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

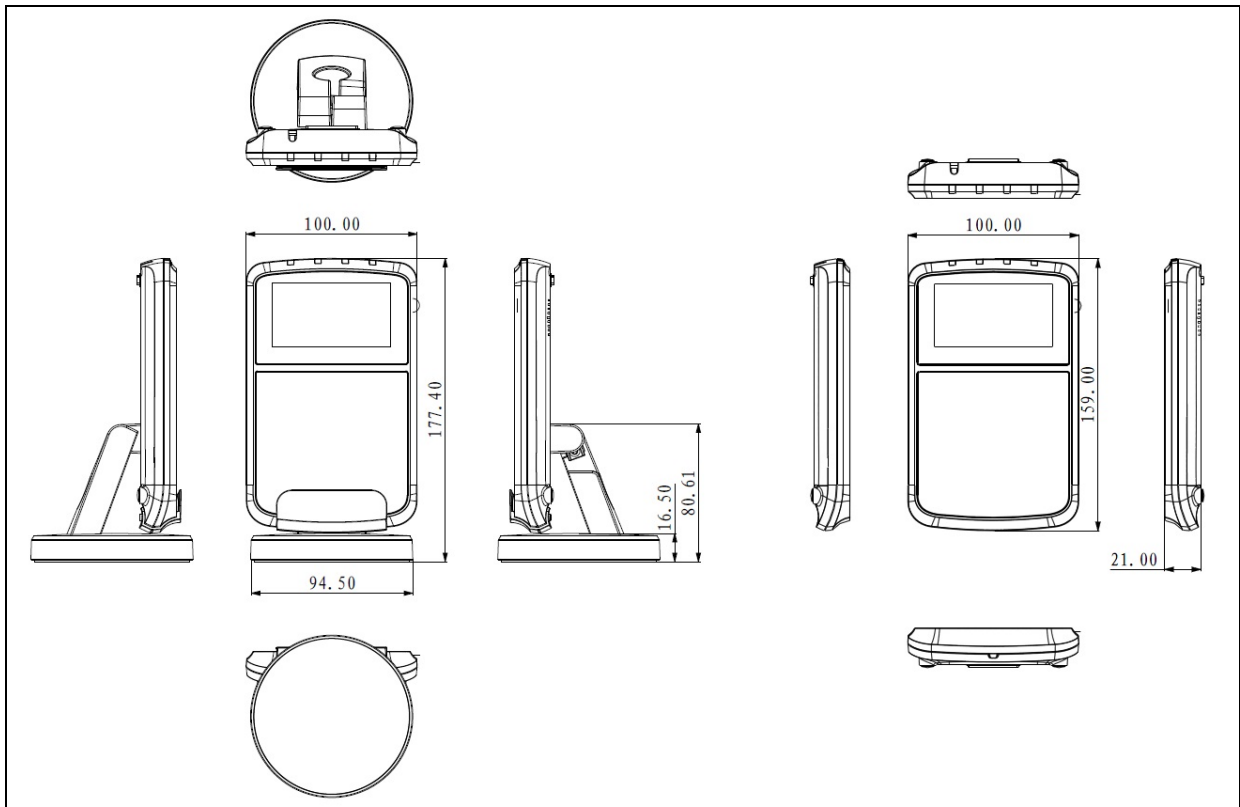
- USB interface for Data Communication and Power Supply
- ARM® Cortex®-M3 32-bit Processor
- Payment Applications:
  - MasterCard PayPass Mag Stripe and M/Chip
  - Visa payWave MSD and qVSDC
  - American Express Expresspay 3.0
  - Apple Pay ready
- Smart Card Reader:
  - Contactless Interface:
    - 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 Card
- Built-in Peripherals:
  - 16 alphanumeric characters x 8 lines Graphical LCD (128 pixels x 64 pixels)
  - Four user-controllable LEDs (Blue, Yellow, Green and Red)
  - User-controllable tapping region backlight (Red, Green and Blue)
  - User-controllable speaker (Mono tone indication)
- Certifications/Compliance:
  - ISO 14443
  - ISO 7816 Class A, B and C (for 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: 159.0 mm (L) × 100.0 mm (W) × 21.0 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

ARM 32-bit Cortex-M3 CPU

### USB Host Interface

Protocol.....	USB CCID
Type .....	Four Lines: +5 V, GND, D+ and D-
Connector Type.....	Standard Type A
Power Source.....	From USB port
Speed.....	USB Full Speed (12 Mbps)
Supply Voltage .....	Regulated 5 V DC
Supply Current .....	Max. 500 mA
Cable Length.....	1.5 m fixed cable

### Contactless Smart Card Interface

Standard .....	ISO 14443-4 A and B Parts 1-4
Protocol.....	ISO 14443-4 compliant cards, T=CL MIFARE Classic Card Protocol, T=CL
Operating Frequency .....	13.56 MHz
Operating Distance .....	Up to 50 mm (depending on card 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
Standard .....	ISO 7816 Class A, B, C (5 V, 3 V, 1.8 V)
Protocol.....	T=0; T=1
Supply Current .....	Max. 50 mA
Clock Frequency .....	4 MHz
Short Circuit Protection .....	(+5) V/GND on all pins
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..... 128 pixels x 64 pixels graphic LCD with white backlight  
..... Number of characters: 16 alphanumeric characters x 8 lines  
LED..... 4 single-color: Blue, Yellow, Green, and Red  
Tapping Region..... Tri-color backlight: Red, Green and Blue  
Speaker..... Audio tone indication

**Operating Conditions**

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

**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

**Device Driver Operating Systems Support**

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®



American Express and Expresspay are registered trademarks of American Express Company.  
Apple Pay is a trademark of Apple Inc., registered in the U.S. and other countries.  
ARM and Cortex are registered trademarks of ARM Limited (or its subsidiaries) in the EU and/or elsewhere. All rights reserved.  
Linux® is the registered trademark of Linus Torvalds in the U.S. and other countries.  
MasterCard is a registered trademark and PayPass is a trademark of MasterCard International Incorporated.  
Microsoft, Windows and Windows Vista are registered trademarks of Microsoft Corporation in the United States and/or other countries.  
MIFARE, MIFARE Classic and MIFARE Ultralight are registered trademarks of NXP B.V. and are used under license.  
VISA and VISA payWave are registered trademarks of Visa International Service Association.