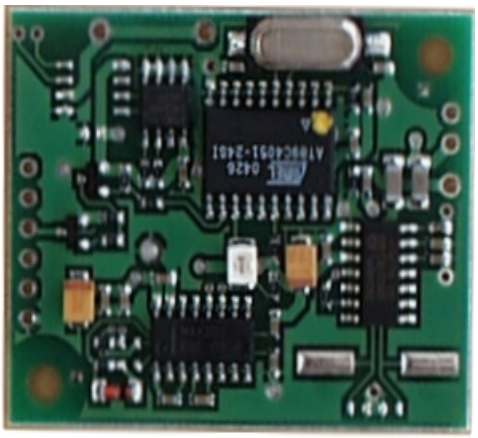
O P E R A T I O N M A N U A L

Version 01/05

RF-Reader

Stand-alone-Reader Leser 2plus
with RS-232 interface



Important! Read by all means!

To maintain the perfect shipping conditions and to ensure safe operation please observe the instructions in this Operation Manual. Damages caused by non-observance of these instructions will invalidate any guarantee. We further cannot take liability for any consequential damages.

Table of Contents

1. Introduction

Dear Customer,

We want to thank you for purchasing this Standalone Reader.

With this unit you have acquired a product built to the latest state of engineering. Its operation is simple and easily understood. Nevertheless please read this Operation Manual carefully for optimum utilization of all of its features.

2. Intended Use

The intended use of this Standalone Reader is the acquisition of transponder data by use of an Antenna Module. These data will be compared by the Standalone Reader with the transponder data stored in an internal EEPROM. If any one of the stored transponder numbers is recognized the Reader will switch an output.
Any use other than the one pointed out above is not admissible.

Design and construction of this Module correspond to all European and national requirements for Electro Magnetic Compatibility (EMC). The unit carries the CE-Sign, the conformity has been proven. All appropriate commentaries and records are in the possession of the manufacturer.

3. Safety Instructions

Important Informations on the Reader Module:

- In conjunction with the Reader Module the Antenna builds a tank circuit creating high voltage at the antenna terminals. Please avoid any contact to these antenna terminals during operation of the Reader and especially keep children at a safe distance from the device.
- The RF Reader Family has not been designed to safely lock or secure doors. During prolonged absence from any room made accessible by a Reader the door must therefore further be locked by means of the original key.
- In order to guarantee sabotage safe operation do in any case mount the Reader's electronic circuit - unreachable for non-authorized persons - inside of the building.
- We cannot take liability for damages caused by improper and/or careless handling of RF Reader products.

For use with the RF Readers specific Transponders suitable for these Readers are necessary.

Notes on Installation of the Reader Modules:

- The Modules are considered Reading and Controlling Devices of Mode of Operation Typ 1 according to EN 60730 (VDE 0631).
- When installing the Reader and Antenna Modules ensure a clean and dry environment.
- The individual Modules must be dry and free of dust.
- For protection of the power supply line use a slow-acting 2.5 A fuse.
- In case a bell transformer is used to provide the necessary power to the Reader Modules of the RF Reader it has to correspond with the requirements according to EN 61558-2-8 (DIN VDE 0570 Part 2-8: Special requirements for bell and ringer transformers).

Notes on Placing and Mounting the Reader Modules:

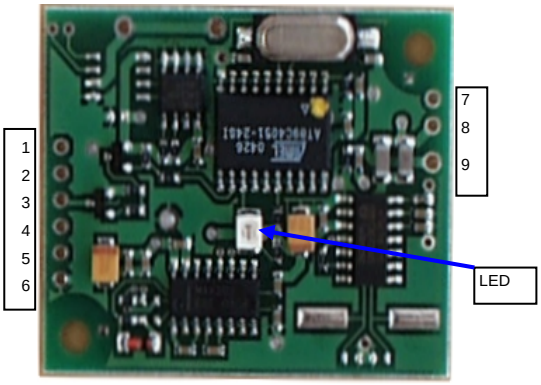
When mounting Reader and Antenna the following guidelines have to be observed:

