Document Title	Revision: B
SR272A; SR272B Hardware User Manual	DAR/T272D/DES/2032

Hardware User Manual

SIRIUS Contactless Transit Reader (Configuration A/B)

Model No: SR272A; SR272B

Revision History

Date	Revision	Description	Author
21 Dec 2016	A	First Release	Vincent Tay
28 Sept 2017	B	Add Configuration B	Vincent Tay

Table of Contents

1. Introduction

This document aims to describe how to operate the SR272A; SR272B hardware, and the connectivity of the reader to the host.

1.1. About the Reader

The SR272A; SR272B reader is NFC reader with support for SIM-sized smartcards.

- Supports up to 8 ISO7816 Class A, B and C (5 V, 3 V, and 1.8 V) SIM-sized smartcards.
- Supports ISO14443 microprocessor cards with T=0 or T=1 protocol with PPS, and ISO14443 memory cards.
- User-controllable RGB status LED.
- User-controllable buzzer.
- Driver-free PC/SC operating mode.

The reader complies with FCC/CE regulations, TUV shock-and vibration tests for use in transit environments.

1.2. Terminology, Abbreviations and Notations

B2B	Board-to-Board
CCID	Chip card interface device.
DPC	Dynamic Power control
EEPROM	Electrically Erasable Programmable Read-Only Memory
Host	Host device refers to the controlling device operating the reader.
LED	Light-Emitting Diode
PCSC	Personal Computer/Smart Card specification
RF	Radio frequency
RGB	Red, Green, Blue
SAM	Secure Access Module
UART	Universal Asynchronous Receiver/Transmitter
USB	Universal Serial Bus

2. Reader Specification

Physical	
Dimensions	104 × 67 × 41（mm） (Config B Antenna size is 195 x 135 x 1 (mm))
Weight	160g
Technical	
Operating System	Linux
Processor	Application: Freescale IMX6 ARM 9 Cortex RF: Maxim M3 Secure Cortex
Memory	2GB DDR RAM and 2GB NAND Flash
Power Supply	DC12V via 10pin connector DC5V via USB
Current Consumption	270mA (Typical)
NFC Features	
Transmit Frequency	13.56 MHz
Protocols supported	ISO/IEC 14443-1 to 14443-4 A/B, ISO/IEC15693, Sony Felica™, ECMA-340, ECMA-352 and ISO18092
Read Range	Memory based Card: up to 10cm, CPU based Card: up to 8.5cm
Cards supported	All ISO14443-X contactless cards
Interface Features	
Alerts	Buzzer
LED Indicators	Power LED (X2), RGB status LED
Data Communication	
USB Interface	USB Type C
Serial Interface	RS-232, RS-485
Environmental	
Operating Temperature	-10°C ~ 70°C
Storage Temperature	-20°C ~ 85°C
Humidity	0% to 95%
Shock	Acceleration: 20g, Pulse duration: 11ms, Direction: 3 perpendicular axes, No of shocks: 5 per axes
Vibration	IEC-68 part 2-31 and DIN EN 60721-3-5 class 5M2
Anti-Corrosion	Conformal coated

3. Board type and stack up

Three PCB assemblies make up the SR272A and SR272B Reader.

- Main Board – Application controller of SR272A; SR272B Reader
- SAM Board – RF controller of SR272A; SR272B Reader
- Antenna Board assembly – Antenna of SR272A Reader and Antenna of SR272B

