

SR802 User Manual

Document History

Date	Version	Author	Change
20-Jun-2025	0.1	Cuong Nguyen	Preliminary documentation

General Note

This document is intended for information purposes.

STYL makes every effort to ensure that the quality of the information is available. The content of this documentation is provided on an “as is” basis and may contain deficiencies or inadequacies.

STYL disclaims any warranty and all responsibility for the application of the device(s) that is made in relation to the accuracy, reliability or contents of this document. STYL is not liable for any injury, loss or damage of any kind incurred for the use of or reliance upon information.

STYL reserves the right to make modifications, additions, and deletions to this document due to typographical errors, inaccurate information, or improvements to products at any time and without notice.

Contents

SR128 User Manual	1
1. Introduction	5
1.1. Abbreviations	5
2. Contactless Product Construction	6
2.1. Overview	6
2.2. PCD Module	7
2.2.1. PCD-APP board interfaces	7
2.2.2. PCD-SAM board interfaces	8
2.2.3. PCD-Antenna board interfaces	10
2.3. Assembly	11
2.3.1. Contactless Product Assembly	11
2.3.2. Physical dimension	12
3. Specifications	13
3.1. Operating Conditions	13
3.2. Power Supply	13
3.3. Processors and Controller	13
3.4. Indicator	13
3.5. PCD	14
3.6. Data Communication Interface	15
3.7. Standards & Certification	15
4. Reader Connection	16
5. Installing and Replacing SAM card	17
6. Operational Precautions	18
6.1. General Safety Instructions	18
6.2. Installation	18
6.3. Reader Status Indicators	19
6.4. Battery Safety Information	20
6.5. Fuse Information	20
7. FCC Compliance Statement	20

1. Introduction

The Contactless Product consists of a CTR module, also known as SR802 Contactless Transit Reader (CTR), integrated with a 7 inches LCD display. The CTR module uses the latest NXP front end NFC IC PN5190 for improved RF performance to meet the latest EMVCo L1 and L2 VISA/MasterCard specifications. Its antenna is integrated around the PID making the display as the touch point for validating the Fare Media.

This document aims to describe how to operate the Contactless Product and the connectivity of the reader to the host.

1.1. Abbreviations

Abbreviation	Description
ECU	Electronic Control Unit
CTR	Contactless Transit Reader
LCD	Liquid Crystal Display
LED	Light Emitting Diode
PCD	Proximity Coupling Device
PID	Passenger Information Display
PWM	Pulse-width modulation
RF	Radio Frequency

2. Contactless Product Construction

This section describes the construction of Contactless Product.

2.1. Overview

The SR802 CTR module adopts a modular approach in its design. It comprises of the following components:

CTR module – Application Processor board with SAM and Antenna/Reader board

- o CTR Main processor iMX8M Mini
 - Memory: 2GB DDR4, 4GB eMMC
 - Operating system is Linux Kernel v6.1
- o Secure MCU MAX32552, Memory: 384kB SRAM, 1MB Flash internal, 4MB External Nor Flash
- o NFC IC PN5190
- o Support 2 Secure Embedded SAM ICs and 2x physical SAM card slots.

