FACTORY AUTOMATION

ISO**9001**

# IPH-350-R2

Manual
Edition '98

PEPPERL+FUCHS

# IPH-350-R2
# List of Contents



Issued 21.01.1998



Pepperl+Fuchs GmbH · 68301 Mannheim · Telephone (06 21) 7 76-11 11 · Fax (06 21) 7 76-10 00 · Internet http://pepperl-fuchs.com

# Notes

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# 1 General Information

## 1.1 The use of the symbols WARNING, CAUTION, NOTE


Warning

*This symbol warns of danger. If it is not heeded, there is a threat of death or injury to personnel and damage to or destruction of equipment.*

Attention

*This symbol warns of a possible fault. If it is not heeded, the device or the system or plant connected to it may develop a fault or fail completely.*

Note

*This symbol draws attention to important information.*

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# 2 Safety

## 2.1 Prescribed use

The IPH-350-R2 read/write head is part of the inductive identification system IDENT-I System P from Pepperl+Fuchs and reads and writes the code and data carriers of this system.

The evaluation system is integrated into the head and there is a serial interface at the output. This can be connected directly to a PLC or to an industrial PC.

This read/write head can read code and data carriers from both sides. The heads must not be flush mounted in metal or other conducting materials, nor should they be mounted directly on conducting materials.


Warning

*The protection of operating personnel is not guaranteed, if the read/write head is not used in the manner prescribed for them.*

*The IPH-350-R2 device must only be operated by trained specialist personnel and in accordance with these operating instructions.*

## 2.2 General advice on safety


Warning

*Operation other than that described in these instructions places the safety and function of the device and the connected system in doubt.*

*The connection of this device and maintenance of it, whilst a voltage is applied, must only be carried out by specialist electrical personnel.*

*If it is not possible to eliminate a fault, the device is to be taken out of service and protected against inadvertent operation.*

*Repairs must only be undertaken by the manufacturer. Interference with the operation of the device and modifications to it are not permissible and render the guarantee invalid.*

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# 3 Product Description

## 3.1 Delivery package

The following equipment is supplied:

- 1 manual and data transmission protocol
- 1 IPH-350-R2 device

## 3.2 Range of application

The device is intended for mobile use with a portable PC.

It's suitable especially for:

- inspection
- maintenance

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## 3.3 Accessories / product family

The inductive identification system IDENT-I System P from Pepperl+Fuchs comprises the following individual components.

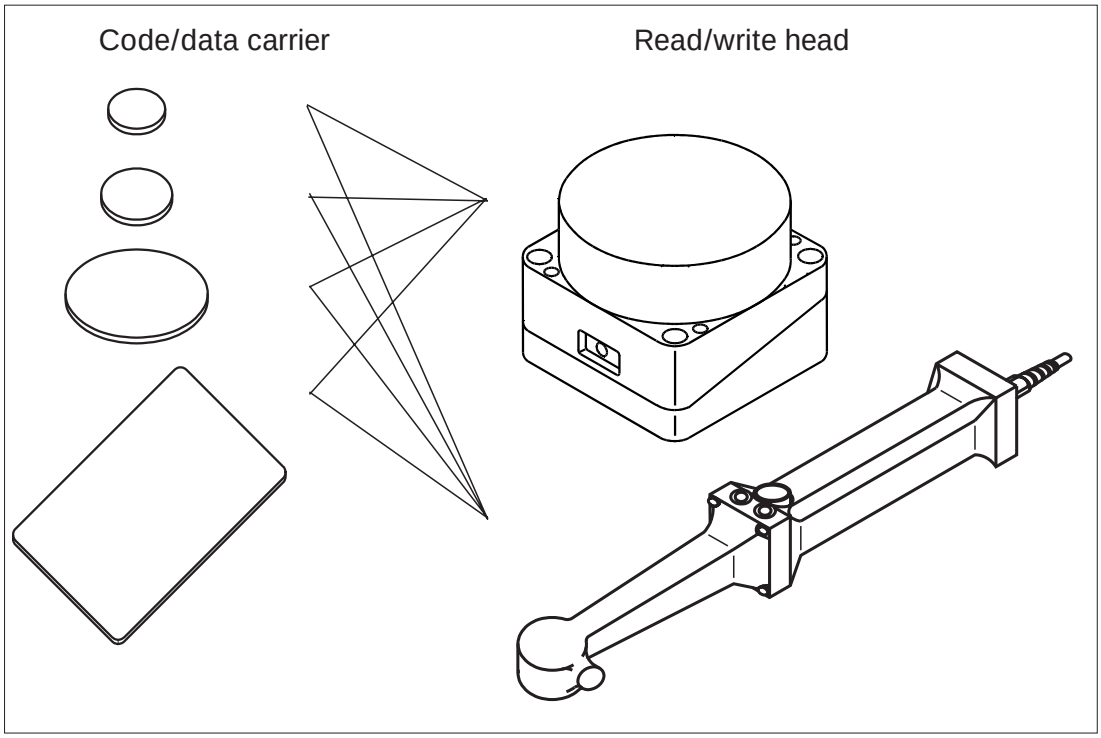


Figure 3.1: Overview of the components in the IDENT-I System P structure

Note

*Detailed information on the components in the IDENT-I System P inductive identification system can be obtained from the Sensor Systems 1 catalogue.*

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# 4 Installation

## 4.1 Storage and transportation

The device should be packed appropriately to avoid damage due to shock and protected against dampness. The original packing affords optimum protection. In addition, the permissible ambient conditions should not be exceeded (see Technical Data).

## 4.2 Unpacking

Check that the contents are undamaged. Report any damage to the post office or carrier and inform the supplier.

Check the contents of the package against your order and the delivery documents for:

- Quantity supplied
- Type of device and version - as specified on type label.
- Accessories
- Manual

Retain the original packaging, in case the device has to be stored at some later time or despatched.

Any queries should be directed to Pepperl+Fuchs.

## 4.3 Dismantling, packing and disposal

### Repacking

After removing from an installation, if the device is to be used again at a later date, it should be suitably repacked against shock and dampness. Optimum protection is afforded by the original packaging.

### Disposal

Note

*Scrap electronic components are a special kind of refuse. The local regulations regarding the disposal of such waste must be observed.*

*The IPH-350-R2 read/write head contains no internal batteries which would require removal prior to disposal.*

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# 5 Commissioning


Warning

*Make sure before commissioning, that the system to which the device is connected cannot be placed at risk, for example, due a lack of control of processes which may be initiated.*

The cables have to be connected according to the terminal diagram. The connection to the computer is made using a suitable plug.

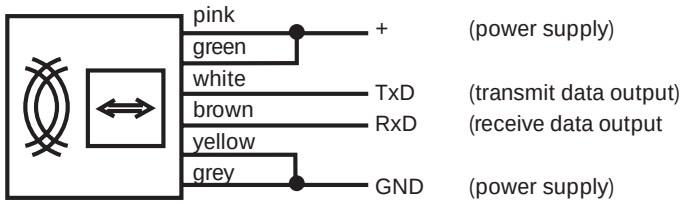


Figure 5.1: Connection of the IPH-350-R2 read/write head

# 6 Data transmission protocol

The description of the data transmission protocol is apart of his own.

