SIEMENS

SIMATIC Ident

RFID systems
SIMATIC
RF650R/RF680R/RF685R

Configuration Manual

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Legal information

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This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

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indicates that death or severe personal injury **may** result if proper precautions are not taken.

⚠ CAUTION
indicates that minor personal injury can result if proper precautions are not taken.

NOTICE
indicates that property damage can result if proper precautions are not taken.

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The product/system described in this documentation may be operated only by **personnel qualified** for the specific task in accordance with the relevant documentation, in particular its warning notices and safety instructions. Qualified personnel are those who, based on their training and experience, are capable of identifying risks and avoiding potential hazards when working with these products/systems.

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1 Introduction

Purpose of this document

This manual contains all the information required for the parameter assignment and commissioning of the RF650R, RF680R and RF685R readers of the SIMATIC RF600 system.

This manual is intended for:

- Commissioning engineers
- Configuration engineers
- Service technicians

Scope of validity of this document

This documentation is valid for all supplied versions of the SIMATIC RF650R/RF680R/RF685R readers and describes the delivery state as of 10/2016 and firmware version V3.0.

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Documentation classification

You will find further information on the properties, technical specifications and possible applications of the RF650R, RF680R and RF685R readers in the "SIMATIC RF600 System Manual (https://support.industry.siemens.com/cs/ww/en/view/22437600)".

You will find more information on operating the readers via communications modules (PROFIBUS operation) in the manuals of the relevant communications module (https://support.industry.siemens.com/cs/ww/en/ps/15105/man).

You will find further information on the Ident profile and Ident blocks based on the "Proxy Ident Function Block" protocol and described in this manual in the manual "Ident profile and Ident blocks, standard function for Ident systems (https://support.industry.siemens.com/cs/ww/en/view/106368029)".

For S7 programmers who create their own command and acknowledgment frames, the communications rules and frames that are required can be found in the Appendix in the section "Command and acknowledgement frames (Page 329)". XML programmers will find the required communications rules and frames in the section "Programming via XML interface (Page 185)".

History

The following edition(s) of the configuration manual have been published up to now:

Edition	Note
10/2014	First edition
07/2015	Revised and expanded edition Expansion of the documentation by the following: • PROFIBUS connection • MRP and SNMP capability • Capability of processing transponders of the ISO 18000-6B standard
10/2015	Revised and expanded edition
01/2016	Revised and expanded edition
10/2016	Revised and expanded edition Expansion of the documentation by the following: • New functions of the WBM V3.0 • Functions for Rockwell controllers • OPC UA interface • Ethernet IP interface

Abbreviations and naming conventions

The following terms/abbreviations are used synonymously in this document:

Reader	Write/read device (SLG)
Transponder, tag	Data carrier, mobile data storage, (MDS)
Communications module (CM)	Interface module (ASM)

Security information

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Additionally, Siemens’ guidance on appropriate security measures should be taken into account. For more information about industrial security, please visit
Link: (http://www.siemens.com/industrialsecurity)

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To stay informed about product updates, subscribe to the Siemens Industrial Security RSS Feed under
Link: (http://www.siemens.com/industrialsecurity).

2 Notes on security

Recommendations for secure handling of the reader and WBM

Keep to the following security recommendations when working with the reader and WBM (Web Based Management) to prevent unauthorized access to the device:

- Enable user management and create new profiles.
- Before making the device available, change the default passwords for the standard profiles "Administrator" and "User".
- Use strong passwords.
- You should not use the same passwords for different user names or systems.
- Enable only the services (communications protocols) that will actually be used on the device and also the installed interfaces/ports. Unused ports could be used to access the network downstream from the device.
- The configuration files are available in XML format for simple use. Make sure that the configuration files outside the device are suitably protected. You can, for example, encrypt the files, store them at a safe location and transfer them only via secure communications channels.
- Do not connect the device directly to the Internet. Operate the device within a protected network area.
- The firmware itself is signed and encrypted. This ensures that only authentic firmware can be downloaded to the device.
- Check for non-secure protocols activated on the device. While some protocols such as HTTPS are secure, others such as HTTP were not developed for this purpose. With non-secure protocols, suitable security measures must be taken to prevent unauthorized access to the device/network.
- Check regularly that the device complies with these recommendations and /or other internal security policies.
- Evaluate your plant as a whole in terms of security. Use the cell protection concept with suitable products.

Description 3

3.1 Properties of the UHF readers

Area of application

The UHF readers SIMATIC RF650R, RF680R and RF685R are intended for use in logistics and in automation. The RF680R and RF685R readers are intended for use in automation environments, for example on a production line but are equally suitable for applications in logistics. To meet these requirements, the readers were equipped with a high transmit power and degree of protection (IP65). For applications in logistics with less demanding requirements relating to the protection class and transmit power, the RF650R reader is a cost-effective alternative. All readers are equipped with extensive diagnostics options and can process ISO 18000-63 and ISO 18000-6B transponders.

The RF685R has one special feature with its internal, adaptive antenna - just as with the antenna RF680A. This significantly increases the reliability of read and write actions even under difficult radio conditions.

The RF680R and RF685R readers are either integrated without problems in SIMATIC S7 automation systems via an integrated PROFINET connector or via the RS-422 interface and the ASM 456 communications module via PROFIBUS. Suitable programming blocks are available. The connection to PC environments and Rockwell controllers is via Ethernet using TCP/IP and the XML protocol, OPC UA or Ethernet/IP. A second Ethernet interface (both M12) can be used for diagnostics during operation so that the connection to the higher-level system does not need to be interrupted or for PROFINET bus/ring structures.

The RF650R has one Ethernet interface (RJ-45). This is used both to connect to PC systems as well as for configuration and diagnostics and it can also be used during operation. Higher-level software communicates with the reader using TCP/IP, the XML protocol or OPC UA.

The WBM (Web Based Management) allows commissioning, configuration and diagnostics of all three devices using an Internet browser. This makes additional updates and installation of configuration and diagnostics software unnecessary.

Characteristics

The following characteristics distinguish the SIMATIC RF650R, RF680R and RF685R UHF readers:

Table 3- 1 Characteristics of the readers

Characteristics	RF650R	RF680R	RF685R
Antennas	4 x external antenna connectors		1 x internal, adaptive antenna 1 x external antenna connector
Transmit power (max.)	4000 mW [1]		
Digital inputs/outputs	4 x digital inputs and 4 x digital outputs		
RS-422 interface	--	1 x plug M12 8-pin	
PROFIBUS connection via CM	--	ASM 456 (115.2 kbps)	
Ethernet interface	1 x Industrial Ethernet, RJ-45	2 x Industrial Ethernet, M12	
Transmission speed (max.)	100 Mbps	100 Mbps	
Degree of protection	IP30	IP65	
Configuration/diagnostics options	WBM (browser)	WBM (browser) STEP 7 (S7)	
Interfaces to PC/controller	XML interface (TCP/IP with XML protocol)	XML interface SIMATIC interface (TCP/IP with XML protocol, OPC UA, Ethernet/IP or PROFINET capability)	

[1] The maximum transmit power is restricted depending on the country of deployment.

Note

Minimum supported block size of an S7 controller

When operating with an S7 controller, make sure that only blocks with a minimum size of ≥ 16 KB are supported.

NOTICE

IRT is not supported

Note that the RF680R/RF685R readers do not support IRT (Isochronous Real Time). The readers can also not function as IRT conductors (e.g. in a bus structure).

The readers can be configured as clients in MRP rings. Network diagnostics via SNMP is supported by the readers.

NOTICE
Operation in VLANs Note that the readers cannot be operated in VLANs whose ID is ≠ 0.

Certificates

The readers RF680R and RF685R support the following certificates:

RF680R/RF685R certificates (https://support.industry.siemens.com/cs/ww/en/ps/15088/cert)

Integration

The following figures show examples of some of the of the integration options of the readers. Note that in all examples, the connection of the readers RF680R and RF685R can be via a SIMATIC controller both via Industrial Ethernet / PROFINET and via PROFIBUS.

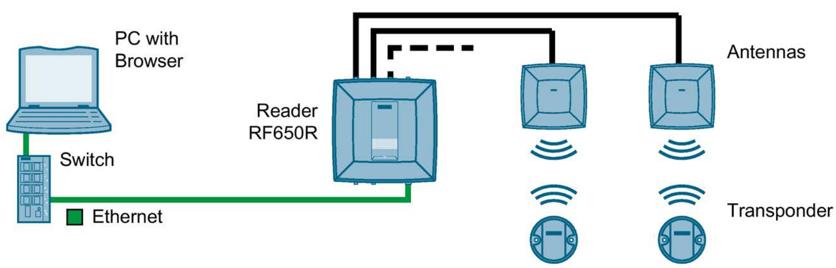


Figure 3-1 RF650R reader in an IT environment

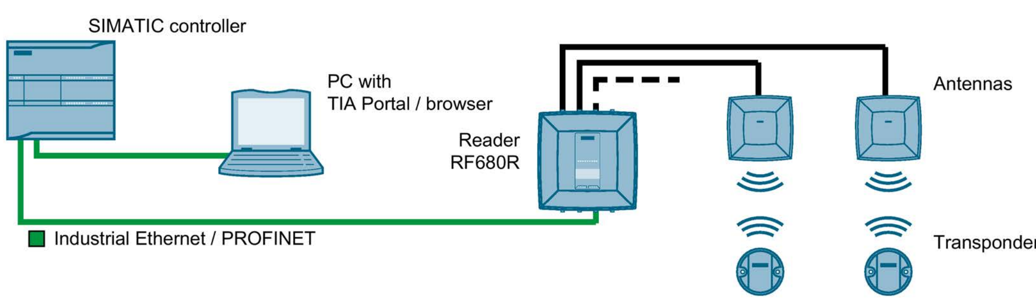


Figure 3-2 RF680R reader in an automation environment (PROFINET)

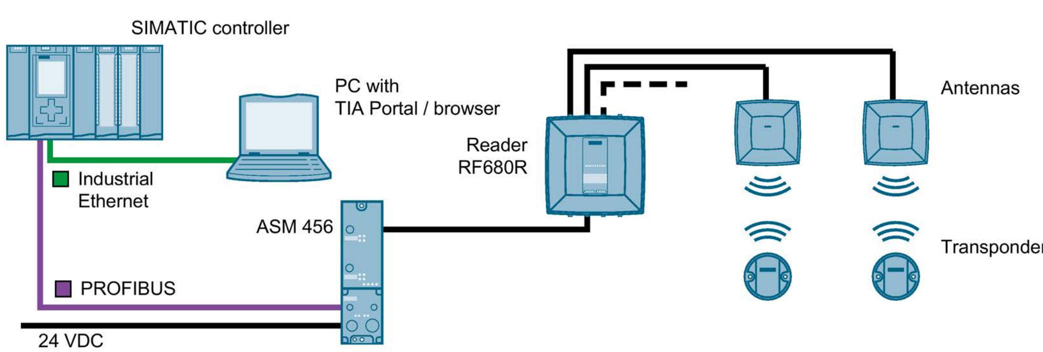


Figure 3-3 RF680R reader in an automation environment (PROFIBUS)

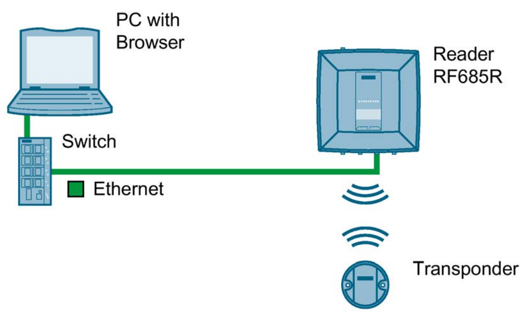


Figure 3-4 RF685R in an IT environment, without external antenna

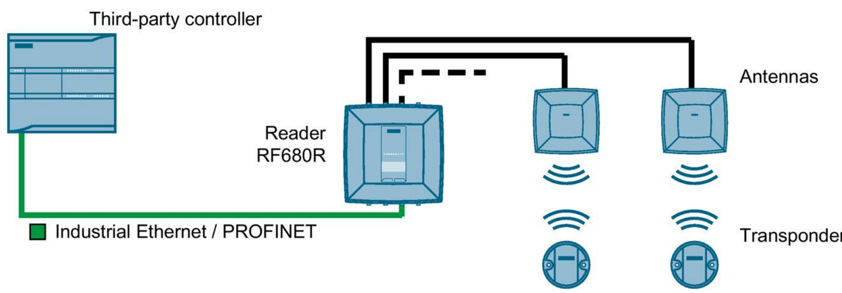


Figure 3-5 RF680R reader in an automation environment (PROFINET) and third-party controller used.

All 3 readers can be integrated in an IT environment (XML, OPC UA). The RF68xR readers can be integrated both in an IT and in an automation environment (S7).

The RF685R reader can also be operated without external antennas.

3.2 User-specific procedures

The SIMATIC RF650R, RF680R or RF685R UHF readers are preconfigured when shipped and can be put into operation without any further configuration. When shipped from the factory, the readers are preconfigured as follows:

- First antenna connector occupied: RF640A
- Transmit power: 20 dBm
- IP address:
  - RF650R: 192.168.0.254
  - RF680R/RF685R: DHCP

As described in the previous section, the SIMATIC UHF readers RF650R, RF680R and RF685R are designed for different environments and requirements.

If you operate the RF680R and RF685R readers in an automation environment, they are configured and programmed from the perspective of an S7 user. Integration in third-party controllers (e.g. Rockwell controllers) is, of course, also possible. In this case the configuration, engineering and programming is performed from the point of view of a

Rockwell user. If you operate the RF650R, RF680R and RF685R readers in an XML environment, they are configured and programmed from the perspective of an XML user. If you operate the RF650R, RF680R and RF685R readers in an OPC UA environment, they are configured and programmed from the perspective of an OPC UA user.

If you want to adapt the readers to your requirements, we recommend the following user-specific procedure:

Procedure as S7 user

1. Connect the hardware

   You will find information on this in the section "Connect the hardware (Page 23)".
2. Assign the IP address / device name

   You will find information on this in the section "Assigning the IP address / device name with the PST (Page 28)" or "Assigning the IP address / device name with STEP 7 (Page 30)".
3. Configure reader and if applicable communications module

   You will find information on this in the section "Configuration via STEP 7 (PROFINET device) (Page 35)" and "Configuring with the WBM (Page 41)".
4. Configure / program reader commands

   You will find information on this in the section "Programming via SIMATIC controller (Page 109)".

Procedure as Rockwell user

1. Connect the hardware

   You will find information on this in the section "Connect the hardware (Page 23)".
2. Assign the IP address / device name

   You will find information on this in the section "Assigning the IP address / device name with the PST (Page 28)" or "Assigning an IP address via DHCP (Page 33)".
3. Configure the reader

   You will find information on this in the sections "Configuring with Studio 5000 Logix Designer (Page 39)" and "Configuring with the WBM (Page 41)".
4. Configure / program reader commands

   You will find information on this in the section "Programming via Rockwell controller (Page 155)".

Procedure as XML user

1. Connect the hardware

   You will find information on this in the section "Connect the hardware (Page 23)".
2. Assign the IP address / device name

   You will find information on this in the section "Assigning the IP address / device name with the PST (Page 28)".
3. Configure the reader

   You will find information on this in the section "Configuring with the WBM (Page 41)".
4. Program reader commands

   You will find information on this in the section "Programming via XML interface (Page 185)".

Procedure as an OPC UA user

1. Connect the hardware

   You will find information on this in the section "Connect the hardware (Page 23)".
2. Assign the IP address / device name

   You will find information on this in the section "Assigning the IP address / device name with the PST (Page 28)".
3. Configure the reader

   You will find information on this in the section "Configuring with the WBM (Page 41)".
4. Program reader commands

   You will find information on this in the section "Programming via the OPC UA interface (Page 277)".

Note

Synchronize reader time of day

Note that the reader clock corresponds to UTC time and cannot be adapted to time zones. You can, however, transfer the local time of day stored in your operating system to the reader. This time of day is retained on the reader for at least two days even without a power supply. If the reader is disconnected from the power supply for a longer period, the time will need to be reset. This can be done manually via the WBM, using NTP or in a program.

Later in the document, these symbols will help your orientation and will show you whether the section is of interest to you or not. Only the sections with user-specific content, in other words content that is tool/interface-specific contain these symbols. Sections without these symbols are general and relevant for both areas of application.

Commissioning 4

Note

Commissioning the readers in PROFIBUS operation

You will find information on commissioning the RF680R and RF685R readers via a communications module (PROFIBUS operation) in the manual of the relevant communications module.

4.1 Important notes on using the device

Safety notices on the use of the device

The following safety notices must be adhered to when setting up and operating the device and during all work relating to it such as installation, connecting up, replacing devices or opening the device.

General notes

WARNING

Safety extra low voltage

The equipment is designed for operation with Safety Extra-Low Voltage (SELV) by a Limited Power Source (LPS). (This does not apply to 100 V ... 240 V devices.)

This means that only SELV / LPS complying with IEC 60950-1 / EN 60950-1 / VDE 0805-1 must be connected to the power supply terminals. The power supply unit for the equipment power supply must comply with NEC Class 2, as described by the National Electrical Code (r) (ANSI / NFPA 70).

There is an additional requirement if devices are operated with a redundant power supply:

If the equipment is connected to a redundant power supply (two separate power supplies), both must meet these requirements.

WARNING

Opening the device

D not open the device when energized.

NOTICE
Alterations not permitted
Alterations to the devices are not permitted. If this is not adhered to, the radio approvals, the relevant country approvals (e.g. CE or FCC) and the manufacturer's guarantee are invalidated.

Overvoltage protection

NOTICE
Protection of the external 24 VDC voltage supply
If the module is supplied via extensive 24 V supply lines or networks, interference by strong electromagnetic pulses on the supply lines is possible, e.g. from lightning or the switching of large loads.
The connector for the 24 VDC external power supply is not protected against strong electromagnetic pulses. Make sure that any cables liable to lightning strikes are fitted with suitable overvoltage protection.

Repairs

WARNING
Repairs only by authorized qualified personnel
Repairs may only be carried out by authorized qualified personnel. Unauthorized opening of and improper repairs to the device may result in substantial damage to equipment or risk of personal injury to the user.

4.2 Connect the hardware

Prior to installation and commissioning

NOTICE
Read the manual of the controller you using
Prior to installation, connecting up and commissioning, read the relevant sections in the manual of the controller you are using. When installing and connecting up, keep to the procedures described in the manual.

NOTICE
Installation/removal with the power off
Wire up the PC or controller and modules to be connected only when the power is off. Make sure that the power supply is turned off when installing/uninstalling the devices.

Procedure

Follow the steps below to connect a reader via Ethernet:

1. Install the reader.
2. Connect the reader to the PC or switch or the controller using an Ethernet cable.
   – For the Ethernet connection to the RF650R reader, use a connecting cable with an RJ-45 plug at both ends.
   – For the Ethernet connection of the RF680R/RF685R reader, use a connecting cable with an M12 plug (4-pin).
3. If necessary, connect the reader to one or more external antennas.
4. Connect the reader to the power supply using the connecting cable.

The reader is ready for operation when the "R/S" LED is lit/flashes green. If the "R/S" LED is flashing, the reader is waiting for a connection. If the "R/S" LED is lit constantly, the reader is connected to the controller or PC.

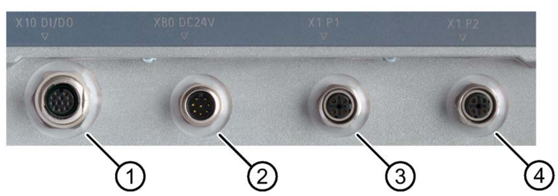
Follow the steps below to connect a reader via PROFIBUS:

1. Install the reader.
2. Using a reader connecting cable connect the RF680R/RF685R reader to the communications module.
3. Connect the communications module to the controller using a PROFIBUS cable.
4. If necessary, connect the reader to one or more external antennas.
5. Connect the communications module to the power supply using the connecting cable.

The reader is ready for operation when the "R/S" LED is lit/flashes green. If the "R/S" LED is flashing, the reader is waiting for a connection. If the "R/S" LED is lit constantly, the reader is connected to the controller or PC.

Pre-assembled cables therefore permit the ideal and simple connection of the reader. You will find more information on the cables and wide-range power supply unit in the catalog " ID 10 (https://w3app.siemens.com/mcms/infocenter/content/en/Seiten/order_form.aspx?nodeKey=key_9180440&infotype=1)".

Table 4- 1 Interfaces and antenna connectors of the readers

Picture	Description
	Interfaces of the RF680R/RF685R readers ① Digital I/O interface (M12, 12-pin) ② Power supply 24 VDC and RS-422 (M12, 8-pin) ③ Ethernet interface (M12, 4-pin) ④ Ethernet interface (M12, 4-pin)
	Interfaces of the RF650R reader ① Digital I/O interface (M12, 12-pin) ② Power supply 24 VDC (M12, 8-pin) ③ Ethernet interface (RJ-45, 8-pin)
	Antenna connectors of the RF650R/RF680R readers 4 x antenna connectors for external antennas (RP-TNC)
	Antenna connector of the RF685R reader 1 x antenna connector for external antenna (RP-TNC)

For detailed information on mounting the readers as well as ordering data of the readers and cables, refer to the section "SIMATIC RF600 System Manual (https://support.industry.siemens.com/cs/ww/en/view/22437600)".

4.3 Setup/network topology

Communication of the RF680R and RF685R readers can be set up as a star, bus or ring topology.

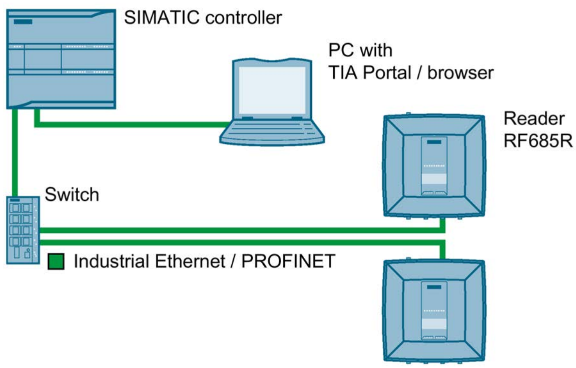


Figure 4-1 Sample configuration star topology

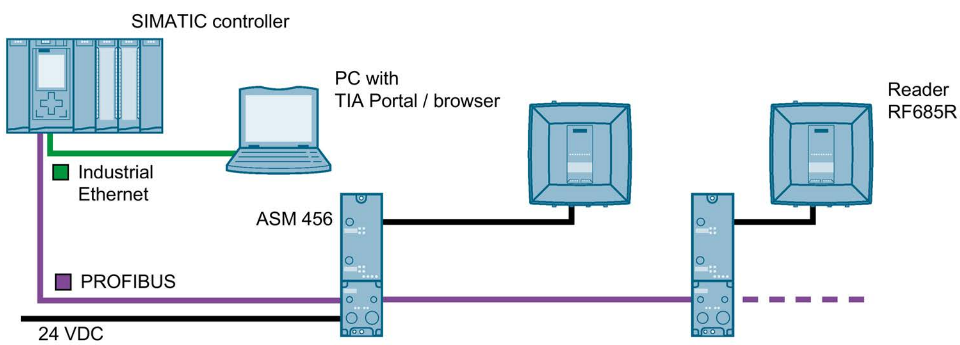


Figure 4-2 Sample configuration bus topology

With a bus topology, remember that if the communications connection of a reader to the controller is interrupted, the communications connection to all downstream readers is also interrupted.

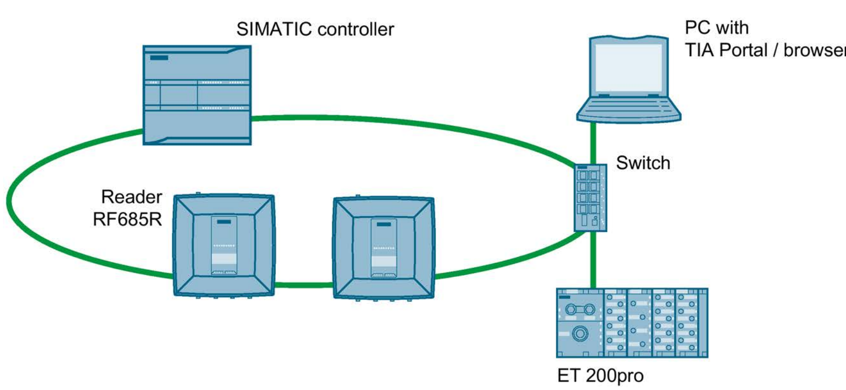


Figure 4-3 Sample configuration MRP ring topology

NOTICE
IRT is not supported Note that the RF680R/RF685R readers do not support IRT (Isochronous Real Time). The readers can also not function as IRT conductors (e.g. in a bus structure). The readers can be configured as clients in MRP rings. Network diagnostics via SNMP is supported by the readers.

Media redundancy

Media redundancy is a function that ensures network and system availability. Redundant transmission links in the MRP topology ensure that an alternative communications path is made available if a transmission link fails. To make this possible you need to configure the RF680R and RF685R readers as a client of the Media Redundancy Protocol (MRP) in STEP 7 (Basic / Professional).

MRP is part of PROFINET standardization according to IEC 61158.

Note

Support of option "12"

When the address is assigned via DHCP, the option "12" (hostname) is also supported. The host name can be taken from the SNMP variable "sysName".

The variable can be written using SNMP tools.

Setup of an MRP ring topology

To set up an MRP ring topology with media redundancy, you must join both free ends of a line network topology in the same device. The closing of the line topology to form a ring is via two network ports of one of the devices (ring ports). The RF680R and RF685R readers can be integrated as clients in an MRP ring topology via the network ports "X1P1" and "X1P2".

You will find additional information on setting up an MRP ring topology in the STEP 7 online help and in the "SIMATIC PROFINET system description (https://support.industry.siemens.com/cs/ww/en/view/19292127)".

4.4 Assign the IP address / device name

To achieve ideal communication between the PC and readers or a controller and readers, you need to assign a unique IP address or device name to each individual reader. Depending on the infrastructure in which you want to operate the readers, there are different procedures as explained below:

- Operating RF650R/RF680R/RF685R readers as an XML user in an IT environment

  The unique assignment is based on the IP address using the Primary Setup Tool V4.2 or higher (PST).

- Operating RF650R/RF680R/RF685R readers as an OPC UA user in an IT environment

  The unique assignment is based on the IP address using the Primary Setup Tool V4.2 or higher (PST).

- Operating RF680R/RF685R readers as an S7 user in an automation environment

  The unique assignment for PROFINET operation is based on the device name using the TIA Portal (as of STEP 7 Basic / Professional V13).

  In PROFIBUS operation via a communications module an IP address needs to be assigned only for configuration and diagnostics purposes.

- Operating RF680R/RF685R readers as a Rockwell user in an automation environment

  The unique assignment is made using the IP address.

The RF650R reader ships with the IP address "192.168.0.254" set in the factory. In the factory settings, the RF680R and RF685R readers are set to DHCP. With the aid of the tools listed and the WBM (as of firmware V3.0) you can change IP addresses.

These alternative methods are described below.

4.4.1 Assigning the IP address / device name with the PST

Requirement

The Primary Setup Tool (V4.2 or higher) is installed and the RF650R/RF680R/RF685R reader is connected and has started up. You will find the Primary Setup Tool on the DVD accompanying the reader or on the Internet at "Industry Online Support (https://support.industry.siemens.com/cs/ww/en/ps)".

Procedure

Follow the steps below to assign a new, unique IP address and a unique device name to the reader:

1. Call up the Primary Setup Tool with "Start > All Programs > Siemens Automation > SIMATIC > Primary Setup Tool".
2. In the menu bar under "Settings > Set PG/PC interface..." select the network adapter via which the reader is connected to the PC and confirm with "OK".
3. Click on the "Search" icon in the toolbar.

   A dialog box opens with the information that a device was found in the network.
4. Click on the "+" character beside the folder symbol in the structure tree and click the entry "Ind. Ethernet interface".

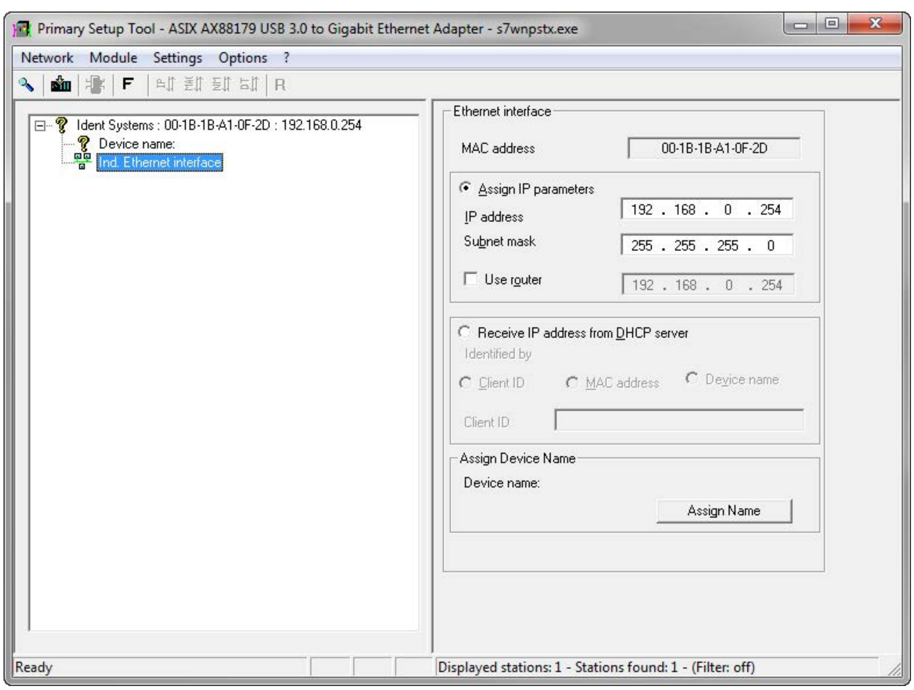


Figure 4-4 Assigning an IP address

5. To assign the reader a new IP address, select the "Assign IP parameters" radio button.
6. Enter a new, unique IP address for the reader in the "IP address" input box.
7. Enter the subnet mask of your network in the "Subnet mask" input box.

8. Click on "Assign Name" to assign a unique device name to the reader.
9. Click the "Load" symbol to transfer the settings to the reader.
10. Confirm the next dialog box with "Yes".

Note

Waiting time

Wait until the IP address / the device name has been updated. To display the change, you need to activate the search function using the "Search" icon .

Result: The reader is assigned the new IP address and a new device name.

Station buzz test

If several readers are connected to the network/PC, it is possible to make the LEDs of the device selected in the output window flash. Using the node flash test, you can identify the required reader quickly and simply.

Follow the steps below to identify the relevant reader using the flash function:

1. In the menu bar, select the menu command "Network> Browse".
2. Select the required module from the device list.
3. In the menu bar, select the menu command "Module> Flashing".
4. Click the "Start" button.

   The LEDs on the selected reader flash.
5. Click the "Stop" button to stop the flashing.

4.4.2 Assigning the IP address / device name with STEP 7

This section is intended only for S7 users (RF680R/RF685R).

Note

Restriction when assigning IP addresses

Remember that only the RF680R and RF685R readers can be configured as a PROFINET device using STEP 7. The RF650R reader does not support PROFINET and can therefore only be assigned a unique IP address using the Primary Setup Tool and the WBM.

Requirement

STEP 7 is installed, the RF680R/RF685R readers are linked into the TIA Portal and the RF680R/RF685R reader is connected and has started up.

You will find further information on linking the readers into the TIA Portal in the section "Linking readers into STEP 7 (Basic / Professional) (Page 35)".

Procedure

Follow the steps below to assign a unique device name to the reader:

1. Call up the TIA Portal with "Start > All Programs > Siemens Automation > TIA Portal Vxx".
2. Create a new project.
3. Change to the Project view.
4. Using the project tree, insert a SIMATIC controller in the project using the "Add new device" menu command.

   The device view opens and the SIMATIC controller is displayed.
5. Drag the required reader from the hardware catalog to the project.
6. Change to the network view and connect the reader to the SIMATIC controller.
7. Right-click on the reader.

8. In the shortcut menu, select the menu command "Assign device name".

   Reaction: The "Assign PROFINET device name" window opens.

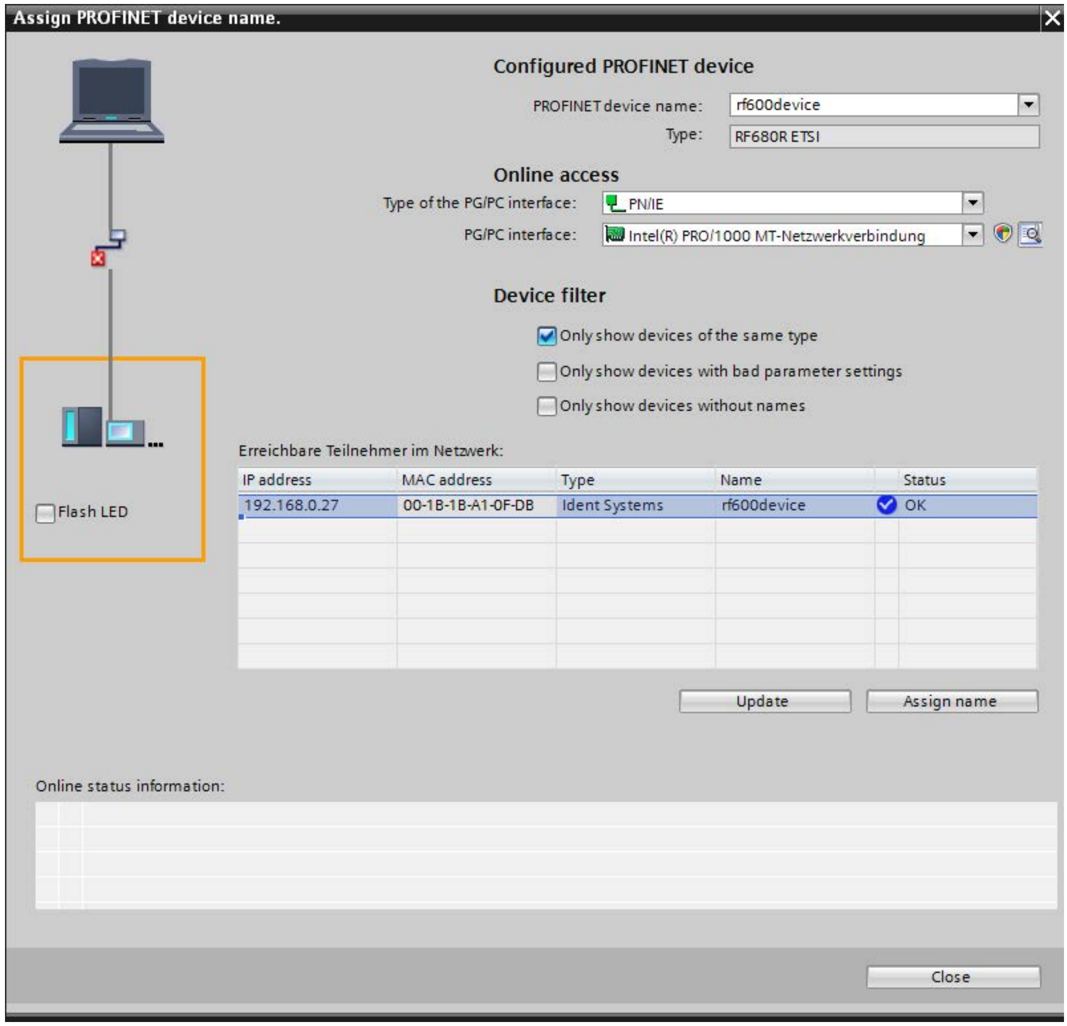


Figure 4-5 Assigning a device name

9. Select the connection type in the "Online access" in the "Type of the PG/PC interface" drop-down list.
10. In the "PG/PC interface" drop-down list in the "Online access" area, select the network adapter via which the reader is connected to the PC.
11. Click the "Refresh" button to display all reachable nodes in the network.
12. Select the required node from the list.
13. Now click the "Assign name" button to assign the PROFINET device name to the reader.

Result: The reader is assigned the configured PROFINET device name from the project.

Note

Assigning a device name when replacing a module

When you replace a module, you can assign the device names automatically. You will find more information on this in the section "Replacing a module (Page 304)".

Station buzz test

If several readers are connected to the controller, it is possible to make the LEDs of the device selected in the output window flash. In this case, compare the MAC address of the device with the displayed MAC address and then select the required reader. Using the node flash test, you can identify the required reader quickly and simply.

Follow the steps below to identify the relevant reader using the flash function:

1. In the Project tree, select the menu command "Online access > <your online access> > Update accessible devices".

   The available devices are displayed.
2. Select the required RF680R and click the entry "Online & Diagnostics" in the folder of the selected device.
3. Select the option "Functions > Assign name".
4. Click the "Flash LED" button.

   The two LEDs on the selected reader flash.
5. Click the "Flash LED" button again to stop the flashing.

4.4.3 Assigning an IP address via DHCP

This section is intended for all user type but primarily for Rockwell users (RF680R/RF685R).

In Rockwell controllers, the IP address is assigned with the aid of a DHCP server. The reader then functions as a DHCP client. To assign the reader an IP address via DHCP, a DHCP server must be configured in the same subnet. Rockwell Automation™ makes a BOOTP / DHCP server for Windows available to assign IP address data to the MAC address of the reader.

Requirement

Studio 5000 Logix Designer and a current version of the BOOTP / DHCP server are installed, the RF680R/RF685R readers are linked in and the RF680R/RF685R reader is connected and has started up. The BOOTP / DHCP server is preconfigured and is available.

You will find further information on linking the readers into Studio 5000 Logix Designer in the section "Configuring with Studio 5000 Logix Designer (Page 39)".

Procedure

Follow the steps below to assign a unique device name to the reader:

1. Call up the BOOTP / DHCP server.
2. Click on the menu command "Tools > Network Settings".

   The input screen "Network Settings" is opened.
3. Enter the subnet mask of the server in the input box "Subnet Mask".
4. Enter the gateway of the server in the input box "Gateway".
5. Confirm your entry with "OK".
6. Double click on an entry in the "Request History" area.

   The input screen "New Entry" opens.
7. In the input box "IP Address" enter a new unique IP address.

8. Confirm your entry with "OK".

   The entry was assigned the IP address in the "Request History" area.

   The entry is also displayed in the "Relation List" area.

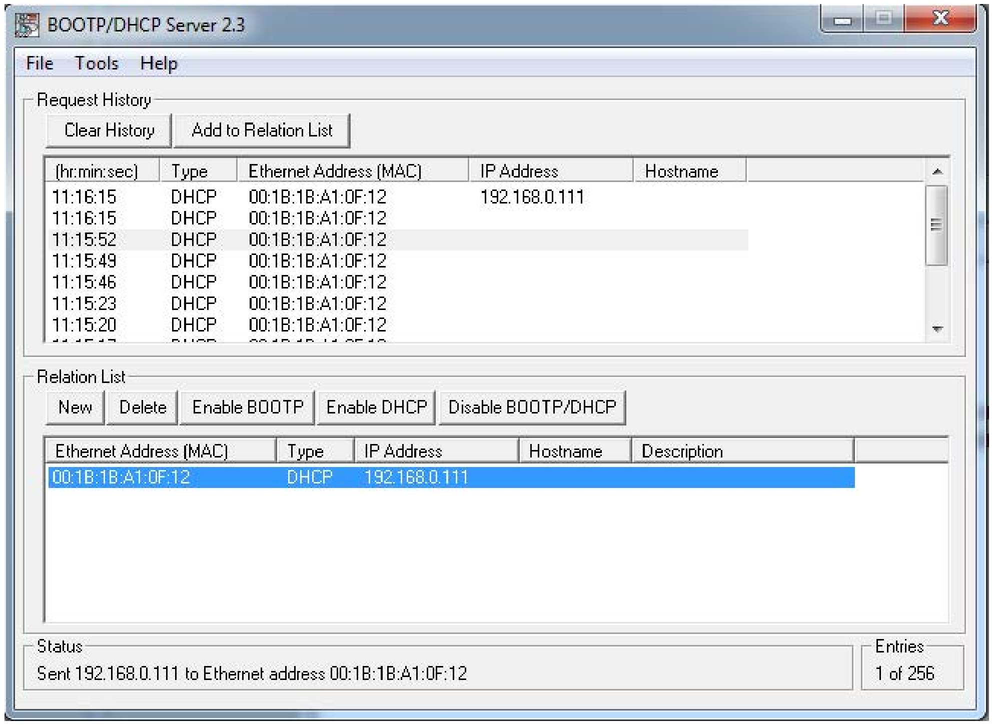


Figure 4-6 BOOTP / DHCP server software

9. Click the "Disable BOOTP/DHCP" button to save the IP address on the reader.

Result: The reader is assigned the IP address statically.

5 Configuration via STEP 7 (PROFINET device)

This section is intended only for S7 users (RF680R/RF685R).

Note

Configuration of the readers using STEP 7 for PROFIBUS operation

You will find information on configuring the communications module you are using for PROFIBUS operation in the manual of the relevant communications module.

5.1 Linking readers into STEP 7 (Basic / Professional)

Note that the RF680R/RF685R readers are only included in the TIA Portal as of STEP 7 Basic/Professional version V14. With older versions, the readers must later be linked into TIA using an HSP or GSDML file. Using the GSDML file, you can also link the reader into STEP 7 Classic or third-party systems. You will find the current GSDML file on the reader.

You will find further information on downloading the GSDML file in the section "The "System" menu item (Page 106)".

Procedure

Follow the steps below to link the HSP file of the RF680R/RF685R readers into STEP 7:

1. Copy the installation file (*-zip) locally to your PC.

   You will find the file on the Internet on the pages of the Industry online support (https://support.industry.siemens.com/cs/ww/en/view/72341852).
2. Extract the *.zip file and copy the *.ispxx files it contains to a directory that you can access with STEP 7 Basic / Professional.
3. Open the TIA Portal and change to the project view.
4. With the "Options > Support packages" menu command, open the "Detailed information" dialog.

   After opening the this dialog, the "Installation of support packages" tab opens as default and in the right-hand window, you can see the support packages installed up to now.
5. Click the "Add from file system" button and go to the folder where you stored the *.ispxx files.
6. Select the required *.ispxx file.

   The HSP file for the installation now appears in the "Detailed information" dialog. The "Installed" column still has the entry "No" for this HSP.
7. Select the HSP file and click the "Install" button.

8. In the next dialog, click the "Continue" button to start the installation.

   At the end of the installation, a message appears indicating that the installation was successful.
9. Click the "Finish" button and restart the TIA Portal.

Result: Your hardware catalog has now been updated in the TIA Portal. If you open the "Detailed information" dialog again, the "Installed" column for the HSP file now has the entry "Yes". You will find the RF680R/RF685R readers on the following path in the hardware catalog: "Detecting & Monitoring > Ident systems > PROFINET > SIMATIC RF600".

As an alternative, you can also link the GSDML file into the TIA Portal. You then install using the "Options > Install general station description file (GSD)" menu command. When installing using the GSDML file, you will find the RF680R/RF685R readers on the following path in the hardware catalog: "Additional field devices > PROFINET IO > Ident systems > Siemens AG > SIMATIC RF600".

You will find further information and help on linking in files in the online help of the TIA Portal.

5.2 Creating a STEP 7 project (Basic / Professional)

The RF680R/RF685R readers can be linked into SIMATIC automation systems using STEP 7 Basic / Professional as of V13 (TIA Portal). The connection is via PROFINET. Following this, you can configure the reader using the WBM while you control the work with the reader using the Ident library of the TIA Portal.

Requirement

The reader is connected, has started up and a device name has been assigned to the reader. The TIA Portal has been started.

Procedure

Follow the steps below to create a new project:

1. Call up the TIA Portal with "Start > All Programs > Siemens Automation > TIA Portal Vxx".
2. Create a new project.
3. Change to the Project view.
4. Using the project tree, insert a SIMATIC controller in the project using the "Add new device" menu command.

   The device view opens and the SIMATIC controller is displayed.
5. Drag the required reader type from the hardware catalog to the project ("Detecting & Monitoring > Ident systems > PROFINET > SIMATIC RF600").
6. Change to the network view and connect the reader to the SIMATIC controller.

Note

Downloading the project

If you have already created an RF680R/RF685R project, you can select this in the start view of the TIA Portal and open it with the "Load project" button.

5.3 Overview of the configurable properties

To display the reader properties, select the reader in the device view and open the "Properties" tab.

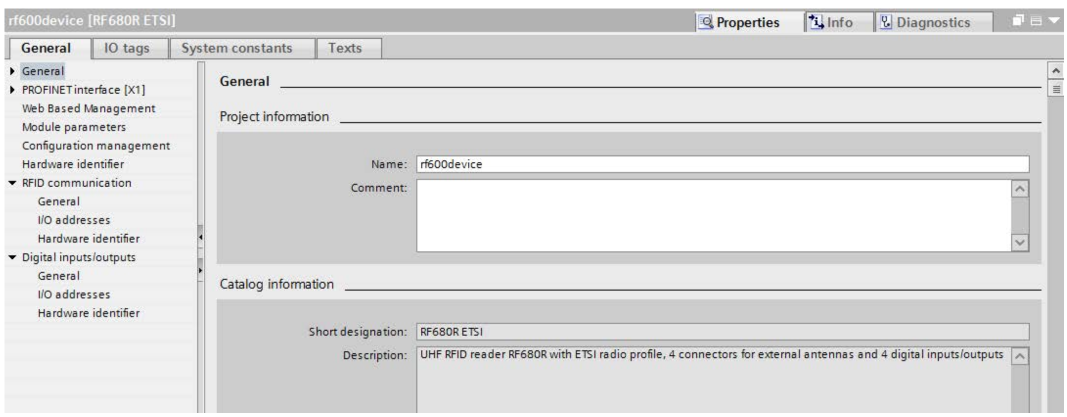


Figure 5-1 Properties of the reader

The following table provides an overview of all configurable reader parameters:

Table 5- 1 Configurable parameters of the reader

Parameter		Functionality
General		General settings of the reader
PROFINET interface [X1]		All settings of the PROFINET interface
	General	Name of the PN interface
	Ethernet addresses	Setting of the IP address and device name
	Advanced options	Advanced PROFINET options such as update time, port settings, belonging to an MRP domain etc.
	Hardware identifier / diagnostics addresses	Hardware identifier of the PROFINET interface (with a connected S7-1200/-1500). Diagnostics address of the PROFINET interface (with a connected S7-300/-400).
Web Based Management		Starting the WBM of the reader Note: The WBM can only be started if either the PROFINET connection between the CPU and reader is established or the reader was assigned the IP address stored in the project. This means that the device name has been assigned and the TIA configuration must be loaded on the SIMATIC controller.
Module parameters		Enabling/disabling read-point related diagnostics messages Possible error messages: • 0x154D - Internal firmware error • 0x1591 - Antenna 1 not connected • 0x1592 - Antenna 2 not connected • 0x1593 - Antenna 3 not connected • 0x1594 - Antenna 4 not connected
Configuration management		• Loading configuration data on the reader from the STEP 7 project. • Saving configuration data of the reader in the STEP 7 project.
Hardware identifier / diagnostics addresses		Hardware identifier of the reader (with a connected S7-1200/-1500). Diagnostics address of the reader (with a connected S7-300/-400).
RFID communication		Address parameters of the reader
	General	General settings
	I/O addresses	I/O address parameter ("LADDR") of the reader. This parameter is used in the "IID_HW_CONNECT" variable.
	Hardware identifier	Hardware identifier parameter ("HW-ID") of the reader. This parameter is used in the "IID_HW_CONNECT" variable.
Digital inputs/outputs		Address parameters of the digital inputs/outputs of the reader.
	General	General settings
	I/O addresses	I/O address parameter of the digital inputs/outputs. Using the set address range (I/O address), the digital inputs/outputs configured in the WBM of the reader can be accessed.
	Hardware identifier	Hardware identifier parameter of the digital inputs/outputs.