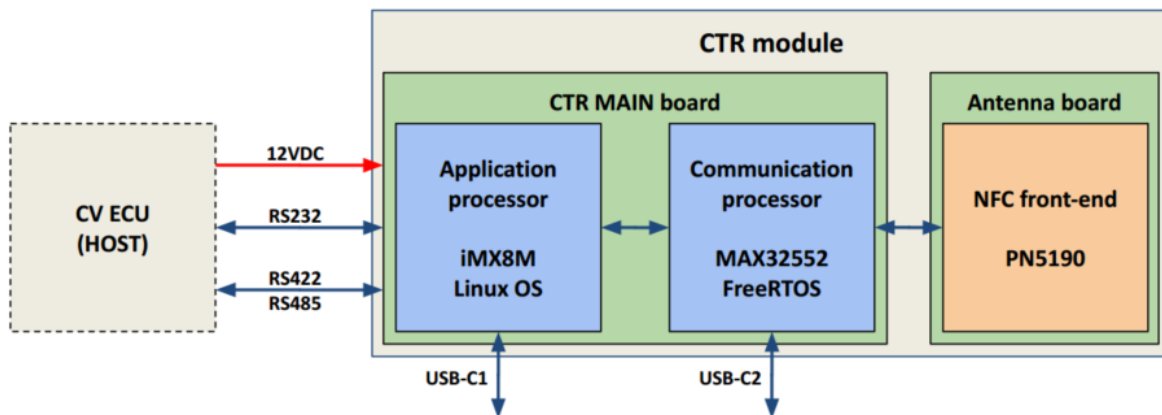


Figure 1. System overview

2.2. PCD Module

2.2.1. CTR Main board interfaces

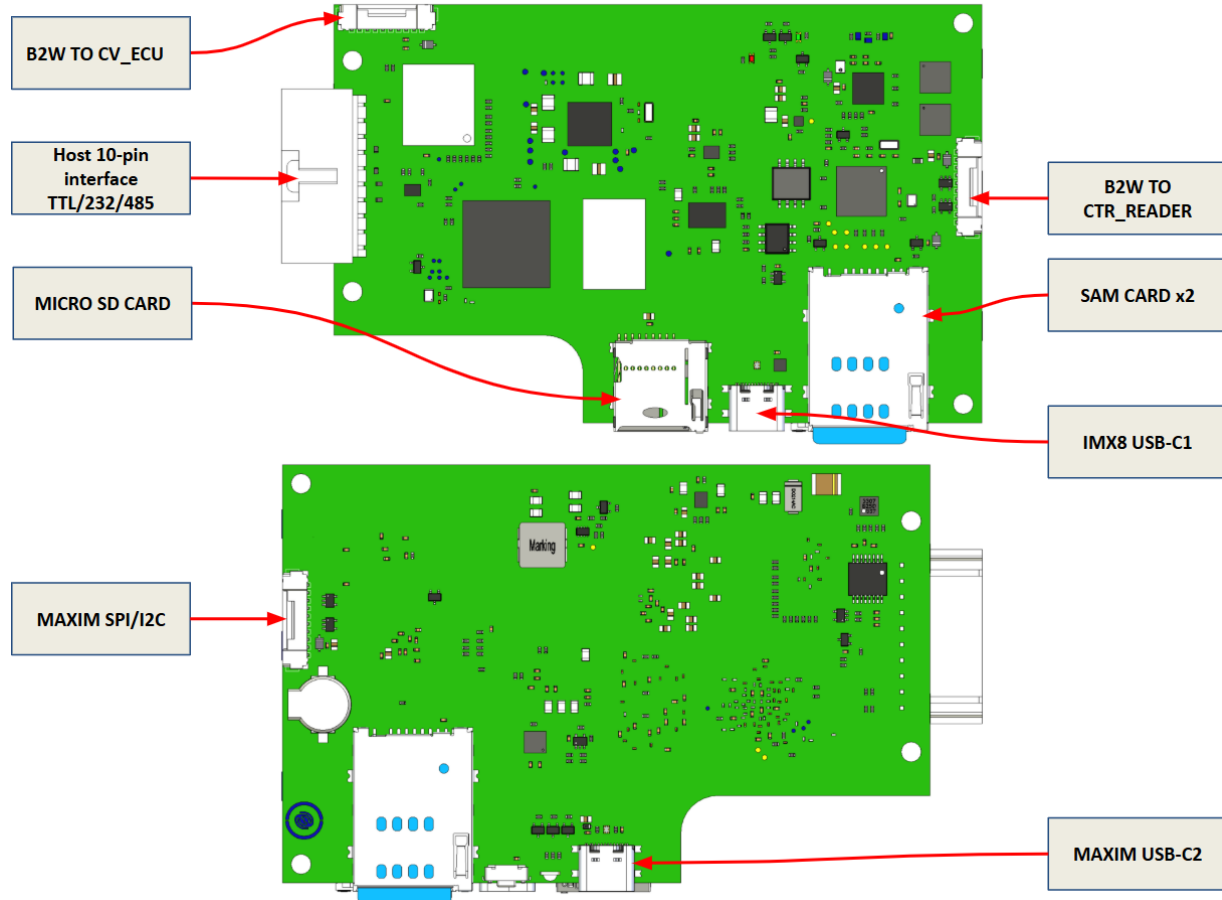
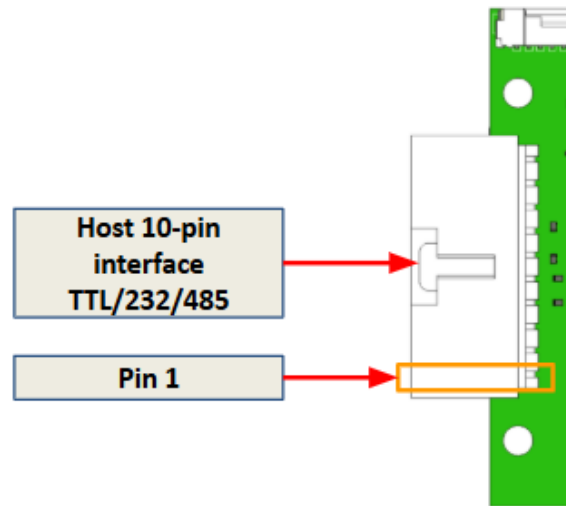


Figure 2. CTR Main board PCB with main connector pinout

Table 1. CTR Main board PCB main connectors

Connector	Function
USB-C1 Connector	USB interface to HOST Support USB 2.0 data only
USB-C2 Connector	USB interface for reader operating in PCSC/CCID mode Support USB 2.0 data only
B2W connector to CTR Reader	CTR Main board to CTR Reader board connection
B2W connector to ECU	CTR Main board to ECU board connection
Host 10-pin connector	Reader power input and RS232/485 connectivity to HOST

