



Kenetics Innovations Pte Ltd

SR14+ABC Transit Reader

CSC-RW Technical Manual

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1.1 Change Log

Version 0.1

- Initial release.
- Values documented in this draft document may not be finalized.

Version 1.0

- Update for final design documentation

Section 2: Introduction

2.1 Purpose

The purpose of this document is to document the hardware specification of SR14+ABC reader. SR14+ABC reader is a contact-less smart reader, designed for automatic fare collection purpose.

2.2 Abbreviations

CSC-RW	Contact-less Smart Card Reader Writer, use interchangeably with SR14+ABC
RF	Radio Frequency

2.3 Terminology

Main Board	Control board of SR14+ABC Reader
Antenna Board	Antenna of SR14+ABC Reader

Section 3: Hardware Specification

3.1 General Hardware Specifications

Embedded Processors / Memory	
CPU Types	Dual CPU Architecture, 1 RF CPU & 1 Application CPU.
Secure Application Module (SAM)	
Number of SAMs	4 x SAM Slots
RF Specifications	
Operating Frequency	13.56 MHz (+/- 50 ppm)
RF Output Power	Up to 0.7 Watt typical.
Protocols Supported	ISO 14443-A, B & C
Reading Range	Memory Cards: up to 10cm CPU Cards: up to 8.5cm
Number of Outputs	2 UFL RF Outputs, Multiplexed and Alternating

Figure 3.1 General Hardware Specifications

On Board Ports	
10 Pin, 2.54mm Pitch	Power In 12VDC, RS232, RS485/TTL
Mini-USB	USB Device
Physical Specifications	
Dimensions	67 x 104 x 18 mm
Weight	200 Grams +/- 20 grams
Antenna Type	
Antenna	1 x Shielded with Ferrite / Spacer Backed, Stackable

Figure 3.2 On-board IO Ports Specification

3.2 Radio Frequency Interface Specification

Specification of Radio Frequency Interface	
RF Protocol Supported	ISO 14443-A, B & C
Card Supported	All ISO14443-X contactless cards
Maximum Communication Range	Logic Card: Up to 10cm Microprocessor Card: Up to 8.5cm
Operating Frequency	13.56MHz
RF Output Power	Up to 0.7 Watt Typical
RF Connector Type	U.FL

Figure 3.3 Radio Frequency Interface Specification

3.3 Physical Dimensions Specifications

Physical Dimension Specifications	
Connectors	<ul style="list-style-type: none"> • 10 pin, 2.54mm pitch right angled, connector • Mini-USB connector
Dimensions	Control Board with Antenna: 67 x 104 x 18 mm
Material	PCBA FR4 Board
Antenna	Separate PCB Antenna
Cable Length (between PCBs)	Approx. 10cm
Operating Temperature	-10°C to + 70°C (0% - 95% RH, non-condensing)
Storage Temperature	-20°C to + 85°C (0% - 95% RH, non-condensing)
Special Treatment	Selective Conformal Coating
Reference Figure	Figure 3.6

