RFID Reader for PORT

PCR2-TWN4

Contents

1 Introduction

The PCR2-TWN4 is a LF Card Reader used in the PORT Technology devices (see table below). The HW is the same for both working frequencies and it is configured according the operation.

PCR2-TWN4 is the successor of PCR-TWN4 resp. PCR-TWN4-mini adapted to the next generation PORT design. The major difference is the arrangement of camera and RFID reader within the fancy RGB LED circle.

The target devices for PCR2-TWN4 are:

PORT1	PORT4	PORT5
		

1.1 Scope

The PCR2-TWN4 board implements the following main parts and functions:

- USB connector to PORT5
- Connector for NJR radar
- Fancy RGB LED circle: on-board and off-board (PCRI, RLEB)
- Interface to external I/Os:
  - Wiegand output
  - RS232 interfaces
  - RF beam radar interface
- hole for camera
- BLE (support for HID virtual credentials)

1.2 Compatibility

The PCR2-TWN4 is hardware compatible with the PCR2 PCB and software compatible with PCR-TWN4 resp. PCR-TWN4-mini.

1.3 References

REF[1] PCRI2.Q + PCR2.Q + RLEB1.Q, technical description
Q xx xxx xxx Ae 0

REF[2] PCR-TWN4, Reader for PORT
July 2 2015

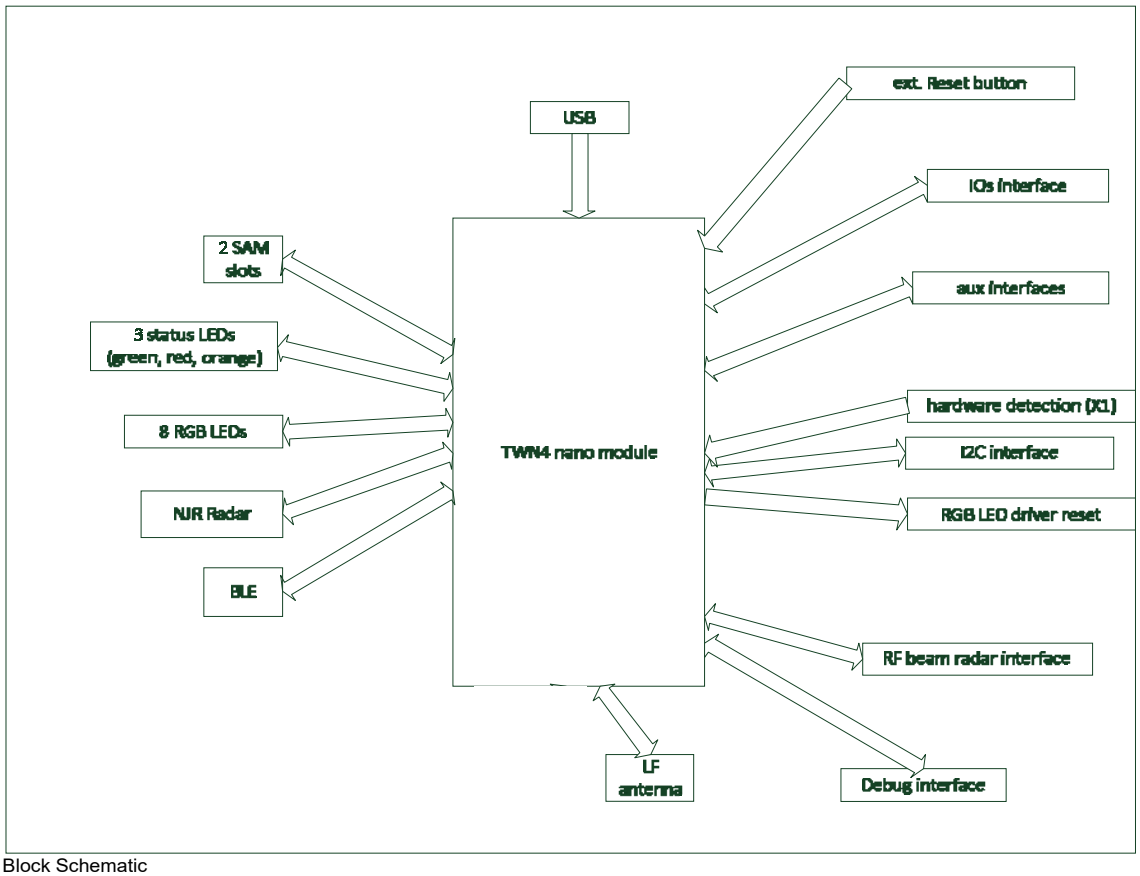
REF[3] PCR-TWN4-mini, Readerfor PORT
Feb 4 2016

