

Installation Instructions SCR-Smart Card Reader
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1 Introduction

The Scheidt & Bachmann (S&B) 13,56 MHz RFID Smart Card Reader System “SCR” is designed for **exclusive application with S&B devices only. It will never be sold as single system. S&B devices are products like ticket vending machines, pay on foot machines, ticket dispensers, ticket validators etc.** with 13,56 MHz RFID functionality.

SCR is integrated by a set of one common sandwich circuit board and one or two (see cp. 4) of 2 different antenna types.


For operational description, pls. see cp. 2.

For block diagram, pls. see cp. 3.

For detailed antenna adaptation and pin assignment, pls. see cp. 4.

For detailed pin assignment, pls. see cp. 5.

For FCC/ IC information, pls. see cp. 6.

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2 Operational description

2.1 Basic operation principle

SCR is a 13,56Mhz RFID Transponder Read/ Write Unit for use in S&B equipment. It can be used for various applications in S&B eqt, such as SmartCards, eTicketing, wireless creditcard processing (EMV), etc. All such devices are under responsibility of S&B.

Corresponding partners for SCR are passive RFID Transponders, based on the ISO 14443 Type A and B or Mifare standard. The transponders are passive units; the power supply of transponders is realized via RF link of the SCR module.

SCR serves as an interface between data medium (transponder) and the S&B subsystem:

- RF modulation and demodulation
- Digital Data generation and detection
- Intermediate memory (for processing and commands)
- I/F to S&B eqt. (such as Ticket vending machines)

2.2 System Structure

The processor-based SCR solution consists of two PCBs (CPU module and baseboard):

The **CPU module** contains the CPU together with an FPGA. All necessary interface lines are fed to two connectors. The CPU Module is plugged into the baseboard.


On the **baseboard** resides the power supply that converts the input voltage of 8V—12V into 5V and 3.3V. Alternatively the SCR can be supplied with a 5V power supply. Additionally two chips are implemented to interface to two independent antennas for transactions with contact less smartcards. Another chip is used, to interface to four SAM (secure access module) sockets. Finally there are all connectors, transceivers and other components integrated, that the SCR needs to communicate to a host (USB 1.1, RS232) and to the customer (antenna, LEDs, buzzer).

The **Smart Card Target** (that is the area, where the customer shall tag the contact less smart card) is a separate PCB, designed as antenna, with LED and a buzzer as user interface. The SCR supports two independent antennas.

Four SAMs (secure access module) sockets are implemented to handle keys and to store transaction data (depends on application).

The SCR is equipped with a USB compliant interface to perform upload of transactional and event data and download of firmware versions and operational data.

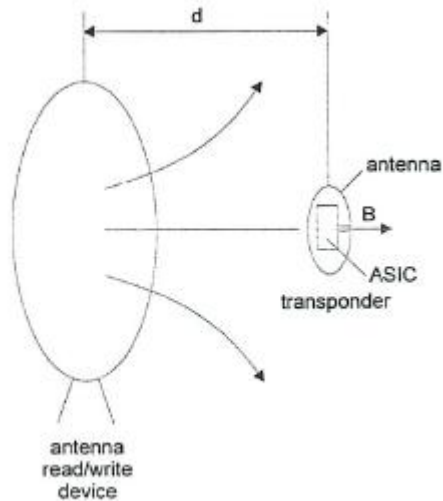
The SCR can be equipped with a RS232 interface to perform the same data exchange that is possible with USB.

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2.3 RF coupling of SCR and Transponder

Since electromagnetic coupling is used for data transmission between SCR and transponder and power supply of the transponder the electromagnetic field is the most important attribute. The following figure shows the run of the electromagnetic field lines with the transponder placed in the antenna field.