Figure 3.4 Physical Dimensions Specifications

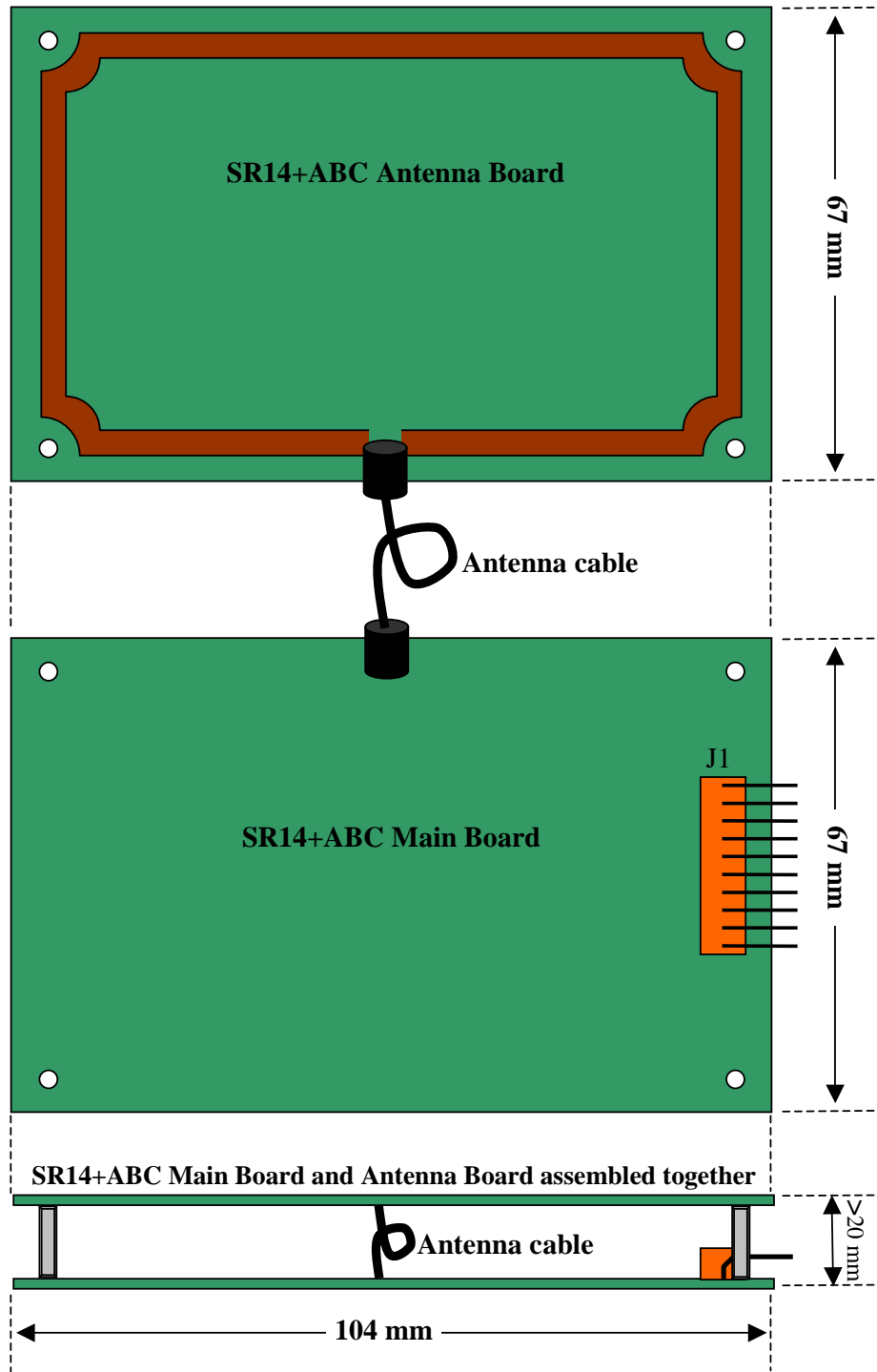


Figure 3.5 SR14+ABC Reader general outlines¹

¹ Stand-off and screws are not part of DCPS, and deliverables.