REF[4] data sheet TWN4 MultiTech Nano module
www.elatec-rfid.com

REF[5] blank board PCR2.Q, mechanical drawing
Q xx xxx xxx Ae 0

REF[6] PCRI2 camera support + support cap, mechanical drawing
Z 419 06623 Ae 0

2 General board implementation



Block Schematic

The PCR2-TWN4 is composed of a main module (TWN4) that communicates through USB with a Host (main board inside the PORT Terminal).

The TWN4 module is able to manage a variety of interfaces (RGB LEDs, IOs, proximity detection, status LEDs, …) and in the same time is also able to manage the reading of cards/tags through the HF and/or LF antenna.

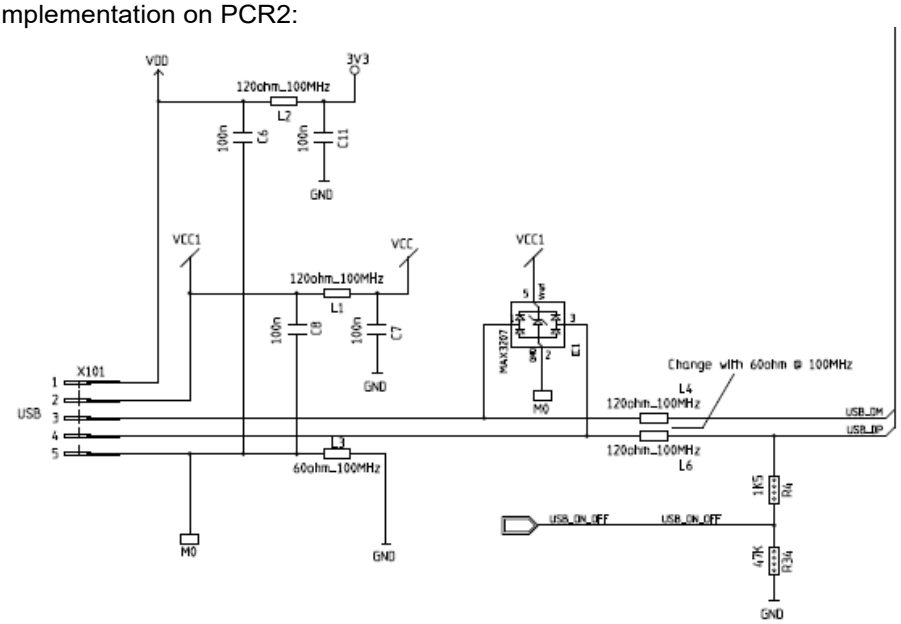
All the activities on the PCR2-TWN4 are managed from the host processor inside the PORT Terminal.

2.1 USB

signals on connector USB according REF[1], chapter 3.3.2:
- VDD
- VCC1
- USB_DM
- USB_DP
- M0

power supply according REF[1], chapter 2.4

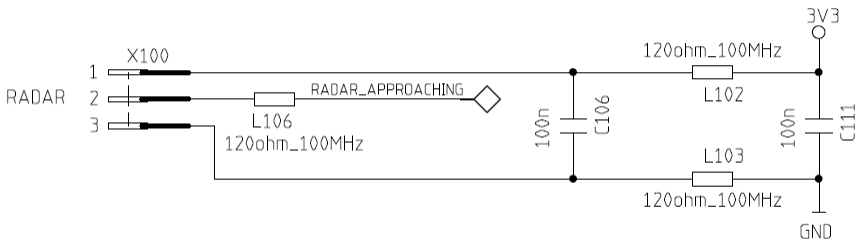
implementation on PCR2:



