

# Kronegger P&P Reader RS232

Version 3.2

## User - Manual

Confidential

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**Wireless Sensor Technologies**

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# 1 Introduction

Kronegger GmbH. provides customer support and optional design in services for properly integrating the products. Since we do not have full information on customer's applications or products, it is due to the customer to verify that the integrated products are suitable for the application intended and that no patents or intellectual property rights are infringed. Integrating the products into the customer's application is a development process that requires special experience, professional skills and involves usual technical risks. Kronegger GmbH. assumes no responsibility or liability for customer's applications, their performance, the required development effort, production, installation, operation, their suitability, reliability and safety. The products are not designed for applications where malfunction could cause potential risk of death, personal injury or environmental damage.

A C2/3PC is required for adding each host-specific condition to the original grant. The test plan as described in chapter 5.1 of this document has to be performed. This test plan fulfills the requirement by rule 47 CFR 15.212(b) to demonstrate continued compliance when the module is integrated into a host.

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

If using a permanently affixed label, the modular transmitter must be labeled with its own FCC identification number, and, if the FCC identification number is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. This exterior label can use wording such as the following: "Contains Transmitter Module FCC ID ZKCPP9912-2009-5 or contains FCC ID ZKCPP9912-2009-5". Any similar wording that expresses the same meaning may be used. The Grantee may either provide such a label, an example of which must be included in the application for the equipment authorization, or, must provide adequate instructions along with the module which explains this requirement. In the latter case, a copy of these instructions must be included in the application for equipment authorization.

Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.

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.

The manual has been written to the best of our knowledge. We do not guarantee the correctness and completeness of the provided information and insist on the good practice of crosschecking during the customer's development process through sufficient testing coverage. Feedback on errors in the manual are highly appreciated.

This document may be used to support the integration of Kronegger products. Any other use, duplication, storage or circulation is not authorized shall be prosecuted as a violation of copyright laws.

## 2 Getting Started

As factory default the data are transmitted at 115200, n, 8, 1 and no handshake. Two protocol modes are available. As default the binary protocol is used. To change the protocol type or the baud rate you have to configure the EEPROM (see EEPROM Memory Organization).

First of all you need a Mifare+ reader with an USB cable (Type A to mini B)  
For the communication with the reader you have to download a virtual com-port driver (VCP) for the USB interface. Please check the following link for the latest version:

<http://www.ftdichip.com/Drivers/VCP.htm>

The driver will map the USB to a serial communication port. Install the driver and connect the reader. It will show "new hardware detected." You can check your setup under System Setting/System/Hardware/Device Manager to find out which com-port had been assigned to your reader. Optionally you can change the com number in the advanced settings of the com-port.

For the communication with the reader you need the ReaderTool which is delivered with any Kronegger Reader. The Microsoft .NET Framework 2.0 (or any higher version) needs to be installed first in order to run the ReaderTool:

<http://www.microsoft.com/downloads/details.aspx?familyid=0856EACB-4362-4B0D-8EDD-AAB15C5E04F5&displaylang=en>

The ReaderTool needs no installation, simply start it and the reader will be selected automatically. Now you can communicate with your Mifare+ reader.

Step by Step:

- Download and install the FTDI driver

- Connect the Reader via the USB cable to the PC

- Download and install the Microsoft .NET Framework

- Start the ReaderTool

- Now you can communicate with the reader

### 3 Instruction Set

Following table describes all commands of the reader device. Each command sends a response to the host. Exceptions are mentioned explicitly. The green LED is acknowledging a successfully executed command. The red LED indicates an error.

#### **Generic Commands – Overview**

Generic commands apply to all supported tags.

Command	Description	Applicable OEM		
		Micro	Plus	XXL
'b'	Get Serial Number	✓	✓	✓
'c'	Continuous Read	✓	✓	✓
'e'	Send SAM APDU			✓
'k'	Lock Block			✓
'poff '/'pon'	Antenna Power off/on	✓	✓	✓
'pp'	Set/Get User ports	✓	✓	✓
'pr'/'pw'	Read/Write User ports	✓	✓	✓
're'	Read EEPROM register	✓	✓	✓
's'	Select	✓	✓	✓
't'	Send 14443-4 APDU		✓	✓
'v'	get Version	✓	✓	✓
'vs'	Set Version	✓	✓	✓
'we'	Write EEPROM register	✓	✓	✓
'x'	Reset	✓	✓	✓

