



Advanced Card Systems Limited

Card and Reader Technologies

A background image showing a person's hands interacting with a card reader device. The person is wearing a blue and white plaid shirt. The card reader is a white, rectangular device with a slot for cards. The person's hands are positioned over the device, and a card is visible in the slot. The image is slightly blurred and has a soft, warm tone.

Reference Manual

ACR122T



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1.0. Introduction

The ACR122T is a PC-linked Contactless cards Reader and writer for accessing ISO14443 Part 4 Type A contactless card.



2.0. Feature

- USB Interface
- HID Standard
- No Driver Requested
- Build-in Antenna for contactless tags access.
- Support ISO14443 Part 4 Type A
- 13.56MHz Carrier Frequency Band
- Bi-Color LED.
- RoHS
- Small in size



3.0. Hardware Interfaces

3.1. USB Interface

The ACR122T is connected to a Host through the USB as specified in the USB Specification 1.1. The ACR122T is working in Full speed mode, i.e. 12Mbps.

Pin	Signal	Function
1	VCC	+5V power supply for the reader (Max 200mA, Normal 100mA)
2	D-	Differential signal transmits data between Host and ACR122T
3	D+	Differential signal transmits data between Host and ACR122T
4	GND	Reference voltage level for power supply

3.2. Bi-Color LED

- User-controllable Bi-Color LED. Red and Green Color.

3.3. Built-in Antenna

- 6 turns symmetric loop antenna.
- The estimated size = 19mm x 19mm.
- The loop inductance should be around ~ 1.6uH to 2.5uH
- Operating Distance for different Tags ~ up to 10mm (depend on the Tag)
- No anti-collision. Only one Tag can be accessed at any one time.



4.0. Chips Selection

The AC1038 (ST7SCR) will be used as the main core for the reader. The reasons are listed below:

1. The AC1038 (ST7SCR) has been used in our current readers for a long time. This chip is considered stable and mature
2. Little change on the existing USB and Contactless Cards access portions of the ACR122U firmware can be used.
3. The AC1038 (ST7SCR) supports USB Interface
4. The AC1038 (ST7SCR) provides sufficient I/O pins for driving the RF Interface chip
5. The AC1038 (ST7SCR) is RoHS compliant
6. ST provides a good technical support on AC1038 (ST7SCR)
7. The development tools for AC1038 (ST7SCR) are available. It can save the development charge
8. The development effort and time can be significantly shorten if the AC1038 (ST7SCR) be used

The PN532 will be used as an RF Interface chip. The reasons are listed below:

1. The PN532 supports ISO14443 Type A, B, NFC and FeliCa Protocols and Interface
2. Only two pins is required for the communication with the controller via High Speed serial Interface
3. The chip is small in size, it can help to reduce the size of the overall product.
4. The PN532 is RoHS compliant
5. The supplier of the N532 is NXP, which is well-know company. They provided good technical support on their product
6. Currently use in ACR122U, save the time on development