2.2 RADAR

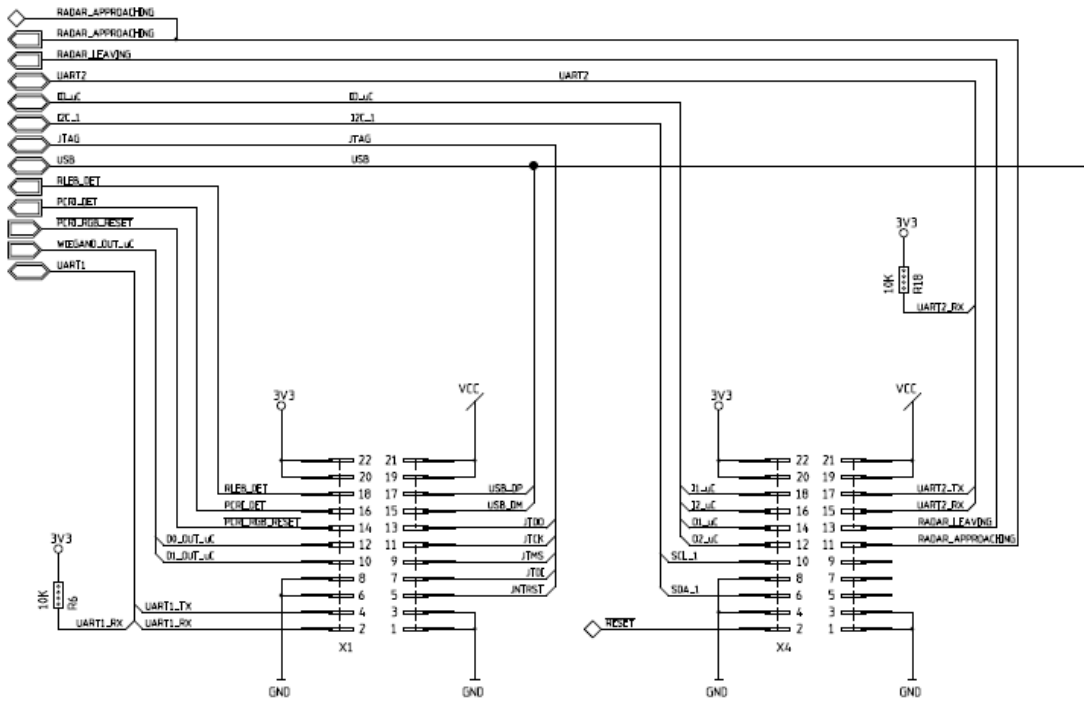
As a standard, NJR radar is connected. However, with an extension board (analog filter) it is also possible to connect a radar by RF Beam.

signals on connector RADAR according REF[1], chapter 3.4.2:
- 3V3
- RADAR_APPROACHING (NJR or RF Beam)
- GND



2.3 IO-Extension Connector X1 and X2

implementation on PCR:



2.3.1 X1 - USB

signals on connector X1 according REF[1], chapter 3.5.2.1:

- USB_DM
- USB_DP

2.3.2 X1/X2 - Power Supply

signals on connector X1 and X2 according REF[1], chapter 3.5.2.1 and 3.5.2.2:

- GND
- VCC
- 3V3

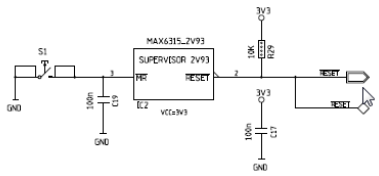
power supply according REF[1], chapter 2.4

2.3.3 X2 - Ext. reset button

signals according REF[1], chapter 3.5.2.2:

- RESET~

implementation on PCR (on-board reset button not required):