Configuring with Studio 5000 Logix Designer 6

6.1 Configuring with Studio 5000 Logix Designer

This section is intended only for users of Rockwell controllers (RF680R/RF685R).

Note

Serial number in Studio 5000 Logix Designer

Note that the serial number specified in the Studio 5000 Logix Designer does not match the reader serial number. The serial number specified in the Logix Designer forms the last 4 bytes of the MAC address of the reader.

Note

Tested programs

The content described in this section was tested with the programs "RS Logix 5000" (V20) and "Studio 5000 Logix Designer" (V21 to V28).

6.2 Linking readers into Studio 5000 Logix Designer

The readers RF680R/RF685R must be linked into the Studio 5000 Logix Designer via an EDS file. You will find the current EDS file on the reader.

You will find further information on downloading the EDS file in the section "The "System" menu item (Page 106)".

Procedure

Follow the steps below to link the EDS file of the RF680R/RF685R readers into Studio 5000 Logix Designer:

1. Copy the installation file (*.eds) locally to your PC.
2. Open the Studio 5000 Logix Designert and change to the project view.
3. Use the menu command "Tools > EDS Hardware Installation Tool"

   the "EDS Hardware Installation Tool" is opened.
4. Follow the instructions of the tool to link the readers into Studio 5000 Logix Designer.

Result: Your hardware catalog in Studio 5000 Logix Designer is now updated.

6.3 Creating a Studio 5000 Logix Designer project

The RF680R/RF685R readers can be linked into Rockwell automation systems using Studio 5000 Logix Designer. The connection is via Ethernet/IP. Following this, you can configure the reader using the WBM while you control the work with the reader using the Ident library of Studio 5000 Logix Designer.

Requirement

The reader is connected, has started up and an IP address has been assigned to the reader. The Studio 5000 Logix Designer was started.

Procedure

Follow the steps below to create a new project:

1. Start the Studio 5000 Logix Designer.
2. Create a new project.

   Select the controller you are using and configure the project properties.
3. Change to the Project view.
4. Right-click on "Ethernet" in the "Controller Organizer > I/O Configuration" area.
5. In the shortcut menu, select the menu command "New Module...".

   The input screen "Select Module Type" is opened.
6. Select the reader "RF68xR" and click the "Create" button.

   The input screen "New Module" opens.
7. Enter the name of the reader in the "Name" input field.
8. In the input box "IP Address" enter the IP address of the reader.
9. Click the "Change" button.

   The input screen "Module Definition" opens.
10. In the "Size" box change the data word size from "SINT" to "INT".
11. Confirm your entry with "OK".
12. Confirm with "OK".

7 Configuring with the WBM

The RF650R, RF680R and RF685R readers are equipped with a Web server that provides a Web Based Management (WBM) for configuring the reader. The connection is via Ethernet. Settings such as transmit power, number and type of the antennas etc. can be made with the WBM. This can be called up using a Web browser such as the Microsoft Internet Explorer, Mozilla Firefox or Google Chrome.

7.1 Starting WBM

Requirement

The reader is connected, turned on and ready for operation ("RS" LED is lit or flashing green) and the relevant reader has been assigned an IP address.

To achieve a good workflow with the WBM, we recommend that you use a PC that meets the following minimum requirements:

- CPU: DualCore with 3 GHz
- RAM: 2 GB

You can start the WBM with the following Web browsers: Microsoft Internet Explorer V9 or higher, Microsoft Edge, Mozilla Firefox V48 or higher and Google Chrome V53 or higher. The user interface of the WBM is designed for a screen resolution of 1366 x 786 pixels.

Procedure

Follow the steps below to start the WBM:

1. Start your Web browser.
2. Enter the IP address of the reader in the address field of your browser.
3. Confirm your entry by pressing the <Enter> key.

Result: The WBM of the reader opens.

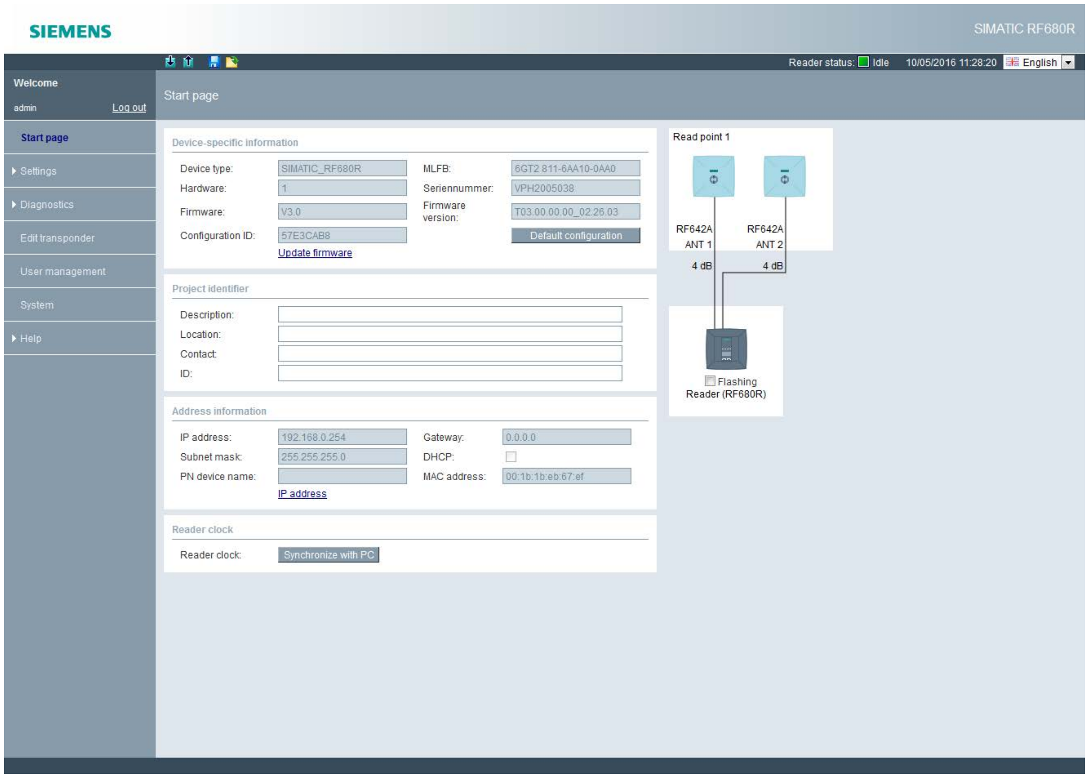


Figure 7-1 The start page of the WBM

Note

The connection to the reader cannot be established

If no connection can be established to the reader, check the following points:

- Make sure that all cables are correctly connected.
- Make sure that the reader has started up ("RS LED" lit/flashing green).
- Check the IP addresses of the PC and the reader and the subnet mask. Both IP addresses must be in the same subnet (you will find more information on this in the section "Assign the IP address / device name (Page 27)").
- Make sure that the connection is not blocked by a firewall.
- Check the connection between the PC and reader using a ping request.

7.2 The WBM

Using the WBM, you can configure the SIMATIC RF650R/RF680R/RF685R readers.

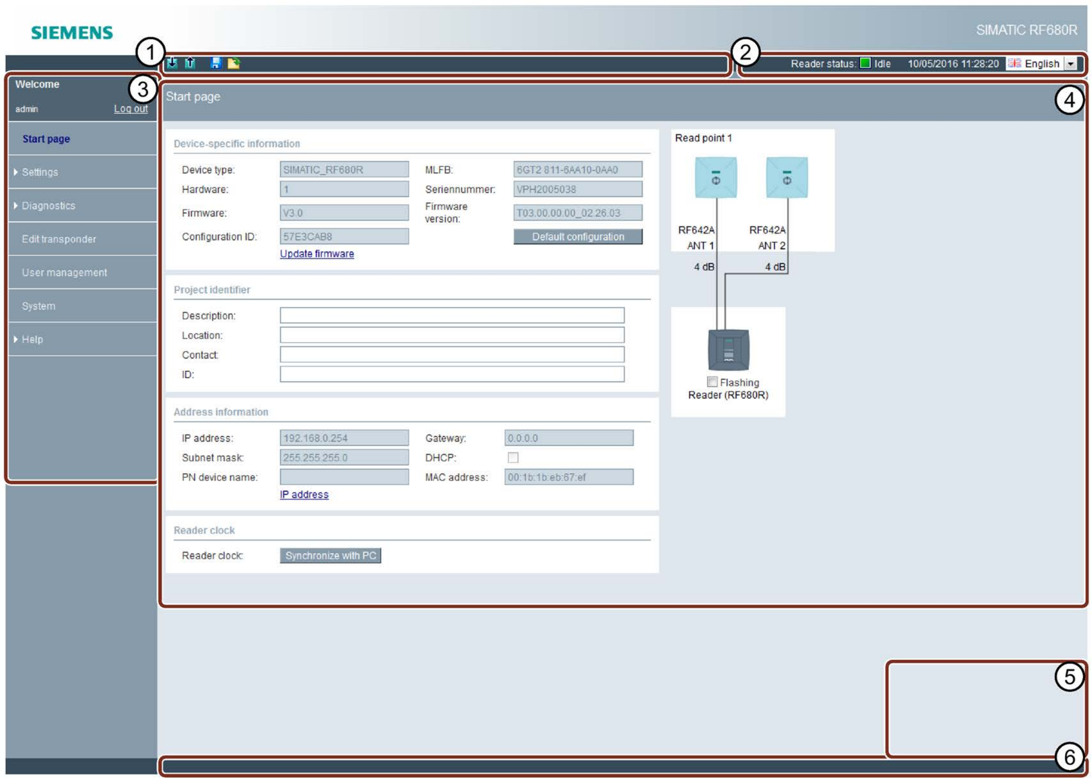
NOTICE
Security recommendation: Enable user management After starting the WBM the first time, no user management is enabled. To make sure that no unauthorized persons can access the reader settings, we recommend that you enable the user management and create new user profiles after the first login. For further information on logging in to WBM and creating/deleting user profiles, refer to the section "The "User management" menu item (Page 102)".

NOTICE
Access to the reader Remember that simultaneous access to a reader using two browsers is possible but not recommended. If changes are made when two browsers are accessing a reader at the same time, this can lead to errors in the configuration or to an undesired result.

When you have created new user profiles you need to log in with one of these user profiles when you restart the WBM.

Layout of the WBM

After successful connection establishment to the reader, the start window of the WBM appears:



The start window of the WBM is divided into 4 areas:

① Toolbar
② Status bar
③ Login and menu tree
④ Main window
⑤ Message area
⑥ Information bar

Figure 7-2 Start window of the WBM

Toolbar and status bar

On the left above the main window there are four buttons for transferring/loading/storing the displayed configuration. You can also operate these buttons directly with key combinations.

Table 7- 1 The toolbar of the WBM

Icon	Description
	Transfer configuration to reader With this button, you can transfer the configuration data set in the WBM to the reader. Key combination: Ctrl + L
	Load configuration from reader With this button, you can load the configuration data currently set on the reader into the WBM. Key combination: Ctrl + G
	Save configuration as With this button, you can save the configuration data set in the WBM on the PC. Key combination: Ctrl + S
	Load configuration from PC With this button, you can load the configuration data stored on the PC in the WBM. Remember that this data is only loaded in the WBM. To transfer the data to the reader, you also need to click the "Transfer configuration to reader" button. Key combination: Ctrl + O

Note

Loading a configuration

Note that you cannot transfer any user profiles and passwords to other readers using the configuration file. After loading the configuration file on a new reader, you need to enable user management and create new user profiles and passwords.

On the right above the main window there is the status bar with the following information:

- Display of the reader status
- Date/time display of the reader
- Drop-down list for selecting the user interface language

Login and menu tree

At the left top edge of the WBM there is a the login and menu tree. Below the login/logout area, there are various menu items. The currently selected menu item is highlighted in dark blue.

The following table provides an overview of the menu items and the functions they provide.

Table 7- 2 The menu structure of the WBM

Menu items		Functions
Start page		• System overview • Viewing device-specific information • Entering customer-specific plant designation
Settings		
	General	• Selecting a country profile and channels • Enabling/disabling categories of log events
	Read points	• Defining read points and assigning antennas • Specifying antenna parameters • Setting algorithms to improve reading quality • Assigning tag fields • Assigning filters • Setting triggers
	Tag fields	• Creating and editing tag fields
	Filters	• Creating and editing filters
	Digital outputs	• Setting the behavior of the digital outputs
	Communication	• Making communications settings
	Adjust antennas	• Optimization of the antenna alignment
	Activation power	• Detect activation power
Diagnostics		
	Tag monitor	• Displaying the read quality • Overview of the identified transponders • Display of the digital inputs/outputs
	Log	• Overview of the log entries
	Messages	• Overview of the messages of the WBM
Edit transponder		• Changing EPC-IDs • Reading out transponder data and writing to tag fields • Locking transponder access • 'Destroying' transponders
User management		• Enabling/disabling user management • Creating and deleting user profiles • Changing passwords

Menu items	Functions
System	• Updating the firmware • Resetting readers to the factory settings • Specifying the IP address • Importing certificates • Transferring PLC device description files
Help	• Documentation relevant for the reader

If you are logged in to the WBM as a "User", some menu items can only be used with certain restrictions. You will find a list of the restrictions in the section "The "User management" menu item (Page 102)".

Main window

The main window shows the contents of the selected menu items. Here, you can configure the various menu-dependent parameters.

Note

Entering values in text boxes

Apart from manual entry of values, you can also change values with the following buttons:

- Arrow up / down
  The value is increased or decreased by one increment.
- PgUp / PgDn
  The value is increased or decreased by ten increments.
- Home / End
  The value is set to the minimum or maximum value.

Message area

The message area displays all WBM-related error messages and warnings (e.g. transfer errors). The message is displayed here are entered automatically in the "Settings - Messages" menu item.

Information bar

The information bar displays deviations between the settings in the user interface of the WBM and the configuration stored on the connected reader. Minor deviations are shown on an orange background; changes that require the reader to be restarted are shown on a red background.

7.3 The menu items of the WBM

7.3.1 The "Start page" menu item

The "Start page" menu item is divided into 5 areas.

- Device-specific information
- Project ID
- Address information
- Reader clock
- Configuration display

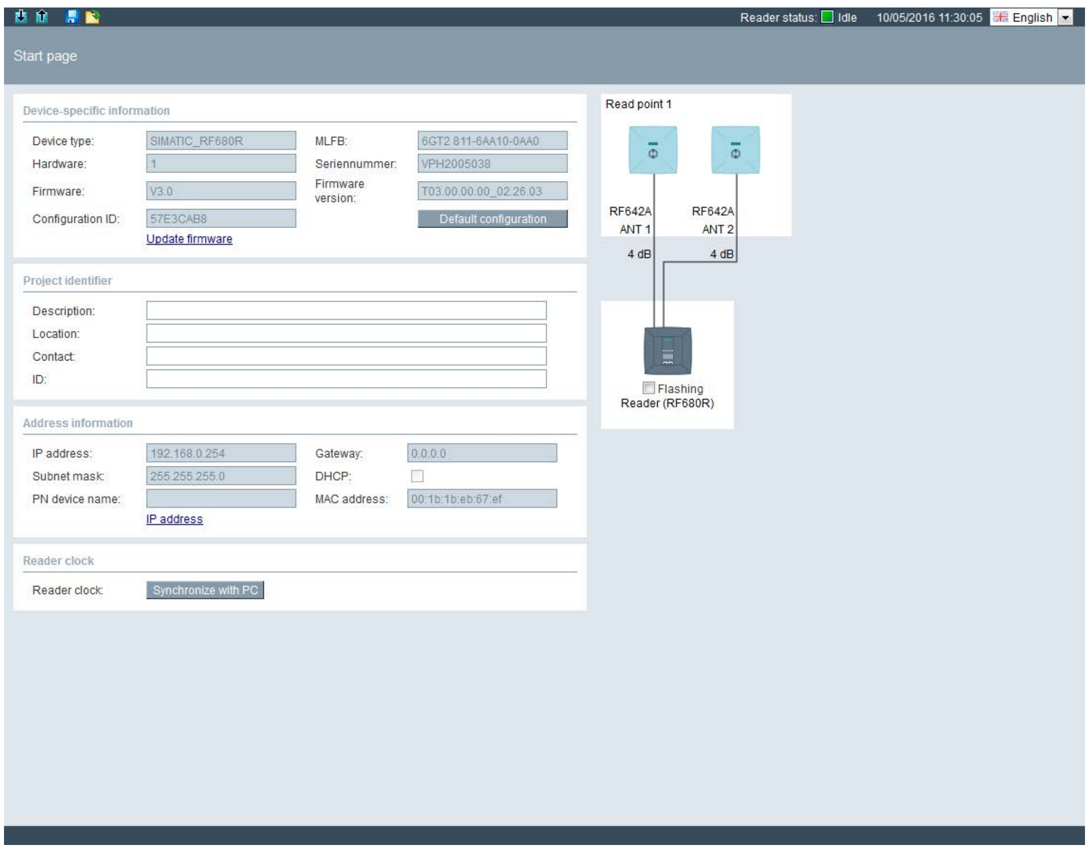


Figure 7-3 The "Start page" menu item

Device-specific information

The first area contains device-specific information. The "Device type", "MLFB", "Hardware" and "Serial number" boxes are specified in the factory. The content of the "Firmware" and "Firmware version" boxes depends on the firmware stored on the reader. Using the "Update firmware" link, you jump to the "System" menu item in which you can update firmware. The "Configuration ID" box contains a unique identifier for the configuration that was last activated on the reader or loaded on the reader. Click the "Default configuration" button to reset the parameters shown in the user interface to the default values. When you restore the default configuration, address information (IP address, device name) is retained.

Project ID

The second area contains input boxes with which you can store your own device-specific information on the reader. Among other things, this is intended to make it easier to identify the individual readers.

Address information

The third area contains all the important address information with which the PC or controller can identify the reader. You can assign the IP address and PN device name to the reader using the "PST" and "STEP 7" tools. Via the link "IP Address" you jump to the "System" menu item inn which you can also reassign the IP address.

Reader clock

With the "Synchronize with PC" button, you can synchronize the reader clock with the time in your operating system.

Note

The reader time always corresponds to UTC time

Note that the time of day of the reader clock corresponds to UTC time and cannot be adapted to time zones. By clicking the button, the local time of day stored in your operating system is transferred to the reader. This time of day is retained on the reader for at least two days even without a power supply.

Configuration display

The current configuration is shown to the right of the four areas. The schematic representation contains information on the connected reader type and antennas as well as the antenna cables being used including the cable loss.

With the "Flash" check box, you can trigger a flashing signal on the connected reader. This allows fast and simple visual identification of the connected reader.

7.3.2 The "Settings - General" menu item

The "Settings - General" menu item is divided into 4 areas:

- Country profile
- Channels
- Extended settings
- Log settings

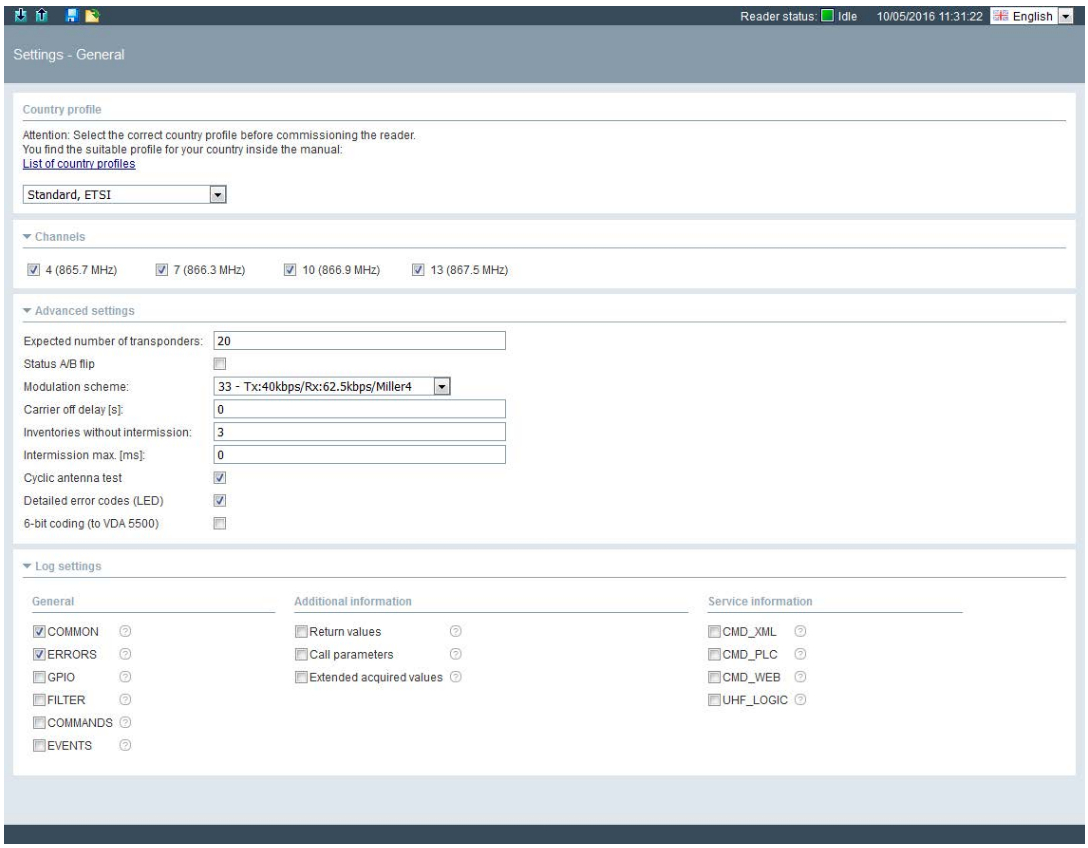


Figure 7-4 The "Settings - General" menu item

Country profile

From the "Country profile" drop-down list, you can select the radio profile the reader will use. The "Channels" area is adapted depending on the radio profile selected. The radio profiles depend on the country or region. To ensure that the reader keeps to the local radio regulations, select the country profile belonging to your country. You will find which country profile applies to you in the "List of country profiles".

Channels

The "Channels" area displays the channels with the frequencies of the selected country profile. Disable the check boxes of the channels that the reader should not use. Note that with FCC country profiles, the check boxes cannot be disabled.

Extended settings

The "Extended settings" area contains various general reader parameters.

Table 7- 3 Description of the parameters

<table>
<tr><th>Parameter</th><th colspan="2">Description</th></tr>
<tr><td rowspan="3">Expected number of transponders</td><td colspan="2">The number of transponders expected to be read with the reader. With this input, the reader can optimize the transponder identification.</td></tr>
<tr><td>Value range</td><td>1 ... 1000</td></tr>
<tr><td>Increment</td><td>1</td></tr>
<tr><td>Status A/B flip</td><td colspan="2">Activation/deactivation of the A/B flip function

A/B flip is an extended method of the reader for identifying transponders. With this function, large transponder populations can be identified quickly and reliably. It takes into account the target status of the transponder that can be in status "A" or "B".

This function divides each identification process into two steps. With the first step in identification, all transponders with the status. "A" (default status) located in the antenna field are identified. If a transponder is identified, it changes briefly to status "B" before, depending on the set session, it automatically changes back to status "A" shortly afterwards. With the second step in identification, all transponders with the status. "B" located in the antenna field are identified.

This increases the probability that all transponders will be identified.</td></tr>
<tr><td>Modulation scheme</td><td colspan="2">Specifies the data transfer rate, radio, profile and coding:
• Tx: Data transfer rate from reader to transponder
• Rx: Data transfer rate from transponder to reader
• Miller/FM0: Coding of the transponder signal
Miller is used with the "Dense Reader Mode". The "Dense Reader Mode" allows the operation of neighboring reader systems on an identical frequency channel. If an FM0 profile is selected, neighboring readers can have greater influence on each other.
• ISO 18000-6B: Changeover of the transponder standard
When using transponders of the ISO 18000-6B standard (UCODE HSL), this scheme must be used. Mixed operation with transponders of the ISO 18000-6B and ISO 18000-63 standard is possible. With the aid of the "Set_Param" block or the XML command "setParameter" you can switch over the modulation scheme during operation.</td></tr>
<tr><td rowspan="3">Carrier off delay [s]</td><td colspan="2">Off delay of the carrier frequency in seconds. This mechanism can reduce the time required to access transponders that are accessed more than once in succession. This time specifies how long the UHF carrier frequency remains active after transponder access. During the off delay time, the reader is quicker when re-accessing transponders that have already been accessed.</td></tr>
<tr><td>Value range</td><td>0 ... 25.5 s</td></tr>
<tr><td>Increment</td><td>0.1 s</td></tr>
<tr><td rowspan="3">Inventories without intermission</td><td colspan="2">Number of inventories to be taken without being interrupted by a send pause (intermission). [1)]</td></tr>
<tr><td>Value range</td><td>1 ... 65535</td></tr>
<tr><td>Increment</td><td>1</td></tr>
</table>

Parameter	Description	
Intermission max [ms]	Maximum duration of the intermission in milliseconds between the "inventories without intermission". The length of time of the individual send pauses vary randomly within the range of values you have specified. [1]	
	Value range	0 ... 65535 ms
	Increment	1 ms
Cyclic antenna test	Activating/deactivating the cyclic antenna test. If the cyclic antenna test is active, the reader checks whether or not the antennas are plugged in and connected to the reader. To do this, the antennas are accessed with minimum power. To make sure that antennas radiate power only when this is specifically required, you can disable the antenna test. Without the cyclic antenna test, an interrupted connection can only be detected when the antenna is accessed. Note that the cyclic antenna test does not work if the cable attenuation is ≥ 4 dB.	
Detailed error codes (LED)	Enabling/disabling the detailed error codes. This area exists only with the RF680R/RF685R readers. Error messages are indicated by red flashing status LEDs (RF680R/RF685R) and the red flashing "ER" LED. If the "Detailed error codes (LED)" check box is enabled, a separate LED pattern is assigned to every error in the LED status display. Disable the "Detailed error codes (LED)" check box to disable the alternative LED error display. You will find more information on the LED error display in the section "How the LED status display works (Page 289)".	
6 bit coding (acc. So VDA5500)	Enabling / disabling the 6 bit coding When 6 bit coding is enabled, the reader identifies transponders written according to VDA5500 The access to the user data stored in the 6 bits is converted transparently to 8 bits. When the USER memory area "MB11" is accessed, the most significant bit of the "Data Byte-Count Indicator" is not evaluated by the reader. This restriction only applies to user data > 128 bytes.	

[1] You will find more information on the intermission parameters below.

Log settings

In the "Log settings" area, you can use the check boxes to decide which events are entered in the log. The log is structured as a circular buffer. Bear in mind that with a high degree of detail of the data, the circular buffer fills up more quickly which can have a negative effect on the performance of the device.

Table 7- 4 Description of the parameters of the log

Parameter	Description
General	
COMMON	Messages relating to general events: e.g. reader startup, login to the WBM, ...
ERRORS	Error and alarm messages of the reader
GPIO	Changes to the digital inputs/outputs
FILTER	Transponders that were filtered out.
COMMANDS	Commands of the user application
EVENTS	Recording of all tag events (e.g. glimpsed, ...)
Additional information	
Return value	Return values for the commands of the user application and for the written or read transponder data.
Call parameters	Call parameters for the commands of the user application
Extended acquired values	Additional data obtained when the transponder was identified (antenna, polarization, channel, ...).
Service information	
CMD_XML	Frames on the XML interface
CMD_PLC	Internal frames on the PLC interface
CMD_WEB	Internal frames between Web server and reader
UHF_LOGIC	Internal frames to the UHF part of the reader

Intermissions

Random intermissions can be used to reduce the mutual influence between RFID devices in environments with a high reader density.

The incidence and duration of the intermissions can be set depending on the required availability of the RFID data. The following figure shows the effects of the intermissions:

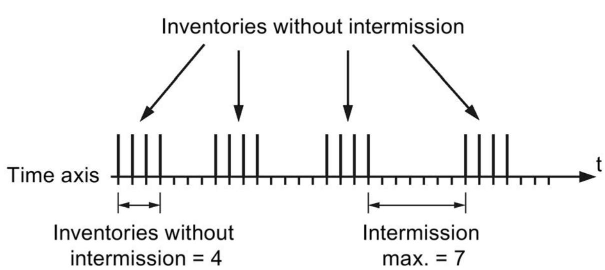


Figure 7-5 Example of intermissions

Note

Delay due to intermissions

Remember that intermissions delay the other algorithms.

7.3.3 The "Settings - Read points" menu item

In the "Settings - Read points" menu, up to four logical read points can be defined depending on the reader type. A logical read point is, for example, an incoming goods gate in logistics or a machine infeed on a production line. A read point, on the other hand, can be assigned one or more antennas required to cover the identification area of the read point.

The settings are structured identically for each read point and divided into the following 6 areas:

- Read point name
- Assigned antennas
- Algorithms
- Tag fields
- Filters
- Trigger

Note

Parallel operation of read points

Note that simultaneous read/write/inventory access to multiple read points leads to delays. The length of the delay depends on the time required for the command and the number of commands.

The index number beside the icon in the Read points tab shows how many antennas are assigned to the particular read point.

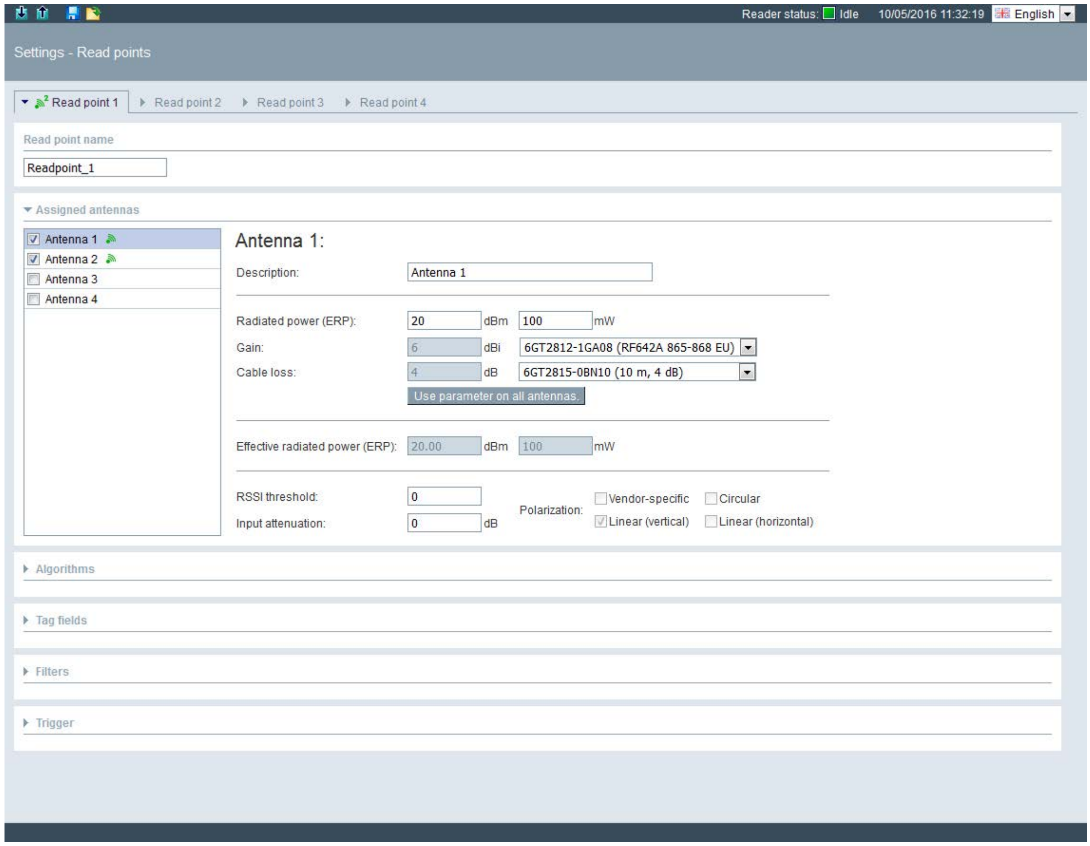


Figure 7-6 The "Settings - Read points" menu item

Read point name

In the input box, you can assign a name to the read point (e.g. "incoming goods gate 5" or "welding robot 21").

Assigned antennas

In the "Assigned antennas" area, you can assign each read point 1 to 4 antennas depending on the connected reader type. To do this, select the check boxes of the relevant antennas in the list. If an antenna has already been assigned to a read point, a green icon is displayed on the right. If the check box is enabled, the antenna is assigned to the selected read point. To specify antenna parameters for the individual antennas, select the required antenna in the list.

Table 7- 5 Description of the antenna parameters

Parameter	Description		
Description	Input box for storing device-specific information. For example, the location of the antenna		
Radiated power	Required radiated power that the antenna should output. Note: The unit (ERP/EIRP) depends on the selected radio profile. The two input boxes are linked together. If the value in one of the input boxes is changed, the value of the other input box will be adapted automatically. The actual radiated power emitted may be lower due to other components and/or parameters.		
	Value range	5 ... 33/36 dBm	3 ... 2000/4000 mW
	Increment	0.25 dBm	--
Gain	The antenna gain affects the actual radiated power. The gain of an antenna describes how much of the power fed in can be converted in the air and depends on the antenna being used. Here, you can either select an antenna based on its name or enter the value of the antenna gain of an antenna being used directly.		
	Value range	-15 ... 15 dBi	
	Increment	0.25 dBi	
Cable loss	The cable loss affects the actual radiated power. The cable loss depends on the cable being used. Here, you can either select a cable based on its name or enter the value of the cable loss of a cable being used directly.		
	Value range	0 ... 63.75 dB	
	Increment	0.25 dB	
Apply parameters to all antennas	Button that transfers the entered values (radiated power, gain, cable loss) of this antenna to all other antennas.		
Effective radiated power	The actual radiated power is made up of the transmit power emitted by the reader, the cable loss and the antenna gain. It is possible that the target value for the radiated power is never reached in reality due to the use of long cables and antennas with low gain. Note: The unit (ERP/EIRP) depends on the selected radio profile.		

Parameter	Description	
RSSI threshold	The RSSI threshold specifies the signal strength above which a transponder is identified. Only the transponders that reach the RSSI threshold are entered in the list of identified transponders. In reflecting environments (metal reflects UHF waves), transponders could be detected that are not located directly in the antenna field and therefore should not actually be "read". The RSSI value of these transponders is usually noticeably lower than the RSSI value of transponders located directly in antenna field. Such transponders can be filtered out with a suitable RSSI threshold value. In the "Diagnostics - Tag monitor" menu item, all the detected transponders are displayed along with their RSSI values. From the RSSI values of the transponders that should be read and the RSSI values of the transponders that should not be read, it is possible to derive an RSSI threshold value.	
	Value range	0 ... 255
	Increment	1
Input attenuation	The input attenuation weakens the strength of received transponder signals at the reader input. Increasing the attenuation means that received weak transponder signals are no longer identified by the reader. This attenuation applies both to transponder responses as well as to signals of neighboring readers. Adapting this parameter helps to reduce disruptions caused by neighboring readers and transponder populations.	
	Value range	0 ... 31.75 dB
	Increment	0.25 dB
Polarization	The polarization indicates the alignment of the waves of the antenna and depends on the antenna being used. Most antennas have an unchangeable polarization. The polarization of the internal antenna of the RF685R reader can be set - just like the RF680A antenna. If you use the internal antenna of the RF685R reader, you also need to enable the required polarization using the corresponding check box. If more than one check box is selected, the polarization is changed with each inventory. This increases the probability of identification in difficult radio conditions but does, however, increase the access time (time required for the additional inventories).	

Algorithms

Compared with other frequency bands (LF, HF), UHF RFID has the following special properties:

- Large distances in the range of several meters,
- Reflection of the waves on metal surfaces,
- Region-dependent bandwidth restricted by regulations

In conjunction with the fact that electromagnetic waves in the UHF range are not visible, this often leads to unwanted or incomprehensible responses in UHF systems. Typical, simple examples include:

- Not everything is read or even nothing is read.
- Reading works but writing does not.
- Transponders are identified that should not be identified at all.

There are often simple explanations for these responses and therefore usually also solutions. Algorithms are additional functions that help you to achieve the required functionality even in difficult radio conditions. The following environmental conditions are possible causes of this response:

- There are several readers in a restricted space, e.g. every 3 to 5 meters along a production line (high reader density).
- The objects to be identified or the transponders are close together (the distance from each other is less than the antenna field).
- There is a lot of metal in the environment (e.g. production environment with metallic conveyor technology, loading doors with metal ramps)
- The objects to be identified are on a metal surface.

With the algorithms, you can optimize the write/read settings to ensure reliable communication between reader and transponder. If none of these conditions applies, the use of algorithms is usually unnecessary.

Note

Algorithms for trained users

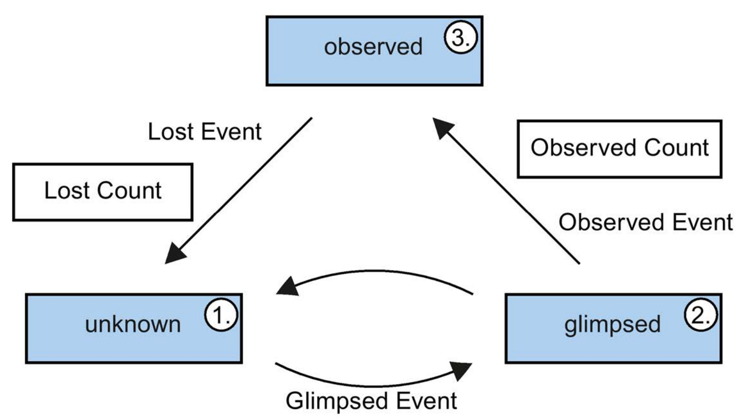
Note that the following algorithms were designed specifically for trained users. Settings in individual algorithms have effects on other algorithms. You should only work with the algorithms when you are aware of the interdependencies between the various algorithms and their purpose.

In the section "Application examples of the algorithms (Page 321)" you will find several examples of applications in which the use of the algorithms is described.

Click the "Adopt parameters from read point" button to transfer all parameters of the algorithms and the session from another read point to this read point.

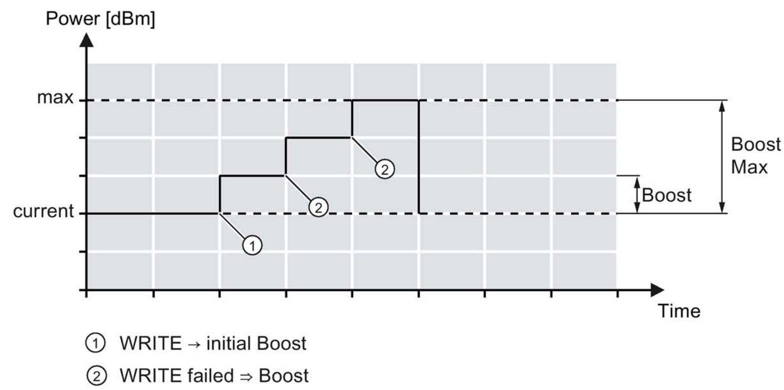
The icons of the algorithms indicate whether the algorithm is activated ( ) or deactivated ( ).

Table 7- 6 Description of the algorithms

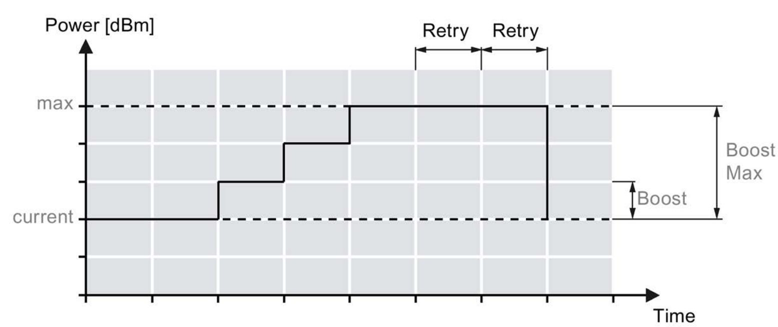
<table>
<tr><th>Algorithm</th><th colspan="2">Description</th></tr>
<tr><td rowspan="6">Smoothing</td><td colspan="2">This algorithm ensures that only transponders that could be identified often enough will be reported as "reliably identified". Transponders that only appear briefly in the antenna field (e.g. due to overshoot) are filtered out.

</td></tr>
<tr><td>Observed Count</td><td>The value specifies how often a transponder needs to be identified before it is reported as "reliably identified" (observed).
When entering the value "1", the transponder changes to the status "observed" during the first recognition. The "Glimpsed" event as well as the "Observed" event are generated in the process.</td></tr>
<tr><td>Lost Count</td><td>The value specifies how often a transponder reported as "reliably identified" (observed) may no longer identified by cyclic inventories before it is reported as being "not identified" (lost).
The value "0" indicates that the lost event is generated at the same time as the observed event.
If you enter the maximum value "65535", transponders are never reported as "not identified" (lost).</td></tr>
<tr><td>unknown</td><td>The transponder is unknown to the reader. The transponder has either never been identified or processing of the transponder data by the reader has been completed.</td></tr>
<tr><td>glimpsed</td><td>Transponder was scanned the first time.</td></tr>
<tr><td>observed</td><td>The transponder was identified reliably for at least "x" read cycles. The number "x" is specified with "Observed Count".</td></tr>
</table>

<table>
<tr><th>Algorithm</th><th colspan="2">Description</th></tr>
<tr><td rowspan="3">Read/Write Power Ramp</td><td colspan="2">The effect of this algorithm is to ensure that there is enough power available when executing a command (Read, Write, Lock, Kill). If a command fails to execute, it is repeated with an increased radiated power. The radiated power is increased step-by-step until the power is adequate to execute the command or until the specified maximum value is reached. Not that the Inventory Power Ramp depends on the Read/Write Power Ramp.

The value "Boost" corresponds to the initial power increase with write access. Read access is performed with the basic power without an initial boost. If a value is entered only for "Boost" and not for "Boost max", only write access with increased power are performed.

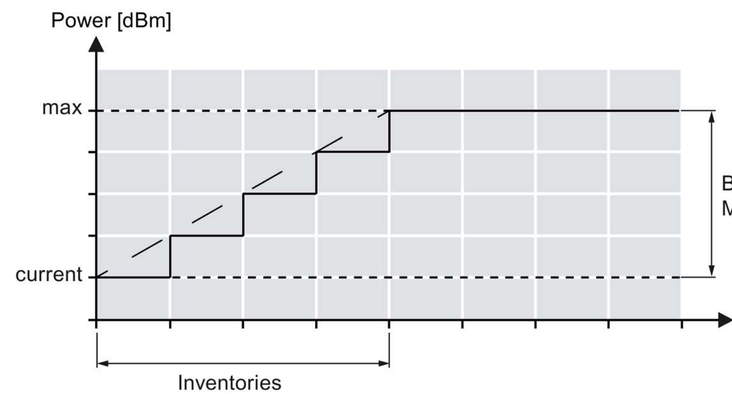

</td></tr>
<tr><td>Boost [dB]</td><td>The value specifies by how many dB the radiated power is increased in each step.</td></tr>
<tr><td>Boost Max [dB]</td><td>The value specifies by how many dB the radiated power can be increased as maximum.</td></tr>
<tr><td rowspan="2">Command Retry</td><td colspan="2">The effect of this algorithm is that commands are executed reliably. If the command fails to execute (Read, Write, Lock, Kill), it is repeated.

The algorithm is linked to the "Read/Write Power Ramp" algorithm and is only started when no command could be executed despite the read/write power ramp. If no read/write power ramp is set, the commands are repeated with the current power.


</td></tr>
<tr><td>Retries</td><td>The value specifies how often the command is repeated with the specified maximum dB increase.</td></tr>
</table>

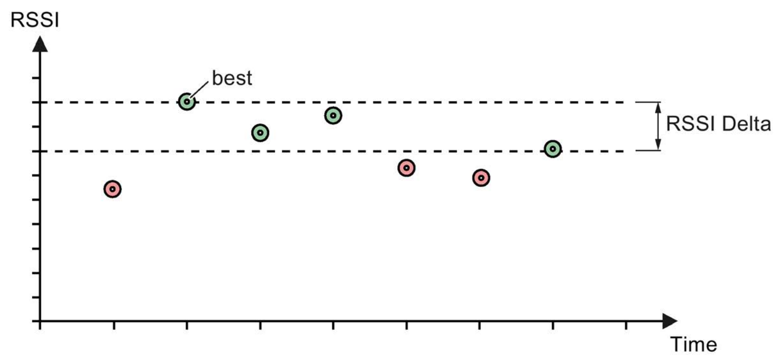
<table>
<tr><th>Algorithm</th><th colspan="2">Description</th></tr>
<tr><td rowspan="4">Inventory Power Ramp</td><td colspan="2">This algorithm increases the radiated power automatically in steps if the specified number of expected transponders is not detected in each inventory. The power is increased until the required number of transponders is detected or until the specified maximum value is reached. This, for example, compensates for fluctuating radio conditions.

This algorithm is only used when taking inventories (e.g. "presence mode" in PROFINET operation). With read/write commands, the algorithm is not started.



The step size of the individual increases is calculated as follows: Boost max / Inventories

Example:
Boost max = 5 dB, Inventories = 10 ⇒ Step size = 0.5 dB</td></tr>
<tr><td>Expected Tags</td><td>The value specifies the minimum number of transponders that should be identified per read point in every inventory. If this value is not reached, the radiated power is increased.</td></tr>
<tr><td>Boost Max [dB]</td><td>The value specifies by how many dB the radiated power can be increased as maximum.</td></tr>
<tr><td>Inventories</td><td>The value specifies the number of inventories to be taken until the maximum radiated power is reached. If the specified number of transponders is identified before the maximum radiated power is reached, the radiated power is not increased to the maximum value.</td></tr>
</table>

<table>
<tr><th>Algorithm</th><th colspan="2">Description</th></tr>
<tr><td rowspan="2">RSSI Delta</td><td colspan="2">The effect of this algorithm is that from a number "x" of identified transponders, only the "strongest" are reported. Transponders will only be reported as "reliably identified" if their RSSI value is at least as high as the RSSI value of the best identified transponder minus the RSSI Δ value.
This algorithm is used only when taking inventories, for example with the XML commands "readTagIDs" and "readObservedTagIDs" and in the "presence mode" with PROFINET.