CTR Main Host 10-pin connector pinout



Connector	Pinout	Designator	Description
10-pin 2.54mm Host connector	1	J1	HOST_SHDN
	2		GND
	3		+SUP_VIN
	4		RS485_RX-
	5		RS485_RX+
	6		RS485_TX-
	7		RS485_TX+
	8		RS232_TXDOUT
	9		GND
	10		RS232_RXDIN

Figure 3. CTR-Host 10 Pins - main connector pin out configuration

Table 2. CTR Main board PCB main connectors

Connector	Function
USB-C2 Connector	USB interface for reader operation in PCSC/CCID mode
B2B connector	For expansion to 8 SAM
PCD-Host 10-pin conn	Reader power input and RS232/485 connectivity to HOST
PCD-Reader Antenna conn	Connection to Antenna

2.2.2. PCD-Antenna board interfaces

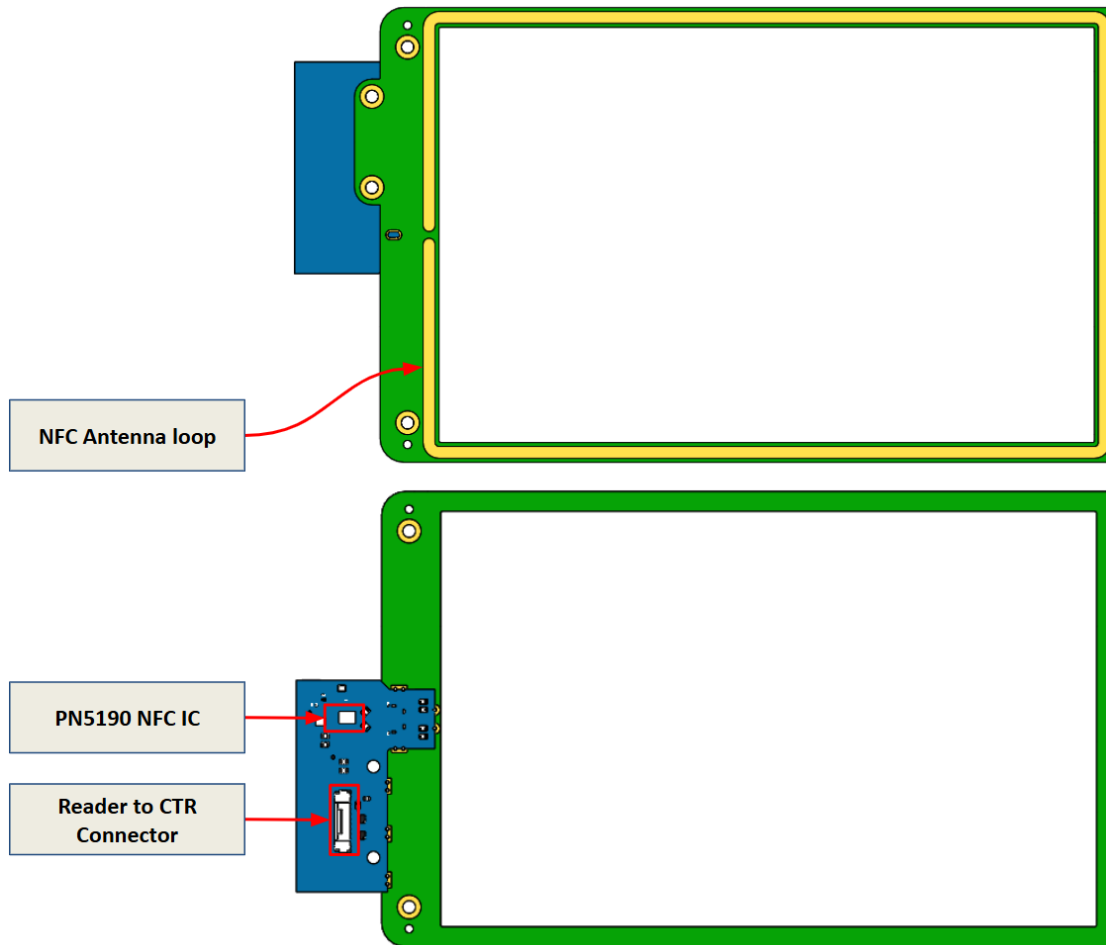


Figure 4. CTR-Reader-Antenna board PCB

Table 3. CTR-READER ANTENNA board PCB main connector

Table 4.