3.1. Main Board

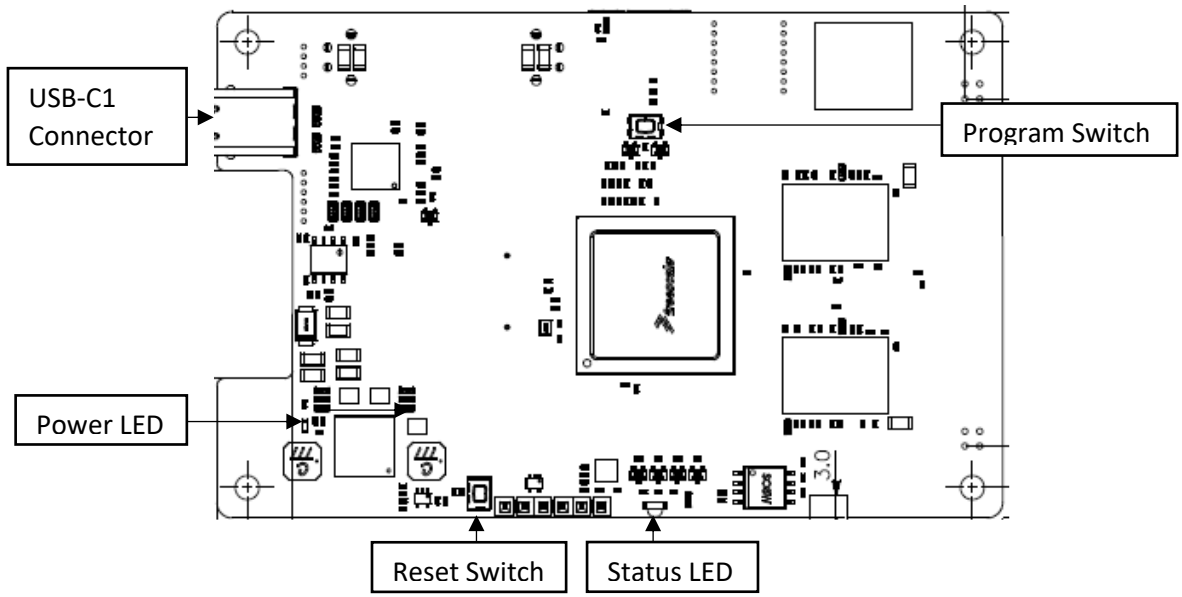


Figure 1: Main Board (Top)

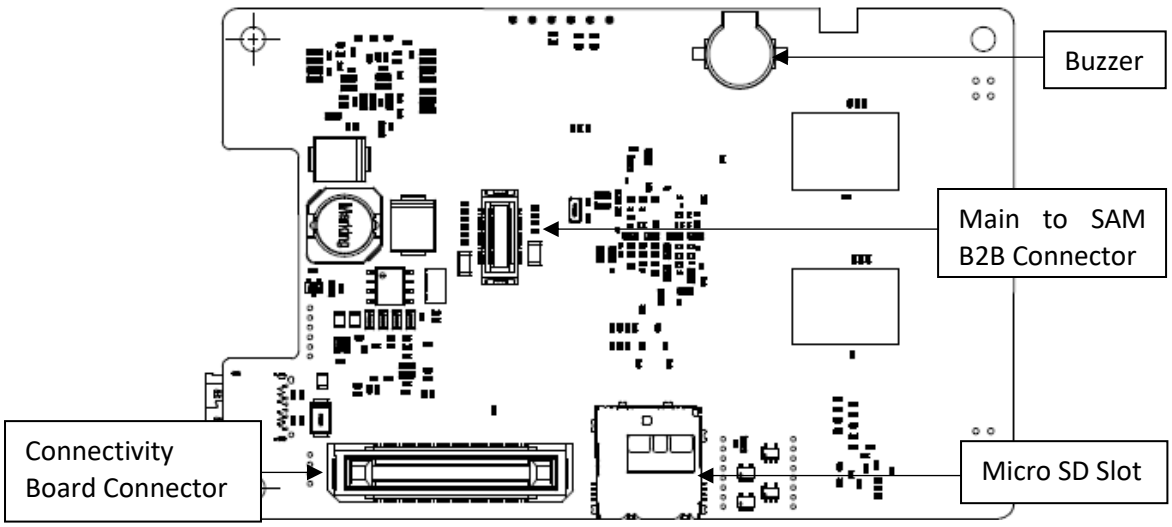


Figure 2: Main Board (Bottom)