</td></tr>
<tr><td>RSSI Delta</td><td>The value specifies the maximum RSSI difference of the transponder compared with the highest RSSI value.</td></tr>
<tr><td rowspan="2">Black List</td><td colspan="2">The effect of this algorithm is that transponders that have already been processed are hidden. This function is particularly useful at read points at which only one individual transponder or a few transponders should be identified but the antenna field is larger than the distance between the neighboring transponders.
With suitable XML or control commands, these transponders can be included in the black list and therefore filtered out. For example because these transponders have already been identified or processed.</td></tr>
<tr><td>Size</td><td>The value specifies the maximum number of transponders (EPC-IDs) that can be entered in the black list.
The black list is a circulating buffer with a configurable size. If all the entries in the black list are occupied, the next new entry deletes the oldest entry.</td></tr>
</table>

Sessions

The way in which sessions work is very complex and it is recommended that only trained users should use them. How they work is described in the "EPCglobal Specification (http://www.gs1.org)".

Sequence of the algorithms

The following table figure shows an overview of the algorithms over time.

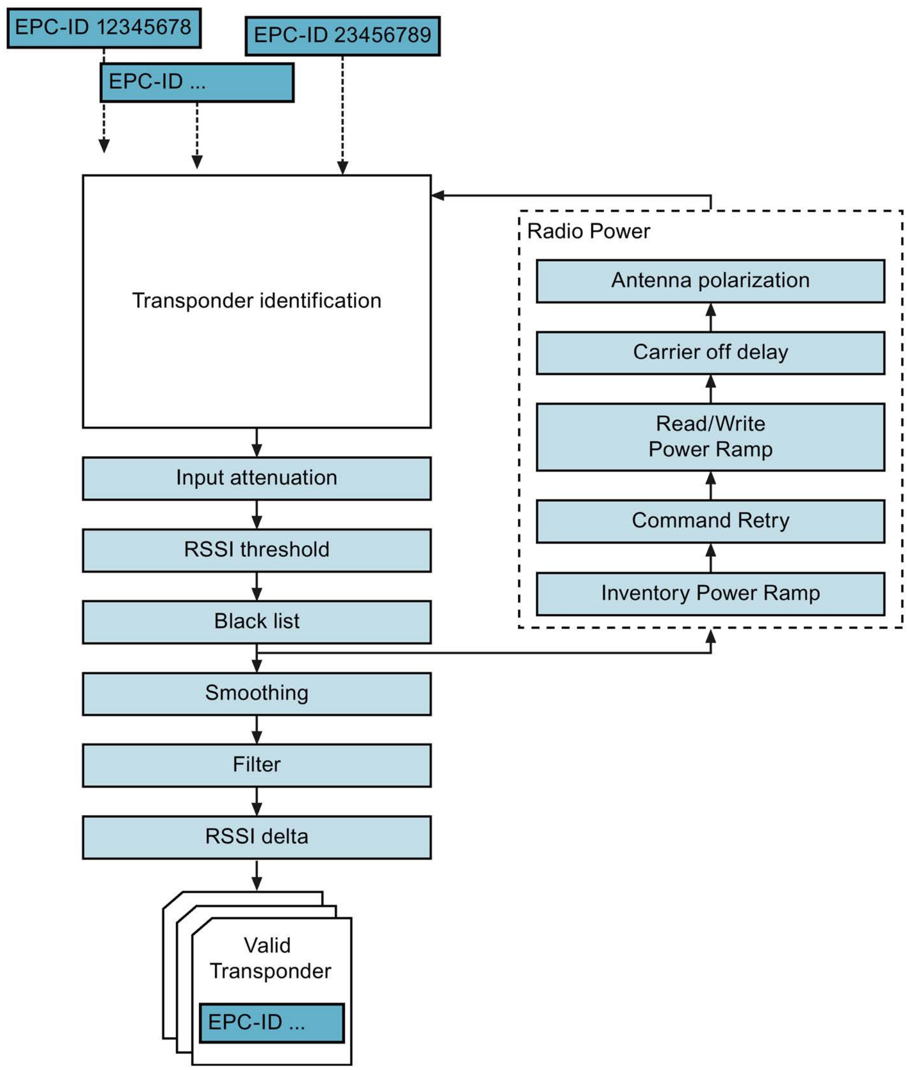


Figure 7-7 Sequence of the algorithms

Tag fields

In the "Tag fields" area, you can assign tag fields to a read point. Tag fields are logical memory areas of a transponder that have symbolic names. To read out the tag fields from every transponder automatically, these must be assigned to the read points. This additional data is sent along with the "TagEventReports" via the XML interface.

The content of the tag fields is output only via the tag events (Page 265) of the XML commands.

Table 7- 7 Description of functions

Icon	Description
	Assign tag field Click the button to assign existing tag fields to the read point. You can select the required tag field from the drop-down list.
	Create new tag field Click the button to create new tag fields. The button acts as a link to the "Settings - Tag fields" menu item.
	Delete tag field Click the button to remove tag fields already assigned to the read point.
	Edit tag field Click the button to edit existing tag fields. The button acts as a link to the "Settings - Tag fields" menu item.

You will find more information on the tag fields in the section "The "Settings - Tag fields" menu item (Page 66)".

Filters

In the "Filters" area, you can assign filters to the read point. The data required for the comparison with the filter criteria is read out after reliable identification of a transponder. Depending on the filter evaluation (criterion applies / does not apply), identified transponders are either filtered out or not.

Table 7- 8 Description of functions

Icon	Description
	Assign filter Click the button to assign existing filters fields to the read point. You can select the required filter from the drop-down list.
	Create new filter Click the button to create new filters. The button acts as a link to the "Settings - Filters" menu item.
	Remove filters Click the button to remove filters already assigned to the read point.
	Edit filters Click the button to edit existing filters. The button acts as a link to the "Settings - Filters" menu item.

You will find more information on filters in the section "The "Settings - Filters" menu item (Page 68)".

Trigger

In the "Trigger" area, you can specify the conditions that will trigger inventories. If a Inventory Power Ramp was configured, this is fired by triggers. If one of the assigned conditions applies, inventories are taken. With "Trigger action" you can set whether the response to the trigger is that

- a specified/permanent number of inventories is taken or
- inventories are taken for a specified/permanent time [ms].

These conditions are also used with the XML command "triggerSource".

If you do not specify a trigger, you can trigger inventories using the corresponding XML commands ("triggerSource") or SIMATIC blocks ("Inventory", "Read_xxx") or XML commands ("Scan"). Note that configuring triggers is unnecessary for operation using S7.

Click the button ➕ to specify up to two conditions. Click the button ✕ to remove already specified conditions.

Table 7- 9 Description of the trigger conditions

Condition	Description
IO_LEVEL	With this condition, the reader continues to take inventories uninterrupted as long as the selected input/output is in the specified state "On" or "Off".
IO_EDGE	With this condition, the reader takes inventories once as set in "Trigger action". When there is an edge change at the selected input.
CONTINUOUS	With this condition, the reader takes inventories continuously.
TIMER	With this condition, the reader takes inventories as set in "Trigger action". Following this, there is a pause with the value set in the "TIMER" box [ms].

7.3.4 The "Settings - Tag fields" menu item

In the "Settings - Tag fields" menu item, you can create and edit tag fields. Tag fields are logical memory areas of a transponder that have symbolic names. Memory areas are defined by a logical name, the memory bank, a memory address and the length. If a tag field is created and assigned to a read point, the data of every reliably identified transponder is read out automatically. This data is then signaled with each "observed" "TagEventReport" via the XML interface to the user application.

This page is divided into 3 areas:

- Tag fields
- Tag field properties
- Transponder memory configuration

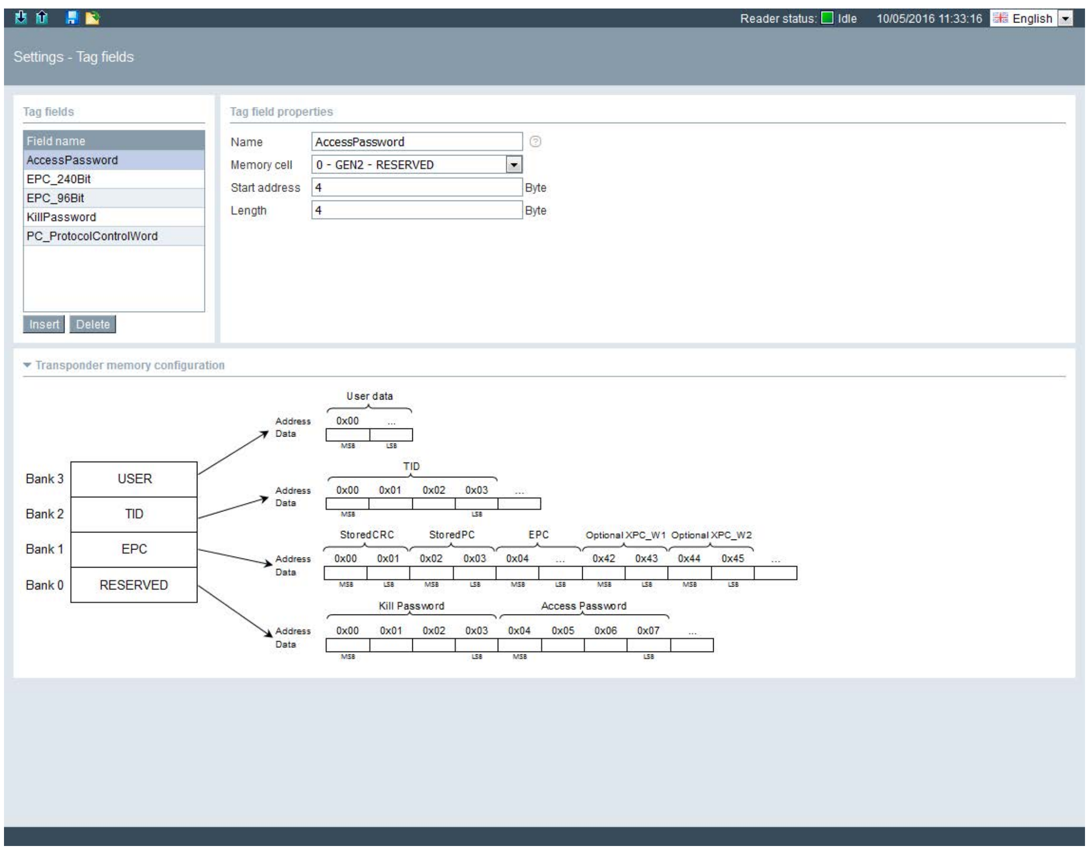


Figure 7-8 The "Settings - Tag fields" menu item

Tag fields

The "Tag fields" area contains a list of all tag fields that already exist. To edit a tag field, select the required field in the list. The selected tag field is highlighted in color. Click the "Insert" button to create a new tag field. Click the "Delete" button to delete the selected tag field.

Tag field properties

In the "Tag field properties" area, you can adapt the parameters of the individual tag fields.

Table 7- 10 Description of the parameters of the tag fields

Parameter	Description	
Name	Input field for assigning a logical name/ descriptive title to the tag field.	
Bank	Drop-down list for selecting the memory bank in which the memory area is located.	
Start address	Address starting at which the data will be read out/written.	
	Value range	0 ... 65535 bytes
Length	Number of bytes to be read out or written starting at the start address.	
	Value range	1 ... 1024 bytes

Transponder memory configuration

The "Transponder memory configuration" area contains a graphic to illustrate the memory configuration and the memory areas of a UHF transponder.

Example

The production date of a product is stored on a transponder in the USER memory area (memory bank 3). The production date is located at address 10 and is 8 bytes long. The corresponding tag field is created and assigned to a read point. Following this, with each object/transponder identification (TagEvent "Observed", the production date of the object is read out automatically and sent to the XML user application with the EPC-ID of the transponder.

Explanation of the memory structure

The transponder memory is divided into four different memory banks.

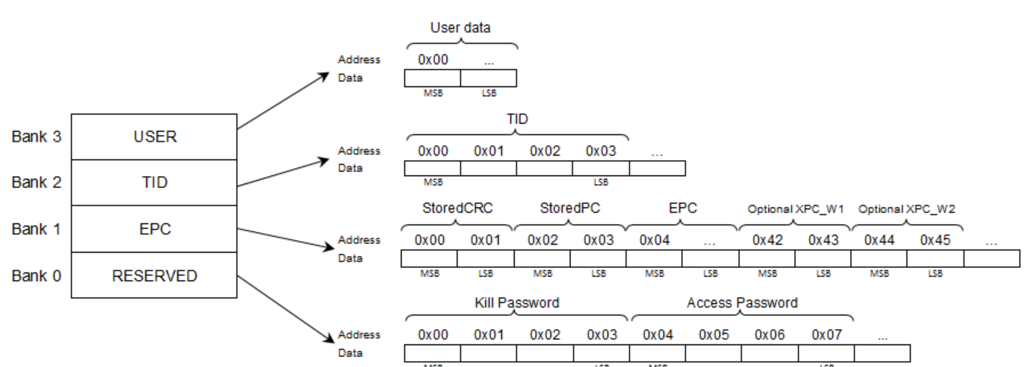


Figure 7-9 Transponder memory configuration

Table 7- 11 Description of the memory banks

Memory type	Description
USER	Freely writable "USER" memory area
TID	Specified by the manufacturer. The TID contains the class identifier and depending on the transponder type also the serial number of the transponder.
EPC	Contains the EPC-ID data, the protocol information (Protocol Control Word) and the CRC data of the transponder. You can write to the EPC memory area.
RESERVED	Contains the access and kill password.

7.3.5 The "Settings - Filters" menu item

In the "Settings - Filters" menu item, you can create and edit filters. By using filters and depending on the filter criteria, you can separate out specific transponders that will not be processed any further. This page is divided into 3 areas:

- Filters
- Filter properties
- Transponder memory configuration

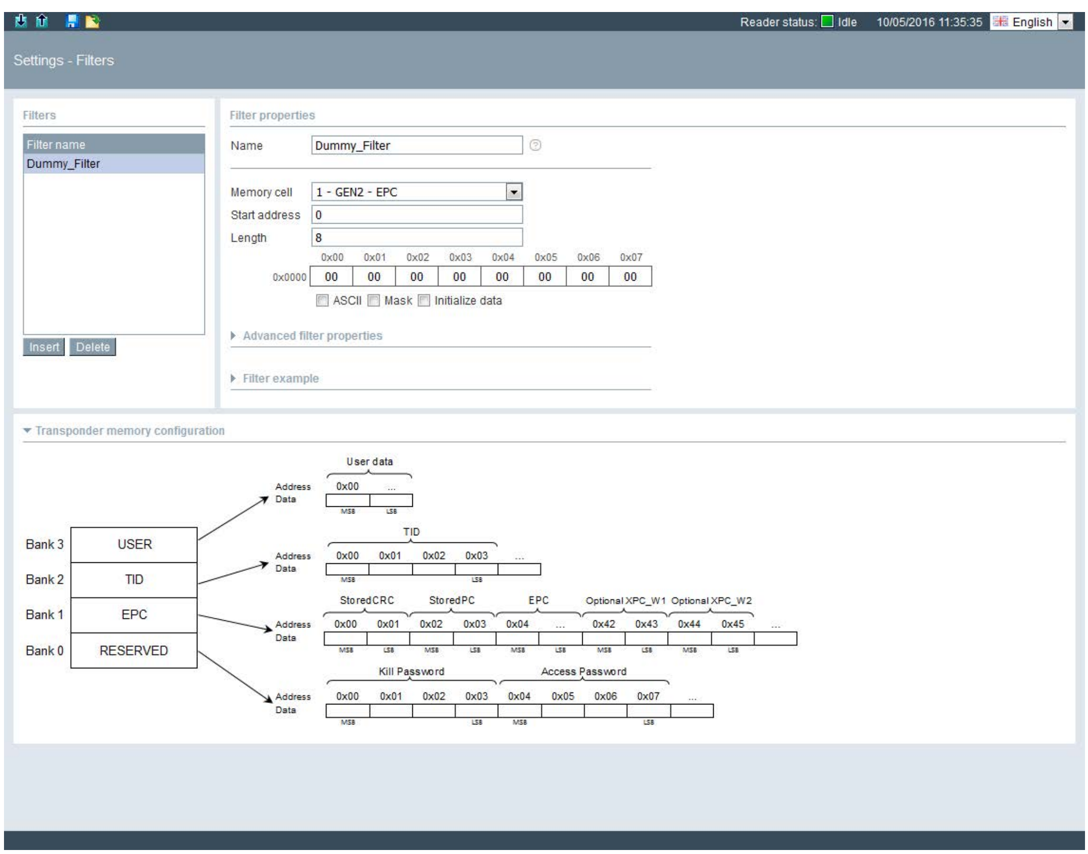


Figure 7-10 The "Settings - Filters" menu item

Filters

The "Filters" area contains a list of all created filters. To edit a filter profile, select the required filter in the list. The selected filter is highlighted in color. Click the "Insert" button to create a new filter. Click the "Delete" button to delete an existing selected filter.

Filter properties

In the "Filter properties" area, you can adapt the properties of the individual filters. To allow filter functions to take effect, the information defined in the filter must be read out from the transponders and compared with the filter criteria.

Table 7- 12 Description of the filter properties

Property	Description	
Name	Input box for assigning a logical name/ descriptive title to the filter.	
Bank	Drop-down list for selecting the memory bank in which the memory area is located.	
Start address	Address starting at which the filter will be checked.	
	Value range	0 ... 65535 bytes
Length	Number of bytes to be checked starting at the start address. The value specified here affects the length of the input boxes "Mask" and "Value".	
	Value range	1 ... 1024 bytes
Criterion	Specifies which value the checked positions must contain HEX representation).	
	Possible characters	0 ... 9, A ... F
ASCII	Hiding/unhiding the ASCII view. When the ASCII view is active, the values of the criterion are shown additionally in ASCII notation. You can edit the values both in the HEX format or in the ASCII format. You can choose between the two input modes "Overwrite" and "Insert".	
Mask	Showing/hiding the mask. Specifies which positions of the criterion should be checked. Example: 00FF → Bits 0 ... 8 of the criterion will be checked.	
	Possible characters	0 ... 9, A ... F
Initialize data	Show/hide the view for initializing the data. Using the initialization function, you can preset the boxes of the criterion and the mask.	

Property	Description
Advanced filter properties	
Inclusive/exclusive filters	Radio button to specify the condition when the transponder processing will continue. • Inclusive filter: The transponder is processed further when the filter criteria mask and value match. • Exclusive filter: The transponder is processed when the filter criteria mask and value do not match.
Unreadable filter data	Radio button to specify what happens if the filter data is not legible, for example because the transponder was not located long enough in the antenna field. Depending on this setting, such transponders are discarded or processed further.

Transponder memory configuration

The "Transponder memory configuration" area contains a graphic to illustrate the memory configuration and the memory areas. For a detailed description of the memory structure, refer to the section "The "Settings - Tag fields" menu item (Page 66)".

Explanation of how filters work

By using filters and depending on the filter criteria, you can separate out specific transponders that will not be processed any further. For example in environments with different product types, you can use filters to filter out the product types that are unimportant for the application or only identify the relevant product types. This is only possible if the information in the memory area of the transponder has been processed accordingly.

Example scenario

A forklift truck takes a pallet with goods from the conveyor belt to store it in the warehouse and in doing so drives through an RFID gate. Both the pallet and the products on the pallet are fitted with transponders. During the remainder of the process, only the information about the palette is necessary. Assign a filter-relevant ID to the transponder of the pallet. Write, for example, to the 10th position in the EPC-ID of all pallet transponders the value "3". The EPC-IDs of the goods transponders, on the other hand, must not have "3" at the 10th position.

With a suitable filter, (value "3" at the 10th position of the EPC-ID), you can now filter out all goods transponders and only identify and process the pallet transponders.

If a filter is active, the appropriate data is read out from each identified transponder and checked against the filter criteria. Depending on this check, transponders are discarded or processed further. A distinction can be made between inclusive and exclusive filtering.

Example of a filter - "Pallet"

The following filter example shows how to create the suitable filter for the sample scenario described.

1. Click on the "Insert" button and select the newly created filter.
2. Name: Enter a name in the input box.
3. Bank: Select the memory area "1 - GEN2 - EPC" from the drop-down list.
4. Start address: Enter "8" in the input box as the start address.

   The EPC-ID starts at the 4th byte of the memory area "EPC". Each byte writes two positions of the EPC-ID. To address the 10th position of the EPC-ID, you therefore need to select the 8th byte:
5. Length: Enter "1" in the input box as the number of bytes.

   Each byte contains two positions of the EPC-ID. Since only one position is relevant in this example, you need to mask out the second position using the mask.
6. Criterion: Enter "03" in the input box as the criterion.

   Since only the second position is relevant in this example, the first position of the criterion can have any other value.
7. Mask: Enter the value "0F" in the input box.

   This specifies the positions in the EPC-ID relevant for filtering out.
8. Inclusive/exclusive filters: Select the "Inclusive filter" filter type.

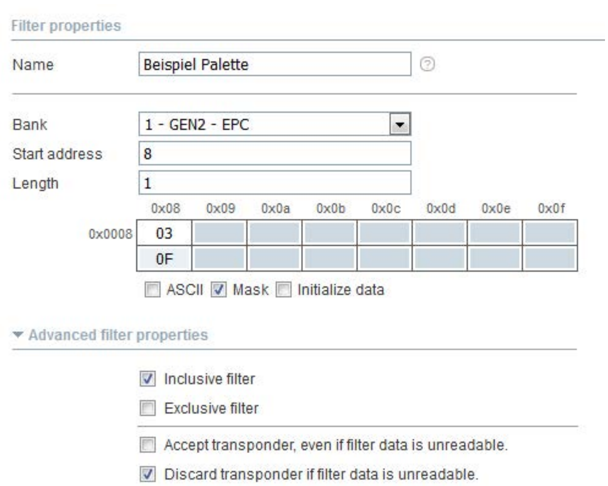


Figure 7-11 Example of a filter

9. Unreadable filter data: Select how the reader handles transponders whose filter data cannot be read out.
10. Enable the filter in the "Settings - Read points" menu item and transfer the configuration to the reader.

7.3.6 The "Settings - Digital outputs" menu item

In the "Settings - Digital outputs" menu item, you can set the properties of the digital outputs and assign functions to the individual outputs. For each output there is an identical tab divided into 2 areas:

- Basic settings
- Events

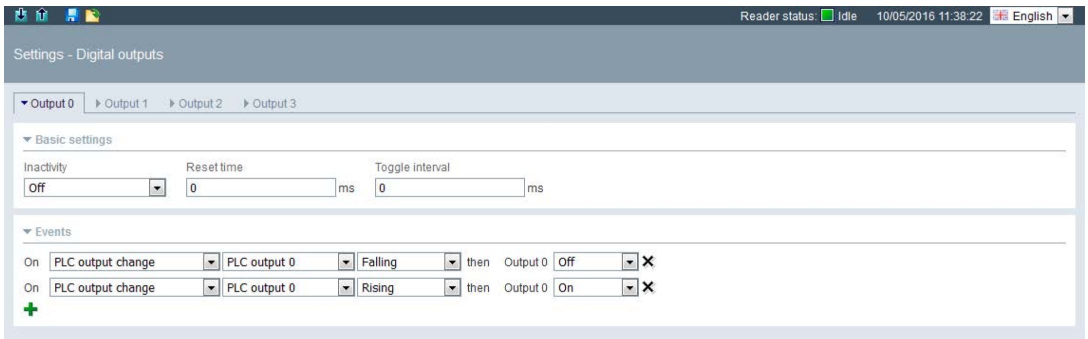


Figure 7-12 The "Settings - Digital outputs" menu item

Basic settings

In the "Basic settings" area, you can make the following settings:

Note

Reaction time of the digital outputs

Note that the reaction time of the digital outputs depends on the reader load.

Table 7- 13 Description of the status properties

Boxes	Description	
Inactivity	Status that the output adopts following device startup.	
Reset time	If the reset time is set to a value ≠ 0, the output automatically returns to the inactivity status when the reset time has elapsed. A value of 0 means that the status of the output is not influenced by this automatic function.	
	Value range	0 ... 65535 ms
	Increment	1 ms
Toggle interval	If a value ≠ 0 is set, the output "flashes" if it is activated by an application or by a function assignment. The flashing frequency corresponds to the value of the toggle interval in milliseconds. A value of 0 means that the status of the output is not influenced by this automatic function.	
	Value range	0 ... 65535 ms
	Increment	1 ms

Events

In the "Events" area, you can define events/conditions that cause a digital output to change to one of the following statuses:

- On

  The output is turned on.
- Off

  The output is turned off.
- Inverted

  The output changes its status starting from the status that is active at the moment the event occurs.

Click the button ➕ to add new events. Click the button ✖ to remove already specified events.

Table 7- 14 Description of the events

Event	Description
Antenna error	If an antenna error occurs on the selected antenna, the output changes to the status specified here.
Transponder identified	If a transponder is identified, the output is changed to the state specified here.
Input change	If the state at the selected digital input changes, the output is set to the state specified here.
Output change	If the state at the selected digital output changes, the output is set to the state specified here.
PLC output change	If the state at the selected PLC output changes, the physical output is set to the state specified here. RF680R/RF685R only

Note the following properties of the digital ouputs:

- The outputs are only changed once when the event occurs.

  The outputs remain set unchanged even when the event is no longer pending.
- Pending events have no effect on the output.
- If an output is changed when an antenna error is detected, this output nevertheless remains unchanged when the antenna error is eliminated

7.3.7 The "Settings - Communication" menu item

The "Settings - Communication" menu item is divided into three tabs.

- Network interfaces
- XML
- OPC UA

In the "Network interfaces" tab, you can enable/disable the network ports (RF680R/RF685R), SNMP and NTP protocols . In the "XML" tab, you can specify which data is sent via the XML interface. In the "OPC UA" tab you can enable and edit the OPC UA server function of the readers.

The "Network interfaces" tab

The "Network interfaces" tab contains the following area:

- Network ports
- SNMP
- NTP

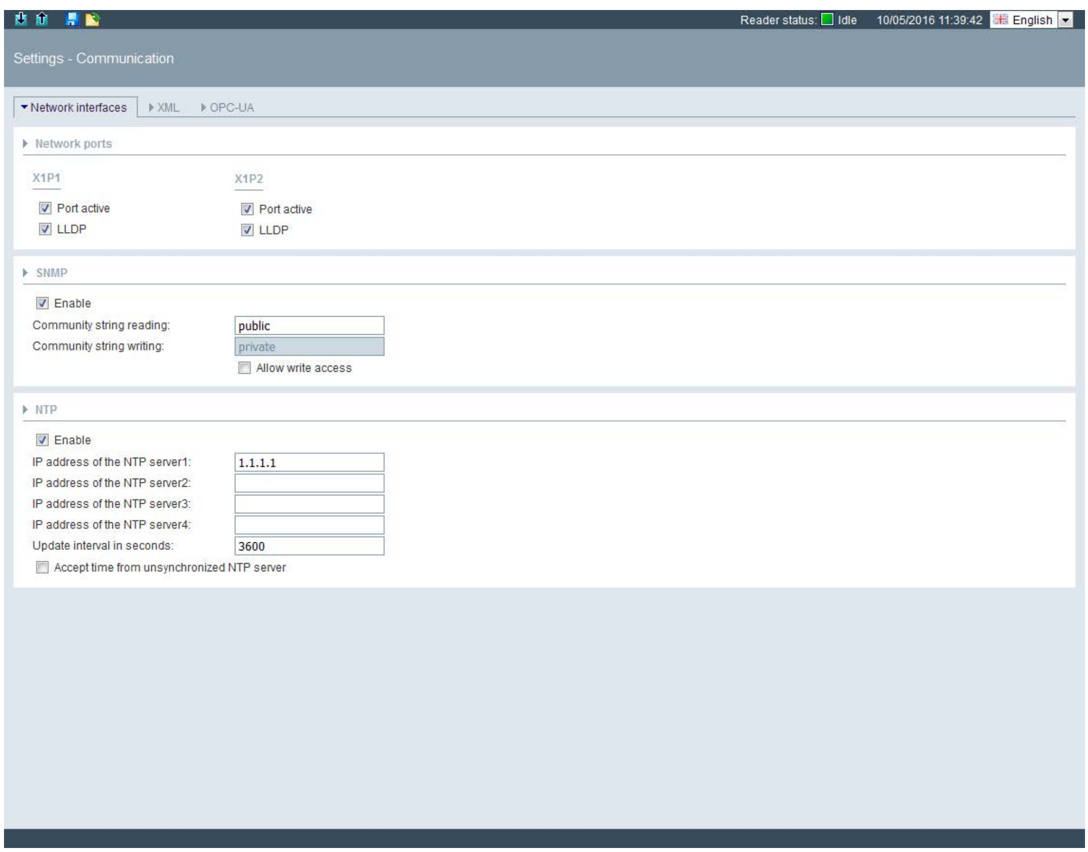


Figure 7-13 The "Settings -- Communication" menu item, "Network interfaces" tab

Network ports

In the "Network ports" area, you can enable/disable the network ports of the readers. Click on the check box of the required network port to enable or disable it.

Note

Disabling the network ports

Make sure that you do not disable the port via which you are currently communicating with the reader.

Note

Requirement for port statistics

Using PROFINET diagnostics and via SNMP you can create port statistics. Note that the "Port statistics" function requires one-port operation. Make sure that the network port which is not in use is disabled with active port operating mode "With port statistics".

Enable the "LLDP" check box to activate the communications log. "LLDP" is a protocol for checking the neighborhood.

SNMP

In the "SNMP" area, you can enable the network protocol. "SNMP" is a protocol for monitoring network components.

When supplied from the factory this setting is disabled and it needs to be enabled here before using SNMP for the first time.

Table 7- 15 Description of the SNMP properties

Property	Description
Community string (reading)	Input box for specifying the user name for read access to SNMP variables.
Community string (writing)	Input box for specifying the user name for write access to SNMP variables. In this box, changes can only be made if write access was permitted. Write access is only possible for the SNMP variables "sysName", "sysLocation" and "sysContact" of the "system" group of MIB-2.
Allow write access	Check box to enable/disable write protection for SNMP variables.

NTP

In the "NTP" area, you can enable the network protocol. "NTP" is a protocol for synchronizing the time in network systems.

When supplied from the factory this setting is disabled and it needs to be enabled here before using NTP for the first time.

Table 7- 16 Description of the NTP properties

Property	Description
IP address of the NTP server x	Input box for entering the address of the NTP master server from which the various connected readers synchronize their time. Up to four NTP servers can be specified to compensate possible server failures.
Update interval in seconds	Input box for specifying the intervals at which the readers automatically synchronize their time.
Accept time from unsynchronized NTP server	Check box to ensure that the readers also accept the time from unsyn-chronized NTP servers.

The "XML" tab

The "XML" tab is divided into 4 areas:

- Basic settings
- Tag events / tag commands
- RSSI Events
- IO Events

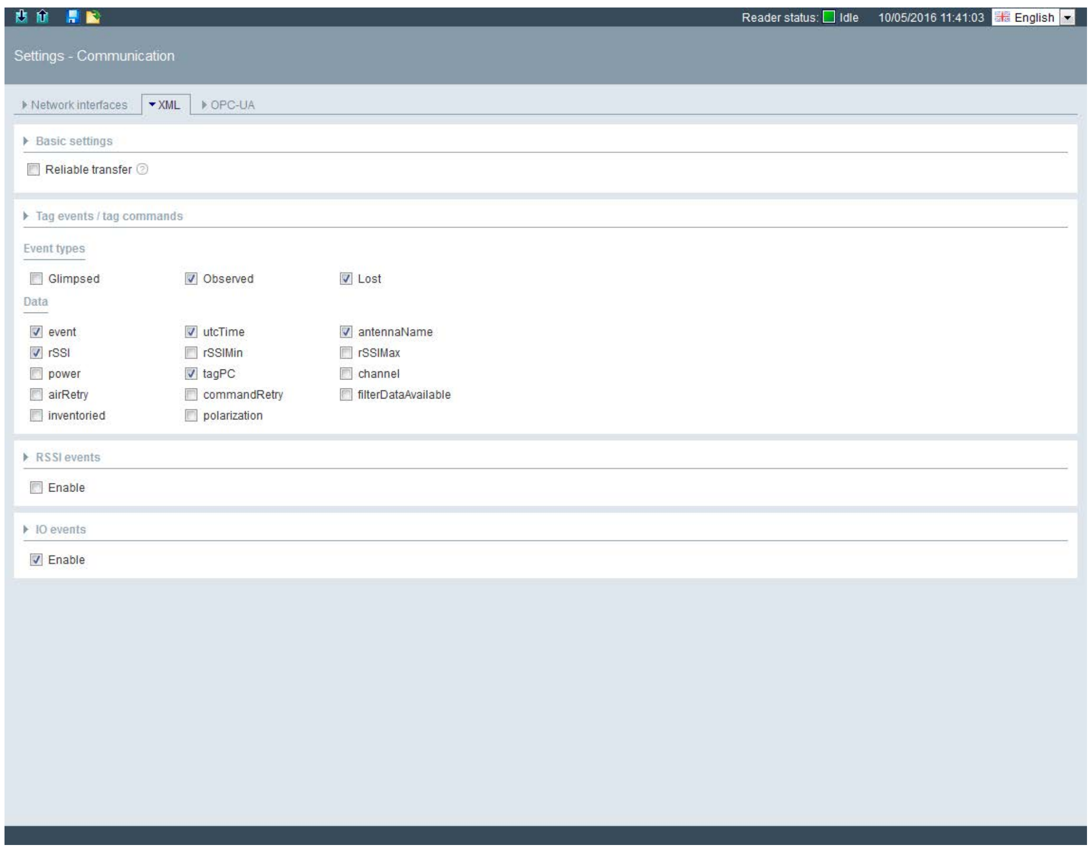


Figure 7-14 The "Settings - Communication" menu item, "XML" tab

Basic settings

Select the "Reliable transfer" check box so that each frame (report) received from the reader by the user application is confirmed with a reply frame. If no reply frame is received by the reader within 10 seconds, it sends the report to the application again. Reports that are not transferred are buffered on the reader.

With this function, you can make sure that no frames from the reader are lost even if the connection is unstable (e.g. WLAN connection aborts occasionally).

This function also allows batch operation of the reader when there is a connection to the user application at certain times. The reader collects the frames and these can, when necessary, be called up using a PC application.

Tag events / tag commands

Tag events signal identified transponders or when they have left the antenna field. Information on all activated tag events is reported by the reader to the XML API interface. The triggers for messages are the following event types:

- Glimpsed

  Transponder was scanned the first time.
- Observed

  The transponder was identified reliably for at least "x" read cycles. You can set the number "x" in the section "The "Settings - Read points" menu item (Page 54)" in the area "Algorithmen > Smoothing > Observed Count" (default value = 1).
- Lost

  The transponder was no longer identified reliably for at least "x" read cycles. You can set the number "x" in the section "The "Settings - Read points" menu item (Page 54)" in the area "Algorithmen> Smoothing Lost Count" (default value = 5).

Note that with the events, only the activated data of the transponder is reported.

The data enabled in this area also affects the message content of the XML commands/reply frames (e.g. with "writeTagID").

Table 7- 17 Description of the event data "Tag events / Tag commands"

Data	Description
event	Event type / status description of the transponder (Glimpsed, Observed, Lost)
utcTime	Time of the event
antennaName	Name of the antenna that scanned the transponder.
rSSI	Signal strength of the transponder
rSSIMin	Minimum signal strength of the transponder
rSSIMax	Maximum signal strength of the transponder
power	Radiated power of the antenna at the time of the scan
tagPC	Protocol Control Word You will find further information in the "EPCglobal Specifications".
channel	Active send channel at the time of the identification
airRetry	Number of command repetitions on the air interface
commandRetry	Number of command repetitions
filterDataAvailable	Information as to whether the data to be used for filtering could be read from the transponder.
inventoried	Number of identifications of a transponder
polarization	Polarization of the antenna at the time of the scan

Not every XML command/event report provides information about all the data activated here. You will find information indicating which XML commands/event reports provide data in the sections "XML commands (Page 191)" and "XML EventReports (Page 265)".

RSSI Events

RSSI events provide information about the signal strength of the transponder responses. The number of these events is significantly higher than that of the tag events and they are sent per identification (inventory) and in some cases even per antenna. This results in a precise series of events during the identification process, however it leads to a lot of data traffic particularly if large numbers of transponders are passing through the antenna field. For this reason, we recommend that you only activate RSSI events when diagnostics is necessary.

For the reader to report the RSSI events events that occur to the XML API interface, the "Enable" check box must be selected.

The following additional data of the RSSI events can be configured:

Table 7- 18 Description of the event data "RSSI events"

Data	Description
utcTime	Time of the event
antennaName	Name of the antenna that identified the transponder.
rSSI	Signal strength of the transponder
power	Radiated power of the antenna
tagPC	Protocol Control Word You will find further information in the "EPCglobal Specifications".
channel	Channel with which the transponder was read.
polarization	Polarization of the antenna

IO Events

For the reader to report the IO events that occur to the XML API interface, the "Enable" check box must be selected.

All events (edge change) of the digital inputs/outputs are always reported to the XML API interface.

You will find more information on events in the section "Events (Page 265)".

The "OPC UA" tab

OPC

The "OPC UA" tab is divided into 4 areas:

- Basic settings
- Security settings
- OPC UA client certificates
- Import OPC UA server certificate

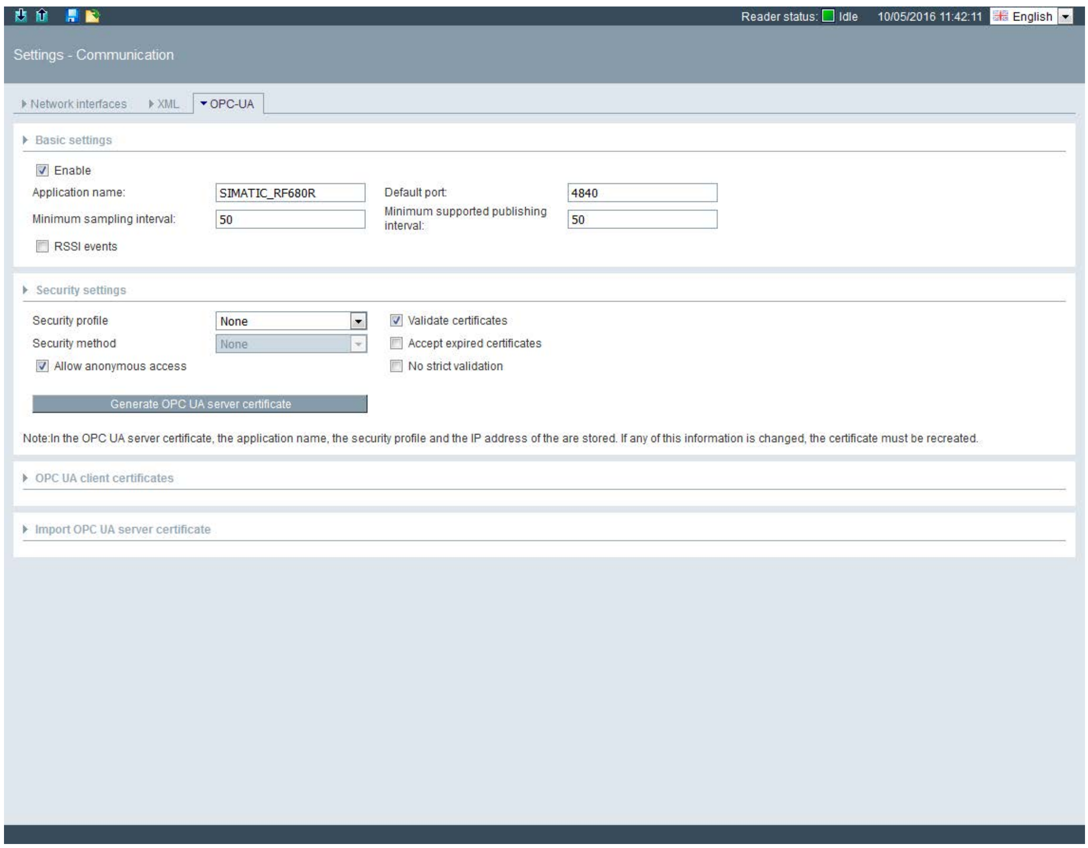


Figure 7-15 The "Settings - Communication" menu item, "OPC UA" tab

Basic settings

In the "OPC UA" area you can make the basic settings for the OPC UA interface. Select the "Enable" check box to enable the OPC UA interface.

Table 7- 19 Description of the parameters

Parameter	Description
Application name	Name of the OPC UA application of the server. The application name is required to identify the OPC UA namespace of the reader and should be unique for each reader within the project. The application name is part of the URL of the OPC UA server of the reader.
Default port	Here you can change the port number of the application. As default, port number 4840 is used, the standard TCP port for the OPC UA binary protocol.
Minimum sampling interval	Minimum sampling interval at which the reader samples the process data. The sampling interval is limited to a minimum value of 10 milliseconds,, to reserve adequate time for other processes. Range of values: 10 .. 50 ms Default setting: 50 ms
Minimum supported publishing interval	Minimum publishing interval supported by the server application at which the process data is published for logged on OPC UA clients. Lower values set by an OPC UA client are not taken into account. Range of values: 10 .. 65535 ms Default setting: 50 ms
RSSI Events	Check box to activate the RSSI events sent to the OPC UA client. RSSI events provide information about the signal strength of the transponder responses. If RSSI events are not enabled, only tag events of the type "Observed" are sent. If the check box is enabled, RSSI events are also sent to the OPC UA client.

Security settings

In the "Security settings" area you can make security settings for the OPC UA certificates.

Table 7- 20 Description of the parameters

Parameter	Description
Security profile	Specification of the security profile and the access options for the UA server of the reader • None No security profile is used. • Basic 128 This profile corresponds to the security profile "Basic 128" of the OPC UA specification. The reader uses signing and if configured 128-bit encryption. • Basic 256 This profile corresponds to the security profile "Basic 256" of the OPC UA specification. The reader uses signing and if configured 256-bit encryption. • Basic 256 / SHA 256 This profile corresponds to the security profile "Basic 256 / SHA 256" of the OPC UA specification. The reader uses signing and if configured 256-bit encryption using the hash algorithm SHA-256.
Security method	Specifies the security method of the server • Sign or sign and encrypt Depending on the settings on the communications partner (client), the reader selects the method with the highest possible security. • Sign The reader only allows communication with signed frames. • Sign and encrypt The reader only allows communication with signed and encrypted frames.
Allow anonymous access	If the check box is selected, the reader allows anonymous users access to the data of its OPC UA server. Anonymous users do not need to give a user name/password when establishing a connection. If anonymous access is not allowed, an OPC UA client or a user must provide a valid user name/password combination of a user with OPC UA rights. A user with OPC UA rights can be created via the WBM. The user profile preinstalled in the factory (user name: "admin", password "admin") also has OPC UA rights.
Generate OPC UA server certificate	Button for creating an OPC UA server certificate. Among other things the server certificate serves to identify the OPC UA server to the OPC UA client. The OPC UA server certificate contains the application name, the security profile and the IP address of the reader. If any part of this information is changed, the server certificate needs to be recreated. Note: Note that the procedure can take several minutes.

Parameter	Description
Validate certificates	If the check box is selected, the reader generally checks the certificate of the communications partner. If the partner certificate is invalid or not trustworthy, communication is aborted.
Accept expired certificates	If the check box is selected, the reader checks the certificate of the communications partner. If the current internal reader time is outside the period of validity of the partner certificate, this is nevertheless allowed and communication established.
No strict validation	If the check box is selected, the reader also allows communication in the following situations: • The IP address of the communications partner is not identical to the IP address in its certificate. Note: The OPC UA server does not check the IP address of its communications partner (client). • The use stored in the certificate (OPC UA client/server) differs from the function (OPC UA client/server) of the communications partner. • The current internal reader time is outside the period of validity of the partner certificate. Regardless of these exceptions, to establish a connection at least the following requirements must be met: • The application URI sent by the requesting client must match the URI of the server application of the reader. • If the partner certificate is not trustworthy, the reader must at least have stored a self-signed certificate of the partner. • If the partner certificate was issued by several CAs (Certification Authorities), all CAs must be stored in the certificate store of the reader.

OPC UA client certificates

The "OPC UA client certificates" area contains a list of all existing user certificates. To display details of a certificate, select the required certificate in the list. The selected certificate field is highlighted in color.

Client certificates displayed in red have not yet been classified as trustworthy by the OPC UA server. The client of such a certificate cannot yet establish a valid connection to the server. Client certificates displayed in black have already been accepted and are classified as trustworthy by the OPC UA server.

With a certificate shown in red, click the "Accept" button to classify the certificate as trustworthy. The cover of the certificate then changes to black. Click the "Delete" button to delete an existing selected certificate. Click the "Update" button to update the list.

Import OPC UA server certificate

In the "Import OPC UA server certificate" area you can transfer server certificate files (*.der) and server certificate key files for the OPC UA server to the reader. Remember that you first need to import the data into the reader before you can activate it.

Using the server certificates, you can integrate the reader in your specific security infrastructure. Certificates are used to check the identity of a person or a device, to authenticate a service or to encrypt files. You can create your own certificates or use official certificates created by a certification authority.

Contact your administrative IT department for further information on the topic of certificates.

Note

Recommendations for secure use of OPC UA

It is recommended that you use the highest security levels and disable anonymous access.