- Metallic objects must not be placed between Antenna and Transponder.
- The Antenna should be mounted on non-metallic material (wood, concrete) at a minimum distance of 3 cm from any metallic object.
- The connecting line of the Antenna must not be of any length in excess of 1.5 m. Otherwise the reading distance stated for the Reader Modules in Section 12. **Technical Specifications** cannot be guaranteed.
- The connecting line of the Antenna must not be mounted in the immediate proximity of any other line carrying electric current.
- Two or more connecting lines of any Antennas must not be mounted side by side.
- **When mounting several RF Readers inferences of Modules among each other can be avoided if a minimum distance of approximately 1 m is kept between Reading devices.**

4. Device Description

The RF-reader Leser 2plus with RS232 interface is a plug-in module, which builds together with the power module POW a reader unit. The connection to the power module POW is simply done with pin connectors (2,54mm grid), as both pcbs have congruent pinnings.

PCB Stand-alone-Reader Leser 2plus



Terminal positions:

1 +5V
2 input push button
3 output open collector (max. 200 mA)
4 output data, TX-TTL
5 input data, RX-TTL
6 GND
7 Antenna 1 (for pin connector to Powermodule)
8 Antenna 2 (for pin connector to Powermodule or screw connector)
9 Antenna 1 (for screw connector)

5. Functional Description

The RF reader Leser 2plus with serial RS232 interface is a reader, which can be used both as a stand-alone reader or as a reading head just sending the decoded transponder numbers to the PC.

Up to 50 transponder numbers can be stored in an on board EEPROM. The reader switches an output, if the decoded transponder is stored in the memory of the reader. The “ON”-time of the output can be set from app. 0,5 sec to 15 sec in steps of 1 sec.

It is recommended to use the PC software “LeserPlus Manager” (download from www.codatex.com) to store the transponder numbers (key transponders) in the memory.

Alternatively a master transponder can be used to store the key transponders into the memory. The master transponder must be stored separately in the memory.

In the stand-alone mode the reader decides on its own, which transponder is permitted to switch the output.

Through the serial interface and the PC software “LeserPlus Manager” the table of permitted transponders can be comfortably managed: uploaded, modified and downloaded to the reader. Also the switch time of the output can be changed easily.

If you configure the reader as reading head (in the PC software LeserPlus Manager), the reader does not switch outputs on its own, but just sends the number to the serial interface and waits for instructions from the PC.

ATTENTION: If the reader is in reading head mode, the reader does not switch the output on its own, even if there are transponders stored in the memory. In this mode the reader waits for instructions from the PC. The reading head mode can be deactivated through PC software only.

A more detailed description of the reader is available in item **Operation.**

6. Connections

The exact terminal positions can be seen in the table in Section 4. **Device Description** above.

It is recommended to use the power module POW as power supply to the Leser 2plus. The connection pins 1 to 6 and 7 and 8 are layouted in a 2,54mm grid, so that pin connectors can be used for soldering both bcb to a sandwich assembly. In case of using the power module POW please refer to the user guide of the POW for detailed description of the connectors on the POW module. All pins are available on the POW.

If an external power supply is used:
- make sure that it provides a stabilized 5V source with a low ripple (<50mV).
- connect the antenna module to the pins 7 and 8 of the Leser 2plus.
- alternatively you can use a 3,5mm screw terminal on pin 8 and 9 for the antenna connection
- connect the power supply (5V, GND) to the pins 1 and 6 of the Leser 2plus.

7. Putting into Operation

After the Leser 2plus and the Antenna have been connected in accordance with the connection scheme the Leser 2plus can be put into operation.

If you are using the PC software, please connect the serial interface of the reader with the corresponding pins of the RS232 interface of your PC.

After activating the power supply the Reader is in permanent Reading Mode.

8. Operation

Following operation is based on the assumption, that the reader is connected to the power module 2002 POW. This is especially referring to input 2, for which a push button is placed on the power module and for the open-collector output 3, to which a relay is connected on the power module.

