




HERMOS



Englisch

Customer manual

LFM 32x WipRack Rev1.1



0. Table of contents

Inhaltsverzeichnis

0. Table of contents	2
1. Introduction	5
1.1 Using the device	6
2. Version history	7
3. Used abbreviations and designations	7
4. General instructions	8
4.1 Objective of the product manual	8
4.2 Warranty and liability	8
5. Safety instructions and warnings	9
5.1 Scope and symbols	9
5.2 Safety symbols - according to DIN 4844-2	9
5.2.1 Mandatory signs	10
5.2.2 Warning signs	10
5.2.3 Prohibition signs	10
5.2.4 Other signs	11
5.3 Obligations	11
5.3.1 Operator's obligations	11
5.3.2 Responsibilities of operating personnel	12
5.3.3 ESD Instructions	12
5.4 Residual risks	13
5.5 Supplemental instructions	14
5.5.1 Regulations and certifications	14
6. Functional description	15
6.1 General information	15
6.2 Basic functions - operating modes	15
6.2.1 Normal operation	15
6.2.2 Sensor-triggered operation	16
6.2.3 Test module	16
6.3.1 Top view	17
6.4 Technical Specification	19
6.4.1 Device labels	20
6.4.2 Device Label FCC ID 2AP5OLFM-32X	20
7. Installation	21
7.1 Safety instructions	21
7.2 Qualified installation personnel	22
7.3 Unpacking	22





7.4 Mounting the device	23
7.5 Installing the Readhead	27
7.5.1 Readhead connections	27
7.6 Power Supply	28
7.7 DIP-switch	29
7.8 USB connection	29
8. Commissioning	31
8.1 Operating conditions	31
8.2 The USB connector (serial interface) parameters	31
8.3 Parameter of the ethernet interface	32
8.3.1 Change network settings with DeviceDiscoverer	32
8.3.2 Firmware update with DeviceDiscoverer	35
8.3.3 Test Device with DeviceDiscoverer	36
9. Operating	38
9.1 Operating personnel	38
9.2 Protocol change	38
9.2.1 General	38
9.2.2 Automatic protocol detection	38
9.3 Addressing the antenna port	39
9.4 Customer Factory parameters sets	39
10. ASCII-11 Communication protocol	41
10.1 Structure of the communication protocol	41
10.2 Packet content	41
Packet header	41
Message data	42
Packet end	42
10.3 Data elements	44
10.4 Protocol Commands	52
10.4.1 X - Read data	54
10.4.2 R – Automatic read	55
10.4.3 W - Write data	57
10.4.4 G – Query parameter	58
10.4.5 F – Query parameter	59
10.4.6 P – Set parameter	60
10.4.7 N – Reset	61
10.4.8 e – Error message	62
10.4.9 E – Error message	62
10.4.10 H – Heartbeat	63





10.4.11 V – Query software version	64
10.4.12 L - Lock data area	65
10.4.13 I – Adjust RF module	66
10.4.14 J – RF module Queries the vote	67
10.4.15 A – Sensor event object removed	68
10.4.16 B – Sensor event object detected	69
10.4.17 O – Set output	70
10.4.18 Q – Querying the status of the inputs and outputs	71
10.4.19 D – Write to Display	72
10.5 Parameter	73
10.5.1 Parameters ASC-I1 Mode	73
10.5.2 Additional Parameters ASC-W1 Mode	75
10.5.3 Additional Parameters	76
10.6 Message examples	80
10.7 Error Codes	84
10.8 Wiring of the outputs	86
10.8.1 ASC-W1 Mode: Reader in operation mode and sensor triggered reading	86
10.8.2 ASC-W1-Mode: Reader in operation mode and external triggered reading	89
10.9 ASCII – table	90
11. Service and Troubleshooting	93
11.1 General information	93
11.2 Troubleshooting personnel	93
11.3 Safety instructions	94
11.4 Error indications on the device	95
11.5 No communication with the reading device	95
11.6 Software releases	96
11.7 Customer service	97
12. Disassembly and storage	98
12.1 Disassembly	98
12.2 Storage	98
13. Transport and disposal	98
13.1 Transport	98
13.2 Disposal	98





1. Introduction

These operating instructions are intended for the operator who must pass these on to the personnel responsible for installation, connection, use, and repairs of the machine.

The operator must ensure that the information contained in these operating instructions and in the accompanying documents has been read and understood.

The operating instructions must be kept at a known place that is easy to reach, and they must be consulted if there is the slightest doubt.

The manufacturer assumes no responsibility for damage to persons, animals, or objects or to the unit itself arising from the improper use or the disregard or insufficient consideration to the safety criteria contained in these operating instructions or based on modifications of the unit or the use of unsuitable replacement parts.

The copyright for the operating instructions lies solely with



HERMOS AG
Track & Trace - RFID Division Gartenstr. 19
95490 Mistelgau

or its legal successor.

Reproduction or circulation of this document to third parties only by express written permission of copyright holder. This also applies if only excerpts of the document are copied or circulated. These same conditions apply to the disclosure of the document in digital format.

As of: July - 2018





1.1 Using the device

The device is exclusively used to read and write passive LF transponders.

Any other use of the machine or any use beyond its intended purpose is considered non-intended and thus improper.

In this case, the device safety and the device protection provided may be compromised. HERMOS AG is not liable for damages resulting from such use.

The device was developed for the use in an industrial environment as a built-in device in other systems. It was not developed as a stand-alone or mobile device in a non-industrial environment, such as domestic, vehicle or open air use.

Intended use also includes the following:

- Following all the operating instructions
- Following all the safety instructions

Improper use, which can endanger the unit, the user and third parties, include:

- The use of the device contrary to its intended use
- Changes to the device as well as attachments and conversions
- Operating the unit when there are obvious problems

WARNING



Danger of injury due to unauthorised modifications

There are risks from unauthorised modifications on the device. Only original spare parts from the manufacturer must be used. No modification, attachment or conversion may be performed on the device without the permission of HERMOS AG.

WARNING



Danger of injury and interruption of operation due to improper use

There are risks through the improper use of the device.

The device must only be used according to its intended use.





2. Version history

Version	Date	Author	Amendments
1.1	15.11.2022	HERMOS AG, RK, LD, AL	Documentation for LFM32x WipRack using ASCII protocol

3. Used abbreviations and designations

RFID	Radio Frequency Identification
LF	Low Frequency 134,2 kHz
SEMI	Semiconductor Equipment and Materials
SECS	SEMI Equipment Communications Standard
HSMS	High-Speed SECS Message Service
PoE	Power over Ethernet
DHCP	Dynamic Host Configuration Protocol





4. General instructions

All previous versions of this document lose their validity with the issue of this version.

We compiled the information in this document according to the best of our ability. HERMOS AG does not guarantee the accuracy and completeness of the information provided in this document and is also not liable for consequential damages based on faulty or incomplete information.

4.1 Objective of the product manual

The product manual serves as support and contains all the necessary information that must be followed for general safety, transport, installation and operation.

The product manual with all safety instructions (as well as all additional documents) must be:

- Followed, read, and understood by all persons working with the unit (especially knowledge of the safety instructions)
- Easily available always to all persons
- Consulted if even the slightest doubt arises (safety)

Objectives:

- Prevent accidents
- Increase the service life and reliability of the unit
- Reduce the costs of production downtime

4.2 Warranty and liability

The „General Terms and Conditions of Sale and Delivery“ of HERMOS AG shall apply.

The warranty period is 24 months beginning with the delivery of the device, which is verified by the invoice or other documents.

The warranty includes repairs of all damages to the unit that occur during the warranty period and were clearly caused by material or manufacturing defects.

Warranty and liability claim in the event of personal injury or property damage are excluded if they arise from one or more of the following causes:

- Improper use of the unit
- Disregarding the information in the operating instructions
- Unauthorised structural modifications of the unit
- Insufficient maintenance and repairs
- Disaster events due to impact with foreign objects or force majeure





5. Safety instructions and warnings

5.1 Scope and symbols

Follow the general safety instructions as well as special safety instructions included in the chapters.

The unit was built according to state-of-the-art technology and recognised safety regulations. In order to prevent danger to life and limb of the user, third parties, or the unit, only use the unit for its intended purpose and in perfect condition with regard to safety.

Bodily injuries and/or property damages resulting from non-compliance with the instructions provided in the operating instructions are the responsibility of the company operating the unit or the assigned personnel.

Faults that may compromise safety must be eliminated immediately.

DANGER



Risk of death, injury and property damage.

There is a risk of danger due to disregard of the product manual and the safety information contained therein.

Read the product manual carefully before putting the unit into operation for the first time. Fulfil all required safety conditions.

5.2 Safety symbols - according to DIN 4844-2

The following special safety symbols in accordance with DIN 4844-2 are used at the corresponding passages in the text of this product manual and require special attention depending on the combination of the signal word and symbol.

DANGER








Risk of injury due to disregarding the safety symbols.







Risks exist when disregarding warnings in the operating instructions. Follow all warnings.




5.2.1 Mandatory signs

	Observe additional information		Use safety goggles
	Wear ear protection		Wear safety shoes
	Important note		

5.2.2 Warning signs

	Warning of a hazardous area		Warning of hazardous electrical voltage
	Warning of electromagnetic radiation		Warning of flammable substances
	Warning of explosive substances		Warning of electrostatically sensitive components

5.2.3 Prohibition signs

	Unauthorised access is prohibited		Fire, open flame and smoking prohibited
	Switching prohibited		Prohibited



5.2.4 Other signs

	<p>Verpackungsmaterial vor- schriftsgemäß entsorgen</p>		<p>Recycling</p>
--	---	--	------------------

5.3 Obligations

5.3.1 Operator's obligations

A safe condition and use of the unit is a requirement for a safe operation of the unit. For that reason, the operator has the obligation to ensure that the following points are adhered to:

- ⇒ The unit may only be operated by trained and authorised personnel.
- ⇒ Prohibit unsafe or dangerous working methods! If necessary, check the conduct and actions of its personnel!
- ⇒ Have personnel who must be trained, instructed or within the scope of general training work only on the unit under the supervision of an experienced person!
- ⇒ Have the personnel confirm by their signature that the operating instructions have been understood!
- ⇒ Precisely establish responsibilities according to the various task areas (operation, installation)!
- ⇒ Operating personnel must be required to immediately report any occurring and identifiable safety deficiencies to their superior!





5.3.2 Responsibilities of operating personnel

The operating personnel are obligated to contribute to the prevention of work accidents and their consequences by their personal conduct.

Risk of injury due to insufficient personnel qualifications

WARNING



There are dangers to personnel and the proper operation due to inadequately qualified personnel.

Only trained personnel may operate the unit.

New operating personnel must be instructed by the existing operating personnel. The operator must precisely regulate the personnel's areas of responsibility, competence, and monitoring precisely.

The personnel for the areas of responsibility mentioned above must have the corresponding qualification for this work (training, instruction). If necessary, this can be done by the manufacturer on behalf of the operator. In case of disregard, all warranty claims are void.

5.3.3 ESD Instructions

CAUTION



Static electricity can damage electronic components in the unit. All persons who install or maintain the unit must be trained in ESD protection.



ESD protective measures must be applied when opening the unit.

- ⇒ Disconnect the power supply prior to removing or adding components!
- ⇒ Observe the basic principles of ESD protection
- ⇒ Take the appropriate ESD precautionary measures





5.4 Residual risks

Despite all precautionary measures taken, there may still be residual risks that are not apparent. Adhering to the safety instructions, the intended use, and the product manual as a whole can reduce residual risks.

DANGER



Danger caused by electrical current

Electrical residual energy remains in lines, equipment and devices after shutting down the device.



Only qualified electricians may perform work on the electrical supply system.

ATTENTION



Disconnect the unit from the power supply system if active parts of the unit can be accessed using tools. Access is only permitted by authorised personnel.



Regularly check the electrical equipment of the unit. Regularly check all moving cables for damage within the scope of maintenance and repair work.

DANGER



Dangers of fire and explosion

There is a risk of fire and explosions in the vicinity of the device.



Smoking, exposed flames and fire are strictly prohibited in the vicinity of the unit. Do not store any flammable liquids within the hazardous area of the device.



A fire extinguisher must be kept in the vicinity of the device.

WARNING



Warning of electromagnetic radiation

Electromagnetic radiation develops when transmitting and receiving data. Arrange the antenna in such a position that it is not in the vicinity or make contact with the human body while transmitting.





5.5 Supplemental instructions

- ⇒ Read and understand all safety and operating instructions prior to installing and operating the device.
- ⇒ This documentation was written for specifically trained personnel. The installation, operation and error handling may only be carried out by specifically trained personnel.
- ⇒ Keep these instructions. Keep this documentation in a location that is accessible to all personnel involved with the installation, use, and error handling of the device.
- ⇒ Follow all warnings. Follow all warnings on and in the device and in the documentation.
- ⇒ Install the unit only in accordance with the manufacturer's instructions.
- ⇒ Use only the accessories and cables from the manufacturer.
- ⇒ Troubleshooting that is not described in the chapter a service and troubleshooting may only be performed by the manufacturer.
- ⇒ When connecting cable connections, only pull on the plug and not on the cable.
- ⇒ Only use spare parts specified by the manufacturer.

The provisions of the accident-prevention regulations of the government safety organisations always apply to all work on the unit.

- ⇒ Applicable, legally binding accident prevention regulations.
- ⇒ Applicable binding regulations at the place of use
- ⇒ Technical standards for safety and professional work
- ⇒ Existing environmental protection regulations
- ⇒ Other applicable regulations

5.5.1 Regulations and certifications

The electrical design and documentation satisfy the DIN / VDE, EN / IEC regulations.





6. Functional description

6.1 General information

LF reading devices are radio frequency identification systems that use radio transmission to read or write data of LF transponders (134,2 kHz), which operate as tamper-proof electronic tags. The LF reading devices communicate with common transponders (134,2kHz) according to ISO 18000-2 and ISO 11785 that are available on the market.

The data is transmitted via the existing interface with the present transmission parameters. If several interfaces are available and connected to the host, the transmission is always carried out on the most recently used interface. The data is embedded in a defined communication protocol and exchanged between the reader and host.

6.2 Basic functions - operating modes

During normal operation, the LF reading device supports various basic functions:

- Heartbeat function, software version query
- Scanning of transponders in the antenna area (UID)
- Reading data
- Writing data
- Locking data
- Setting and reading out parameters
- Setting and querying inputs and outputs

The LF devices can be set in 3 other operating modes by setting the parameters: Polling operation (optional), sensor-triggered automatic reading and test mode.

6.2.1 Normal operation

During normal operation, the LF reading device is immediately ready for operation after a reset. It does not perform any automatic actions in this mode (standby). During normal operation, actions are triggered by protocol commands from the host.

A scanning procedure or reading in the data area is initiated by a command of the host system using the communication protocol. →

In addition to the actions triggered by the host, a corresponding message can be automatically sent to the host and an automatic reading operation can be started by activating or releasing a sensor.

