

TECHNICAL INFORMATION MANUAL

Revision 1 – 03/04/2023

R3101C

Lepton³x1

**25dBm 1-Port RAIN
RFID Reader Module**



R3104C

Lepton³x4

**25dBm 4-Port RAIN
RFID Reader Module**



Visit the [Lepton³x1 R3101C](#) and [Lepton³x4 R3104C](#) web pages,
you will find the latest revision of data sheets, manuals,
certifications, technical drawings, software and firmware.
All you need to start using your reader in a few clicks!

Scope of the Manual

The goal of this manual is to provide the basic information to work with the Lepton³x1 R3101C and Lepton³x4 R3104C Readers.

Change Document Record

Date	Revision	Changes	Pages
23/06/2022	00	Preliminary revision	-
03/04/2023	01	Added CE Declaration of Conformity and UKCA Declaration of Conformity in the <i>Regulatory Compliance</i> chapter	30÷35
		Modified <i>Key Features</i> paragraph	9
		Removed <i>Tab: Startup and Wakeup Time</i> and <i>Tab.: Inventory Performance</i>	
		Modified <i>Tab. 3.4: Supply Current Specifications</i>	15
		Modified <i>Evaluation Board</i> chapter	17÷29
		Modified <i>Fig. 1.3: Evaluation Board for Lepton3x1 and Lepton3x4 readers</i>	7
		Removed <i>WKUP pin</i> information in <i>Hardware Interface</i> chapter	10÷16

Reference Document

[RD1] EPCglobal: EPC Radio-Frequency Identity Protocols Class-1 Generation-2 UHF RFID Protocol for Communications at 860 MHz – 960 MHz, Version 2.0.1 (April 2015).

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1 INTRODUCTION

Description

Readers

The Lepton³x1 (Model R3101C) and Lepton³x4 (Model R3104C), embedded readers of the easy2read[®] product line, are ultra compact readers for low power, high performance RAIN RFID applications.

With programmable output power from 10 dBm to 25 dBm, the readers can detect tags at more than 2 m of distance (depending on antenna and tag dimensions).

Due to their low power consumption, the modules are specifically designed to be easily integrated in battery powered devices.

The radio frequency core of the modules is based on the Impinj E310 IC that permits to achieve fast reading speed and to be used in dense reader and dense tag environments for top-class rated performances.

The compactness of the devices allows to embed the Lepton³x1 and Lepton³x4 inside industrial handhelds, smartphone accessories and other compact form factor devices.

The Lepton³x1 and Lepton³x4 comply with and can operate in both European and US regulatory environments and, thanks to their multiregional capabilities, they are ideal for integration in devices requiring compliance to different geographical regions.

The Lepton³x1 and Lepton³x4 are designed on the basis of the Lepton³ with the aim to facilitate the integration for those who prefer to use connectors instead of automatic manufacturing required by the SMD form factor. In addition, Lepton³x4 is a turnkey solution for systems requiring up to 4 antenna ports.

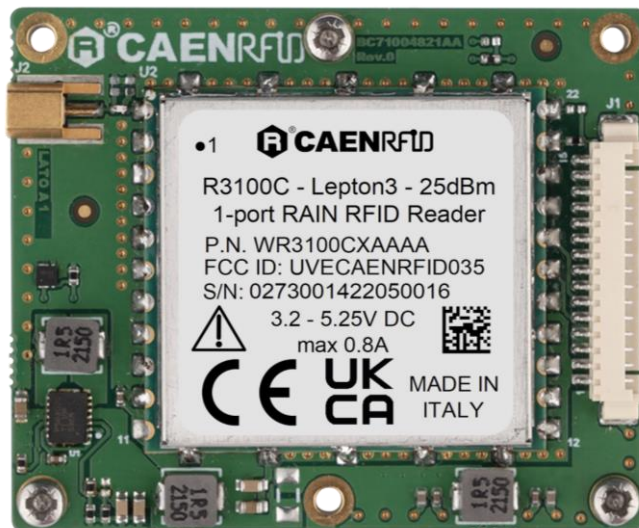


Fig. 1.1: Lepton³x1 (Model R3101C) Reader – top view



Fig. 1.2: Lepton³x4 (Model R3104C) Reader – top view

Evaluation Board

The [Mod. R4320CEVB - Evaluation Board](#) allows managing the Lepton³x1 and Lepton³x4 readers directly using an USB interface (via the embedded USB to UART converter). This board is particularly suited for Lepton³x1 and Lepton³x4 readers evaluation and SW development purpose. For more information, please refer to § *Evaluation Board* chapter page 17.

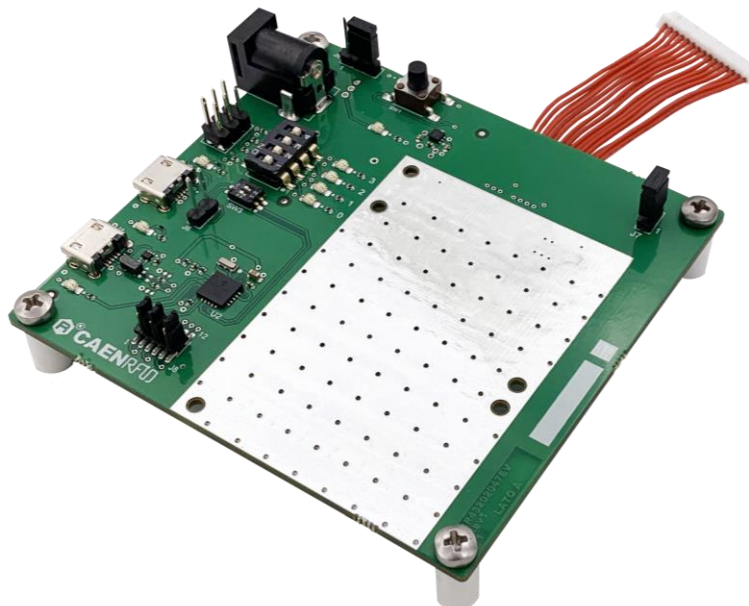


Fig. 1.3: Evaluation Board for Lepton³x1 and Lepton³x4 readers

Ordering Options

	Code	Description
Reader	WR3101CXAAAA	Lepton³x1 - 25dBm Reader Module
	WR3104CXAAAA	Lepton³x4 - 25dBm Reader Module
Accessories	WALIM0000005	Power Supply for R4320CEVB
	WR4320CXVBX	Lepton³x1 and Lepton³x4 - Evaluation Board

2 TECHNICAL SPECIFICATIONS

Technical Specifications

Frequency Range	865.600÷867.600 MHz (ETSI EN 302 208 v3.3.1) 902÷928 MHz (FCC part 15.247)
RF Power	Configurable from 10 dBm to 25 dBm (from 10 mW to 316 mW) conducted power
RX Sensitivity	-72dBm – 10%PER, assuming 20 dB antenna RL @ 25 dBm output
Antenna VSWR Requirement	< 2:1 for optimum performances
Antenna Connectors	- 1 MMCX jack (Model R3101C Lepton ³ x1) - 4 MMCX jack (Model R3104C Lepton ³ x4)
Frequency Tolerance	±10ppm over the entire temperature range
Number of Channels	4 channels (compliant to ETSI EN 302 208 v3.3.1) 50 hopping channels (compliant to FCC part 15.247)
Standard Compliance	EPC C1G2 / ISO18000-63
I/O Interface	4 I/O lines 3.3V level I _{out} = 8mA max
Connectivity	- UART Serial Port • Baudrate: from 9.6 to 921.6 kbps, default 921.6 kbps • Databits: 8 • Stopbits:1 • Parity: none • Flow control: none - 3.3 V I/O voltage level
Power Supply	3.2 ÷ 5.25 V DC
Power Consumption	- 800 mA @ RF out = 25 dBm - 5 mA in idle mode - Ready to receive commands
Dimensions	- Model R3101C Lepton ³ x1: (L) 51 x (W) 42 x (H) 8 mm ³ (2.01 x 1.65 x 0.32) inches ³ - Model R3104C Lepton ³ x4: (L) 60 x (W) 42 x (H) 8 mm ³ (2.36 x 1.65 x 0.32) inches ³
Operating Temperature	-20°C to +70°C
Weight	- 30 g (Model R3101C Lepton ³ x1) - 34 g (Model R3104C Lepton ³ x4)

Tab. 2.1: Lepton³x1 - Lepton³x4 Technical Specifications



Warning: The RF settings must match the operating country/region to comply with local laws and regulations.

The usage of the reader in different countries/regions from the one in which the device has been sold is not allowed.

Key Features

- RAIN RFID (UHF EPC Class1 Gen2, ISO 18000-63) compliant
- Both ETSI and FCC support in the same module
- Ultra compact size
- Up to 25 dBm (316mW) output power
- -72 dBm Rx sensitivity, assuming 20 dB antenna return loss
- Inventory (FastID, Tag Population Estimate, Select, Session, Target)
- Access (Read, Write, Lock, Kill, BlockPermalock, and QT)
- Shielded to prevent unwanted radiation and provide noise immunity in embedded environments
- Single mono-static RF port (mod. R3101C Lepton³x1)
- Four mono-static RF ports (mod. R3104C Lepton³x4)
- Field upgradability via firmware updates
- UART serial interface using CAEN RFID easy2read[®] protocol

3 HARDWARE INTERFACE

Introduction

An example R3101C Lepton³x1/R3104C Lepton³x4 system-level block diagram for an embedded system is shown in *Fig. 3.1: Lepton³x1 R3101C/Lepton³x4 R3104C - Example of Block Diagram*. This figure shows the electrical connections that may and must be made to control the R3101C Lepton³x1/R3104C Lepton³x4. In the figure, the required connections are illustrated with solid lines. Recommended and optional connections are illustrated with different dotted and dashed line patterns. More details for each connection are listed in the following paragraphs.