3.2. SAM Board

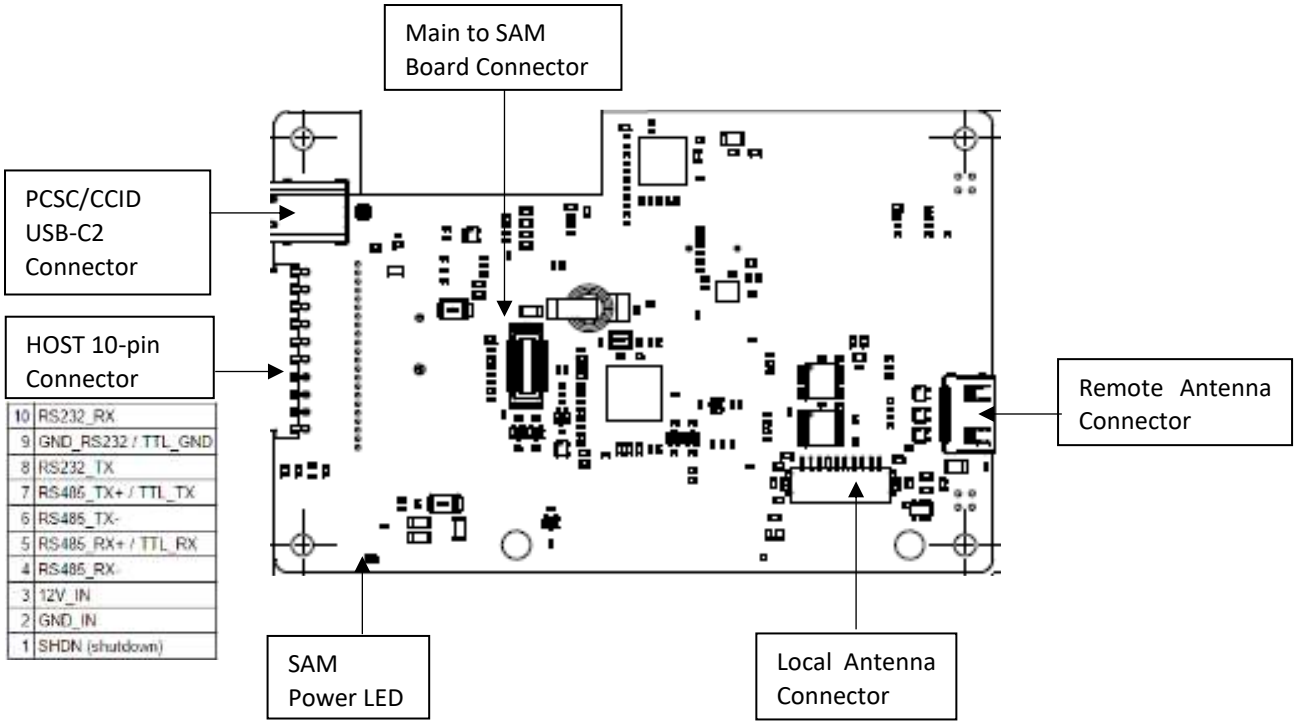


Figure 3: SAM Board (Top)