When the reading operation is successful, the read data is immediately transmitted to the host. If several antenna ports are occupied simultaneously, the reading operations are processed sequentially.

Writing actions (data saved to a transponder) are generally only possible via commands from the host.





6.2.2 Sensor-triggered operation

Device versions with IO module (at least 1 input) offer the function of a sensor-triggered automatic reading operation. The reading device automatically performs a reading operation when the input is triggered. The type of action (inventory/reading) can be defined with the parameters „Read mode“ and „Read page“.

The read data is automatically sent to the host.

The result of the reading operation (successful, not successful) can be optionally output via I/O s of the respective antenna port.

6.2.3 Test module

The HERMOS LF reading devices support a test mode that facilitates setting up the antenna and checking the reading ranges during commissioning. From the 4 Dip-Switches (near the network connector) the DIP3 and DIP4 are used for test mode. The evaluation of the DIP switch depends on parameters. See also chapter [„DIP-switch“](#).

If the device is in read test mode, the reader triggers every 300ms a read at the last selected I/O port.

For detected sensor:

If no transponder could be read the red port LED is short switched on for 200ms. As long as a tag is read successfully, the green port LED is on.

For released sensor:

If no transponder could be read the red port LED is short switched on for 20ms. As long as a tag is read successfully, the green port LED is flashing with about 2,5Hz (200ms on/off).

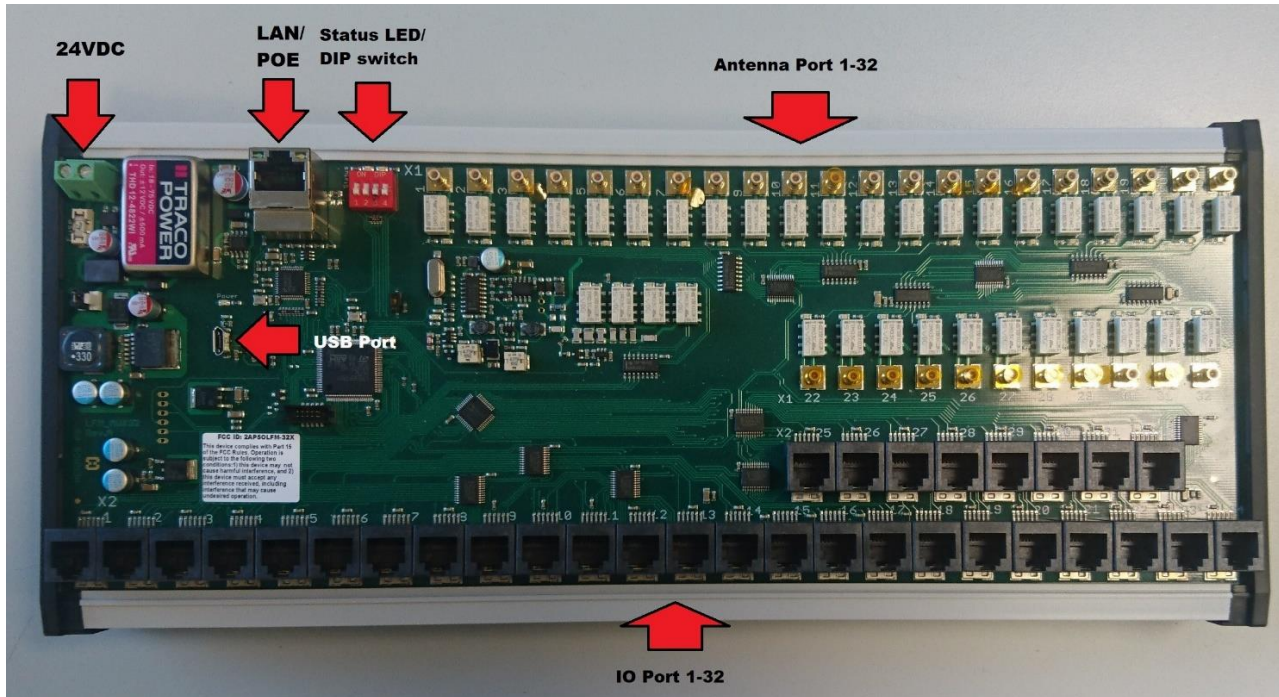
For the write testmode at first a tag read is triggered every 300ms. When the tag could be read than the reader triggers a tag write every 500ms. When tag write fails than the tag read is triggered again every 300ms. For the write testmode a yellow port LED (red and green port LED switched on) indicates that the tag could only read. The green port LED indicates the success of read and write process.

During test mode, the green status LED flashes if the read or write fails and lights up steadily if the read or write succeeds. The orange status LED has no functionality and is permanently switched on. See also [“Status LEDs”](#).



6.3 Illustration

6.3.1 Top view



Component	Description
24VDC	Two-pin socket for the connection of the 24V DC power supply.
Power-LED	The green power LED indicates that the operating voltage is present and the device is ready for operation.
Status-LEDs	<p>The two status LEDs are used for the reading and writing feedback in test mode. If the device is in test mode, the green status LED flashes if the read or write fails and lights up steadily if the read or write succeeds. During test mode the orange status LED has no functionality and is permanently switched on.</p> <p>After a restart, a short self-test of the LEDs, then display of the protocol: SECS: The green LED goes on briefly ASCII: The yellow LED goes on briefly</p>
DIP-switch	See chapter “Dip-switch” for functionality.
LAN/POE	The device features an Ethernet interface. The communication with the device can be carried out via the 10/100 BaseT interface. The Ethernet interface is generally PoE capable.

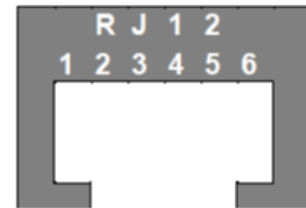
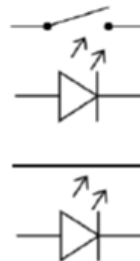




USB interface	Interface for Service See chapter USB-connection .
Antenna Port 1-32	SMB connections for connecting the up to 32 antennas
IO Port 1-32	RJ12 connection for the up to 32 Readhead In-/Outputs

Pin assignment Readhead

PIN	Signal
1	Tx Display
2	VCC (+3,3V/+5V)
3	INPUT
4	LED 2 (max. 10mA)
5	GND
6	LED 1 (max. 10mA)



LED 2 at Readhead → green LED

LED 1 at Readhead → red LED

at Readhead → LED 1 and LED 2 together on → appears as yellow LED





6.4 Technical Specification

Technical data	
Voltage (protected against reverse polarity)	20 – 28 V DC, or PoE
Power consumption (passive, reading, pulse)	60mA, 200mA, max.300mA (@24VDC)
Fuse type Nano2	375 mA
Operating temperature	-0 to 50 °C
Storage temperature	-20 °C to 70 °C
Permissible humidity at 50°C	25 – 80 %
Transmission frequency	134,2 kHz
Ethernet interface	10/100 BaseT, (PoE, IEEE 802.3af)
Protocol	ASCII
Housing material	PVC
Protection	IP40
Reader dimensions	335 x 140 x 45 mm
Weight	approx. 900 g





6.4.1 Device labels

The device label is located on the reading unit housing.
It contains a CE mark, article/serial number and the MAC address.

1. Designation
2. Article number (variants)
3. Serial number (example)
4. MAC address
5. Manufacturer

LF WIP-Regal 32x RFID kit
P/N: HRF.W.LFM.30BWV.NW.10K
S/N: 2202HAG09178 
PO: HK210654
MAC: E8:EB:1B:00:C5:43
HERMOS AG
Made in Germany

6.4.2 Device Label FCC ID 2AP5OLFM-32X

FCC

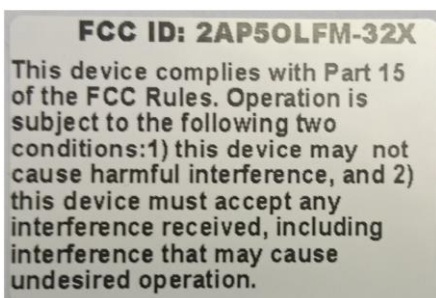
- The Federal Communications Commission (FCC) warns the users that changes or modifications to the unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

RF exposure statement (mobile and fixed devices)

This device complies with the RF exposure requirements for mobile and fixed devices. However, the device shall be used in such a manner that the potential for human contact during normal operation is minimized.

- FCC §15.105 (a):

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.















7. Installation


Follow the basic safety instructions in the chapter Safety instructions.

7.1 Safety instructions



	The unit is exclusively designed for indoor use in an industrial environment. The unit may only be installed indoors with a temperature and humidity level within the range of the specified technical module parameters.
	Never use the unit near or in water. Never pour liquids of any type over the unit. However, if the unit should still come in contact with liquid, disconnect it and have it checked by a technician.
	Do not install the device near heat sources such as radiators, heat registers, stoves or other devices (including amplifiers) that generate heat. Do not install the unit in a flammable environment.
	Never expose the device to extreme temperature fluctuations, since condensation otherwise develops inside the unit and causes damages.
	Do not install the device in the vicinity of voltage lines or other power lines with which they could collide (for example, drilling), which could result in serious injuries or even death.
	The device (especially the antenna) should not be installed in the immediate vicinity of electrical equipment such as medical devices, monitors, telephones, TV sets and magnetic disks, and metal objects. This could result in reduced read and write ranges.
	Never use the unit in explosive areas (such as paint warehouses).
	Do not use the device in areas where it is exposed to vibrations or shocks.
	The installation location must be adequately illuminated during the installation.
	Never install the unit during a lightning storm.






	<p>Make sure that the installation meets the requirements of the FCC (country specific) for human exposure to radio frequencies.</p>
---	--

7.2 Qualified installation personnel

	<p>The unit must only be installed by specially trained personnel. If you have any doubts about the qualifications, please contact the manufacturer.</p>
	<p>If the unit is operated by untrained personnel, the reading device and or connected devices may be damaged.</p>

7.3 Unpacking

The LF reading device and the accessories can be packed customer-dependent in clean room conditions. In order to maintain this condition, the devices must be unpacked in clean room conditions.

	<p>The packaging material consists of cardboard and foil. Dispose of these materials separately under the respective regulations of your country.</p>
---	---

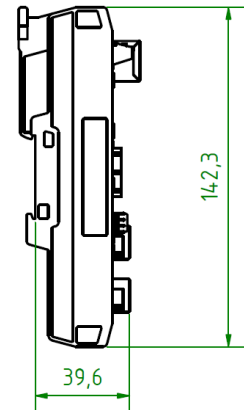
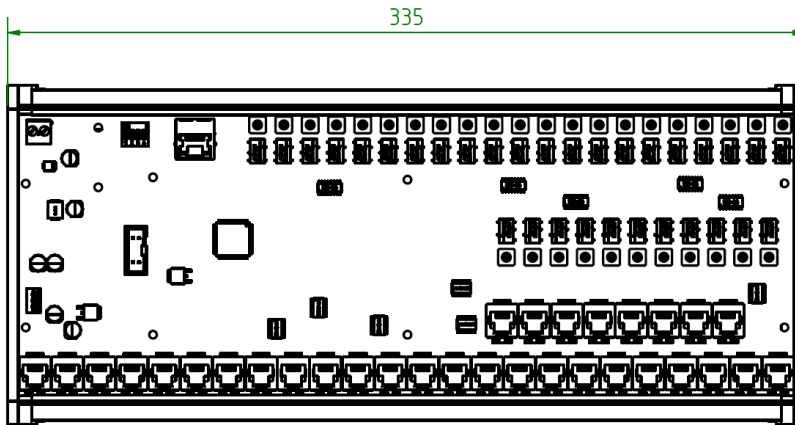


7.4 Mounting the device



The mounting surface must be stable, non-flammable, dry and clean. If necessary, clean it before you install the device. Only mount the components on mounting-rail TS 35, at the designated locations and make sure that the operating and ambient conditions specified in the technical data are always maintained.

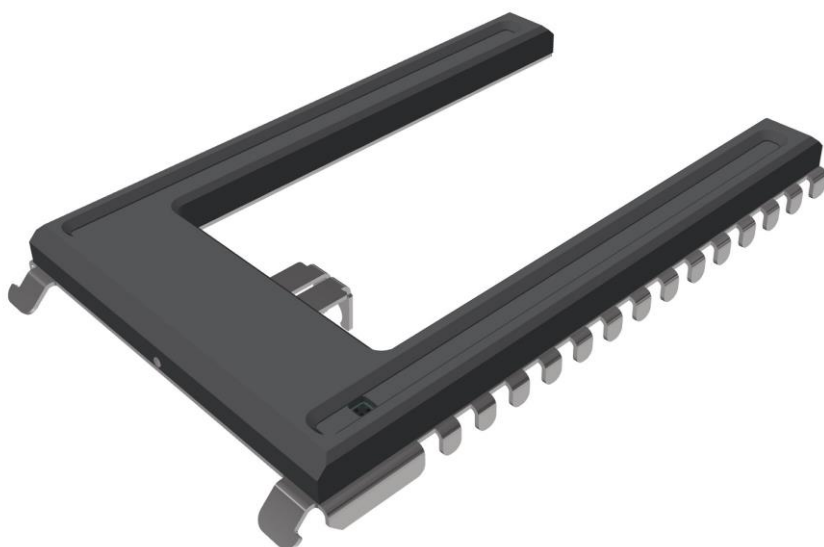
Dimensions:



7.5 Installing the Readhead

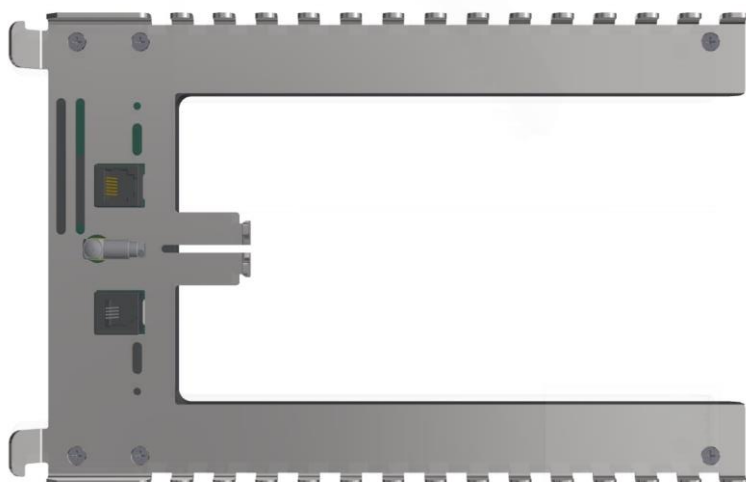


The Readhead housing is optimized for grid-shelves mounting.



7.5.1 Readhead connections

Antenna: SMB
IO's: RJ12





Use the antennas and antenna cable from the manufacturer to ensure optimum reading and writing ranges.

7.6 Power Supply

The device can be connected to an external power supply (24VDC, 0.5A) or power up with POE.



There are risks if the device is supplied with the incorrect voltage. Only use cables, plugs and adapters from the manufacturer. Observe power ratings provided in the technical data.