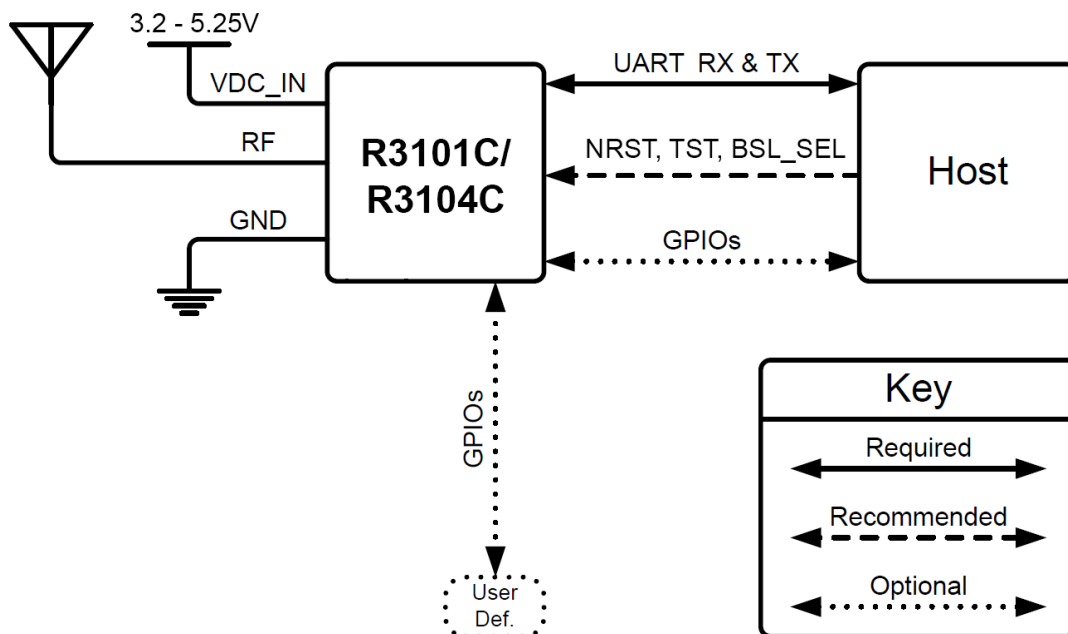


Fig. 3.1: Lepton³x1 R3101C/Lepton³x4 R3104C - Example of Block Diagram

Required connections:

- VDC_IN and GND are required to power the R3101C Lepton³x1/R3104C Lepton³x4.
- RF is required to connect to the UHF RFID antenna/antennas.
- UART Tx and Rx are required to communicate with the system host.

Recommended connections:

- nRST is used to reset the R3101C Lepton³x1/R3104C Lepton³x4 if UART communication is not available. This connection is highly recommended. This pin is internally driven strong low during software resets, so it should only be driven externally by an open drain signal. It must not be driven strong high.
- TST and BSL_SEL shall be used for the FW recovery/upgrade procedure.

In order to start the Boot Strap Loader of Lepton³ internal microcontroller NRST, TST and BSL_SEL signals shall be driven as in the picture below:

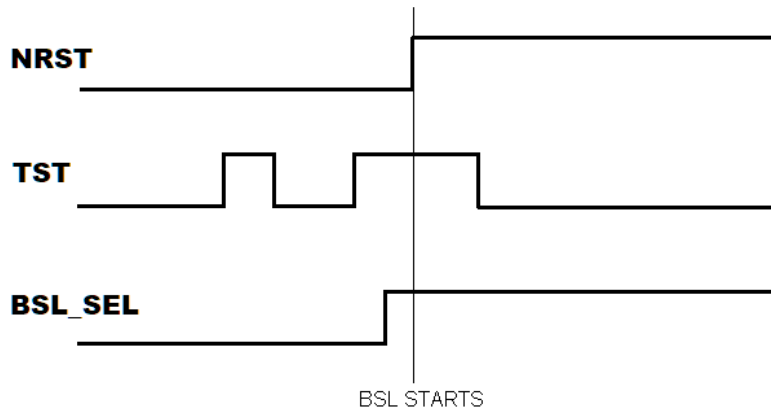


Fig. 3.2: BSL Sequence

The BSL program execution starts when TST pin has received a minimum of two positive transitions and if TST is high while /RST rises from low to high. BSL_SEL shall be at high level before BSL starts. Pulses length and distance between edges of all signals shall be 10ms at least.

Optional connections:

- GPIOs allow interaction with the R3101C Lepton³x1 / R3104C Lepton³x4 as both digital inputs and outputs. They may be used to trigger inventory, generate events based on inventory activity, or provide general-purpose user-controlled digital I/O.

Power Supply

The R3101C Lepton³x1/R3104C Lepton³x4 is powered by a voltage applied to the VDC_IN pin (pin 3 and 4) relative to the GND pins. The supply voltage operating range is 3.2V to 5.25V. Current consumption varies from about 800 mA to about 5mA depending on the operating mode. The power supply is internally bypassed and regulated, and no external bypass or bulk storage capacitance is required, as long as the input voltage is stable.

If R3101C Lepton³x1/R3104C Lepton³x4 activity is not required at all times, and power reduction is desired, the VDC_IN supply voltage may be externally gated to remove power to the device.

RF Connection

The Lepton³x1 R3101C has a single MMCX jack RF port, the Lepton³x4 R3104C has four MMCX jacks RF ports. Each RF port shall be connected to a 50 Ω antenna via a MMCX plug and 50 Ω cable.

UART Communication

The R3101C Lepton³x1/R3104C Lepton³x4 has one full-duplex UART standard interface, accessible using pins UART-RX, UART-TX. Such UART implements the host communication interface via easy2read[®]. The Tx pin is output from the R3101C Lepton³x1/R3104C Lepton³x4, the Rx pin is input to the R3101C Lepton³x1/R3104C Lepton³x4. Interface settings are by default 921,600 baud, with 8 data bits, 1 stop bit, and no parity bit (8-n-1 configuration).

UART interface signals are 3.3 V relative to GND. The specific VIH, VIL, VOH and VOL specifications may be found in the § *Device Input and Output Specifications* paragraph page 16. The TX pin is driven strong high and low with a sink/source current of about 8 mA. If the load on a pin draws more than the 8 mA sink and source current, the pin is not guaranteed to meet the VOH and VOL specs listed in § *Device Input and Output Specifications* paragraph page 16. Excessive current sunk or sourced on the GPIO pins can also cause electrical damage to the device.



Warning: Voltages outside of the maximum IO operating voltage range of -0.3 to 4.0 V should not be applied to the UART pins. This can cause permanent damage to the device.

Reset Pin

The R3101C Lepton³x1/R3104C Lepton³x4 may be reset by a logic low voltage on the NRST pin (pin 14). Usage of this pin is recommended in all designs. It may be used to reset the part if an unexpected operating state is entered. The R3101C Lepton³x1/R3104C Lepton³x4 does have an internal watchdog circuit that will reset it if abnormal operation occurs, but the NRST pin provides a further level of reliability.

The NRST pin is pulled high (3.3 V) by an internal 51,1 k Ω nominal resistor. To reset the part, drive the pin strong low for at least the minimum reset pulse width as specified in § *Device Input and Output Specifications* paragraph page 16 (approximately 25 μ s). This pin may be driven active low to reset the part, but should not be driven strong high. Driving the pin strong high prevents the R3101C Lepton³x1/R3104C Lepton³x4 from resetting itself in case user requested software reset. This pin should be driven using an “open drain drives low” drive mode, which creates either a strong low voltage or a floating voltage output.

GPIO Pins

The R3101C Lepton³x1/R3104C Lepton³x4 GPIOs can be controlled using the easy2read[®] interface. Their drive mode, direction, and state are all controllable via easy2read[®]. There are two directions: input and output. In both input and output directions, there are three possible pin states: high, low, and float. For more details on using easy2read[®] to control the GPIOs, see the easy2read[®] protocol documentation.

In the output direction, the GPIOs are driven strong high and low with a source and sink current of 8 mA, and in float mode the pin is not driven either high or low, leaving the pin floating, also known as “high impedance” or “high-Z”. The pins are driven to 3.3 V nominally. If the load on a pin draws more than the 8 mA sink and source current, the pin is not guaranteed to meet the VOH and VOL specs listed in the § *Device Input and Output Specifications* paragraph page 16.



Warning: Excessive current sunk or sourced on the GPIO pins can also cause electrical damage to the device.

In the input direction, the high and low states apply a pull-up or pull-down resistor, and in float mode the pin is not pulled either high or low, leaving the pin floating, also known as “high impedance” or “high-Z”. The pull-up and pull-down resistors are about 35 k Ω nominal. See the § *Device Input and Output Specifications* paragraph page 16 for more specific ratings. The inputs logic levels are proportional to 3.3 V. Specific VIH and VIL specs may be found in the § *Device Input and Output Specifications* paragraph page 16.



Warning: Voltages outside of the maximum IO operating voltage range of -0.3 to 4.0 V should not be applied to the pins, no matter their configuration. This can cause permanent damage to the device.