## 4 Hardware

### 4.1 Features

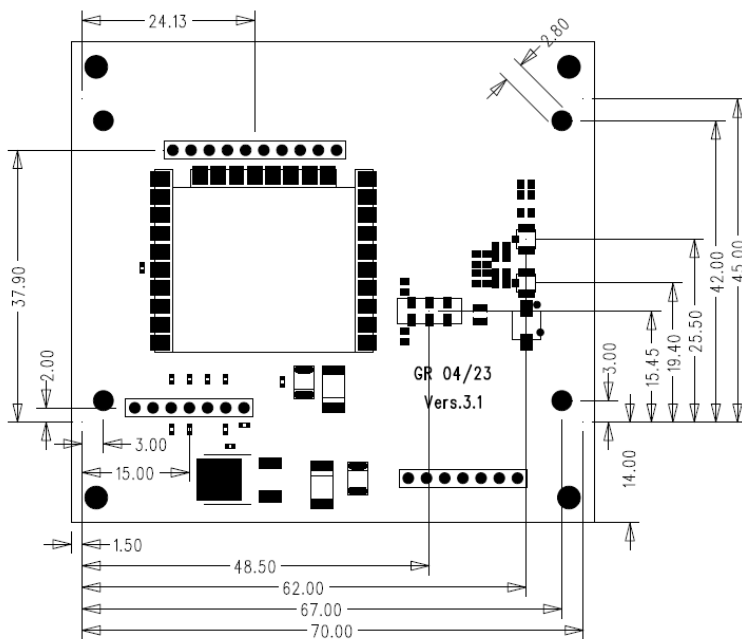
Dimensions	73,0 x 67,0 x 10,0 (LxWxH) $\pm 1$ mm 45,0 x 70,0 x 10,0 (LxWxH) $\pm 1$ mm (12V Supply)
Antenna	on board
Interface type	RS232
Reading distance	up to 50mm depending on tag
Signaling	reading LED, power LED
Power supply	5 VDC $\pm 10\%$ regulated, 12 VDC $\pm 10\%$ regulated

## 4.2 Dimensions:

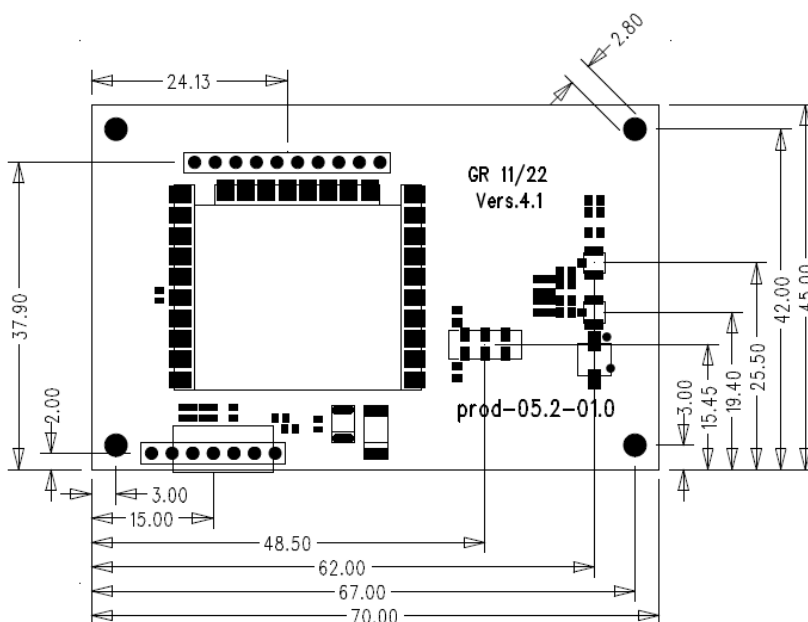
All dimensions listed in mm.

PCB thickness:  $1,5 \pm 0,1$  mm

12V Version:



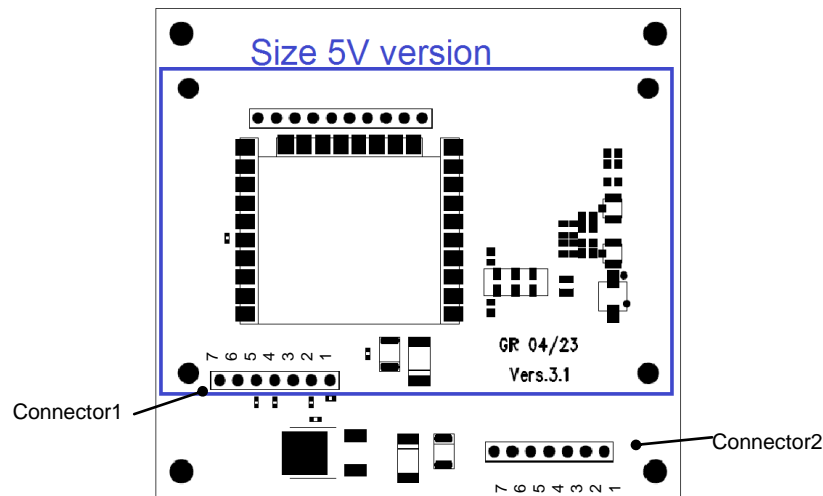
5V Version:





## 4.3 Pinout

Size 12V version



## 4.4 Electrical characteristics of Connector1:

PIN	PIN No.	Min.	Typ.	Max.	Description
RFU	1				NC
VCC1	2	4,5 V	5,0 V 150 mA	5,5 V 250 mA	Supply Voltage Supply Current
GND	3		GND		Ground for Power Supply and Interface
RX RS232	4	-30 V 3 kΩ	5 kΩ	+30 V 7 kΩ	RS232 Voltage Levels Input Impedance
TX RS232	5	±5 V 300 Ω	±9 V		RS232 Voltage Levels Output Impedance
RX TTL	6		3,3 V 8 mA	5,5 V 25 mA	TTL Input from Host
TX TTL	7		3,3 V 8 mA	3,6 V 25 mA	TTL Output to Host

## 4.5 Electrical characteristics of Connector2:

PIN	PIN No	Min.	Typ.	Max.	Description
VCC2	1	11 V	12 V 150 mA	13 V 250 mA	Supply Voltage Supply Current
RFU	2				RFU
GND	3		GND		Ground for Power Supply and interface
RX RS232	4	-30 V 3 kΩ	5 kΩ	+30 V 7 kΩ	RS232 Voltage Levels Input Impedance
TX RS232	5	±5 V 300 Ω	±9 V		RS232 Voltage Levels Output Impedance
RX TTL	6		3,3 V 8 mA	5,5 V 25 mA	TTL Input from Host
TX TTL	7		3,3 V 8 mA	3,6 V 25 mA	TTL Output to Host

## 5 Integration

The limited condition §15.212(a) "No RF shielding" will require a PAG identified in KDB Publication 388624 PAG. The module requires a MODLIM PAG as following:

- RF shielding- A C2/3 PC test plan for each specific host.

Guidance as provided in Appendix C of 996369 D01 Module Certification Guide v03.

The objective of this Permissive Change (C2/3PC) is to confirm that all host's emissions remain compliant with all the applicable FCC rules.

It is permitted for the test plan to allow for test reduction based on a "worst-case scenario." The manufacturer can use sound engineering judgment and justification to identify a 'worst-case' data rate and bandwidth setting for test reduction.

The test plan shall confirm and demonstrate compliance with the following:

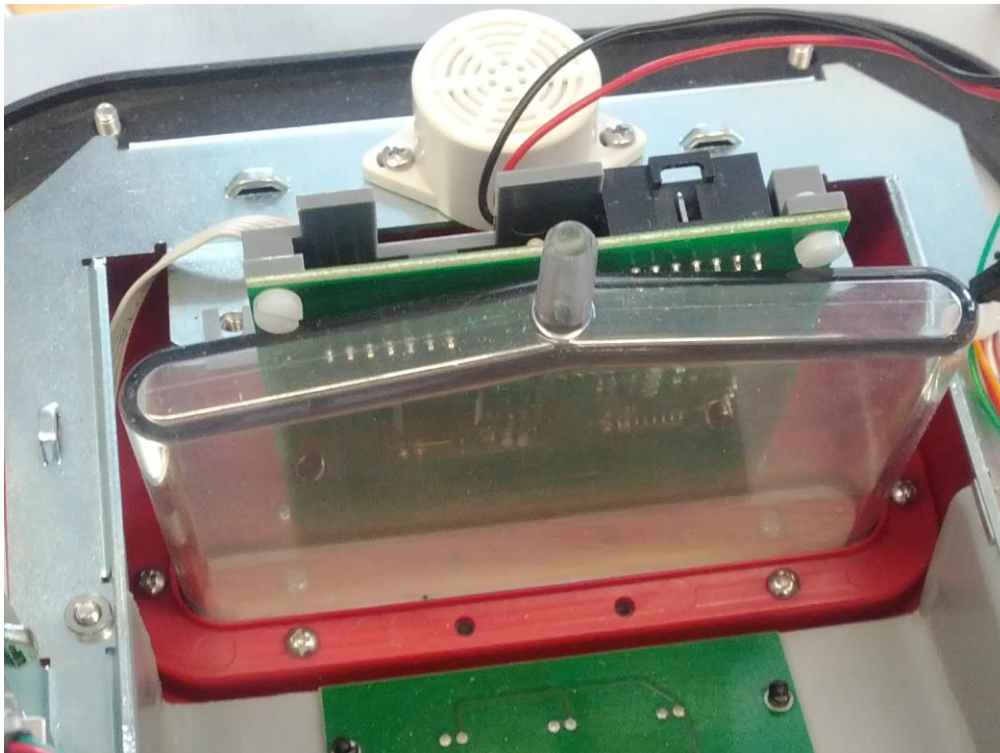
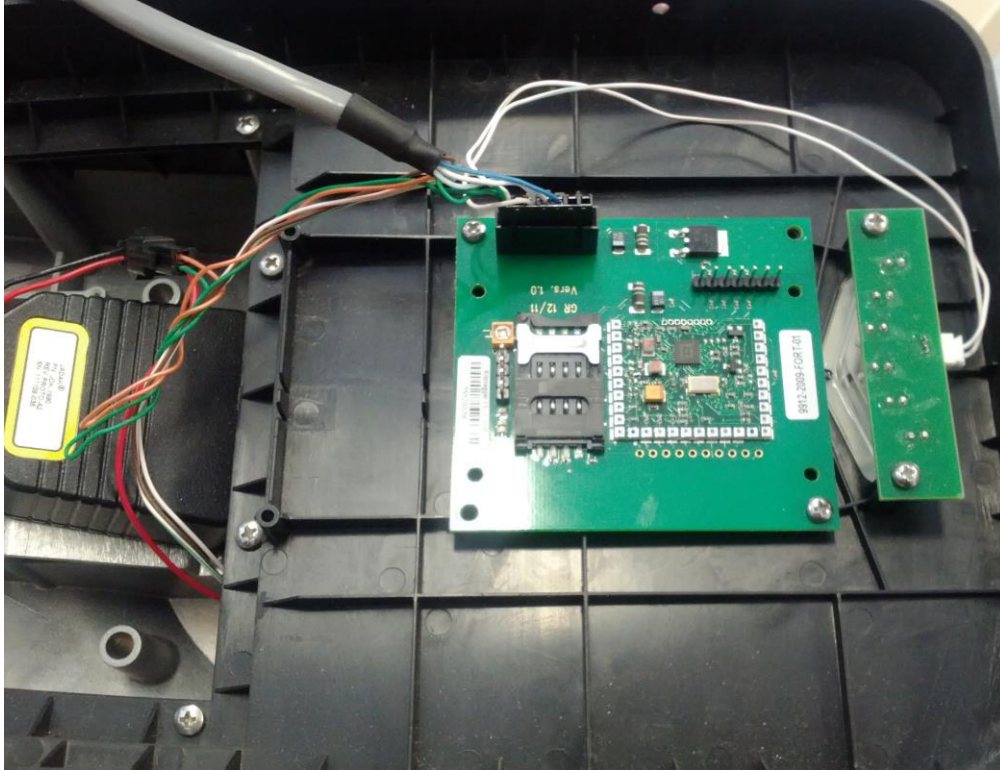
- Confirm and document the continued compliance for the fundamentals for each band under each specific rule part granted for the module.
- The test shall demonstrate each band's worst-case modulation mode(s).
- Test Band edge compliance for the widest and narrowest bandwidths per modulation type.
- Include radiated spurious emissions with the antenna connected. Testing shall be performed for each supported modulation teasing 15.31(m). In all cases, a test of each modulation is required for channels over the frequency range defined in 15.33(a) for unlicensed transmitters and 2.1057(a) for licensed transmitters.
- Confirm and demonstrate with the radiated test that no additional parasitic, non-compliant emissions exist due to ingress (parasitic oscillations, radiation of stray signals within a host, etc.), are present.
- These tests can be based on C63.10 and C63.26 as guidance

## 5.1 Test plan

The module does not contain its own shielding and requires a test plan. The limited condition §15.212(a) “No RF shielding” requires a Class II Permissive Change for each integration. This test plan has to be carried out for each type of device, the module is integrated into.

- The transmitter power and the bandwidth of signal should be tested according to FCC 47 CFR Part 15C Clause 15.215 (c) with test method according to ANSI C63.10 clauses 6.9, section 11.11 and 11.12 and Clause 15.225 (e) fulfilled.
- The conducted emissions at the mains terminal according to FCC 47 CFR Part 15C Clause 15.207 should be measured as defined in ANSI C63.10 section 6.2 or comparable test setup to ensure the conducted emissions are within the limits.
- The disturbance / radiated emissions according to FCC 47 CFR Part 15C Clauses 15.209 and 15.225 should be measured completely. If the module antenna is installed in close proximity to metal planes or to conductive planes it can demonstrate different properties. It is important to keep in mind that the major concern with unshielded modules is ingress from other sources of RF in the final host. It is important to be looking for any and all emissions and not be limited to those specific frequencies from the original filing. The device is tested with the default bandwidth and default modulation scheme used to communicate with the transponder. Other than default bandwidth and default modulation scheme are not used.

- Integration examples



## Version History

Date	Revision Number
19.04.2012	Version 2.0
21.11.2023	Version 3.0
05.03.2024	Version 3.1
05.12.2024	Version 3.2