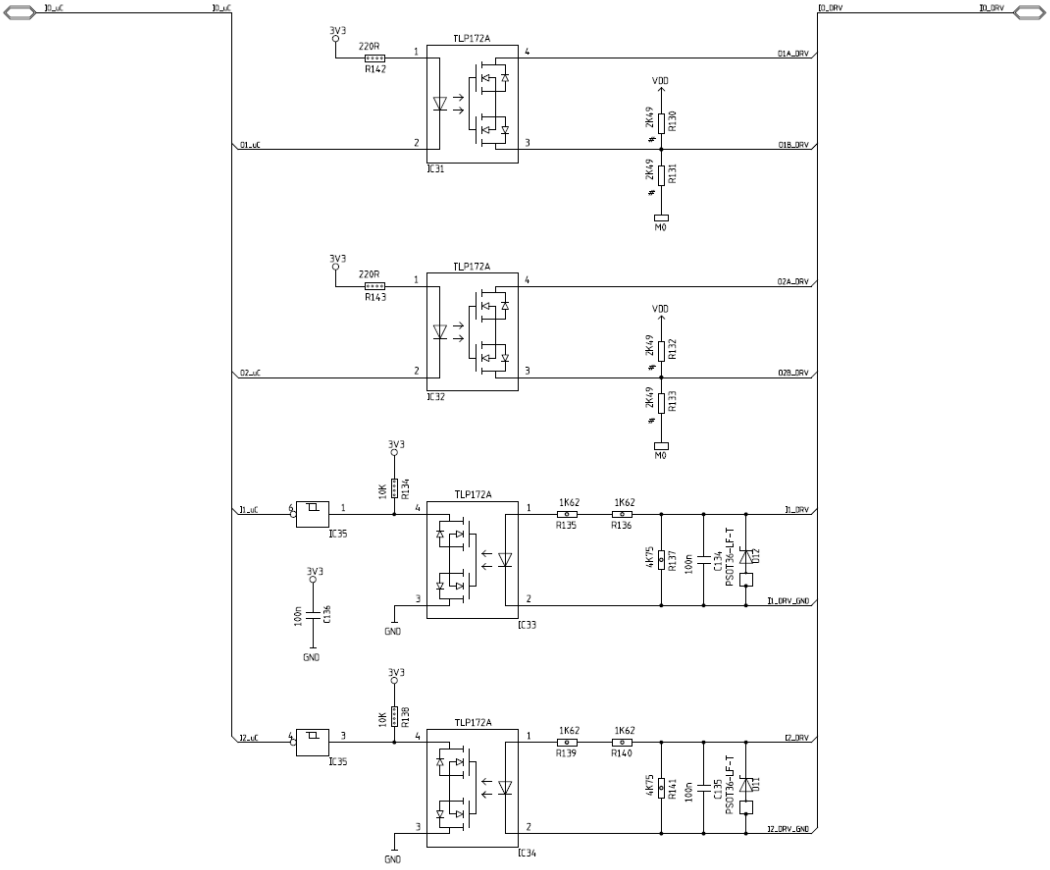


2.3.4 X2 - IOs

signals on connector X2 according REF[1], chapter 3.5.2.2:

- O2_uC
- O1_uC
- I2_uC
- I1_uC

external circuit on PCRI2:

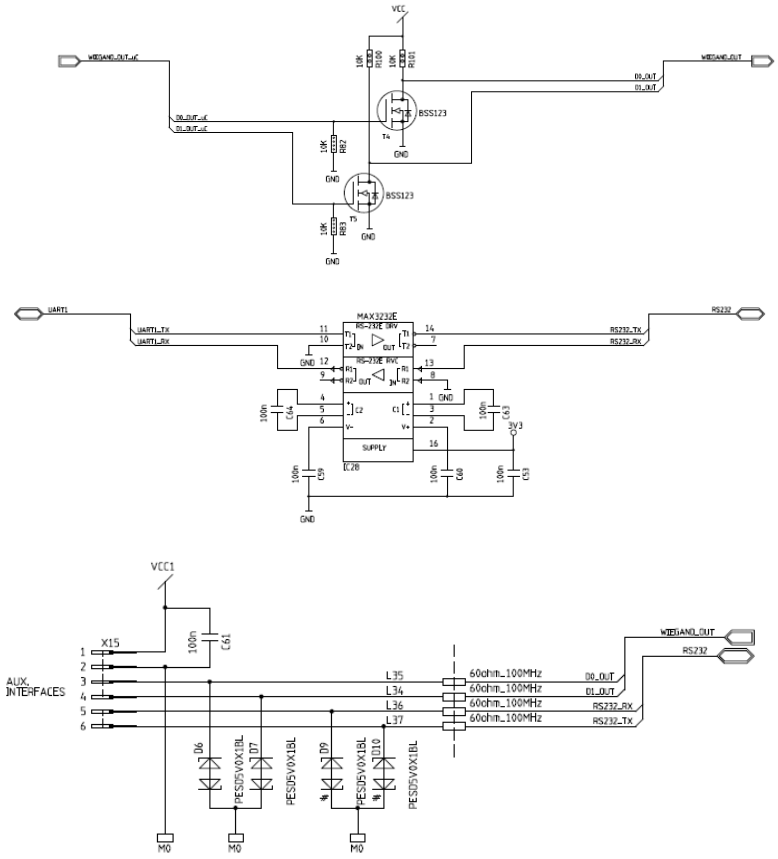


2.3.5 X1 - aux interfaces - wiegand output and UART

signals on connector X1 according REF[1], chapter 3.5.2.1:

- D1_OUT_uC
- D0_OUT_uC
- UART1_RX
- UART1_TX

external circuit on PCRI2:

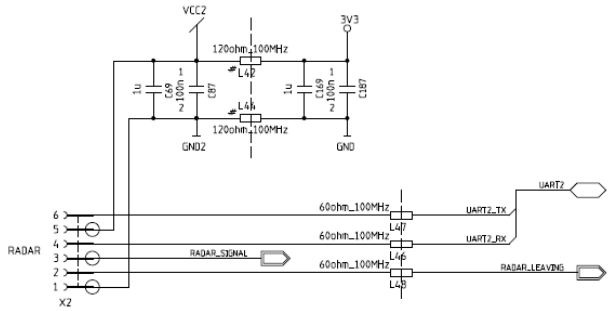


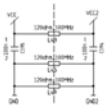
2.3.6 X2 - External radar

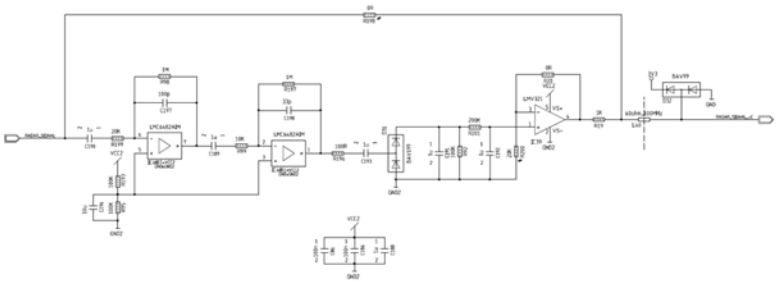
The RADAR interface designed for both: NJR and RF Beam. When NJR is used the UART can be used to set the sensitivity (however the default value on the NJR is supposed to be ok for our application).

signals on connector X2 according REF[1], chapter 3.5.2.2:
- RADAR_APPROACH (NJR and RF Beam)
- RADAR_LEAVING (NJR only)
- UART2_RX (NJRonly)
- UART2_TX (NJRonly)

Circuit on external PCRI board:







2.3.7 X1 - Hardware detection

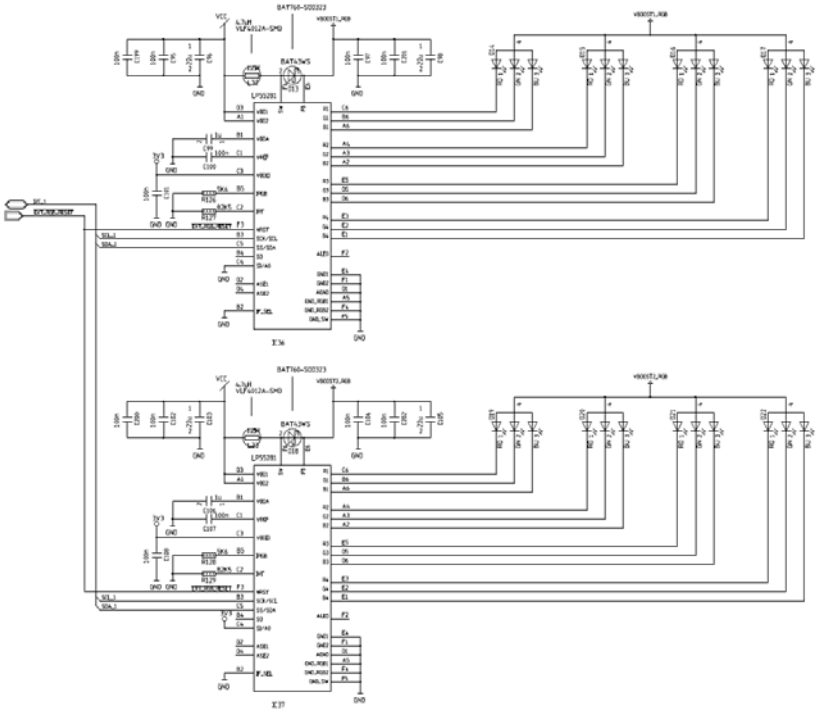
signals on connector X1 according REF[1], chapter 3.5.2.1:
- PCRI_DET
- RLEB_DET