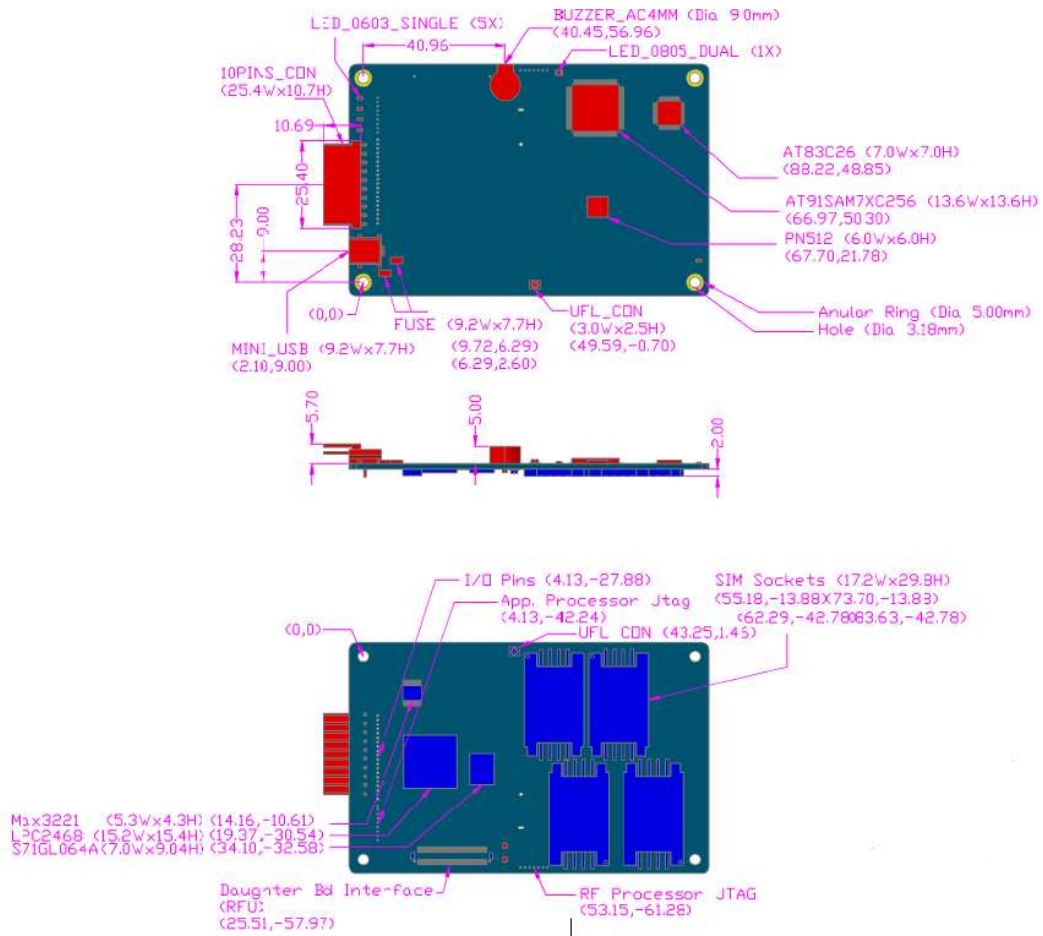
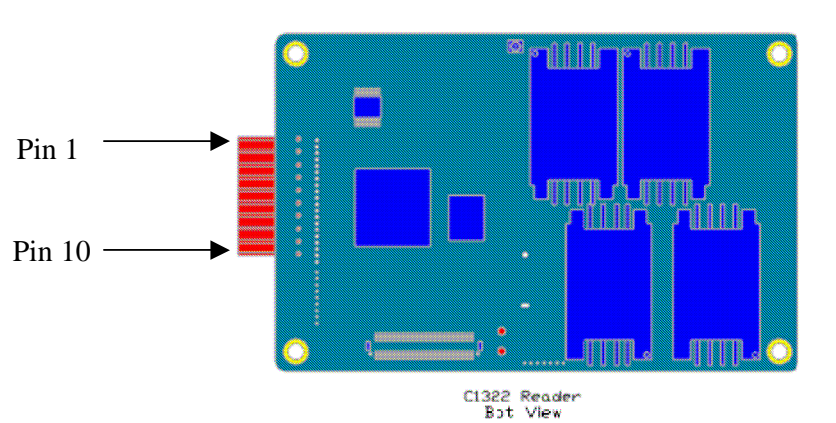


Figure 3.6 SR14+ABC Reader Mechanical Dimensions



Figure 3.7 SR14+ABC Reader Antenna Stackup



10-pin connector – Pin No.		Signals
1	Reset Control	SHDN
2	Power	Power GND
3		Power Supply (+12V)
4	RS485/TTL	RX-
5		RX+ (TTL-Rx)
6		TX-
7		TX+(TTL-Tx)
8	RS232	TXD
9		Signal Ground
10		RXD

Figure 3.8 10 pin connector pin assignment

The reader can be reset by in input voltage above 3 volts on pin 1 of the main connector - SHDN. Any high pulse longer than 500ms will trigger the hardware reset.