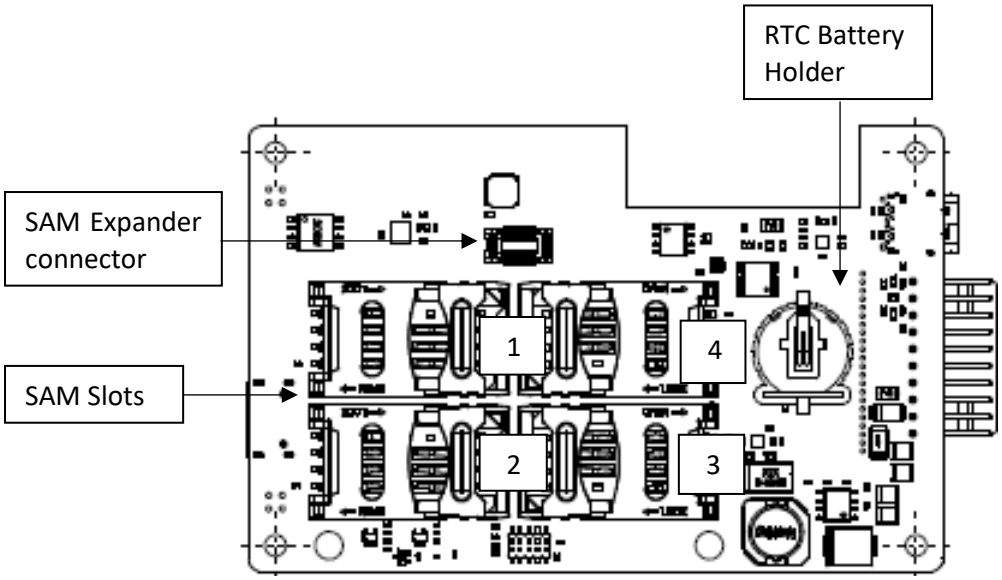


Figure 4: SAM Board (Bottom)

3.3. Antenna Board

3.3.1. (Configuration A)

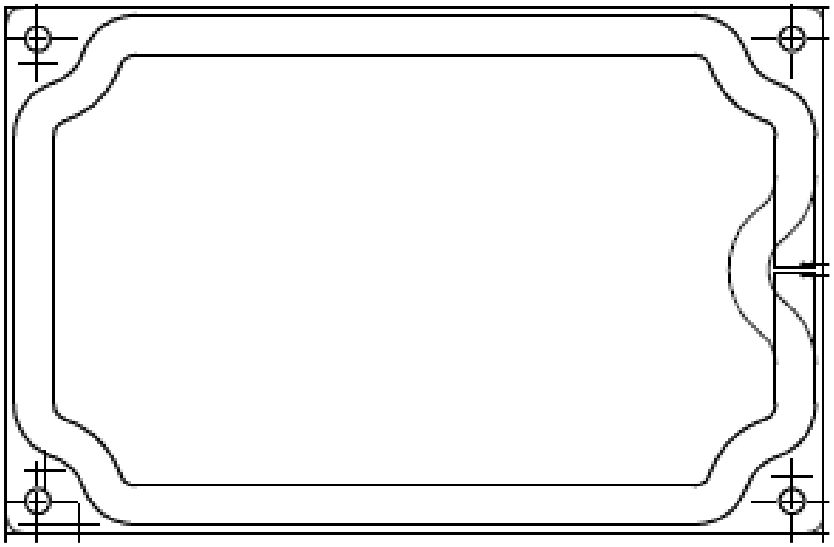


Figure 5: Antenna Board (Top)

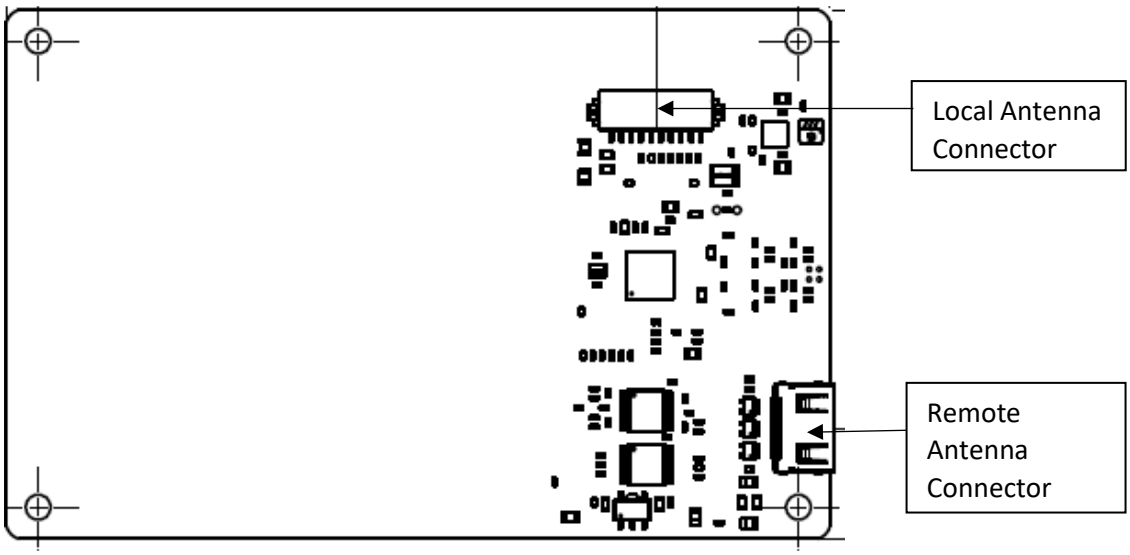


Figure 6: Antenna Board (Bottom)