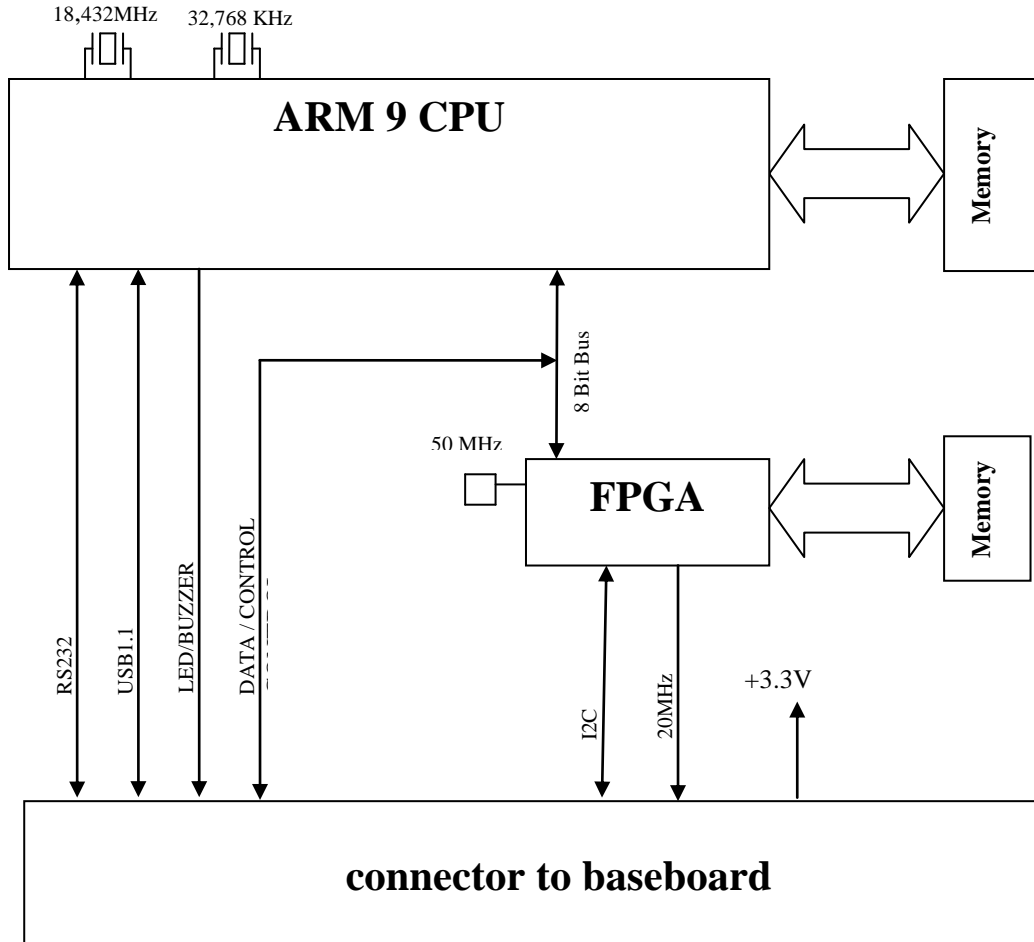



The RF coupling is according to all layers of ISO 14443 Type A and B are supported.

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3 Block diagram: Circuit Board Transponder II 03 62101 0

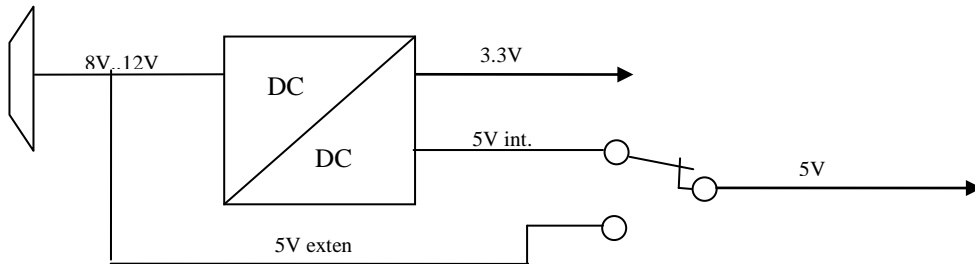
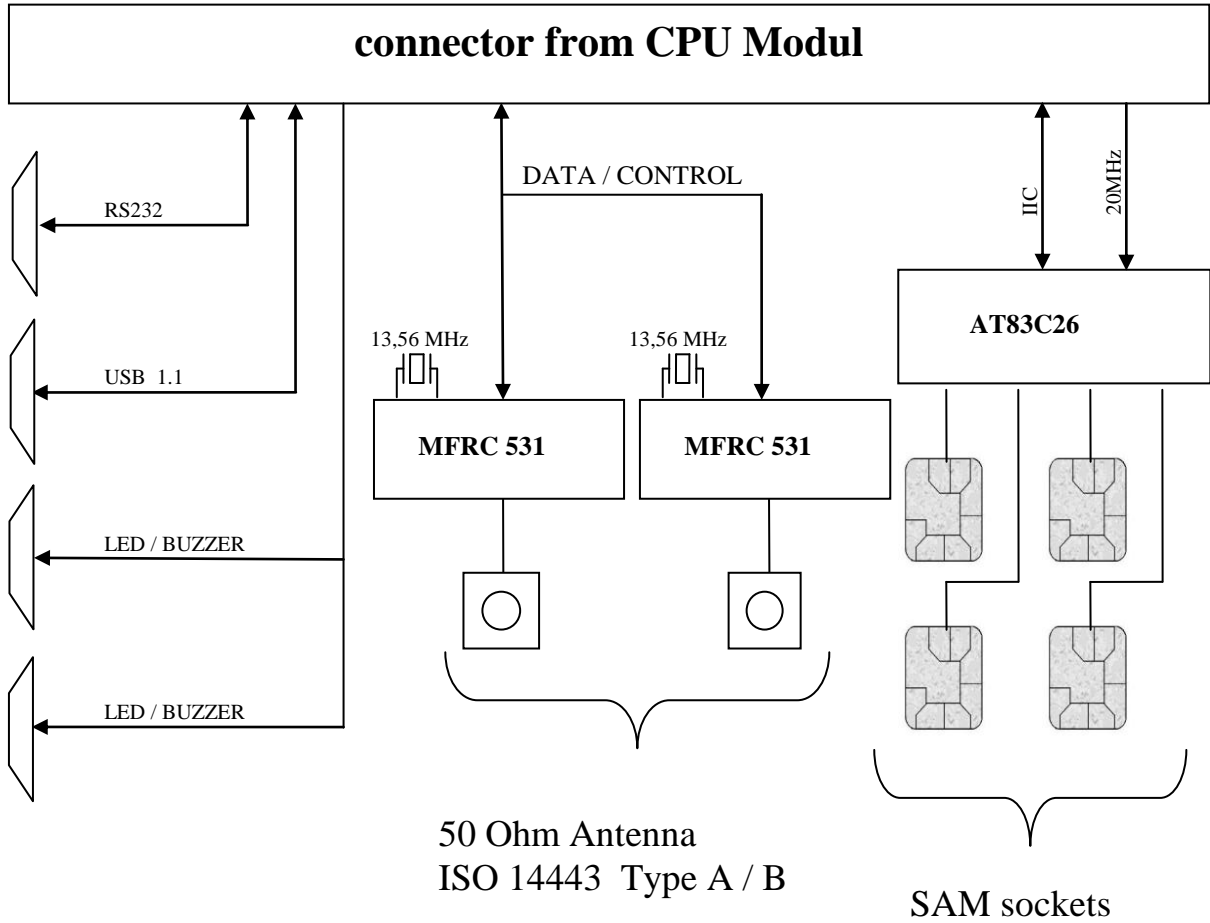
CPU Module 03 53742 0