hardware detection according REF[1], chapter 2.8

2.3.8 X2 - I2c serial interface

signals on connector X2 according REF[1], chapter 3.5.2.2:
- SDA_1
- SCL_1

external circuit on PCRI2:



2.3.9 X1 - LED driver reset output

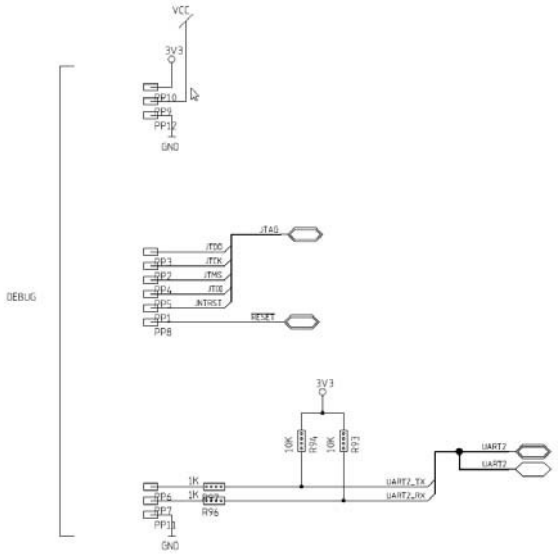
signal on connector X1 according REF[1], chapter 3.5.2.1:
- PCRI_RGB_RESET~

2.3.10 X1/X2 – Debug interface

signals on connector X1 according REF[1], chapter 3.5.2.1:
(to be used for Arm Cortex M0?)
- JTDO
- JTCK
- JTMS
- JTDI
- JNTRST
- RESET~

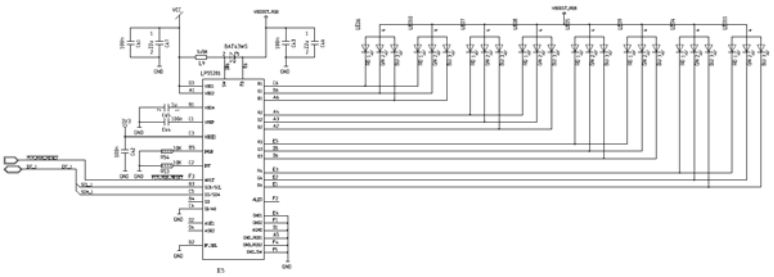
signals on connector X2 according REF[1], chapter 3.5.2.2:
- UART2_TX
- UART2_RX

External circuit on PCRI2:



2.4 on-boad RGB LEDs

implementation on PCR2:



The RGB LED controllers (internal and external) are coordinated by an additional Cortex M0 processor.

2.5 TWN4 module

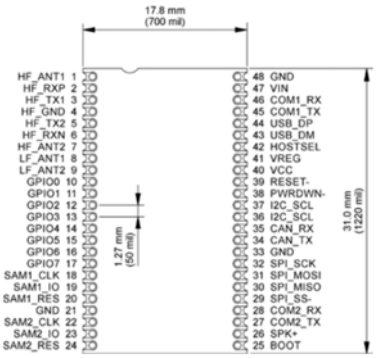
TWN4-nano module is required to be used.