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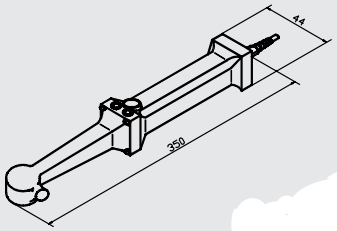
# 7 Technical Data




| | | |
|---|---|---|
| **Model number:** | **IPH-350-R2** | |
| **Technical data:** | | |
| **Distance** | | **in air** |
| read distance with | IPC01-25 | 0 mm ... 25 mm |
| write distance with | IPC01-25 | 0 mm ... 15 mm |
| read distance with | IPC02-20 | 0 mm ... 20 mm |
| read distance with | IPC02-50 | 0 mm ... 40 mm |
| read distance with | IPC02-C1 | 0 mm ... 40 mm |
| read distance with | IPC03-20 | 0 mm ... 20 mm |
| write distance with | IPC03-20 | 0 mm ... 15 mm |
| read distance with | IPC03-50 | 0 mm ... 40 mm |
| write distance with | IPC03-50 | 0 mm ... 25 mm |
| read distance with | IPC03-C1 | 0 mm ... 40 mm |
| write distance with | IPC03-C1 | 0 mm ... 25 mm |
| **Serial Interface** | | RS232 |
| Transfer Rate in Baud | | 1200, 2400, 4800, 9600 |
| Cable accumulation (RS232 standard) | | |
| pink, green | | Vcc (+5V; power supply) |
| grey, yellow | | Vss (GND; power supply) |
| white | | TXD (transmit data output) |
| brown | | RXD (receive data input) |
| **Displays:** | | LED green<br>LED red |
| **Electrical ratings:** | | |
| Working voltage $U_B$ | | 4.75 V DC ... 5.25 V DC |
| Current consumption | | 100 mA (typical)<br>10 mA (typical with power down mode) |
| **Mechanical data:** | | |
| Housing material | | POM |
| Operating temperature | | 253 Kelvin ... 333 Kelvin (-20 °C ... +60 °C) |
| Storage temperature | | 253 Kelvin ... 333 Kelvin (-20 °C ... +60 °C) |
| Protection class to EN 60529 | | IP65 |
| Method of connection | | Helix cable (Socket up inquiry) |
| Cable length | | max.1.8 m |
| **General Certification of Bundesministerium für Post und Telekommunikation** | | BZT G 750717 H |

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## Notes



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# One Company, Two Divisions.

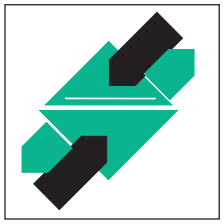
## Factory Automation Division

### Product Range

- Binary and analog sensors
- in different technologies
  - Inductive and capacitive sensors
  - Magnetic sensors
  - Ultrasonic sensors
  - Photoelectric sensors
- Incremental and absolute rotary encoders
- Counters and control equipment
- ID systems
- AS-Interface

### Areas of Application

- Machine engineering
- Conveyor or transport
- Packaging and bottling
- Automobile industry



## Process Automation Division

### Product Range

- Signal conditioners
- Intrinsically safe interface modules
- Remote process interface
- Intrinsically safe field bus solutions
- Level control sensors
- Process measuring and control systems engineering at the interface level
- Intrinsic safety training

### Areas of Application

- Chemical industry
- Industrial and community sewage
- Oil, gas and petrochemical industry
- PLC and process control systems
- Engineering companies for process systems

### Service Area

Worldwide sales, customer service and consultation via competent and reliable Pepperl+Fuchs associates ensure that you can contact us wherever or whenever you need us. We have subsidiaries worldwide for your convenience.

## Your direct connection


**Factory Automation Tel. (0621) 776-1111**
**e-mail: fa-info@de.pepperl-fuchs.com**

**Process Automation Tel. (0621) 776-2222**
**e-mail: pa-info@de.pepperl-fuchs.com**

**USA Headquarter**
Pepperl+Fuchs Inc. · 1600 Enterprise Parkway
Twinsburg, Ohio 44087 · Cleveland-USA
Tel. (330) 4 25 35 55 · Fax (330) 4 25 46 07

**Asia Pacific Headquarter**
Pepperl+Fuchs Pte Ltd. · P+F Building
18 Ayer Rajah Crescent · Singapore 139942
Tel. (65) 7 79 90 91 · Fax (65) 8 73 16 37

**Worldwide Headquarter**
Pepperl+Fuchs GmbH · Königsberger Allee 87
68307 Mannheim · Germany
Tel. (06 21) 7 76-0 · Fax (06 21) 7 76-10 00
http://www.pepperl-fuchs.com ·
e-mail: info@de.pepperl-fuchs.com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FACTORY AUTOMATION

ISO**9001**

# IPH-350-R2

Description
Data transmission protocol
Edition '98

PEPPERL+FUCHS

# 1 Contents

1 Contents

# 2 Serial Interface, Transmission Protocol

## 2.1 General Description of the STX / ETX Transmission Protocol

### 2.1.1 Notes on Syntax

In the syntax description all control characters are printed in **bold** letters, i.e. for an **ACK** the value 06h is output on the serial interface. Constant character strings are indicated by quotes (e.g. „1000“). Variable parameters are enclosed by the characters < and > with each character corresponding to one character to be transmitted. The meaning of the characters is explained after the syntax description.

### 2.1.2 General Block-Commands Structure

Transfer of request and responses is generally enclosed by the control characters **STX** and **ETX**. **In between these control characters only ASCII characters are permitted!** Numerical values (parameters) are transferred in an ASCII character string. For the numerical value 123 = 7Bh, e.g., the ASCII character string „7B“ is transmitted via interface. If you want to transfer, e.g., the parameter value 100, proceed as follows:

| Parameter value, decimal | | corresponds to HEX value | | ASCII character string that is to be transferred |
|---|---|---|---|---|
| 100 | ⇒ | 64h | ⇒ | „64“ |

Thus, for each byte to be transferred 2 characters are handed over.

Alternatively, parameters can be transferred as decimal character strings in some cases (e.g. when using the transponder´s general write/read functions). If, e.g., the value 123 (decimal) is to be transmitted, you must, in this special case, proceed as follows:

| Parameter value, decimal | ASCII character string that is to be transferred |
|---|---|
| 123 | „123“ |

As you can see, in this case 3 characters are handed over for each byte to be transmitted.

The data transfer is concluded by a check sum behind the **ETX** control character. The check sum is calculated by an XOR linking operation on the first transferred control character up to (and inclusive of) the ETX control character. The start value for the XOR operation is 0. In the case of responses from the RF system, the STX is preceded by another control character for acknowledgement (**ACK** for positive acknowledgement and **SYN** for an error message); one exception are the background responses: they lack the acknowledgement control characters **ACK** and **SYN**.

In addition, 1-byte control characters are permitted for which no parameters are transferred (the control characters **ESC** and **NAK**).

### 2.1.3 Control-Character Definition

The control characters are defined with the following values:

| | |
|---|---|
| **STX** | 02h |
| **ETX** | 03h |
| **ACK** | 06h |
| **NAK** | 15h |
| **SYN** | 16h |
| **ESC** | 1Bh |

### 2.1.4 Example for a Request PC ⇒ RF System

Request consists of the **STX** control character, a 4-character function number, the data (parameters) and the **ETX** control character, followed by the check sum.

**STX** Function number [Data] **ETX** Check sum

In the following example the time for the time-out is to be set to 1 second. The following data are transmitted:

**STX** „1004“ <tttt> **ETX** <c>

tttt Byte time-out in 10 ms, 1 second = 100 x 10 ms = „0064“
c Check sum

The check sum is calculated on the basis of:

| Character | Value | | Check sum | | Result |
|---|---|---|---|---|---|
| | | | 00h | | |
| **STX** | 02h | **xor** | 00h | ⇒ | 02h |
| ‘1’ | 31h | **xor** | 02h | ⇒ | 33h |
| ‘0’ | 30h | **xor** | 33h | ⇒ | 03h |
| ‘0’ | 30h | **xor** | 03h | ⇒ | 33h |
| ‘4’ | 34h | **xor** | 33h | ⇒ | 07h |
| ‘0’ | 30h | **xor** | 07h | ⇒ | 37h |
| ‘0’ | 30h | **xor** | 37h | ⇒ | 07h |
| ‘6’ | 36h | **xor** | 07h | ⇒ | 31h |
| ‘4’ | 34h | **xor** | 31h | ⇒ | 05h |
| **ETX** | 03h | **xor** | 05h | ⇒ | 04h |
| | | | 04h | | |

Transmission is of:

**STX** „1004“ „0064“ **ETX** 04h

In the programming language C++, e.g., the character string “\x02““1004““0064““\x03““\x04“ would be transmitted, in Pascal it would be the character string #$02+’10040064’+#$03+#$04.