External Connections and Mechanical Drawings

The location of the connectors is shown in Fig. 3.3: R3101C Lepton³x1 mechanical drawings and connectors locations (units: mm) and Fig. 3.4: R3104C Lepton³x4 mechanical drawings and connector locations (units: mm). Their part numbers are listed here below:

Antenna Ports: RF Coax Connector Huber+Suhner type 82_MMCX-S50-0-2/111_K (to be used with Huber+Suhner type 11_MMCX-50-1-1/111_O)

MOLEX Connector: PCB Header Molex type 53261-1571 (to be used with Molex Type 51021-1500 + 15pcs crimp terminal type 50058-8100)

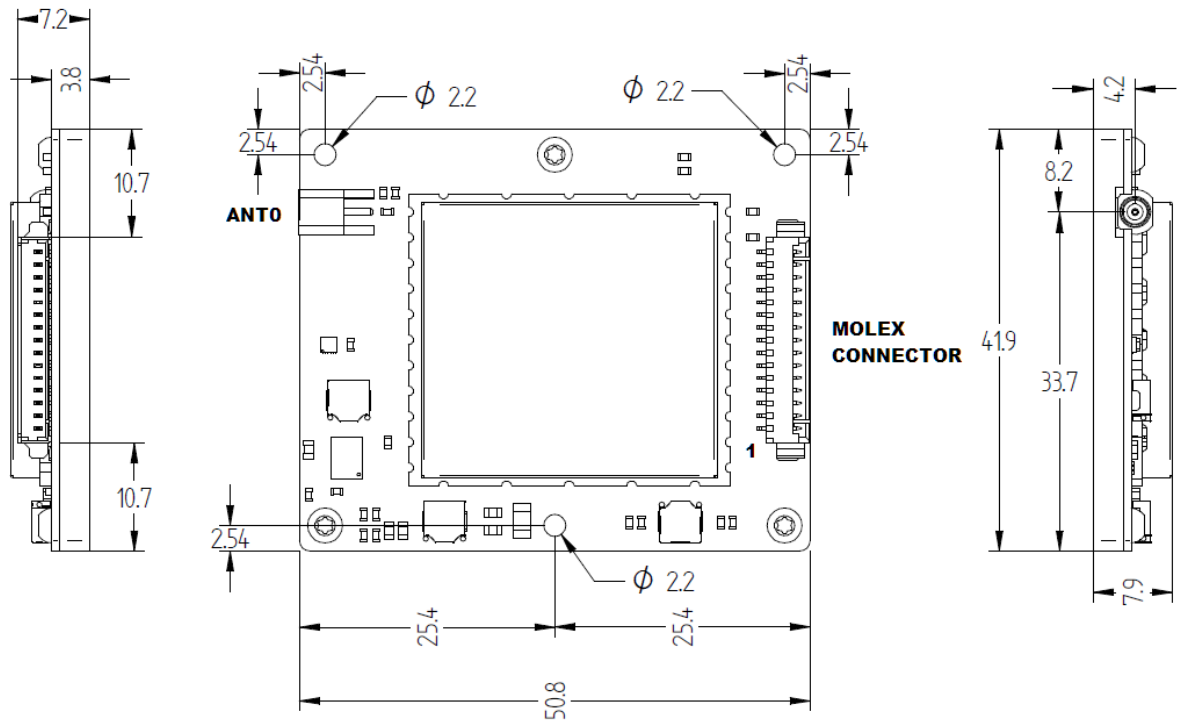


Fig. 3.3: R3101C Lepton³x1 mechanical drawings and connectors locations (units: mm)

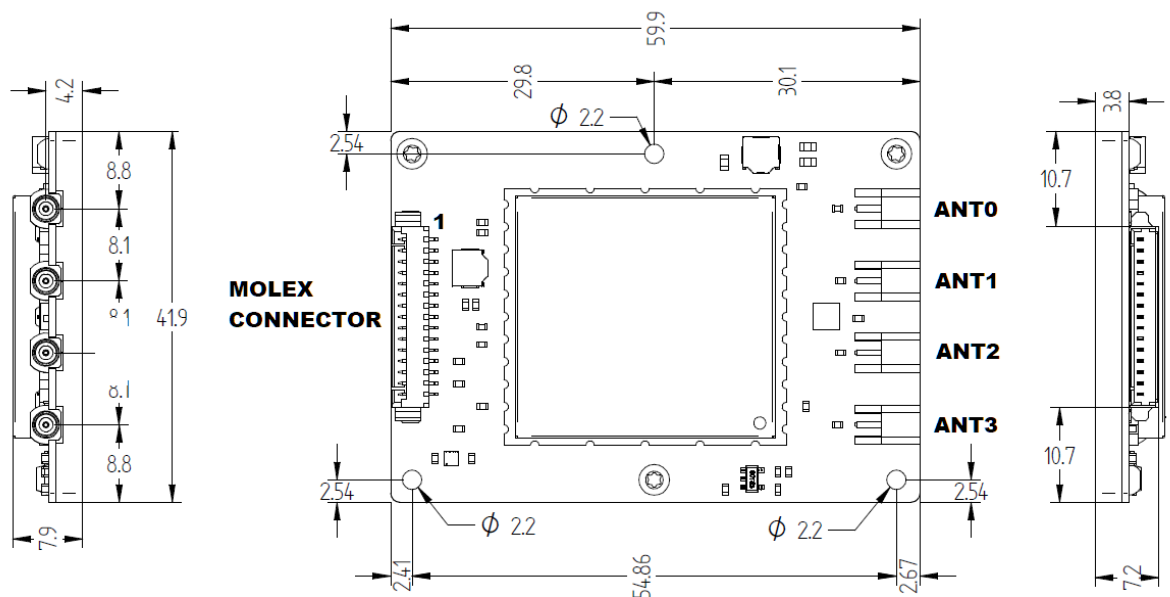


Fig. 3.4: R3104C Lepton³x4 mechanical drawings and connector locations (units: mm)

Pin #	Name	Direction	Function
1	GND	-	Ground
2	GND	-	Ground
3	VDC_IN	-	Supply voltage
4	VDC_IN	-	Supply voltage
5	GPIO0	IN/OUT	General purpose I/O #0
6	GPIO1	IN/OUT	General purpose I/O #1
7	GPIO2	IN/OUT	General purpose I/O #2
8	GPIO3	IN/OUT	General purpose I/O #3
9	RXD	IN	UART RX (input to the module)
10	TXD	OUT	UART TX (output from the module)
11	WKUP - RFU	IN/OUT	Reserved for future use
12	STATUS - RFU	IN/OUT	Reserved for future use
13	TST	IN	TST pin to be used for FW recovery/upgrade
14	nRST	IN	Active low reset. Connect to open drain driver.
15	BSL_SEL	IN	Boot Strap Loader interface enable signal

Tab. 3.1: Power supply and interface connector pin listing and signal definitions

Electrical Specifications

Absolute Maximum Ratings

The absolute maximum ratings (see *Tab. 3.2: Absolute Maximum Ratings*) define limitations for electrical and thermal stresses. These limits prevent permanent damage to the R3101C Lepton³x1/R3104C Lepton³x4.

Operation outside maximum ratings may result in permanent damage to the device.

Parameter	Min.	Max.	Unit	Conditions
Supply voltage	-0.3	5.5	V	VDC_IN pin relative to GND
IO voltage	-0.3	4.0	V	Non-VDC_IN pin voltages relative to GND
RF input power	-	+25	dBm	Incident to pin 1 (RF)
Storage temperature	-30	+100	°C	
Humidity	-	95	% RH	Non-condensing
ESD immunity	-	2	kV	Human-body model, all I/O pads

Tab. 3.2: Absolute Maximum Ratings

Operating Conditions

This section describes operating voltage, frequency, and temperature specifications for the R3101C Lepton³x1/R3104C Lepton³x4 during operation.

Parameter	Min.	Max.	Unit	Conditions
Supply	3.2	5.25	V	VDC_IN relative to GND
Temperature	-20	+70	°C	Ambient Temperature
Frequency	902	928	MHz	FCC part 15.247
	865.6	867.6	MHz	ETSI EN 302 208 v3.3.1

Tab. 3.3: Operating Conditions

Device Functional Specifications

This section describes operating voltage, frequency, and temperature specifications for the R3101C Lepton³x1/R3104C Lepton³x4 during operation.

Parameter	Typ.	Unit	Description
Supply Current			Current consumed by Lepton ³ R3100C via VDC_IN pin
Active mode – 3.2 to 5.25V supply	800	mA	+25 dBm transmit power Inventorying tags
Idle mode – low latency	45	mA	Ready to receive easy2read [®] packets. Lower latency to return to Active mode.
Idle mode – standard latency	5	mA	Ready to receive easy2read [®] packets

Tab. 3.4: Supply Current Specifications

UHF Gen 2 RFID Radio Specifications

Parameter	Min.	Typ.	Max.	Unit	Conditions
Frequency	902		928	MHz	See § Tab. 2.1: Lepton ³ x1 - Lepton ³ x4 Technical Specifications page 8
	865.6		867.6	MHz	
Input impedance		50		Ω	
Input match		-10		dB	S11
Rx sensitivity		-72		dBm	10%PER, assuming 20 dB antenna RL @ 25 dBm output

Tab. 3.5: RF Receiver Specifications

Parameter	Min.	Max.	Unit	Notes
Tx Power	10	25	dBm	Meets FCC and equivalent regulatory constraints
Tx Power Error		1	dB	Difference between desired Tx power and actual Tx power
Return Loss	0		dB	No damage into open RF port at 25 dBm at any phase angle
Frequency	865.6	867.6	MHz	ETSI EN 302 208 v3.3.1
	902	928	MHz	FCC part 15.247

Tab. 3.6: RF Transmitter Specifications

Device Input and Output Specifications

Parameter	Min.	Typ.	Max.	Unit	Conditions
nRST					
VIL	-0.3		0.8	V	
VIH	2		3.6	V	
Hysteresis voltage		400		mV	
Internal pull-up resistor	14	21	25	kΩ	
Reset pulse width	25			μs	
Digital inputs					
VIL	-0.3		0.8	V	
VIH	2		3.6	V	
Hysteresis voltage		400		mV	
Internal pull-down resistor	20	35	50	kΩ	
Digital outputs					
VOL	0.0		0.6	V	
VOH	2.7		3.6	V	
Drive current (sink or source)	8			mA	
UART					
Default baud rate			921.6	kbaud	
Configurable baud rate	9.6		921.6	kbaud	
Data bits		8		bits	
Parity bit		None			
Stop bits		1		bits	