7.3.8 The "Settings - Adjust antenna" menu item

In the "Settings - Adjust antenna" menu item, you can optimize the antenna alignment. This page is divided into 3 areas:

- Basic settings
- Transponder list
- RSSI display

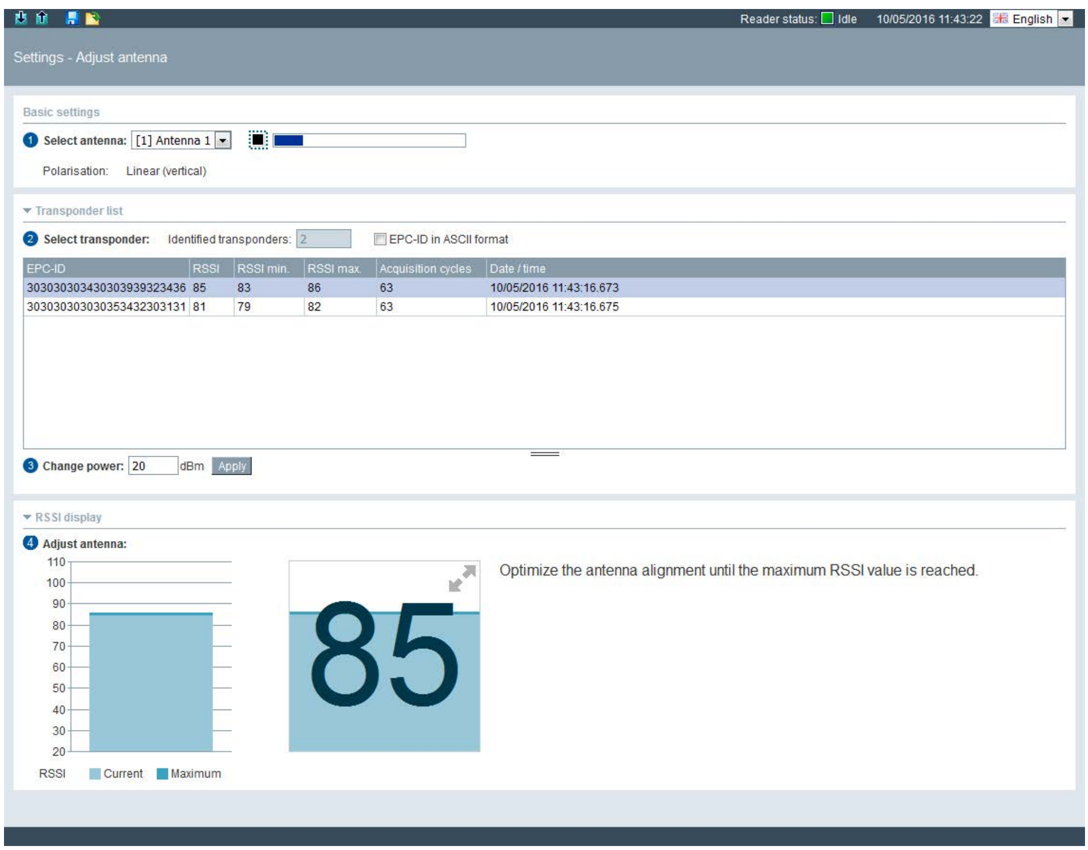


Figure 7-16 The "Settings - Adjust antenna" menu item

Procedure for optimizing the antenna alignment

Note

Do not optimize the antenna alignment during operation

We recommend that you do not optimize (▶) the antenna alignment during operation since this can disturb operation. Optimize the antenna alignment prior to putting the system into operation.

① Select the required antenna and start measuring the RSSI values.

② Select a transponder from the list.

③ Transfer the activation power to the "Radiated power" input box of the "Settings - Read points" menu item.

④ Adjust the antenna until you obtain the highest possible RSSI value.

Basic settings

In this area, you can select the antenna whose alignment needs to be optimized. With the "Start/Stop adjustment" buttons(▶/■), you can control the measurement of the RSSI values.

By clicking the ▶ button, a new measurement is started. Cyclic reads are performed on the selected antenna and the measured values obtained are displayed. Any existing measured values from a previous measurement are deleted. By clicking the ■ button, the measurement is stopped.

Transponder list

After you have started measuring the RSSI values, all the transponders identified by the reader are listed in the table. Select the "EPC-ID in ASCII format" check box to display the EPC-IDs of the transponders in ASCII code.

Table 7- 21 Displayed properties of the recognized transponders

Property	Description
EPC ID	ID of the identified transponder
RSSI	Last measured RSSI value of the transponder
RSSI min.	Minimum RSSI value of the transponder. Calculated over all successful inventories.
RSSI max.	Maximum RSSI value of the transponder. Calculated over all successful inventories.
Acquisition cycles	Number of inventory replies (scans) of this transponder.
Date/time	Time stamp when the transponder was identified the first time.

You can select the transponders individually in the table. The selected transponder is highlighted in color and its measured values shown in the "RSSI display" area.

If the By clicking the "Apply" button, you transfer the value entered in the field to the "Radiated power" input box of the "Settings - Read points" menu item. This change is transferred directly to the reader. To store this change on the reader so that it is safe against failure, you need to click the "Transfer configuration to reader" button.

RSSI display

This area shows the measured RSSI values of the selected transponder. The bar chart shows the maximum measured and the current or last measured RSSI value of the transponder. The current RSSI value of the selected transponder is also displayed as a numeric value. Using the arrow symbols, you can expand or reduce the window for the numeric RSSI value. This allows you to read the current RSSI value even from greater distances so that you can find the optimum alignment for the highest RSSI value quickly and simply by varying the antenna position.

The RSSI value is also displayed by the status LEDs of the RF680R/RF685R readers and by the "PRE" LED of the RF650R reader. Low RSSI values are shown in red, medium RSSI values in yellow and high RSSI values in green.

7.3.9 The "Settings - Activation power" menu item

In the "Settings - Activation power" menu item, you can detect and optimize the activation power of the various antennas. This function helps you to find the optimum radiated power with which the transponder will be reliably identified without generating overshoot. This page is divided into 3 areas:

- Basic settings
- Measuring range settings
- Transponder list
- RSSI graph

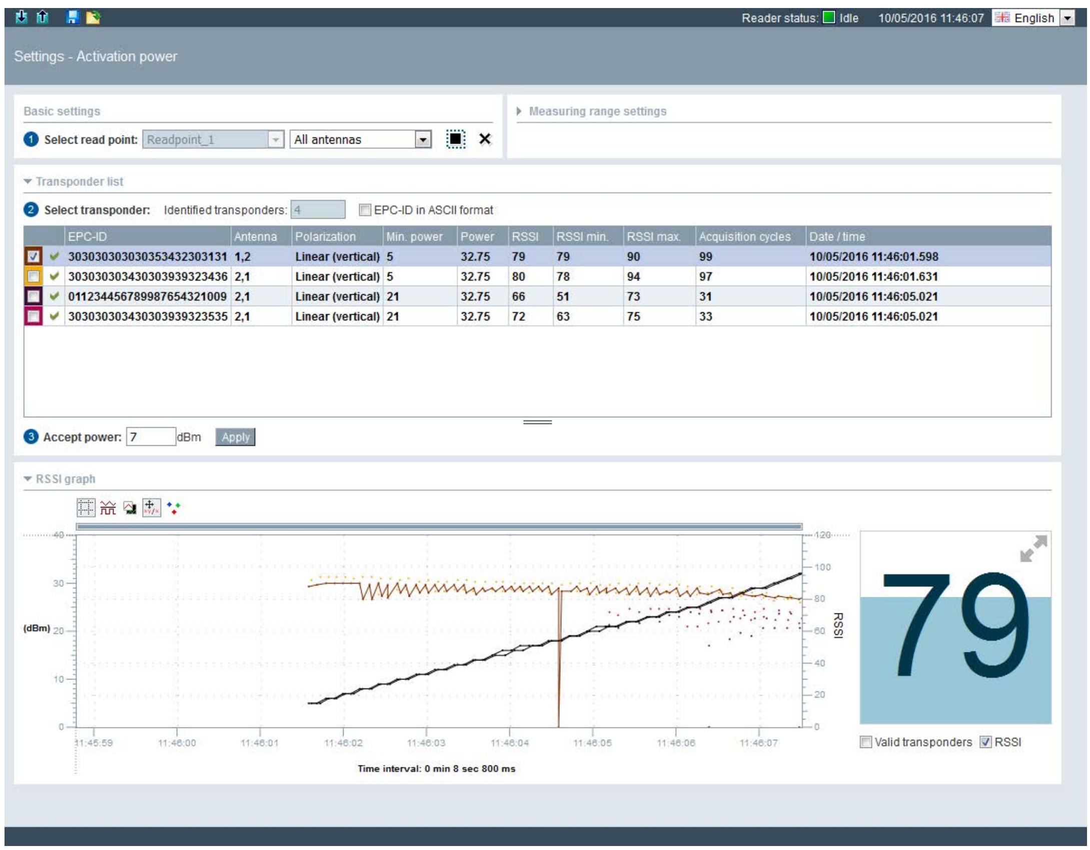


Figure 7-17 The "Settings - Activation power" menu item

Procedure for determining the activation power

Note

Do not optimize the activation power during operation

We recommend that you do not optimize (▶) the activation power during operation since this can disturb operation.

---

① Select the required read point and antenna, enter the required measuring range values and start the measurement.

② Select a transponder from the list.

③ Transfer the activation power to the "Radiated power" input box of the "Settings - Read points" menu item.

Basic settings

In this area, you can select the read point and antenna whose optimum activation power you want to measure.

With the "Start/Stop measurement" (▶/■) and "Delete display" (✕) buttons, you can control the power measurement.

By clicking the ▶ button, a new recording is started. Cyclic reads are performed on the selected antenna and the measured values obtained are displayed. Any existing measured values from a previous recording are deleted. By clicking the ■ button, the recording is stopped. Clicking the ✕ button deletes the currently displayed measured values.

Measuring range settings

Using the input boxes in this area, you can influence the measurement. The parameters contained in this area are intended for trained users. For untrained users, we recommend using the default settings.

- Power from ... to ...

  Specifies the range of values (dBm value) within which the measurement is made. The measurement starts at the "from" value and ends automatically as soon as the "to" value is reached.

- Increment

  Specifies the dB value by which the radiated power is increased step-by-step during the measurement.

- Time interval

  Specifies the time after which the radiated power is increased by the dB value increment during the measurement.

  Note that with a large number of transponders and inventory can take several seconds. Select a suitably large time interval to make sure that several inventories can be taken. If the time interval selected is too short this can mean that the power is increased already before the end of the inventories.

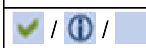
- Channels

  Specifies which channels should be used in the measurement.

Transponder list

After you have started the measurement, all the transponders identified by the reader are listed in the table (max. 500). Select the "EPC-ID in ASCII format" check box to display the EPC-IDs of the transponders in ASCII code.

Table 7- 22 Displayed properties of the recognized transponders

Property	Description
	Selection of the transponders to be displayed in the graph. Up to 10 transponders can be selected. The selected transponders are shown in the RSSI graph as continuous lines. Up to 10 further transponders from the list are displayed as dots.
	Filter status of the transponders • Transponder was identified and returned to the user application. • Transponder was identified but filtered out. Place the mouse pointer over the symbol to find out which filter filtered out the transponder. • Transponder was identified and not filtered out. However the transponder has not yet been returned to the user application (e.g. due to the "Glimpsed" status).
EPC ID	ID of the identified transponder
Antenna	Antenna with which the transponder was detected.
Polarization	Polarization of the antenna
Min. power	Minimum radiated power [dBm] of the antenna with which the transponder was identified.
Power	Radiated power [dBm] of the antenna with which the transponder was last identified.
RSSI	Last measured RSSI value of the transponder
RSSI min.	Minimum RSSI value of the transponder. Calculated over all successful inventories.
RSSI max.	Maximum RSSI value of the transponder. Calculated over all successful inventories.
Acquisition cycles	Number of inventory replies (scans) of this transponder.
Date/time	Time stamp when the transponder was identified the first time.

The value "Min. power" of the transponder last selected in the transponder list is automatically transferred to the "Accept power" box with 2 dB added. By clicking the "Apply" button, you transfer the value entered in the field to the "Radiated power" input box of the "Settings - Read points" menu item.

Note

Optimizing the radiated power

The value entered automatically in the "Accept power" box corresponds to the minimum value with which the transponder was identified by the antenna (Min. power) plus a power reserve of 2 dB. This value serves as a guideline and you can adapt it. To be sure that the antenna reliably detects the transponders regularly, we recommend that you accept the automatically adapted default value.

RSSI graph

The graph shows the course of the measured radiated power(dBm value) of the selected antenna over time (black line) and the RSSI values of all selected transponders (colored lines/dots). Using the icons, you can modify the display of the graph and adapt it to your needs.

Table 7- 23 Buttons of the RSSI graph

Icon	Description
	Show/hide grid lines
	Change RSSI curve types Measured values are joined together either with a direct line or using horizon- tal and vertical lines.
	Change over the background color, between white and black
	Make RSSI graph moveable / fixed The RSSI graph is either fixed or the zero point of the graph can be moved holding down the left mouse button.
	Highlight RSSI measured values Display measured values with thin or thick points.

The current RSSI value of the last selected transponder or the number of valid transponders is also displayed as a numerical value. You can control the value that is displayed using the radio buttons. Using the arrow symbols, you can expand or reduce the window for the numeric RSSI value.

7.3.10 The "Diagnostics - Tag monitor" menu item

In the "Diagnostics - Tag monitor" menu item, you obtain an overview showing which transponder was identified and how well with which antenna. This page is divided into 5 areas:

- Basic settings
- Trigger
- Transponder list
- RSSI graph
- Digital inputs/outputs

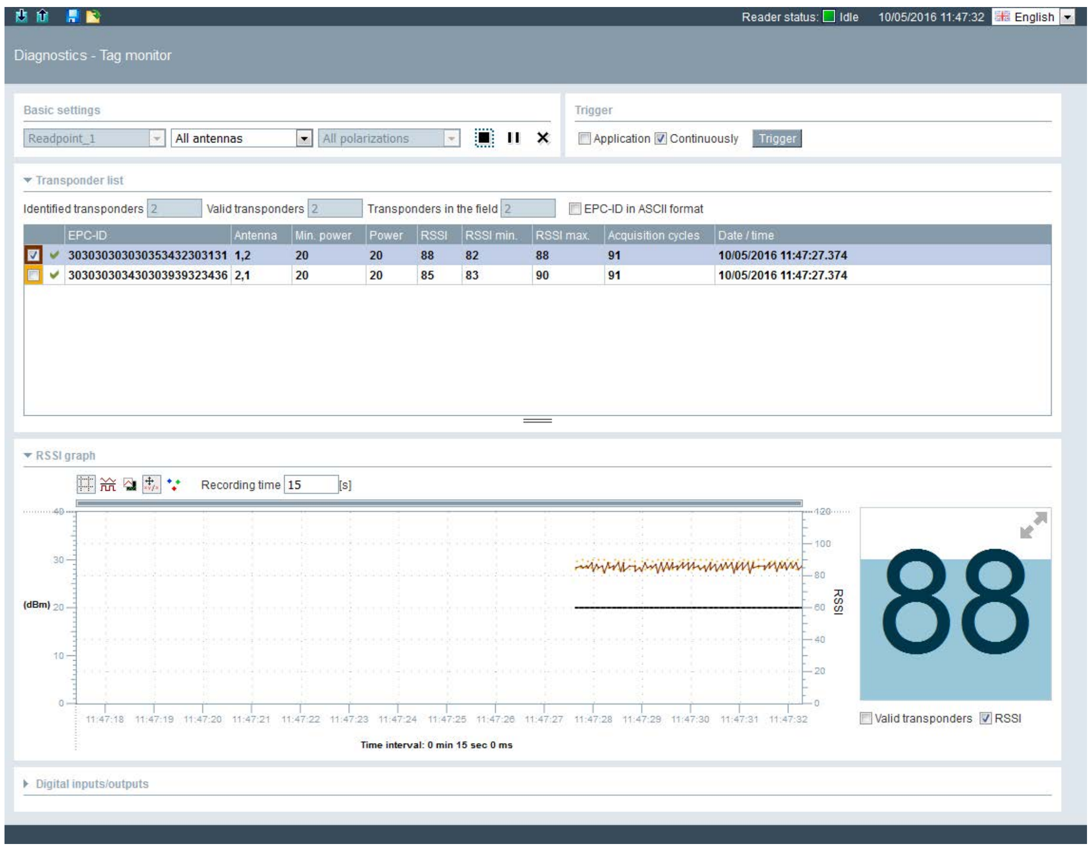


Figure 7-18 The "Diagnostics - Tag monitor" menu item

Basic settings

In this area, you can select the read point and the antenna whose behavior you want to analyze. Depending on the reader being used or the connected antenna, you can also select the antenna polarization. With the "Start/Stop diagnostics" (▶/■), "Pause" (❚❚/▶❚) and "Delete display" (✕) buttons, you can control the diagnostics.

By clicking the ▶ button, a new diagnostics phase is started. Any existing measured values from previous diagnostics are deleted. If read procedures are triggered via the controller, the IT system or a digital input, the measured values are displayed in the table and in the RSSI graph. By clicking the ■ button, the diagnostics is stopped. Clicking the ✕ button deletes the currently displayed measured values. With the ❚❚ button, you can halt the display of the RSSI graph while the diagnostics continues.

Trigger

Note

Diagnostics in the commissioning phase / during normal operation

With the aid of the "Diagnostics - Tag Monitor" you can monitor the behavior of the connected RFID system. Here a distinction is made between diagnostics during operation and diagnostics during the commissioning phase:

- Diagnostics in the commissioning phase (Trigger = "Continuously")

  To monitor the behavior of the RFID system during the commissioning phase, you can have the read access triggered continuously by the reader itself (Trigger = "Continuously"). Note that this type of diagnostics influences the triggers of any higher-level systems because the continuous triggers are given higher priority.
- Changeover during normal operation (Trigger = "Application")

  To monitor the behavior of the RFID system during operation, you can trigger individual reads manually (Trigger = "Application"). The requirement for this is that the reads are controlled in normal operation by a higher-level system (e.g. controller/IT system) or by a digital input.

Note that diagnostics via the tag monitor influences current operation. In particular the continuous trigger can lead to data being sent to the higher-level system, that can lead to an unwanted response.

To perform diagnostics during operation, select the "Application" check box and start the diagnostics (▶). However in the commissioning phase use the option "Continuously".

Follow the steps below to perform diagnostics during operation:

1. Select the "Application" check box.
2. Start the diagnostics phase (▶).
3. Click the "Trigger" button.

Follow the steps below to perform diagnostics during the commissioning phase:

1. Select the "Continuously" check box.
2. Start the diagnostics phase (▶).

Transponder list

After you have started the diagnostics, all the transponders identified by the reader are listed in the table (max. 500).

The output boxes:

- Identified transponders

  Number of physically identified transponders (max. 500).
- Valid transponders

  Number of identified transponders recognized by the reader as being valid since the start of the recording and that were possibly further processed.
- Transponders in the field

  Number of transponders located in the antenna field of the reader or the antenna during the last inventory.

Select the "EPC-ID in ASCII format" check box to display the EPC-IDs of the transponders in ASCII code.

Table 7- 24 Displayed properties of the recognized transponders

Property	Description
☐ / ☑	Selection of the transponders to be displayed in the graph. Up to 10 transponders can be selected. The selected transponders are shown in the RSSI graph as continuous lines. Up to 10 further transponders from the list are displayed as dots.
✔ / ⓘ /	Filter status of the transponders • Transponder was identified and returned to the user application. • Transponder was identified but filtered out. Place the mouse pointer over the symbol to find out which filter filtered out the transponder. • Transponder was identified and not filtered out. However the transponder has not yet been returned to the user application (e.g. due to the "Glimpsed" status).
EPC ID	ID of the identified transponder
Antenna	Antenna(s) with which the transponder was identified.
Min. power	Minimum radiated power [dBm] of the antenna with which the transponder was identified.
Power	Radiated power [dBm] of the antenna with which the transponder was last identified.
RSSI	Last measured RSSI value of the transponder
RSSI min.	Minimum RSSI value of the transponder. Calculated over all successful inventories.
RSSI max.	Maximum RSSI value of the transponder. Calculated over all successful inventories.
Acquisition cycles	Number of times the reader identified the transponder. An inventory means a scan on the air on one antenna and with one polarization. Not to be confused with number of inventories: Cup with a single inventory, all antennas with all polarizations are queried.
Date/time	Time stamp when the transponder was identified the first time.

RSSI graph

The graph shows the course of the measured radiated power(dBm value) of the selected antenna over time (black line) and the RSSI values of all selected transponders (colored lines/dots). Using the icons, you can modify the display of the graph and adapt it to your needs.

Table 7- 25 Buttons of the RSSI graph

Icon	Description
	Show/hide grid lines
	Change RSSI curve types Measured values are joined together either with a direct line or using horizontal and vertical lines.
	Change over the background color, between white and black
	Make RSSI graph moveable / fixed The RSSI graph is either fixed or the zero point of the graph can be moved holding down the left mouse button.
	Highlight RSSI measured values Display measured values with thin or thick points.

In the "Recording time" input box, you can specify the duration of the recording shown in the graph. With the aid of the gray shift bar, you can move the recording time of the draft forwards or backwards.

The current RSSI value of the last selected transponder or the number of valid transponders is also displayed as a numerical value. You can control the value that is displayed using the radio buttons. Using the arrow symbols, you can expand or reduce the window for the numeric RSSI value.

Digital inputs/outputs

In this area you can have these statuses of the digital inputs/outputs displayed. Inputs on a gray background indicate that the inputs are either not connected or that no signal with the minimum voltage is applied (see also the section "Connection scheme for the digital I/O interface" of the system manual "SIMATIC RF600"). Outputs shown on a gray background indicate that the output is logically set to the value "0" or is turned off. If an input or an output is shown on a green background, this indicates logical status "1" or that the output is turned on or that a signal is applied to the input.

You can use this function to control the outputs. To make changes, you need to click the "Apply" button.

7.3.11 The "Diagnostics - Log" menu item

The log of the reader is displayed in the "Diagnostics - Log" menu item. The log helps SIEMENS specialists to analyze errors.

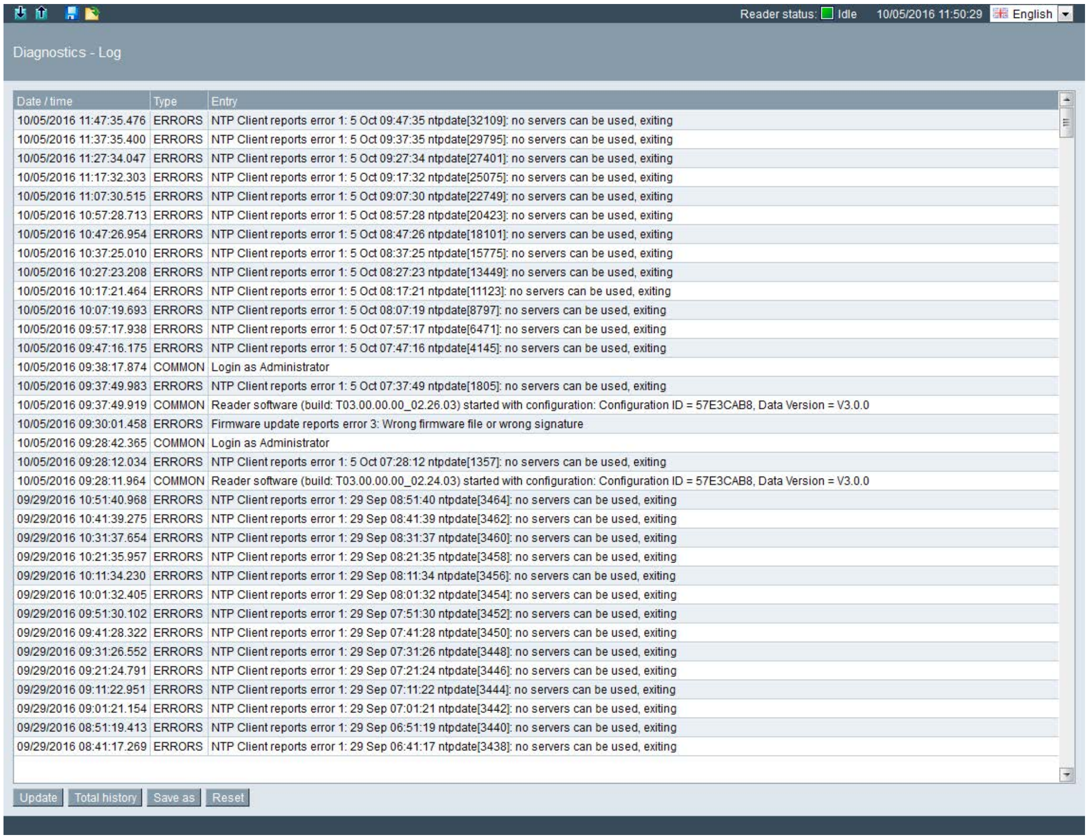


Figure 7-19 The "Diagnostics - Log" menu item

The menu item "Log" shows all the message types that were selected in the menu item "Settings - General" in the"Log settings" area. This menu item documents the actions performed by the reader.

The entries contain the following properties:

Table 7- 26 Displayed properties of the log messages

Property	Description
Date/time	Time stamp when the entry was made by the reader. Note that the time stamp is generated by the reader clock (UTC time). This time is compared with the time zone set on the PC and displayed accordingly.
Type	Type of message Which message types are signaled depends on the check boxes enabled in the menu item "Settings - General" in the "Log settings" area.
Entry	Text of the message

With the "Update", "Save as" and "Reset" buttons, you can control the entries:

- Update

  The log is read in again from the reader and the list updated. The displayed log entries contain 200 KB of data.

- Total history

  The complete stored log of the reader is read in. The displayed log entries contain 10 MB of data.

- Save as

  The log read out from the reader is stored as a *.log file on the PC.

- Reset

  The log is deleted on the reader.

With a large number of log entries in the history, it may take several minutes before these are displayed.

Service support by SIEMENS specialist personnel

By changing the address line in the browser, and additional menu item for service purposes can be called. To do this, change the value of the page to 11 (http://192.168.0.55/Default.mwsl#page=11). Apart from displaying internal instructions, via this menu a "Service Log File" can also be stored by the reader on the PC.

This file records internal sequences of the reader and is required for service support by SIEMENS specialists. Reading out the data can under certain circumstances impair the performance of the reader and it should therefore only be read out if requested by SIEMENS service.

7.3.12 The "Diagnostics - Messages" menu item

In the "Diagnostics - Messages" menu item, all messages of the WBM (e.g. transfer errors) are displayed.

Figure 7-20 The "Diagnostics - Messages" menu item

All the error messages and warnings displayed in the log bar are automatically entered in the messages list.

The entries contain the following properties:

Table 7- 27 Displayed properties of the messages

Property	Description
No	Chronological numbering of the messages.
Date/time	Time stamp of when the warning or error message occurred.
Menu	Menu item that was selected when the message occurred.
Type	Type of message
Message	Text of the message
Comment	Explanation of the message text.

7.3.13 The "Edit transponder" menu item

In the "Edit transponder" menu item, you can edit all the transponders identified from the read point that are currently located in the antenna field. This page is divided into 7 areas:

- Basic settings
- Identified transponders
- Selected transponder
- Write EPC-ID
- Read/write
- Lock
- Kill

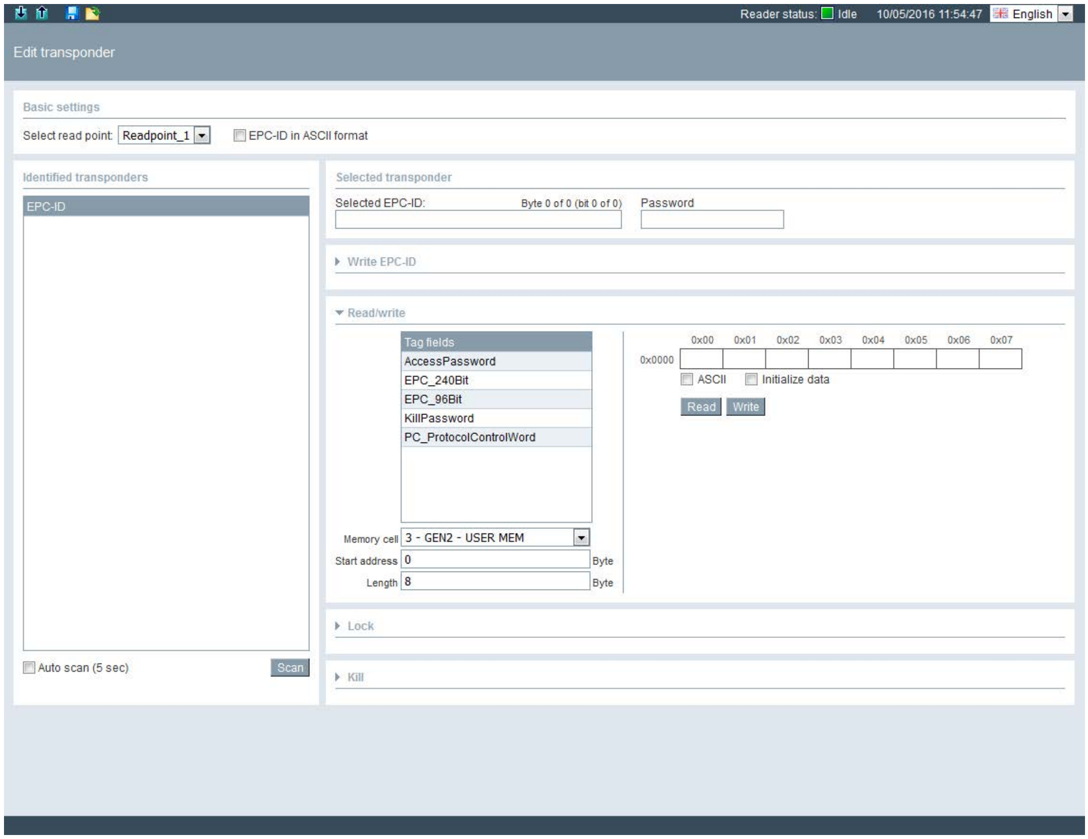


Figure 7-21 The "Edit transponder" menu item

Basic settings

In this area, you can select the read point with which transponders will be processed.

Select the "EPC-ID in ASCII format" check box to display the EPC-IDs of the transponders in ASCII code.

Identified transponders

The "Identified transponders" area contains a list of the transponders identified by the read point. To obtain or update list entries, click the "Scan" button. To edit a transponder, select the required EPC-ID in the list. The selected EPC-ID is highlighted in color. The selected EPC-ID is also displayed in the "Selected EPC-ID" box.

Select the "Auto scan (5 sec)" check box to update the list entries automatically every 5 seconds.

Selected transponder

The EPC-ID selected in the list is displayed in the "Selected EPC-ID" box. In the "Password" input box, you can enter the access or kill password. You require these passwords to "Lock" or "Kill" the transponder. You specify the passwords in the section "The "Settings - Tag fields" menu item (Page 66)".

Write EPC-ID

This area is not displayed if you have selected the modulation scheme "65 - ISO 18000-6B".

In the "New EPC-ID" input box, you can enter the ID of the transponder. Click the "Copy selected EPC-ID" button to transfer the EPC-ID selected in the list to the input box. This allows you to change existing IDs both quickly and simply. Click the "Write" button to assign the new EPC-ID to the transponder.

Read/write

In the "Read/write" area, you can read out and overwrite the memory areas. You have the option of preassigning the memory area using the tag fields you have already created. Using the parameters, you can adapt the memory area manually.

Table 7- 28 Description of the parameters of the tag fields

Parameter	Description	
Bank	Drop-down list for selecting the memory area to be read/written. The following properties relate to this setting.	
Start address	Value of the start address of the data to be read/written.	
	Value range	0 ... 65535 bytes
Length	Number of bytes to be read/written starting at the start address.	
	Value range	1 ... 1024 bytes
Data	Input boxes for the values (HEX representation).	
	Possible characters	0 ... 9, A ... F
ASCII	Showing/hiding the ASCII view. When the ASCII view is active, the data is shown additionally in ASCII notation. You can edit the data both in the HEX format or in the ASCII format. You can choose between the two input modes "Overwrite" and "Insert".	
Initialize data	Show/hide the view for initializing the data. Using the initialization function, you can preset the data fields.	

The data of the selected memory area is displayed in HEX beside the list of tag fields.

With the "Read" button, the data is read from the transponder. The data read from the transponder is highlighted in red to distinguish it from the data entered manually. If no values are displayed, this means that no values have yet been read from the transponder.

Click the "Write" button to transfer the changed data to the transponder.

Lock

This area is not displayed if you have selected the modulation scheme "65 - ISO 18000-6B".

In the "Lock" area, you can protect or unlock the memory areas (banks) as well as the access and kill password of the selected transponder. Select the "Permanent" check box to make the setting irreversible. Click the "Apply" button to transfer the settings to the transponder. To enable/disable protection, you need to enter the access password in the "Password" input box.

NOTICE
Read/write protection of the passwords
Note that passwords that are read/write protected can no longer be read out. We recommend that you note down the password.

Kill

This area is not displayed if you have selected the modulation scheme "65 - ISO 18000-6B".

In the "Kill" area, you can 'destroy' the entire memory of the transponder. Following a successful "kill", the transponder can no longer be identified by any RFID reader and is therefore no longer usable. To "destroy" the transponder, click the "Execute" button. To destroy the transponder, you need to enter the kill password in the "Password" input box. Note that with the default kill password, you cannot destroy a transponder. To destroy a transponder with the kill password, you first need to assign a kill password.

Explanation of the Lock command

In the factory setting, UHF transponders are not protected by passwords in other words they are in the "open status". The memory banks "0" (kill / access password), "1" (EPC) and "3" (USER) can be modified with a write command. Memory bank "2" (TID) can normally not be changed since this is already locked by the manufacturer.

Some use cases, however require that writing is checked or completely prevented. The "Lock" command is used for this purpose. With this, you can lock individual or multiple memory areas. To be able to lock memory areas, you need to change the transponder to the "protected status" (access password ≠ 00000000). You create the access password using the predefined tag fields and can edit this using the "Read/write" area in this menu.

After you have changed the access password, you can still access the memory areas with the default password. To access the memory areas only with the access password, enable the read/write protection of the relevant memory area.

To lock the memory areas, two bits are used. These bits can also be combined with each other. Depending on the memory area this has the following different effects:

Table 7- 29 Memory bank "1" (EPC) and memory bank "3" (USER)

Write protection	Permanent	Description
--	--	The associated memory area can be written in both the open status and in the protected status.
--	✓	The associated memory area can be written to permanently in both the open and in the protected status and must not be protected.
✓	--	The associated memory area can only be written to in the protected status.
✓	✓	The associated memory area cannot be written to in any of the statuses.

Table 7- 30 Memory bank "0" (kill/access password)

Read/ write protection	Permanent	Description
--	--	The associated password memory area can be read and written to in both the open and in the protected status.
--	✓	The associated password memory area can be permanently read and written to in both the open and in the protected status and must not be protected.
✓	--	The associated password memory area can be read and written to only in the protected status.
✓	✓	The associated password memory area cannot be read or written to in any of the statuses.

Example

To ensure that the EPC-ID cannot be modified by every user, you need to lock it. First assign an access password (≠ 00000000) and then lock memory bank "1" (EPC). You also need to lock the access password in memory bank "0" (access password) to make sure that no one can read out the access password and then change the EPC-ID with it.

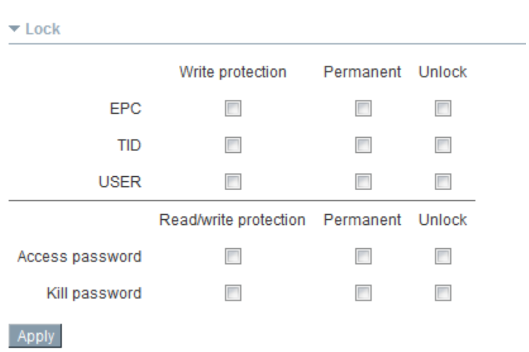


Figure 7-22 Example of locking the EPC-ID

7.3.14 The "User management" menu item

To be able to work with the user management function you first need to enable it. To do this, click the "Enable user management" button and confirm with "OK". The user management requires a secure connection using HTTPS. Change the connection and log in with an administrator login.

Figure 7-23 The "User management" menu item; "User management on / off"

Note

First login to WBM via HTTPS

The RF650R, RF680R and RF685R readers ship with the following user profile pre-installed in the factory:

- User name: admin
- Password: admin

Using the "admin" user profile, you can create new user profiles and delete existing profiles.

NOTICE
Security recommendation: Enable user management After starting the WBM the first time, no user management is enabled. To make sure that no unauthorized persons can access the reader settings, we recommend that you enable the user management and create new user profiles after the first login and delete the preinstalled profile.

Procedure

Follow the steps below to log in to the WBM:

1. Enter your user name in the "User" input box.
2. Enter your password in the "Password" input box.

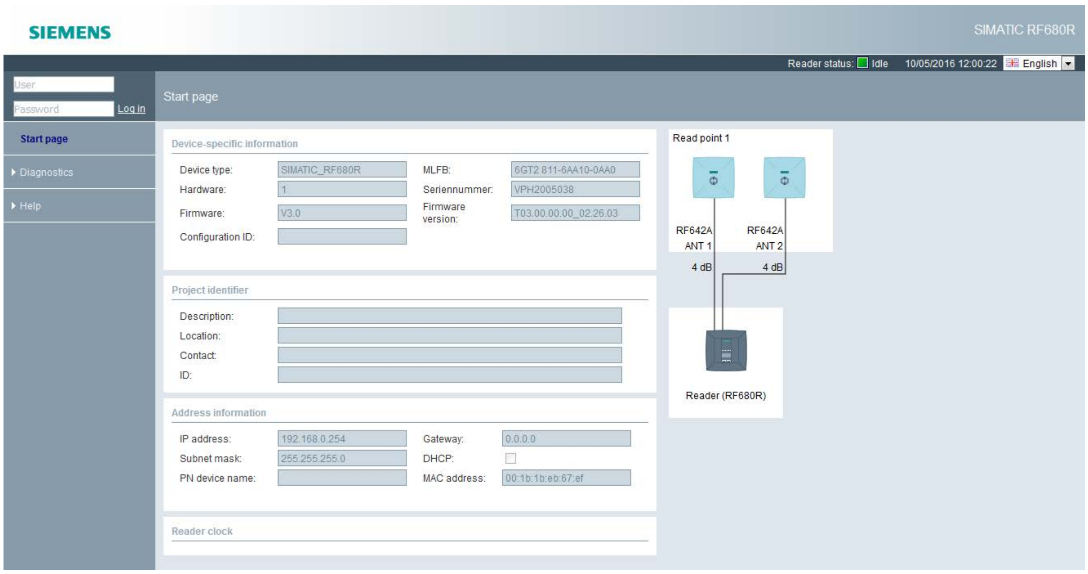


Figure 7-24 Login to WBM

3. Click the "Log in" button.

Result: You are logged in to the WBM and can now set reader parameters.

The "User management" menu item

In the "User management" menu item, you can create, delete and edit user profiles and change passwords. This page is divided into 5 areas:

- User profiles
- User properties
- Password
- Roles
- User management on / off

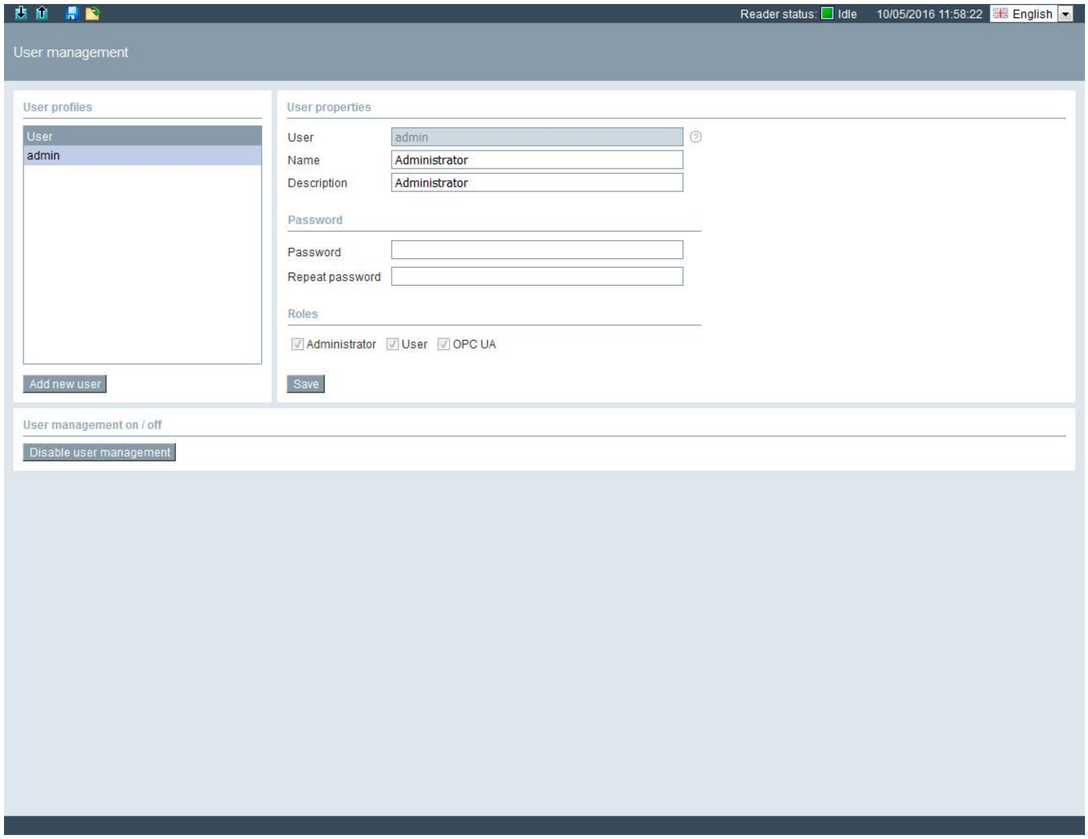


Figure 7-25 The "User management" menu item

User profiles

The "User profiles" area contains a list of all existing user profiles. Up to a maximum of 32 user profiles can be created. To edit a user profile, select the required user name in the list. The selected user name is highlighted in color.

Click the "Add new users" button to create a new user. Click the "Delete" button to delete a selected user profile.

User properties

In the "User name" input box, enter the name of the newly created user profile. You require the user name and the password to log in to the WBM. The user name cannot be edited later.

In the "Name" input box, you can enter the name of the person or the name of the group that works with the user profile. In the "Description" input box, you can enter further information about the user profile.

Password

Enter the password of the user profile in the "Password" and "Repeat password" input boxes. You require the user name and the password to log in to the WBM. User passwords can be changed by the users themselves or an administrator. If you lose your administrator password, you need to reset the reader to the factory settings using the XML command "resetreader" (value "Reset2Factory").

Roles

In the "Roles" area, you can assign roles to the user profile. Click the relevant check box to assign the required roles to the user profile. The "Administrator" role has all read/write rights

- Users

  Restricted user profile with read/write rights. As "User", you cannot create new user profiles or edit other user profiles. In addition to this, as the "user", you cannot write to the reader in the "Run" reader status.
- Administrator

  User profile with all read/write rights
- OPC UA

  Restricted user profile with OPC UA rights. As an "OPC UA" user you can only log on to an OPC UA connection. This role has no rights whatsoever in the WBM and it cannot be used to log on to the WBM.

Click the "Save" button to save the changes and to create the new user profile.

Note

Restrictions when transferring the configuration

Note that as a "user", you can only transfer changes when the reader is in the "Idle" status. As an "administrator" you can also transfer changes when the reader is in the "Run" status.

The following table provides you with an overview of the menu items that are restricted for the "User" role:

Table 7- 31 Restrictions for the "User" role

Menu items		Restrictions
Start page		• Restricted: Input boxes cannot be filled. • No operator control is possible in the "Run" reader status.
Settings		
	Adjust antennas	• No operator control is possible in the "Run" reader status.
	Detect activation power	• No operator control is possible in the "Run" reader status.
Diagnostics		
	Tag monitor	• No operator control is possible in the "Run" reader status.
	Log	• Restricted: The log cannot be reset.
Edit transponder		• No operator control is possible in the "Run" reader status.
User management		• Restricted: Changing your own password.
System		• No operator control is possible in the "Run" reader status.

User management on / off

Click the "Disable user management" button if you want to disable user management again.

7.3.15 The "System" menu item

In the "System" menu item, you can update firmware, reset the reader to the factory settings, change the IP address of the reader, load certificates on the reader and transfer control files to the PC. This page is divided into 5 areas:

- Firmware update
- Restore
- IP address
- Certificate
- Device description files

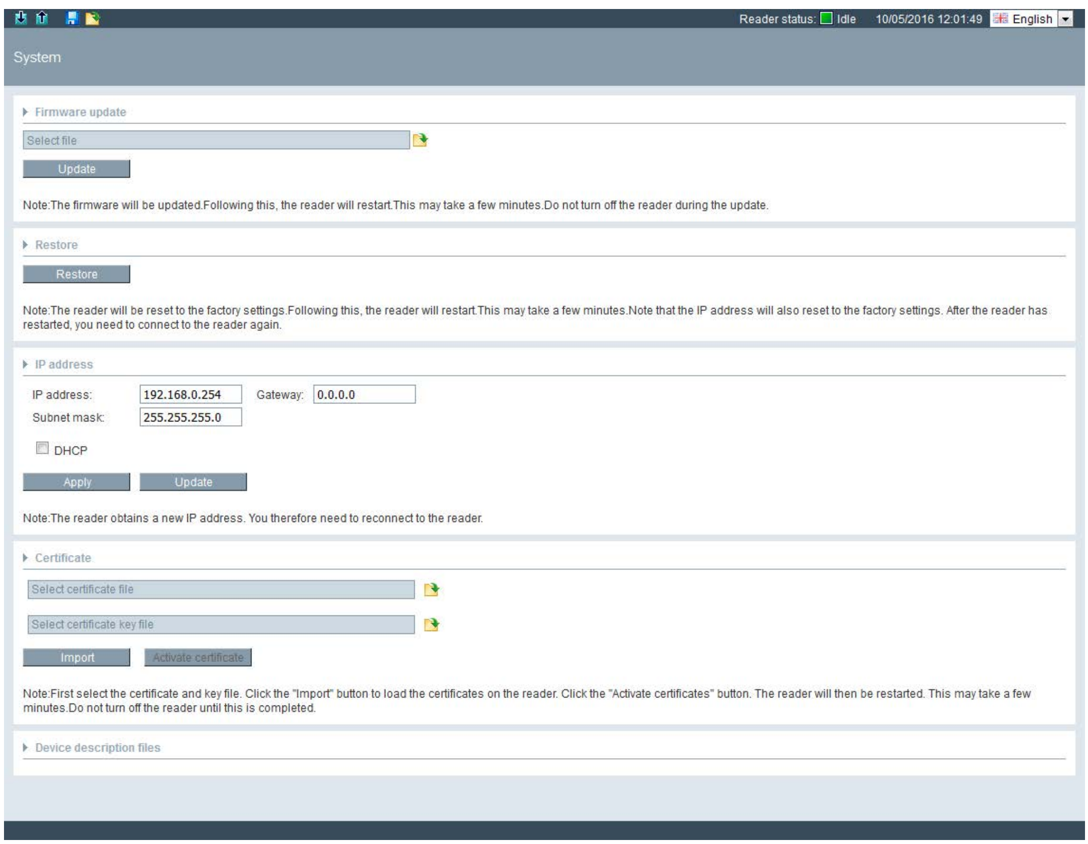


Figure 7-26 The "System" menu item

Firmware update

In the "Firmware update" area, you can update the firmware of the reader. For a detailed description of firmware updates, refer to the section Firmware update (Page 305).

Restore

In the "Restore" area, you can reset the reader to the factory settings. When you restore the reader, all set configuration data, settings of the user management and address information are lost.

Click the "Restore" button to restore the device to factory configuration settings. After restoring, the reader is automatically restarted. Note that after this, you need to assign a new IP address to the readers.