5.0. Implementation

5.1. The ACR122T is built based on the AC1038 and PN5321 chips.

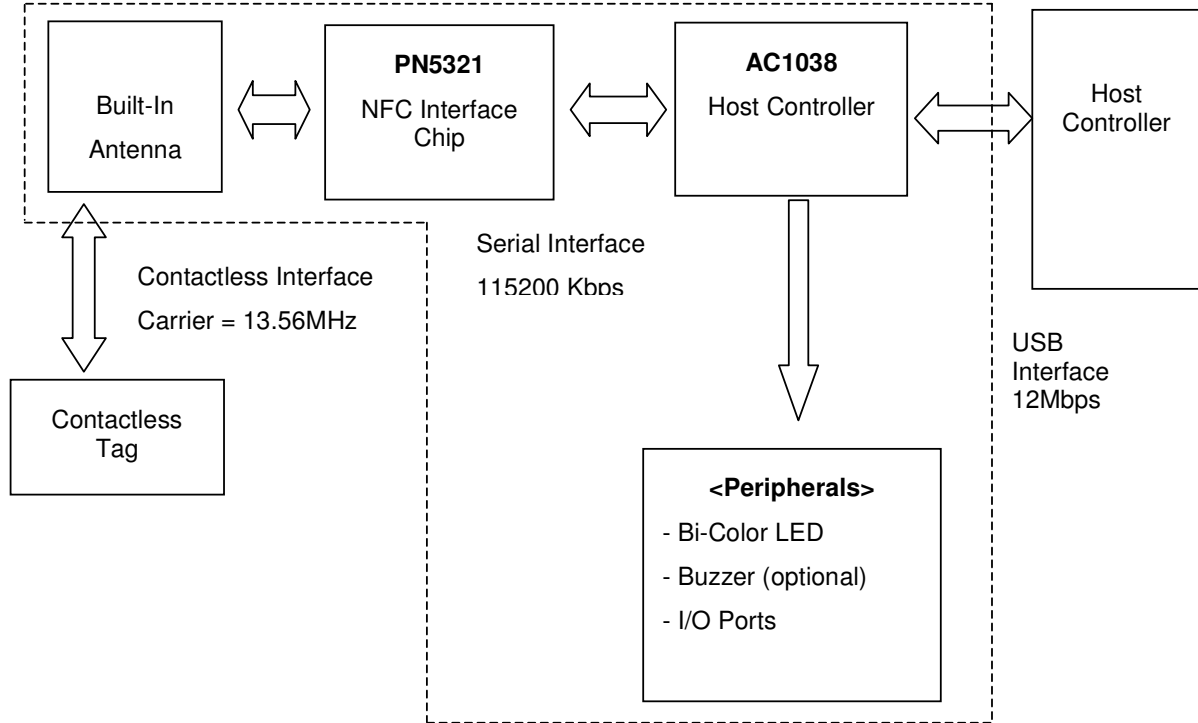
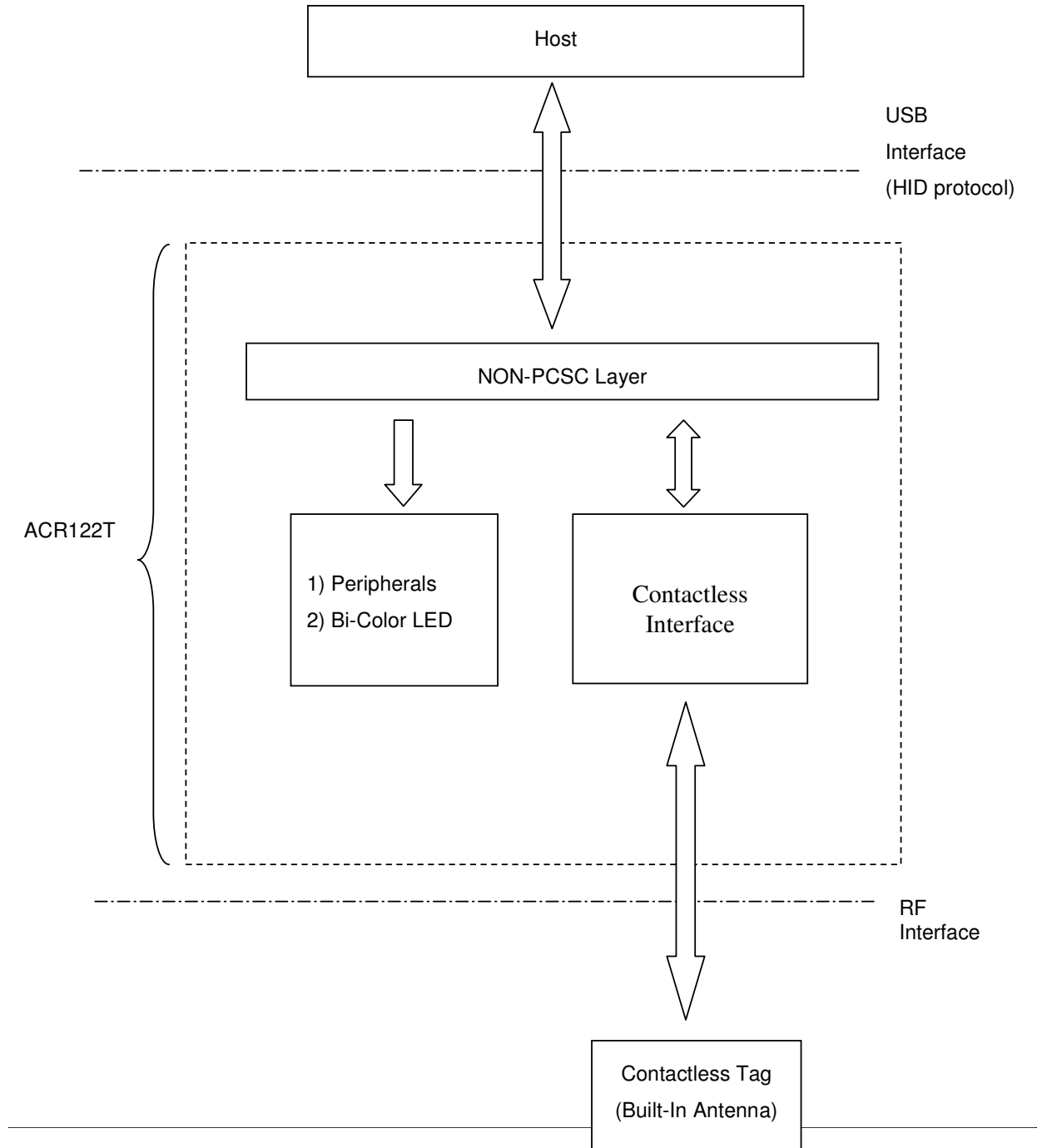


Figure 1.ACR122T System Block Diagram



5.2. Communication between the Host and the Contactless interface and Peripherals.

The Contactless interface & Peripherals are accessed through the use of HID Command Pattern.





6.0. Software Interface

Non PCSC interface is used for exchanging APDUs and Responses between the Host and Tag. The ACR122T is only used as transceiver. The ADPUs and Responses are transparent to the ACR122T. ACR122T will come with the following commands for this purpose.

1. Card Polling

To request response from contactless card within the antenna access area, the serial number of the contactless card will be returned

2. APDU Transmit

To send an APDU (PN532 and Contactless cards Commands), and the Data will be returned

3. Bi-Color LED Control

To control the status of the Bi-Color LED

4. Reset Antenna

To reset the Build-in Antenna

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.