3.3.2. (Configuration B)

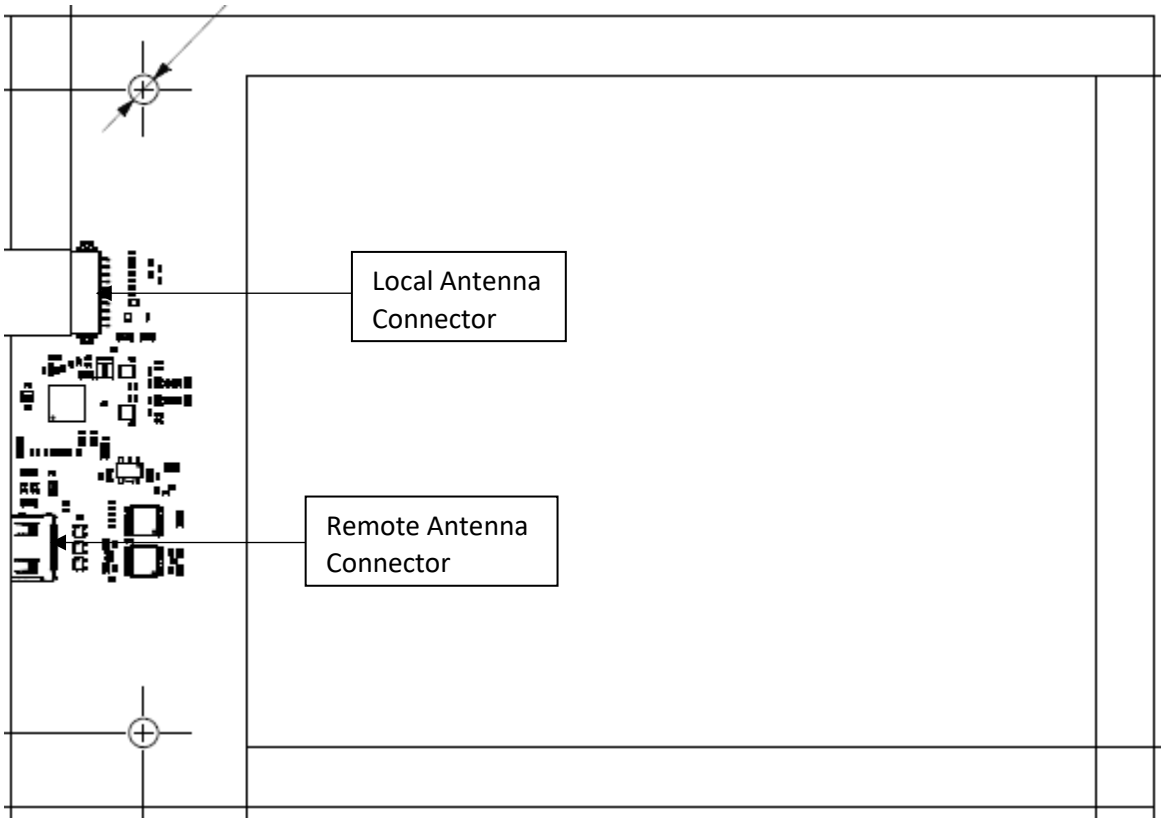


Figure 7: Antenna Board

3.4. Assembly Diagram

The assembled reader stack-up diagram is shown below.