3.4 Electrical Specifications

Electrical Specifications	
Supply Voltage	12V DC +/- 10% regulated
Maximum Voltage Ripple	200mVpp
Maximum Supply Current	270 mA (@ room temperature & 50ohm-tuned antenna)
Link to Host	USB, RS232 and RS485

Figure 3.9 Electrical Specifications

3.5 Field Strength Profile of CSC-RW

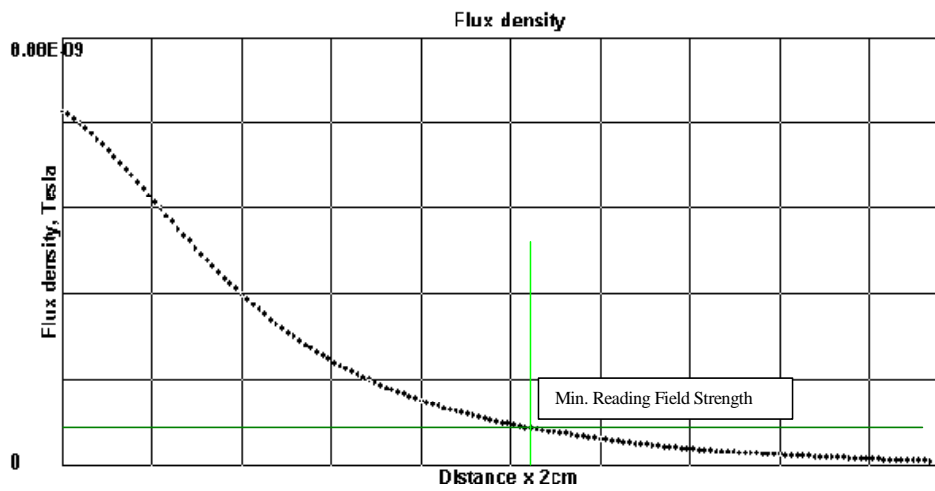
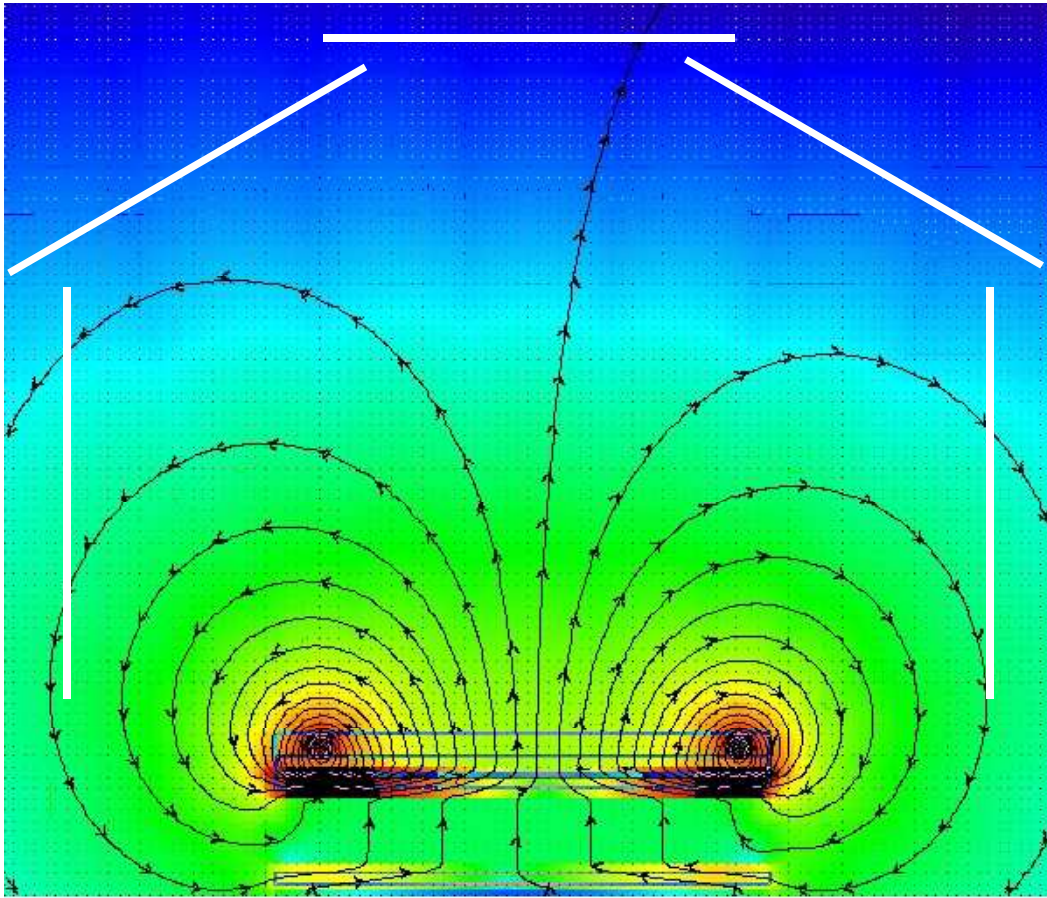