- **Programming the Master Transponder**

  When configuring the Reader at first the Master Transponder has to be programmed.
  Programming condition for the Master Transponder is initiated by pressing the push button until the LED lights up and switches off again (appr. 1 s). Now the push button is to be released and the Master Transponder must be brought close to the Antenna. The recognition of the Master Transponder is then acknowledged by a three-fold lighting up of the LED.
  The Reader is in programming condition for the Master Transponder for a maximum time period of 5 seconds. If during this length of time no Transponder is brought close to the Antenna, the Reader will acknowledge this process by a five-fold lighting up of the LED followed by a return of the Reader to the Reading Mode.

  The previously as Master Transponder stored Transponder is only empowered to program further Key Transponders. It cannot be stored as a Key Transponder.
  A Master Transponder cannot be used for normal opening action.
  Please mark your Master Transponder accordingly and keep it in a safe place.

- **Storing of a new Master Transponder**

  In case the Master Transponder is lost, a new Transponder can be stored as Master Transponder. This process will invalidate the previous Master Transponder.

  If a Transponder used as Key Transponder is newly programmed to be Master Transponder it will lose its function as a Key Transponder.

  Previously stored Key Transponders will remain in the Reader's memory, i. e. they will not be deleted by programming a new Master Transponder.

- **Programming of Key Transponders**

  In order to program new Key Transponders the previously stored Master Transponder has to be brought close to the Antenna for read-in for at least 3 but no more than 10 seconds. The Reader will then change to the Programming Mode for 10 seconds. This condition is signalled by a two-fold short lighting up of the LED.
  Every Transponder read during this length of time will be stored in the Reader as a valid key (Key Transponder). Every recognized and stored Key Transponder will be acknowledged by a single short lighting up of the LED. Previously stored Key Transponders will not be stored again and will thus not be acknowledged (LED does not light up).
  The 10 second time period for the programming mode will at times be newly started upon recognition of a Key Transponder.
  A Transponder previously stored as Master Transponder cannot be used as a Key Transponder.

- **Adding of Key Transponders**

  If any Master Transponder is being read for more than 3 but less than 10 seconds, the Reader will change to the programming condition and all Transponders previously stored in the Reader will remain valid.
  By doing this new Transponder numbers can be added and stored as Key Transponders to the numbers already existing.

- **Erasing all stored Key Transponders**

  If the Master Transponder is held close to the Antenna for longer than 10 seconds, the Reader will delete all stored Transponders and will change to the programming condition. The LED will light up twice after 3 seconds and twice again after 10 seconds. Then the Reader will start new programming of the Key Transponders.
  Single Transponders cannot be erased separately.

  Caution: When putting the unit into operation for the first time its memory should be erased completely, i. e. the Master Transponder should be brought close to the Antenna for at least 10 seconds.

- **Setting the Switching Time for the Relay**

  ATTENTION: The output switching times are approximate values which can deviate from the nominal values depending on the status of the reader.

  The Reader allows the setting of the relay's switching time. During this process no Transponder should be close to the Antenna.
  In order to set the switching time of the relay press the push button for at least 5 seconds until the LED lights up for the second time (immediately after pressing the push button the LED will light up. It will switch off again after about 1 seconds indicating the programming condition for the Master Transponder).
  After the second lighting up of the LED release the push button and press it again as many times as the number of seconds you want to set the relay's switching time, i. e. the push button has to be pressed 3 times for a switching time of 3 seconds and accordingly 5 times for a 5 second switching time. The maximum switching time is 15 seconds. When pressing the push button the LED will switch off and will light up again when the push button is released. This way the number of push button strokes can also be counted optically. After the switching time has been set, press the push button until the LED shortly lights up three times, indicating the end of the setting process. The setting process for the relay's switching time has thus been concluded.
  If you happen to accidentally press the push button more often than the allowed 15 times (for a 15 second switching time), the Reader will terminate the programming process without any change of the switching time (LED will light up 5 times).

  In order to set the shortest possible switching time of 0.5 seconds shortly release the push button after appr. 5 seconds, i. e. after lighting up of the LED and press and hold it again until the LED lights up 3 times.