### 2.1.5 Break Request PC ⇒ RF System

The Break request serves to abort a transmission already started. Example:

**STX** „100“ **ESC**

i.e. the transmitted character string is not evaluated, there is, however, no error message!

### 2.1.6 Direct Response RF System ⇒ PC

The response of the RF system is structured like the request; the only difference is that the response block is preceded by an acknowledgement control character.

**ACK** **STX** Function number [Data] **ETX** Check sum

or

**SYN** **STX** Function number Error number **ETX** Check sum

for an error response with the error number as parameter. The error response is only returned if the request has been made according to the request syntax, but includes, e.g., a parameter providing an incorrect value, or if the function is not supported by the RF system. In the case of errors that cannot be identified only a **NAK** is returned.

**Max. response time is 5 seconds.**

### 2.1.7 Global Error Response RF System ⇒ PC

In the case of a global transmission error the RF system returns a **NAK** control character after a certain defined time (time-out).

### 2.1.8 Acknowledgement of a Break Request RF System ⇒ PC

A Break request is acknowledged by one single **ACK** control character without parameter.

### 2.1.9 Background Response RF System ⇒ PC

The Background responses of the RF system are a special case. If the requested condition changes (if, e.g., a transponder is moved into or out of the reading distance of the antenna, while the background function of transponder recognition is active), the information is transmitted to the host (PC) at once. Since a Background response is not a direct reaction to a request, the **ACK** control character is not transmitted in this case. **In addition, the Background response is repeated each second until it is acknowledged by the PC**. This way, no responses get lost. Example for a Background response:

**STX** „3100“ „01“ **ETX** <c>

means that a IPC01 (Philips PCF7930) transponder has been moved into reading distance.

### 2.1.10 Acknowledgement of a Background Response by the PC

Each received Background response must be acknowledged by the PC. For this, the following sequence is transmitted to the RF system via serial interface:

**ACK STX** <ffff> **ETX** <c>

f Function number of the Background response

If, e.g., a IPC01 (Philips PCF7930) transponder recognition is to be acknowledged by the PC in background mode after the transmission of the background data on the part of the RF system, the following must be transmitted:

**ACK STX** „3100“ **ETX** <c>

### 2.1.11 Notes on the Background Functions

Contrary to a single-mode request, where each action of the RF system must be requested on the part of the PC, the Background functions are an alternative to the cyclical requests by the PC. Each activation of a Background function reserves resources of the reader, i.e. within the RF system time is needed for the management of the Background functions. We therefore recommend to use the Background functions economically, since otherwise their advantage, i.e. the quick recognition or reading of transponders, cannot be utilized. In the transponder background modes the HF carrier remains turned on, thus leading to a higher power consumption, i.e. more energy is needed for the RF system (cf. also the max. current consumption of the RF system).

The Background functions are limited; this means that maximally

- all I/O functions (e.g. request for key status) and
- max. 1 transponder background function

can be activated. If, e.g., a IPC01 (Philips PCF7930) transponder recognition is active in background mode, it can be turned off by, e.g., an IPC02 (EM4001/2) transponder reading function in background mode. In this case, the IPC02 (EM4001/2) transponder reading function will then be active in background mode.

**A single-mode request of an active Background function deletes its background status!**

# 3 Protocol Description

The following table shows the compatibility between the code carriers and data carriers of Pepperl+Fuchs and the transponder types of different manufacturers.

| **Pepperl+Fuchs type** | **transponder type** | |
|---|---|---|
| IPC01 | Philips PCF7930 | Read/Write |
| IPC02 | EM V4001 & 4002 / SID Unique | Read |
| IPC03 | EM V4050 / SID Titan | Read/Write |

The transponder type is added in parentheses at the concerning places in the text..

## 3.1 System Control, 1xxx

### 3.1.1 Reset Request, 1000

The RF Reset request returns the RF system back to its start-up condition and carries out a re-start. Depending on the system, it may thus take some time until acknowledgement. During the re-start the serial interface, among others, is reset to its default values (see Appendix). The displays and outputs, if existing (system-specific), are also reset to their standard values.

PC ⇒ RF System:

**STX** „1000“ **ETX** <c>

RF System ⇒ PC:

**ACK STX** „1000“ <sss> <i> „/“ <hh> <vv> **ETX** <c>

s System designation, e.g. „SIH“ or „STK“ or „DEM“ etc.
i System main index, e.g. „1“ or „2“
h Hardware version number, e.g. „01“ for hardware index 1
v Software version number, e.g. „10“ for software index 10

### 3.1.2 Request Version Number, 1001

Use this function to determine the (system) designation of the connected hardware as well as the index versions of hard- and software (cf. Reset request).

PC ⇒ RF System

**STX** „1001“ **ETX** <c>

RF System ⇒ PC

**ACK STX** „1001“ <sss> <i> „/“ <hh> <vv> **ETX** <c>

s System designation, e.g. „SIH“ or „STK“ etc.
i System main index, e.g. „1“ or „2“
h Hardware version number, e.g. „01“ for hardware index 1
v Software version number, e.g. „10“ for software index 10

### 3.1.3 Interface Test, 1002

The interface test is only necessary in the case of baud-rate setting.

PC ⇒ RF System

**STX** „1002“ **ETX** <c>

RF System ⇒ PC

**ACK STX** „1002“ **ETX** <c>

During response of the RF system no other parameters are transferred.

### 3.1.4 Change of Baud Rate, 1003

With this function you can set the transmission baud rate of the RF system. The baud rates that are supported depend on the system used and can be found in the system´s documentation (technical information); a wrong baud rate setting generates an error message. After the successful transfer of the new baud rate an interface test (cf. description above) must be carried out within 10 seconds on the basis of the new baud rate; otherwise the system is re-started. Within this time (until the successful interface test) all other functions or interface transmissions also cause a re-start of the RF system.

PC ⇒ RF System

**STX** „1003“ <bbbb> **ETX** <c>

b Baud rate to be set; in case of a setting of e.g. 9600 Baud = 2580h, „2580“ must be transmitted.

RF System ⇒ PC

**ACK STX** „1003“ **ETX** <c>

During response of the RF system no other parameters are transferred.

### 3.1.5 Set Byte Time-out, 1004

Use this function to determine the time-out interval, i.e. the max. time between two data bytes during a request, for data transmission in order to be able to work with slower systems, too, or to manually enter data. Max. time that can be set is 10 seconds, default time-out setting is 500 ms.

PC ⇒ RF System

**STX** „1004“ <tttt> **ETX** <c>

t Time to be set x 10 ms, e.g. „0064“ for 1 second.

RF System ⇒ PC

**ACK STX** „1004“ **ETX** <c>

During response of the RF system no other parameters are transferred.

### 3.1.6 Request Random Number for Encoded Password Transfer, 1006

This function returns an 8-bytes long random number, by which a password can be transmitted in encoded form. The password-encoding algorithms for different transponder types can be found in separate data sheets.

PC ⇒ RF System

**STX** „1006“ **ETX** <c>

RF System ⇒ PC

**ACK STX** „1006“ <zzzzzzzzzzzzzzzz> **ETX** <c>

z ASCII character string of a random number of 8 bytes length.

### 3.1.7 Request Active Background Functions, 1007

Use this function to determine which Background functions are currently active. For each active Background function a bit flag is set, with the distribution according to the table below.