Tab. 3.7: Digital Interface Specification

EPC Class-1 Generation-2 Operation

Supported RF modes

The R3101C Lepton³x1/R3104C Lepton³x4 support the following link profiles, whose characteristics are reported in the following table:

Link Profile	Regulation	Forward Link Profile			Reverse Link Profile	
		R2T Modulation	Tari	PIE	T2R Modulation	Link Frequency
1	ETSI	PR-ASK	20 μs	2	Miller M=2	320 kHz
2	ETSI	PR-ASK	20 μs	2	Miller M=4	320 kHz
3	FCC	PR-ASK	20 μs	2	Miller M=4	250 kHz
4	ETSI	PR-ASK	15 μs	2	Miller M=2	320 kHz
5	ETSI/FCC	PR-ASK	20 μs	2	Miller M=8	160 kHz

Tab. 3.8: RF Modes – Forward and Reverse Link Profiles

4 EVALUATION BOARD

Technical Specifications Table

Digital I/O	Four I/O lines 3.3 V out @ 3mA, 5 V tolerant
UART via USB Port	USB micro female connector Baudrate: 115200 Databits: 8 Stopbits: 1 Parity: none Flow control: none 9.6÷115 kbit/s data rate (settable) It appears as USB serial port; drivers for all Windows OS
LED display	GREEN: power from AC/DC adapter GREEN: USB connection YELLOW: UART to USB interface activity GREEN: GPIO[0..3]
Dimensions	(W)81 x (L)76 x (H)18 mm ³ (3.2 x 3.0 x 0.7 inch ³)
Electrical Power	DC Voltage 5V +/-5% Current consumption: 2A max.
Operating Temperature	-20 °C to +70 °C

Tab. 4.1: R4320CEVB - Lepton³x1 and Lepton³x4 Evaluation Board - Technical Specifications

Connection Diagram

The following block diagram shows how to connect the R3101C Lepton³x1/R3104C Lepton³x4 with the PC host via the R4320CEVB service board.

In the evaluation board R3101C Lepton³x1/R3104C Lepton³x4 UART interface is accessible via a Microchip UART to USB converter.

The board equipped with R3101C Lepton³x1/R3104C Lepton³x4 readers shall be powered by an external 5V 1A min. DC adapter. The use of the Power Supply for R4320CEVB (WALIM0000005) is recommended (see § *Ordering Options* page 7).