Never connect the reading device to an external power supply and a PoE cable at the same time. This can damage the reading device or the connected components.



7.7 DIP-switch

Test mode can be activated via the 4 DIP switches on the device. In test mode, a continuous reading operation is performed at the set antenna port and the result of the reading operation is displayed on the green status LED.

The test mode is activated by setting DIP switch 3 to ON. DIP switch 4 can be used to select between test reading and test writing. For the LFM32x WipRack reader the selection of the antenna port is changed by a change of detected port sensor.

Switch	Function
1	No function
2	No function
3	off: Operation mode on: Activated test mode
4	DIP 3 off: Deactivated test mode off->on Start Antenna Tuning DIP 3 on: Activated test mode Selection of the test function: off = Read, on = Write



7.8 USB connection

The LFM 32x WipRack reader has an additional serial interface that is designed as a USB service interface (USB micro socket!) and can be connected to any USB port of a running PC.

We recommend using a high-quality USB cable with a USB micro connector and a maximum length of 3m to ensure secure communication.

Before connecting the reader, however, the driver for the virtual COM port must be successfully installed so that the connected device can be addressed via the virtual COM port. The driver is available in the download area of the RFID products on the HERMOS homepage:

Homepage: <http://www.hermos.com/en/protected>
Benutzername: Customer_LF
Passwort: 781692





- After downloading and unpacking the driver, the installation is started by running the CP210xVCPInstaller_x64.exe or CP210xVCPInstaller_x86.exe application.
- When using a single USB reader, select the "SingleReader" driver. The reader can be operated on any USB port of the PC.
- When using several USB readers at the same time, select the "MultiReader" driver. A virtual serial interface is assigned to each USB port. A reader can be installed on each USB port of the PC.
- The USB reader is now plugged into a USB port of the PC, the computer recognizes the device and automatically starts the driver installation.
- Follow the further installation instructions and install the software via "Install the software automatically". If the automatic installation fails, start the manual installation.
- If the driver is successfully installed and the USB reader is plugged in, it can be addressed via the virtual COM port. The associated virtual COM port is displayed as "Silicon Labs USB to UART Bridge" in the device manager of the control panel. The parameters of the serial interface can be found in [Chapter 8](#).





8. Commissioning

8.1 Operating conditions

The following requirements must be fulfilled for smooth device operation.

1. The operating temperature must be within the scope of the values specified in the technical data.
2. The device must be connected to the power supply (provide PoE is not used).
3. An antenna must be properly connected to the reading device.
4. A transponder must be within the reading and writing ranges of the connected antenna.
5. For normal operation, deactivate test mode after installation. (All DIP switches off).

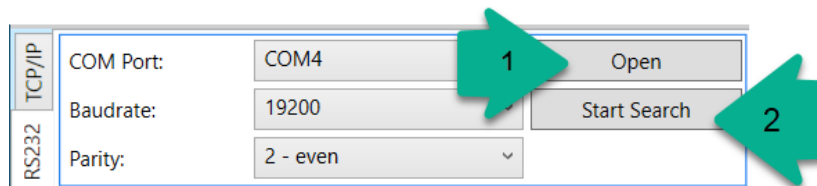
8.2 The USB connector (serial interface) parameters

The following serial interface settings (USB connector) are set upon delivery. The baud rate can be set via parameters.

	Wert
Baudrate	19200
Databits	8
Stopbits	1
Parity	Even

The USB service interface (virtual COM port !) can be used to parameterise, test and load the firmware with the Hemos DeviceDiscoverer, the respective reader.

If you want to communicate with the device via the serial interface, you can switch to serial communication via the "RS232" tab.



- With the "Open" button (arrow 1) the selected COM port can be opened with the selected settings. Serial communication then takes place with the selected settings and the responding reader is entered in the device list.





- A reader search with several typical port settings is carried out one after the other via the "Start Search" button (arrow 2) via the selected COM port.

The search begins with the currently set values for baud rate and parity.

If serial communication is established, the further search is aborted, the determined settings for baud rate and parity are accepted and the reader is entered in the device list.

8.3 Parameter of the ethernet interface

The unit is connected to the customer network via a 10/100BaseT Ethernet interface. The DHCP (Dynamic Host Configuration Protocol) is activated on delivery.

If there is not a DHCP server available in your network, a random IP address is set from the Zero- Conf range (169.254.0.0/16) and operations must still be performed to obtain an IP address. If an IP address could be obtained or with a static IP address, the device can be connected via TCP / IP port 3241 in the delivery state.

The HERMOS „DeviceDiscoverer“ is available for configuring the network setting.

8.3.1 Change networksettings with DeviceDiscoverer

HERMOS components can be found in the LAN network and settings can be easily changed using the „DeviceDiscoverer“.





HERMOS Device Discoverer - 2.1.0.0

File Device Help

Network Interface: Ethernet: 172.20.2.37 Search Devices

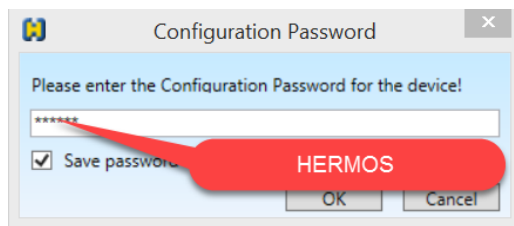
Host Name	IP Address	Device Name	MAC-Address	Serial Number	Software Version
LFM_4x	172.20.4.146	LFM_4x	D8:80:39:D4:83:90	1706HAG01234	LFM4I1.5
DHCP Enabled: <input checked="" type="checkbox"/> ✓ Set IP-Address: 172.20.4.146 ✓ Set Subnet-Mask: 255.255.248.0 ✓ Gateway: 172.20.0.1 ✓ Port: 3241 ✓ Set Hostname: LFM_4x ✓ Set Client Mode: <input type="checkbox"/> ✓ Set Server IP-Address: 127.0.0.1 ✓ Server IP-Port: 3241 ✓ Request Interval: 0 ✓ Restart Details		Serial Number: 1706HAG01234 Hardware Version: LFM_4x_RevA MAC-Address: D8:80:39:D4:83:90 Factory Settings disabled! Enabled Manufacturer Mode!		Device Test Firmware Update Telnet	
UHF_DSP_MZ1	172.20.1.93	UHF_DSP	D8:80:39:D9:C0:BC	1808HAG02225	UFSDSP1x20

2 Devices found!





1. Select your network interface if you have several options on your PC.
2. Your network is automatically scanned for all HERMOS reading devices using the „Search Devices“ button.
3. Select the desired reading device in the list to open the network settings. Here, you can edit the network settings and apply them to the reading device by pressing the respective button. Use „HERMOS“ if you are asked to enter a password!



After parameters are changed, the reading device reboots and can be read in using „Search Devices“.

CAUTION



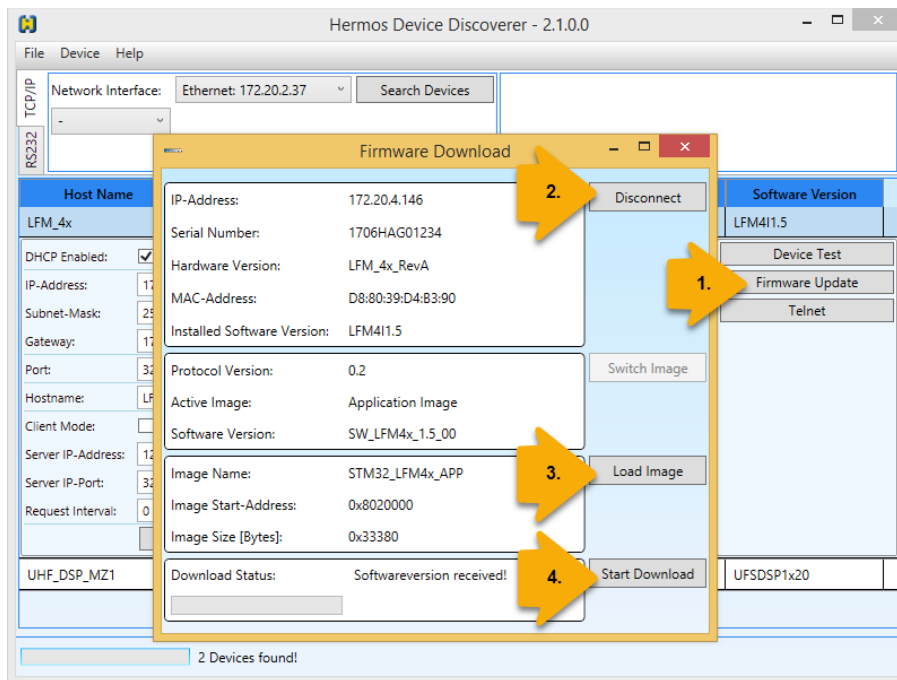
Changing network settings generally cause the reading device to reboot. This closes an existing HSMS host connection.



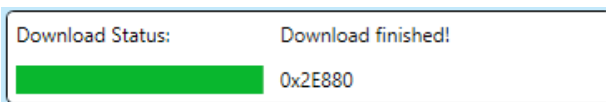


8.3.2 Firmware update with DeviceDiscoverer

Firmware updates can also be performed using the HERMOS „DeviceDiscoverer“. Start the tool with administrator rights and scan the network for all HERMOS devices. To do an update, mark the desired reading device and select „Firmware Update“. Use „HERMOS“ if you are asked to enter a password!



1. Click the "Firmware Update" button to open the new Firmware Download window for the selected reader.
2. It is usually not necessary to open the download connection as this happens automatically. Otherwise, pressing the Connect button will open the download connection.
3. Select the new firmware file using the load image button.
4. Start the download process.
Wait until the „Download Finished“ message appears.



CAUTION



During the download process, do not disconnect the power supply or interrupt the network connection.



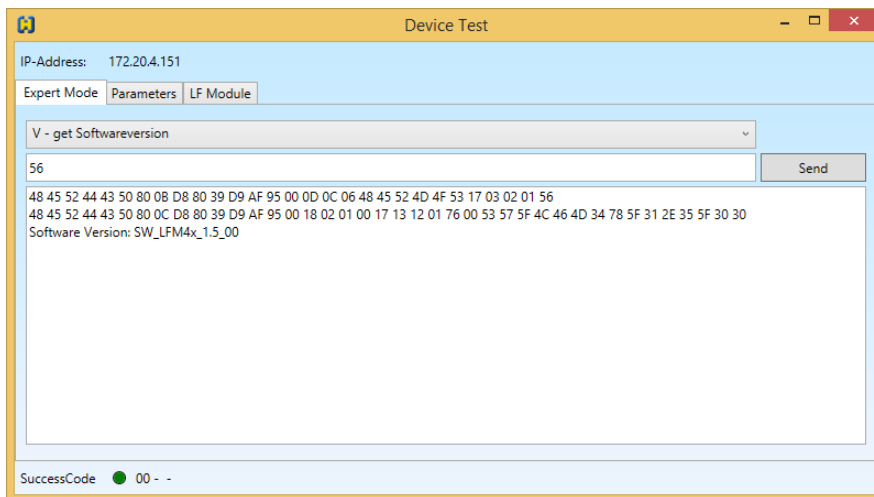


8.3.3 Test Device with DeviceDiscoverer

Readers can also be tested with the HERMOS "Device Discoverer" if you have one support feature. Start the tool with administrator rights and search for the HERMOS device under test in the network. Select the desired reader and select the "Device Test" button independently of your interface. A further "Device Test" view is opened with which the addressed reader can be tested via the UDP protocol without having to disconnect any existing TCP / IP connection.

Expert Mode:

In the "Expert Mode" tab you can select from a list of test commands and send this after any modification. The Trace window below shows all traffic generated when testing with UDP. The success code of the response message is displayed in the status bar at the bottom left. The tab "register mode" is a feature only for experts!





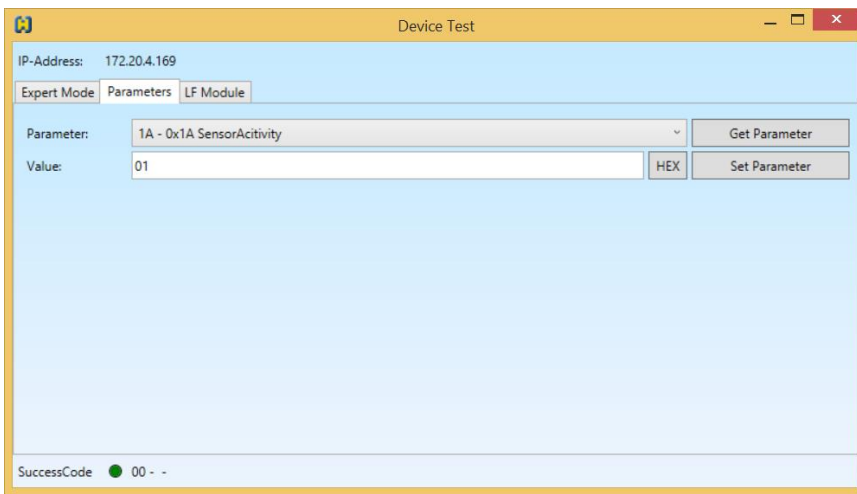
Parameters:

In the "Parameters" tab you can choose from a list of parameters that can be read and written.

CAUTION

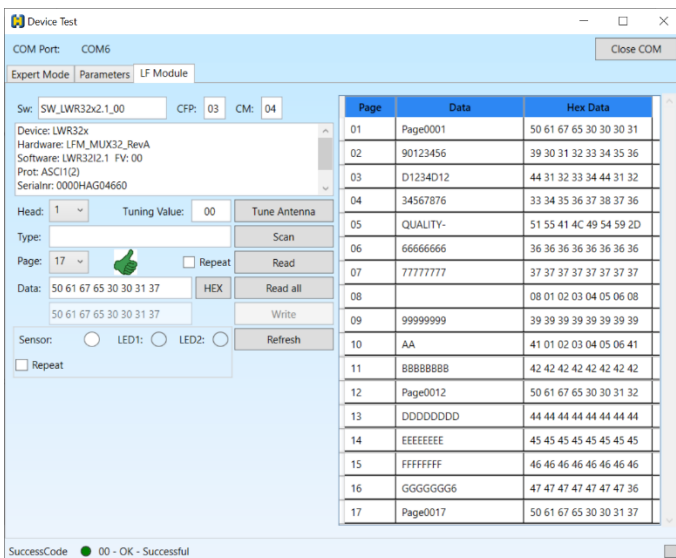


When setting and reading parameters, it must be carefully considered which communication protocol is currently set. Some parameters are defined differently in different protocols.



LF Module:

In the register "LF Module" a test reading can be carried out. One or more pages of a multipage transponder can be read out. The success code of the triggered reading is displayed in the status bar at the bottom of the window. Via a scan, the first page of every readable 134.2 kHz LF transponder is read out and displayed.