The main function of the TWN4-nano module is simply to manage the RF part of the PCR2-TWN4. At the end is the interface between the RF part and the digital part.

Default hardware option with Elatec's TWN4 MultiTech Nano module with PI taglist. PI taglist should always be activated independent if TWN4 SIO card (HID iClass) is present in SAM socket. A second hardware option is TWN4 MultiTech Nano LEGIC 42. See also REF[4].

Version C0
(SMT)

Version C1
(THT)



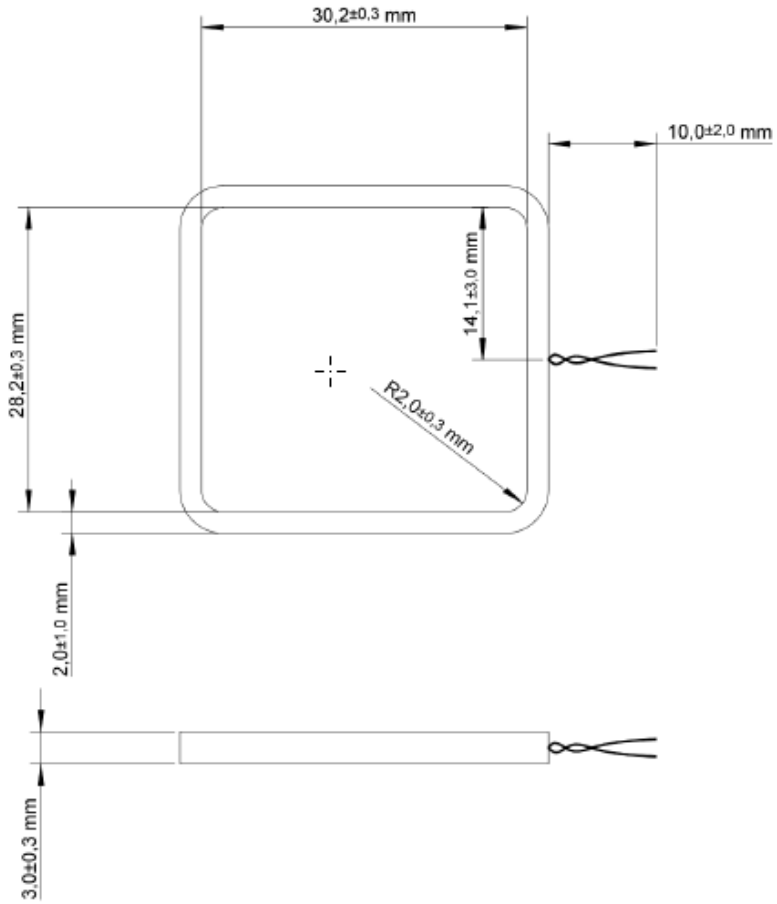
radio

The RF frontend handles the transceiver functionality for contactless communication with a transponder at a frequency of 125 kHz with ASK, FSK or PSK.

LF antenna

Housing with metal backplate of PORT1 and PORT4 device must be taken in account.
Reading distance of min 2 cm is requested.

LF antenna implemented as an additional air coil and with the following features:



Additional details:

- Inductance: 490µH ± 5%
- Baking wire 0.165mm

2.7 BLE

Support HID virtual credentials

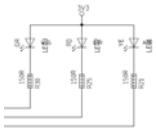
2.8 SAM sockets

prepared for HID iClass SE Processor (socket 1), customized SAM (socket 2). Socket of HID iClass SE processor might be on the front side of the PCB.