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Baseboard 03 51634 0



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4 Antenna Setup

For SCR system, the following antenna setups can be used

Antenna Connector BU500 Antenna Connector BU550

03 57570	none
03 64127	none
none	03 57570
none	03 64127
03 57570	03 57570
03 57570	03 64127
03 64127	03 57570

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5 List of Cables and components

Cable

Function	Connector SCR	Type	No			Count	Length
Power 5V 5V 8V-24V 8V-24V	ST950	2 x AWG20 UL SW	50 62106	0		1	0-3m
		3 x AWG20 C UL SW	50 60120	0	A		0-3m
		2 x AWG20 UL SW	50 62106	0			0-3m
		3 x AWG20 C UL SW	50 60120	0	A		0-3m
LED/Buzzer	ST572 / ST582	6 x AWG24 C UL SW	50 61441	0	A	2	0-7,3m
Antenna	BU500 / BU550	M17 / 113-RG316	5063381	0		2	0-7,3m
Host RS232 USB	ST301	4 x AWG24C UL CSA SW	50 61440	0	A	1	0-3m
	BU410						0-5

Used components

Component	PCB	Version	Index	Remarks
Reader Baseboard	03 51634	0	I	The Index shows current design state. Earlier versions have been part of earlier FCC/IC certification. Further indices will be covered by this certification, as long as radio characteristics will not be affected.
Reader CPU Module	03 53742	0	I	./.
Antenna Type A	03 57570	./.	./.	To achieve the best performance the adaptation of the antenna must be changed, depending on the housing situation (resonance adaptation). Scheidt & Bachmann ensures, that resonance parameters will be met under housing conditions.
Antenna Type B	03 64127	./.	./.	To achieve the best performance the adaptation of the antenna must be changed, depending on the housing situation (resonance adaptation). Scheidt & Bachmann ensures, that resonance parameters will be met under housing conditions.

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6 FCC/IC information

Important note:

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

The device is labelled as follows:

<p>This device complies with part 15 of the FCC and Industry Canada Rules. Operation is subject to the following two conditions:</p>
--


- | |
|---|
| <p>(1) This device may not cause harmful interference, and</p> <p>(2) this device must accept any interference received, including interference that may cause undesired operation.</p> |
|---|

<p>Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.</p>
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The device, that contains the SCR module, is labelled outside the device referring to the enclosed module. This exterior label can use wording such as the following:

Contains FCC ID:	O5K-SCR
Contains IC ID:	8312A-SCR

Any similar wording that expresses the same meaning may be used.

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