9. Operating

9.1 Operating personnel



The device should only be operated by specially trained personnel. If you have any doubts about the required qualifications, please contact the manufacturer. The operation of the device without special expertise can result in damages to the device or on connected devices.

9.2 Protocol change

9.2.1 General

To communicate with a connected host system, some reader supports ASCII or SECS / HSMS protocols. The protocol selection takes place by means of automatic protocol recognition.

The currently set protocol is displayed on the status LED during the boot process.

SECS: The red LED goes on briefly after self test

ASCII: The yellow LED goes on several times

Since the LFM 32x WipRack reader only supports the ASCII protocol, automatic protocol recognition is deactivated.

9.2.2 Automatic protocol detection

The reader automatically adjusts to the protocol used by checking and evaluating the first message after a reset. The interface is changed accordingly when the protocol is changed and reinitialized. This process can take several seconds. Already sent messages are lost. The newly recognized protocol is used for further communication. A renewed change is only possible after another reset. Automatic protocol detection can be enabled or disabled by setting parameter 98 (0x62).



With automatic protocol detection enabled, receiving undefined or random characters may result in an accidental protocol change.

Since the LFM 32x WipRack Reader only supports ASCII protocol, automatic protocol detection is disabled and it is not recommended to enable this feature!





9.3 Addressing the antenna port

The LFM 32x WipRack reader is equipped with 32 antenna ports. Each of these ports has its own antenna tuning with which the connected antenna is tuned to the ambient conditions. In the set protocol, the read or write commands are always executed by port. The 32 antenna ports from 1 to 32 are numbered consecutively and are addressed accordingly in the logging command.

In the ASCII protocol, the reader ID decides on the selection of the antenna port. The reader ID („00“ to „1F“) responds to the respective antenna port 1 to 32.

9.4 Customer Factoryparametersets

The reader LFM 32x WipRack can be delivered with a few Factoryparametersets. The settings of the Factoryparameterset is part of the factory settings and should only be changed by Hermos. If customer needs another Factoryparameterset setting, please ask Hermos for the necessary steps. The installed Factoryparameterset can be read by parameter 64 (use command “G0164”).

Factoryparameterset 3: (CFP3 ASC-W1 mode)

The reader only distributes the [advanced SZ ASCII](#) protocol, where up to 32 antenna ports can be addressed by a 2 ASCII characters port ID “00” up to “1F”.

The antenna is addressed by the ReaderID „00“ to „1F“, or TargetID „01“ to „32“. If SECS protocol could be used, then no MID area would be defined. The USB connector (virtual COM-Port) can be used for serial host communication. For the TCP/IP communication the complete end packet of the ASCII-I1 protocol will be transmitted (end character and 4 bytes checksum).

P-command: The parameter value will be interpreted as hexadecimal value.

The additional F-command can be used to deliver the parameter value with hexadecimal interpretation. X/R/W-command: The page value will be interpreted as hexadecimal value.

Errors will be send with the command “E”. With default settings a confirmation has to be send. The additional B-command can be used for signal the detection of an object. On default the master/slave mode is deactivated, so the Ethernet port and the USB port can be used for host communication. On default the ports LED’s are not influenced by sensor triggered events.

Factoryparameterset 4: (CFP4 standard ASC-I1 mode with watchport 0 to 3)

The reader only distributes the [advanced SZ ASCII](#) protocol, where up to 32 antenna ports can be addressed by a 2 ASCII characters port ID “00” up to “1F”.

The antenna will be addressed by the ReaderID „00“ to „1F“ or TargetID „01“ to „32“. If SECS protocol could be used, then the standard MID range of 2 pages / 16 characters would be defined. The additional B-command can be used for signal the detection of an object. The RS232 port can be used for serial host communication. On default the ports LED’s are not influenced by sensor triggered events.





Factoryparameterset 6: (CFP6 standard ASC-I1 mode with watchport 0 to 1)

The reader only distributes the [advanced SZ ASCII](#) protocol, where up to 32 antenna ports can be addressed by a 2 ASCII characters port ID "00" up to "1F".

The antenna will be addressed by the ReaderID „00“ to „1F“ or TargetID „01“ to „32“.

If SECS protocol could be used, then the standard MID range of 2 pages / 16 characters would be defined. On default the additional B-command can not be used for signal the detection of an object. On parameter reading with Gxy (xy:= readerID) only the parameter 0 up to 7 will be send. The RS232 port can be used for serial host communication. On default the ports LED's are not influenced by sensor triggered events.





10. ASCII-I1 Communication protocol

10.1 Structure of the communication protocol

The communication is carried out via ASCII packets.

After each command to the reading device, a specific reply is transmitted. We recommend waiting for this reply before transmitting a new command.

10.2 Packet content

Each message packet consists of a packet header (header = 3 or 6 characters), the message data (2 or more characters) and the packet end.

Packet header	Message data	Packet end
---------------	--------------	------------

Packet header

The packet header contains a start character and the message length. The message length consists of 2 hexadecimal bytes and defines the number of characters in a message.

Packet header		
Start character	Length 1 (high byte)	Length 2 (low byte)

- Start** Start character (ASCII character „S“)
- Length 1** High byte of the message length (ASCII character „0“-“F“)
- Length 2** Low byte of the message length (ASCII character „0“-“F“)

Advanced ASCII-format / Advanced SZ ASCII-format:

The advanced ASCII format is defined for ASCII messages whose message length exceeds 255 characters. The extended SZ-ASCII format is defined for ASCII messages in which more than 15 antenna ports have to be addressed. The packet header contains two start characters and the message length. The message length consists of 4 hexadecimal bytes and defines the number of characters in a message.

Packet header					
Start 1	Start 2	Length 1	Length 2	Length 3	Length 4

- Start 1** First start character (ASCII-character „S“)
- Start 2** Second start character (ASCII-character „X“ = advanced ASCII protocol or „Z“ = advanced SZ ASCII protocol)





- Length 1** High byte of the message length (ASCII-character „0“-„F“)
- Length 2** Byte packet length (ASCII character „0“-„F“)
- Length 3** Byte packet length (ASCII character „0“-„F“)
- Length 4** Low byte of the message length (ASCII character „0“-„F“)

Message data

The message contains a command character, a target or source address, the number of the antenna port (head) and the actual message data.

The number of the antenna port is not required for all messages.

Message data		
Command	Address	Data

- Command** The command is defined by an ASCII character. (See protocol commands)
- Address** Target/source address (ASCII characters „0“, „1“, “00”...“1F”) *
- Data** The definition of the message data depends on the protocol command.

*) The LFM 32x WipRack Reader only supports the [advanced SZ ASCII](#) protocol to address the readers via 2 ASCII character address “00” ... “1F”.

Packet end

The end of the packet contains an end character and a checksum consisting of 4 characters.

Packet end				
End character	Checksum 1	Checksum 2	Checksum 3	Checksum 4

- End character** ASCII end character <CR> (hex 0x0D).
- Checksum 1** High byte XOR logic of all data (packet header, data and end character). (ASCII character „0“...“F“)
- Checksum 2** Low byte XOR logic of all data (packet header, data and end character). (ASCII character „0“...“F“)
- Checksum 3** High byte addition of all data (packet header, data and end character). (ASCII character „0“...“F“)





Checksum 4 Low byte addition of all data (packet header, data and end character).
(ASCII character „0“...“F“)



The checksum is not necessary when using the TCP/IP interface (No transmission). The end character is only transmitted.

If the device is operated in ASC-W1 mode, the complete end packet is transmitted (end character and 4 bytes checksum).





10.3 Data elements

The data elements that are used by default ASCII messages, which are described in the message details section, are defined in this section.

Tuning value	2 Byte
---------------------	---------------

The tuning value is a set value for the optimal antenna tuning. For optimum read and write ranges, the value is automatically determined by the reader. The value is measured in 16 steps (0-F). He can also be targeted.

Example: „08“ ... automatic tuning from the reader
 „10“ ... manual tuning 0x00
 „1F“ ... manual tuning 0x0F

CMD	1 Byte
------------	---------------

Command of the message, see table in Chapter “Commands”.

COLUMN	3 Bytes
---------------	----------------

The column is displayed as 3 ASCII characters (3 bytes) in hexadecimal format („000“ to „FFF“). Column defines the column (X position) of the cursor. Position 0 is on the left. The display text is written from this position. The number of columns depends on the type of display used. Depending on the display command used, the column value is ignored or interpreted as a pixel value. (see data element [DspCmd](#))

Valid range:

- do not care DspCmd 0x10 - 0x17
- Pixel 0 - 249 2-colour EInk-Displays black, white
- Pixel 0 - 211 3-colour EInk-Displays black, white, red/yellow

If you write outside the valid range (right), these characters are ignored.

Data	16 Bytes
-------------	-----------------

The data is represented in HEX format by 2 ASCII characters. The data always includes every 8 bytes of the corresponding page of the transporter.

Example:
 Transponder data in ASCII-Format „12345678“ (8 bytes)





Transponder data in HEX-Format 0x31 0x32 0x33 0x34 0x35 0x36 0x37 0x38
Data in message „3132333435363738“ (16 ASCII-characters)

DspArg	3 Bytes
---------------	----------------

Additional arguments for display write. For future development.

DspCmd	2 Bytes
---------------	----------------

Command of the display data write message. The command is displayed as 2 ASCII characters (2 bytes) in hexadecimal format („00“ to „FF“).

Command		Display Data
DspCmd	Funktion	
„10“ (0x10)	Write Display (black/white) max. 4 lines with up to 20 characters each	1 ... 64/80 (ASCII) Data depends on font size (see FONT)
„11“ (0x11)	Write Display (white/black) max. 4 lines with up to 20 characters each	1 ... 64/80 (ASCII) Data depends on font size (see FONT)
„14“ (0x14)	Write Display with header (black/white) max. 4 lines with up to 20 characters each	1 ... 64/80 (ASCII) Data depends on font size (see FONT)
„15“ (0x15)	Write Display with header (white/black) max. 4 lines with up to 20 characters each	1 ... 64/80 (ASCII) Data depends on font size (see FONT)
„20“ (0x20)	Delete display and write data on display (black / white) with update. Starting pixel row and column max. 4 lines with xx characters	1 ... 64/80 (ASCII) Data depends on font size (see FONT)
„21“ (0x21)	Delete display and write data on display (white / black) with update. Starting pixel row and column max. 4 lines with xx characters	1 ... 64/80 (ASCII) Data depends on font size (see FONT)
„30“ (0x30)	Write display (black / white) without first deleting the display memory and with display update. Starting pixel row and column	1 ... 64/80 (ASCII) Data depends on font size (see FONT)





	max. 4 lines with xx characters	
„31“ (0x31)	Write display without first deleting the display memory (white / black) with update. Starting pixel row and column max. 4 lines with xx characters	1 ... 64/80 (ASCII) Data depends on font size (see FONT)
„32“ (0x32)	Write display (black / white) without first deleting the display memory and without an update Starting pixel row and column max. 4 lines with xx characters	1 ... 64/80 (ASCII) Data depends on font size (see FONT)
„33“ (0x33)	Write display (white / black) without first deleting the display memory and without updating Starting pixel row and column max. 4 lines with xx characters	1 ... 64/80 (ASCII) Data depends on font size (see FONT)
„80“ (0x80)	Negate display white pixels black	-
„F0“ (0xF0)	Write the data in the internal display data structure and then update the entire display. Max. 4 lines with up to 20 characters. The display is updated with the display command "10" (0x10).	1 ... 64/80 (ASCII) Data depends on font size (see FONT)
„F1“ (0xF1)	Write the data in the internal display data structure and then update the entire display. Max. 4 lines with up to 20 characters. The display is updated with the display command "11" (0x11).	1 ... 64/80 (ASCII) Data depends on font size (see FONT)
„F2“ (0xF2)	Write the data in the internal display data structure and then update the entire display. Max. 4 lines with up to 20 characters. The display is updated with the display command "14" (0x14).	1 ... 64/80 (ASCII) Data depends on font size (see FONT)
„F3“ (0xF3)	Write the data in the internal display data structure and then update the entire display. Max. 4 lines with up to 20 characters. The display is updated with the display command "15" (0x15).	1 ... 64/80 (ASCII) Data depends on font size (see FONT)





DspLen	2 Bytes
--------	---------

The DspLen is displayed as 2 ASCII characters (2 bytes) in hexadecimal format („00“ to „FF“). The DspLen defines the length of the following display data DspData.

DspData	DspLen Characters
---------	-------------------

The display data are output directly without any further conversion. From every display character the ASCII-code ist tranfered as one byte.

Example: “AB12” will transferred as 0x41, 0x42, 0x31 and 0x32 (ASCII-code of characters)

FONT	2 Bytes
------	---------

The FONT is displayed as 2 ASCII characters (2 bytes) in hexadecimal format („00“ to „FF“). Definition of the font size of the display text to be written. Available fonts are Arial 6 pt, 8 pt, 10 pt, 12pt, 14pt, 20pt, 24pt, 28pt, 40pt, 48pt

The automatic line break is carried out after 16 or 20 characters, depending on the font size used.

Font:

- 6 pt, 8 pt, 10 pt line break after 20 characters, next line 30 pt.
- 12 pt, 14 pt line break after 16 characters, next line 30 pt.
- 20 pt line break after 14 characters, next line 30 pt.
- 24 pt line break after 12 characters, next line 30 pt.
- 28 pt line break after 10 characters, next line 36 pt.
- 40 pt line break after 8 characters, next line 50 pt.
- 48 pt line break after 6 characters, next line 60 pt.

If an undefined font size is specified or the data element is not specified, the default font size 12 pt. (see [parameter default display font](#)) is automatically used.

Line	3 Bytes
------	---------

The Line is displayed as 3 ASCII characters (3 bytes) in hexadecimal format („000“ to „FFF“).LINE defines the line (Y position) of the cursor. Position 0 is up.

The display text is written from this position. The number of lines depends on the type of display used.

Depending on the display command used, the line value is interpreted as line 0-3 or as a pixel value. (see data element [DspCmd](#))





Valid range:

DspCmd 0x10 - 0x17: Line 0 - 3

DspCmd>0x20: Pixel 0 - 121 2-colour EInk-Displays black, white

Pixel 0 - 103 3-farbige EInk-Displays black, white, red/yellow

If the valid area is written beyond (below), these characters are ignored.

Output Index	1 Byte
--------------	--------

The Output Index defines the index of the output of a Readerhead that is addressed. Each Readerhead has 2 LEDs.

- Example:
- 1 LED1 of the port (red)
 - 2 LED2 of the port (green)
 - 3 red status LED
 - 4 yellow status LED
 - 5 LED1 and LED2 (yellow)

Output State	4 Bytes
--------------	---------

The data element shows or sets the current status of the outputs.

The Data Element Output State includes the status of each output on the reader. The status is displayed as 1 byte for each sensor.

- 0 Switch off the output permanently
- 1 Switch on the output permanently
- 2 output flashes with approx. 1 Hz
- 3 output remains unchanged
- 4 output flashes with approx. 2 Hz

Parameter No.	1 Byte
---------------	--------

The number of the parameter is displayed as an ASCII character (1 byte) in HEX format.