As an alternative, you can also reset the reader to the factory settings using the XML command "resetReader" (value "Reset2Factory").

IP address

In the "IP address" area, you can change the IP address, subnet mask and gateway of the reader. As an alternative, the IP address can be obtained from a DHCP server.

Note

Support of option "12"

When the address is assigned via DHCP, the option "12" (hostname) is also supported. The host name can be taken from the SNMP variable "sysName".

The variable can be written using SNMP tools.

Certificate

In the "Certificate" area, you can transfer certificate files (*.pkcs#1) and certificate key files to the reader. Remember that you first need to import the data into the reader before you can activate it.

Using the certificates, you can integrate the reader in your specific security infrastructure. Certificates are used to check the identity of a person or a device, to authenticate a service or to encrypt files. You can create your own certificates or use official certificates created by a certification authority.

Contact your administrative IT department for further information on the topic of certificates.

Device description files

When it is supplied, current GSDML and ESD files as well as the OPC device description file are stored on the reader. Click the "Save on PC" button to transfer device description files to the connected PC. With the aid of these files you can integrate the RF600 readers in the configuration software of your Siemens S7 controllers and in Rockwell conntrollers.

7.3.16 The "Help" menu item

In the "Help" menu item, you will find the configuration manual belonging to the readers "SIMATIC RF650R/RF680R/RF685R".

Programming via SIMATIC controller 8

This section is intended only for S7 users (RF680R/RF685R).

This section describes the programming and configuration of the RF680R and RF685R readers via a SIMATIC controller. With the described functions, you can read out and write transponder data via the readers.

Note

Programming and configuring the readers using STEP 7 for PROFIBUS operation

You will find information on programming and configuring the communications module you are using for PROFIBUS operation in the manual of the relevant communications module.

8.1 Retrieving the Ident library

To be able to configure Ident systems using STEP 7 Basic/Professional, you require suitable Ident instructions. The Ident library with the Ident profile and the Ident blocks are integrated in STEP 7 as of version V13 SP1.

Requirement

The TIA Portal has been started and a project created.

Procedure

Follow the steps below to link the Ident library into STEP 7 Basic/Professional (V13 or older):

1. Copy the installation file (*.zalxx) locally to your PC.

   You will find the file on the Internet on the Support home page (https://support.industry.siemens.com/cs/ww/en/view/90063944).
2. Open the TIA Portal and change to the project view.
3. Open the "Libraries" tab on the right edge of the screen.
4. Right click in the area "Global libraries".
5. Select "Retrieve library" from the shortcut menu.

   The "Retrieve archived global library" dialog is opened.
6. Go to the extracted library file "Identification_Vx.x.zalxx" and select it.
7. Confirm your entry with "OK".

Result: The Ident library is extracted and linked into the TIA Portal.

8.2 Overview of the Ident library

To program the various identification systems, an Ident library is available.

The following table provides you with an overview of the currently existing blocks that can be used with the RF680R and RF685R readers.

Table 8- 1 Overview of the Ident library for RF680R and RF685R

Position			Symbolic name	Description
Instructions/ blocks	Ident blocks	Basic blocks	Read	Using these blocks, it is simple to program communication with the Ident systems. The basic blocks include all the blocks that are used often.
			Write	
			Reset_Reader	
			Reader_Status	
			Reader_Status_RF68xR	
		Extended blocks	Config_Download	Using these blocks, it is simple to program communication with the Ident systems. The extended blocks provide functions that are required less often for operating the Ident system.
			Config_Upload	
			Inventory	
			Read_EPC_Mem	
			Read_TID	
			Set_Param	
			Write_EPC_ID	
			Write_EPC_Mem	
			AdvancedCMD	Advanced command set. With the "AdvancedCmd" block it is possible to access other commands from the Ident command set and to execute chained commands.
	Ident profile		Ident_Profile	These blocks are available for experts to be able to include complex command structures in their own program sequence. It is also possible to use repeat commands and chaining.
PLC data types	System data types		IID_HW_CONNECT	Data type for all blocks for physical addressing of communications modules and readers and for synchronizing the function blocks used for each reader.
			IID_CMD_STRUCT	Data type for the Ident profile for setting the command parameters.
	Status data types		IID_READER_STATUS_89_ RF68xR	Data type for the result of "Reader_status" with the attribute "0x89".

The Ident profile is a single complex block containing all the commands and functions for Ident. The Ident blocks represent a simplified interface of the Ident profile. Each Ident block contains a single command of the Ident profile.

Note

Parallel operation using Ident blocks and Ident profile is not possible

Note that the reader cannot be operated at the same time using the Ident blocks and the Ident profile.

8.3 Project preparations

Requirement

The TIA Portal has been started and a project created.

Procedure

Follow the steps below to copy the PLC data types and the Ident profile to your project:

1. Open the project and change to the project view.
2. Using the project tree, insert a SIMATIC controller in the project using the "Add new device" menu command.

   The device view opens and the SIMATIC controller is displayed.
3. Change to the network view.
4. Drag the required RFID device from the hardware catalog to the project.
5. Connect the RFID device to the SIMATIC controller.
6. Open a program block (e.g. "Main [OB1]").
7. Open the "Instructions > Optional packages" tab on the right edge of the screen.
8. Drag the required block from the block tab "Instructions" tab to the program block of your project.

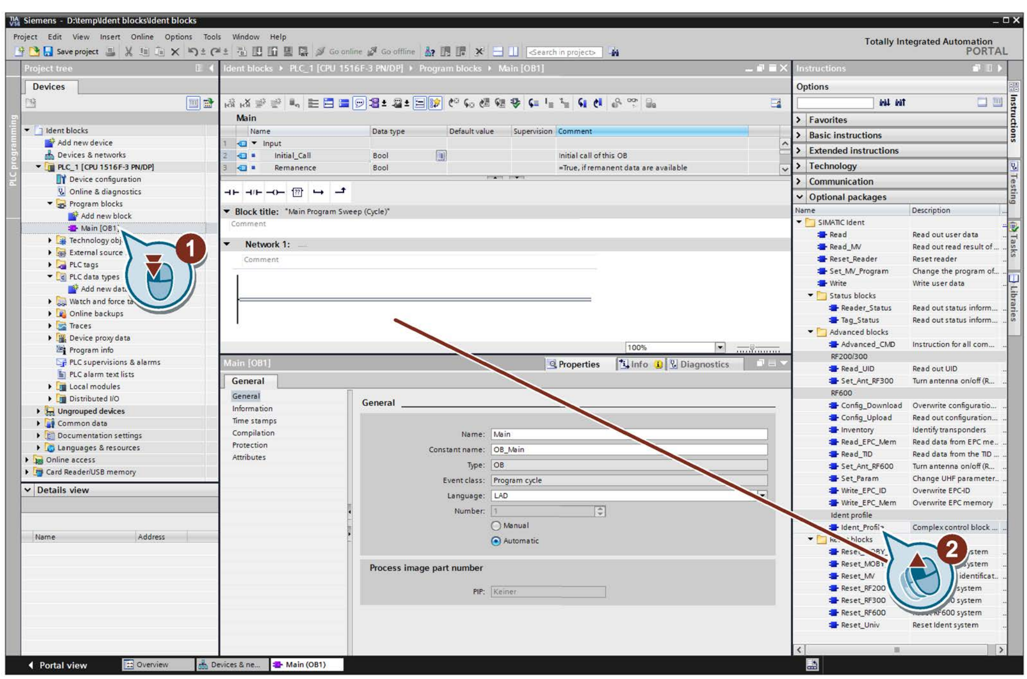


Figure 8-1 Inserting blocks and data types in the project

Result: The PLC data types and blocks required to configure the Ident blocks are copied to your project.

Note

Ident profile is required

Note that the Ident profile also needs to be integrated in your project even if you only work with the Ident blocks. When executing commands, the Ident blocks access the Ident profile.

8.4 Setting the "IID_HW_CONNECT" data type

Before you can start parameter assignment of the blocks, you first need to create a variable of the PLC data type "IID_HW_CONNECT". The Ident system or a channel of the Ident system is addressed using the "IID_HW_CONNECT" PLC data type.

Addressing the Ident devices

When working with all the instructions/blocks, you require the "IID_HW_CONNECT" data type to address the reader. Setting the command parameters for the Ident profile is handled by the Ident blocks. The Ident profile and the "AdvancedCMD" block also require the "IID_CMD_STRUCT" data type for the parameter assignment of the individual commands. Depending on whether you work with the Ident profile or the Ident blocks, you need to link in and assign parameters for these data types as described in the following sections.

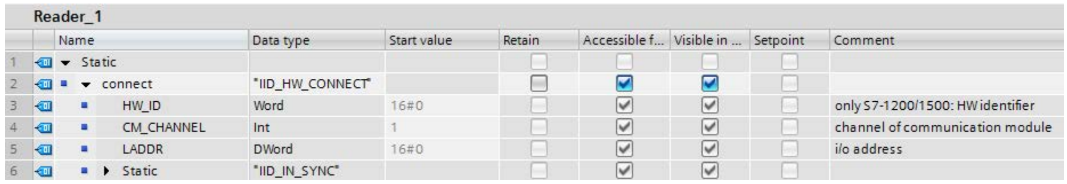
Parameter assignment of the "IID_HW_CONNECT" data type

Follow the steps below to set the parameters for the "IID_HW_CONNECT" data type for a channel:

1. In the project tree, double-click on the entry "Create new block" in the "Program block" folder.
2. Click the "Data block" button and assign a name to the block.
3. Confirm your entry with "OK".

   The data block is opened.
4. Create a new variable by entering a variable name in the "Name" column.

5. In the "Data type" column, select the "IID_HW_CONNECT" data type.



Reader_1

	Name	Data type	Start value	Retain	Accessible f...	Visible in ...	Setpoint	Comment
1	▼ Static			☐	☐	☐	☐	
2	▼ connect	"IID_HW_CONNECT"		☐	☑	☑	☐	
3	HW_ID	Word	16#0	☐	☑	☑	☐	only S7-1200/1500: HW identifier
4	CM_CHANNEL	Int	1	☐	☑	☑	☐	channel of communication module
5	LADDR	DWord	16#0	☐	☑	☑	☐	i/o address
6	▶ Static	"IID_IN_SYNC"		☐	☑	☑	☐	

Figure 8-2 Creating a data block

6. Specify the address data of the reader.
   – HW_ID: Hardware identifier of the module (with S7-1200 and S7-1500)
   – CM_CHANNEL: Selection of read point
   – LADDR: I/O address of the module

   You can read out the values of the "HW_ID" and "LADDR" parameters in the device configuration in the properties of the reader. Enter the parameter values you have read out in the "Start value" column of the corresponding parameters. Reading out parameter values is described below.

Follow the steps below to read out the parameter values "HW_ID" and "LADDR" for a channel:

1. Open the device view.
2. Double-click on the reader.

   The properties window of the reader opens.
3. In the "RFID communication" > "I/O addresses" tab, and you will find the I/O address that corresponds to "LADDR".

   Note that the input and output address must have the same value.

4. In the "RFID communication" > "Hardware identifier" tab you will find the hardware identifier that corresponds to the "HW_ID".

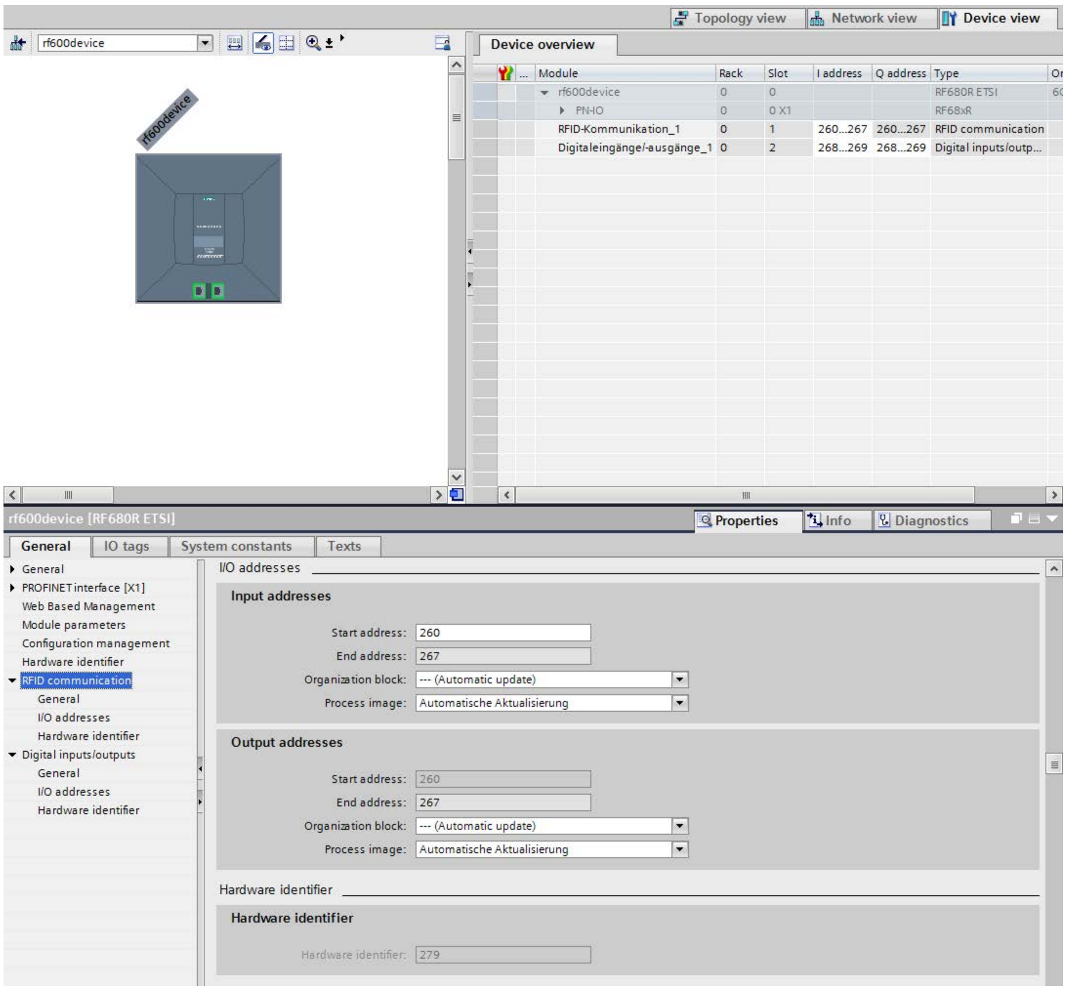


Figure 8-3 The "Hardware identifier" parameter

5. Transfer the values of "LADDR" and "HW_ID" to the PLC data type "IID_HW_CONNECT" of the reader for which you want to set parameters.

The "IID_HW_CONNECT" data type has now been created and addressed for a channel. Repeat these steps for every other reader/channel. If you want to use a different channel of the reader, set this using the "CM_CHANNEL" parameter. The "HW_ID" and "LADDR" parameters remain the same for all channels of a reader.

The library is now linked in and the required blocks and data types have been created in your project. The "IID_HW_CONNECT" data type has also been created and addressed. You can now start programming and configuring the blocks.

Note

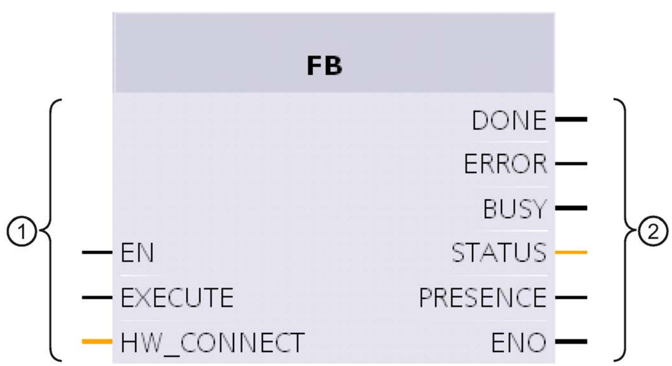
Configuring "IID_CMD_STRUCT"

If you work with the Ident profile or with the "AdvancedCmd" block, you also need to create a further element with the data type "IID_CMD_STRUCT" (Array [1...10]) in the data block you have already created.

8.5 General structure of the function blocks

Structure of the blocks based on the sample block "FB"

The following graphic shows an example of a block with input and output parameters as they exist in the same way in all blocks.



① Input parameters
② Output parameters
■ Data type: Bit
■ Data type: Byte, Word, DWORD, INT

Figure 8-4 Example of a block

Description of the parameters

Table 8- 2 Description of the input and output parameters

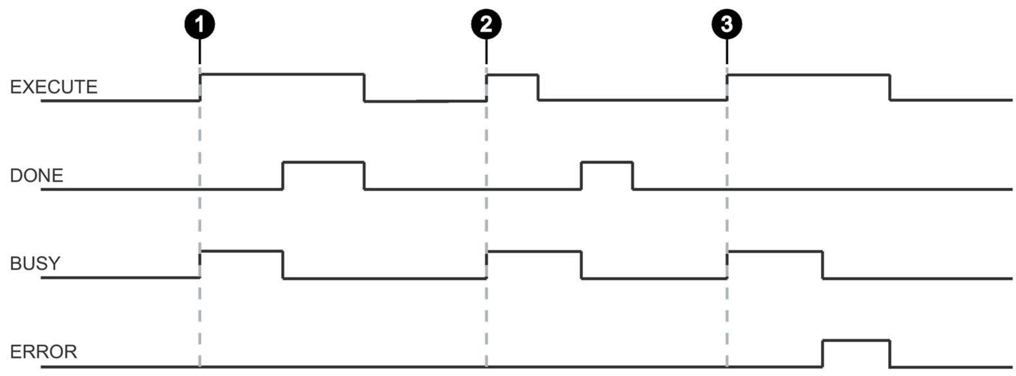
Parameter	Description
Input parameters	
EN	Enabling Input
EXECUTE	There must be a positive edge at this input before the block will execute the command.
HW_CONNECT	Global parameter of the type "IID_HW_CONNECT" to address the channel/reader and to synchronize the blocks. This parameter needs to be created and addressed once for each channel/reader. "HW_CONNECT" must always be transferred to the blocks to address the relevant channel/reader.
Output parameters	
DONE (BOOL)	The job was executed. If the result is positive, this parameter is set.
ERROR (BOOL)	The job was ended with an error. The error code is indicated in Status.
BUSY (BOOL)	The job is being executed.
STATUS (DWORD)	Display of the error message if the "ERROR" bit was set.
PRESENCE (BOOL)	This bit indicates the presence of a transponder. The displayed value is updated each time the block is called. This parameter does not occur in the blocks specifically for code reader systems.
ENO	Enable output

General sequence when calling the blocks

Note

Different sequences with the Ident profile and standard profile V1.19

Note that the sequence of the Ident profile is not the same as that of the previous standard profile V1.19. Depending on the environmental conditions, the application conditions and the block functions used, the standard profile V1.19 cannot be used.



Case ①	By setting EXECUTE (EXECUTE = 1) the function/instruction is started. If the job was completed successfully (DONE = 1), you need to reset EXECUTE. DONE is reset at the same time.
Case ②	EXECUTE is set for only one cycle. As soon as BUSY is set, you can reset EXECUTE again. If the job was completed successfully, DONE is set for one cycle.
Case ③	Handling as in Case 1, however with error output. As soon as ERROR is set, the precise error code is available in the STATUS output. ERROR and STATUS retain their values as long as EXECUTE is set or for one cycle if EXECUTE was reset before the block was ended.

Figure 8-5 General sequence when calling the blocks

How the blocks work

You can only ever send one command to the reader or communications module. You can, however, call and start two or more blocks at the same time. The blocks execute in the order in which they are called.

This does not apply to the Reset blocks. If a Reset command is executed, the command active at this time is aborted.

Creating blocks

Requirement

The "IID_HW_CONNECT" data type has had parameters assigned.

Follow the steps below to link in a block and to set the call parameters:

1. Open the program block you have created by double-clicking in the "Project tree" > "Program blocks" tab.
2. Drag the required block from the block library tab to the program block.
3. Enter the variable you created earlier in the "HW_CONNECT" input parameter.

The block is called and connected to the relevant channel.

Note

Working with multiple channels

If you work with several channels, you must ensure that for each channel, the block is called with a separate instance DB.

Note

Working with the Ident profile or with the "AdvancedCmd" block

If you work with the Ident profile or with the "AdvancedCmd" block, you also need to connect the "CMDREF" input parameter with a variable of the "IID_CMD_STRUCT" (Array [1...10]) data type.

8.6 Programming Ident blocks

8.6.1 Basic blocks

8.6.1.1 Read

The "Read" block reads the user data from the transponder from memory bank 3 (USER area) and enters this in the "IDENT_DATA" buffer. The physical address and the length of the data are transferred using the "ADR_TAG" and "LEN_DATA" parameters. Specific access to a certain transponder is made with the "EPCID_UID" and "LEN_ID".

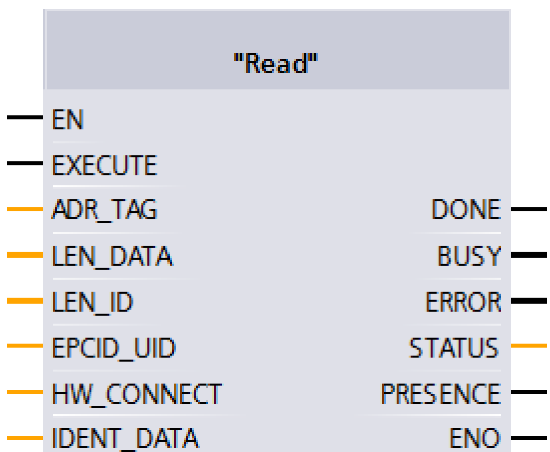


Figure 8-6 "Read" block

Table 8- 3 Explanation of the "Read" block

Parameter	Data type	Default values	Description
ADR_TAG	DWord	DW#16#0	Physical address on the transponder where the read starts.
LEN_DATA	Word	W#16#0	Length of the data to be read
LEN_ID	Byte	B#16#0	Length of the EPC-ID/UID Default value: 0x00 ≙ unspecified single tag access (RF680R, RF685R)
EPCID_UID	Array[1...62] of Byte	0	Buffer for up to 62 bytes EPC-ID 2 - 62-byte EPC-ID is entered at the start of the buffer (length is set by "LEN_ID")
IDENT_DATA	Any / Variant	0	Data buffer in which the read data is stored. Note: For Variant, currently only an "Array_of_Byte" with a variable length can be created. For Any, other data types/UDTs can also be created.

8.6.1.2 Write

The "Write" block writes the user data from the "IDENT_DATA" buffer to the transponder to memory bank 3 (USER area). The physical address and the length of the data are transferred using the "ADR_TAG" and "LEN_DATA" parameters. Specific access to a certain transponder is made with the "EPCID_UID" and "LEN_ID".

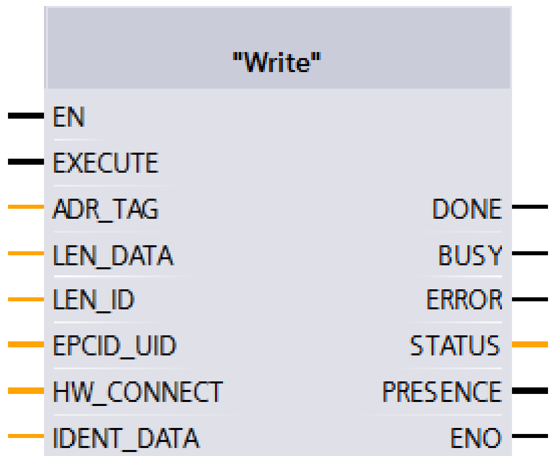


Figure 8-7 "Write" block

Table 8- 4 Explanation of the "Write" block

Parameter	Data type	Default values	Description
ADR_TAG	DWord	DW#16#0	Physical address on the transponder where the write starts.
LEN_DATA	Word	W#16#0	Length of the data to be written
LEN_ID	Byte	B#16#0	Length of the EPC-ID/UID Default value: 0x00 ≙ unspecified single tag access (RF680R, RF685R)
EPCID_UID	Array[1...62] of Byte	0	Buffer for up to 62 bytes EPC-ID 2 - 62-byte EPC-ID is entered at the start of the buffer (length is set by "LEN_ID")
IDENT_DATA	Any / Variant	0	Data buffer with the data to be written. Note: For Variant, currently only an "Ar-ray_of_Byte" with a variable length can be created. For Any, other data types/UDTs can also be created.

8.6.1.3 Reset_Reader

The "Reset_Reader" block can currently only be used in conjunction with the RF680R and RF685R readers or the RF120C communications module with a reader connected.

Using the "Reset_Reader" block, you can reset all reader types of the Siemens RFID systems. All the readers are reset to the settings configured on the reader with the WBM. The "Reset_Reader" block does not have any device-specific parameters and is executed using the "EXECUTE" parameter.

With the "Reset_Reader" block, you can interrupt any active Ident block at any time. The blocks are then ended with "DONE = true" and "ERROR = false".

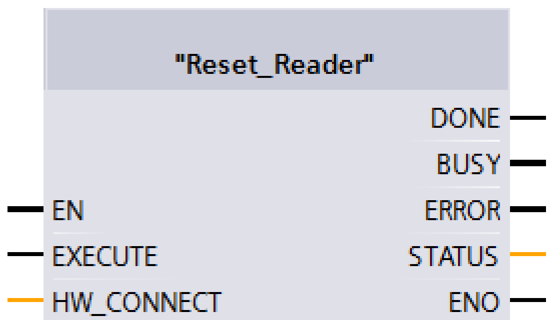


Figure 8-8 "Reset_Reader" block

8.6.1.4 Reader_Status

The "Reader_Status" block reads status information from the reader. For the RF68xR reader, there is only the status mode "0x89" that is selected using the "ATTRIBUTE" parameter. The status data is returned as "Array of Byte".

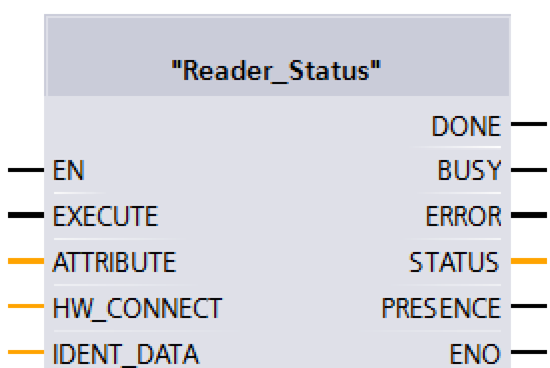


Figure 8-9 "Reader_Status" block

Table 8- 5 Explanation of the "Reader_Status" block

Parameter	Data type	Default values	Description
ATTRIBUTE	Byte	B#16#81	Identifier of the status mode "0x89" Note: The default value is not valid for RF680R/RF685R and needs to be adapted.
IDENT_DATA	Any / Variant	0	Event values depending on attributes Note: For Variant, an "Array_of_Byte" with a variable length and the existing status UDTs can be created. For Any, other data types/UDTs can also be created.

Results

Table 8- 6 ATTRIBUTE "0x89" ("IID_READER_STATUS_89_RF68xR" data type)

Name	Type	Comment
`status_info`	`BYTE`	`SLG-Status mode(Subcommand)`
`hardware_version`	`BYTE`	`Version of hardware`
`firmware_version`	`ARRAY[1..4] of CHAR`	`Version of firmware`
`config ID`	`DWORD`	`Unix timestamp`
`inventory_status`	`WORD`	`0=inventory not active;1=inventory active;2=presence mode active`
`sum of filtered tags`	`WORD`	`All filtered Tags`
`filtered_smoothing`	`WORD`	`Filtered Tags trough Smoothing`
`filtered_blacklist`	`WORD`	`Filtered Tags trough Blacklist`
`filtered data-filter`	`WORD`	`Filtered Tags trough Data-Filter`
`filtered RSSI thresold`	`WORD`	`Filtered Tags trough RSSI Threshold`
`filtered RSSI delta`	`WORD`	`Filtered Tags trough RSSI Delta`

8.6.2 Extended blocks

8.6.2.1 Config_Upload/-_Download

Using the "Config_Upload" and "Config_Download" blocks, you can read out ("Config_Upload") or write ("Config_Download") the configuration of the RF680R/RF685R readers via the control program.

The configuration data is not interpretable data. Save the data on the controller so that it can be written to the reader again if a device is replaced. Bytes 6-9 (see table below) contain a configuration ID with a unique version identifier. With the configuration ID, when performing a "Config Upload", you can check whether the configuration data read matches the configuration data stored on the controller. The configuration data has the following structure:

Table 8- 7 Structure of the configuration data

Byte	Name
0	Structure identifier (2 bytes)
2	Length information (4 bytes) Length of the version identifier and parameter block
6	Version identifier (4 bytes) Based on the identifier, you can uniquely identify the configuration. This is a time stamp in Linux format. The time stamp indicates how many seconds have passed since January 1, 1979, 00:00 (midnight). The identifier is assigned when a configuration is generated.
10 ... "DATA" end	Parameter block

"Config_Upload/Config_Download" can be executed on every channel of the RF680R/RF685R. It is always the same configuration data that is transferred.

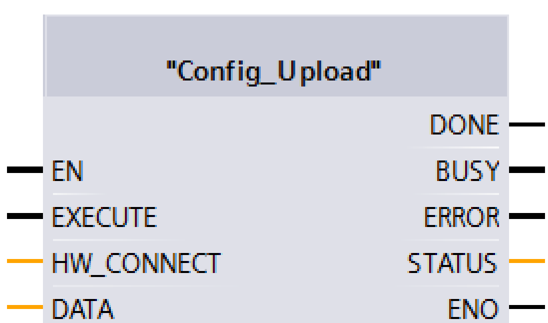


Figure 8-10 "Config_Upload" block

Table 8- 8 Explanation of the "Config_Upload" block

Parameter	Data type	Description
DATA	Any / Variant	Data buffer for configuration data. The real length of the data depends on the complexity of the configuration and the firmware version of the reader. With a standard configuration of the RF680R/RF685R reader, we recommend a memory size of 4 KB. If you use advanced reader configurations (filtering) or want to change the configuration in the future without needing to adapt the memory size of "DATA", we recommend a memory size of 8-16 KB. Note: For Variant, currently only an "Array_of_Byte" with a variable length can be created. For Any, other data types/UDTs can also be created.

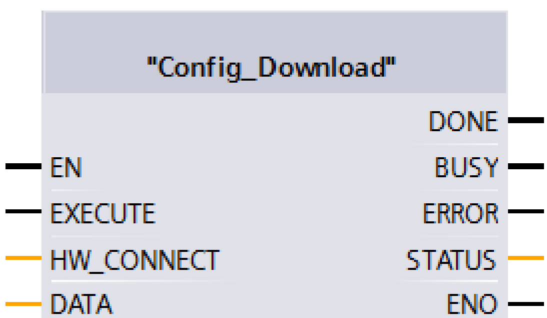


Figure 8-11 "Config_Download" block

Table 8- 9 Explanation of the "Config_Download" block

Parameter	Data type	Description
DATA	Any / Variant	Data buffer for configuration data. The real length of the data depends on the complexity of the configuration and the firmware version of the reader. With a standard configuration of the RF680R/RF685R reader, we recommend a memory size of 4 KB. If you use advanced reader configurations (filtering) or want to change the configuration in the future without needing to adapt the memory size of "DATA", we recommend a memory size of 8-16 KB. Note: For Variant, currently only an "Array_of_Byte" with a variable length can be created. For Any, other data types/UDTs can also be created.

8.6.2.2 Inventory

The "Inventory" block activates the taking of inventories. There are four different modes that you can select with the "ATTRIBUTE" parameter.

- At the start, a certain duration/number (period of time, number of inventories, number of "observed" events or identified transponders) is specified. A distinction is made between the following options:
  - Duration

    Take inventories for a specified period of time
  - Number of inventories

    Take a specified number of inventories
  - Number of "observed" events

    Take inventories until a specified number of transponders have been identified at the same time.

  Inventories are then taken by the reader for this time or number of inventories. When the specified time/number is reached, the block is ended and returns all identified transponders in "IDENT_DATA". The transponders are sorted according to the RSSI value (highest value first). In other words, other commands can only be executed when all inventories have been taken completely. The unit (time or number) is specified using "DUR_UNIT" and the value (time value or number) using "DURATION". This mode can be executed using the attributes "0x80" and "0x81". Depending on the attribute, more or less data is supplied about the identified transponders.
- With the attributes "0x86" (start "Presence_Mode") and "0x87" (end "Presence_Mode"), inventories can be taken permanently. The presence of a transponder can then always be queried using "PRESENCE" without needing to start the block with "EXECUTE". No information about the identified transponders is returned when the command executes!

  To obtain information about the identified transponders, use one of the two calls listed above (with time / number of inventories = 0).

  When this mode is active, commands relating to transponders are not executed immediately but only when a transponder is identified. This achieves shorter reaction times since the command is already pending when the transponder enters the antenna field.

  The "Presence_Mode" is practical in the context of the "Repeat command" function.

The "NUMBER_TAGS" output parameter is used to output the number of identified transponders. With the attributes "0x80" and "0x81" on completion of the read operation, the sum of all identified transponders is displayed. With the attribute "0x86" the number of currently identified transponders is shown at the "NUMBER_TAGS" output parameter (max. 15), without needing to start the module with "EXECUTE".

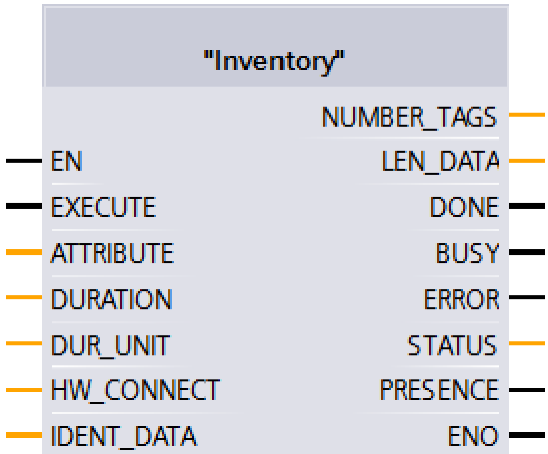


Figure 8-12 "Inventory" block

Table 8- 10 Explanation of the "Inventory" block

Parameter	Data type	Default values	Description
ATTRIBUTE	Byte	B#16#0	Selecting the status mode • 0x80 ≙ EPC-ID without additional information • 0x81 ≙ EPC-ID with additional information on the RSSI value and reserved bytes • 0x86 ≙ enable Presence mode • 0x87 ≙ disable Presence mode
DURATION	Word	W#16#0	Duration dependent on "DUR_UNIT" Period of time or number of inventories or number of "Observed" events Example: • 0x00 ≙ no inventory or 0 ms • 0x01 ≙ one inventory or 1 ms or one transponder
DUR_UNIT	Word	W#16#0	Unit for "DURATION" • 0x00 ≙ time [ms] • 0x01 ≙ inventories • 0x02 ≙ number of "Observed" events
IDENT_DATA	Any / Variant	0	Data buffer for inventory data Note: For Variant, an "Array_of_Byte" with a variable length and the existing status UDTs can be created. For Any, other data types/UDTs can also be created.

Parameter	Data type	Default values	Description
NUMBER_TAGS	Int	0	Number of transponders in the antenna field
LEN_DATA	Word	W#16#0	Length of the valid data

Results

Select the number of "TAG_DATA[x]" elements of the data types of the (ATTRIBUTES "0x08" and "0x81") at least as high as the number of transponders to be expected. Not the following points when creating the receive buffer :"IDENT_DATA"/data type:

- The first element "NUM_IDS" is always of the type "WORD".
- The next element "TAG_DATA" is always of the type "ARRAY". The number of transponders to be expected ("n") must be entered in the "ARRAY".

The following tables show an example of the structure of the receive buffer "IDENT_DATA"/data type for the ATTRIBUTES "0x08" and "0x81".

Table 8- 11 ATTRIBUTE "0x80"

Name	Type	Comment
NUM_IDS	WORD	Number of MDS
TAG_DATA	ARRAY[1..n] of IID_IN_I_80	
TAG_DATA[1]	IID_IN_I_80	
Reserved	BYTE	
ID_Len	BYTE	Length of EPC ID
EPC_ID	ARRAY[1..62] of BYTE	EPC-ID
tagPC	WORD	
TAG_DATA[2]	IID_IN_I_80	
...	...	
TAG_DATA[n]	IID_IN_I_80	

Table 8- 12 ATTRIBUTE "0x81"

Name	Type	Comment
NUM_MDS	WORD	Number of MDS
TAG_DATA	ARRAY[1..n] of IID_IN_I_81	
TAG_DATA[1]	IID_IN_1_81	
reserved	BYTE	
ID_LEN	BYTE	EPC length
EPC_ID	ARRAY[1..62]of BYTE	EPC-ID
tagPC	WORD	
RSSI	BYTE	RSSI value
MaxRSSI	BYTE	highest RSSI value
MinRSSI	BYTE	lowest RSSI value
channel	BYTE	channel; 1..15_ETSI; 1..53:FCC

Name	Type	Comment
antenna	BYTE	antenna; bit coded; Bit 0=antenna 1; Bit 1=antenna 2; ...
polarization	BYTE	polarizatuin of antenna; 0=undefined; 1=circular; 2=vertical linear; 4=horizontal
time	Time_OF_Day	S7 time
power	BYTE	power in dBm
filterDataAvailable	BYTE	0=false; 1=true [1]
Inventoried	WORD	[2]
TAG_DATA[2]	IID_IN_1_81	
...	...	
TAG_DATA[n]	IID_IN_1_81	

1) Indicates whether the filter criteria could be read.

2) Indicates how often the transponder was identified via the air interface before it changed to the "Observed" status.

8.6.2.3 Read_EPC_Mem

The "Read_EPC_Mem" block reads data from the EPC memory of the RF600 transponder. Access is to memory cell 1 as of the start address. The length of the EPC memory to be read out is specified by the "LEN_DATA" parameter.

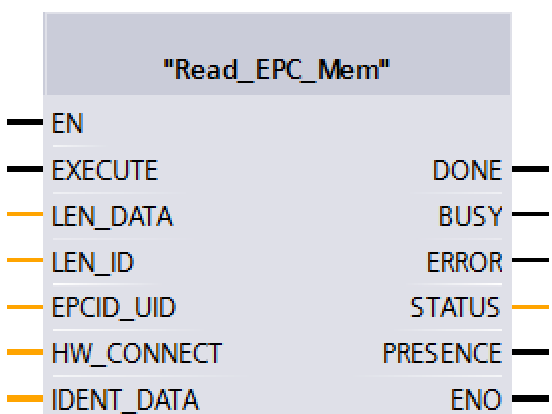


Figure 8-13 "Read_EPC_Mem" block

Table 8- 13 Explanation of the "Read_EPC_Mem" block

Parameter	Data type	Default values	Description
LEN_DATA	Word	W#16#0	Length of the EPC memory to be read out (1 ... 62 bytes)
LEN_ID	Byte	B#16#0	Length of the EPC-ID/UID Default value: 0x00 ≙ unspecified single tag access (RF680R, RF685R)
EPCID_UID	Array[1...62] of Byte	0	Buffer for up to 62 bytes EPC-ID, 8 bytes UID or 4 bytes handle ID. • 2 - 62-byte EPC-ID is entered at the start of the buffer (length is set by "LEN_ID") • 8-byte UID is entered at the start of the buffer ("LEN_ID = 8") • 4-byte handle ID must be entered in the array element [5]-[8] ("LEN_ID = 8") Default value: 0x00 ≙ unspecified single tag access (RF620R, RF630R, RF640R)
IDENT_DATA	Any / Variant	0	Data buffer in which the read EPC memory data is stored. Note: For Variant, currently only an "Ar-ray_of_Byte" with a variable length can be created. For Any, other data types/UDTs can also be created.

8.6.2.4 Read_TID

The "Read_TID" block reads data from the TID memory area (Tag Identification Memory Bank) of the RF600 transponder. The length of the TID to be read is specified by the "LEN_DATA" parameter. The length of the TID varies depending on the transponder and can be found in the transponder data sheet.

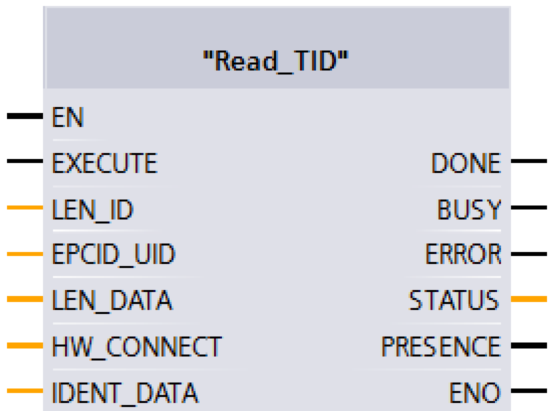


Figure 8-14 "Read_TID" block

Table 8- 14 Explanation of the "Read_TID" block

Parameter	Data type	Default values	Description
LEN_ID	Byte	B#16#0	Length of the EPC memory to be read out (1 ... 62 bytes)
EPCID_UID	Array[1...62] of Byte	0	Length of the EPC-ID/UID Default value: 0x00 ≙ unspecified single tag access (RF680R, RF685R)
LEN_DATA	Word	W#16#4	Buffer for up to 62 bytes EPC-ID, 8 bytes UID or 4 bytes handle ID. • 2 - 62-byte EPC-ID is entered at the start of the buffer (length is set by "LEN_ID") • 8-byte UID is entered at the start of the buffer ("LEN_ID = 8") • 4-byte handle ID must be entered in the array element [5]-[8] ("LEN_ID = 8") Default value: 0x00 ≙ unspecified single tag access (RF620R, RF630R, RF640R)
IDENT_DATA	Any / Variant	0	Read TID Note: For Variant, currently only an "Array_of_Byte" with a variable length can be created. For Any, other data types/UDTs can also be created.

8.6.2.5 Set_Param

With the "Set_Param" block, you can change UHF parameters on an RF680R/RF685R during runtime (e.g. the antenna power).

Note

Settings saved only temporarily

Note that the parameters in the "Set_Param" block are only stored temporarily. If the power for the reader is interrupted, the stored values are lost and must be set again.

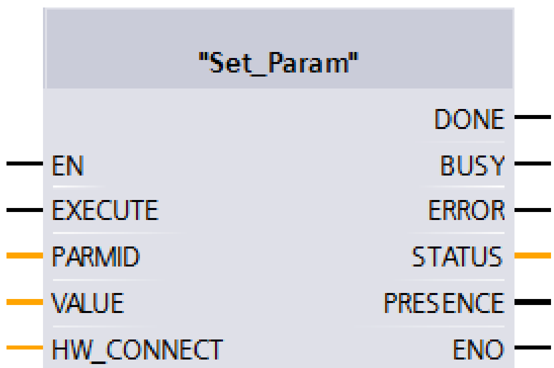


Figure 8-15 "Set_Param" block

Table 8- 15 Explanation of the "Set_Param" block

Parameter	Data type	Default values	Description
PARMID	DWORD	0x00	Parameter identifier
VALUE	DWORD	0x00	Parameter value

Table 8- 16 Parameter values

PARMID (hex)	PARMID (ASCII)	Parameter	VALUE
0x41315057	A1PW	Antenna 01: Radiated power	Range of values: 0.5 ... 33 Increment: 0.25 Radiated power of the antenna in [dBm]. Bytes 1 and 2 are not used, byte 3 represents the integer and byte 4 the decimal place. Example: A radiated power of 10.25 dBm represents a "VALUE" of "0x0A19".
0x41325057	A2PW	Antenna 02: Radiated power	
0x41335057	A3PW	Antenna 03: Radiated power	
0x41345057	A4PW	Antenna 04: Radiated power	
0x41315452	A1TR	Antenna 01: RSSI threshold	Range of values: 0 ... 255 Threshold value for RSSI. Transponders with lower values are discarded. Value without unit without a direct relationship with the radiated power.
0x41325452	A2TR	Antenna 02: RSSI threshold	
0x41335452	A3TR	Antenna 03: RSSI threshold	
0x41345452	A4TR	Antenna 04: RSSI threshold	
0x5331444C	S1DL	Read point 01: RSSI delta	Range of values: 0 ... 255 Difference for RSSI values. Transponders with lower values relative to the transponder with the highest RSSI value are discarded. Value without unit without a direct relationship with the radiated power.
0x5332444C	S2DL	Read point 02: RSSI delta	
0x5333444C	S3DL	Read point 03: RSSI delta	
0x5334444C	S4DL	Read point 04: RSSI delta	
0x4131504F	A1PO	Antenna 01: Polarization	Range of values: 0, 1, 2, 4 Polarization of the antenna (for intelligent antennas e.g. internal antenna RF685R) • 0: default, undefined • 1: circular • 2: vertical linear • 4: horizontal linear Input is bit coded. Combinations are possible (adding values).
0x4132504F	A2PO	Antenna 02: Polarization	
0x4133504F	A3PO	Antenna 03: Polarization	
0x4134504F	A4PO	Antenna 04: Polarization	
0x52364353	R6CS	Modulation scheme	Range of values: 32, 33, 34, 35, 37, 65 Modulation scheme of the read point Specification of which transponder types are identified (ISO 18000-63/-6B).

PARMID (hex)	PARMID (ASCII)	Parameter	VALUE
0x57544348	WTCH	Date and time	Range of values: 01.01.2000 00:00 a.m. ... 19.01.2038 3:14 a.m. 01.01.2000 01:00 a.m. ≙ 946684800 Date and time (UTC) Time in seconds since 01.01.1970; Setting of the internal reader clock, the date and time are set.
0x57544F44	WTOD	Time	Range of values: 0:00 – 23:59 p.m. S7 time (TOD, UTC) Milliseconds since midnight; Setting of the internal reader clock, only the time is changed but not the date.
0x57444154	WDAT	Date	Range of values: 01.01.2000 ... 18.01.2038 S7 date Days since 01.01.1970; Setting of the internal reader clock, only the date is changed but not the time.

8.6.2.6 Write_EPC_ID

The "Write_EPC_ID" block overwrites the EPC-ID of the RF600 transponder and adapts the length of the EPC-ID in the memory of the transponder. The new EPC-ID length to be written is specified with the "LEN_ID_NEW" parameter and the previous EPC-ID is specified using the "LEN_ID" and "EPCID_UID" parameters.

Make sure that when you execute the block only one transponder is located in the antenna field. This ensures that the identification when writing the ID is unique. If there is more than one transponder in the antenna field, a negative response is returned.