PC ⇒ RF System

**STX** „1007“ **ETX** <c>

RF System ⇒ PC

**ACK STX** „1007“ <bbbbbbbb> **ETX** <c>

b ASCII character string of a double word = value of 32 bits´ size.

Table of background flags:

| | |
|---|---|
| Bit 00 | IPC01 (Philips PCF7930) transponder identification |
| Bit 01 | Mikron Hitag HT1-DC3 transponder identification |
| Bit 02 | IPC02 (EM 4001 & 4002 / SID Unique) transponder identification |
| Bit 03 | IPC03 (EM 4050 / SID Titan) transponder identification |
| Bit 04 | Temic e5530 transponder identification |
| Bit 05 | Temic e5550 transponder identification |
| Bit 06 | *reserved for future definitions* |
| Bit 07 | *reserved for future definitions* |
| Bit 08 | Read IPC01 (Philips PCF7930) transponder |
| Bit 09 | Read Mikron Hitag HT1-DC3 transponder |
| Bit 10 | Read IPC02 (EM 4001/2 / SID Unique) transponder |
| Bit 11 | Read IPC03 (EM 4050 / SID Titan) transponder |
| Bit 12 | Read Temic e5530 transponder |
| Bit 13 | Read Temic e5550 transponder |
| Bit 14 | |
| : | *reserved for future definitions* |
| Bit 31 | |

### 3.1.8 Put RF System in Low-current Mode, 1008

This function puts the RF system into a „current saving“ mode; the system remains in this low-current mode until any character is sent via interface. Then the RF system displays a Reset starting message and returns to its default settings.

PC ⇒ RF System

**STX** „1008“ **ETX** <c>

RF System ⇒ PC

**ACK STX** „1008“ **ETX** <c>

### 3.1.9 Request Supported Transponder Types, 100A

With this function you can determine which transponder types are supported by the system used.

PC ⇒ RF System

**STX** „100A“ **ETX** <c>

RF System ⇒ PC

**ACK STX** „100A“ <ssss> **ETX** <c>

s ASCII character string of a word = value of 16 bits´ size.

The supported transponder types are returned in binary code:

| | |
|---|---|
| Bit 00 | 1= IPC01 (Philips PCF7930) |
| Bit 01 | 1= Mikron Hitag HT1-DCx |
| Bit 02 | 1= IPC02 (EM V4002 / SID Unique) |
| Bit 03 | 1= IPC03 (EM V4050 / SID Titan) |
| Bit 04 | 1= Temic e5530 |
| Bit 05 | 1= Temic e5550 |
| Bit 06..15 | *not used; reserved for future transponder types* |

## 3.2 Periphery Control, 2xxx

### 3.2.1 Determine Key Status, 2000

The Key request feature is system-dependent. RF systems without key probe return an error message. This function can be carried out in both single and background mode; in background mode each change of status of the key probe is transmitted to the PC.

PC ⇒ RF System

**STX** „2000“ <m> **ETX** <c>

m Mode: „S“ = single mode, „B“ = background mode

RF System ⇒ PC (direct response of a single or background request)

**ACK STX** „2000“ <ss> **ETX** <c>

s Key status; „00“ = Key not pressed, „01“ = Key pressed

In the case of a background response there is no ACK control character; a background response must be acknowledged on the part of the PC.

### 3.2.2 LED Control, 2003

The LED control is system-dependent. For RF systems without LED this request is without effect.

PC ⇒ RF System

**STX** „2003“ <ll> **ETX** <c>

l LED bit pattern; „00“ = no LED, „01“ = LED1 on, „02“ = LED 2 on, „03“ = LED1+2 on ...

RF System ⇒ PC

**ACK STX** „2003“ **ETX** <c>

## 3.3 Transponder Recognition, 3xxx

### 3.3.1 General Transponder Recognition, 3000

With this function you can find out if and which transponder type is in reading distance to the antenna.

PC ⇒ RF System

**STX** „3000“ **ETX** <c>

RF System ⇒ PC

**ACK STX** „3000“ <tt> **ETX** <c>

t Transponder type in reading distance to antenna.

The following transponder types are defined[1]:

„00“ no transponder in reading distance
„01“ Transponder IPC01 (Philips PCF7930) recognized
„02“ Transponder Mikron Hitag HT1-DCx recognized
„03“ Transponder IPC02 (EM V4002 or SID Unique) recognized respectively
„04“ Transponder IPC03 (EM V4050 or SID Titan) recognized respectively
„05“ Transponder Temic e5530 recognized
„06“ Transponder Temic e5550 recognized

### 3.3.2 IPC01 (Philips PCF7930) Transponder Recognition, 3100

This function determines, either in single or in background mode, if there is a IPC01 (Philips PCF7930) device in reading distance to the antenna or not. If in background mode, each change of status is transmitted.

PC ⇒ RF System

**STX** „3100“ <m> **ETX** <c>

m Mode: „S“ = single mode, „B“ = background mode

RF System ⇒ PC (direct response for background and single mode request)

**ACK STX** „3100“ <xx> **ETX** <c>

x „00“= no PCF7930 transponder in reading distance, „01“ = transponder could be recognized

In the case of a background response there is no ACK control character; a background response must be acknowledged on the part of the PC.

[1] The transponder used must be supported by the RF system!

### 3.3.3 Mikron Hitag HT1-DCx Transponder Recognition, 3200

This function determines, either in single or in background mode, if there is a Mikron Hitag HT1-DCx transponder in reading distance to the antenna or not. If in background mode, each change of state is transmitted.

PC ⇒ RF System

**STX** „3200“ <m> **ETX** <c>

m Mode: „S“ = single mode, „B“ = background mode

RF System ⇒ PC (direct response for background and single mode request)

**ACK STX** „3200“ <xx> **ETX** <c>

x „00“= no Hitag transponder in reading distance, „01“= transponder could be recognized

In the case of a background response there is no ACK control character; a background response must be acknowledged on the part of the PC.

### 3.3.4 IPC02 (EM 4001 & 4002 / SID Unique) Transponder Recognition, 3300

This function determines, either in single or in background mode, if there is an IPC02 (EM V4002 or SID Unique) transponder in reading distance to the antenna or not. If in background mode, each change of state is transmitted.

PC ⇒ RF System

**STX** „3300“ <m> **ETX** <c>

m Mode: „S“ = single mode, „B“ = background mode

RF System ⇒ PC (direct response for background and single mode request)

**ACK STX** „3300“ <xx> **ETX** <c>

x „00“= no IPC02 (EM 400x) transponder in reading distance, „01“= transponder could be recognized

In the case of a background response there is no ACK control character; a background response must be acknowledged on the part of the PC.

### 3.3.5 IPC03 (EM 4050 / SID Titan) Transponder Recognition, 3400

This function determines, either in single or in background mode, if there is an IPC03 (EM V4050 or SID Titan) transponder in reading distance to the antenna or not. If in background mode, each change of state is transmitted.

PC ⇒ RF System

**STX** „3400“ <m> **ETX** <c>

m Mode: „S“ = single mode, „B“ = background mode

RF System ⇒ PC (direct response for background and single mode request)

**ACK STX** „3400“ <xx> **ETX** <c>

x „00“= no IPC03 (EM 4050) transponder in reading distance, „01“= transponder could be recognized

In the case of a background response there is no ACK control character; a background response must be acknowledged on the part of the PC.

### 3.3.6 Temic e5530 Transponder Recognition, 3500

This function determines, either in single or in background mode, if there is a Temic e5530 transponder in reading distance to the antenna or not. If in background mode, each change of state is transmitted.

PC ⇒ RF System

**STX** „3500“ <m> **ETX** <c>

m Mode: „S“ = single mode, „B“ = background mode

RF System ⇒ PC (direct response for background and single mode request)

**ACK STX** „3500“ <xx> **ETX** <c>

x „00“= no Temic e5530 transponder in reading distance, „01“= transponder could be recognized

In the case of a background response there is no ACK control character; a background response must be acknowledged on the part of the PC.