  Moreover the switching time of the relay is automatically extended as long as a valid Key Transponder is in the close proximity of the Antenna's reading area. This means that the set switching time only counts from that point in time when the transponder is removed from the reading area of the Antenna.

- **Memory Display**

  It is possible to store up to 50 Key Transponders in the Reader.
  In case the memory is completely filled (50 Key Transponders), the Reader will indicate this condition with a five-fold lighting up of the LED whenever an attempt to program further Transponders is started.

- **Reading Mode**

  Whenever a transponder is read by the Reader its number is compared with the numbers of the Key Transponders stored in memory. If the particular number is present in memory, the relay is switched for the preset period of time. At the same time the LED lights up for the duration of the switching process.

- **Reading transponders in the reading head mode**

  In this mode the reader ignores the transponder numbers stored in the memory of the reader. It sends the read number on the serial interface to the PC and follows the instructions coming from the PC. One can have in the PC independent tables of transponder numbers and the PC (an individual PC software) is deciding if an instruction to switch the output is sent to the reader.
  One can switch the reader from reading head mode to standalone mode according to individual application requirements.

9. Operation through serial interface with PC Software „LeserPlus Manager“:

The software “LeserPlus Manager” is available for downlaod from the Codatex homepage under www.codatex.com.
We recommend to use this software for configuring the reader as it offers comfortable data management and backup.

- **System requirements:**
  - Windows 2000, XP
  - App. 5 MB free hard disk memory
  - 16 MB RAM memory
  - Processor min. 100 MHz
  - Display resolution min. 800 x 600
  - Serial interface RS232

Following interface parameters must be used:

Baudrate :	9600
Databyte:	8
Parity:	none
Stopbits:	1
Flux control:	none

ASCII-Codes (Decimal):
<STX> = 002
<EOT> = 004
<ACK> = 006
<NAK> = 021

10. Interface protocol description:

ATTENTION: This interface protocol is for experienced users only. We recommend to use the PC software “LeserPlus Manager” for reader management.

The RF reader Leser 2plus can be operated both in the stand-alone mode and in the reading head mode.

In the **stand-alone** mode following instructions are available to talk to the reader:

1. Reader start up

After power on of the reader, it sends an OK

<STX>OK<EOT>

2. Version number

The version number of the reader can be read with
<STX>H<EOT>.
The reader responds with
<STX>XRDV[1][2] EOT>
[1] shows the firmware version
[2] shows the hardware version of the reader

If a command is not accepted by the reader it sends a
<STX>NAK><EOT>

3. Programming the Master Transponder

For programming a master transponde the reader must be switched into the master programming mode by following command:
<STX>M<EOT>
The reader responds with
<STX><ACK><EOT>
and stays in the master transponder programming mode for 5 sec.
If a transponder is read during this period of time, the reader responds with
<STX>M[Data]<EOT>
[Data] is the number of the master transponder, e.g. “**M**37FA4B02AC”

Is there no transponder the reader will respond
<STX>M<NAK><EOT>

4. Setting the number of transponders to be programmed

For programming transponders to the memory of the reader, there must be set the numbers of transponders to be programmed. The number to be set must include the master transponder. The command to set the number of transponders is
<STX>Zxx<EOT>
xx is the hexadecimal number of transponders to be stored (from 00 to 32 HEX)
The reader responds with
<STX><ACK><EOT>

Example:
If you want to store 25 key transponders (plus the master transponder) the number must be set to the 26 decimal which is 1A in HEX. The command shall be:
<STX>Z1A<EOT>

5. Reading the number of transponders to be programmed

To read the number of reserved memory for transponders use the command
<STX>Y<EOT>
The reader responds with
<STX>xx<EOT>
xx shows the hexadecimal number of reserved memory for transponder numbers including the master transponder.

Attention: If you have programmed for example 25 key transponders into the reader and you set the number of reserved memory to 10 only the first 9 key transponders will activate the output. For using all 25 programmed key transponders you have to set the reserved memory to 26 (1A in HEX).