Connector	Function
Reader to CTR Main 10-pin connector	CTR Reader board to CTR Main board connection

2.3. Assembly

2.3.1. Contactless Product Assembly

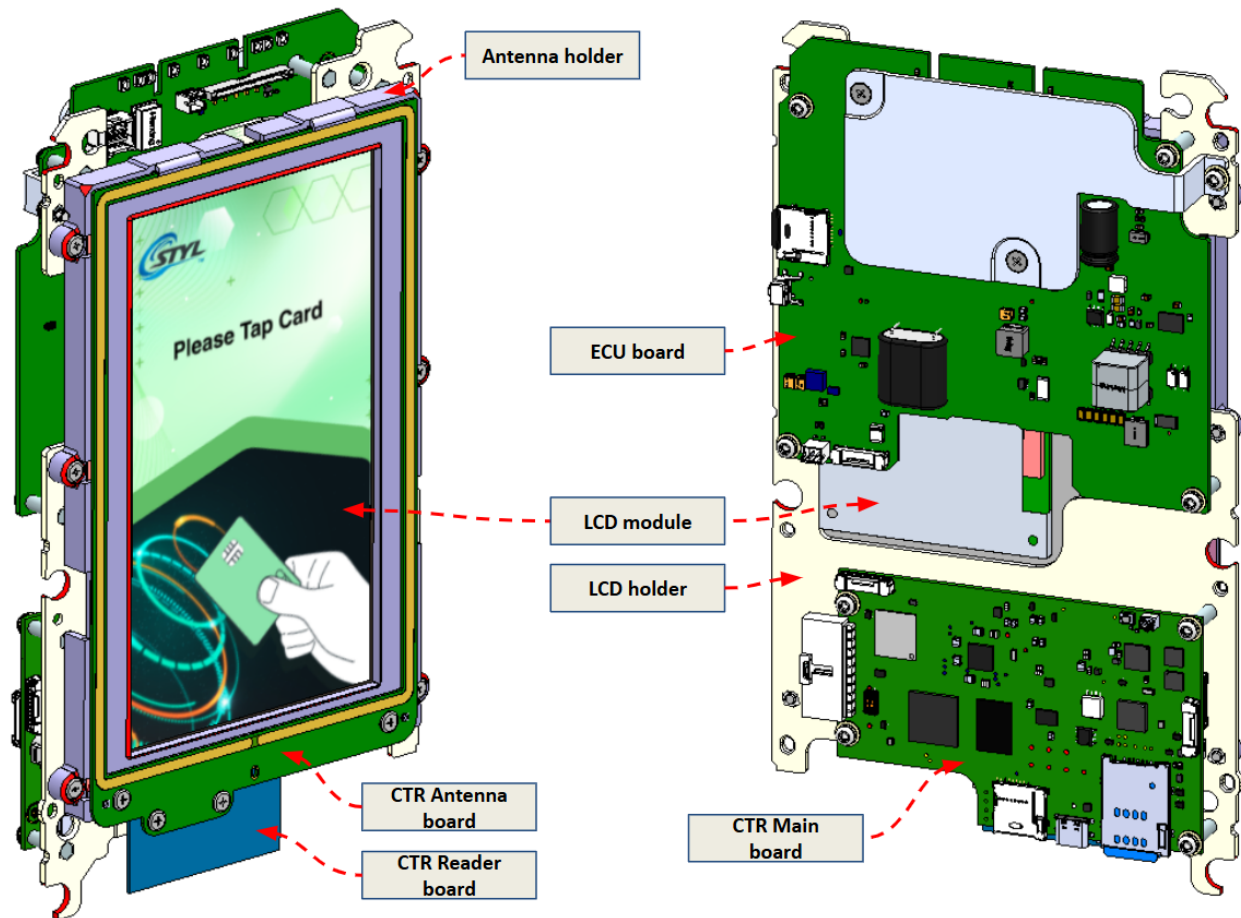


Figure 5. CTR module top and bottom view

2.3.2. Physical dimension

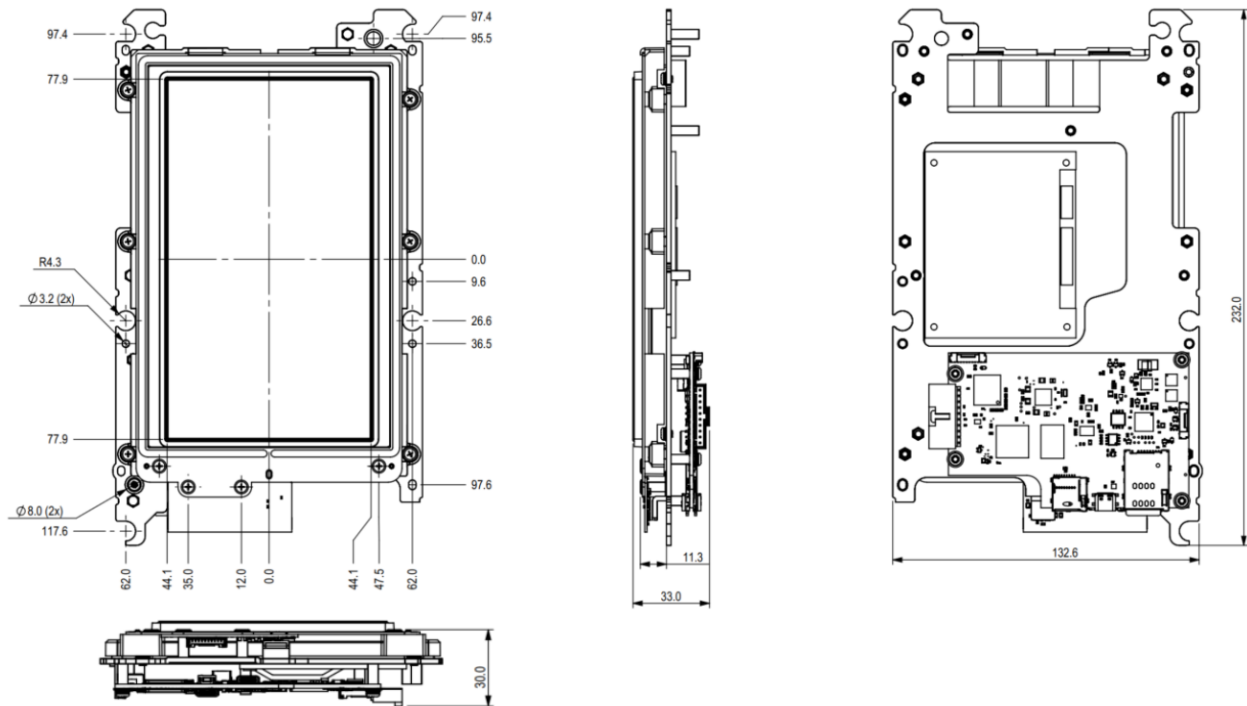


Figure 6. Physical dimension without cables

3. Specifications

3.1. Operating Conditions

No.	Specification	Type	Min.	Typ.	Max.	Unit	Remarks
1	Temperature	Operating	-10	-	+70	°C	
2	Temperature	Storage	-20	-	+70	°C	
3	Humidity	Relative	0	-	95	%	non-condensing

3.2. Power Supply

The PP-Unit power input is 12V from the 10-pin connector for the CTR module.

No.	Specification	Type	Min.	Typ.	Max.	Unit	Remarks
1	10 Pin Connector	Voltage	-	12	-	VDC	
		Current	-	-	650	mA	
2	USB C1	Voltage	-	5	20	VDC	
		Current		500	900	mA	500mA (for USB2.0) 900mA (for USB3.1)
					1500	mA	Voltage max 20V for USB-C PD
3	USB C2	Voltage	-	5	-	VDC	

		Current		500	900	mA	500mA (for USB2.0) 900mA (for USB3.1)
--	--	---------	--	-----	-----	----	--

3.3. Processors and Controller

No.	Specification	Description
1	CTR Main board Application processor	CPU: NXP iMX 8M Mini Dual Lite, 2x A53 M4 RAM: 2GB DDRL3 (external) Flash: 4GB eMMC (external) Device Unique ID 64-bit. Hardware Crystal Oscillator: 24MHz