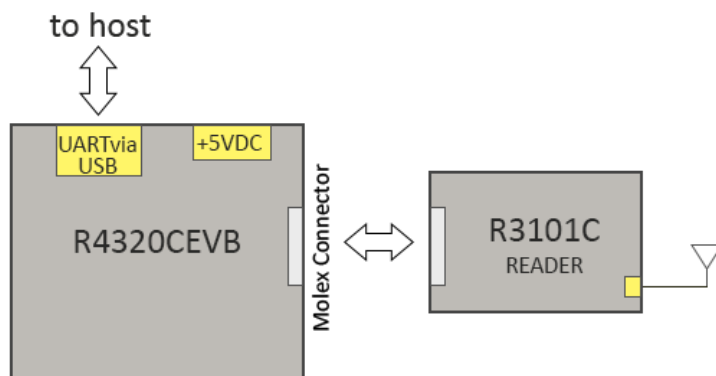


Fig. 4.1: Evaluation Board R4320CEVB – R3101C Reader Connection Diagram

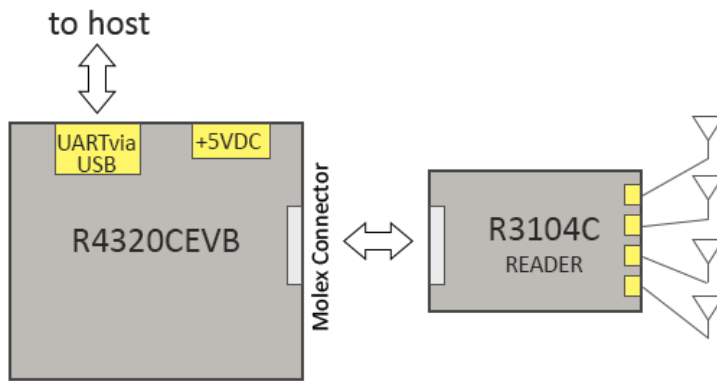


Fig. 4.2: Evaluation Board R4320CEVB – R3104C Reader Connection Diagram

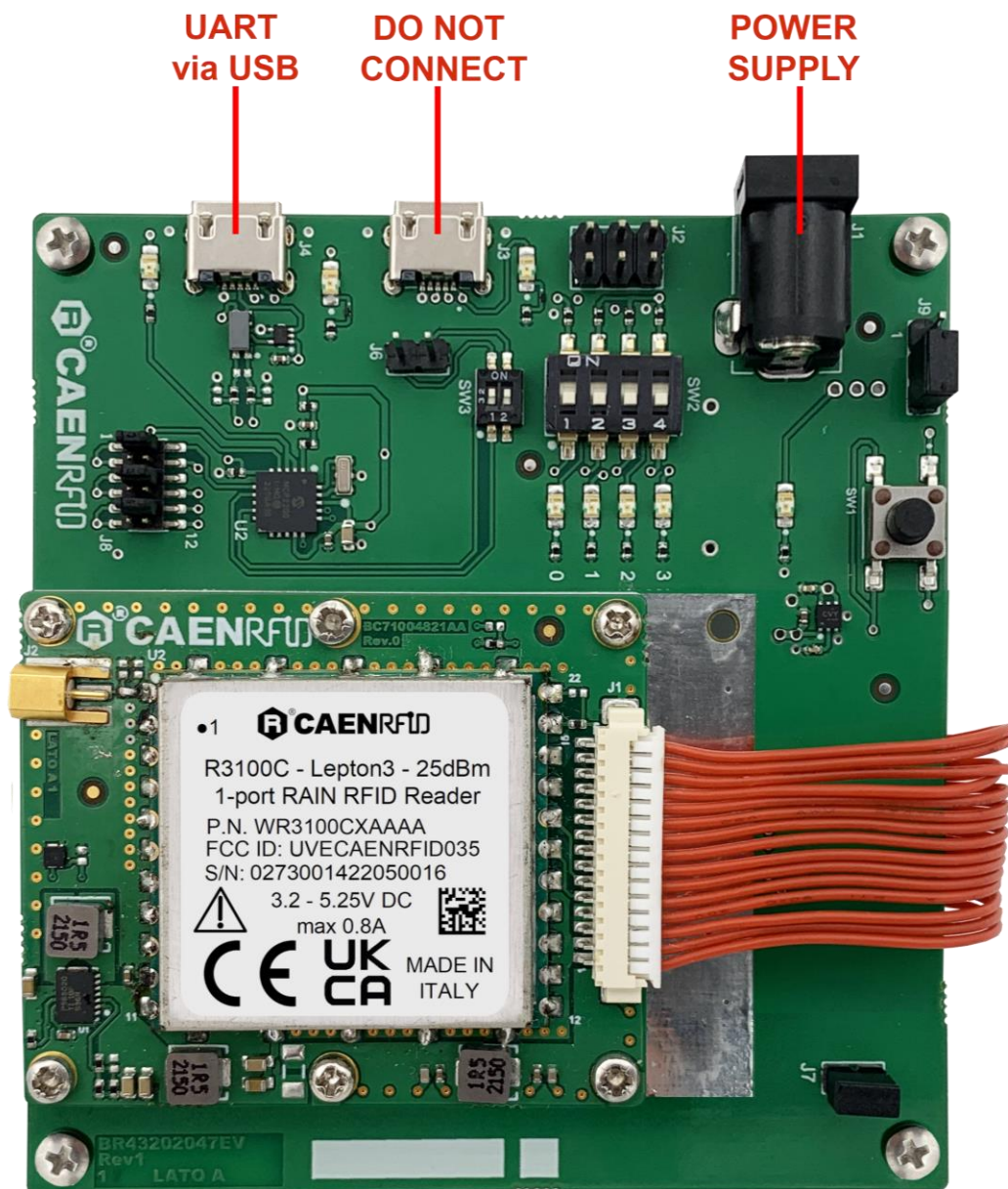


Fig. 4.3: Evaluation Board R4320CEVB – R3101C Reader Interface Connectors

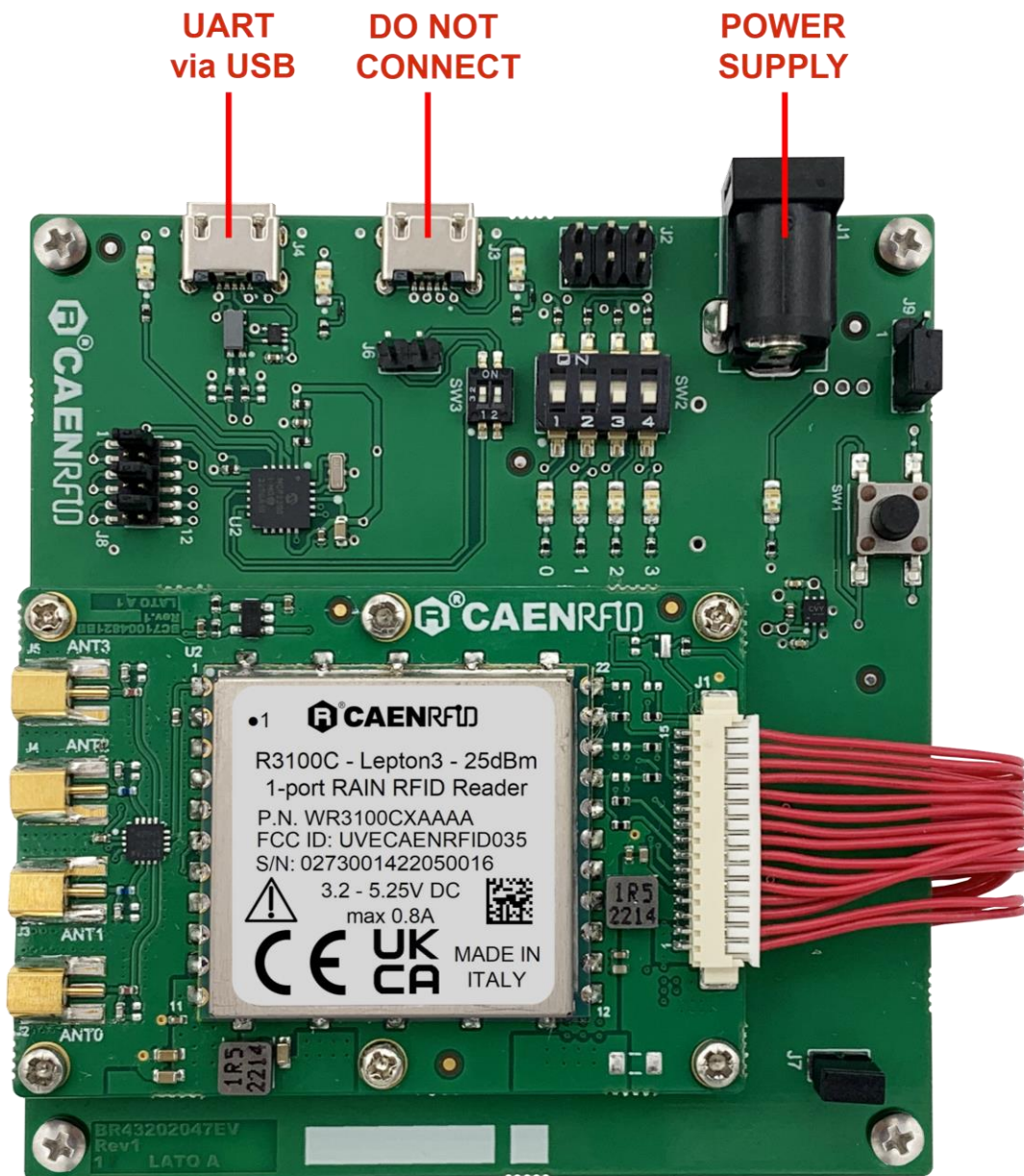


Fig. 4.4: Evaluation Board R4320CEVB – R3104C Reader Interface Connectors

Installation Notice

Fix the R3101C Lepton³x1/R3104C Lepton³x4 reader to the R4320CEVB board using 3 M2x12 countersunk screws and 3 M2 screws nuts and connect the Molex connectors.

The reader case shall be kept electrically isolated via thermal sildpad from the ground plane.

The correct way to connect the R3101C Lepton³x1/R3104C Lepton³x4 module to the R4320CEVB evaluation board is shown in the following picture:

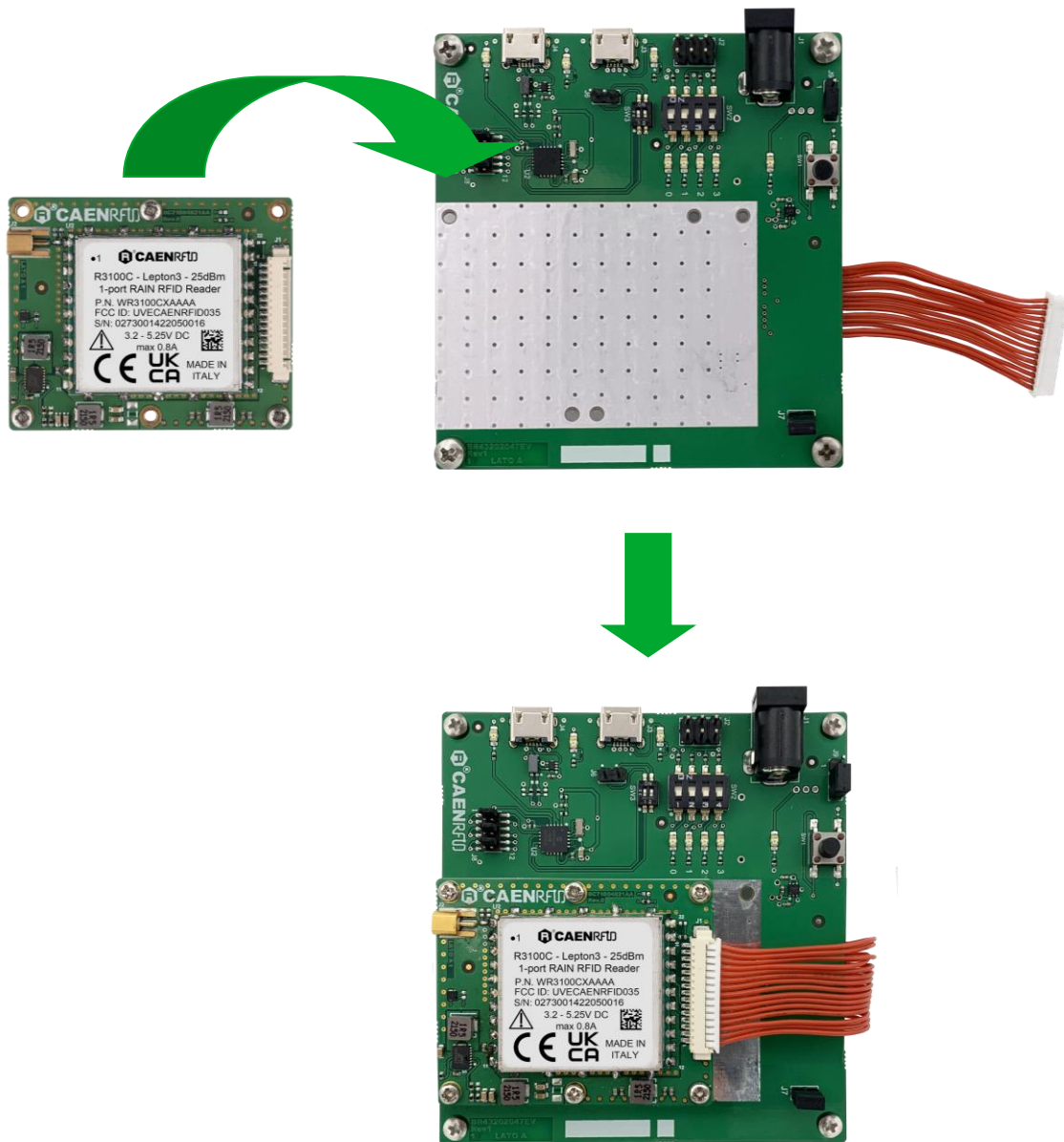


Fig. 4.5: Connection of the R3101C module to the R4320CEVB evaluation board

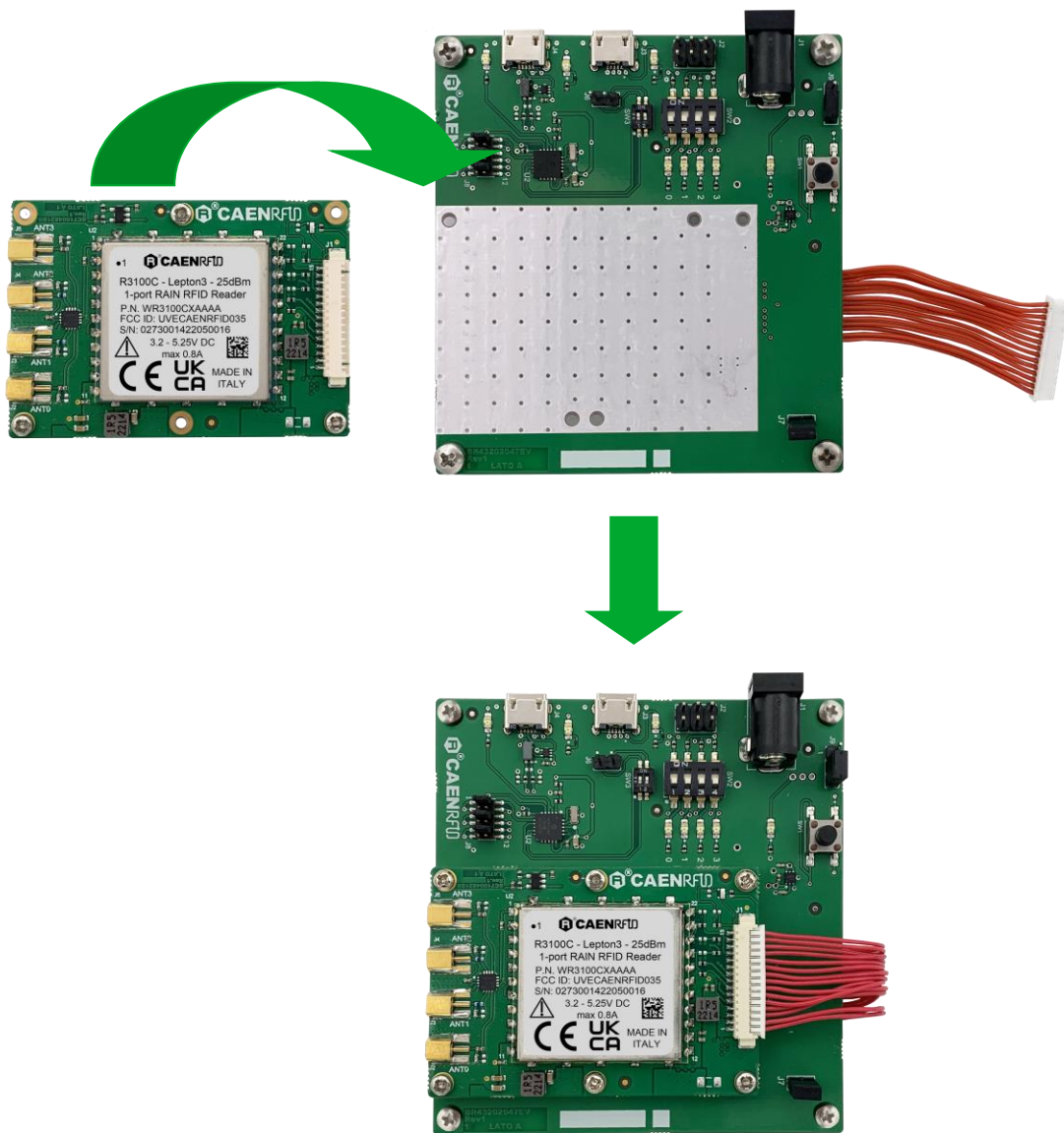


Fig. 4.6: Connection of the R3104C module to the R4320CEVB evaluation board

Connecting to the R3101C Lepton³x1/R3104C Lepton³x4 reader

USB Communication Setup



Warning: If your PC is running a Windows version older than Windows 10, to correctly operate with the reader, you need to install the *FTDI USB driver*. You can find it easily via a WEB research.