- Example:
- Parameter 1 "1"
 - Parameter 2 "2"
 - Parameter 15 "F"

Parameter Value	2 Bytes
-----------------	---------

With single-digit parameter numbers from „0“ to „F“, the actual parameter value can be decimal or hexadecimal depending on the mode.





In the standard ASC-I1 mode, the data element displays the value of a parameter using 2 ASCII characters (2 bytes) in decimal format (“00” bis “99”).

Example: Value 45 „45“

In ASC-W1 mode the data element indicates the value of a parameter by means of 2 ASCII characters (2 bytes) in hexadecimal format („00“ to „FF“).

Example: Value 45 (decimal) “2D“(hexadecimal)





Reader-ID	2 Byte
-----------	--------

The reader ID defines the address of the antenna port.
The reader LFM 32x can be read at all 32 antenna ports (1-32).
The antenna port is selected via the reader ID and is continuous.

For [advanced SZ ASCII protocol](#) up to 32 antenna ports can be addressed by a 2 ASCII characters reader ID "00" up to "1F". General messages also possible at address "FF" (HFF).

Response-Code	4 Bytes
---------------	---------

This feature is not required for the individual device. This code is always „0000“.

Page	1 Bytes
------	---------

The page of the transponder for a read / write operation is defined by 2 ASCII characters (2 bytes) in decimal format

Example: Page 1 ⇔ „01“
 Page 10 ⇔ „10“
 Page 17 ⇔ „17“

If the device is operating in ASC-W1 mode, the page should be interpreted in hexadecimal form:
The page of the transponder for a read / write operation is defined by 2 ASCII characters (2 bytes) in hexadecimal format.

Example: Page 1 ⇔ „01“ („81“ if page is locked)
 Page 10 ⇔ „0A“ („8A“ if page is locked)
 Page 17 ⇔ „11“ („91“ if page is locked)
 Read/Only ⇔ “F0“
 Read/Write ⇔ “F1“





Serial number	4 Bytes
---------------	---------

Contains 4 byte of the serial number.
The serial number is also on the adhesive label of the device.

Example: „1707HAG04660“ complete serial number
Decimal „04660“ (the last 5 characters of the complete serial number) Hexadecimal serial number „1234“
The gateway ID is the last two digits and has the value 0x34

Software version	16 Bytes
------------------	----------

The data item contains the software version currently used in the reader. The version string is displayed with up to 16 characters.

Example: „4C464D3449312E35“ hex-String („LFM411.5“)

Timeout	2 Bytes
---------	---------

The data element Timeout defines the period of time that elapses until the LEDs are switched off. The timeout is defined in hexadecimal notation.
When the timeout expires, the LED turns off.

Example: „00“ ... permanently on
„01“ bis „FF“ ... 1 s bis 255 s Timeout





10.4 Protocol Commands

Read:

Command	Description
X	Read Data
R	Automatic Read

Write:

Command	Description
W	Write Data

Device-Settings:

Command	Description
G	Query Parameter
F	Query Parameter (Device is operated in ASC-W1 mode)
P	Set Parameter
N	Reset
e	Error message
E	Error message (Device is operated in ASC-W1 mode)
H	Heartbeat
V	Software-Version
L	Lock side of a transponder
I	Coordinate RF-modules
J	Querying the coordination of the RF-module

In- and Output:

Command	Description
O	Set Output
Q	Query Output/Input State





A	Sensor event: Sensor removed
B	Sensor event: Sensor detected (Device is operated in ASC-W1 mode)

Display:

Command	Description
D	Write to Display





10.4.1 X - Read data

Host ⇌ Device			
CMD	Reader-ID	Page	Readlength
X	2 Bytes *)	2 Bytes	2 Bytes

*) only [advanced SZ ASCII protocol](#) supported !

Device ⇌ Host			
CMD	Reader-ID	Page	Data
x	2 Bytes *)	2 Bytes	16 Bytes

*) only [advanced SZ ASCII protocol](#) supported !

The data element „page“ can have the following values:

Page	Description
„01“ ... „17“	Read # page
„98“	Read multiple pages to the end character or a blank character 1)
„99“	Read out all transponder data

1) „E“ or „F“ in ID, Bit 0...3 of the read ID

In ASC-W1 mode, the data element „page“ can have the following values:

Page	Description
„01“ ... „11“	Read page # of a multipage transponder
„F0“	Read/Only transponder
„F1“	Read/Write transponder





„00“	Read the first page of all transponder types
------	--

If there is no transponder in the reading range of the antenna, the reader repeats the reading function several times before an error message is sent. The number of repetitions is defined in parameter 4 (readmode). If reading is still not possible, the reader sends the error message ,no tag (4)' to the host after the repetitions have been carried out.

No confirmation is expected from the host.

For a multipage read request (98 or 99), the protocol is retried. At the end of reading, the reader sends an additional packet.

If the sensor check is activated (parameter 1: readmode), the assignment of the external input is checked before the initiation of a read process by the host. The reading process is only started if the sensor is occupied, otherwise the error message ,no tag (4)' is sent.

10.4.2 R – Automatic read

By assigning the external input, an automatic read operation can be triggered. The command „R“ sends the read data to the host. The host then has to confirm the message. Depending on the setting of the reader (parameter 1: readmode), the reader reads the following pages:

Read Mode:

- 0 ⇒ Reading the page defined in parameter 2 (readpage)
- 1 ⇒ sequential reading of a transponder to the end character (,E' - end character or ,F' empty) in ID bit 0 ... 3
- 2 ⇒ Reading the entire transponder (all pages)

Device ⇒ Host			
CMD	Reader-ID	Page	Data
R	2 Bytes *)	2 Bytes	16 Bytes **)

*) only [advanced SZ ASCII protocol](#) supported !

Host ⇒ Device	
CMD	Reader-ID
r	2 Bytes *)

*) only [advanced SZ ASCII protocol](#) supported !





When reading several pages (par. 1: [readmode](#) „tag“ or „everything“) the command is repeated for each read page. The last package contains the command ‚R‘ and the reader ID.

The host expects a confirmation of the read data. If there is no confirmation from the host, the command is repeated. (par.5: [.RS232 repeat time‘](#), par.6: [.RS232 maxrepeat‘](#)).

If a reading is not possible, the reader automatically repeats the reading with the set parameters. (par.3: [.r / w delay time‘](#), par.4 [.r / w maxrepeat‘](#)).

If no reading is possible, the reader sends the error message ‚no tag (4)‘ to the host.

The delay time for the presence sensor can be set (parameter 0: [.sensor delay‘](#)).

An automatic reading is only possible if all messages to be confirmed have been confirmed by the previous reading or the waiting time (par.5: [.RS232 repeat time‘](#), par.6: [.RS232 maxrepeat‘](#)) has elapsed after the last transmission.





10.4.3 W - Write data

The command W starts writing a defined data area of a transponder.
If there is no transponder in the write range of the antenna, the reader sends an error message (error 4 - no transponder).

Host ⇨ Device			
CMD	Reader-ID	Page	Data
W	2 Bytes *)	2 Bytes	16 Bytes

*) only [advanced SZ ASCII protocol](#) supported !

Device ⇨ Host	
CMD	Reader-ID
w	2 Byte *)

*) only [advanced SZ ASCII protocol](#) supported !

If the describing of the tag fails, the reader repeats the writing operation several times before sending an error message. The number of repetitions is defined in parameter 4 ([,r / w maxrepeat'](#)). If writing is still not possible, the reader sends the error message ',no tag (4)'' to the host after the repetitions have been carried out.

If the sensor check is activated (parameter 1: [readmode](#)), the assignment of the external input is checked before the start of the write process by the host. The write process is started only when the sensor is busy, otherwise the error message ',no tag (4)'' is sent.





10.4.4 G – Query parameter

With the command „G“ the values of all [public parameters](#) of the device can be queried.

Host ⇨ Device	
CMD	Reader-ID
G	2 Bytes *)

Device ⇨ Host			
CMD	Reader-ID	Parameter No.	Parameter Value
g	2 Bytes *)	1 Byte	2 Bytes

*) only [advanced SZ ASCII protocol](#) supported !

The reader sends an individual protocol packet for each available public parameter. After the last parameter, the reader sends a last packet including the command ‚g‘ and the reader ID. From the list of [public parameters](#) only the parameter 0 to 7 and parameter F will be send.

The values returned for the data item parameter value in the response are decimal values (00-99). The values for the data item Parameter No. are hexadecimal values (0-F).





10.4.5 F – Query parameter


The command „F“ can be used to query the value of a public parameter of the device.

Host ⇔ LF Device		
CMD	Reader-ID	Parameter No.
F	2 Bytes *)	1 Byte

Device ⇔ Host			
CMD	Reader-ID	Parameter No.	Parameter Value
f	2 Bytes *)	1 Byte	2 Bytes

*) only [advanced SZ ASCII protocol](#) supported !

The reader sends an individual protocol packet for the requested public parameter. The values returned in the response for the data elements parameter number and parameter value are each hexadecimal values (0-F or 00-FF).

	<p>In the case of two-digit hexadecimal parameter numbers (Parameter No.), the parameter number and the parameter value double-digit hexadecimal are also used in the response.</p>
---	---





10.4.6 P – Set parameter

The command „P“ can be used to change the value of individual parameters. After a parameter has been successfully changed, the reader sends a confirmation message.

Host ⇔ Device			
CMD	Reader-ID	Parameter No.	Parameter Value
P	2 Bytes *)	1 Byte	2 Bytes


Device ⇔ Host	
CMD	Reader-ID
p	2 Bytes *)

*) only [advanced SZ ASCII protocol](#) supported !

Depending on the [Factoryparameterset](#) selected, the data elements parameter number and parameter value must be interpreted differently. For single-digit hexadecimal parameter no. the following interpretations must be observed:

In the standard ASC-I1 protocol mode the data element „Parameter Value“ with decimal values (00-99) has to be used. The values for the data item „Parameter No.“ are hexadecimal values (0-F).

Only in ASC-W1 mode ([Factoryparameterset 3](#)) the data elements „Parameter No.“ and „Parameter Value“ have to be used as hexadecimal values (0-F or 00-FF).

	For two-digit hexadecimal parameter numbers (Parameter No.), the parameter value must always be sent in two digits hexadecimal.
---	---





10.4.7 N – Reset

The command N performs a reset of the hardware/software of the reader.
After performing the reset operation, the device sends a confirmation message.

Host ⇒ Device	
CMD	Reader-ID
N	2 Bytes *)

Device ⇒ Host	
CMD	Reader-ID
n	2 Bytes *)

*) only [advanced SZ ASCII protocol](#) supported !

After a hardware reset, a confirmation („n00“) is sent to the host.

If TCP / IP is used as the interface, the host will not receive an acknowledgment, because an existing TCP/IP connection is interrupted by the reset.





10.4.8 e – Error message

This message is only available in [standard ASC-I1](#) mode!

If an error occurs the device will send an error message with the respective error code.

Device ⇨ Host		
CMD	Reader-ID	Error ID
e	2 Bytes *)	1 Byte

*) only [advanced SZ ASCII protocol](#) supported !

Further information about error codes and the corresponding corrective measures can be found in the chapter [Error Codes](#).

10.4.9 E – Error message

This message is only available in [ASC-W1](#) mode. If there is an error, the device sends an error message with the appropriate error code to the host.

The reader expects a confirmation of the error message. If there is no confirmation from the host, the command is repeated. (Par.5: [‘RS232 delay time’](#), par.6: [‘RS232 maxrepeat’](#)).

Device ⇨ Host		
CMD	Reader-ID	Error ID
E	2 Bytes *)	1 Byte

*) only [advanced SZ ASCII protocol](#) supported !

More about error codes and the corresponding corrective measures can be found in the chapter [Error Codes](#).

Host ⇨ Device	
CMD	Reader-ID
e	2 Bytes *)

*) only [advanced SZ ASCII protocol](#) supported !





10.4.10 H – Heartbeat

The command „H“ sends a heartbeat request to the reader.
The reader responds with its serial number and a response code.

Host ⇒ Device	
CMD	Reader-ID
H	2 Bytes *) - also Reader ID FF allowed

Device ⇒ Host			
CMD	Reader-ID	Serial number	Response-Code
h	2 Bytes *)	4 Bytes	4 Bytes

*) only [advanced SZ ASCII protocol](#) supported !

The heartbeat function can be performed for all 4 antenna ports (1-4).
If another reader is operated as a customer variant on the RS232 port, a heartbeat can be sent to the external reader via reader ID „5“.
The response code is part of the protocol but is not used for this device. The response code is always ,0000‘.





10.4.11 V – Query software version

The command V is used to query the software version of the device.

Host ⇒ Device	
CMD	Reader-ID
V	2 Bytes *)

Device ⇒ Host		
CMD	Reader-ID	Software version
v	2 Bytes *)	16 Bytes

*) only [advanced SZ ASCII protocol](#) supported !

The 8 characters of the software version are represented by 16 ASCII characters. Each character is described in hex format and transmitted by 2 ASCII characters.





10.4.12 L - Lock data area

A single page of a multipage transponder can be disabled. The page can still be read, but not rewritten. The process cannot be reversed.

Host ⇒ Device		
CMD	Reader-ID	Pages
L	2 Bytes *)	2 Bytes


Device ⇒ Host	
CMD	Reader-ID
L	2 Bytes *)

*) only [advanced SZ ASCII protocol](#) supported !

If the lock of the transponder page fails, the reader repeats the procedure several times before an error message is sent. The number of repetitions is defined in parameter 4 ([,r/w maxrepeat'](#)). If writing is still not possible, the reader sends the error message ,no tag (4)' to the host after the repetitions have been carried out.

If the page was already locked, a positive confirmation will be sent (same as the first block).

If the sensor check is activated (parameter 1 [readmode](#)), the assignment of the external input is checked before the blocking process is started by the host. The locking process is only started when the sensor is occupied, otherwise the error message ,no tag (4)' is sent.

	<p>Locking a page cannot be reversed. This page is permanently write protected.</p>
---	---





10.4.13 I – Adjust RF module

It is necessary to adjust the RF module in order to adapt an antenna to the ambient conditions optimally. The tuning achieves an optimal read / write range for the present installation environment. Tuning is performed one at a time for each antenna port and the determined tuning value is stored for each antenna. For optimal results, the vote should be automatic, but the voting value can also be set manually.

Host ⇔ Device		
CMD	Reader-ID	Tuning Value
I	2 Bytes *)	2 Bytes

Device ⇔ Host	
CMD	Reader-ID
i	2 Byte *)

*) only [advanced SZ ASCII protocol](#) supported !

To start the auto-tuning process, select the value 08.

Example: I0008 ... automatic tuning of antenna 1

If the reader can not determine the appropriate calibration, the error „5 - Invalid“ is sent instead of the confirmation.





10.4.14 J – RF module Queries the vote

The command „J“ can be used to query the tuning values of the individual antennas. Each antenna port has its own tuning value.