### 3.3.7 Temic e5550 Transponder Recognition, 3600

This function determines, either in single or in background mode, if there is a Temic e5550 transponder in reading distance to the antenna or not. If in background mode, each change of state is transmitted.

PC ⇒ RF System

**STX** „3600“ <m> **ETX** <c>

m Mode: „S“ = single mode, „B“ = background mode

RF System ⇒ PC (direct response for background and single mode request)

**ACK STX** „3600“ <xx> **ETX** <c>

x „00“= no Temic e5550 transponder in reading distance, „01“= transponder could be recognized

In the case of a background response there is no ACK control character; a background response must be acknowledged on the part of the PC.

## 3.4 Transponder Read Functions, 4xxx

### 3.4.1 Read Transponder (All Types), 4000

With the „Read transponder“ function all supported transponder types can be read on the condition that they have previously been written to with the „Write to transponder“ function (exception: read-only transponders). You can select between different response formats.

PC ⇒ RF System

**STX** „4000“ <aaaa> <nn> <f> **ETX** <c>

a Start address from where to read
n Number of bytes to be read
f Response format: „A“ = ASCII, „H“ = HEX, „D“ = decimal, „B“ = binary

RF System ⇒ PC

**ACK STX** „4000“ <d...d> **ETX** <c>

d Read data; the number of transmitted data characters depends on the number of the requested bytes and on the data format used. In ASCII, the number of returned characters is identical to the number requested, in the HEX format, the number is doubled, in the decimal format it is tripled, and in binary format 8 times as many characters are returned.

**If data are accessed that lie outside the transponder´s address range, an error message is returned!**

### 3.4.2 Read IPC01 (Philips PCF7930) Transponder, 4100

Reading of a IPC01 (Philips PCF7930) transponder. The IPC01 (Philips PCF7930) transponder can only be read block by block, i.e. in blocks of 16 bytes each. Since direct addressing for reading the blocks is not possible, block assignment must be performed by the user, e.g. by assigning block numbers in the first block byte. The function can be used in both single and background mode; a background response is only returned when a PCF7930 transponder could be read again.

PC ⇒ RF System

**STX** „4100“ <m> <nn> **ETX** <c>

m Read mode: „S“ = single mode, „B“ = background mode
n Number of blocks to be read, e.g. „01“ for 1 block, „05“ for 5 blocks, etc.

RF System ⇒ PC (direct response for background and single mode request)

**ACK STX** „4100“ <d..d> **ETX** <c>

d Read data; the number of transmitted characters depends on the number of the blocks to be read. 32 characters are transferred per block, with 2 characters being combined to one data byte (cf. the general structure of block commands, parameter transfer).

In the case of a background response there is no ACK control character; a background response must be acknowledged on the part of the PC.

### 3.4.3 Read Mikron Hitag Transponder (Block by Block), 4200

Reading of a Mikron Hitag HT1-DCx transponder. With this function the Hitag transponder is only read block by block, i.e. in blocks of 16 bytes each. The function can be used in both single and background mode; a background response is only returned when a Hitag transponder could be read again.

**Hitag transponders can be partly read-protected by a password; in the case of a Read request of such a protected block without password transfer, an error message is generated!**

PC ⇒ RF System

**STX** „4200“ <m> <aa> <ee> **ETX** <c>

m Read mode: „S“ = single mode, „B“ = background mode
a First block to be read, e.g. „07“ for seventh block or „0A“ for tenth block
e Last block to be read, e.g. „09“ for ninth or „0C“ for twelfth block

RF System ⇒ PC (direct response for background and single mode request)

**ACK STX** „4200“ <d..d> **ETX** <c>

d Read data; the number of transmitted characters depends on the number of the blocks to be read. 32 characters are transferred per block, with 2 characters being combined to one data byte (cf. the general structure of block commands, parameter transfer).

In the case of a background response there is no ACK control character; a background response must be acknowledged on the part of the PC.

### 3.4.4 Read Mikron Hitag Transponder (Page by Page), 4201

Reading of a Mikron Hitag HT1-DCx transponder. With this function the Hitag transponder is only read page by page, i.e. in pages of 4 bytes each. The function can be used in both single and background mode; a background response is only returned when a Hitag transponder could be read again.

**Hitag transponders can be partly read-protected by a password; in the case of a Read request of such a protected page without password transfer, an error message is generated!**

PC ⇒ RF System

**STX** „4200“ <m> <aa> <ee> **ETX** <c>

m Read mode: „S“ = single mode, „B“ = background mode
a First page to be read
e Last page to be read

RF System ⇒ PC (direct response for background and single mode request)

**ACK STX** „4200“ <d..d> **ETX** <c>

d Read data; the number of transmitted characters depends on the number of the pages to be read. 8 characters are transferred per page, with 2 characters being combined to one data byte (cf. the general structure of block commands, parameter transfer).

In the case of a background response there is no ACK control character; a background response must be acknowledged on the part of the PC.

### 3.4.5 Read IPC02 (EM 4001 & 4002 or SID Unique) Transponders respectively, 4300

Reading of an IPC02 (EM 4001 & 4002 or SID Unique) transponder respectively. All 64 bits of the transponder are returned, i.e. all data bits including line- and column-parity bits; a parity check is performed in the RF system. The 9 header bits are appended to the end of the data transmitted. The function can be used in both single and background mode; a background response is only returned when an IPC02 (EM 400x) transponder could be read again.

PC ⇒ RF System

**STX** „4300“ <m> **ETX** <c>

m Read mode: „S“ = single mode, „B“ = background mode

RF System ⇒ PC (direct response for background and single mode request)

**ACK STX** „4300“ <dddddddddddddddd> **ETX** <c>

d Read data; 16 characters are returned, i.e. 2 characters per read byte (cf. the general structure of block commands, parameter transfer).

In the case of a background response there is no ACK control character; a background response must be acknowledged on the part of the PC.

### 3.4.6 Read IPC02 (EM 4001 & 4002 or SID Unique) Serial Number respectively, 4301

Reading of an IPC02 (EM 400x or SID Unique) serial number respectively. Only the data bits relevant for the serial number are returned, i.e. 5 bytes. The parity check is performed in the RF system. The function can be used in both single and background mode; a background response is only returned when an IPC02 (EM 400x) transponder could be read again.

PC ⇒ RF System

**STX** „4301“ <m> **ETX** <c>

m Read mode: „S“ = single mode, „B“ = background mode

RF System ⇒ PC (direct response for background and single mode request)

**ACK STX** „4301“ <ddddddddddd> **ETX** <c>

d Read data; 10 characters are returned, i.e. 2 characters per read byte (cf. the general structure of block commands, parameter transfer).

In the case of a background response there is no ACK control character; a background response must be acknowledged on the part of the PC.

### 3.4.7 Read IPC03 (EM 4050 or SID Titan) respectively, 4400

Reading of an IPC03 (EM 4050 or SID Titan) transponder respectively. With this function the IPC03 (EM 4050) transponder is only read by double words, i.e. in blocks of 4 bytes each. The parity data are evaluated in the RF system and not output. The function can be used in both single and background mode; a background response is only returned when an IPC03 (EM V4050 or SID Titan) transponder could be read again. In the case of an incorrect LOGIN password, the RF system returns a read error.