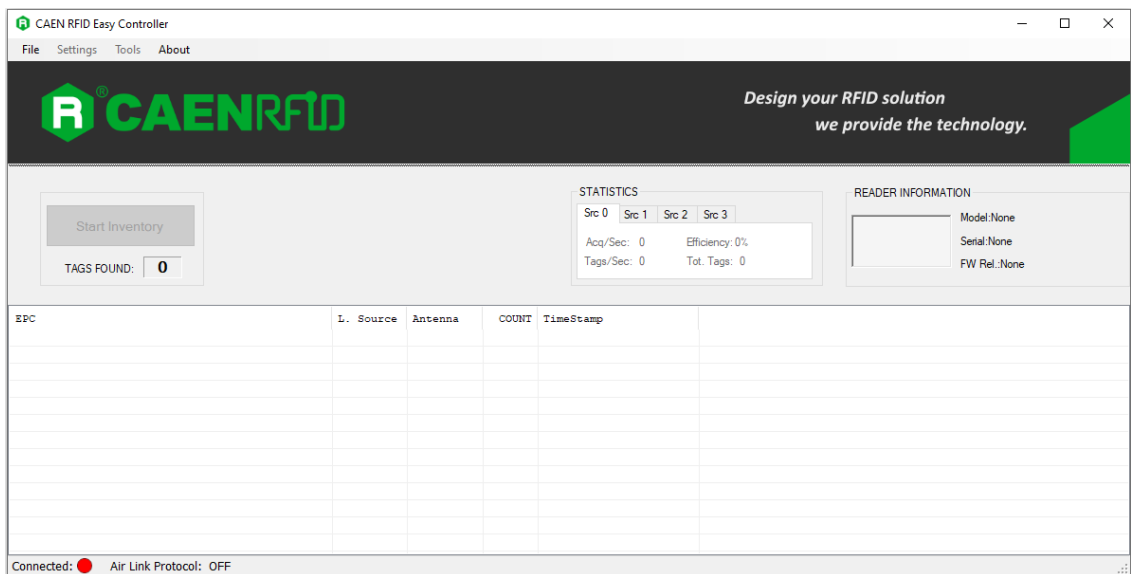
Evaluation Board USB-UART Details

R4320CEVB board embeds an FTDI FT232BL UART to USB converter. This part allows a PC to communicate with the R3101C Lepton³x1/R3104C Lepton³x4 over USB. The Microchip MCP2200 part achieves this by enumerating as an USB device and adding a COM port. In Windows, this COM ports can be viewed in the Device Manager under the "Ports (COM & LPT)" category.

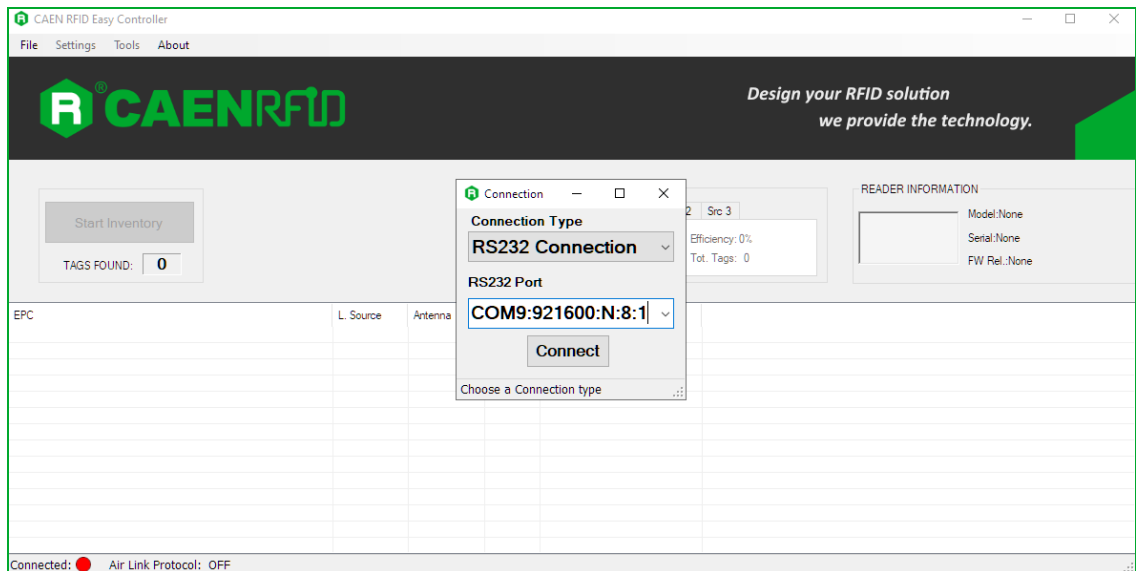
Easy Controller

Follow these steps to connect the R3101C Lepton³x1/R3104C Lepton³x4 using the *Easy Controller* application for Windows:

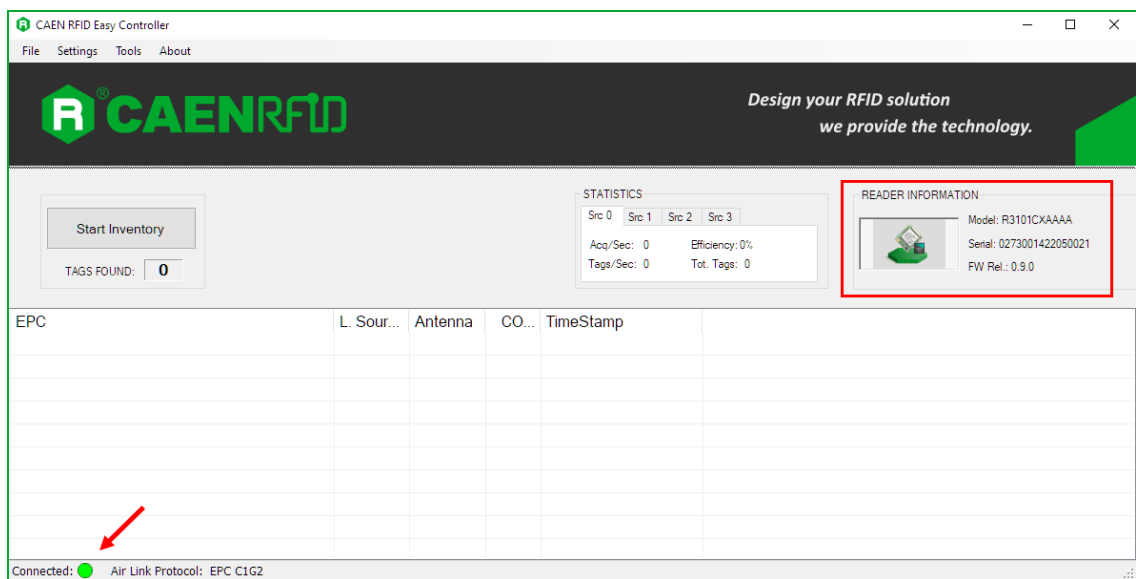
1. Download the latest version of the *Easy Controller software* from the [Lepton³x1 R3101C web page](#) or [Lepton³x4 R3104C web page](#), *Downloads* section and install it.
2. Launch the *Easy Controller* application:



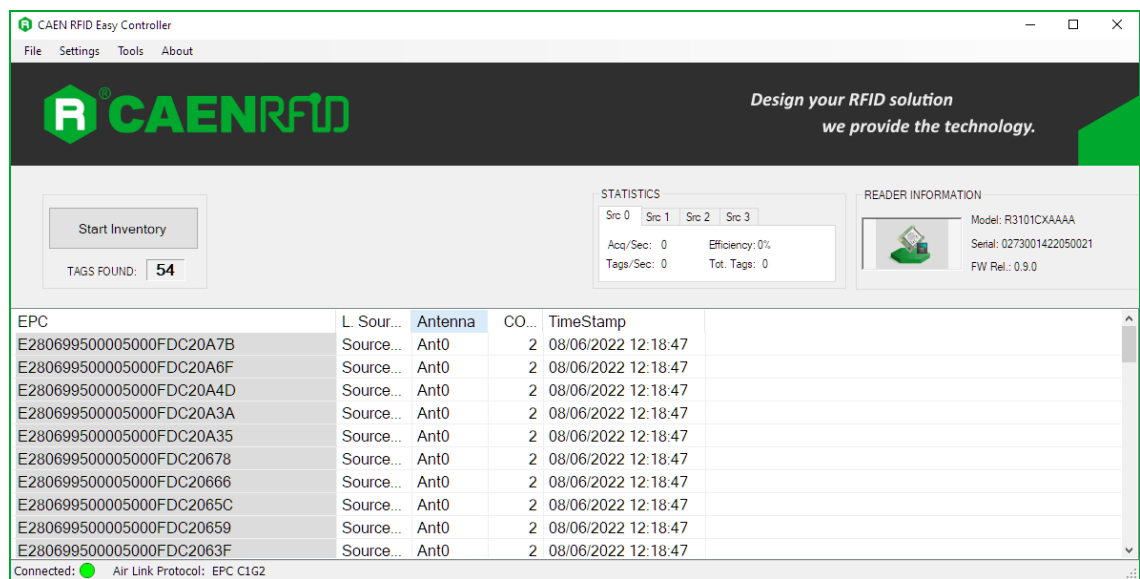
- On the main screen click on *File* → *Connect*. A Connection window will open. Select the *Connection Type* (RS232) and specify the RS232 port (COM 9 in this example). In order to connect to the module via Easy Controller software the serial settings shall be added to the COM port address since R3101C Lepton³x1/R3104C Lepton³x4 module has a different baudrate (921600bps) from default value used by the SW:



- To verify if the connection with the reader has been established, check the green dot on the bottom left side of the sidebar and on the *READER INFORMATION* box you can find information on reader model, serial number and firmware release:



- Place one or more tags near the antenna connected to the reader, click on *Start Inventory* and see tags information displayed on the main window:



For more information on the CAEN RFID *Easy Controller for Windows* application usage, please refer to the relevant user manual: you can download it from the [Lepton³x1 R3101C web page](#) or [Lepton³x4 R3104C web page](#), *Downloads* section or in the [Manual and Documents](#) web area.

Technical Drawings

The following drawing shows the R4320CEVB components position.

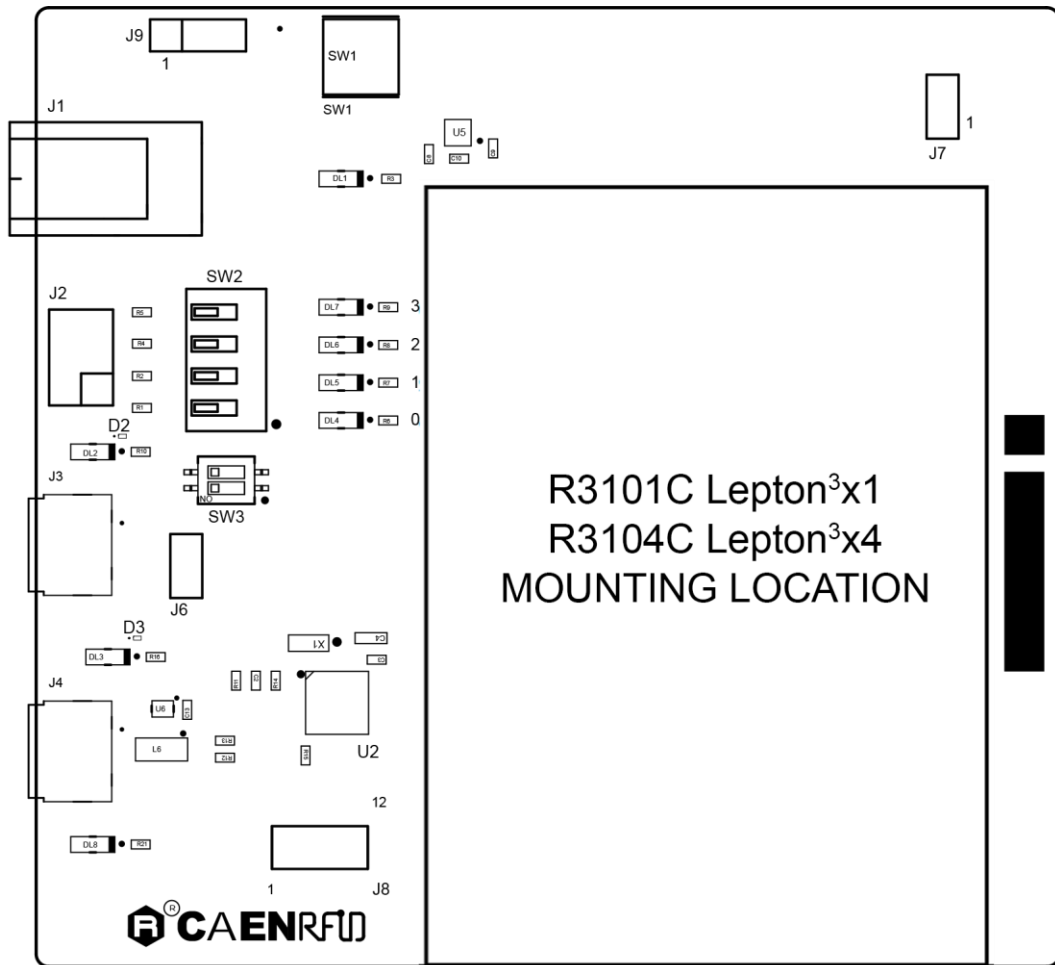


Fig. 4.7: R4320CEVB Technical Drawing

Electrical Schematic

The electrical schematic of the R4320CEVB is shown in the following figure:

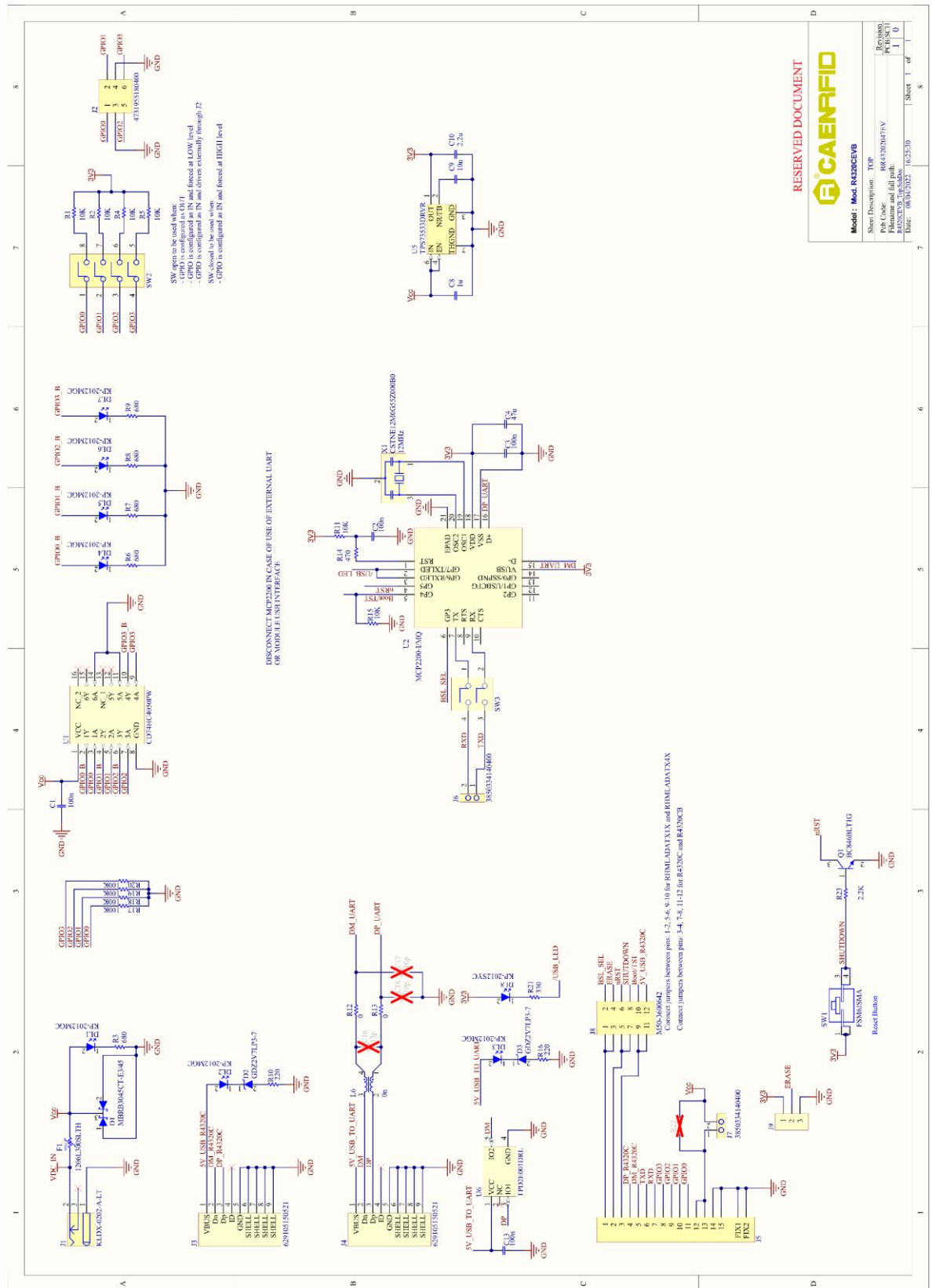


Fig. 4.8: R4320CEVB Electrical Schematic

External Connections

Please refer to *Fig. 4.7: R4320CEVB Technical Drawing* page 25.

J1: Power Supply connector: central pin (2.1mm diam.) is the negative terminal. The use of the Power Supply for R4320CEVB (WALIM0000005) is recommended (see § *Ordering Options* page 7).

J2: header for GPIO external connection

- J2-1 = GPIO0 (in/out)
- J2-2 = GPIO1 (in/out)
- J2-3 = GND
- J2-4 = GND
- J2-5 = GPIO2 (in/out)
- J2-6 = GPIO3 (in/out)

J3: Micro USB female connector, **not supported by R3101C Lepton³x1/R3104C Lepton³x4 modules**

J4: Micro USB female connector for UART via USB interface

J6: Header that can be used to connect UART signals to an external device (see § *Electrical Schematic* page 26 for details)

J7: Jumper that can be removed and connected to a multimeter terminals for module current consumption measurements purposes.