Host ⇔ Device	
CMD	Reader-ID
J	2 Bytes *)

Device ⇔ Host		
CMD	Reader-ID	Tuning value
j	2 Bytes *)	2 Bytes

*) only [advanced SZ ASCII protocol](#) supported !

The tuning value is a set value for the optimal antenna tuning. For optimum read and write ranges, the value is automatically determined by the reader (I-message). The tuning value is measured in 16 steps (0-F).





10.4.15 A – Sensor event object removed


The message of sensor events can be activated in the parameter „Watch-Port“ (par. 07). If this is activated, the reader reports every drop of the external sensor.
The sensor message must be confirmed by the host.

Host ⇨ Device	
CMD	Reader-ID
A	2 Bytes *)

LF Lesegerät ⇨ Host	
CMD	Reader-ID
a	2 Bytes *)

*) only [advanced SZ ASCII protocol](#) supported !

The sensor event is detected after an adjustable delay time (par. 0 [Sensor Delay](#)). During the delay time, the sensor signal must be stable.

	In parameter 1 „ Read Mode “ the sensor can be deactivated.
---	---






10.4.16 B – Sensor event object detected

The message of sensor events can be activated in the parameter „Watch-Port“ (par. 07). If this is activated, the reader reports any recognition of the external sensor. The sensor message must be confirmed by the host.

Host ⇒ Device	
CMD	Reader-ID
B	2 Bytes *)

Device ⇒ Host	
CMD	Reader-ID
b	2 Bytes *)

*) only [advanced SZ ASCII protocol](#) supported !

	<p>The assignment of the external sensor results in an automatic reading and is not sent as a sensor event in standard ASC-I1 mode. In the ASC-W1 mode, however, a sensor event B is present. In parameter 1 „Read Mode“ the sensor can be deactivated.</p>
---	---





10.4.17 O – Set output

The command O can be used to set the state of the outputs.

The status of all outputs is changed in a message. In the current version, the value of the data element Head-ID always has the value „1“ for the outputs.

Host ⇨ Device					
CMD	Reader-ID	Head-ID	Output Index	Output State	Timeout **)
O	2 Bytes *)	1 Byte	1 Byte	1 Byte	2 Bytes


Device ⇨ Host		
CMD	Reader-ID	Head-ID
o	2 Bytes *)	1 Byte

*) only [advanced SZ ASCII protocol](#) supported !

**) The specification of a time duration (timeout) is optional.

Example: permanently switch on LED 1 (red):
 >> O0111100
 << 0011

Turn red status LED on for 10 seconds:
 >> O011310A
 << 0011

	<p>The number of available outputs depends on the reader version used.</p>
---	--



10.4.19 D – Write to Display

The D command can be used to write display commands to a serial connected E-Ink display. The E-Ink display used enables 4 lines to be written with up to 20 characters per line. The number of lines and characters per line depends on the font size used.

Host ⇒ Device								
CMD	Reader-ID	DspCmd	DspArg	Column	Line	Font	DspLen	DspData
D	2 Bytes *)	2 Bytes	3 Bytes	3 Bytes	3 Bytes	2 Bytes	2 Bytes	DspLen Bytes

Device ⇒ Host	
CMD	Reader-ID
d	2 Bytes *)

*) only [advanced SZ ASCII protocol](#) supported !


Example: Replace two display lines of display output (cmd 0xF0 :=update data of internal display structure and write the displaystructure to display), Start at line-index 1 and column-index 0. The fontsize 12 indicates 16 characters per line !


```
>> D00F00000000010C20Test112345678911Test223456789222
<< d00
```





10.5 Parameter

	The parameters 0, 1, 2 and 7 are only valid if the reader is equipped with a corresponding I / O module and provides one input per antenna port.
---	--

	*) : Some parameters are implemented for each antenna port. Addressing of the parameter takes place via the reader ID of the message. In this realisation, the parameter is present once per antenna port. If no parameter arrays should be used, please ask the manufacturer (parameter 63)!
---	---

10.5.1 Parameters ASC-I1 Mode

The data element „Parameter No.“ can have the following values. List of public parameters:

Nr. (dez)	Nr. (hex)	Parameter name	Description
0	0x00	Sensor delay	Delay time for the presence sensor. 01 .. 99 (0,1 Sekunden) Default: 10 ... (1 second) Realisation: a separate parameter for each port *)
1	0x01	Read mode	Read mode for reading automatically started by external input. 00 - read only one page 01 - read until the end character or empty character2) 02 - read all pages 10 - read only one page with previous sensor Check1) 11 - read until the end character / empty character with previous sensor check 1) 2) 12 - read all pages with previous sensor Check1) 99 - Disable sensor 1) If the Sensor Check (first byte = 1) is activated, the assignment of the potential-free input is checked before initiating a read / write process. When used, the read / write process is started, otherwise the error message „NOTAG“ is sent. 2) ‚E‘ or ‚F‘ in ID bits 0...3 of the read ID Default: 00 ... (read only one page) Realisation: a separate parameter for each port *)





2	0x02	Read page	<p>Page for readmode „00“. First page of each transponder 02.. 17 Side of a multipage transponder</p> <p>Default: 01 (read first page) Realisation: a separate parameter for each port *)</p>
	0x03	r/w repeat time	<p>Time between two read / write attempts. 01 .. 99 (0,1 s) Default: 05 ... (0,5 seconds) Realisation: a separate parameter for each port *)</p>
4	0x04	r/w max repeat	<p>Max. number of read / write attempts. 01 .. 99 Default: 05 Realisation: a separate parameter for each port *)</p>
5	0x05	RS232 repeat time	<p>If no confirmation message was received from the host, the device waits for this time before sending another message. The number of repetitions is defined in parameter 6 (‘RS232 max repeat’). 01 .. 99 (0,1 s) Default: 45 ... (4,5 seconds)</p>
6	0x06	RS232 max repeat	<p>If an acknowledgement is not sent by the host, the device repeats the message according to the set value. Only then is an error message sent. 00 - endless 01 .. 99 - Number of attempts Default: 3</p>
7	0x07	Watch port	<p>Activates / deactivates the event message to the host that the dry contact (external output) has been opened (Bit0).</p> <p>Bit0 (=0x01) reporting of contact has been opened: 0 - deactivated 1 – activated</p> <p>For CFP4 setting the Bit1 is also available. See ASC-W1 parameter7.</p> <p>Default: 1 Realisation: a separate parameter for each port *)</p>
F	0x0F	Reader address	<p>Address of the first antenna port (00 ... 1F) Default: 0</p>





10.5.2 Additional Parameters ASC-W1 Mode


For ASC-W1 mode ([factoryparameterset 3](#)) the following additional parameters are public:

Nr. (dez)	Nr. (hex)	Parameter name	Description
2	0x02	Read page	Page for readmode „00“. 00 First page of each transponder 01 ... 17 Side of a multipage transponder Default: 00 (read first page) Realisation: a separate parameter for each port *)
7	0x07	Watch port	Activates / deactivates the event message to the host that the dry contact (external output) has been opened (Bit0) or closed (Bit1). Bit0 (=0x01) reporting of contact has been opened: 0 - deactivated 1 - activated Bit1 (=0x02) reporting of contact has been closed: 0 - deactivated 1 – activated Default: 1 Realisation: a separate parameter for each port *)
8	0x08	Fieldstrength	Parameter is without further function. Range: 00-01 Default: 1
9	0x09	Charge time	Transponder charging time in milliseconds. Range: 00-FF Default: 32(50ms) Realisation: a separate parameter for each port *)
10	0x0A	Verify	Parameter is without further function. Range: 00-03 Default: 1
11	0x0B	Fallout	Parameter is without further function. Range: 00-03 Default: 1
12	0x0C	RS232 repeat time	Parameter is without further function. Range: 00-FF Default: 0
13	0x0D	Noiselevel adjust	Parameter is without further function. Bereich: 00-FF Default: 0
14	0x0E	Sensor polarity	Type of sensor signal to start an automatic read. The setting is applied for the addressed sensor. 0 ... read process when sensor is covered 1 ... read process when sensor is uncovered Default: 0 Realisation: a separate parameter for each port *)





10.5.3 Additional Parameters

	<p><u>*)</u>: Some parameters are implemented for each antenna port (→parameter array). Addressing of the parameter takes place via the reader ID of the message. In this realisation, the parameter is present once per antenna port. See parameter 32 Bit2 parameter array activation/deactivation</p>
---	--

Nr. (DEZ)	Nr. (HEX)	Parameter name	Description
19	0x13	Data length autoread	<p>The parameter determines the number of bytes read from the tag during an automatic read 0 ... 136 (maximale 17 pages !!)</p> <p>Default: 8 Databytes Realisation: a separate parameter for each port *)</p>
26	0x1A	Sensor Activity	<p>The sensor activity of head is represented by a bit. 0 ... Sensor not activated 1 ... Sensor activated</p> <p>Default: 1 Realisation: a separate parameter for each port *)</p>
29	0x1D	Transponder load duration (read mode)	<p>Charging time of a transponder during the reading process. The default setting should not be changed.</p> <p>Default: 50 ... (50ms) Realisation: a separate parameter for each port *)</p>
30	0x1E	r/w synchronize	<p>Activates / deactivates the synchronization of the reader. When synchronization is enabled, the reader detects interference or other active readers and synchronizes the read cycle . 0 ... synchronization deactivated 1 ... synchronization activated</p> <p>Default: 1 ... activated</p>
32	0x20	Feature Setup	<p>Bit 0: activate Par. 6 ASCII_RETRY for ASC-W1 Bit 1: activate Par. C ASCII_T3 for ASC-W1 Bit 2: 0: ues parameter arrays; 1:no parameter array Bit 3: 0: set min. sensortimeout of 100ms for value 0 Bit 4: For value 1 the parameter "F" will not be tranfered for ASCII-I1 command "G". Bit 5: Port LED's will be affected by read and sensor actions Bit 6: 0: wait for display response; 1: no wait Bit 7: 0: save sensor event if another sensor event is still running; 1: send error AUTOREADFAIL if another sensor event (autoread !!) is still running</p> <p>Default: 0x01 ... (0000 0001)</p>





35	0x23	Special Features	<p>Bit 0: After a hardware reset, the reader will auto-read if the presence sensor is covered. 0 ... execute read operation after reset, when sensor is covered 1 ... Do not execute a read after reset, when the sensor is covered (standard)</p> <p>Bit 1: Trigger sensor-triggered automatic read operation 0 ... reading after detected sensor trigger 1 ... No automatic reading with detected sensor</p> <p>Bit 2: 0: non volatile memory is used for saving the reader ID at reset process Bit 2: 1: non volatile memory ist not used</p> <p>Bit 3: not documented</p> <p>Bit 4: set external head LED1 at sensor triggered read</p> <p>Bit 5: page transfer when reading the first page of a multipage transponder 0 ... without page transfer 1 ... with page transfer</p> <p>Bit 6: external head LED1 will be influenced at ASC-W1 mode</p> <p>Bit 7: external head LED2 will be influenced at ASC-W1 mode</p> <p>Default: 0x01 ... (0000 0001)</p>
36	0x24	DIP switch activation	<p>Bit 0 to bit 4 defines the behavior of the four externally accessible DIP switches. Bit0: DIP 4 active Bit1: DIP 3 active Bit2: DIP 2 active Bit3: DIP 1 active Bit4: Value (1): If no test mode is activated (DIP3 = OFF), the set antenna port (via DIP1 and DIP2) is tuned automatically by changing the DIP 4 from OFF to ON. If tuning is successful, the adjustment for the port is saved and the Status LED is switched on.</p> <p>Default: 0x1F</p>
38	0x26	Test after software reset	<p>This parameter activates / deactivates the initial test after a software reset . 0 ... No initial test after software reset 1 ... initial test after software reset</p> <p>Default: 0</p>
40	0x28	Transponder load duration (write mode)	<p>Charging time of a transponder during the writing process. The default setting should not be changed</p> <p>Default: 50 ... (50ms)</p>
41	0x29	Delay time between read cycles	<p>Delay time between two read cycles. A reduction of the delay increases the reading speed. 1 .. 250 (1 ms)</p> <p>Default: 10 ... (10ms)</p>





64	0x40	Customer Factory Parameter CFP (read only)	This parameter is only for factory time, to define a special customer behaviour (CFP). Parameter should not be changed by customer! Default: 3
70	0x46	Software Version String (read only)	The read-only parameter returns the complete identifier of the current firmware.
71	0x47	Serial number string (read only)	The read-only parameter provides the complete serial number string.
72	0x48	Hardware revision String (read only)	The read-only parameter provides the complete identifier for the hardware version.
75	0x4B	DIP switch status (read only)	The parameter is used to query the position of all DIP switches. Bit0: DIP 4 (0=off, 1=on) Bit1: DIP 3 (0=off, 1=on) Bit2: DIP 2 (0=off, 1=on) Bit3: DIP 1 (0=off, 1=on) The result is independent of parameter 36 (0x24).
76	0x4C	Saved fatal errors or events (read only)	The read-only parameter retrieves all errors and events stored in a ring memory. Since only about 25 characters are read out of the memory per call, it may need to be retrieved several times until it is completely emptied. Fatal errors and the creation of default parameters will be saved.
83	0x53	Display Response Wait Time	Max. time to wait for a display response, if feature waiting for response is activated. 00 ... 255 time factor 20ms Default: 150*20ms=300ms
84	0x54	Antenna tuning of the addressed antenna	By automatically adjusting the antenna, the influence of ambient conditions can be minimized 00 ... 15 value of antenna adjustment Default: 08 Realisation: a separate parameter for each port *
86	0x56	Display Waiting Time	Waiting time as long as the maximum waiting for the output of the remaining characters before the next output on a display. 0...no waiting time 1...200 waiting time in 5ms steps Default: 100 (500ms)
87	0x57	Display default FONT	If the display write command does not contains a valid value for the item FONT than the parameter value default display font is used. The value range ist between 6 and 48 pt. See item FONT for recommended values! Default: 12 (12pt)





88	0x58	Display linesize (read only)	<p>The number of characters within a line depends on the selected FONT. This parameter delivers the number of character within a display line from the last display writing command. Only the display commands 0x1x and 0xFx distribute this parameter.</p> <p>Default: 16 characters per line for default FONT 12pt Realisation: a separate parameter for each port *)</p>
89	0x59	Display max datasize (read only)	<p>The number of characters within a line and the number of lines depends on the selected FONT. This parameter delivers the number of character within all display lines from the last display writing command. Only the display commands 0x1x and 0xFx distribute this parameter.</p> <p>Default: 64 characters for default FONT 12pt</p>
96	0x60	Set default parameters	<p>Via this parameter default parameters of the reader can be established. Factor setting parameters remain unaffected!</p> <p>0... reset all parameters 1... reset all parameters except network settings The query of the parameter returns the fine version of the software version.</p>
97	0x61	Default protocol (read only)	<p>This parameter provides information about the currently set protocol.</p> <p>1 ...SECS protocol (not realized !) 2 ... ASCII protocol</p> <p>Default: 2</p>
98	0x62	Protocol change allow (read only)	<p>This parameter can be used to allow a detected protocol change. This will then set the new default protocol and restart the device. If the protocol change is suppressed, no automatic change takes place.</p> <p>0 ... protocol change not allowed 1 ... protocol change allowed</p> <p>Default: 0</p>





10.6 Message examples

Standard ASCII Protocol:

ASCII	HEX	Description
,S'	53	Start character
,0'	30	High byte message length
,2'	32	Lowbyte message length
,H'	48	Message first character: value
,0'	30	Message second character: destination address
CR	0D	End character
,2'	32*)	Highbyte – Checksum XOR
,4'	34*)	Lowbyte – Checksum XOR
,3'	33*)	Highbyte – Checksum Addition
,A'	41*)	Lowbyte – Checksum Addition

*) : With TCP / IP transmission in the standard ASC-I1 protocol, the checksum bytes are not transmitted. In ASC-W1 mode, however, they are also transmitted!