**IPC03 (EM 4050) transponders can be partly read-protected by a password; in the case of a read request of such a protected block without password transfer, an error message is generated!**

PC ⇒ RF System

**STX** „4400“ <m> <aa> <ee> **ETX** <c>

m Read mode: „S“ = single mode, „B“ = background mode
a First block to be read, e.g. „07“ for seventh block or „0A“ for tenth block
e Last block to be read, e.g. „09“ for ninth or „0C“ for twelfth block

RF System ⇒ PC (direct response for background and single mode request)

**ACK STX** „4400“ <d..d> **ETX** <c>

d Read data; the number of transmitted characters depends on the number of the blocks to be read. 8 characters are transferred per block, with 2 characters being combined to one data byte (cf. the general structure of block commands, parameter transfer).

In the case of a background response there is no ACK control character; a background response must be acknowledged on the part of the PC.

### 3.4.8 Read Temic e5530 Transponder, 4500

Reading of a Temic e5530 transponder. Note that the RF system must know the current header size, the header itself, and the number of released blocks (of 4 bytes each). It must also know the bit rate and the encoding type of the transponder to be read. The RF system´s setting is performed on the basis of the corresponding configuration functions. All requested bytes are returned, starting with the 1st byte behind the header. If the number of requested bytes is equal to or higher than the number of bytes released in the transponder (= blocks * 4), the header is read, too. The function can be used in both single and background mode; a background response is only returned when a Temic e5530 transponder could be read again.

PC ⇒ RF System

**STX** „4500“ <m> <nn> **ETX** <c>

m Read mode: „S“ = single mode, „B“ = background mode
n Number of blocks to be read, e.g. „01“ for 1 block or „02“ for 2 blocks, etc.

RF System ⇒ PC (direct response for background and single mode request)

**ACK STX** „4500“ <d..d> **ETX** <c>

d Read data; the number of transmitted characters depends on the number of the blocks to be read. 8 characters are transferred per block, with 2 characters being combined to one data byte (cf. the general structure of block commands, parameter transfer).

In the case of a background response there is no ACK control character; a background response must be acknowledged on the part of the PC.

### 3.4.9 Read Temic e5550 Transponder, 4600

Reading of a Temic e5550 transponder. Note that the RF system must know the transponder configuration. The RF system´s setting is performed on the basis of the corresponding configuration functions. The requested number of blocks is returned, starting with the first block released on the transponder. In case more blocks are requested than are released on the transponder to be read, the RF system returns the error message „no TAG in field“. The function can be used in both single and background mode; a background response is only returned when a Temic e5550 transponder could be read again.

PC ⇒ RF System

**STX** „4600“ <m> <nn> **ETX** <c>

m Read mode: „S“ = single mode, „B“ = background mode
n Number of blocks to be read, e.g. „01“ for 1 block or „02“ for 2 blocks, etc.

RF System ⇒ PC (direct response for background and single mode request)

**ACK STX** „4600“ <d..d> **ETX** <c>

d Read data; the number of transmitted characters depends on the number of the blocks to be read. 8 characters are transferred per block, with 2 characters being combined to one data byte (cf. the general structure of block commands, parameter transfer).

In the case of a background response there is no ACK control character; a background response must be acknowledged on the part of the PC.

## 3.5 Transponder Write Functions, 5xxx

### 3.5.1 Write to Transponder (All Types), 5000

With the function „Write to transponder“ all writable transponder types can be written to. You can thus access a transponder byte by byte, independent of its organization and access type. You may have to read the transponder before accessing it. In case of writing beyond the transponder´s writable range, an error message is generated.

PC ⇒ RF System

**STX** „5000“ <aaaa> <f> <d..d> **ETX** <c>

a Start address from where to write. The lowest writable address is 0; for this, „0000“ must be transmittted. If you want to write, e.g., from address 12 onwards, „000C“ must be transmitted (cf. the general structure of block commands, parameter transfer).
f Format character; „A“ = ASCII, „H“ = HEX, „D“ = decimal
d Characters to be transmitted; the number of characters to be transmitted depends on the format used. In ASCII the characters are transmitted to the transponder 1:1, in the HEX format it is 2 characters, in the decimal format it is 3 characters that make up a byte to be written (cf. the general structure of block commands, parameter transfer).

RF System ⇒ PC

**ACK STX** „5000“ **ETX** <c>

Is returned if the transponder could be written to, otherwise, an error acknowledgement is returned.

### 3.5.2 Write to IPC01 (Philips PCF7930) Transponder Block by Block, 5100

With this function you can write to a IPC01 (Philips PCF7930) transponder block by block, i.e. by 16 bytes each. Blocks 0 and 1 are configuration blocks, i.e. writing to these blocks can damage the transponder in its functionality!

**If the transponder is in „write-protected mode“, an error message is generated, unless the correct password has been transferred!**

PC ⇒ RF System

**STX** „5100“ <bb> <ddddddddddddddddddddddddddddddd> **ETX** <c>

b Block number to be written to, e.g. „02“ for second or „07“ for seventh block
d Data to be written. For each byte to be written 2 characters must be transferred (cf. the general structure of block commands, parameter transfer).

RF System ⇒ PC

**ACK STX** „5100“ **ETX** <c>

Is returned if the transponder could be written to, otherwise, an error acknowledgement is returned.

### 3.5.3 Write to IPC01 (Philips PCF7930) Transponder Byte by Byte, 5101

With this function you can write to a IPC01 (Philips PCF7930) transponder byte by byte within a block. Blocks 0 and 1 are configuration blocks, i.e. writing to these blocks can damage the transponder in its functionality!

**If the transponder is in „write-protected mode“, an error message is generated, unless the correct password has been transferred!**

PC ⇒ RF System

**STX** „5101“ <bb> <aa> <nn> <d..d> **ETX** <c>

b Block number to be written to, e.g. „02“ for second or „07“ for seventh block
a Byte start address (0..15) within a block; if you want to write, e.g., from address 10 onwards, „0A“ must be transmitted as parameter (cf. the general structure of block commands, parameter transfer).
n Number of bytes to be written from start address onwards. You can only write within one block, otherwise an error message is returned.
d Data to be written. The number of characters to be transmitted depends on the number of bytes to be written; for each byte to be written 2 characters must be transferred (cf. the general structure of block commands, parameter transfer).

RF System ⇒ PC

**ACK STX** „5101“ **ETX** <c>

Is returned if the transponder could be written to, otherwise, an error acknowledgement is returned.

### 3.5.4 Write to Mikron Hitag HT1-DCx Transponder Block by Block, 5200

With this function you can write to a Mikron Hitag transponder block by block, i.e. by 16 bytes each. Blocks 0 and 1 are configuration blocks, i.e. writing to these blocks can damage the transponder in its functionality!

**If the transponder is in „write-protected mode“, an error message is generated, unless the correct password has been transferred!**

PC ⇒ RF System

**STX** „5200“ <bb> <ddddddddddddddddddddddddddddddd> **ETX** <c>

b Block number to be written to, e.g. „02“ for second or „07“ for seventh block
d Data to be written. For each byte to be written 2 characters must be transferred (cf. the general structure of block commands, parameter transfer).

RF System ⇒ PC

**ACK STX** „5200“ **ETX** <c>

Is returned if the transponder could be written to, otherwise, an error acknowledgement is returned.

### 3.5.5 Write to Mikron Hitag HT1-DCx Transponder Page by Page, 5201

With this function you can write to a Mikron Hitag transponder page by page, i.e. in blocks of 4 bytes each. Pages 0 to 7 are configuration pages, i.e. writing to these pages can damage the transponder in its functionality!

**If the transponder is in „write-protected mode“, an error message is generated, unless the correct password has been transferred!**

PC ⇒ RF System

**STX** „5201“ <aa> <nn> <d..d> **ETX** <c>

a First page to be written to. If you want to write, e.g., from page 34 onwards, „22“ must be transmitted as parameter (cf. the general structure of block commands, parameter transfer).
n Number of pages to be written from start address onwards. You can write to max. 4 pages.
d Data to be written. The number of characters to be transmitted depends on the number of pages to be written; for each page 8 characters must be transferred, with 2 characters representing one byte to be written (cf. the general structure of block commands, parameter transfer).