2	CTR Main board Communication processor	MCU: Maxim MAX32552, ADI/Maxim ARM Cortex-M3 Deep Cover Secure RAM: 256kB SRAM NVS RAM: 8KB AES-encrypted Flash: 1MB dual-bank flash NOR Flash: 4MB flash (external) Hardware Crystal Oscillator: 27.12MHz

3.4. Indicator

No.	Specification	Description
1	CTR – Visual indicator	RGB LED and single LED on CTR Main board
2	CTR – Sound indicator	DC Buzzer on CTR Main board

3.5. PCD

No.	Specification	Description
1	Carrier Frequency	13.56MHz, maximum RF output power of 2W
2	Standard compliance	ISO/IEC 14443-1 to 14443-4 Type A & B NFC comprising ECMA-340, ECMA-352, ISO/IEC 21481 and ISO18092
3	Baud-rate	106kbps, 212kbps, 424kbps, 848kbps
4	Card type supported	MIFARE Classic MIFARE DESFire MIFARE Ultralight Infineon myD-move
5	Other features	Selectable NFC mode Active or Passive Able to power on/off RF field Support discovery, anti-collision and activation mechanisms Support multiple PICCs in one single RF field Support customization of the primary polling sequence Supporting auto-tuning for dynamic adjustment of the transmission power for different loading conditions
6	Communication Range	CPU-based cards (e.g ID-1 CePAS): 8.5cm and above Memory-based cards (e.g., Mifare Ultralight): up to 10cm

No.	Specification	Description
		EMVCo contactless media: according to EMVCo Contactless Interface Specifications. Communication distance adjustable (<10cm) for power consumption saving.