Figure 3.10 Magnetic Field Strength profile of SR14+ABC Reader

Section 4: Operational Precautions

4.1 General Safety Instructions

When using the SR14+ABC reader, general safety precautions should always be followed.

1. Handle bare boards with care
2. Only operate the product with the indicated power supply requirement

4.2 Installation

SR14+ABC reader is a contact-less smart card reader, which uses inductive coupling to communicate with contact-less cards. Precaution must be taken to keep the reader far enough from metal surfaces. Refers to table below for general guidelines. Installation of reader near a metal surface may dramatically shorten the operating distance and increase power consumption

Descriptions	Clearance
Antenna positioned above metallic surface (ferrous or non-ferrous metal alike)	Recommended to be > 20mm away
Any edge or sides of the antenna against any metal surface (ferrous or non-ferrous metal alike)	Recommended to be > 20mm away
Any closed loop formed by metal in close proximity to antenna	To be avoided at all times! Especially within 100mm facing directly parallel to the antenna top face.

Figure 4.1 Installation Recommendations

Please notice that installation recommendations served as a general guidelines for SR14+ABC reader installation. It does not guarantee the performance to be consistent over every reader installed under different scenarios.

Fine-tuning or adjustment of the antenna may still be required to achieve optimal performance.

4.3 Diagnostic Status Indicators

Conditions	Descriptions
LED – All 4 LED ON	Performing Power-On Self Test during Boot-up
Any of 4 LED remains ON after Power-ON Self Test	If any of the 4 LEDs remain ON after Built-in Self Test on Power-Up, there is error occurred and should be send for technical troubleshooting.

Section 5: Compliance Statement

This product is currently pending certification for the following compliances:

1. CE
2. FCC
3. EMC: EN61000-6-4: Part 6-4 – Generic Standards – Emission standard for industrial environment
4. EMC: EN61000-6-2: Part 6-2 – Generic Standards – Immunity standard for industrial Environment

Regulatory Notes

An RFID system comprises an RF transmission device, and is therefore subject to national and international regulations. Prior to the powering and operation of the SR14+ABC reader, relevant compliance certificate should be obtained from the associated watchdog agency. Sale, lease or operation in some countries may be subject to prior approval by the respective government body or other international compliance organization.

For operation of radio telecommunication equipment in the European Union or in countries where the CE (Conformité Européene) mark is recognized, Kenetics Innovations, hereby, declares that the SR14+ABC Reader is in compliance with the essential requirements and other relevant provisions of the European Council's R&TTE directive 1999/5/EC. Note that the SR14+ABC Reader is supplied with its own integral antenna. Users and installers are welcomed to consult the R&TTE directive 1999/5/EC as well as the ETSI EN 302-291-1/2 harmonized standard whether further compliance testing is required if they intend to use their own antenna with SR14+ABC reader control board.

In addition, the length of external cables connected to interface 10 pins of SR14+ABC reader should not exceed 3m. Cable lengths exceeding 3m may not necessarily degrade the performance of the reader but would have to be subject to further compliance test associated with the CE mark. Kenetics will not be liable for cable installations that exceed 3m.

For countries requiring FCC certification, a typical system configuration containing the SR14+ABC reader has been tested and found to be compliant with the limits for a FCC Part 15C (intentional radiator) device. Nonetheless, it is still the responsibility of the customers to have their complete system tested and approved for use from the appropriate compliance agencies/authorities before operating or selling the system. As part of FCC part 15 compliance requirements, it should be noted that:

- Modifications not expressly approved by this company could void the user's authority to operate the SR14+ABC reader.
- The SR14+ABC reader complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) The SR14+ABC reader may not cause harmful interference, and (2) must accept any interference received, including interference that may cause undesired operation.

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