RF System ⇒ PC

**ACK STX** „5201“ **ETX** <c>

Is returned if the transponder could be written to, otherwise, an error acknowledgement is returned.

### 3.5.6 Write to IPC03 (EM V4050 or SID Titan) Transponders Block by Block (Word by Word), 5400

With this function you can write to an IPC03 (EM V4050 or SID Titan) transponder respectively block by block, i.e. in blocks of 4 bytes each. Note that this function cannot be used to write to function blocks 1 and 2, since for this purpose separate requests are provided!

PC ⇒ RF System

**STX** „5400“ <bb> <dddddddd> **ETX** <c>

b Block number to be written to. If you want to write to, e.g., block 5, „05“ must be transmitted as parameter (cf. the general structure of block commands, parameter transfer).
d Data to be written. For each block 8 characters must be transferred, with 2 characters representing one byte to be written (cf. the general structure of block commands, parameter transfer).

RF System ⇒ PC

**ACK STX** „5400“ **ETX** <c>

Is returned if the transponder could be written to, otherwise, an error acknowledgement is returned.

### 3.5.7 Write to Temic e5550 Transponder without Lock Bit, 5600

With this function you can write to a Temic e5550 transponder block by block (with 4 bytes per block). The lock bit is not set! Blocks 1 to 7 can be used. The configuration block can only be written to with a special configuration instruction.

**If the transponder is in „write-protected mode“, an error message is generated, unless the correct password has been transferred!**

PC ⇒ RF System

**STX** „5600“ <bb> <dddddddd> **ETX** <c>

b Block number, e.g. „02“, if block 2 is to be written to, or „05“ for block 5
d Data to be written. 8 characters are transferred, with 2 characters representing one byte to be written (cf. the general structure of block commands, parameter transfer).

RF System ⇒ PC

**ACK STX** „5600“ **ETX** <c>

Is returned if the transponder could be written to, otherwise, an error acknowledgement is returned.

### 3.5.8 Write to Temic e5550 Transponder with Lock Bit, 5601

With this function you can write to a Temic e5550 transponder block by block (with 4 bytes per block), just as in function 5600. **In addition, the lock bit of the block to be written to is set here, so that it cannot be changed subsequently.** Blocks 1 to 7 can be used. Configuration block 0 can be written to with a special format instruction.

**If the transponder is in „write-protected mode“, an error message is generated, unless the correct password has been transferred!**

PC ⇒ RF System

**STX** „5601“ <bb> <dddddddd> **ETX** <c>

b Block number, e.g. „02“, if block 2 is to be written to, or „05“ for block 5
d Data to be written. 8 characters are transferred, with 2 characters representing one byte to be written (cf. the general structure of block commands, parameter transfer).

RF System ⇒ PC

**ACK STX** „5601“ **ETX** <c>

Is returned if the transponder could be written to, otherwise, an error acknowledgement is returned.

## 3.6 Transponder-specific Functions, 6xxx

### 3.6.1 Activate Password Mode (General Write/Read Functions), 6000

With this function you can write to password-protected transponders or read them, with the exception of the Mikron HT1-DC3. You may use a password of any length for the function; missing bytes are exchanged for zeros, excess bytes are cut off. The transponder in the respective field is recognized and the password applied to it. The password mode remains active until it is either deactivated or a new mode is activated with another password.

**CAUTION: The password transferred via interface can e.g. be intercepted by a „Line Listener".**

**The Password function refers to both the general and the specific write/read functions.**

PC ⇒ RF System

**STX** „6000" <f> <p..p> **ETX** <c>

f Format character for password transfer; „A" = ASCII, „H" = HEX
p Password data; the number of characters to be transferred depends on the format used (cf. the general structure of block commands, parameter transfer).

RF System ⇒ PC

**ACK STX** „6000" **ETX** <c>

Is returned when the password has been received by the RF system.

The following password sizes are determined:

| | |
|---|---|
| IPC01 (Philips PCF7930) | 7 bytes |
| GEMPLUS | 7 bytes |
| IPC03 (EM V4050) | 4 bytes |
| SID Titan | 4 bytes |
| Temic e5550 | 4 bytes |

### 3.6.2 Deactivate Password Mode (General Write/Read Functions), 6001

Switching off password mode. Afterwards, you can no longer access protected data.

PC ⇒ RF System

**STX** „6001" **ETX** <c>

RF System ⇒ PC

**ACK STX** „6001" **ETX** <c>

During response of the RF system no other parameters are transferred.

### 3.6.3 Write New Password (General), 6002

To overwrite an existing password you must first have activated the password mode with the current password, otherwise this function returns an error message.

PC ⇒ RF System

**STX** „6002“ <f> <p..p> **ETX** <c>

f Format character for password transfer; „A“ = ASCII, „H“ = HEX
p Password data; the number of characters to be transferred depends on the format used (cf. the general structure of block commands, parameter transfer).

RF System ⇒ PC

**ACK STX** „6002“ **ETX** <c>

Is returned when the new password was successfully written to the transponder.

### 3.6.4 Set IPC01 (Philips PCF7930) Read Pointer, 6100

With this function you can set the IPC01 (Philips PCF7930) read pointers, i.e. determine the area (in blocks) which can be subsequently read by a Read request.

PC ⇒ RF System

**STX** „6100“ <aa> <ee> **ETX** <c>

a First block to be read, e.g. „00“ for block 0 or „02“ for block 2, etc.
e Last block to be read, e.g. „05“ for block 5 or „07“ for block 7, etc.

RF System ⇒ PC

**ACK** STX „6100“ **ETX** <c>

Is returned if the pointers could be set.

### 3.6.5 Transfer IPC01 (Philips PCF7930) Password via Security Data to the RF System, 6101

This function sets the IPC01 (Philips PCF7930) password mode for all Write requests to the transponder. To do so, the actual password is combined with the random number (as defined by function 1007) according to a certain algorithm and transferred to the RF system. Thus it is not possible to determine the password by „listening“ to the serial interface.

PC ⇒ RF System

**STX** „6101“ <ssssssssssssssss> **ETX** <c>

s Security data, consisting ot 16 characters, i.e. 2 characters make up 1 data byte (cf. the general structure of block commands, parameter transfer).

RF System ⇒ PC

**ACK STX** „6101“ **ETX** <c>

Return after successful data transmission.

### 3.6.6 Deactivate IPC01 (Philips PCF7930) Password Mode, 6102

With this function the password mode for the IPC01 (Philips PCF7930) transponder can be deactivated again, i.e. further Write requests to password-protected transponders are acknowledged by an error message.

PC ⇒ RF System

**STX** „6102“ **ETX** <c>

RF System ⇒ PC

**ACK STX** „6102“ **ETX** <c>

Return after successful deactivation of the password mode.

### 3.6.7 Write New IPC01 (Philips PCF7930) Password to TAG via Security Data, 6103

This function allows for the writing of a (new) password to the IPC01 (Philips PCF7930) transponder by using data encoding. To do so, the actual password is combined with the random number (as defined by function 1007) according to a certain algorithm and transferred to the RF system. Thus it is not possible to determine the password by „listening“ to the serial interface.

PC ⇒ RF System

**STX** „6103“ <ssssssssssssssss> **ETX** <c>

s Security data, consisting ot 16 characters, i.e. 2 characters make up 1 data byte (cf. the general structure of block commands, parameter transfer).

RF System ⇒ PC

**ACK STX** „6103“ **ETX** <c>

Return after successful writing of the password.

### 3.6.8 Mikron Hitag ID Request, 6200

This function determines the ID of the Mikron Hitag transponder which is in reading distance to the antenna.

