Advanced Card Systems Limited

Card and Reader Technologies

User Manual

ACR128U Contact and Contactless Card Reader and Writer

1.0 INTRODUCTION

The ACR128U is a Contact and Contacless Smart Card Reader and Writer developed on the 13.56MHz Contactless Technology. This device is a dual-interface reader (IFD and PCD) that supports both contact (ICC) and contactless (PICC) smart cards. It is designed to support ISO 7816 Parts 1-4 and ISO14443 Type A and B Cards, Hybrid Cards and Combi Cards but not FeliCa tags.

High-speed (424 kbps) communication for PICCs (Maximum 848 kbps). Energy saving modes for turning off the antenna field whenever the PICC is inactive, or no PICC is found. It prevents the PICC from exposing to the field all the time. I t can support USB V2.0 interface and the speed up to 12Mbps. This device Firmware Upgradeable through the RS232 Interface with a special cable can more easily.

2.0 FEATURES

- One standard ICC landing type card acceptor.
- One SAM socket is provided for highly secure applications.
- A built-in antenna for PICC contactless access applications.
- ISO 7816 Parts 1-4 Compliant for Contact Smart Card Interface.
- ISO 14443 Parts 1-4 Compliant for Contactless Smart Card Interface.
- T=CL emulation for MIFare 1K/4K PICCs. Multi-Blocks Transfer Mode is provided for efficient PICC access.
- High Speed (424 kbps) Communication for PICCs. #Maximum 848 kbps.
- Intelligent Support for Hybrid Cards and Combi Cards.
- Energy saving modes for turning off the antenna field whenever the PICC is inactive, or no PICC is found. It prevents the PICC from exposing to the field all the time.
- User-Controllable Peripherals. E.g. LED, Buzzer.
- CCID Compliant.
- PCSC Compliant for Contact, Contactless and SAM Interfaces.
- USB V2.0 Interface. (12Mbps)
- Device Firmware Upgradeable through the RS232 Interface with a special cable.

3.0 Typical Applications

- Network access control
- Micro-payment
- Public Transportation Terminals
- Automatic Fare Collection
- Physical access control
- Customer Loyalty
- Time attendance
- Contactless public phones
- Vending machines
- ICAO E-Passport

4.0 Installation Procedure

Plug the ACR128U USB cable into the USB port. When the reader connects to the PC, then the user must be install the driver to start up the reader.

5.0 Hardware Interfaces

5.1 Bi-Color LED Indicator

The LEDs are used for showing the state of the contact and contactless interfaces.

Reader States	Red LED PICC Indicator	Green LED ICC Indicator
1. No PICC Found	A single pulse per ~ 10 seconds	
2. PICC is present but not activated	Toggling ~ 0.3 Hz	
3. PICC is present and activated	ON	
4. PICC is operating	Blinking	
5. ICC is present and activated		ON
6. ICC is absent or not activated		OFF
7. ICC is operating		Blinking

5.2 Buzzer

A monotone buzzer is used to show the "Card Insertion" and "Card Removal" events

Events	Buzzer
1. Card Insertion Event (ICC or PICC)	Beep
2. Card Removal Event (ICC or PICC)	Beep
3. Combi Card (support both ICC and PICC interfaces) is inserted in the contact card acceptor	2 Beeps
4. PICC is activated	1 beep per second (Default = Disabled)
5. PICC is activated (PPS Mode is activated). E.g. 424kbps High Speed Mode	2 beeps per second (Default = Disabled)

5.3 SAM Interface

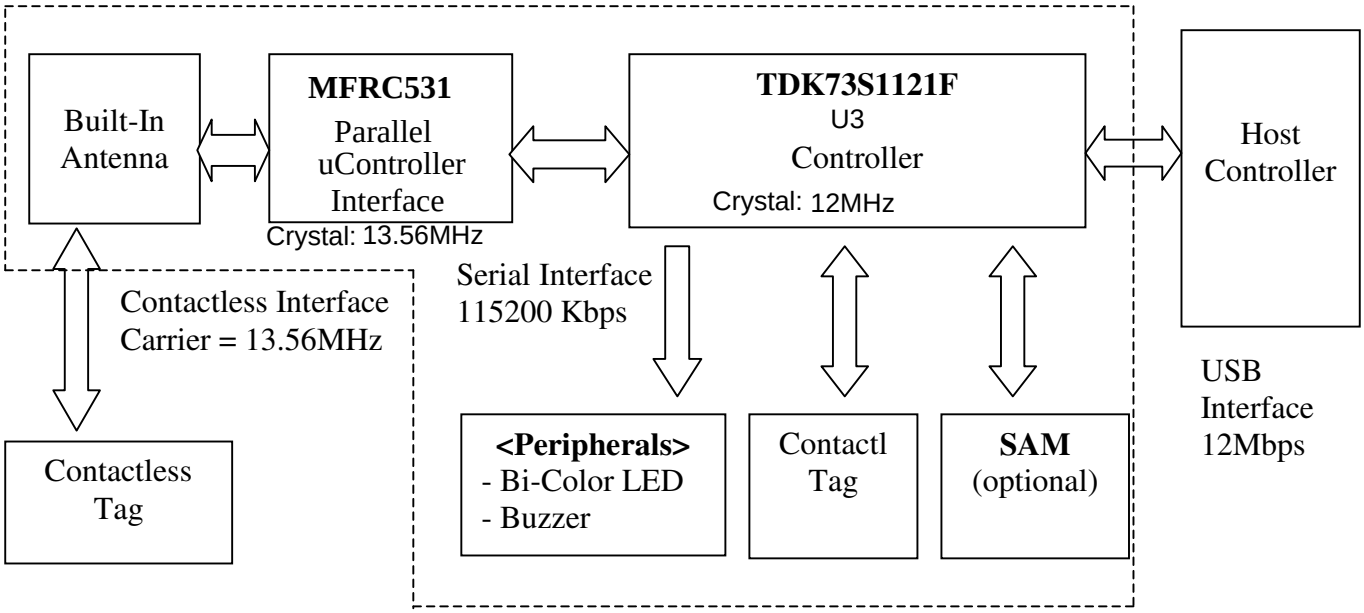
- One SAM socket is provided.

5.4 Built-in Antenna

- 3 turns symmetric loop antenna. Center tapped.
- The estimated size = 65mm x 60mm.
- The loop inductance should be around ~ 1.6uH to 2.5uH
- Operating Distance for different Tags ~ up to 50mm (depend on the Tag)

6.0 Implementation

The ACR128U is built based on the TDK73S1121F and MFRC531 chips.



ACR128U System Block Diagram

FCC Warning:

This device complies with part 15 of the FCC Rules.Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and
(2) This device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.