Calculation of the XOR checksum:

$$53 \text{ XOR } 30 \text{ XOR } 32 \text{ XOR } 48 \text{ XOR } 30 \text{ XOR } 0D = 24 \Rightarrow ,2' ,4'$$

Calculation of the addition-checksum:

$$53 + 30 + 32 + 48 + 30 + 0D = 13A \Rightarrow ,3' ,A'$$

(LSB is used)





Advanced SZ ASCII Protocol:

ASCII	HEX	Description
,S'	53	Start character
,Z'	5A	Second Start character tod identify advanced SZ protocol
,0'	30	High byte message length (higher byte)
,0'	30	Low byte message length (higher byte)
,0'	30	High byte message length (lower byte)
,3'	33	Lowbyte message length (lower byte)
,H'	48	Message first character: value
,0'	30	High byte destination address
,0'	30	Low byte destination address
CR	0D	End character
,4'	34*)	Highbyte – Checksum XOR
,F'	46*)	Lowbyte – Checksum XOR
,2'	32*)	Highbyte – Checksum Addition
,5'	35*)	Lowbyte – Checksum Addition

*) : With TCP / IP transmission in the standard ASC-I1 protocol, the checksum bytes are not transmitted. In ASC-W1 mode, however, they are also transmitted!





Calculation of the XOR checksum:

```
53 XOR 5A XOR 30 XOR 30 XOR 30 XOR 33      34  => ,3' ,4'  
XOR 48 XOR 30 XOR 30 XOR 0D =
```

Calculation of the addition-checksum:

```
53 + 5A + 30 + 30 + 30 + 33 + 48 + 30 + 30 + 0D  225  => ,2' ,5'  
=  
(LSB is used)
```

The following examples are based on the standard ASC-I1 protocol. The range of the Reader ID is set from 00 to 1F (antenna port 1 up to 32) in this case:

V – Query software version

```
>> V01  
<< v014C5752333249322E31  
Command      V  
Reader-ID     01  
Software version,4C5752333249322E30'  =>  ASCII „LWR32I2.0“
```

I – automatically tune RF module (antenna port 3)

```
>> I0208  
<< i02  
CommandI     I  
Reader-ID    02   (Tuning Antenna port 3)
```

J – RF module Read out tuning value (Antenna port 3)

```
>> J02  
<< j0201  
Command      J  
Reader-ID    02   (Antenna port 3)  
Data         01   (voting value)
```

X – Read data (Reading from page 1 of the multipage transponder)

```
>> X0101  
<< x01014142434445464748  
Command      X  
Reader-ID    01   (reading on antenna port 2)  
Page         01  
Data,4142434445464748'  =>  ASCII „ABCDEFGH“
```

R - Automatic reading on antenna port 2

```
<< R01013132333435363738  
>> r01  
Command      R  
Reader-ID    01   (automatic reading on antenna port 2)  
Page         01  
Data,4142434445464748'  =>  ASCII „ABCDEFGH „
```





W – Write data (Write antenna port 3, page 16 Multipage)

>> W02103132333435363738

<< w02

Command	W	
Reader-ID	02 (Write to antenna port 3)	
Page	10 (10hex = page 16dec.)	
Data,3132333435363738'	⇒	ASCII „12345678“

D – Write Display (Write display port 1, cmd 240, font 12pt)

>>D00F000000000000C40Test112345678911Test223456789222Test333456789333Test443456789444

<< d00

Command	D	
Reader-ID	00 (Write to display port 1)	
Cmd	F0 (240)	
Arg	000	
Colomn	000	
Line	000	
Font	0C (12pt)	
Datalen	40 (64 Zeichen)	
Data, "Test112345678911Test223456789222Test333456789333Test443456789444"		





10.7 Error Codes

ID	Name	Description	Possible Cause	Corrective action
0	none	No error		none
1	auto fail	Automatic reading is not possible	Reader is still busy with a former read or write request	Wait until the previous request has ended.
2	ext fail	Execution failed, read or write operation cannot be carried out	Reader is still busy with a former read or write request.	Wait until the previous request has ended.
3	write fail	Data transfer to the tag is not possible.	Reader is still busy with a former read or write request.	Wait until the previous request has ended.
4	no tag	No transponder or antenna installed	Antenna is not connected properly	Check antenna connection
			Antenna is not tuned	Antenna tuning
			No readable transponder within the reading range	Put the transponder in the antenna area. Check the type and function of the transponder
			Antenna / transponder are misaligned	Check the alignment of the antenna and the transponder
			Antenna is damaged or too close to metal	Replace the antenna, check the tuning
5	invalid	Invalid parameter or data	Invalid command data	Check command syntax and data content
			Parameter is not implemented or out of range	Check parameter syntax and value
6	unknown	Unknown errors		none
7	Unconfig	The device is not configured	Wrong reader address	Check message syntax, check parameter F „Reader address
8	check	Parity or checksum error	Wrong baud rate	Check the baud rate of the serial interface (Com port)
			Transmission error at serial communication	Check RS232 cable and connector, Check sources of interference with RS232
9	void ackn	unexpected acknowledge	Serial communication is interrupted	Check RS232 cable and connector, Check sources of interference with RS232
			Ethernet communication is interrupted	Check Ethernet cable and connector, check IP address settings
			Double or wrong acknowledgment	Check communication settings at the host
A	Locked	Locked page cannot be written	Tag is write protected	Check the page number to be written, exchange the tag for the new one





B	Unconfig	Maximum number of send messages has been confirmed (RS232 maxrepeat), The terminal did not confirm within the specified timeframe	Host system does not acknowledge the message	Check availability off he host system, Check RS232 cable and connector Ethernet cable and connector, Check IPAddress settings
C	Bad type	Wrong transponder type	A wrong transponder type is used (Read only or Read / Write instead of multipage)	Check and replace transponder type
:	Msg len	Message too long or too short or not received completely	Message too long or too short or not received completely	Message length is longer than indicated on the length byte, Check message length and length byte
			Message is longer than specified in the length byte	Check message length, check length byte
			Not all characters are transfered (Intercharacter Timeout)	Check message syntax, Check RS232 or Ethernet connection
;	Invalid	Invalid command	Unknown command was received	Check message syntax





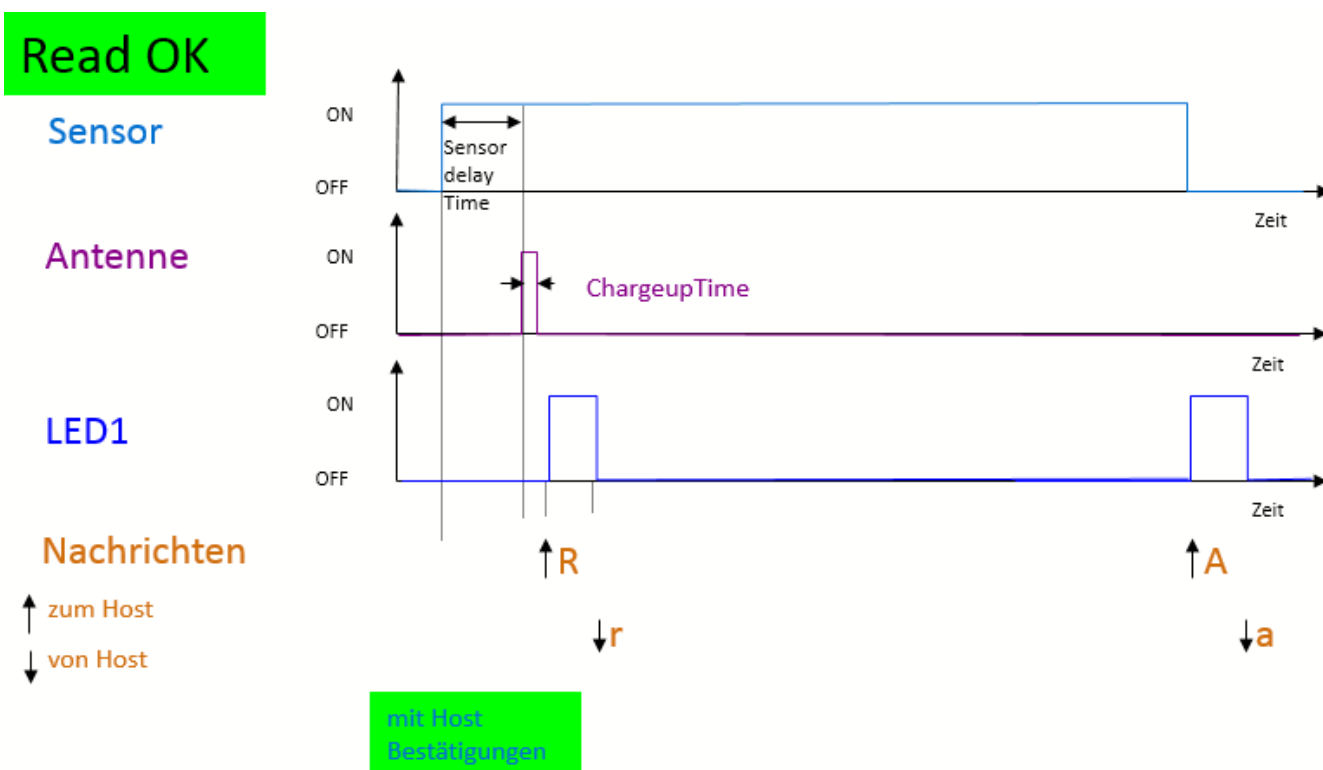
10.8 Wiring of the outputs

For readers with I / O modules, depending on the [Factoryparameter set](#), the outputs of the respective antenna port can be switched accordingly when reading.



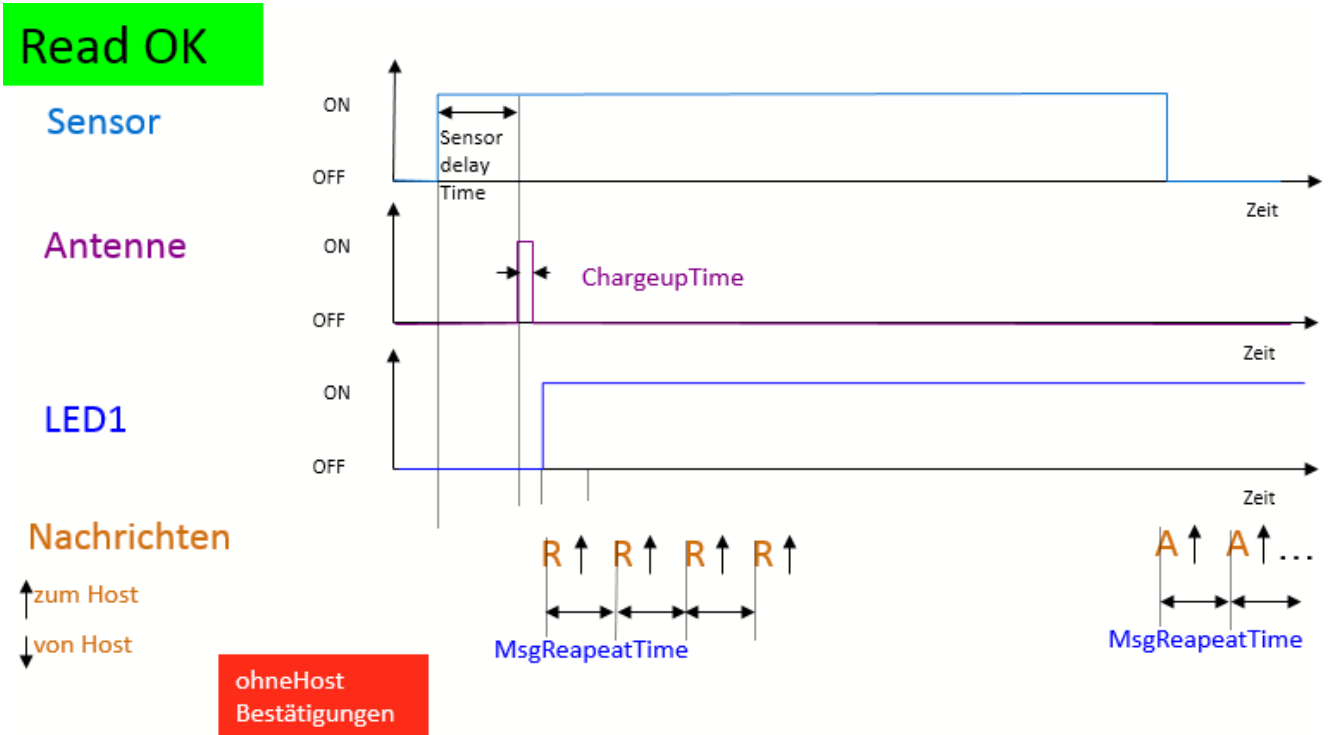
On default settings the sensor triggered read events will not affect the ports leds LED1 and LED2. With [parameter 32](#) and [parameter 35](#) the default behaviour can be changed!