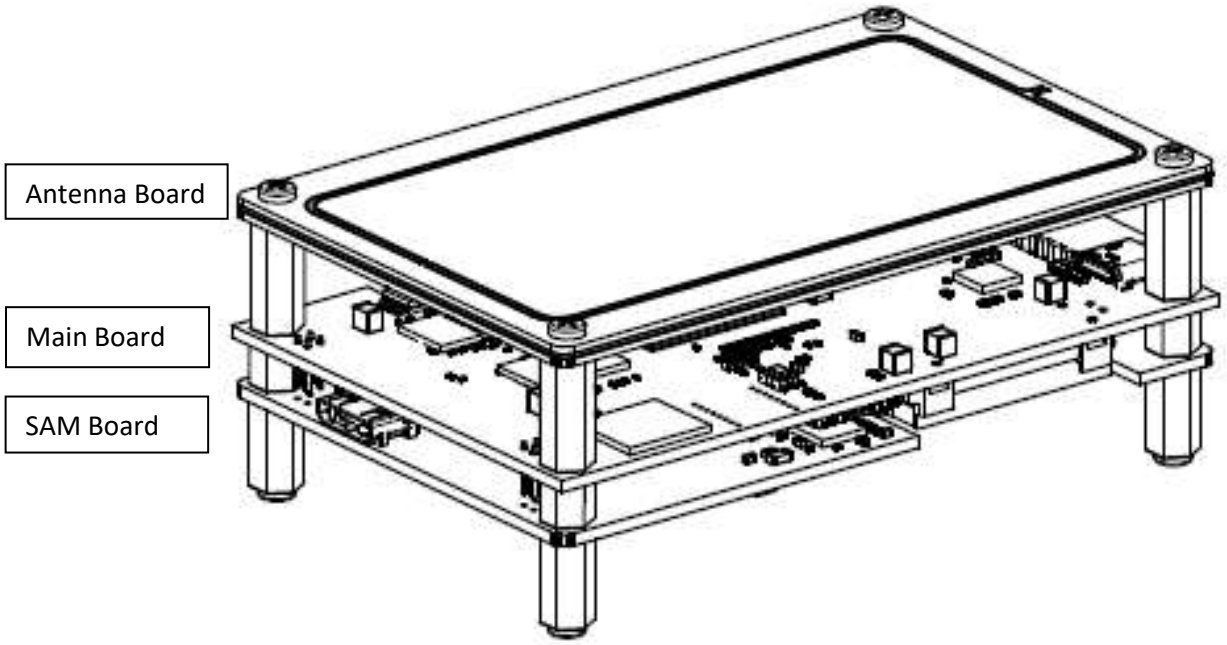


Figure 8: Assembled SR272A Reader