PC ⇒ RF System

**STX** „6200“ **ETX** <c>

RF System ⇒ PC

**ACK STX** „6200“ <iiiiiiii> **ETX** <c>

i Mikron Hitag ID; 8 characters are transferred, with 2 characters being combined to one byte each (cf. the general structure of block commands, parameter transfer).

### 3.6.9 Write to IPC03 (EM V4050 / SID Titan) Protection Word, 6400

With this function the protection word of an IPC03 (EM 4050 or SID Titan) transponder respectively can be written to. Before writing to the protection word the password must be transferred via function 6000!

PC ⇒ RF System

**STX** „6400“ <ll> <ff> <ee> <aa> **ETX** <c>

```
l     Last word address (block address) which is write-protected
      e.g. „0A“ for word address 0Ah
f     First word address (block address) which is write-protected
      e.g. „09“ for word address 09h
e     Last word (block) which is read-protected via password
      e.g. „1C“ for word address 1Ch
a     First word (block) which is read-protected via password
      e.g. „03“ for word address 03h
```

RF System ⇒ PC

**ACK STX** „6400“ **ETX** <c>

### 3.6.10 Write to IPC03 (EM V4050 / SID Titan) Control Word, 6401

With this function the control word of an IPC03 (EM 4050 or SID Titan) transponder respectively can be written to. Before writing to the control word the password must be transferred via function 6000!

PC ⇒ RF System

**STX** „6401“ <nnnn> <ee> <aa> **ETX** <c>

```
n     „0000“= password check off, no read after write
      „0001“= password check on, no read after write
      „0002“= password check off, read after write
      „0003“= password check on, read after write
e     Last word (block) which is output permanently
a     First word (block) which is output permanently
```

RF System ⇒ PC

**ACK STX** „6401“ **ETX** <c>

### 3.6.11 Temic e5530 Reader Configuration, 6500

In order to be able to read the Temic e5530 transponder, the RF system must know the transponder´s configuration. This includes the bit rate and the encoding of the transponder data. The default settings are bit rate = RF/64 and bi-phase encoding.

PC ⇒ RF System

**STX** „6500“ <kkkkkkkk> **ETX** <c>

k Configuration; the configuration consists of 32 bits, i.e. of 4 bytes, i.e. 8 characters are to be transmitted to the reader (cf. the general structure of block commands, parameter transfer).

The following settings are possible:

| Bit 20 | Bit 19 | Bit 18 | Bit rate |
|---|---|---|---|
| 0 | 1 | 0 | RF/32 |
| 0 | 1 | 1 | RF/40 |
| 1 | 0 | 0 | RF/50 |
| 1 | 0 | 1 | RF/64 |

| Bit 16 | Bit 15 | Encoding |
|---|---|---|
| 0 | 1 | Manchester |
| 1 | 0 | Bi-phase |

No other bits are evaluated at the moment!

PC ⇒ RF System

**ACK** STX „6500“ **ETX** <c>

Positive response, if the transferred configuration has been received and set.

### 3.6.12 Temic e5530 Header, 6501

In order to be able to read the Temic e5530 transponder, the RF system must know the header size, the header itself, and the number of blocks released in the transponder. The following function transmits these data to the RF system:

PC ⇒ RF System

**STX** „6501“ <gg> <hhhh> <nn> **ETX** <c>

g Header size; „08“ = 8-bit header, „10“ = 16-bit header
h Header information, consisting of 4 characters (cf. the general structure of block commands, parameter transfer).
n Number of blocks released in the transponder

RF System ⇒ PC

**ACK STX** „6501“ **ETX** <c>

### 3.6.13 Temic e5550 Reader Configuration, 6600

In order to be able to read the Temic e5550 transponder, the RF system must know the transponder´s configuration. The default setting is bit rate = RF/64.

PC ⇒ RF System

**STX** „6600“ <kkkkkkkk> **ETX** <c>

k Configuration; the configuration consists of 32 bits, i.e. of 4 bytes, i.e. 8 characters are to be transmitted to the reader (cf. the general structure of block commands, parameter transfer).

The following settings are possible:

| Bit 20 | Bit 19 | Bit 18 | Bit rate |
|---|---|---|---|
| 0 | 1 | 0 | RF/32 |
| 0 | 1 | 1 | RF/40 |
| 1 | 0 | 0 | RF/50 |
| 1 | 0 | 1 | RF/64 |

No other bits are evaluated at the moment!

PC ⇒ RF System

**ACK STX** „6500“ **ETX** <c>

Positive response, if the transferred configuration has been received and set.

### 3.6.14 Configure Temic e5550 Transponder, 6601

With this function you can configure the Temic e5550 transponder (write to block 0). The bit values should be checked in the e5550 transponder specification. In addition you may protect block 0 from being re-written by using the lock bit.

PC ⇒ RF System

**STX** „6601“ <ll> <kkkkkkkk> **ETX** <c>

l Lock-bit flag: „00“ = do not set lock bit, „01“ = set lock bit
k Configuration; the configuration consists of 32 bits, i.e. of 4 bytes, i.e. 8 characters are to be transmitted to the reader (cf. the general structure of block commands, parameter transfer).

RF System ⇒ PC

**ACK STX** „6601“ **ETX** <c>

## 3.7 Error Messages

### 3.7.1 Response of an Error Number after a Request

A negative acknowledgement has the following format:

**SYN STX** <ffff> <ee> **ETX** <c>

f Function number the request of which has caused the error message
e Error code; 2 characters are transferred, their combination makes up a 1-byte error number (cf. the general structure of block commands, parameter transfer).

### 3.7.2 Error numbers

| | |
|---|---|
| **„01“** | Check sum errors |
| **„02“** | Invalid function number |
| **„03“** | Function not supported |
| **„04“** | Syntax error in parameter |
| **„05“** | Invalid parameter value |
| **„10“** | TAG write/read error |
| **„11“** | Password error |

# One Company, Two Divisions.

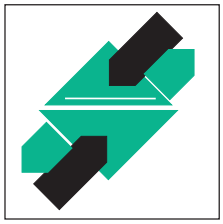
## Factory Automation Division

### Product Range

- Binary and analog sensors
- in different technologies
  - Inductive and capacitive sensors
  - Magnetic sensors
  - Ultrasonic sensors
  - Photoelectric sensors
- Incremental and absolute rotary encoders
- Counters and control equipment
- ID systems
- AS-Interface

### Areas of Application

- Machine engineering
- Conveyor or transport
- Packaging and bottling
- Automobile industry



## Process Automation Division

### Product Range

- Signal conditioners
- Intrinsically safe interface modules
- Remote process interface
- Intrinsically safe field bus solutions
- Level control sensors
- Process measuring and control systems engineering at the interface level
- Intrinsic safety training

### Areas of Application

- Chemical industry
- Industrial and community sewage
- Oil, gas and petrochemical industry
- PLC and process control systems
- Engineering companies for process systems

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## Your direct connection


**Factory Automation Tel. (0621) 776-1111**
**e-mail: fa-info@de.pepperl-fuchs.com**

**Process Automation Tel. (0621) 776-2222**
**e-mail: pa-info@de.pepperl-fuchs.com**

**USA Headquarter**
Pepperl+Fuchs Inc. · 1600 Enterprise Parkway
Twinsburg, Ohio 44087 · Cleveland-USA
Tel. (330) 4 25 35 55 · Fax (330) 4 25 46 07

**Asia Pacific Headquarter**
Pepperl+Fuchs Pte Ltd. · P+F Building
18 Ayer Rajah Crescent · Singapore 139942
Tel. (65) 7 79 90 91 · Fax (65) 8 73 16 37

**Worldwide Headquarter**
Pepperl+Fuchs GmbH · Königsberger Allee 87
68307 Mannheim · Germany
Tel. (06 21) 7 76-0 · Fax (06 21) 7 76-10 00
http://www.pepperl-fuchs.com ·
e-mail: info@de.pepperl-fuchs.com


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