Connector: see picture above
Silkscreen: SAM1 resp. SAM2

2.9 Status leds

LEDs according REF[1], chapter 2.13.2

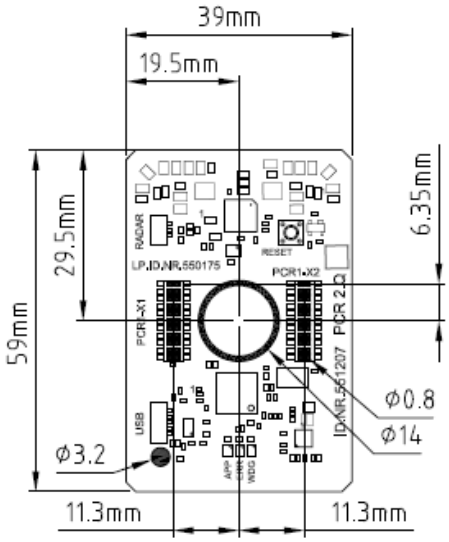


3 Mechanics

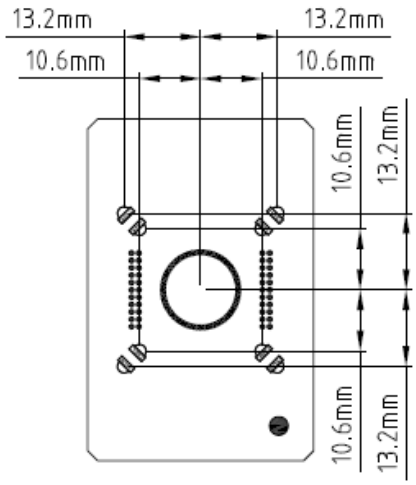
according REF[1], chapter 4

PCB size: 59 mm x 39 mm
PCB thickness: 1.0 mm

extraxt from REF[5]:



TOP SIDE



BOTTOM SIDE

Camera hole	positioning according mechanical drawing beware of camera support (REF[6])
X1 and X2 connector to PCRI or RLEB:	positioning according mechanical drawing
RGB LEDs	positioning according mechanical drawing
USB connector to PORT5 host	positioning free
RADAR connector to NJR radar	positioning free

4 Reliability

see REF[1], chapter 5

Certifications

The PCR2-TWN4 comply from 15.19 / 15.21 and RSS-Gen clause 8.4.

The PCR2-TWN4 complies with the following requirements:

- FCC (Federal Communications Commission) Part 15
- IC (Industry Canada) RSS-102

This PCR2-TWN4 complies with Industry Canada's licence-exempt RSSs. Operation is subject to the following two conditions:

- This device may not cause harmful interference, and
- This device must accept any interference received, including interference that may cause undesired operation.

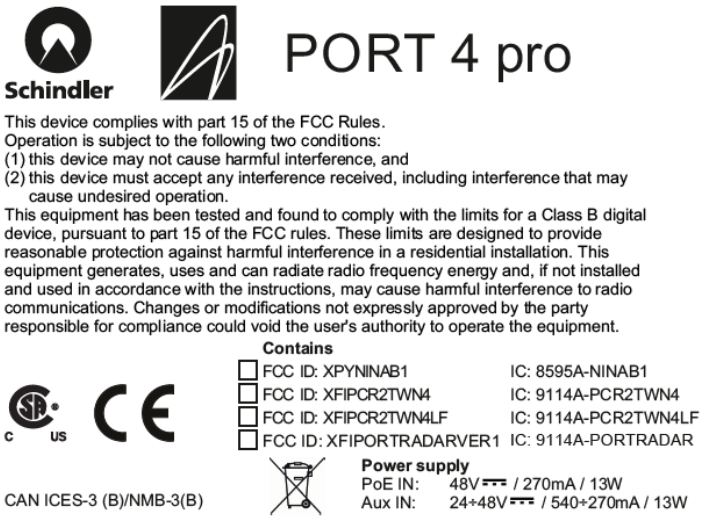
Changes or modification not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

FCC ID: XFIPCR2TWN4LF

IC ID: 9114A-PCR2TWN4LF

All the PORT products that include the PCR2-TWN4 module are compliant with the FCC Part 15 Subpart B ed ICES 003.

PCR2-TWN4LF
FCC ID: XFIPCR2TWN4LF
IC: 9114A-PCR2TWN4LF



5 Document History

2017 Mai 29	Scs	1st draft
2017 Juni 2	Scs	Adapted to feedback from A. Buetti
2018 Nov 16	Bua	Version 2 chapter *2. General Board Implementation*: - subchapter *radio introduced with description of modulation schemes* - subchapter *HF and LF antenna* introduced with description of physical antenna dimension chapter *4. Reliability* - subchapter *Certifications* introduced