10.8.1 ASC-W1 Mode: Reader in operation mode and sensor triggered reading

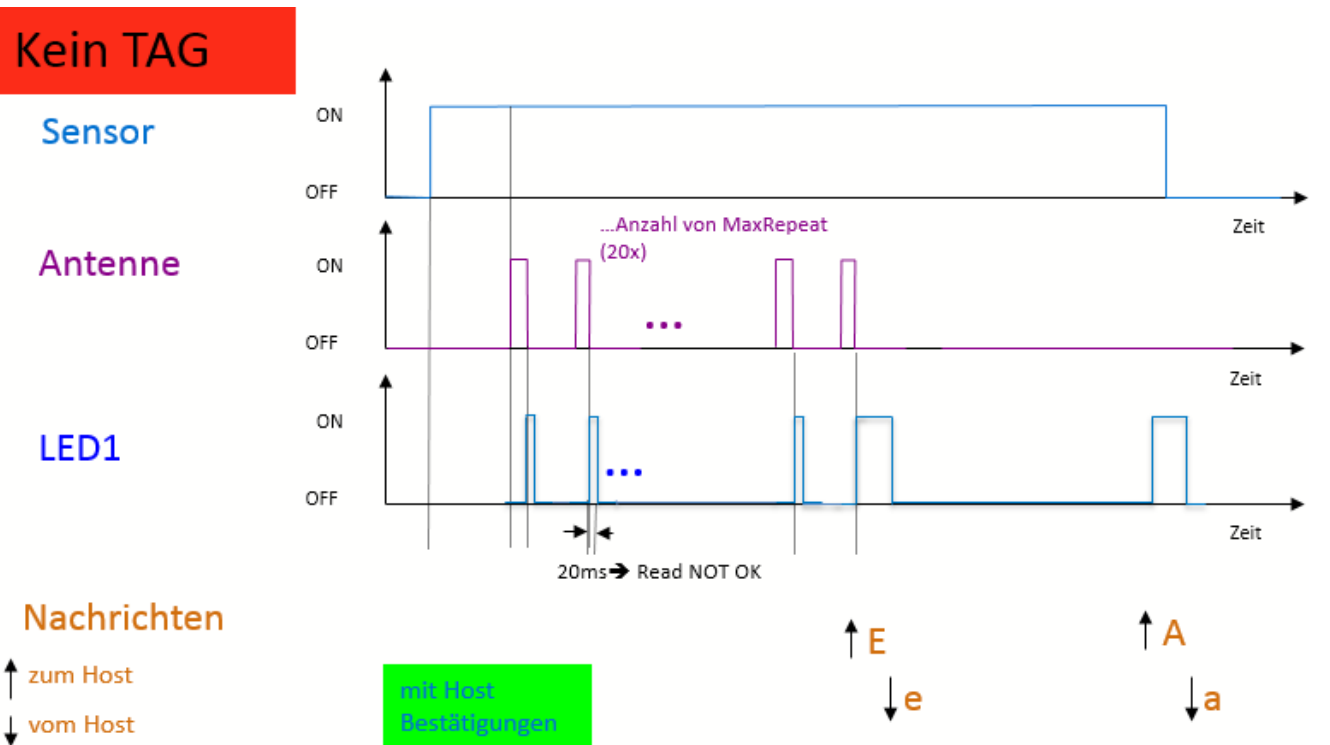


Picture 1: Successful reading with instant host confirmation ([Feature activated!](#))





Picture 2: Successful reading with missing host confirmation ([Feature activated !](#))



Picture 3: Unsuccessful reading with instant host confirmation ([Feature activated !](#))

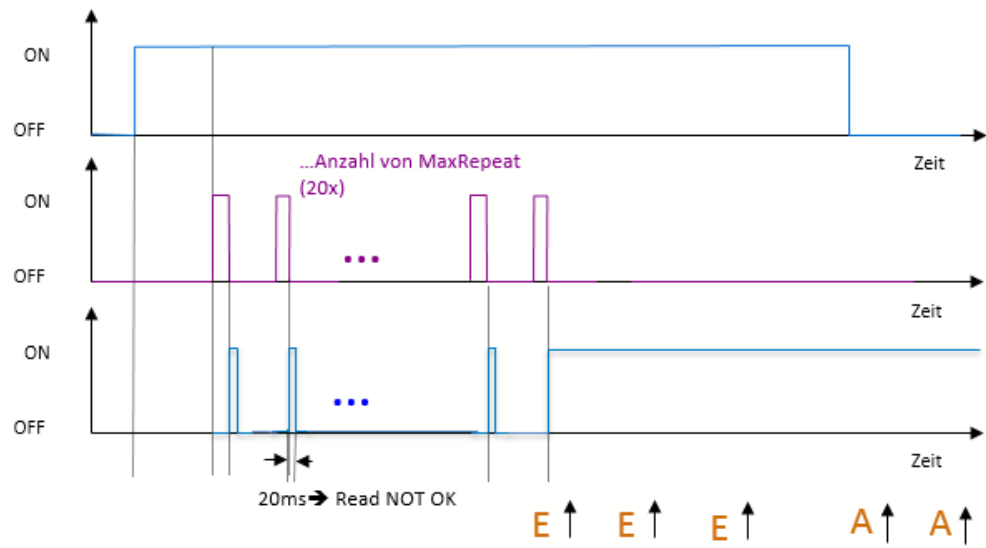


Kein TAG

Sensor

Antenne

LED1



Nachrichten

↑ zum Host

↓ von Host

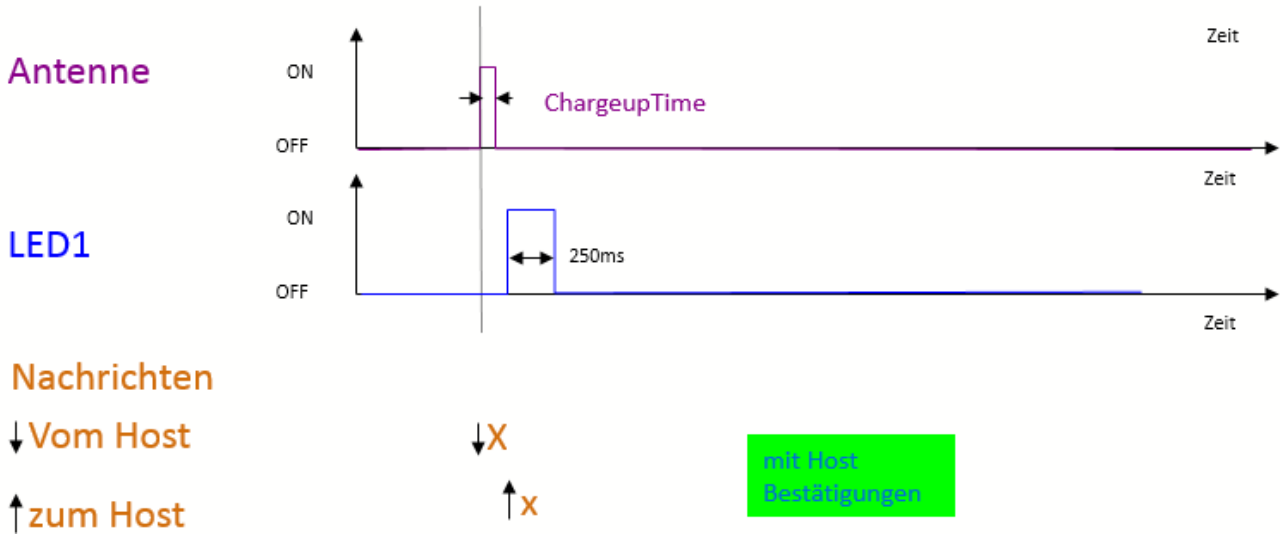
Ohne Host
Bestätigungen

Picture 4: Unsuccessful reading with missing host confirmation ([Feature activated !](#))



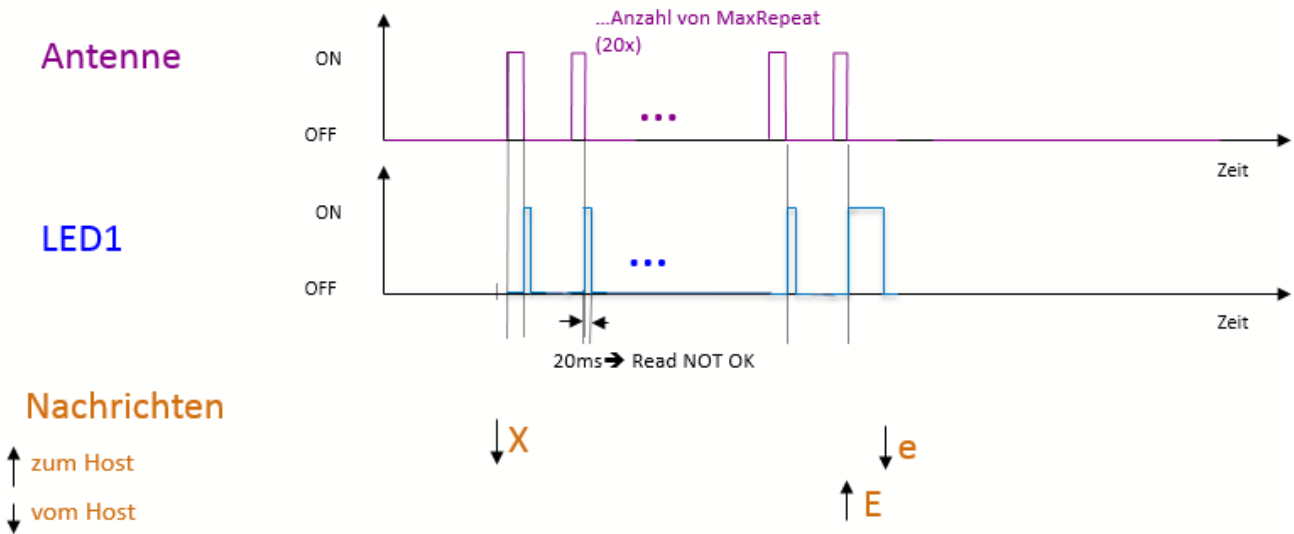
10.8.2 ASC-W1-Mode: Reader in operation mode and external triggered reading

Read OK



Picture 5: Successful external reading X ([Feature activated !](#))

Kein TAG



Picture 6: Unsuccessful external reading X ([Feature activated !](#))





10.9 ASCII – table

DEZ	HEX	CTRL	Code
0	0	^@	NUL
1	1	^A	SOH
2	2	^B	STX
3	3	^C	ETX
4	4	^D	EOT
5	5	^E	ENQ
6	6	^F	ACK
7	7	^G	BEL
8	8	^H	BS
9	9	^I	HT
10	A	^J	LF
11	B	^K	VT
12	C	^L	EF
13	D	^M	CR
14	E	^N	SOH
15	F	^O	SI
16	10	^P	DLE
17	11	^Q	DC1
18	12	^R	DC2
19	13	^S	DC3
20	14	^T	DC4

DEZ	HEX	CTRL	Code
21	15	^U	NAK
22	16	^V	SYN
23	17	^W	ETB
24	18	^X	CAN
25	19	^Y	EM
26	1A	^Z	SUB
27	1B	^[ESC
28	1C	^\ ^_	FS
29	1D	^] ^_	GS
30	1E	^^	RS
31	1F	^_	US





DEZ	HEX	CTRL
32	20	BLANK
33	21	!
34	22	"
35	23	#
36	24	\$
37	25	%
38	26	&
39	27	'
40	28	(
41	29)
42	2A	*
43	2B	+
44	2C	,
45	2D	-
46	2E	.
47	2F	/
48	30	0
49	31	1
50	32	2
51	33	3
52	34	4
53	35	5
54	36	6
55	37	7

DEZ	HEX	CTRL
56	38	8
57	39	9
58	3A	:
59	3B	;
60	3C	<
61	3D	=
62	3E	>
63	3F	?
64	40	@
65	41	A
66	42	B
67	43	C
68	44	D
69	45	E
70	46	F
71	47	G
72	48	H
73	49	I
74	4A	J
75	4B	K
76	4C	L
77	4D	M
78	4E	N
79	4F	O





DEZ	HEX	CTRL
80	50	P
81	51	Q
82	52	R
83	53	S
84	54	T
85	55	U
86	56	V
87	57	W
88	58	X
89	59	Y
90	5A	Z
91	5B	[
92	5C	\
93	5D]
94	5E	^
95	5F	_
96	60	'
97	61	a
98	62	b
99	63	c
100	64	d
101	65	e
102	66	f
103	67	g

DEZ	HEX	CTRL
104	68	h
105	69	i
106	6A	j
107	6B	k
108	6C	l
109	6D	m
110	6E	n
111	6F	o
112	70	p
113	71	q
114	72	r
115	73	s
116	74	t
117	75	u
118	76	v
119	77	w
120	78	x
121	79	y
122	7A	z
123	7B	{
124	7C	
125	7D	}
126	7E	~
127	7F	□








11. Service and Troubleshooting

11.1 General information



Follow the basic safety instructions in the chapter Safety instructions.

-  The maintenance of the reading device and its components may only be performed by the manufacturer.
-  Observe the instructions in this section when errors occur. Do not perform any further troubleshooting measures in addition to the described measures.
-  In case of doubt concerning errors and handling them, contact the manufacturer.

11.2 Troubleshooting personnel



Troubleshooting must only be performed by specially trained personnel. In case of doubts concerning the necessary qualifications, contact the manufacturer.



The handling of device errors by untrained personnel as well as the incorrect handling of the device can result in personal injuries as well as damages to the reading device and/or connected devices.





11.3 Safety instructions



All components of the antenna oscillating circuit carry high voltage.



Only use spare parts specified by the manufacturer.
Unauthorised substitution of parts can result in fire, electric shock or other hazards.



Electrostatic charges damage electronic components within the device.
ESD protective measures must be applied prior to opening the unit.



Carefully remove the housing covers to prevent damage.
Do not operate the device when the housing is open.






Never short circuit the fuse! This may result in fire or damages on the device. Only use fuses specified by the manufacturer.









11.4 Error indications on the device

Power-LED is off

-  Check the power supply and the connecting cables!
-  Remove the power adapter. Open the case and check the fuse. Replace the fuse with a fuse specified by the manufacturer!
-  If the above measures do not resolve the problem, contact the manufacturer.

11.5 No communication with the reading device

-  Check the interface connection cable for damage and correct connection!
-  Check the power LED is lit, and make sure that the status indicator does not indicate an error.
-  Try to read in the reader with the HERMOSDevice-Discoverer and check the device settings.
-  If the above measures do not correct the error, please contact the manufacturer.





11.6 Software releases

Release-date	Version	Description
17.08.2021	LFM4I1.8 (ASCII)	First Release for LFM4x WipRack Demo
11.02.2022	LWR32I2.0 (ASCII)	First Release for LFM32x WipRack with ASCII protocol





11.7 Customer service

HERMOS AG

Track & Trace RFID Division

Gartenstraße 19

D-95490 Mistelgau

Germany

Phone +49 (0) 9279 – 991 -0

Fax +49 (0) 9279 – 991 -100

E-Mail rfid@hermos.com


URL: <http://www.hermos.com/de/produkte/rfid/>





12. Disassembly and storage

12.1 Disassembly

	<ul style="list-style-type: none"> ➔ Remove the power supply ➔ Remove all cables ➔ Loosen and remove the mounting screws ➔ Remove the reading device from the installation area
---	---

12.2 Storage

Store the reading device and its components in a clean and dry environment. Make sure that the power supply has been removed.

Observe the required storage conditions specified in the technical data.

13. Transport and disposal

13.1 Transport


Use a solid cardboard box for the transport.

Use enough cushioning material to protect the device on all sides.

13.2 Disposal

The device and its components are made of various materials.

Disconnect the electronic components from the housing and dispose of them separately.

	<ul style="list-style-type: none"> ➔ Do not dispose of the unit in normal household waste. ➔ Dispose of the materials separately and according to the legal regulations of your country. ➔ Housing and attachments as plastic waste ➔ Electronic components, antennas and cables as electronic waste
---	--