6. Reading key transponder numbers

You can read the transponder numbers stored in the memory with following command
<STX>Gxx<EOT>
xx is the number of the memory location in HEX (from 00 to 32 HEX)
The reader responds with
<STX>[Transpondernumber]<EOT>
Is there no transponder number stored at this location the reader responds with
<STX>FFFFFFFFFF<EOT>

7. Setting the reader modes “Stand-alone” and “Reading head”

The stand alone mode will be set with following command
<STX>K1<EOT>
The reading head mode will be set with following command
<STX>K1<EOT>
The reader responds with
<STX>ACK<EOT> after successful change of mode otherwise with
<STX>NAK<EOT>

8. Enable/Disable the Master transponder

You can disable the master transponder functionality with following command
<STX>J0<EOT>
After this command no more key transponders can be added by using the master transponder.
To enable the master transponder functionality again use
<STX>J1<EOT>
The reader responds with
<STX>ACK<EOT> after successful change of mode otherwise with
<STX>NAK<EOT>

9. Enable/Disable the serial transmission of transponder numbers

The transponder numbers are sent on the serial interface by default with following format
<STX>[data]<EOT>
[data] is showing a capital R followed by the 5 byte transponder number, e.g. **R**1D37FA4B02

You can disable the serial transmission of transponder numbers with following command
<STX>N0<EOT>
To enable the serial transmission again use
<STX>N1<EOT>
The reader responds with
<STX>ACK<EOT> after successful change of mode otherwise with
<STX>NAK<EOT>

10. Switching the open collector output

The command
<STX>R1<EOT> will activate the open collector output.
<STX>R1<EOT> will deactivate the open collector output

11. Reading the CONFIG Byte

With the command
<STX>C0<EOT> the CONFIG Byte of the reader can be read.
The reader responds with
<STX>[xx]<EOT>
xx shows the CONFIG Byte in HEX, e.g. 07 HEX means 0000 0111

See following table for bit interpretation

MSB LSB

res	res	res	res	Relay status	Send transponder number	Master transponder enabled	Mode stand-alone reading head

12. Reading the output switching time

With the command
<STX>C1<EOT> the output switching time of the reader can be read.
The reader responds with
<STX>[xx]<EOT>
xx shows the output switching time in HEX
00 HEX means 0,5 sec
01 HEX means 1 sec
02 HEX means 2 sec and so on.

13. Programming the output switching time

With the command
<STX>D1xx<EOT> the output switching time of the reader can be set.
xx means the output switching time in HEX
00 HEX means 0,5 sec
01 HEX means 1 sec
02 HEX means 2 sec and so on.

11. Care, Maintenance and Disposal

Besides providing the specified voltage and its intended use as a device for acquisition, storage and interpretation of Transponder Data the Standalone Reader does not require any special care or maintenance.

An RF Reader that highly unexpected has become unusable must be disposed of observing all relevant legal regulations.

12. Debugging

If all notes and regulations of this and other relevant Operation Manuals (Online Help, etc.) are observed correctly there should be no unexpected malfunctions. If this nevertheless happens to be the case, please do not attempt to make any own repairs. Return the device to your point of purchase and have it checked and possibly repaired by a qualified engineer. Opening or improper handling of the devices will invalidate any guarantee.

13. Technical Specifications

Operation Voltage:	5V ±5%, stabilized, ripple <50mV
Power consumption:	max. 200 mA
Transmitter frequency:	125 kHz
open collector output current:	max. 100mA (sink), max. 300mW
Max. Reading Distance:	app. 7 cm
Max. Distance Antenna / Electronics:	1.5 m
Max. Number of Transpondersl:	50 key transponder
Measurements Casing (L x W x T):	45 x 35 x 10 mm
Operating Temperature:	0°C bis 45°C

14. Notes on Manufacturer

CODATEX Hainzlmaier KEG
Ischlerbahnstraße 15
A – 5020 Salzburg

Email: info@codatex.com
Internet: **http://www.codatex.com**

We herewith declare, that this RF reader is in accordance with the basic specifications and other relevant regulations of the directive 1999/5/EG.

The original declarations of conformity (Nr.: G0M20208-7058-C) can be found on our homepage under www.codatex.com.