3.6. Data Communication Interface

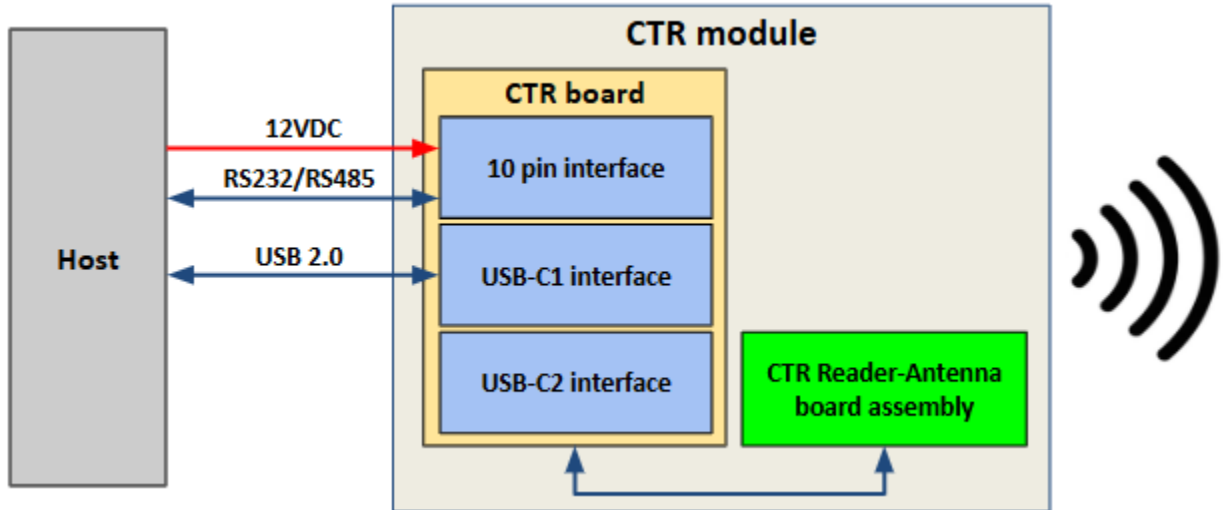
No.	Specification	Description
1	CTR – USB interface	USB-C1: - To Application processor on CTR Main board - USB Type-C UFP with PD Sink 5-20V USB-C2: - To Communication processor on CTR Main board - USB Type-C UFP with standard USB Power 5VDC
2	CTR – Serial interface	RS232/422/485 link Baud-rate configurable 9600, 19200, 115200 and 230400 kbps
3	CTR – SD card	MicroSD card interface
4	CTR – SAM card	ISO-7816 compliant SAM card slot x 4, with provision to expand to 8 slots. - Support class A (5V), B (3V), and C (1.8V) SIM-sized smart card. - Support smart card ISO7816-3 T=0 and T=1 protocol. - Configurable baud rates of 19200, 38400, 76800, 115200, 230400, 414514 bps;
5	CTR – Extended GPIO	User-configurable GPIOs. Support I2C for GPIO Extension port.

3.7. Standards & Certification

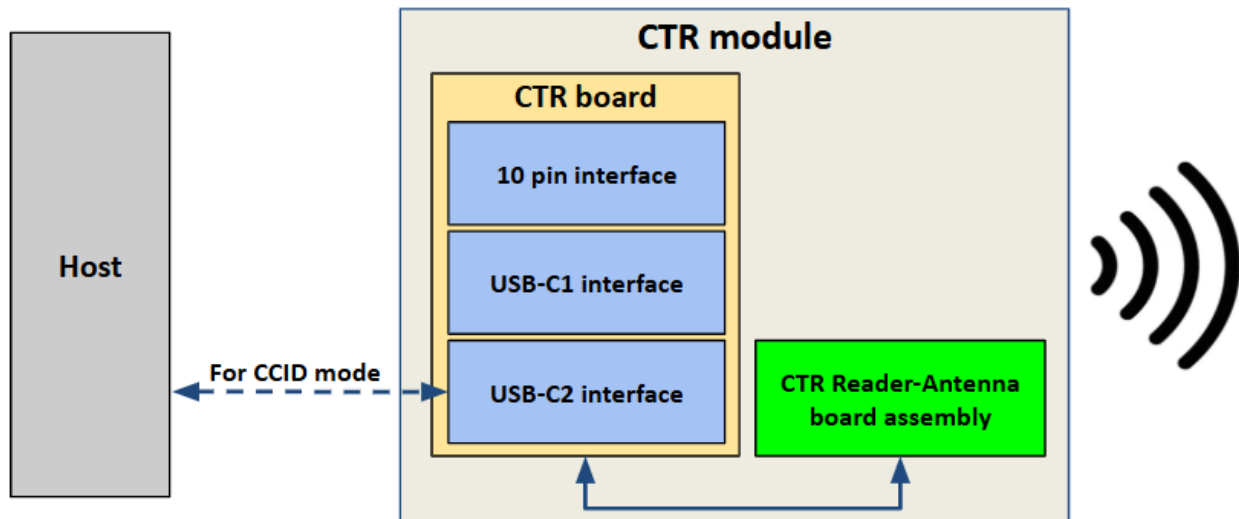
No.	Specification	Description
1	Material	Special Temperature/Humidity/Voltage Range Tests (RS802 RS) Temperature/Power cycle test (RS802 RS) Highly Accelerated Lifetime Test (RS802 RS)
2	Regulatory	CE / FCC approved
3	EMV	ECR Regulation R10 EMV L1 v3.1 EMV L2 MasterCard PayPass MCL 4.0 MasterCard TQM EMV L2 VISA PayWave VCPS 2.2, VCTKS 1.1 EMV L2 AMEX ExpressPay 4.1 PURE NETS eSCC (ISO 10373-6)
5	Mechanical	ASTM D4169 Assurance Level II - Vibration IEC 68-2-30 - Drop and topple
6	Temperature	IEC 68-2-2 – Tests B: Dry Heat IEC 68-2-30 – Tests Db and Guidance: Damp Heat