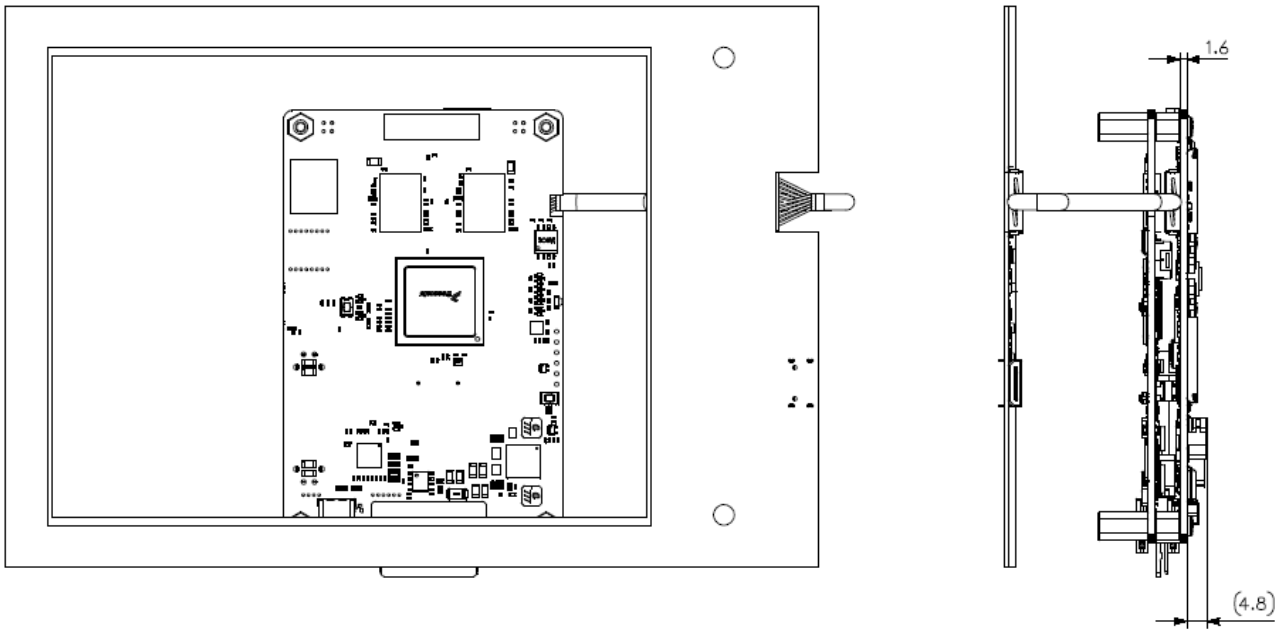
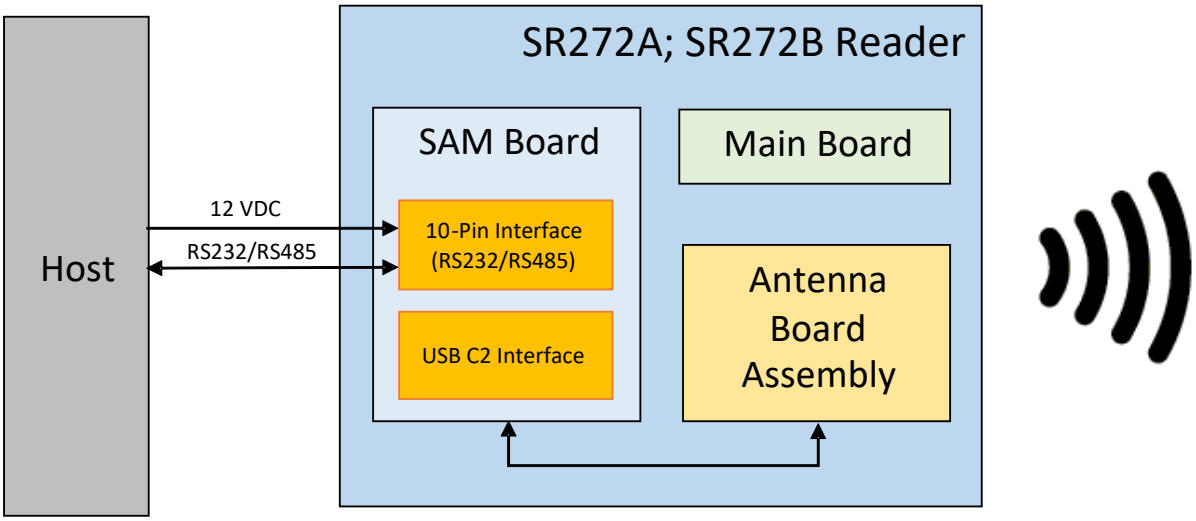