Jumpers and Switches

Please refer to *Fig. 4.7: R4320CEVB Technical Drawing* page 25.

SW1

SW1: Press it to reset R3101C Lepton³x1/R3104C Lepton³x4 modules

SW2

SW2: Can be used to drive module GPIOs according to the following configurations:

SW open to be used when

- GPIO is configured as OUT
- GPIO is configured as IN and forced at LOW level
- GPIO is configured as IN and driven externally through J2

SW closed to be used when

- GPIO is configured as IN and forced at HIGH level

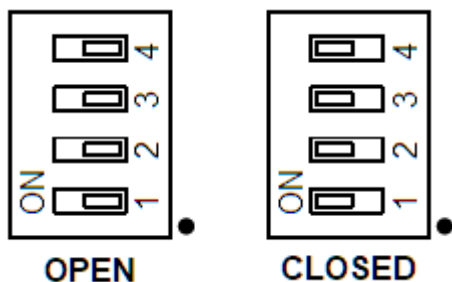


Fig. 4.9: SW2 configuration

SW3

SW3: Shall be used to correctly select communication interface of R3101C Lepton³x1/R3104C Lepton³x4 module with the host:

SW open to be used when

- UART interface is used directly connected to external device (i.e. microcontroller inside customer's board)

SW closed to be used when

- UART via USB interface is used (connection to PC via J4 connector)

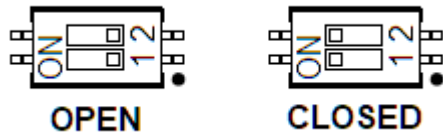


Fig. 4.10: SW3 configuration

J8



Warning: J8 is a jumper block for reader family configuration!

J8: Jumper block for reader family configuration:

- Connect jumpers between pins: 3-4, 7-8, 11-12 for Hadron reader family
- Connect jumpers between pins: 1-2, 5-6, 9-10 for Lepton reader family

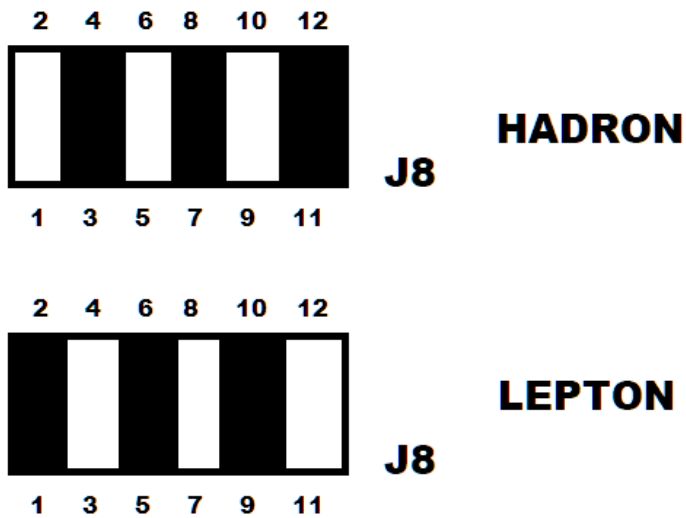


Fig. 4.11: J8 jumper block configurations

J9: Jumper for FW Recovery/Upgrade Procedure

J9

J9: Jumper for FW Recovery/Upgrade Procedure, **not supported by R3101C Lepton³x1/R3104C Lepton³x4 modules**

LEDs

Please refer to *Fig. 4.7: R4320CEVB Technical Drawing* page 25.

DL1 (green) = Power Supply

DL2 (green) = not supported

DL3 (green) = UART via USB connection

DL4 (green) = GPIO0

DL5 (green) = GPIO1

DL6 (green) = GPIO2

DL7 (green) = GPIO3

DL8 (yellow) = UART via USB communication activity

5 REGULATORY COMPLIANCE

CE Compliance (mod. R3101C)

Reference standard:

ETSI EN 301 489-1 V2.2.3:2019

ETSI EN 301 489-3 V2.1.1:2017

ETSI EN 302 208 V3.3.1:2020

IEC 62368-1:2018

See § *Lepton³x1 R3101C CE DECLARATION OF CONFORMITY* page 32 for the Lepton³x1 R3101C CE Compliance Certificate.



Warning: The CE compliance is guaranteed only if the reader is used as described in this manual

CE Compliance (mod. R3104C)

Reference standard:

ETSI EN 301 489-1 V2.2.3:2019

ETSI EN 301 489-3 V2.1.1:2017

ETSI EN 302 208 V3.3.1:2020

IEC 62368-1:2018

See § *Lepton³x4 R3104C CE DECLARATION OF CONFORMITY* page 33 for the Lepton³x4 R3104C CE Compliance Certificate.



Warning: The CE compliance is guaranteed only if the reader is used as described in this manual

UKCA Compliance (mod. R3101C)

Reference standard:

ETSI EN 301 489-1 V2.2.3:2019

ETSI EN 301 489-3 V2.1.1:2017

ETSI EN 302 208 V3.3.1:2020

BS EN 62368-1:2014+A11:2017

See § *Lepton³x1 R3101C UKCA DECLARATION OF CONFORMITY* page 34 for the Lepton³x1 R3101C UKCA Compliance Certificate.



Warning: The UKCA compliance is guaranteed only if the reader is used as described in this manual

UKCA Compliance (mod. R3104C)

Reference standard:

ETSI EN 301 489-1 V2.2.3:2019

ETSI EN 301 489-3 V2.1.1:2017

ETSI EN 302 208 V3.3.1:2020

BS EN 62368-1:2014+A11:2017

See § *Lepton³x4 R3104C UKCA DECLARATION OF CONFORMITY* page 35 for the Lepton³x4 R3104C UKCA Compliance Certificate.



Warning: The UKCA compliance is guaranteed only if the reader is used as described in this manual

RoHS Directive

The R3101C Lepton³x1 and R3104C Lepton³x4 RFID Readers are compliant with the EU Directive 2015/863/EU (RoHS3) and the UK Regulation 2012 SI 2012/3032 (RoHS) on the Restriction of the Use of certain Hazardous Substances in Electrical and Electronic Equipment.

R3101C LEPTON³X1

CE DECLARATION OF CONFORMITY

We

CAEN RFID Srl
Via Vetràia, 11
55049 Viareggio (LU)
Italy
Tel.: +39.0584.388.398 Fax: +39.0584.388.959
Mail: info@caenrfid.com
Web site: www.caenrfid.com

herewith declare under our own responsibility that the product:

WR3101CXAAAA – Lepton³x1 - 25dBm Reader Module

corresponds in the submitted version to the following standards:

ETSI EN 301 489-1 V2.2.3:2019

ETSI EN 301 489-3 V2.1.1:2017

ETSI EN 302 208 V3.3.1:2020

IEC 62368-1:2018

and declare under our sole responsibility that the specified product meets the principle requirements and other applicable regulations of directives 2014/53/EU (RED) and 2015/863/EU (RoHS3)

Date: 03/04/2023

A blue ink signature of Adriano Bigongiari, Chief Executive Officer, written over the company name and address.

CAEN RFID Srl
Via Vetràia, 11
55049 VIAREGGIO - ITALY
VAT IT 02032050466

Adriano Bigongiari (Chief Executive Officer)

On the basis of this declaration, this product will bear the following mark:



The compliance is guaranteed only if the reader is used as described in the Lepton³x1 – Lepton³x4 - Technical Information Manual.

R3104C LEPTON³X4

CE DECLARATION OF CONFORMITY

We

CAEN RFID Srl
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Italy
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Mail: info@caenrfid.com
Web site: www.caenrfid.com

herewith declare under our own responsibility that the product:

WR3104CXAAAA – Lepton³x4 - 25dBm Reader Module

corresponds in the submitted version to the following standards:

ETSI EN 301 489-1 V2.2.3:2019

ETSI EN 301 489-3 V2.1.1:2017

ETSI EN 302 208 V3.3.1:2020

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R3101C LEPTON³X1

UKCA DECLARATION OF CONFORMITY

We

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WR3101CXAAAA – Lepton³x1 - 25dBm Reader Module

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ETSI EN 301 489-3 V2.1.1:2017

ETSI EN 302 208 V3.3.1:2020

BS EN 62368-1:2014+A11:2017

and declare under our sole responsibility that the specified product meets the principle requirements and other applicable regulations of directives UK Regulation 2016 No. 1206 and UK Regulation 2012 SI 2012/3032 (RoHS).

Date: 03/04/2023

A blue ink signature of Adriano Bigongiari, with the company name and address printed below it.

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55049 VIAREGGIO - ITALY
VAT IT 02032050466

Adriano Bigongiari (Chief Executive Officer)



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R3104C LEPTON³X4

UKCA DECLARATION OF CONFORMITY

We

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ETSI EN 302 208 V3.3.1:2020

BS EN 62368-1:2014+A11:2017

and declare under our sole responsibility that the specified product meets the principle requirements and other applicable regulations of directives UK Regulation 2016 No. 1206 and UK Regulation 2012 SI 2012/3032 (RoHS).

Date: 03/04/2023

A blue ink signature of Adriano Bigongiari over a blue circular stamp. The stamp contains the text: 'CAEN RFID Srl', 'Via Vetràia, 11', '55049 VIAREGGIO - ITALY', and 'VAT IT 02032050466'.

CAEN RFID Srl
Via Vetràia, 11
55049 VIAREGGIO - ITALY
VAT IT 02032050466

Adriano Bigongiari (Chief Executive Officer)



On the basis of this declaration, this product will bear the following mark:

The compliance is guaranteed only if the reader is used as described in the Lepton³x1 – Lepton³x4 - Technical Information Manual.