4. Reader Connection

The SR802 reader interfaces with the host via either a 10-pin serial connection or USB when operating in a host-reader configuration.



In PCSC/CCID mode, the host can connect to the reader using the USB-C2 interface. The reader will present itself as a standard PCSC reader to the Operating System.



5. Installing and Replacing SAM card

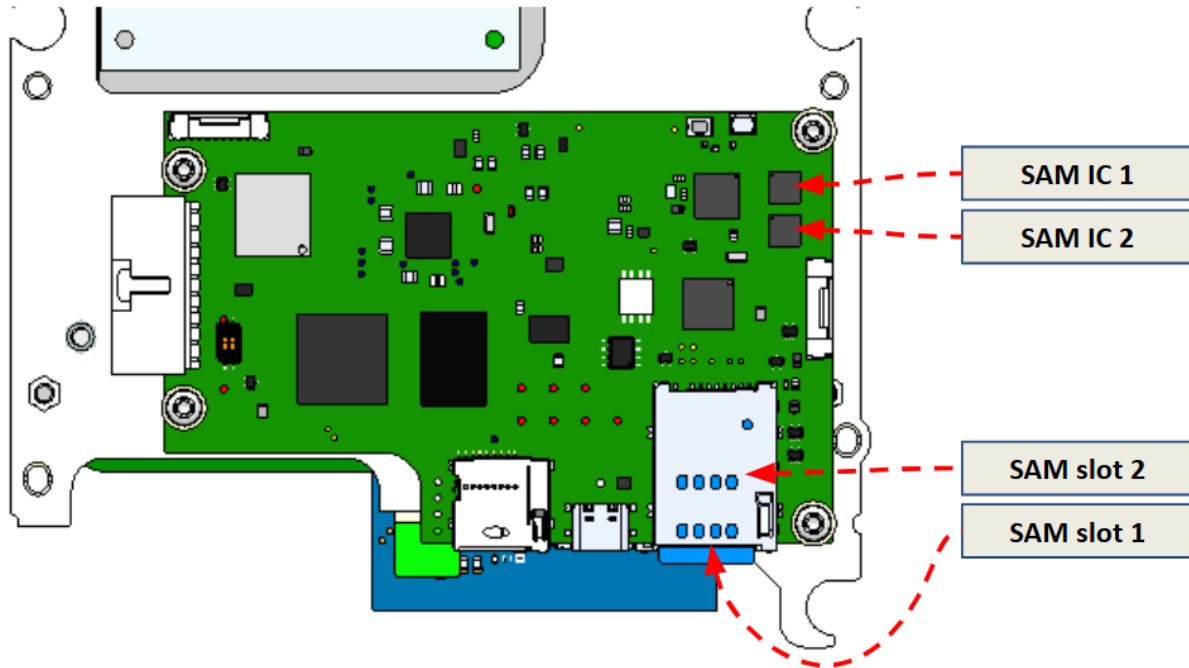
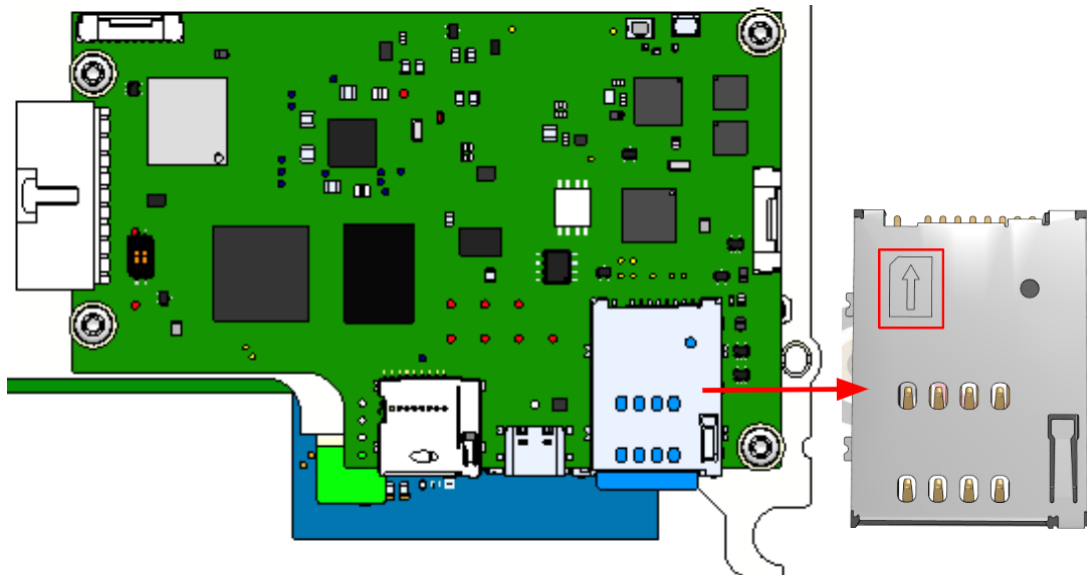