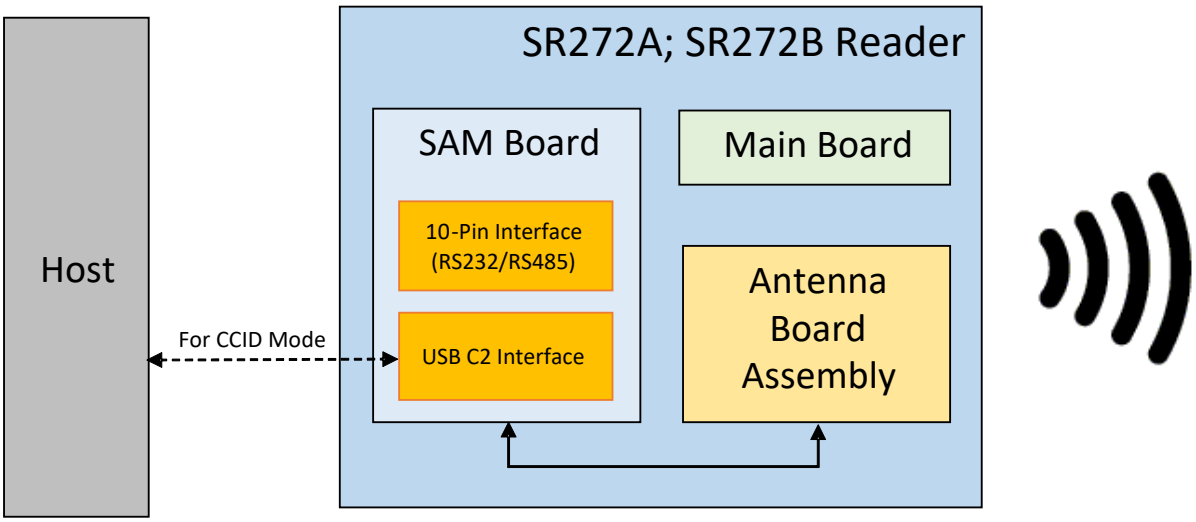
Figure 9: Assembled SR272B Reader

4. Reader Connection

The SR272A; SR272B reader interfaces with the host via the 10pin serial and power connection when operating host-reader configuration.



In PCSC/CCID mode, the host can connect to the reader using the USB-C interface. The reader will present itself as a standard PCSC reader to the Operating System.


Host
For CCID Mode
SR272A; SR272B Reader
SAM Board
10-Pin Interface
(RS232/RS485)
USB C2 Interface
Main Board
Antenna
Board
Assembly

5. Operational Precautions

5.1. General Safety Instructions

The SR272A; SR272B reader contains ESD sensitive components. When handling with the boards, avoid in contact with components especially the ICs on the boards. The operating voltage of the SR272A; SR272B reader is 12VDC. Operating the SR272A reader other than the rated voltage will experience performance deterioration or damage the reader.

5.2. Installation

The SR272A; SR272B Reader uses inductive coupling to communicate with contactless cards. Therefore, the reader is highly sensitive to ferrous or non-ferrous metal alike. Installation near to metal may affect operating distance. It is important to keep a comfortable distance away these metal surfaces for optimum performance.

5.3. Reader Status Indicators

There are 2 power LEDs indicators (one on Main board and one on SAM board). In addition, there is a RGB status LED on the Main board.

The RGB status indicator provides the following status information.

Color	Status
WHITE	Powered up and ready for use.
RED/Blinking	Power-on-Self-Test (POST) failed. • Power undersupply/over-supply. • NFC Reader board connection error. • SAM controller connection error. • Temperature sensor not responding or over-heated.
GREEN	Application loaded, ready for operation.
YELLOW	Application-specific.
CYAN	
BLUE	Programming in progress.
PURPLE	Programming completed, ready to restart.

5.4. Battery Safety Information

CAUTION
RISK OF EXPLOSION IF BATTERY IS REPLACED
BY AN INCORRECT TYPE.
DISPOSE OF USED BATTERIES ACCORDING TO THE INSTRUCTIONS

Use only CR1220, BATTERY LITHIUM COIN 3V 12.5MM. Observe the following guidelines for safe use of Li-Ion batteries.

a. Do not expose the battery to excessive heat or cold. Do not short-circuit. It may explode.
b. To avoid risk of fire, burn or damage to your battery, do not allow a metal object to touch battery contacts.
c. Do not disassemble the battery. There are no user serviceable parts inside.
d. If battery leakage is observed, avoid any contact with affected area and properly dispose of the battery.
e. If you come in contact with battery leakage, rinse exposed area with soap and water. If it contacts the eye, flush the eye with water for 15 minutes and seek medical attention.
f. When discarding a battery, contact your local waste disposal provider to understand local restrictions for disposal or recycling of batteries.

5.5. Fuse Information

This product contains Fuse in its circuit. The Fuse part number is 0ZCJ0100FF2E; FUSE PTC RESETTABLE 1.0A 6V CHIP 1206 (Bel Fuse).

6. FCC Compliance Statement

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.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Important: Caution: Any changes or modifications not expressly approved by the party responsible for compliance to this equipment would void the user's authority to operate this device.