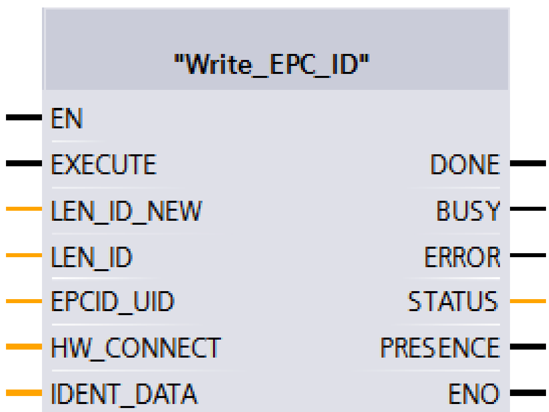


Figure 8-16 "Write_EPC_ID" block

Table 8- 17 Explanation of the "Write_EPC_ID" block

Parameter	Data type	Default values	Description
LEN_ID_NEW	Byte	W#16#0C	Length of the current EPC-ID
LEN_ID	Byte	B#16#0	Length of the previous EPC-ID
EPCID_UID	Array[1...62] of Byte	0	Previous EPC ID
IDENT_DATA	Any / Variant	0	Current EPC ID Note: For Variant, currently only an "Ar-ray_of_Byte" with a variable length can be created. For Any, other data types/UDTs can also be created.

8.6.2.7 Write_EPC_Mem

The "Write_EPC_Mem" block overwrites the EPC memory of the RF600 transponder. The length of the EPC memory to be overwritten is specified by the "LEN_DATA" parameter.

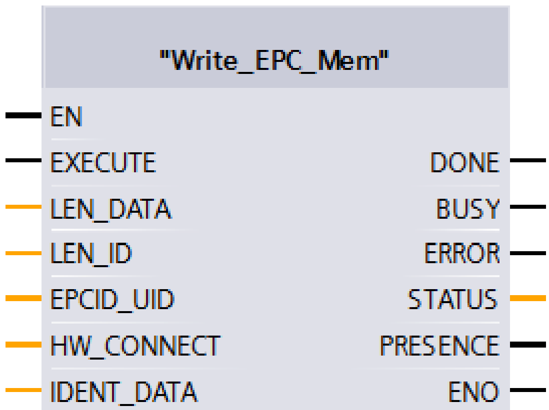


Figure 8-17 "Write_EPC_Mem" block

Table 8- 18 Explanation of the "Write_EPC_Mem" block

Parameter	Data type	Default values	Description
LEN_DATA	Word	W#16#0	Length of the EPC memory to be overwritten (1 ... 62 bytes)
LEN_ID	Byte	B#16#0	Length of the EPC-ID/UID Default value: 0x00 ≙ unspecified single tag access (RF680R, RF685R)
EPCID_UID	Array[1...62] of Byte	0	Buffer for up to 62 bytes EPC-ID, 8 bytes UID or 4 bytes handle ID. • 2 - 62-byte EPC-ID is entered at the start of the buffer (length is set by "LEN_ID") • 8-byte UID is entered at the start of the buffer ("LEN_ID = 8") • 4-byte handle ID must be entered in the array element [5]-[8] ("LEN_ID = 8") Default value: 0x00 ≙ unspecified single tag access (RF620R, RF630R, RF640R)
IDENT_DATA	Any / Variant	0	Data buffer with the EPC memory data to be overwritten. Note: For Variant, currently only an "Array_of_Byte" with a variable length can be created. For Any, other data types/UDTs can also be created.

8.6.2.8 AdvancedCMD

With the "AdvancedCmd" block, every command can be executed including commands not represented by other blocks. This general structure can be used for all commands and is intended only for trained users.

This gives you the option of sending the command as a chained command. To allow this, the block provides a CMD buffer for 100 commands. All chained commands must be entered starting at the first position in the buffer. For every chained command, the "chained bit" must also be set in the CMD structure. The "chained bit" is not set in the last command in the chain. You will find further information on the "chained bit" in the section "Chaining (Page 146)".

The entire command structure must be specified in the "CMD" input parameter. You create the structure for the "CMD" parameter in a data block.

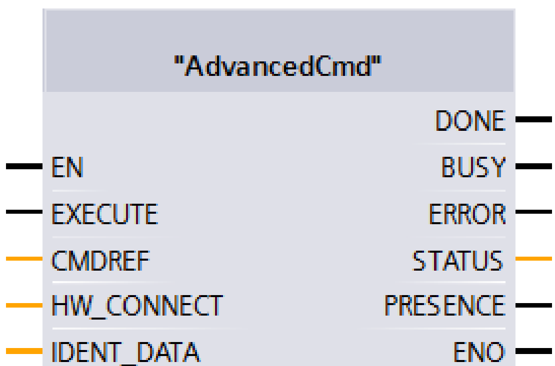


Figure 8-18 "AdvancedCmd" block

Table 8- 19 Explanation of the "AdvancedCmd" block

Parameter	Data type	Default values	Description
CMDREF	Any / Variant	--	You will find a detailed description of the parameter in the sections: • "Command structure (Page 140)" • "Overview of the commands (Page 139)"
IDENT_DATA	Any / Variant	0	Buffer for data to be written or read. Note: For Variant, currently only an "Array_of_Byte" with a variable length can be created. For Any, other data types/UDTs can also be created.

8.7 Programming the Ident profile

8.7.1 Structure of the Ident profile

Note

Parallel operation using Ident blocks and Ident profile is not possible

Note that the reader cannot be operated at the same time using the Ident blocks and the Ident profile.

The blocks described in the section"Programming Ident blocks (Page 119)" represent a simplified interface of the Ident profile. If the functionality available with the blocks is not adequate for your application, you can use the Ident profile as an alternative. Using the Ident profile, you can set complex command structures and work with command repetition. The following graphic shows the Ident profile including the commands that can be implemented with it.

Note

Ident profile for trained users

The Ident profile is a complex block containing all the functionality of the Ident blocks. The Ident profile was developed specially for trained block users who want to configure complex functions with their own blocks. For untrained users, we recommend using the Ident blocks.

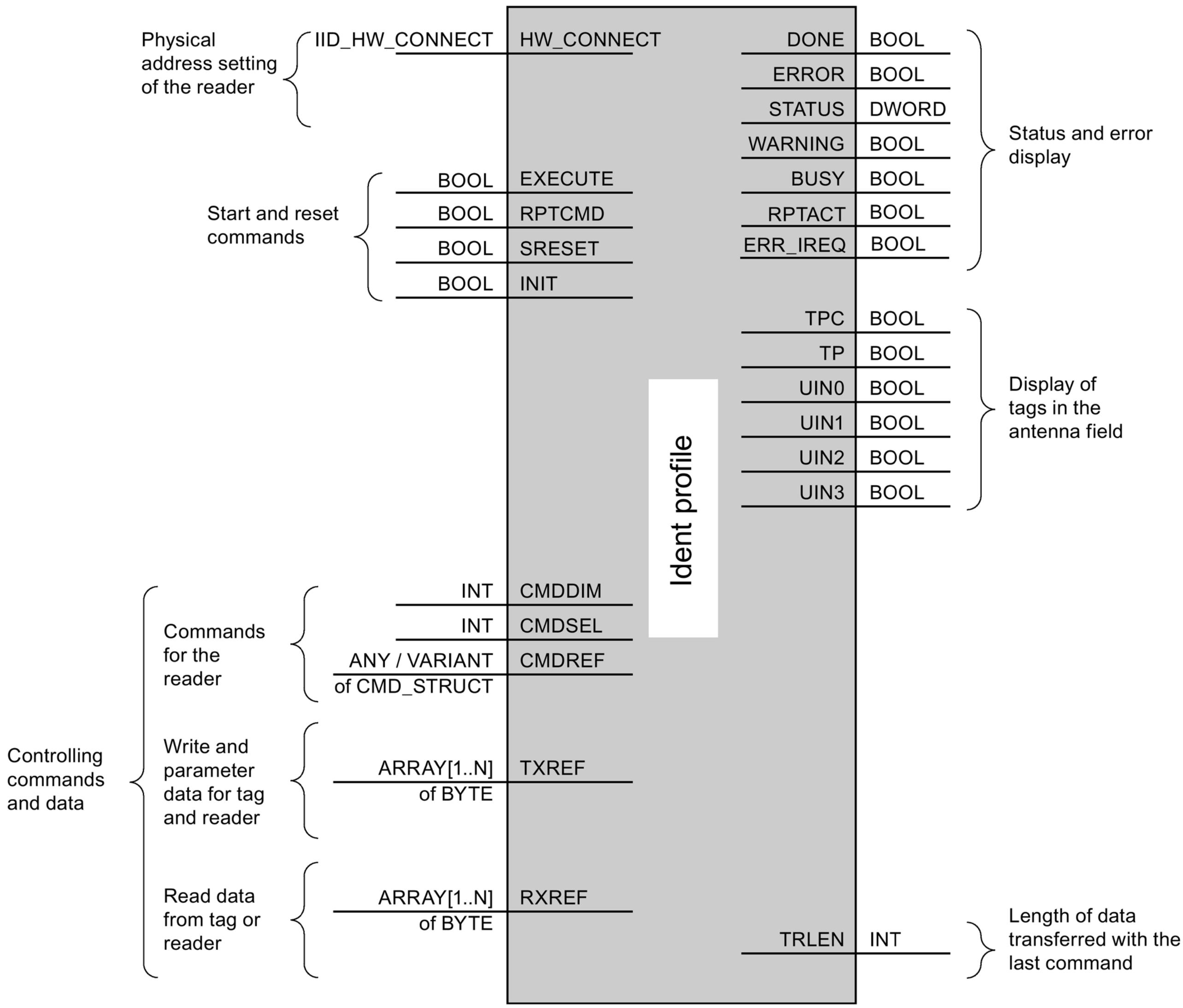


Figure 8-19 The input parameters of the Ident profile

Note

Working with multiple channels

If you work with several channels, you must ensure that for each channel, the block is called with a separate instance DB.

You will find more information on Ident profile in the manual "Ident profile and Ident blocks (https://support.industry.siemens.com/cs/ww/en/view/106368029)".

8.7.2 Overview of the commands

The following table contains all the commands supported by the Ident profile and the "AdvancedCMD" block.

Table 8- 20 Commands of the Ident profile

Command	Command code		Parameters used	Description
	HEX	ASCII		
PHYSICAL-READ	70	'p'	OFFSETBUFFER, EPCID_UID, LEN_ID, LENGTH, ADR_TAG, MEM_BANK, PSWD	Reads data from a transponder by specifying the physical start address of the memory bank (UHF), the length and the password.
PHYSICAL-WRITE	71	'q'	OFFSETBUFFER, EPCID_UID, LEN_ID, LEN_DATA, ADR_TAG, MEM_BANK, PSWD	Writes data to a transponder by specifying the physical start address of the memory bank (UHF), the length and the password.
READER-STATUS	74	't'	OFFSETBUFFER, ATTRIBUTES	Reads out the status of the reader.
INVENTORY	69	'i'	OFFSETBUFFER, ATTRIBUTES, DURATION, DUR_UNIT	Requests a list of all currently accessible transponders within the antenna range.
WRITE-ID	67	‘g‘	OFFSETBUFFER, EPCID_UID, LEN_ID, NEW-LEN_ID, PSWD	RF680R/RF685R: Writes a new EPC-ID to the transponder.
KILL-TAG	6A	‘j‘	EPCID_UID, LEN_ID, PSWD	RF680R/RF685R: The transponder is permanently deactivated.
LOCK-TAG-BANK	79	‘y‘	EPCID_UID, LEN_ID, PSWD, ACTION, MASK	RF680R/RF685R: The corresponding memory area of the transponder is blocked as specified.
EDIT-BLACKLIST	7A	‘z‘	EPCID_UID, LEN_ID, MODE	RF680R/RF685R: The black list is processed. The current transponder can be added, all identified transponders added, individual transponders deleted or all transponders deleted.
GET-BLACKLIST	6C	‘l‘	OFFSETBUFFER	RF680R/RF685R: The entire EPC-IDs are read out from the black list.
READ-CONFIG	61	'a'	--	Reads out the parameters from the reader.
WRITE-CONFIG	78	'x'	LEN_DATA, CONFIG	Sends new parameters to the reader.

8.7.3 Command structure

Before you can start a command with "EXECUTE" or "INIT", you need to define the command. To allow simple definition of a command, the command buffer "CMDREF" was created using the "IID_CMD_STRUCT" data type. In the command buffer, you have 10 areas available in which commands can be programmed. The parameter "CMDSEL" specifies which command [1...10] is started with "EXECUTE".

Remember that the first element in the buffer is always reserved for "INIT". In other words if "INIT" is set, "CMDSEL" must be set to "1" and element "1" in the CMD buffer must be filled with the relevant settings.

The following table contains the command structure of the parameters. Not every command uses all parameters.

Table 8- 21 Command structure of the parameters

Parameter	Data type	Default value	Description
CMD	BYTE	B#16#0	Command code (compare the table in the section "Overview of the commands (Page 139)".)
OFFSETBUFFER	INT	0	Relative offset within the received data buffer. The parameter specifies the address within the memory area at which the first byte of the received data must be stored or the first byte of the data to be sent is expected. All subsequent bytes must be stored in ascending addresses.
EPCID_UID	ARRAY[1...62] OF BYTE	B#16#0	Buffer for up to 62 bytes EPC-ID 2 - 62-byte EPC-ID is entered at the start of the buffer (length is set by "LEN_ID") Default value: 0x00 ≙ unspecified single tag access
LEN_DATA	WORD	W#16#0	Amount of data to be read/written in bytes
ADR_TAG	DWORD	DW#16#0	Physical start address on the transponder
ATTRIBUTES	BYTE	B#16#0	Sub command name for several commands (e.g. "READER-STATUS", "INVENTORY", etc,)
CHAINED	BOOL	FALSE	• 0x00 = not chained • 0x01 = chained All chained commands must have this bit set except the last command. The commands are worked through in the order in which they are located in the CMD structure.
CONFIG	BYTE	B#16#0	• 0x01 = reset, no configuration data • 0x02 = no reset, configuration data to be sent • 0x03 = reset, configuration data to be sent • 0x80 = no reset, only individual parameters

Parameter		Data type	Default value	Description
EXT_UHF		STRUCT	--	Structure for additional parameters (RF680R/RF685R only)
	LEN_ID	BYTE	B#16#0	Length of the valid data in the "EPCID_UID" field.
	MEM_BANK	BYTE	B#16#3	Memory bank on the transponder • 0x00 = RESERVED • 0x01 = EPC • 0x02 = TID • 0x03 = USER
	PSWD	DWORD	DW#16#0	Password for transponder access 0x00 ≙ no password
	EDIT_BLACKLIST_MODE	BYTE	B#16#0	Mode • 0x00 = add EPC-ID • 0x01 = add all "Observed" transponders • 0x02 = delete EPC-ID • 0x03 = delete all
	INVENTORY_DURATION	WORD	W#16#0	Duration Period of time or number of inventories or number of "Observed" events Example: • 0x00 ≙ no inventory • 0x01 ≙ one inventory
	INVENTORY_DUR_UNIT	WORD	W#16#0	Unit for "DURATION" • 0x00 = time [ms] • 0x01 = inventories • 0x02 = number of "Observed" events
	LOCK-TAG-BANK_ACTION	WORD	W#16#0	Lock-Action (see "EPC Specification")
	LOCK-TAG-BANK_MASK	WORD	W#16#0	Lock-Mask (see "EPC Specification")

8.7.4 Commands

Table 8- 22 PHYSICAL-READ

CMD	OFFSET BUFFER	LEN_ DATA	ADR_TAG	CHAINED	EPCID_ UID	LEN_ID	MEM_ BANK	PSWD	IDENT_ DATA
0x70	Offset in the "RXREF" receive buffer	Length of re-ceived data	Address on the tran-sponder	True = chained False = not chained	Buffer for up to 62 bytes EPC-ID 2 - 62-byte EPC-ID is entered at the start of the buffer (length is set by "LEN_ID") Default value: 0x00 ≙ unspeci-fied single tag access	Length of the EPC-ID (2-62 bytes) 0x00 ≙ unspeci-fied sin-gle tag access	Memory bank • 0x00 ≙ re-served • 0x01 ≙ EPC • 0x02 ≙ TID • 0x03 ≙ USER	Password 0x00 ≙ no pass-word	Read data

Table 8- 23 PHYSICAL-WRITE

CMD	OFFSET BUFFER	LEN_ DATA	ADR_TAG	CHAINED	EPCID_ UID	LEN_ID	MEM_ BANK	PSWD	IDENT_ DATA
0x71	Offset in the "TXREF" send buffer	Length of the data to be written	Address on the tran-sponder	True = chained False = not chained	Buffer for up to 62 bytes EPC-ID 2 - 62-byte EPC-ID is entered at the start of the buffer (length is set by "LEN_ID") Default value: 0x00 ≙ unspeci-fied single tag access	Length of the EPC-ID (2-62 bytes) 0x00 ≙ unspeci-fied sin-gle tag access	Memory bank • 0x00 ≙ re-served • 0x01 ≙ EPC • 0x02 ≙ TID • 0x03 ≙ USER	Password 0x00 ≙ no pass-word	Data to be written

Table 8- 24 READER-STATUS

CMD	OFFSETBUFFER	ATTRIBUTES	CHAINED	IDENT_ DATA
0x74	Offset in the "RXREF" receive buffer	Identifier of the status mode "0x89"	True = chained False = not chained	Received status data You will find the data structure of the status mode in the section "Reader_Status (Page 121)".

Table 8- 25 INVENTORY

CMD	OFFSETBUFFER	ATTRIBUTES	INVENTORY_ DURATION	DUR_UNIT	IDENT_ DATA
0x69	Offset in the "RXREF" receive buffer	Identifier of the status modes / possible entries: • 0x80 ≙ inventory with brief transponder information • 0x81 ≙ inventory with a lot of transponder information • 0x86 ≙ Presence mode on • 0x87 ≙ Presence mode off	Only for 0x80 and 0x81: Duration Period of time or number of inventories or number of "Observed" events Example: • 0x00 ≙ no inventory • 0x01 ≙ one inventory	Only for 0x80 and 0x81: Unit for "DURATION" • 0x00 ≙ time [ms] • 0x01 ≙ inventories • 0x02 ≙ number of "Observed" events	Only for 0x80 and 0x81: Data received You will find the data structure of the modes in the section "Inventory (Page 125)".

Table 8- 26 WRITE-ID

CMD	OFFSET BUFFER	EPCID_ UID	LEN_ID	LEN_DATA	PSWD	IDENT_ DATA
0x67	Offset in the "TXREF" send buffer	EPC ID 0x00 ≙ unspecified single tag access	Length of the EPC-ID (2-62 bytes) 0x00 ≙ unspecified single tag access	Length of the new EPC-ID	Password 0x00 ≙ no password	New EPC-ID

Table 8- 27 KILL-TAG

CMD	EPCID_ UID	LEN_ID	PSWD	IDENT_DATA
0x6A	EPC ID 0x00 ≙ unspecified single tag access	Length of the EPC-ID (2-62 bytes) 0x00 ≙ unspecified single tag access	Password must be ≠ 0x00	--

Table 8- 28 LOCK-TAG-BANK

CMD	EPCID_ UID	LEN_ID	PSWD	LOCK_TAG_BANK_ ACTION	LOCK_TAG_BANK_ MASK	IDENT_DATA
0x79	EPC ID 0x00 ≙ unspecified single tag access	Length of the EPC-ID (2-62 bytes) 0x00 ≙ unspecified single tag access	Password 0x00 ≙ no password	For a detailed description of the parameters, refer to the section "lockTagBank (Page 257)" or the "EPC specification".	For a detailed description of the parameters, refer to the section "lockTagBank (Page 257)" or the "EPC specification".	--

Table 8- 29 EDIT-BLACKLIST

CMD	EDIT_ BLACKLIST_MODE	EPCID_ UID	LEN_ID	IDENT_DATA
0x7A	• 0x00 ≙ add EPC-ID • 0x01 ≙ add all "OBSERVED" transponders • 0x02 ≙ delete EPC-ID • 0x03 ≙ delete all	EPC ID	Length of the EPC-ID (2-62 bytes)	--

In the section "Filtering out transponders using the "Black list" (Page 327)" you will find a description of how the "Black List" works based on an example.

Table 8- 30 GET-BLACKLIST

CMD	OFFSETBUFFER	IDENT_DATA
0x6C	Offset in the "RXREF" receive buffer	Read black list IDs

Table 8- 31 Result of GET-BLACKLIST

Name	Type	Comment
NUM_IDS	WORD	Number of MDS
TAG_DATA	ARRAY[1..n] of IID_IN_I_80	
TAG_DATA[1]	IID_IN_I_80	
Reserved	BYTE	
ID_Len	BYTE	Length of EPC ID
EPC_ID	ARRAY[1..62] of BYTE	EPC-ID
TAG_DATA[2]	IID_IN_I_80	
...	...	
TAG_DATA[n]	IID_IN_I_80	

Table 8- 32 READ-CONFIG

CMD	OFFSETBUFFER	IDENT_DATA
0x61	Offset in the "RXREF" receive buffer	Read reset parameters

Table 8- 33 WRITE-CONFIG

CMD	OFFSET BUFFER	LEN_DATA	CONFIG	IDENT_DATA
0x78	Offset in the "TXREF" send buffer	0	0x01 ≙ communication reset, no configuration data	--
		Length information of the configuration data +6	0x02 ≙ no communication reset, configuration data to be sent	
		Length information of the configuration data +6	0x03 ≙ communication reset, configuration data to be sent	
		8	0x80 ≙ no communication reset, individual parameters	

Backup & Restore

When replacing a module, it is possible to read all the configuration data from the reader and to store it on the controller. When the module is replaced, this data can then be loaded on the reader from the controller. The command "WRITE-CONFIG" (Config = 3) is used for the download to the reader and "READ-CONFIG" for the upload from the reader. You will find more information on this in the section "Backup configuration data (Page 301)".

8.7.5 Chaining

With the Ident profile and the Advanced block, it is possible to send chained commands. Chained commands are sent in their entirety to the reader without waiting for the results of the first command. This function allows you to execute various transponder commands with one command start.

With both blocks, you have a command buffer of 100 commands available (Array [1...10] of the "IID_CMD_STRUCT"). In each command structure there is a "chained" bit. This bit must be set for each chained command. In the last chained command, this bit must not be set so that the block recognizes that the chain has ended.

Overview of the commands

Table 8- 34 Overview of the commands with which chaining is possible

Command	Command code		Description
	HEX	ASCII	
PHYSICAL-READ	70	'p'	Reads data from a transponder by specifying the physical start address of the memory bank (UHF), the length and the password.
PHYSICAL-WRITE	71	'q'	Writes data to a transponder by specifying the physical start address of the memory bank (UHF), the length and the password.
INVENTORY [1)]	69	'i'	Requests a list of all currently accessible transponders within the antenna range.
DEV-STATUS	74	't'	Reads out the status of a communications module. This command must not be the last command within the chain.
WRITE-ID	67	‘g‘	RF680R/RF685R: Writes a new EPC-ID to the transponder.
KILL-TAG	6A	‘j‘	RF680R/RF685R: The transponder is permanently deactivated.
LOCK-TAG-BANK	79	‘y‘	RF680R/RF685R: Defines a password for transponder access.

1) Note that chaining of commands must not start with the "INVENTORY" command, because the "INVENTORY" command is executed directly.

Example of command structure

Table 8- 35 Example of a command structure with 3 commands (without EPC-ID)

Command	Parameter	Value	Description
Command 1	IID_CMD_STRUCT[2].CMD	0x69	Execute an inventory with a duration of 2 inventories.
	IID_CMD_STRUCT[2].ATTRIBUTES	0x80	
	IID_CMD_STRUCT[2].EXT_UHF. INVENTORY.DURATION	2	
	IID_CMD_STRUCT[2].EXT_UHF. INVENTORY.DUR_UNIT	1	
	IID_CMD_STRUCT[2].OPTIONS.CHAINED	true	
Command 2	IID_CMD_STRUCT[3].CMD	0x70	Read 10 bytes from the user bank starting at address 0.
	IID_CMD_STRUCT[3].EXT_UHF.MEM_ BANK	3	
	IID_CMD_STRUCT[3].LEN_DATA	10	
	IID_CMD_STRUCT[3].ADDR_TAG	0	
	IID_CMD_STRUCT[3].OPTIONS.CHAINED	true	
Command 3	IID_CMD_STRUCT[4].CMD	0x71	Write 10 bytes to the user bank starting at address 20.
	IID_CMD_STRUCT[4].EXT_UHF.MEM_ BANK	3	
	IID_CMD_STRUCT[4].LEN_DATA	10	
	IID_CMD_STRUCT[4].ADDR_TAG	20	
	IID_CMD_STRUCT[4].OPTIONS.CHAINED	false	

In the chaining, the entire "IID_CMD_STRUCT" buffer ("IID_CMD_STRUCT[1...10]") can be used. The start of the chain is set with the "CMDSEL" parameter.

If several commands are executed in the chain for which data is returned, the position of the data in the receive buffer "RXREF" can be set for each individual command using the "IID_CMD_STRUCT[x].OFFSETBUFFER" parameter.

Note

"IID_CMD_STRUCT[1]" reserved for "INIT"

In the Ident profile, the "IID_CMD_STRUCT[1]" parameter is reserved for "INIT". If you want to use "IID_CMD_STRUCT[1]" for another command, make sure that the reset parameters are written into this parameter when there is an "INIT".

8.7.6 Command repetition

The Ident profile supports command repetition (Repeat command).

How it works

After restart (or "INIT") of the reader, you need to enable the presence mode using the "INVENTORY" command with the attribute "0x86". Then transfer the command chain once with the "EXECUTE" command. This command (or the last command or the command chain) always remains buffered on the reader. If command repetition is started, the temporarily stored command on the reader is executed again, and the result(s) transferred to the Ident profile.

Make sure that the "EPC-ID/UID" of the commands to be repeated have the value 0. If the EPC-ID as a different value, an error message is generated.

Effects of command repetition

- The data transfer on PROFIBUS/PROFINET is minimized. This reduction has a positive effect particularly with extensive bus configurations and slow transmission speeds.
- The reader processes each transponder regardless of the Ident profile. This has a particularly advantageous effect on gate applications since all transponders are always identified with the full reader scan speed.
- Total data throughput is increased considerably particularly with controllers that have few system resources for acyclic frames.

Overview of the commands

Table 8- 36 Overview of the commands with which command repetition is possible

Command	Command code		Description
	HEX	ASCII	
PHYSICAL-READ	70	'p'	Reads data from a transponder by specifying the physical start address of the memory bank (UHF), the length and the password.
PHYSICAL-WRITE	71	'q'	Writes data to a transponder by specifying the physical start address of the memory bank (UHF), the length and the password.
INVENTORY	69	'i'	Requests a list of all currently accessible transponders within the antenna range.
KILL-TAG	6A	‘j‘	RF680R/RF685R: The transponder is permanently deactivated.
LOCK-TAG-BANK	79	‘y‘	RF680R/RF685R: Defines a password for transponder access.

Starting command repetition

You have the option of using command repetition (Repeat command) with or without transfer of the command. Note that the command repetition starts directly after execution even if there is no transponder in the antenna field at the current time. The various procedures are described below.

Sequence of the repeat command with simultaneous command transfer:

1. If applicable, enable the presence mode.
2. Start the command using the input parameter "EXECUTE" while "RPTCMD" is set at the same time. ①

   The command is processed and the result transferred to the Ident profile.

   The Repeat command is activated on the reader.
3. The reader confirms activation with the output parameter "RPTACT" to the Ident profile. The confirmation is made only after the first command has been executed. ②

   The reader executes the command automatically as soon as a transponder is identified in the antenna field.

   If the reader does not support the Repeat command, "RPTACT" remains inactive. If "EXECUTE" is nevertheless set, the error "E7FE0900h" is output after a timeout of 10 seconds.
4. You can read out the individual results by setting the "EXECUTE" input parameter several times. ③

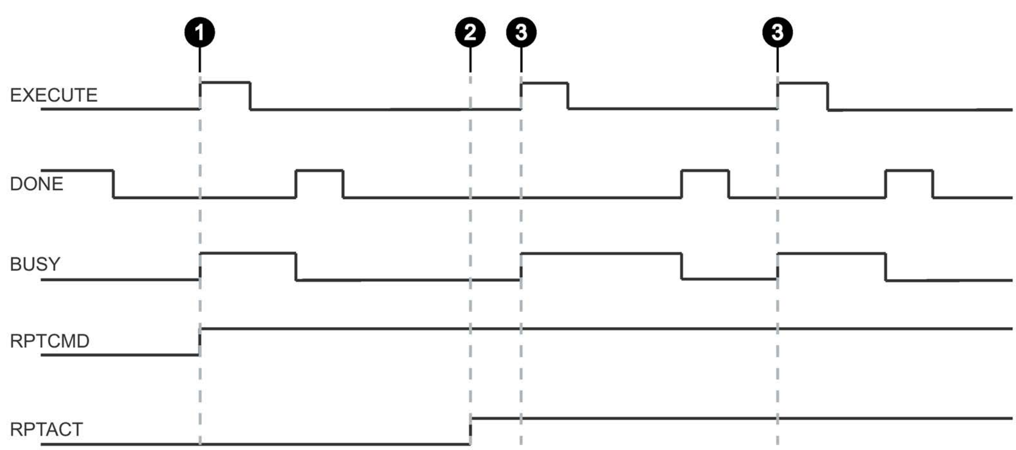


Figure 8-20 Sequence of the repeat command with simultaneous command transfer

Sequence of the repeat command without command transfer:

This sequence is only possible if the command involved has already been transferred and the presence mode was enabled.

1. Set the "RPTCMD" input parameter. ①

   The Repeat command is activated on the reader.

2. The reader confirms activation via the output parameter "RPTACT" of the Ident profile. ②

   If the reader does not support the Repeat command, "RPTACT" remains inactive. If "EXECUTE" is nevertheless set, the error "E7FE0900h" is output after a timeout of 10 seconds.

3. You can read out the individual results by setting the "EXECUTE" input parameter several times. ③

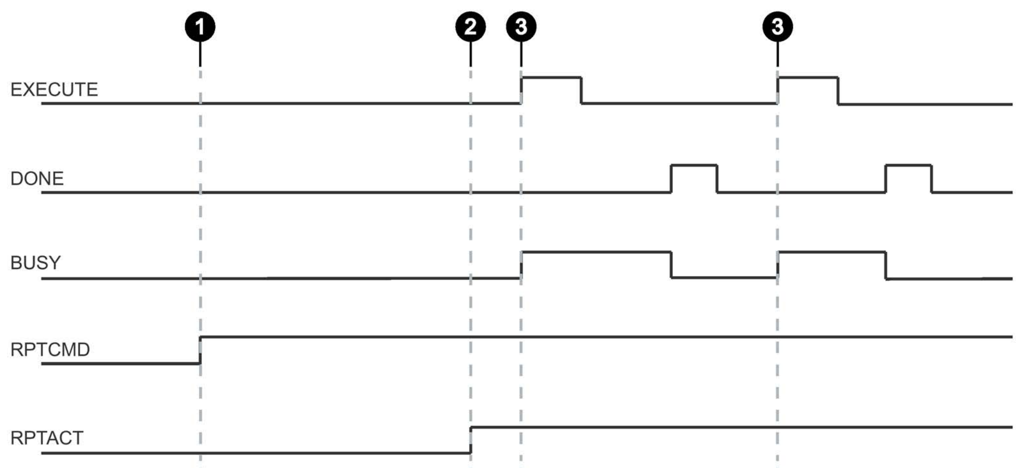


Figure 8-21 Sequence of the repeat command without command transfer

Ending command repetition

You have the option of ending command repetition by resetting "RPTCMD" or using the "INIT" or "SRESET" commands. The various procedures are described below

End the Repeat command and reset "RPTCMD":

1. Reset the "RPTCMD" input parameter. ①
2. Fetch any existing acknowledgments using the "EXECUTE" input parameter. ②

   The "RPTACT" output parameter remains set by the reader as long as there are acknowledgements present.
3. When there are no more acknowledgments, "RPTACT" is reset by the reader. ③

It is always possible to reset the Repeat command with a "RESET" ("INIT", "SRESET").

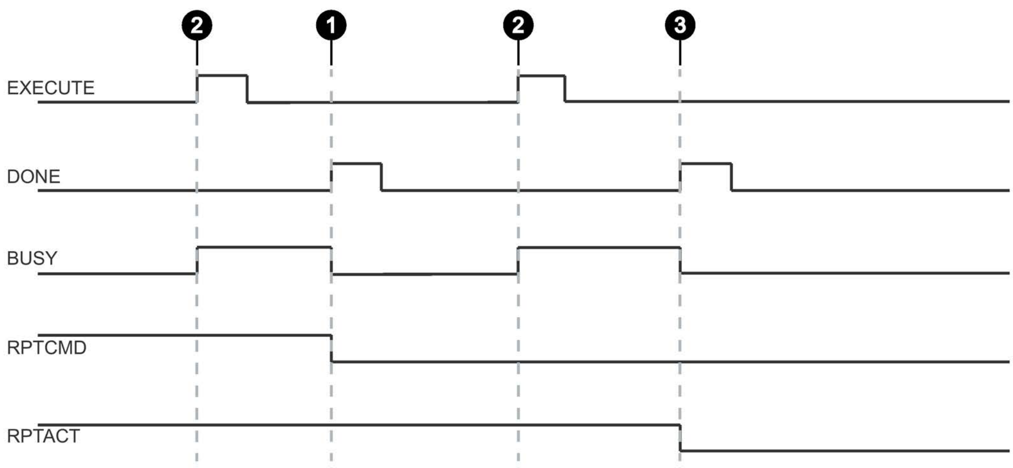


Figure 8-22 End the Repeat command by resetting "RPTCMD" (ended normally)

The "RPTACT" output parameter is reset by the reader. Under certain circumstances, it is possible that resetting "RPTACT" will be delayed. In other words not at the same time as the "DONE" of the last acknowledgement. If the block is now restarted with "EXECUTE" and "RPTACT" is still set although there are no longer any results in the buffer, the block is not ended (BUSY = 1). In this case, you can wait until the next transponders are read out. As an alternative, the block can be ended with "INIT" or "SRESET".

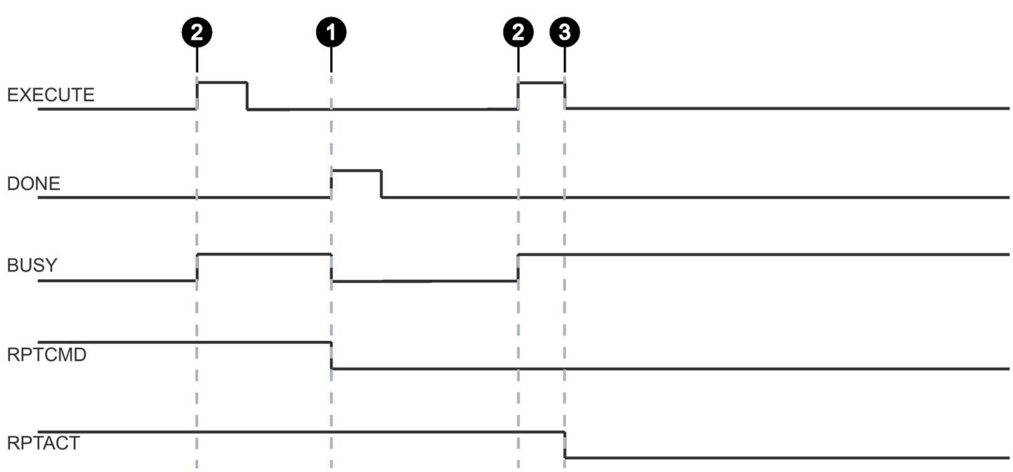


Figure 8-23 End the Repeat command by resetting "RPTCMD" (the last command remains pending)

Note

End the Repeat command with "INIT" or "SRESET"

End the Repeat command using the input parameters "INIT" or "SRESET" if it is not known how many transponders were still processed after resetting the "RPTCMD" input parameter.

Normally, an "SRESET" is performed significantly faster because not reset routine is run through.

Ending the Repeat command with "INIT":

1. Reset the "RPTCMD" input parameter and set the "INIT" input parameter. ①

   If "RPTCMD" is not reset, the Repeat command is activated again on the reader. This response triggers an error message because there is no command.
2. The reader resets the "RPTACT" output parameter due to the "INIT" input parameter. ②

Ending the Repeat command with "SRESET":

1. Reset the "RPTCMD" input parameter and set the "SRESET" input parameter. ①
2. The "DONE" output parameter is set and the reader resets the "RPTACT" output parameter. ②

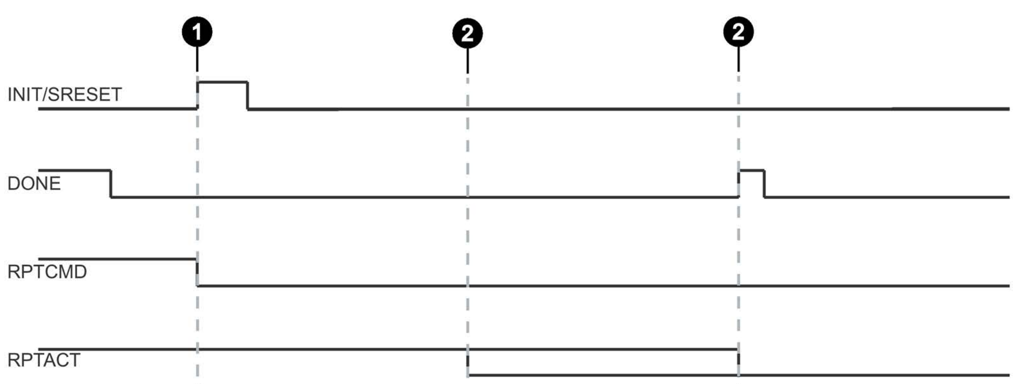


Figure 8-24 Ending the Repeat command with "INIT"/"SRESET"

Data buffer

Permanent command repetition can lead to the data being transferred more slowly to the Ident profile than new transponders are processed. In this case, the reader buffers the results. The reader has a number of buffers for this. If the buffers are full, acknowledgments are discarded and an error message to this effect is generated.

Table 8- 37 Readers that support command repetition

Device type	Number of buffers (number of commands)	Max. user data that can be processed with command repetition
RF680R/RF685R	250	1034 bytes × 250 = 258 500 bytes

Note

Restriction of command repetition

With unique EPC-IDs, the stored command is only repeated if different transponders are brought into the antenna field. If the same transponder (identical EPC-ID) enters the antenna field again and again, the transponder will not be processed again.

8.8 Digital inputs/outputs

There are 4 digital inputs/outputs available on the reader. The outputs can be configured in the WBM. You will find more information on this in the section "The "Settings - Digital outputs" menu item (Page 72)". The request and control are via the controller. You can control the addresses of the inputs/outputs via a WORD large subsegment of the process image of the reader/CM. You can enter the addresses using STEP 7 or Studio 5000 Logix Designer in the properties of the reader in the parameter "Digital inputs/outputs". Via the byte with the lower value address, you can access the digital inputs/outputs.

The structure of this byte and the assignment to the digital inputs/outputs is shown below.

Table 8- 38 Assignment of the digital inputs/outputs

Bit	7...0	3	2	1	0
Input byte	reserved	DI 3	DI 2	DI 1	DI 0
Output byte	reserved	DO 3	DO 2	DO 1	DO 0

Programming via Rockwell controller 9

This section is intended only for Rockwell users (RF680R/RF685R).

This section describes the programming and configuration of the RF680R and RF685R readers via a Rockwell controller. With the described functions, you can read out and write transponder data via the readers.

9.1 Importing add-on instructions

To program Ident systems using the Studio 5000 Logix Designer, you require add-on instructions. You will find the add-on instructions on the DVD supplied with the readers.

Requirement

The Studio 5000 Logix Designer was started and a project was created.

Procedure

Follow the steps below to import the add-on instructions into the Studio 5000 Logix Designer:

1. Copy the installation file (*.l5x) locally to your PC.

   You will find the file on the DVD supplied with the product.
2. Open the Studio 5000 Logix Designer and change to the project view.
3. Right-click on the folder "Add-on Instructions" in the "Controller Organizer" area.
4. In the shortcut menu, select the menu command "Import Add-On Instruction...".

   The dialog "Import Add-On Instruction" opens.
5. Go to the installation file (*.lx5) and select it.
6. Confirm your entry with "OK".

Result: The add-on instructions are imported into the Studio 5000 Logix Designer:

9.2 Overview of the add-on instructions

To program the various identification systems, a library with add-on instructions is available.

The following table provides you with an overview of the currently existing add-on instructions that can be used with the RF680R and RF685R readers.

Table 9- 1 Overview of the add-on instructions for RF680R and RF685R

Position			Symbolic name	Description
Add-On Instructions	Ident blocks	Basic blocks	Param_RF68xR	Using these blocks, it is simple to program communication with the Ident systems. The basic blocks include all the blocks that are used often.
			Reset_RF68xR	
			Read	
			Write	
			Reader_Status	
		Extended blocks	Config_Download	Using these blocks, it is simple to program communication with the Ident systems. The extended blocks provide functions that are required less often for operating the Ident system.
			Config_Upload	
			Inventory	
			Read_EPC_Mem	
			Set_Param	
			Write_EPC_ID	
			Write_EPC_Mem	
			AdvancedCMD	Advanced command set. With the "Ad-vancedCmd" block it is possible to access other commands from the Ident command set and to execute chained commands.
	Ident profile		Ident_Profile	This block is available for experts to be able to include complex command structures in their own program sequence. It is also possible to use command repetition and chaining.
Data types	User-specific data types		IID_CMD_STRUCT	Data type for the Ident profile for setting the command parameters.
			IID_DATA_RF68xR	Data type for parameter data for the reader and data for synchronizing the function blocks for all read points of a reader.

The Ident profile is a single complex block containing all the commands and functions for Ident. The Ident blocks represent a simplified interface of the Ident profile. Each Ident block contains a single command of the Ident profile.

Note

Parallel operation using Ident blocks and Ident profile is not possible

Note that the reader cannot be operated at the same time using the Ident blocks and the Ident profile.

9.3 Project preparation

9.3.1 Assigning parameters to the "Param_RF68xR" block

You first need to link the block "Param_RF68xR" into the project and create and assign the relevant variables for the parameters "READER_CONFIGDATA" and "MSG_PARAM". With the aid of the "Param_RF68xR block, the configuration data is sent to the Ident system.

In addition to this, the block resets the required start values of the "HW_CONNECT" variables for the 4 reader channels (read points).

Note that this block always needs to be executed first before other blocks can be executed. The block must be executed each time the reader or controller is restarted.

Addressing the Ident devices

When working with all the instructions/blocks, you require the "IID_HW_CONNECT" data type to address the reader. The data type "IID_HW_CONNECT" relates to a read point/channel of the reader and is part of the data type "IID_DATA_RF68xR" for all 4 channels. Setting the command parameters for the Ident profile is handled by the Ident blocks. The Ident profile and the "AdvancedCMD" block also require the "IID_CMD_STRUCT" data type for the parameter assignment of the individual commands. Depending on whether you work with the Ident profile or the Ident blocks, you need to link in and assign parameters for these data types as described in the following sections.

Creating the block "Param_RF68xR"

Follow the steps below to create the "Param_RF68xR" block:

1. Drag the block from the "Controller Organizer" into the project.
2. Create a instance variable.
3. Create a global variable for the "READER_CONFIGDATA" parameter.

   The variable of the data type "IID_DATA_RF68xR". As an example for the following description the variable is called "RF68xR_001_ConfigData".
4. Create a global variable for the "MSG_PARAM" parameter.

5. Assign parameters for the variable as follows:

   In the "Configuration" tab":

   – Message Type = CIP generic
   – Service Type = Custom
   – Service Code = 41
   – Class = 80
   – Instance = 1
   – Attribute = 1
   – Source Element = RF68xR_001_ConfigData.Parameter
   – Source Length = 10
6. Select the reader for which you want to assign parameters in the "Communication" tab in the input box "Path".
7. Start the block by calling the "PARAMETERIZE" parameter.

9.3.2 Assigning parameters to the "Param_RF68xR" block

In the next step, the "Reset_RF68xR" block must be linked into the project and have parameters assigned. For this block two further message variables must be created and assigned to the parameters "MSG_READ" and "MSG_WRITE". These two variables can used with all other application blocks.

Before the read point is operational, the reset command needs to be executed. This resets the relevant read point.

Creating the block "Reset_RF68xR"

Follow the steps below to create the "Reset_RF68xR" block:

1. Drag the block from the "Controller Organizer" into the project.
2. Create a instance variable.
3. Select the variable (e.g. "RF680R_001_ConfigData.Channel1" for the parameter "HW_CONNECT".
4. Create a variable for the "MSG_READ" parameter.

5. Assign parameters for the variable as follows:

   In the "Configuration" tab":

   – Message Type = CIP generic
   – Service Type = Custom
   – Service Code = 40
   – Class = 80
   – Instance = 1
   – Source Element = RF680R_001_ConfigData.Channel1.Static.buf
   – Destination Element = RF680R_001_ConfigData.Channel1.Static.buf
6. Select the reader for which you want to assign parameters in the "Communication" tab in the input box "Path".
7. Enable the "Connected" and "Large Connection check boxes.
8. Create a variable for the "MSG_WRITE" parameter.
9. Assign parameters for the variable as follows:

   In the "Configuration" tab":

   – Message Type = CIP generic
   – Service Type = Custom
   – Service Code = 41
   – Class = 80
   – Instance = 1
   – Source Element = RF680R_001_ConfigData.Channel1.Static.buf
10. Select the reader for which you want to assign parameters in the "Communication" tab in the input box "Path".
11. Enable the "Connected" and "Large Connection" check boxes.

    You will find more information on this subject in the section "Param_RF68xR (Page 161)".
12. Select the relevant input word of the reader for the parameter "STATUS_WORD" (<Readername>:I.Data[0]).
13. Select the relevant output word of the reader for the parameter "CONTROL_WORD" (<Readername>:O.Data[0]).
14. Start the block by calling the "EXECUTE" parameter.

9.4 General structure of the add-on instructions

Structure of the blocks based on a sample block

The following graphic shows an example of a block with input and output parameters as they exist in the same way in all blocks.

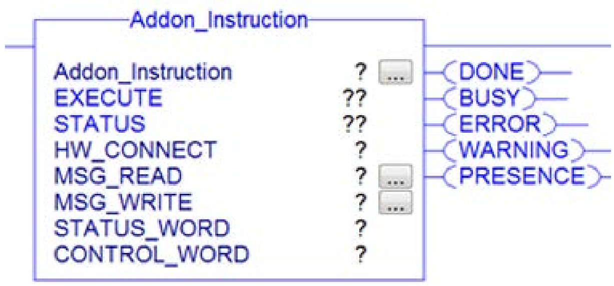


Figure 9-1 Example of a block

Description of the parameters

Table 9- 2 Description of the input and output parameters

Parameter	Description
Input parameters	
EXECUTE	There must be a positive edge at this input before the block will execute the command.
HW_CONNECT	Global parameter of the type "IID_HW_CONNECT" to address the channel/reader and to synchronize the blocks. This parameter is located in the variables of the type "IID_DATA_RF68xR". "HW_CONNECT" must always be transferred to the blocks to address the relevant channel/reader.
MSG_READ	Message variable for communication between the controller and reader
MSG_WRITE	Message variable for communication between the controller and reader
STATUS_WORD	Cyclic status word which is sent from the reader to the contoller.
CONTROL_WORD	Cyclic control word which is sent from the controller to the reader.
Output parameters	
DONE (BOOL)	The job was executed. If the result is positive, this parameter is set.
BUSY (BOOL)	The job is being executed.
ERROR (BOOL)	The job was ended with an error. The error code is indicated in Status.
WARNING (BOOL)	The job was ended with a warning.
STATUS (DINT)	Display of the error message if the "ERROR" bit was set.
PRESENCE (BOOL)	This bit indicates the presence of a transponder. The displayed value is updated each time the block is called. This parameter does not occur in the blocks specifically for code reader systems.