Figure 7. SAM cards position in bottom view

● Installing and Uninstalling SAM cards

Step 1: Insert the SAM card into the SAM connector in the correct direction as shown in the image printed on the connector.



Step 2: Push the SAM card towards the PCBA.

Step 3: Push the SAM card again to remove the SAM card.

6. Operational Precautions

6.1. General Safety Instructions

The SR802 reader contains ESD sensitive components. When managing the device, avoid contact with components, especially the ICs on the boards. The operating voltage of the SR128 reader is 12VDC. The 10pin connector accepts 12VDC. Operating the SR128 reader other than the rated voltage will experience performance deterioration or damage the reader.

6.2. Installation

The SR802 Reader uses inductive coupling to communicate with contactless cards. Therefore, the reader is extremely 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 from these metal surfaces for optimum performance.

6.3. Reader Status Indicators

There are LED indicators and DC Buzzer located on Reader module APP/SAM boards for various Reader status indicators.

Status	Color/Behavior	Description
All Tests Passed	WHITE/Static	Application loaded, ready for operation.
ERROR	YELLOW/Blinking	PN5190 is not responding.
ERROR	BLUE/Blinking	SAM is not responding.
ERROR	RED/Static	Antenna detune.
ERROR	GREEN/Static	RAM error..
ERROR	YELLOW/Static	RF Processor not responding.
WARNING	RED/Blinking	Overvoltage 12.6V.
WARNING	GREEN/Blinking	Undervoltage 11.04V.
WARNING	PURPLE/Blinking	Temperature sensor is not responding.
WARNING	CYAN/Blinking	Overheating 60°C.
WARNING	BLUE/Static	PN5190 EEPROM Config is different from the default file

LED Indications During Firmware Flashing.

Status	Color/Behavior	Description
Programming in Progress	BLUE/Static	Programming in progress.
Programming Completed	PURPLE/Static	Programming completed, ready to restart.
Programming Completed Without the program EEPROM	PURPLE/Blinking	Programming completed. (Program EEPROM setting for USB-C fail)
ERROR	WHITE/Static	Programming in progress. (Program EEPROM setting for USB-C fail)
ERROR	RED/Static	Program MAXIM FW failed
ERROR	YELLOW/Static	Program PN5190 FW failed
ERROR	CYAN/Static	Program EMV Configuration Failed
Programming in Progress	BLUE/Static	Programming in progress.
Programming Completed	PURPLE/Static	Programming completed, ready to restart.
Programming Completed Without the program EEPROM	PURPLE/Blinking	Programming completed. (Program EEPROM setting for USB-C fail)
ERROR	WHITE/Static	Programming in progress. (Program EEPROM setting for USB-C fail)

6.4. Battery Safety Information

CAUTION

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

- a. Use only CR1220, BATTERY LITHIUM COIN 3V 20MM. Observe the following guidelines for safe use of Li Ion batteries.
- b. Do not expose the battery to excessive heat or cold. Do not take a short circuit. It may explode.
- c. To avoid the risk of fire, burn or damage to your battery, do not allow a metal object to touch battery contacts.
- d. Do not disassemble the battery. There are no user serviceable parts inside.
- e. If battery leakage is observed, avoid any contact with the affected area and properly dispose of the battery.
- f. If you come in contact with battery leakage, rinse the exposed area with soap and water. If it contacts the eye, flush the eye with water for 15 minutes and seek medical attention.
- g. When discarding a battery, contact your local waste disposal provider to understand local restrictions for disposal or recycling of batteries.

6.5. Fuse Information

This product contains Fuses in its circuit. The Fuse part numbers are 1206L150/12SLYR; PTC RESET FUSE 12V 1.5A 1206 (Littelfuse).

7. 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 in radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to the 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 with this equipment would void the user's authority to operate this device.