General sequence when calling the blocks

The general sequence when calling a block with Rockwell controllers is identical to the general sequence when calling a block with S7 controllers. For a description of the general sequence, refer to the section "General structure of the function blocks (Page 115)".

9.5 Programming add-on instructions

9.5.1 Basic blocks

9.5.1.1 Param_RF68xR

With the aid of the "Param_RF68xR" block, the configuration data is sent to the Ident system. In addition to this, the block resets the required start values of the "HW_CONNECT" variables for the 4 reader channels (read points). Note that this block always needs to be executed first before other blocks can be executed. The block must be sent at every restart of the controller or the reader.

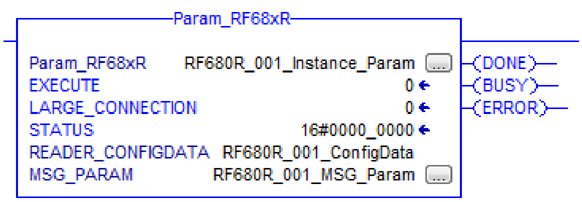


Figure 9-2 "Param_RF68xR" block

The input parameter "LARGE_CONNECTION" is supported only by ControlLogix controllers as of version "5.0". You also require the Logix Designer as of version "21.00.00" and the RSLogix 5000 software as of version "20.00.00".

If the parameter is set (value = "true" or "1"), the maximum frame length is increased from 240 bytes to 1035 bytes. If the parameter is enabled, you must also enable the options "Connected" and "Large Connection" in the parameters "MSG_READ" and "MSG_WRITE" of the message variables.

9.5.1.2 Reset_RF68xR

With the aid of the "Reset_RF68xR" block, you can reset the RF680R and RF685R readers. The reader is reset to the settings configured on the reader with the WBM. The "Reset_RF68xR" block does not have any device-specific parameters and is executed using the "EXECUTE" parameter.

With the "Reset_RF68xR" block, you can interrupt any active Ident block at any time. The blocks are then ended with "DONE = true" and "ERROR = false".

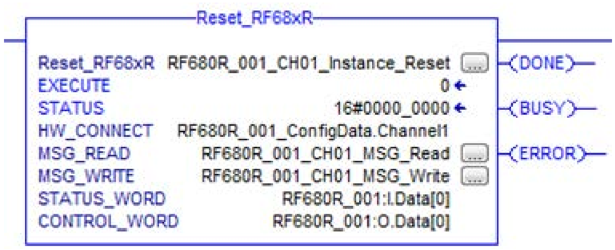


Figure 9-3 "Reset_RF68xR" block

9.5.1.3 Read

The "Read" block reads the user data from the transponder from memory bank 3 (USER area) and enters this in the "IDENT_DATA" buffer. The physical address and the length of the data are transferred using the "ADR_TAG" and "LEN_DATA" parameters. Specific access to a certain transponder is made with the "EPCID_UID" and "LEN_ID".

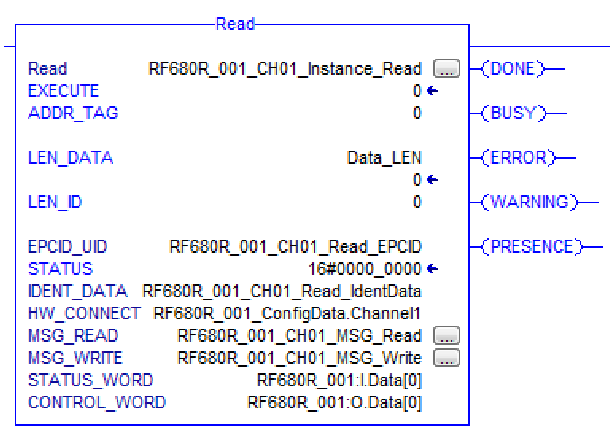


Figure 9-4 "Read" block

Table 9- 3 Explanation of the "Read" block

Parameter	Data type	Default values	Description
ADR_TAG	DINT	DW#16#0	Physical address on the transponder where the read starts.
LEN_DATA	INT	W#16#0	Length of the data to be read
LEN_ID	SINT	B#16#0	Length of the EPC-ID/UID Default value: 0x00 ≙ unspecified single tag access (RF680R, RF685R)
EPCID_UID	SINT[62]	0	Buffer for up to 62 bytes EPC-ID 2 - 62-byte EPC-ID is entered at the start of the buffer (length is set by "LEN_ID")
IDENT_DATA	SINT[10]	0	Data buffer in which the read data is stored. Note. When necessary a byte/array of any size can be transferred to this parameter. Note that the array must be ≥ 10 bytes long (e.g. "SINT[12400]").

9.5.1.4 Write

The "Write" block writes the user data from the "IDENT_DATA" buffer to the transponder to memory bank 3 (USER area). The physical address and the length of the data are transferred using the "ADR_TAG" and "LEN_DATA" parameters. Specific access to a certain transponder is made with the "EPCID_UID" and "LEN_ID".

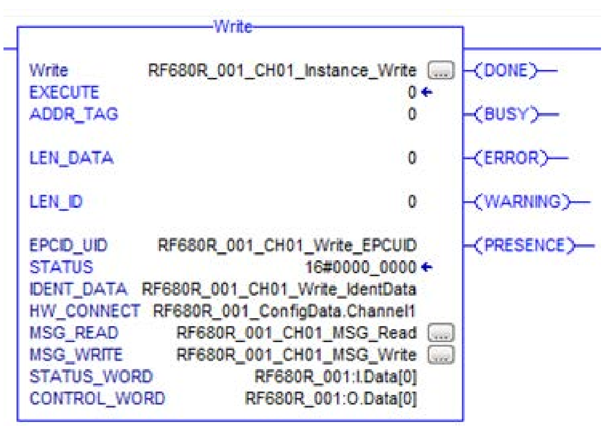


Figure 9-5 "Write" block

Table 9- 4 Explanation of the "Write" block

Parameter	Data type	Default values	Description
ADR_TAG	DINT	DW#16#0	Physical address on the transponder where the write starts.
LEN_DATA	DINT	W#16#0	Length of the data to be written
LEN_ID	SINT	B#16#0	Length of the EPC-ID/UID Default value: 0x00 ≙ unspecified single tag access (RF680R, RF685R)
EPCID_UID	SINT[62]	0	Buffer for up to 62 bytes EPC-ID 2 - 62-byte EPC-ID is entered at the start of the buffer (length is set by "LEN_ID")
IDENT_DATA	SINT[10]	0	Data buffer with the data to be written. Note. When necessary a byte/array of any size can be transferred to this parameter. Note that the array must be ≥ 10 bytes long (e.g. "SINT[12400]").

9.5.1.5 Reader_Status

The "Reader_Status" block reads status information from the reader. For the RF68xR reader, there is only the status mode "0x89" that is selected using the "ATTRIBUTE" parameter. The status data is returned as "Array of Byte".

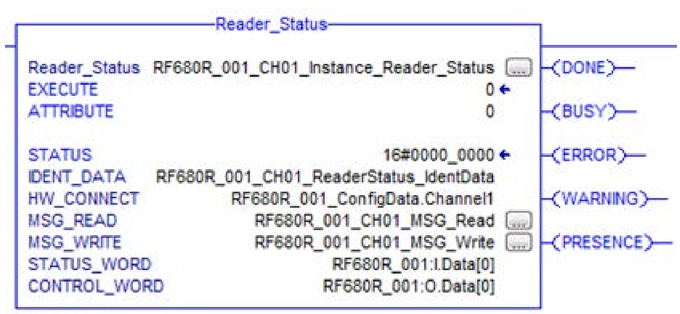


Figure 9-6 "Reader_Status" block

Table 9- 5 Explanation of the "Reader_Status" block

Parameter	Data type	Default values	Description
ATTRIBUTE	SINT	B#16#81	Identifier of the status mode "0x89" Note: The default value is not valid for RF680R/RF685R and needs to be adapted.
IDENT_DATA	SINT[10]	0	Event values depending on attributes Note. When necessary a byte/array of any size can be transferred to this parameter. Note that the array must be ≥ 10 bytes long (e.g. "SINT[12400]").

Results

Table 9- 6 ATTRIBUTE "0x89" ("IID_READER_STATUS_89_RF68xR" data type)

Name	Type	Comment
status_info	BYTE	SLG-Status mode(Subcommand)
hardware_version	BYTE	Version of hardware
firmware_version	ARRAY[1..4] of CHAR	Version of firmware
config ID	DWORD	Unix timestamp
inventory_status	WORD	0=inventory not active;1=inventory active;2=presence mode active
sum of filtered tags	WORD	All filtered Tags
filtered_smoothing	WORD	Filtered Tags trough Smoothing
filtered_blacklist	WORD	Filtered Tags trough Blacklist
filtered data-filter	WORD	Filtered Tags trough Data-Filter
filtered RSSI thresold	WORD	Filtered Tags trough RSSI Threshold
filtered RSSI delta	WORD	Filtered Tags trough RSSI Delta

9.5.2 Extended blocks

9.5.2.1 Config_Upload/-_Download

Using the "Config_Upload" and "Config_Download" blocks, you can read out ("Config_Upload") or write ("Config_Download") the configuration of the RF680R/RF685R readers via the control program.

The configuration data is not interpretable data. Save the data on the controller so that it can be written to the reader again if a device is replaced. Bytes 6-9 (see table below) contain a configuration ID with a unique version identifier. With the configuration ID, when performing a "Config Upload", you can check whether the configuration data read matches the configuration data stored on the controller. The configuration data has the following structure:

Table 9- 7 Structure of the configuration data

Byte	Name
0	Structure identifier (2 bytes)
2	Length information (4 bytes) Length of the version identifier and parameter block
6	Version identifier (4 bytes) Based on the identifier, you can uniquely identify the configuration. This is a time stamp in Linux format. The time stamp indicates how many seconds have passed since January 1, 1979, 00:00 (midnight). The identifier is assigned when a configuration is generated.
10 ... "DATA" end	Parameter block

"Config_Upload/Config_Download" can be executed on every channel of the RF680R/RF685R. It is always the same configuration data that is transferred.

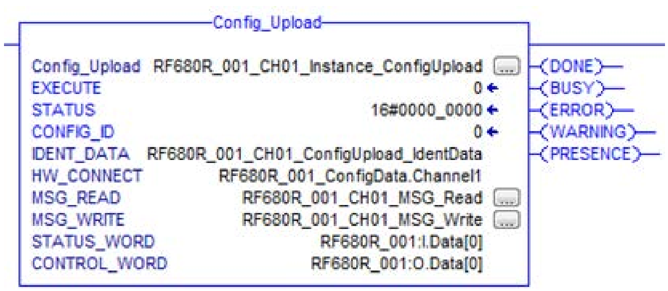


Figure 9-7 "Config_Upload" block

Table 9- 8 Explanation of the "Config_Upload" block

Parameter	Data type	Description
IDENT_DATA	SINT[10]	Data buffer for configuration data. The real length of the data depends on the complexity of the configuration and the firmware version of the reader. With a standard configuration of the RF680R/RF685R reader, we recommend a memory size of 4 KB. If you use advanced reader configurations (filtering) or want to change the configuration in the future without needing to adapt the memory size of "DATA", we recommend a memory size of 8-16 KB. Note. When necessary a byte/array of any size can be transferred to this parameter. Note that the array must be ≥ 10 bytes long (e.g. "SINT[12400]").

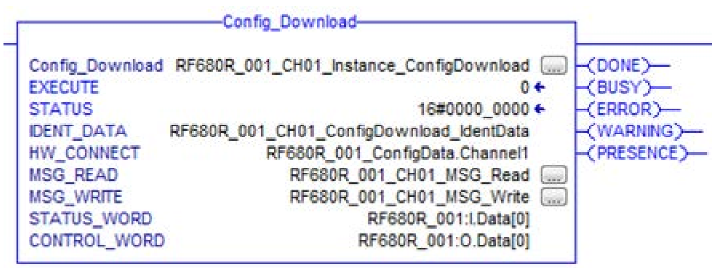


Figure 9-8 "Config_Download" block

Table 9- 9 Explanation of the "Config_Download" block

Parameter	Data type	Description
IDENT_DATA	SINT[10]	Data buffer for configuration data. The real length of the data depends on the complexity of the configuration and the firmware version of the reader. With a standard configuration of the RF680R/RF685R reader, we recommend a memory size of 4 KB. If you use advanced reader configurations (filtering) or want to change the configuration in the future without needing to adapt the memory size of "DATA", we recommend a memory size of 8-16 KB. Note. When necessary a byte/array of any size can be transferred to this parameter. Note that the array must be ≥ 10 bytes long (e.g. "SINT[12400]").

9.5.2.2 Inventory

The "Inventory" block activates the taking of inventories. There are four different modes that you can select with the "ATTRIBUTE" parameter.

- At the start, a certain duration/number (period of time, number of inventories, number of "observed" events or identified transponders) is specified. A distinction is made between the following options:
  - Duration

    Take inventories for a specified period of time
  - Number of inventories

    Take a specified number of inventories
  - Number of "observed" events

    Take inventories until a specified number of transponders have been identified at the same time.

  Inventories are then taken by the reader for this time or number of inventories. When the specified time/number is reached, the block is ended and returns all identified transponders in "IDENT_DATA". The transponders are sorted according to the RSSI value (highest value first). In other words, other commands can only be executed when all inventories have been taken completely. The unit (time or number) is specified using "DUR_UNIT" and the value (time value or number) using "DURATION". This mode can be executed using the attributes "0x80" and "0x81". Depending on the attribute, more or less data is supplied about the identified transponders.
- With the attributes "0x86" (start "Presence_Mode") and "0x87" (end "Presence_Mode"), inventories can be taken permanently. The presence of a transponder can then always be queried using "PRESENCE" without needing to start the block with "EXECUTE". No information about the identified transponders is returned when the command executes!

  To obtain information about the identified transponders, use one of the two calls listed above (with time / number of inventories = 0).

  When this mode is active, commands relating to transponders are not executed immediately but only when a transponder is identified. This achieves shorter reaction times since the command is already pending when the transponder enters the antenna field.

  The "Presence_Mode" is practical in the context of the "Repeat command" function.

The "NUMBER_TAGS" output parameter is used to output the number of identified transponders. With the attributes "0x80" and "0x81" on completion of the read operation, the sum of all identified transponders is displayed. With the attribute "0x86" the number of currently identified transponders is shown at the "NUMBER_TAGS" output parameter (max. 15), without needing to start the module with "EXECUTE".

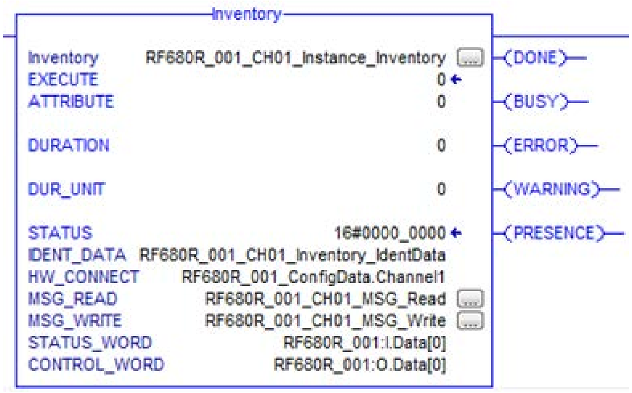


Figure 9-9 "Inventory" block

Table 9- 10 Explanation of the "Inventory" block

Parameter	Data type	Default values	Description
ATTRIBUTE	SINT	B#16#0	Selecting the status mode • 0x80 ≙ EPC-ID without additional information • 0x81 ≙ EPC-ID with additional information on the RSSI value and reserved bytes • 0x86 ≙ enable Presence mode • 0x87 ≙ disable Presence mode
DURATION	DINT	W#16#0	Duration dependent on "DUR_UNIT" Period of time or number of inventories or number of "Observed" events Example: • 0x00 ≙ no inventory or 0 ms • 0x01 ≙ one inventory or 1 ms or one transponder
DUR_UNIT	DINT	W#16#0	Unit for "DURATION" • 0x00 ≙ time [ms] • 0x01 ≙ inventories • 0x02 ≙ number of "Observed" events
IDENT_DATA	SINT[10]	0	Data buffer for inventory data Note. When necessary a byte/array of any size can be transferred to this parameter. Note that the array must be ≥ 10 bytes long (e.g. "SINT[12400]").
NUMBER_TAGS	INT	0	Number of transponders in the antenna field
LEN_DATA	DINT	W#16#0	Length of the valid data

Results

Select the number of "TAG_DATA[x]" elements of the data types (ATTRIBUTES "0x80" and "0x81") at least as high as the number of transponders to be expected. Not the following points when creating the receive buffer :"IDENT_DATA"/data type:

- The first element "NUM_IDS" is always of the type "WORD".
- The next element "TAG_DATA" is always of the type "ARRAY". The number of transponders to be expected ("n") must be entered in the "ARRAY".

The following tables show an example of the structure of the receive buffer "IDENT_DATA"/data type for the ATTRIBUTES "0x80" and "0x81".

Table 9- 11 ATTRIBUTE "0x80"

Name	Type	Comment
NUM_IDS	WORD	Number of MDS
TAG_DATA	ARRAY[1..n] of IID_IN_I_80	
TAG_DATA[1]	IID_IN_I_80	
Reserved	BYTE	
ID_Len	BYTE	Length of EPC ID
EPC_ID	ARRAY[1..62] of BYTE	EPC-ID
tagPC	WORD	
TAG_DATA[2]	IID_IN_I_80	
...	...	
TAG_DATA[n]	IID_IN_I_80	

Table 9- 12 ATTRIBUTE "0x81"

Name	Type	Comment
NUM_MDS	WORD	Number of MDS
TAG_DATA	ARRAY[1..n] of IID_IN_I_81	
TAG_DATA[1]	IID_IN_1_81	
reserved	BYTE	
ID_LEN	BYTE	EPC length
EPC_ID	ARRAY[1..62]of BYTE	EPC-ID
tagPC	WORD	
RSSI	BYTE	RSSI value
MaxRSSI	BYTE	highest RSSI value
MinRSSI	BYTE	lowest RSSI value
channel	BYTE	channel; 1..15_ETSI; 1..53:FCC
antenna	BYTE	antenna; bit coded; Bit 0=antenna 1; Bit 1=antenna 2; ...
polarization	BYTE	polarizatuin of antenna; 0=undefined; 1=circular; 2=vertical linear; 4=horizontal
time	Time_OF_Day	S7 time
power	BYTE	power in dBm

Name	Type	Comment
`filterDataAvailable`	`BYTE`	`0=false; 1=true` 1)
`Inventoried`	`WORD`	2)
`TAG_DATA[2]`	`IID_IN_1_81`	
`...`	`...`	
`TAG_DATA[n]`	`IID_IN_1_81`	

1) Indicates whether the filter criteria could be read.

2) Indicates how often the transponder was identified via the air interface before it changed to the "Observed" status.

9.5.2.3 Read_EPC_Mem

The "Read_EPC_Mem" block reads data from the EPC memory of the RF600 transponder. Access is to memory cell 1 as of the start address 4. The length of the EPC memory to be read out is specified by the "LEN_DATA" parameter.

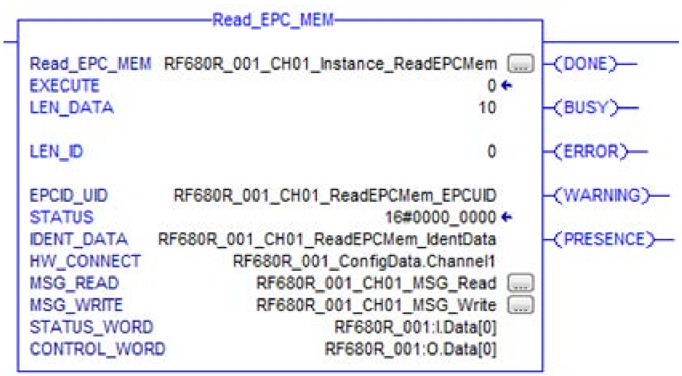


Figure 9-10 "Read_EPC_Mem" block

Table 9- 13 Explanation of the "Read_EPC_Mem" block

Parameter	Data type	Default values	Description
LEN_DATA	DINT	W#16#0	Length of the EPC memory to be read out (1 ... 62 bytes)
LEN_ID	SINT	B#16#0	Length of the EPC-ID/UID Default value: 0x00 ≙ unspecified single tag access (RF680R, RF685R)

Parameter	Data type	Default values	Description
EPCID_UID	SINT[62]	0	Buffer for up to 62 bytes EPC-ID, 8 bytes UID or 4 bytes handle ID. • 2 - 62-byte EPC-ID is entered at the start of the buffer (length is set by "LEN_ID") • 8-byte UID is entered at the start of the buffer ("LEN_ID = 8") • 4-byte handle ID must be entered in the array element [5]-[8] ("LEN_ID = 8") Default value: 0x00 ≙ unspecified single tag access (RF620R, RF630R, RF640R)
IDENT_DATA	SINT[10]	0	Data buffer in which the read EPC memory data is stored. Note. When necessary a byte/array of any size can be transferred to this parameter. Note that the array must be ≥ 10 bytes long (e.g. "SINT[12400]").

9.5.2.4 Set_Param

With the "Set_Param" block, you can change UHF parameters on an RF680R/RF685R during runtime (e.g. the antenna power).

Note

Settings saved only temporarily

Note that the parameters in the "Set_Param" block are only stored temporarily. If the power for the reader is interrupted, the stored values are lost and must be set again.

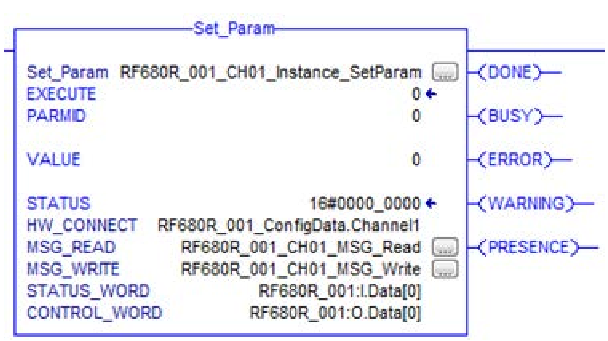


Figure 9-11 "Set_Param" block

Table 9- 14 Explanation of the "Set_Param" block

Parameter	Data type	Default values	Description
PARMID	DINT	0x00	Parameter identifier
VALUE	DINT	0x00	Parameter value

Table 9- 15 Parameter values

PARMID (hex)	PARMID (ASCII)	Parameter	VALUE
0x41315057	A1PW	Antenna 01: Radiated power	Range of values: 0.5 ... 33 Increment: 0.25 Radiated power of the antenna in [dBm]. Bytes 1 and 2 are not used, byte 3 represents the integer and byte 4 the decimal place. Example: A radiated power of 10.25 dBm represents a "VALUE" of "0x0A19".
0x41325057	A2PW	Antenna 02: Radiated power	
0x41335057	A3PW	Antenna 03: Radiated power	
0x41345057	A4PW	Antenna 04: Radiated power	
0x41315452	A1TR	Antenna 01: RSSI threshold	Range of values: 0 ... 255 Threshold value for RSSI. Transponders with lower values are discarded. Value without unit with-out a direct relationship with the radiated power.
0x41325452	A2TR	Antenna 02: RSSI threshold	
0x41335452	A3TR	Antenna 03: RSSI threshold	
0x41345452	A4TR	Antenna 04: RSSI threshold	
0x5331444C	S1DL	Read point 01: RSSI delta	Range of values: 0 ... 255 Difference for RSSI values. Transponders with lower values relative to the transponder with the highest RSSI value are discarded. Value without unit without a direct relationship with the radiated pow-er.
0x5332444C	S2DL	Read point 02: RSSI delta	
0x5333444C	S3DL	Read point 03: RSSI delta	
0x5334444C	S4DL	Read point 04: RSSI delta	
0x4131504F	A1PO	Antenna 01: Polarization	Range of values: 0, 1, 2, 4 Polarization of the antenna (for intelligent antennas e.g. internal antenna RF685R) • 0: default, undefined • 1: circular • 2: vertical linear • 4: horizontal linear Input is bit coded. Combinations are possible (adding values).
0x4132504F	A2PO	Antenna 02: Polarization	
0x4133504F	A3PO	Antenna 03: Polarization	
0x4134504F	A4PO	Antenna 04: Polarization	

PARMID (hex)	PARMID (ASCII)	Parameter	VALUE
0x52364353	R6CS	Modulation scheme	Range of values: 32, 33, 34, 35, 37, 65 Modulation scheme of the read point Specification of which transponder types are identified (ISO 18000-63/-6B).
0x57544348	WTCH	Date and time	Range of values: 01.01.2000 00:00 a.m. ... 19.01.2038 3:14 a.m. 01.01.2000 01:00 a.m. ≙ 946684800 Date and time (UTC) Time in seconds since 01.01.1970; Setting of the internal reader clock, the date and time are set.
0x57544F44	WTOD	Time	Range of values: 0:00 – 23:59 p.m. S7 time (TOD, UTC) Milliseconds since midnight; Setting of the internal reader clock, only the time is changed but not the date.
0x57444154	WDAT	Date	Range of values: 01.01.2000 ... 18.01.2038 S7 date Days since 01.01.1970; Setting of the internal reader clock, only the date is changed but not the time.

9.5.2.5 Write_EPC_ID

The "Write_EPC_ID" block overwrites the EPC-ID of the RF600 transponder and adapts the length of the EPC-ID in the memory of the transponder. The new EPC-ID length to be written is specified with the "LEN_ID_NEW" parameter and the previous EPC-ID is specified using the "LEN_ID" and "EPCID_UID" parameters.

Make sure that when you execute the block only one transponder is located in the antenna field. This ensures that the identification when writing the ID is unique. If there is more than one transponder in the antenna field, a negative response is returned.

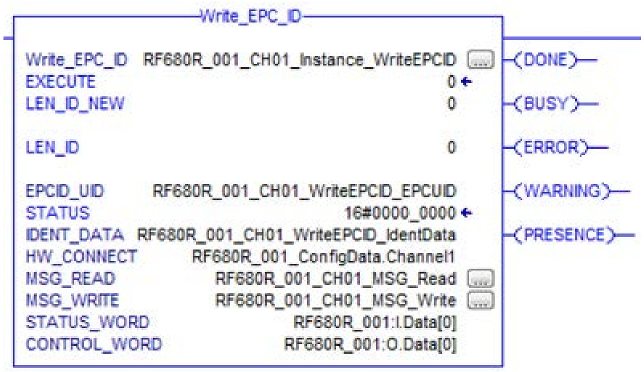


Figure 9-12 "Write_EPC_ID" block

Table 9- 16 Explanation of the "Write_EPC_ID" block

Parameter	Data type	Default values	Description
LEN_ID_NEW	SINT	W#16#0C	Length of the current EPC-ID
LEN_ID	SINT	B#16#0	Length of the previous EPC-ID
EPCID_UID	SINT[62]	0	Previous EPC ID
IDENT_DATA	SINT[10]	0	Current EPC ID Note. When necessary a byte/array of any size can be transferred to this parameter. Note that the array must be ≥ 10 bytes long (e.g. "SINT[12400]").

9.5.2.6 Write_EPC_Mem

The "Write_EPC_Mem" block overwrites the EPC memory of the RF600 transponder. The length of the EPC memory to be overwritten is specified by the "LEN_DATA" parameter.

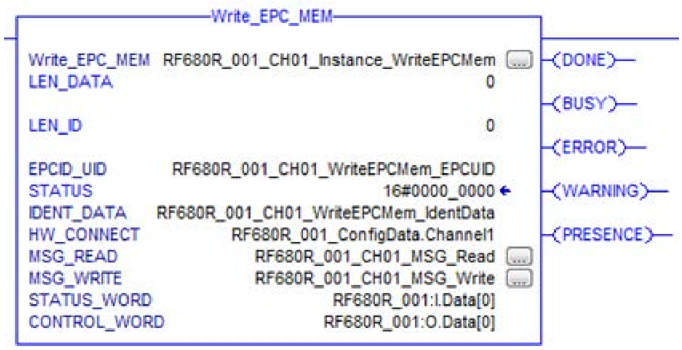


Figure 9-13 "Write_EPC_Mem" block

Table 9- 17 Explanation of the "Write_EPC_Mem" block

Parameter	Data type	Default values	Description
LEN_DATA	DINT	W#16#0	Length of the EPC memory to be overwritten (1 ... 62 bytes)
LEN_ID	DINT	B#16#0	Length of the EPC-ID/UID Default value: 0x00 ≙ unspecified single tag access (RF680R, RF685R)
EPCID_UID	SINT[62]	0	Buffer for up to 62 bytes EPC-ID, 8 bytes UID or 4 bytes handle ID. • 2 - 62-byte EPC-ID is entered at the start of the buffer (length is set by "LEN_ID") • 8-byte UID is entered at the start of the buffer ("LEN_ID = 8") • 4-byte handle ID must be entered in the array element [5]-[8] ("LEN_ID = 8") Default value: 0x00 ≙ unspecified single tag access (RF620R, RF630R, RF640R)
IDENT_DATA	SINT[10]	0	Data buffer with the EPC memory data to be overwritten. Note. When necessary a byte/array of any size can be transferred to this parameter. Note that the array must be ≥ 10 bytes long (e.g. "SINT[12400]").

9.5.2.7 AdvancedCMD

With the "AdvancedCmd" block, every command can be executed including commands not represented by other blocks. This general structure can be used for all commands and is intended only for trained users.

This block gives you the option of sending the command as a chained command. To allow this, the block provides a CMD buffer for 10 commands. All chained commands must be entered starting at the first position in the buffer. For every chained command, the "chained bit" must also be set in the CMD structure. The "chained bit" is not set in the last command in the chain. You will find further information on the "chained bit" in the section "Chaining (Page 183)".

The entire command structure must be specified in the "CMD" input parameter. You create the structure for the "CMD" parameter in a data block.

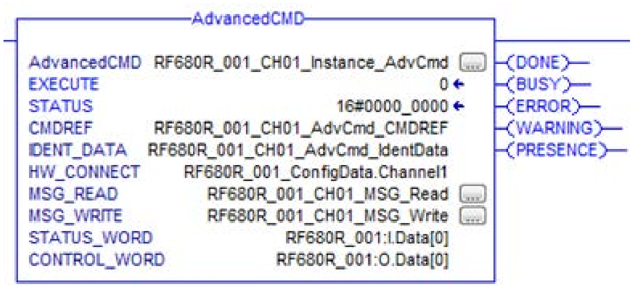


Figure 9-14 "AdvancedCmd" block

Table 9- 18 Explanation of the "AdvancedCmd" block

Parameter	Data type	Default values	Description
CMDREF	IID_CMD_STRUCT	--	You will find a detailed description of the parameter in the sections: • "Command structure (Page 181)" • "Overview of the commands (Page 180)"
IDENT_DATA	SINT[10]	0	Buffer for data to be written or read. Note. When necessary a byte/array of any size can be transferred to this parameter. Note that the array must be ≥ 10 bytes long (e.g. "SINT[12400]").

9.6 Programming the Ident profile

9.6.1 Structure of the Ident profile

Note

Parallel operation using Ident blocks and Ident profile is not possible

Note that the reader cannot be operated at the same time using the Ident blocks and the Ident profile.

The blocks described in the section"Programming add-on instructions (Page 161)" represent a simplified interface of the Ident profile. If the functionality available with the blocks is not adequate for your application, you can use the Ident profile as an alternative. Using the Ident profile, you can set complex command structures and work with command repetition. The following graphic shows the Ident profile including the commands that can be implemented with it.

Note

Ident profile for trained users

The Ident profile is a complex block containing all the functionality of the Ident blocks. The Ident profile was developed specially for trained block users who want to configure complex functions with their own blocks. For untrained users, we recommend using the Ident blocks.

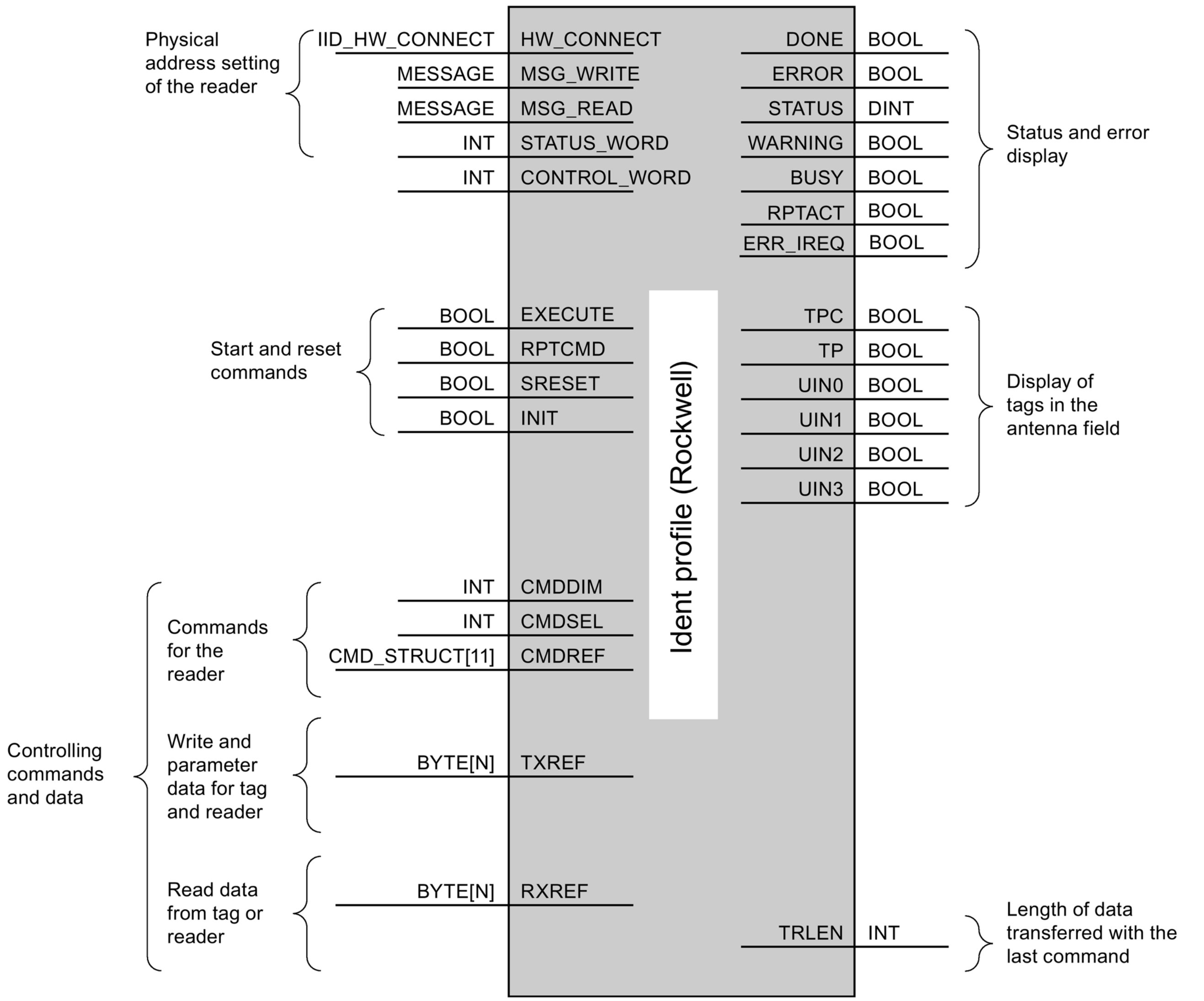


Figure 9-15 The input parameters of the Ident profile

Note

Working with multiple channels

If you work with several channels, you must ensure that for each channel, the block is called with a separate instance DB.

9.6.2 Overview of the commands

The following table contains all the commands supported by the Ident profile and the "AdvancedCMD" block.

Table 9- 19 Commands of the Ident profile

Command	Command code		Parameters used	Description
	HEX	ASCII		
PHYSICAL-READ	70	'p'	OFFSETBUFFER, EPCID_UID, LEN_ID, LENGTH, ADR_TAG, MEM_BANK, PSWD	Reads data from a transponder by specifying the physical start address of the memory bank (UHF), the length and the password.
PHYSICAL-WRITE	71	'q'	OFFSETBUFFER, EPCID_UID, LEN_ID, LEN_DATA, ADR_TAG, MEM_BANK, PSWD	Writes data to a transponder by specifying the physical start address of the memory bank (UHF), the length and the password.
READER-STATUS	74	't'	OFFSETBUFFER, ATTRIBUTES	Reads out the status of the reader.
INVENTORY	69	'i'	OFFSETBUFFER, ATTRIBUTES, DURATION, DUR_UNIT	Requests a list of all currently accessible transponders within the antenna range.
WRITE-ID	67	‘g‘	OFFSETBUFFER, EPCID_UID, LEN_ID, NEW-LEN_ID, PSWD	RF680R/RF685R: Writes a new EPC-ID to the transponder.
KILL-TAG	6A	‘j‘	EPCID_UID, LEN_ID, PSWD	RF680R/RF685R: The transponder is permanently deactivated.
LOCK-TAG-BANK	79	‘y‘	EPCID_UID, LEN_ID, PSWD, ACTION, MASK	RF680R/RF685R: The corresponding memory area of the transponder is blocked as specified.
EDIT-BLACKLIST	7A	‘z‘	EPCID_UID, LEN_ID, MODE	RF680R/RF685R: The black list is processed. The current transponder can be added, all identified transponders added, individual transponders deleted or all transponders deleted.
GET-BLACKLIST	6C	‘l‘	OFFSETBUFFER	RF680R/RF685R: The entire EPC-IDs are read out from the black list.
READ-CONFIG	61	'a'	--	Reads out the parameters from the reader.
WRITE-CONFIG	78	'x'	LEN_DATA, CONFIG	Sends new parameters to the reader.

9.6.3 Command structure

Before you can start a command with "EXECUTE" or "INIT", you need to define the command. To allow simple definition of a command, the command buffer "CMDREF" was created using the "IID_CMD_STRUCT" data type. In the command buffer, you have 10 areas available in which commands can be programmed. The parameter "CMDSEL" specifies which command [1...10] is started with "EXECUTE".

Remember that the first element in the buffer is always reserved for "INIT". In other words if "INIT" is set, "CMDSEL" must be set to "1" and element "1" in the CMD buffer must be filled with the relevant settings.

The following table contains the command structure of the parameters. Not every command uses all parameters.

Table 9- 20 Command structure of the parameters

Parameter	Data type	Default value	Description
CMD	SINT	0	Command code (compare the table in the section "Overview of the commands (Page 180)".)
OFFSETBUFFER	INT	0	Relative offset within the received data buffer. The parameter specifies the address within the memory area at which the first byte of the received data must be stored or the first byte of the data to be sent is expected. All subsequent bytes must be stored in ascending addresses.
EPCID_UID	BYTE[62]	0	Buffer for up to 62 bytes EPC-ID 2 - 62-byte EPC-ID is entered at the start of the buffer (length is set by "LEN_ID") Default value: 0x00 ≙ unspecified single tag access
LEN_DATA	DINT	0	Amount of data to be read/written in bytes
ADR_TAG	DINT	0	Physical start address on the transponder
ATTRIBUTES	SINT	0	Sub command name for several commands (e.g. "READER-STATUS", "INVENTORY", etc,)
CHAINED	BOOL	FALSE	• 0x00 = not chained • 0x01 = chained All chained commands must have this bit set except the last command. The commands are worked through in the order in which they are located in the CMD structure.
CONFIG	SINT	0	• 0x01 = reset, no configuration data • 0x02 = no reset, configuration data to be sent • 0x03 = reset, configuration data to be sent • 0x80 = no reset, only individual parameters

Parameter		Data type	Default value	Description
EXT_UHF		STRUCT	--	Structure for additional parameters (RF680R/RF685R only)
	LEN_ID	SINT	0	Length of the valid data in the "EPCID_UID" field.
	MEM_BANK	SINT	3	Memory bank on the transponder • 0x00 = RESERVED • 0x01 = EPC • 0x02 = TID • 0x03 = USER
	PSWD	DINT	0	Password for transponder access 0x00 ≙ no password
	EDIT_BLACKLIST_MODE	SINT	0	Mode • 0x00 = add EPC-ID • 0x01 = add all "Observed" transponders • 0x02 = delete EPC-ID • 0x03 = delete all
	INVENTORY_DURATION	DINT	0	Duration Period of time or number of inventories or number of "Observed" events Example: • 0x00 ≙ no inventory • 0x01 ≙ one inventory
	INVENTORY_DUR_UNIT	DINT	0	Unit for "DURATION" • 0x00 = time [ms] • 0x01 = inventories • 0x02 = number of "Observed" events
	LOCK-TAG-BANK_ACTION	DINT	0	Lock-Action (see "EPC Specification")
	LOCK-TAG-BANK_MASK	DINT	0	Lock-Mask (see "EPC Specification")

9.6.4 Commands

The structure of the commands with Rockwell controllers is identical to the structure with S7 controllers. You will find a description of the commands in the section "Commands (Page 142)".

9.6.5 Chaining

The sending of chained commands with Rockwell controllers functions in exactly the same was as with S7 controllers. You will find a description of how commands are chained in the section "Chaining (Page 146)".

9.6.6 Command repetition

The Ident profile supports command repetition (Repeat command). Command repetition with Rockwell controllers functions in exactly the same was as with S7 controllers. You will find a description of command repetition in the section "Command repetition (Page 148)".

9.7 Digital inputs/outputs

The structure and the way digital inputs/outputs work with Rockwell controllers is identical to the structure and the way they work with S7 controllers. You will find a description of digital inputs/outputs in the section "Digital inputs/outputs (Page 153)".

Programming via XML interface 10

This section is intended only for XML users (RF650R/RF680R/RF685R).

This section describes the use of the XML interface of the RF650R, RF680R and RF685R readers. When using the XML interface, you can operate the readers via Ethernet (communications protocol "TCP/IP", network port "10001"). The XML interface includes the following functions:

- Read out and write transponder data via the reader
- Read out reader information
- Read out reader configuration
- Reader parameter assignment
- Reset reader
- Process IO
- Receive messages
- Receive tag events
- Receive RSSI events
- Receive IO events
- Use secure transmission

10.1 Functionality of the XML interface

The XML interface is based on command/reply frames and the reader can also send asynchronous reports. Each command that you send is replied to by the reader with a reply frame regardless of whether the command was executed successfully or not. If errors occur during communication, the reply frame contains an error description.

To ensure unique assignment of the commands and replies, each command must include a unique ID. This ID is repeated in the corresponding reply frame.

Normally, the reader replies to a command within 5 seconds. We recommend that you program your application so that if this time is exceeded, the application starts appropriate error handling.

Some commands (e.g. "setConfiguration" or "readTagIds") can take longer than 5 seconds. These commands already include information to this effect.

Note

Saving and working through the commands

It is also possible to send several commands without waiting for the replies. The reader works through the commands in the precise order in which they were received. Note that the reader discards newly arriving commands if internally there are already approximately 100 commands waiting for execution.

Asynchronous notifications (XML reports)

Apart from the synchronous command/reply frames, asynchronous notifications are also transferred. These reports are generated by the reader and may require confirmation of receipt by the user application. Each transfer includes a unique ID (<id>) generated by the reader. In contrast to the IDs of the commands, this ID is generated by the reader itself. The user application can only acknowledge this notification with the same ID.

The reports are divided into events and alarm messages. An event contains data acquired by the reader itself. Alarm messages inform the user application of irregular or incorrect operating conditions of the reader.

The reports can be transferred reliably or without verification.

- In the non-reliable mode, all reports are sent to the user application without waiting for confirmation of receipt. The report is automatically discarded if the connection to the user application does not exist or is interrupted.
- In the reliable mode, the receipt of every report must be confirmed by the user application with a reply frame ("tagEventReport"). If no confirmation of receipt is received within approximately 10 seconds, the reader sends the report to the user application again.

  If there are connection errors or interruptions, the reports are stored on the reader until the connection is re-established. If the reader is turned off, however, the stored reports are lost. Activate reliable transfer if the connection between the reader and PC is not stable, for example due to a WLAN connection.

  You will find further information on the structure of the reply frames in the section "tagEventReport (Page 265)".

The reader can buffer a maximum of 10 000 reports. If this number is exceeded, newly generated reports are discarded internally.

You enable reliable transfer using the WBM ("The "Settings - Communication" menu item (Page 74)").

10.2 Demo application

10.2.1 Structure of the demo application

Among other things, the product DVD supplied with the readers contains a demo application based on Windows .NET 3.5 including source code files ("RFID-Reader XML-Demo > RFReader.TestApp.exe"). This demo application serves as a model on the basis of which you can program your own user application. The demo application includes all the XML functions described in the following sections and is fully functional. This gives you the opportunity of testing your readers immediately using the demo application.

Note

Disclaimer of liability

Note that Siemens AG accepts no liability for the demo application "RFID Reader XML Demo".

Components of the demo application

The demo application consists of the following components:

- Demo API "RFReader.XmlApi"

  If you want to change the application files, you require Microsoft Visual Studio (as of version 2012). An Express version is adequate.

  The "RFReader.XmlApi" contains the XML API interface on which the demo application is based. You control the XML interface at the PC end and make all XML functions available via .NET. To be able to test the API in your own application, you need to reference the following *.dll in your project:

  – RfReader.XmlApi.dll

  – RfReader.XmlApi.Data.dll

- Demo application "RFID Reader XML Demo"

  "RFID reader XML Demo" is a simple Windows application with which you can send commands predefined in the application files to the reader. This application can communicate with several readers. For each physical reader, a new instance of "RFReader.XmlApi" is generated and used by the demo application.

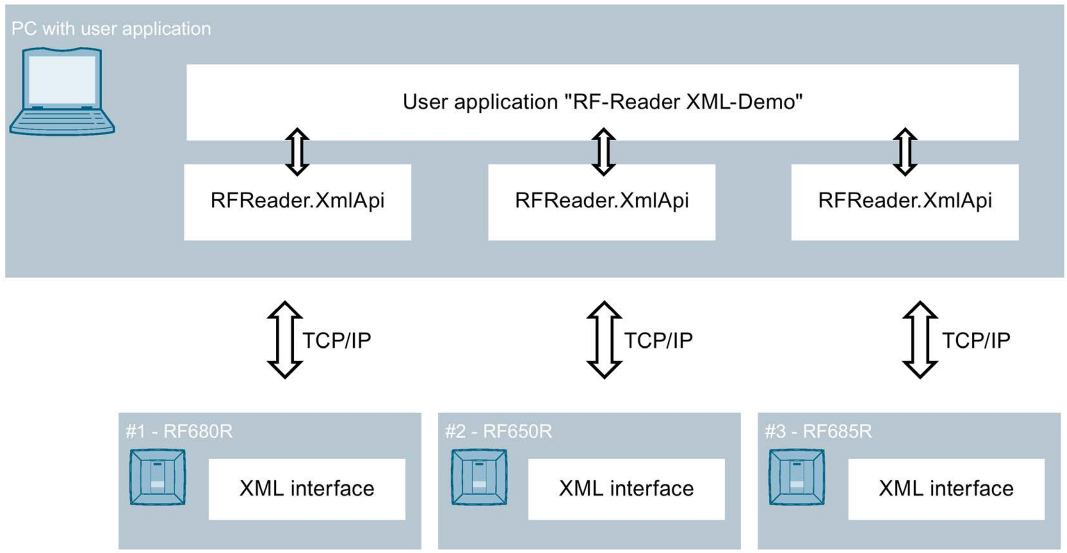
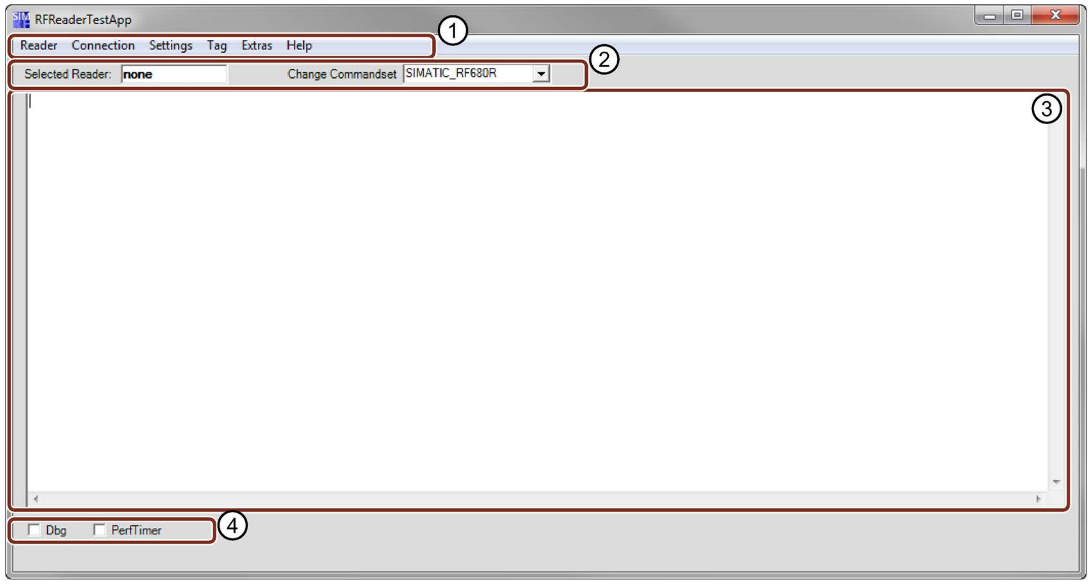


Figure 10-1 Structure/functions of the demo application

10.2.2 User interface of the demo application

To be able to work with the demo application, .NET (V3.5 or higher) must be installed on your PC and the "RFID Reader XML Demo" folder needs to be copied to your PC. Start the application by double-clicking on the file "RFReader.TestApp.exe".

The XML Demo application is divided into four areas:



① Menu bar
② Reader display
③ Log window
④ Check boxes

Figure 10-2 User interface of the demo application

Menu bar

The menu bar contains all available commands. These are grouped together in the relevant menus. Each individual command can be selected from the menu tree.

Menu	Description
Reader	XML commands for connecting to the reader, disconnecting from the reader and for selecting readers.
XML commands	
Connection	XML commands with which you can control the connection between the user application and readers.
Settings	XML commands with which you can control the configuration of the reader.
Tag	XML commands with which you can control processing of the transponder data.
Extras	XML command for resetting the Log window and for parameter assignment and reading out log files
Help	Information on the RFID reader XML demo

Using the menu command "Extras" > "SaveTagEventReports" you can save acquired transponder data on your PC as a *.csv file or in an SQL database.

Reader display

Display of the currently selected reader with which you are communicating. The selection of the extent of the command depends on the connected reader.

Log window

Text box in which all executed commands and their return values are displayed. Alarm messages and events sent by the reader are displayed in the log window. The log window can be cleared with the "Extras" > "Clear log" menu entry.

Check boxes

This area contains two check boxes:

- Dbg

  With this check box, you can display the sent XML data stream.
- PerfTimer

  With this check box, you can display the execution time of each command.

  The displayed time relates to the period between sending the command and the arrival of the reply.

10.2.3 Working with the demo application

Requirement

The reader is connected and has started up. The reader was assigned a unique IP address.

Procedure

Follow the steps below to establish a connection to the reader:

1. Start the demo application.
2. Select the menu command "Reader" > "Connect Reader".
3. Enter the IP address of the reader in the "Reader IP Address" input box.
4. If necessary, select the "Transacted" check box to enable secure transfer in the application.
5. If necessary, change the API name to have the option of switching over between readers when working with several readers.
6. Confirm your entry with "OK".
7. Select the menu command "Connection" > "HostGreetings".

8. In the "Reader Type" input box, enter the reader type with which the application should connect.

   Notation: "SIMATIC_RF6xxR" (e.g. "SIMATIC_RF680R")

   If this input box is not completed, the application connects to every connected, compatible reader.
9. In the "API Version" input box, enter the API version that is suitable for the connected reader.

   The RF650R/RF680R/RF685R readers use version V2.1. The RF640R/RF670R readers use versions V1.0 or V1.1.
10. Confirm your entry with "OK".

Remember that after connecting to the reader the "HostGreetings" command must always be executed first.

The connection is established to the reader. The API name of the currently active reader is displayed in the "Selected Reader" text box. All commands are sent exclusively to this reader.

You can communicate with several readers at the same time. To communicate with other readers, repeat the actions described above. Once you have established a connection to several readers, you can switch from one to the other simply using the "Reader" > "Select Reader" menu command.

After you have established the connection to a reader and have executed the command "HostGreetings, you can communicate with the reader. To do this, various commands are available in the menus. These commands are described in the following sections.

10.3 XML commands

This section describes all the commands you can send from a user application to one of the SIMATIC RF650R, RF680R or RF685R readers.

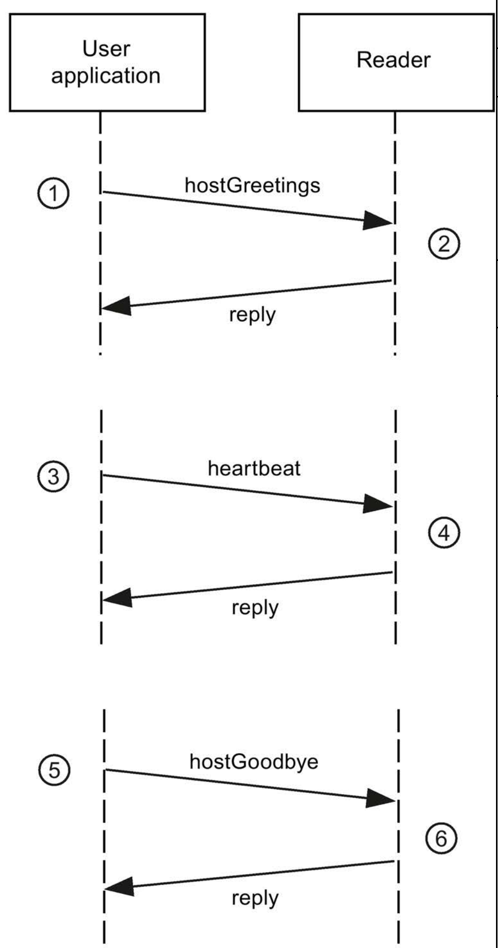
Each command sent by the user application is replied to by the reader with a reply frame. If the command was executed successfully, the reply frame has the value "0" in the "ResultCode" parameter. If other values are returned in this parameter, this means that the command was not executed successfully. In this case, the return value corresponds to the error code.

10.3.1 Connections

This section describes all the commands with which you can control the connection between the user application and the reader.

The following diagram shows how a connection is established and terminated.

Table 10- 1 Sequence of connection establishment / termination

Connection establishment / termination	Step	Description
	1	The user application sends the command "hostGreetings" to the reader.
	2	The reader returns a positive reply frame.
	3	After the connection has been established, the user application communicates with the reader. It sends, for example, a heartbeat frame at regular intervals.
	4	For each command, the reader sends a reply frame.
	5	The user application sends the command "hostGoodbye" to terminate the connection.
	6	The reader sends a positive reply frame. The reader then disconnects the existing TCP/IP connection.

If commands are sent without being preceded by the "hostGreetings" command, the reader replies with the error message "ERROR_INVALID_READER_STATUS".

10.3.1.1 hostGreetings

All communication with a reader must start with the "hostGreetings" command. This is how the reader recognizes the user application connected to the XML interface. If commands are sent without being preceded by the "hostGreetings" frame, the reader replies with the error message "ERROR_INVALID_READER_STATUS".

The XML interface can support several "RFReader.XmlAPI" versions. In the "hostGreetings" command, specify the API version of the XML interface you want to work with. The reply frame of the reader then contains the version that the XML interface uses. The RF650R/RF680R/RF685R readers use version V2.0.

Note that the reply frame of the reader can take up to 20 seconds.

Command

```
<frame>
 <cmd>
    <id> value_id </id>
    <hostGreetings>
        <readerType> value readerType </readerType>     //opt
        <supportedVersions>
            <version> value_version </version>
            <version> value_version </version>         // opt
            …
        </supportedVersions>
    </hostGreetings>
 </cmd>
</frame>
```

// opt → Optional: Line can be omitted.

Reply

```
<frame>
 <reply>
    <id> value_id </id>
    <resultCode> 0 </resultCode>
    <hostGreetings>
        <returnValue>
            <version> value_version </version>
            <configID> value_configID </configID>
        </returnValue>
    </hostGreetings>
 </reply>
</frame>
```

The error codes for negative replies ("resultCode" ≠ 0) are described in the section "Negative XML replies (Page 262)".

Parameter

Parameter	Type	Values	Description
value_id	Decimal value 0...9	0...4294967295	Unique command identifier
value_readerType	Fixed values	SIMATIC_RF680R SIMATIC_RF685R SIMATIC_RF650R	Optional Reader type If the connected reader does not match the value specified, "ERROR_PARAMETER_ILLEGAL_VALUE" is returned. If this parameter is not specified, the connected reader type is not checked.
value_version	Alphanumeric text	V2.1	Supported API protocol version
value_configID	Alphanumeric text	--	Unique identifier of the transferred configuration. The ID can also be read using the "getConfigVersion" function.

10.3.1.2 hostGoodbye

This command ends communication with the reader and terminates the TCP/IP connection.

In the default setting, the reader continues working with its current settings. This allows the reader to work independently. The data accumulating when the reader is operating independently is stored in the buffer. You will find further information on the buffer or on asynchronous notifications in the section "Programming via XML interface (Page 185)".

Command

```
<frame>
 <cmd>
    <id> value_id </id>
    <hostGoodbye/>
 </cmd>
</frame>
```

Reply

```
<frame>
 <reply>
    <id> value_id </id>
    <resultCode> 0 </resultCode>
    <hostGoodbye/>
 </reply>
</frame>
```

The error codes for negative replies ("resultCode" ≠ 0) are described in the section "Negative XML replies (Page 262)".

Parameter

Parameter	Type	Values	Description
value_id	Decimal value 0...9	0...4294967295	Unique command identifier

10.3.1.3 heartBeat

With this command, it is possible to check whether or not the connection is interrupted (e.g. wire break) or whether the reader is out of operation (e.g. network failure).

After executing the command, the reader blocks connection requests of new clients for 30 seconds. By periodically sending "heartBeat" commands within a period of 30 seconds, you can make sure that no other unwanted user applications access the reader.

Command

```
<frame>
 <cmd>
    <id> value_id </id>
    <heartBeat/>
 </cmd>
</frame>
```

Reply

```
<frame>
 <reply>
    <id> value_id </id>
    <resultCode> 0 </resultCode>
    <heartBeat/>
 </reply>
</frame>
```

The error codes for negative replies ("resultCode" ≠ 0) are described in the section "Negative XML replies (Page 262)".

Parameter

Parameter	Type	Values	Description
value_id	Decimal value 0...9	0...4294967295	Unique command identifier

10.3.1.4 setIPConfig

This command is available as of API V2.2.

The IP address of the reader is changed with this command. If the transferred parameters do not contain any inconsistencies, the reader will terminate the connection. This happens as well if the parameters are identical to the previous settings. A response frame is sent in reply to this command only if there is an error.

Command

```
<frame>
 <cmd>
    <id> value_id </id>
    <setIPConfig>
       <iPAddress> value_iPAddress </iPAddress> // opt
       <subNetMask> value_subNetMask </subNetMask> // opt
       <gateway> value_gateway </gateway> // opt
       <dHCPEnable> value_dHCPEnable </dHCPEnable> // opt
    </setIPConfig>
 </cmd>
</frame>
```

// opt → Optional: Line can be omitted.

Reply

```
<frame>
 <reply>
    <id> value_id </id>
    <resultCode> 0 </resultCode>
    <setIPConfig/>
 </reply>
</frame>
```

The error codes for negative replies ("resultCode" ≠ 0) are described in the section "Negative XML replies (Page 262)".

Parameter

Parameter	Type	Values	Description
value_id	Decimal value 0...9	0...4294967295	Unique command identifier
value_iPAddress	IP address	1.0.0.1… 255.255.255.254	IP address of the reader Parameter is ignored, if DHCP is activated: value_dHCPEnable = True

Parameter	Type	Values	Description
value_ subNetMask	IP address	1.0.0.1… 255.255.255.254	Subnet mask of the reader Parameter is ignored, if DHCP is activated: value_dHCPEnable = True
value_gateway	IP address	1.0.0.1… 255.255.255.254	Gateway of the reader Parameter is ignored, if DHCP is activated: value_dHCPEnable = True
value_ dHCPEnable	Fixed values	True False	Use of DHCP to assign the IP address.

10.3.1.5 getIPConfig

This command is available as of API V2.2.

The current IP address of the reader is read out with this command.

Command

```
<frame>
 <cmd>
    <id> value_id </id>
    <getIPConfig/>
 </cmd>
</frame>
```

Reply

```
<frame>
 <reply>
    <id> value_id </id>
    <resultCode> 0 </resultCode>
    <getIPConfig>
       <iPAddress> value_iPAddress </iPAddress>
       <subNetMask> value_subNetMask </subNetMask>
       <gateway> value_gateway </gateway>
       <dHCPEnable> value_dHCPEnable </dHCPEnable>
    <getIPConfig/>
 </reply>
</frame>
```

The error codes for negative replies ("resultCode" ≠ 0) are described in the section "Negative XML replies (Page 262)".

Parameter

Parameter	Type	Values	Description
value_id	Decimal value 0...9	0...4294967295	Unique command identifier
value_iPAddress	IP address	1.0.0.1… 255.255.255.254	IP address of the reader Parameter is ignored, if DHCP is activated: value_dHCPEnable = True
value_ subNetMask	IP address	1.0.0.1… 255.255.255.254	Subnet mask of the reader Parameter is ignored, if DHCP is activated: value_dHCPEnable = True
value_gateway	IP address	1.0.0.1… 255.255.255.254	Gateway of the reader Parameter is ignored, if DHCP is activated: value_dHCPEnable = True
value_ dHCPEnable	Fixed values	True False	Use of DHCP to assign the IP address.

10.3.2 Reader settings

This section describes all the commands with which you can control the configuration of the reader.

10.3.2.1 setConfiguration

This command transfers a configuration to the reader. After confirming the configuration, this is activated and stored permanently in the flash memory of the reader. To be able to work with the newly created configuration, you need to restart the reader.

As an alternative, you can also load a configuration that was created using the WBM.

Note that the reply frame of the reader can take up to 20 seconds.

Command

```
<frame>
 <cmd>
    <id> value_id </id>
    <setConfiguration>
        <configData>
        <![CDATA[value_configData]]>
        </configData>
    </setConfiguration>
 </cmd>
</frame>
```

Reply

```
<frame>
 <reply>
    <id> value_id </id>
    <resultCode> 0 </resultCode>
    <setConfiguration>
        <returnValue>
            <configID> value_configID </configID>
        </returnValue>
    </setConfiguration>
 </reply>
</frame>
```

The error codes for negative replies ("resultCode" ≠ 0) are described in the section "Negative XML replies (Page 262)".

Parameter

Parameter	Type	Values	Description
value_id	Decimal value 0...9	0...4294967295	Unique command identifier
value_configData	CDATA	--	Configuration data The parameter must be embedded in a CDATA segment.
value_configID	Alphanumeric text	--	Unique identifier of the transferred configuration The ID can also be read out with the "getConfigVersion" command.

10.3.2.2 getConfiguration

This command requests the configuration stored on the reader.

You can also export the configuration to transfer it to other readers.

Command

```
<frame>
 <cmd>
    <id> value_id </id>
    <getConfiguration/>
 </cmd>
</frame>
```

Reply

```
<frame>
 <reply>
    <id> value_id </id>
    <resultCode> 0 </resultCode>
    <getConfiguration>
        <returnValue>
            <configID> value_configID </configID>
            <configData>
                <![CDATA[value_configData]]>
            </configData>
        </returnValue>
    </getConfiguration>
 </reply>
</frame>
```

The error codes for negative replies ("resultCode" ≠ 0) are described in the section "Negative XML replies (Page 262)".

Parameter

Parameter	Type	Values	Description
value_id	Decimal value 0...9	0...4294967295	Unique command identifier
value_configData	CDATA	--	Configuration data The parameter must be embedded in a CDATA segment.
value_configID	Alphanumeric text	--	Unique identifier of the transferred configuration The ID can also be read out with the "getConfigVersion" command.

10.3.2.3 getConfigVersion

This command requests the version of the configuration stored on the reader.

Command

```
<frame>
 <cmd>
    <id> value_id </id>
    <getConfigVersion/>
 </cmd>
</frame>
```

Reply

```
<frame>
 <reply>
    <id> value_id </id>
    <resultCode> 0 </resultCode>
    <getConfigVersion>
        <returnValue>
            <configID> value_configID </configID>
        </returnValue>
    </getConfigVersion>
 </reply>
</frame>
```

The error codes for negative replies ("resultCode" ≠ 0) are described in the section "Negative XML replies (Page 262)".

Parameter

Parameter	Type	Values	Description
value_id	Decimal value 0...9	0...4294967295	Unique command identifier
value_configID	Alphanumeric text	--	Unique identifier of the transferred configuration

10.3.2.4 getActiveConfiguration

This command requests the active parameters with which the reader is currently working as a configuration file from the reader.

Note that the values may differ from the stored values.

Note that the reply frame of the reader can take up to 20 seconds.

Command

```
<frame>
 <cmd>
    <id> value_id </id>
        <getActiveConfiguration/>
 </cmd>
</frame>
```

Reply

```
<frame>
 <reply>
    <id> value_id </id>
    <resultCode> 0 </resultCode>
    <getActiveConfiguration>
        <returnValue>
            <configID> value_configID </configID>
            <configData>
                <![CDATA[value_configData]]>
            </configData>
        </returnValue>
    </getActiveConfiguration>
 </reply>
</frame>
```

The error codes for negative replies ("resultCode" ≠ 0) are described in the section "Negative XML replies (Page 262)".

Parameter

Parameter	Type	Values	Description
value_id	Decimal value 0...9	0...4294967295	Unique command identifier
value_configData	CDATA	--	Configuration data The parameter must be embedded in a CDATA segment.
value_configID	Alphanumeric text	--	Unique identifier of the transferred configuration The ID can also be read out with the "getConfigVersion" command.

10.3.2.5 getLogfile

This command requests the log from the reader.

Note that the reply frame of the reader can take up to 20 seconds.

Command

```
<frame>
 <cmd>
    <id> value_id </id>
    <getLogfile>
        <logType> value_logType </logType>
    </getLogfile>
 </cmd>
</frame>
```

Reply

```
<frame>
 <reply>
    <id> value_id </id>
    <resultCode> 0 </resultCode>
    <getLogfile>
        <returnValue>
            <logData>
                <![CDATA[value_configData]]>
            </logData>
        </returnValue>
    </getLogfile>
 </reply>
</frame>
```

The error codes for negative replies ("resultCode" ≠ 0) are described in the section "Negative XML replies (Page 262)".

Parameter

Parameter	Type	Values	Description
value_id	Decimal value 0...9	0...4294967295	Unique command identifier
value_logType	Fixed values	Diagnosis	Optional Type of diagnostics file • Diagnostics: Log file
value_logData	CDATA	--	Data logged by the reader The parameter must be embedded in a CDATA segment.

10.3.2.6 resetLogfile

This command deletes all the entries in the log.

Command

```
<frame>
 <cmd>
    <id> value_id </id>
    <resetLogfile/>
 </cmd>
</frame>
```

Reply

```
<frame>
 <reply>
    <id> value_id </id>
    <resultCode> 0 </resultCode>
    <resetLogfile/>
 </reply>
</frame>
```

The error codes for negative replies ("resultCode" ≠ 0) are described in the section "Negative XML replies (Page 262)".

Parameter

Parameter	Type	Values	Description
value_id	Decimal value 0...9	0...4294967295	Unique command identifier

10.3.2.7 setParameter

This command sets a specific parameter for the reader.

Changes using this command are stored in volatile memory in the configuration of the WBM. As a result, the reader works with the value specified with "setParameter" but does not display this in the WBM.

Note that the reply frame of the reader can take up to 20 seconds.

Command

```
<frame>
 <cmd>
    <id> value_id </id>
    <setParameter>
        <name> value_name </name>
        <value> value_value </value>
        <objType> value_objType </objType>
        <objName> value_objName </objName>
    </setParameter>
 </cmd>
</frame>
```

Reply

```
<frame>
 <reply>
    <id> value_id </id>
    <resultCode> 0 </resultCode>
    <setParameter/>
 </reply>
</frame>
```

The error codes for negative replies ("resultCode" ≠ 0) are described in the section "Negative XML replies (Page 262)".

Parameter

Parameter	Type	Values	Description
value_id	Decimal value 0...9	0...4294967295	Unique command identifier
value_name	Alphanumeric text	See following table	Name of the supported parameter
value_value	Alphanumeric text	See following table	Parameter value
value_objType	Alphanumeric text	See following table	Specifies the type of the parameter groups to be addressed.
value_objName	Alphanumeric text	See following table	Name of the specific parameter group

Possible values of the "value_name" parameter

name	value	objType	objName	Description
Power	0, 5.00...33.00	Antenna	Antenna01 Antenna02 Antenna03 Antenna04	Radiated power of the antenna in [dB] Increment: 0.25 dB
RssiThreshold	0...255	Antenna	Antenna01 Antenna02 Antenna03 Antenna04	RSSI threshold value Transponders with lower RSSI values are not taken into account. This is a value without a unit and without direct reference to the power strength.
Polarization	Default Circular Linear_vertical Linear_ horizontal All	Antenna	Antenna01 Antenna02 Antenna03 Antenna04	Polarization of the antenna Currently, this parameter can only be set for the internal antenna of the RF685R.

name	value	objType	objName	Description
RssiDelta	0...255	Source	See description	Difference for RSSI values Maximum difference compared with the RSSI value of the transponder with the highest RSSI value that the transponders can have and still be processed. This is a value without a unit and without direct reference to the power strength. "objName" must have the name of the corresponding read point.
ModulationScheme	32, 33, 34, 35, 37, 65	General	General	Modulation scheme of the read point This specifies which transponder types are identified (ISO 18000-63/-6B / -6B).

10.3.2.8 getParameter

This command requests a specific parameter of the reader. The return value contains the value currently being used

Command

```
<frame>
 <cmd>
    <id> value_id </id>
    <getParameter>
        <name> value_name </name>
            <objType> value_objType </objType>
            <objName> value_objName </objName>
    </getParameter>
 </cmd>
</frame>
```

Reply

```
<frame>
 <reply>
    <id> value_id </id>
    <resultCode> 0 </resultCode>
    <getParameter>
        <returnValue>
            <value> value_value </value>
        </returnValue>
```

```
    </getParameter>
  </reply>
</frame>
```

The error codes for negative replies ("resultCode" ≠ 0) are described in the section "Negative XML replies (Page 262)".

Parameter

Parameter	Type	Values	Description
value_id	Decimal value 0...9	0...4294967295	Unique command identifier
value_name	Alphanumeric text	See following table	Name of the supported parameter
value_value	Alphanumeric text	See following table	Parameter value
value_objType	Alphanumeric text	See following table	Specifies the type of the parameter groups to be addressed.
value_objName	Alphanumeric text	See following table	Name of the specific parameter group

Possible values of the "value_name" parameter

name	value	objType	objName	Description
Power	0, 5.00...33.00	Antenna	Antenna01 Antenna02 Antenna03 Antenna04	Radiated power of the antenna in [dB] Increment: 0.25 dB
RssiThreshold	0...255	Antenna	Antenna01 Antenna02 Antenna03 Antenna04	RSSI threshold value Transponders with lower RSSI values are not taken into account. This is a value without a unit and without direct reference to the power strength.
Polarization	Default Circular Linear_vertical Linear_horizontal All	Antenna	Antenna01 Antenna02 Antenna03 Antenna04	Polarization of the antenna Currently, this parameter can only be set for the internal antenna of the RF685R.

name	value	objType	objName	Description
RssiDelta	0...255	Source	See description	Difference for RSSI values Maximum difference compared with the RSSI value of the transponder with the highest RSSI value that the transponders can have and still be processed. This is a value without a unit and without direct reference to the power strength. "objName" must have the name of the corresponding read point.
ModulationScheme	32, 33, 34, 35, 37, 65	General	General	Modulation scheme of the read point This specifies which transponder types are identified (ISO 18000-63/-6B).

10.3.2.9 setTime

This command sets the internal reader clock.

Command

```
<frame>
 <cmd>
    <id> value_id </id>
    <setTime>
        <utcTime> value_utcTime </utcTime>
    </setTime>
 </cmd>
</frame>
```

Reply

```
<frame>
 <reply>
    <id> value_id </id>
    <resultCode> 0 </resultCode>
    <setTime/>
 </reply>
</frame>
```

The error codes for negative replies ("resultCode" ≠ 0) are described in the section "Negative XML replies (Page 262)".

Parameter

Parameter	Type	Values	Description
value_id	Decimal value 0...9	0...4294967295	Unique command identifier
value_utcTime	Time	--	UTC time stamp (Universal Time Co-ordinated) in ISO 8601 format: yyyy-MM-ddTHH:mm:ss.fffzzz e.g.: 2009-12-24T18:34:56.929+00:00. Note: The reader only accepts time information from 01.01.2000 ... 18.01.2038.

10.3.2.10 getTime

This command requests the current time stamp of the internal reader clock.

Command

```
<frame>
 <cmd>
    <id> value_id </id>
    <getTime/>
 </cmd>
</frame>
```

Reply

```
<frame>
 <reply>
    <id> value_id </id>
    <resultCode> 0 </resultCode>
    <getTime>
        <returnValue>
            <utcTime> value_utcTime </utcTime>
        </returnValue>
    </getTime>
 </reply>
</frame>
```

The error codes for negative replies ("resultCode" ≠ 0) are described in the section "Negative XML replies (Page 262)".

Parameter

Parameter	Type	Values	Description
value_id	Decimal value 0...9	0...4294967295	Unique command identifier
value_utcTime	Time	--	UTC time stamp (Universal Time Co-ordinated) in ISO 8601 format: yyyy-MM-ddTHH:mm:ss.fffzzz e.g.: 2009-12-24T18:34:56.929+00:00.

10.3.2.11 setIO

This command sets the digital outputs of the reader.

The general settings for the response of the outputs such as "Inactivity" or "Reset time" specified using the WBM in a base configuration (see also section "The "Settings - Digital outputs" menu item (Page 72)").

Command

```
<frame>
 <cmd>
    <id> value_id </id>
    <setIO>
        <outValue> value_outValue </outValue>
    </setIO>
 </cmd>
</frame>
```

Reply

```
<frame>
 <reply>
    <id> value_id </id>
    <resultCode> 0 </resultCode>
    <setIO/>
 </reply>
</frame>
```

The error codes for negative replies ("resultCode" ≠ 0) are described in the section "Negative XML replies (Page 262)".

Parameter

Parameter	Type	Values	Description
value_id	Decimal value 0...9	0...4294967295	Unique command identifier
value_outValue	Characters 0, 1, X	0000…. XXXX… 1111	Each position stands for an output of the reader: • Outport00: 1st position (least significant bit right) • Outport01: 2nd position • Outport02: 3rd position • Outport03: 4th position • … Depending on the value of the particular position, the corresponding output is set to ON (1) or OFF (0) or remains unchanged (X). Example: A "value_outValue" of "0X11" • sets Outport00 to ON • sets Outport01 to ON • leaves Outport02 unchanged • sets Outport03 to OFF This command receives a negative reply "ERROR_PARAMETER_OUT_OF_RANGE" if there are more outputs to be set than the reader supports. If, for example, the reader only supports 2 outputs, with the example above in which 4 outputs are addressed, no output will be set

10.3.2.12 getIO

This command requests the current status of all inputs and outputs of the reader.

Command

```
<frame>
 <cmd>
    <id> value_id </id>
    <getIO/>
 </cmd>
</frame>
```

Reply

```
<frame>
 <reply>
    <id> value_id </id>
    <resultCode> 0 </resultCode>
    <getIO>
        <returnValue>
            <inValue> value_inValue </inValue>
            <outValue> value_outValue </outValue>
        </returnValue>
    </getIO>
 </reply>
</frame>
```

The error codes for negative replies ("resultCode" ≠ 0) are described in the section "Negative XML replies (Page 262)".

Parameter

Parameter	Type	Values	Description
value_id	Decimal value 0...9	0...4294967295	Unique command identifier
value_inValue	Binary characters 0, 1	0000…. 1111	Each position stands for an input of the reader: • Inport00: 1st position (least significant bit right) • Inport01: 2nd position • Inport02: 3rd position • Inport03: 4th position • … Depending on the value of the particular position, the corresponding input is set to ON (1) or OFF (0). If the reader does not support I/O the value remains empty.
value_outValue	Binary characters 0, 1	0000…. 1111	Each position stands for an output of the reader: • Outport00: 1st position (least significant bit right) • Outport01: 2nd position • Outport02: 3rd position • Outport03: 4th position • … Depending on the value of the particular position, the corresponding output is set to ON (1) or OFF (0). If the reader does not support I/O the value remains empty.

10.3.2.13 resetReader

This command resets the reader.

After a positive reply from the user application, the reader terminates the TCP/IP connection and then performs a reset. Following this, you need to establish the connection again with the user application and restart with the "hostGreetings" command.

Command

```
<frame>
 <cmd>
    <id> value_id </id>
    <resetReader>
        <resetType> value_resetType </resetType>      // opt
    </resetReader>
 </cmd>
</frame>
```

// opt → Optional: Line can be omitted.

Reply

```
<frame>
 <reply>
    <id> value_id </id>
    <resultCode> 0 </resultCode>
    <resetReader/>
 </reply>
</frame>
```

The error codes for negative replies ("resultCode" ≠ 0) are described in the section "Negative XML replies (Page 262)".

Parameter

Parameter	Type	Values	Description
value_id	Decimal value 0...9	0...4294967295	Unique command identifier
resetType	Fixed values	Reset2Factory Reboot	Optional Type of reset • Reset2Factory: Reset to the factory settings and delete the stored configuration. • Reboot: Hardware reader reset without deleting the stored configuration. After the restart, communication must be re-established. The default is "Reboot".

10.3.2.14 getReaderStatus

This command requests status information from the reader.

Command

```
<frame>
 <cmd>
    <id> value_id </id>
    <getReaderStatus/>
 </cmd>
</frame>
```

Reply

```
<frame>
 <reply>
    <id> value_id </id>
    <resultCode> 0 </resultCode>
    <getReaderStatus>
        <returnValue>
            <readerType> value_readerType </readerType>
            <mLFB> value_mLFB </mLFB>
            <hWVersion> value_hWVersion </hWVersion>
            <fWVersion> value_fWVersion </fWVersion>
            <subVersions>                               // opt
                <version> value_version </version>
                …
            </subVersion>                              // opt
```

```
        </returnValue>
    </getReaderStatus>
 </reply>
</frame>
```

// opt → Optional: Line can be omitted.

The error codes for negative replies ("resultCode" ≠ 0) are described in the section "Negative XML replies (Page 262)".

Parameter

Parameter	Type	Values	Description
value_id	Decimal value 0...9	0...4294967295	Unique command identifier
value_readerType	Fixed values	SIMATIC_RF680R SIMATIC_RF685R SIMATIC_RF650R	Reader type
value_mLFB	Alphanumeric text	--	SIEMENS article number of the reader Example: 6GT2811-6AA10-0AA0
value_hWVersion	Alphanumeric text	--	Hardware version of the reader Example: V1.0.0.0_1.1.0.34
value_fWVersion	Alphanumeric text	--	Firmware version of the reader Example: V1.0.0.0_1.1.0.34
value_version	Alphanumeric text	--	Reader-specific version of components Note that the number of sub-versions can change. In future versions, there may be more or less sub-versions.

10.3.2.15 getAllSources

With this command, the names of all configured read points of the reader are queried.

Command

```
<frame>
 <cmd>
    <id> value_id </id>
    <getAllSources/>
 </cmd>
</frame>
```

Reply

```
<frame>
 <reply>
    <id> value_id </id>
    <resultCode> 0 </resultCode>
    <getAllSources>
        <returnValue>
            <sourceName> value_sourceName </sourceName>
            …
            <sourceName> value_sourceName </sourceName>    // opt
        </returnValue>
    </getAllSources>
 </reply>
</frame>
```

// opt → Optional: Line can be omitted.

The error codes for negative replies ("resultCode" ≠ 0) are described in the section "Negative XML replies (Page 262)".

Parameter

Parameter	Type	Values	Description
value_id	Decimal value 0...9	0...4294967295	Unique command identifier
value_ sourceName	Text	--	Read point name The name is specified using the WBM (refer to the section "The "Settings - Read points" menu item (Page 54)"). In the standard configuration, there is only one read point with the name "Readpoint_1".

10.3.2.16 getAntennas

The command returns all antennas that are configured at the specified read point.

This command is supported as of API protocol version V2.1.

Command

```
<frame>
 <cmd>
    <id> value_id </id>
    <getAllAntennas>
       <sourceName> value_ sourceName <sourceName>
    </getAllAntennas>
 </cmd>
</frame>
```

Reply

```
<frame>
 <reply>
    <id> value_id </id>
    <resultCode> 0 </resultCode>
    <getAllAntennas>
        <returnValue>
            <antennaName> value_antennaName </antennaName>
            …
            <antennaName> value_antennaName </antennaName>  // opt
        </returnValue>
    </getReaderStatus>
 </reply>
</frame>
```

// opt → Optional: Line can be omitted.

The error codes for negative replies ("resultCode" ≠ 0) are described in the section "Negative XML replies (Page 262)".

Parameter

Parameter	Type	Values	Description
value_id	Decimal value 0...9	0...4294967295	Unique command identifier
value_ source Name	Text	--	Name of the read point The name is set via the WBM (see section "The "Settings - Read points" menu item (Page 54)"). In the standard configuration, there is only one read point with the name "Readpoint_1".
value_ antennaName	Fixed value	Antenna01 Antenna02 Antenna03 Antenna04	Optional Name of the antenna

10.3.3 Transponder processing

This section describes all the commands with which you can control the processing of the transponder data. There are two ways of querying transponder data:

- Synchronous transponder command

  Commands that return the transponder data in the reply frame.

  The reader executes the required action once and then sends back the acquired transponder data.

  Algorithms that work with individual transponder commands such as "Read/WritePowerBoost" and "Read/WriteRetry" are active.

- Asynchronous transponder events

  "TagEventReports" are sent by the reader to the user application on the reader's initiative.

  The transponder data is acquired only by triggers of the read point. The configuration of the reader opens up numerous options for the trigger configuration of a read point.

You specify the message content contained in the reply frames using the tag events in the WBM. You will find more information on the tag events in the section "The "Settings - Communication" menu item (Page 74)".

10.3.3.1 editBlackList

This command saves or removes tag EPC-IDs in/from the black list.

The black list is a filter mechanism with which transponders can be filtered out. Transponders whose IDs are stored in the black list are ignored and not processed. The black list is a circulating buffer with a configurable size. If all the entries in the black list are occupied, the next new entry deletes the oldest entry.

You specify the size of the black list in the WBM. You will find more information on the black list in the section "The "Settings - Read points" menu item (Page 54)".

Command

```
<frame>
 <cmd>
    <id> value_id </id>
    <editBlacklist>
        <sourceName> value_sourceName </sourceName>
        <blackListCmd> value_blackListCmd </blackListCmd>
        <tagID> value_tagID </tagID>           // opt
            …
        <tagID> value_tagID </tagID>           // opt
    </editBlacklist>
 </cmd>
</frame>
```

// opt → Optional: Line can be omitted.

Reply

```
<frame>
 <reply>
    <id> value_id </id>
    <resultCode> 0 </resultCode>
    <editBlacklist/>
 </reply>
</frame>
```

The error codes for negative replies ("resultCode" ≠ 0) are described in the section "Negative XML replies (Page 262)".

Parameter

Parameter	Type	Values	Description
value_id	Decimal value 0...9	0...4294967295	Unique command identifier
value_ sourceName	Text	--	Read point name The name is specified using the WBM (refer to the section "The "Settings - Read points" menu item (Page 54)"). In the standard configuration, there is only one read point with the name "Readpoint_1".
value_ blackList-Cmd	Fixed values	Add Add_obs Del Del_all	How "setBlacklist" works: • Add: all the following EPC-IDs will be saved • Add_obs: all EPC-IDs with the "observed" status are stored in the black list. • Del: all the following EPC-IDs will be removed from the black list • Del_all: All entries in the black list will be removed.
value_tagID	Hexadecimal value 0...9, A...F	--	EPC-ID in "RAW Hex Data Format" Example of a 96-bit EPC-ID: 3005FB63AC1F3681EC880468 For additional information, refer to the "EPC Global Specification".

10.3.3.2 getBlackList

With this command, all EPC-IDs currently stored in the black list are queried.

The black list is a filter mechanism with which transponders can be filtered out. Transponders whose IDs are stored in the black list are ignored and not processed.

Command

```
<frame>
 <cmd>
    <id> value_id </id>
    <getBlacklist>
        <sourceName> value_sourceName </sourceName>
    </getBlacklist>
 </cmd>
</frame>
```

Reply

```
<frame>
 <reply>
    <id> value_id </id>
    <resultCode> 0 </resultCode>
    <getBlacklist>
        <returnValue>
            <tagID> value_tagID </tagID>           // opt
                …
            <tagID> value_tagID </tagID>           // opt
        </returnValue>
    </getBlacklist>
 </reply>
</frame>
```

// opt → Optional: Line can be omitted.

The error codes for negative replies ("resultCode" ≠ 0) are described in the section "Negative XML replies (Page 262)".

Parameter

Parameter	Type	Values	Description
value_id	Decimal value 0...9	0...4294967295	Unique command identifier
value_ sourceName	Text	--	Read point name The name is specified using the WBM (refer to the section "The "Settings - Read points" menu item (Page 54)"). In the standard configuration, there is only one read point with the name "Readpoint_1".
value_tagID	Hexadecimal value 0...9, A...F	--	EPC-ID in "RAW Hex Data Format" Example of a 96-bit EPC-ID: 3005FB63AC1F3681EC880468 For additional information, refer to the "EPC Global Specification".

10.3.3.3 triggerSource

Triggering the read point to trigger inventories. In this case, identified transponders are subjected to the smoothing algorithm and can have the statuses "GLIMPSED", "OBSERVED" and "LOST". The data of the identified statuses is sent to the user application as a "TagEventReport".

The configuration parameters of the read point such as "Smoothing" and the definition of the data of each transponder (tag fields, RSSI value, ...) to be sent are taken from the stored configuration. You set this parameter in the WBM. You will find more information on parameters in the section "The "Settings - Read points" menu item (Page 54)".

Command

```
<frame>
 <cmd>
    <id> value_id </id>
    <triggerSource>
        <sourceName> value_sourceName </sourceName>
        <triggerMode> value_triggerMode </triggerMode>  // opt
    </triggerSource>
 </cmd>
</frame>
```

// opt → Optional: Line can be omitted.

Reply

```
<frame>
 <reply>
    <id> value_id </id>
    <resultCode> 0 </resultCode>
    <triggerSource/>
 </reply>
</frame>
```

For negative replies ("resultCode" ≠ 0), refer to the description in the section "Negative XML replies (Page 262)".

Parameter

Parameter	Type	Values	Description
value_id	Decimal value 0...9	0...4294967295	Unique command identifier
value_ sourceName	Text	--	Read point name The name is specified using the WBM (refer to the section "The "Settings - Read points" menu item (Page 54)"). In the standard configuration, there is only one read point with the name "Readpoint_1".
value_ triggerMode	Fixed values	Single Start Stop	Optional Trigger type (default = single) The duration and number can be set up via the Web-based interface. • Single Single triggering of the read point. • Start The read point is continuously triggered until a stop command is sent. • Stop Stops triggering of the read point. Note that this command is only effective for previously executed trigger commands. The command has no effect on any configured continuous triggers.

10.3.3.4 readTagIDs

With this command, the selected read point takes an inventory and returns all identified transponders in the reply frame. If no transponder was identified, a positive reply without transponder data is returned.

The command remains active during the entire duration. In the implementation of the client application, make sure that timeout monitoring is used. The configuration parameters of the data source (read cycles per trigger, read timeout, ...) are not used. You will find more information on parameters in the section "The "Settings - Read points" menu item (Page 54)".

Note

Filter mechanisms influence the results

Defined filter mechanisms influence the results (refer to the section "The "Settings - Filters" menu item (Page 68)"). Then in the reply frame, only the transponders that were not filtered out appear

---

Note

Delay of the reply frames

A reply frame of the reader can be delayed additionally by the set duration of the command.

Command

```
<frame>
 <cmd>
    <id> value_id </id>
    <readTagIDs>
        <sourceName> value_sourceName </sourceName>
        <duration> value_duration </duration>    // opt
        <unit> value_unit </unit>       // opt
    </readTagIDs>
 </cmd>
</frame>
```

// opt → Optional: Line can be omitted.

Reply

```
<frame>
 <reply>
    <id>value_id</id>
    <resultCode> 0 </resultCode>
    <readTagIDs>
        <returnValue>
            <tag>
                <tagID> value_tagID </tagID>
                <tagPC> value_tagPC </tagPC>                // opt
                <utcTime> value_utcTime </utcTime>             // opt
                <antennaName> value_antennaName </antennaName>  // opt
                <rSSI> value_rSSI </rSSI>      // opt
                <channel> value_channel </channel>   // opt
                <power> value_power </power>     // opt
                <polarization> value_polarization </polarization> // opt
                <inventoried> value_inventoried </inventoried> // opt
                <filterDataAvailable> value_filterDataAvailable
</filterDataAvailable> // opt
            </tag>
            …
            <tag>     // opt
                …
            </tag>    // opt
        </returnValue>
    </readTagIDs>
```

```
  </reply>
</frame>
```

// opt → Optional: Line can be omitted. In the reply, the parameter is transferred depending on the configuration settings (Settings - Communication).

The error codes for negative replies ("resultCode" ≠ 0) are described in the section "Negative XML replies (Page 262)".

Parameter

Parameter	Type	Values	Description
value_id	Decimal value 0...9	0...4294967295	Unique command identifier
value_ sourceName	Text	--	Read point name The name is specified using the WBM (refer to the section "The "Settings - Read points" menu item (Page 54)"). In the standard configuration, there is only one read point with the name "Readpoint_1".
value_duration	Decimal value 0...9	0...65535	Optional Duration for which the selected read point will read transponders. If the value "0" is set or the parameter is empty, only one read cycle is exe- cuted.
value_unit	Fixed values	Time Count	Optional Specifies the unit for the duration. • Time = time in milliseconds • Count = number of inventories If no value is set, the duration is speci- fied in milliseconds.
value_tagID	Hexadecimal value 0...9, A...F	--	EPC-ID in "RAW Hex Data Format". Example of a 96-bit EPC-ID: 3005FB63AC1F3681EC880468 For additional information, refer to the "EPC Global Specification".
value_utcTime	Time	--	Optional UTC time stamp (Universal Time Co- ordinated) in ISO 8601 format: yyyy-MM-ddTHH:mm:ss.fffzzz e.g.: 2009-12-24T18:34:56.929+00:00.
value_ antennaName	Fixed values	Antenna01 Antenna02 Antenna03 Antenna04	Optional Name of the antenna

Parameter	Type	Values	Description
value_rSSI	Decimal value 0...9	0...255	Optional RSSI value
value_channel	Decimal value 0...9	1...50	Optional Channel number on which the transponder was detected.
value_power	Decimal value 0...9	0, 5.00...33.00	Optional Used radiated power of the antenna in [dB] Increment: 0.25 dB
value_polarization	Fixed values	Default Circular Linear_vertical Linear_horizontal All	Optional Polarization of the antenna Currently, this parameter can only be set for the internal antenna of the RF685R.
value_inventoried	Decimal value 0...9	0...65535	Optional Indicates how often the transponder was identified via the air interface in this command.
value_ filterDataAvailable	Fixed values	True False	Optional Indicates whether or not a filter criterion was received. • True: All the data was read or there was no filter set. • False: Data could not be read.

10.3.3.5 getObservedTagIDs

With this command, the selected read point takes an inventory and returns all identified transponders in the reply frame.

In contrast to the "readTagIDs" command, the smoothing algorithm of the selected read point is also affected here. The read point must therefore take enough inventories until a transponder adopts the "Observed" status. This can be achieved by selecting the suitable parameter values or by triggering/starting the read point in good time before the command.

If no transponder was identified with the "Observed" status, a positive reply without transponder data is returned.

The command remains active during the entire duration. In the implementation of the client application, make sure that timeout monitoring is used. The configuration parameters of the data source (read cycles per trigger, read timeout, ...) are not used. You will find more information on parameters in the section "The "Settings - Read points" menu item (Page 54)".

Note

Filter mechanisms influence the results

Defined filter mechanisms influence the results (refer to the section "The "Settings - Filters" menu item (Page 68)"). Then in the reply frame, only the transponders that were not filtered out appear.

Note

Delay of the reply frames

A reply frame of the reader can be delayed additionally by the set duration of the command.

Command

```
<frame>
 <cmd>
    <id> value_id </id>
    <getObservedTagIDs>
        <sourceName> value_sourceName </sourceName>
        <duration> value_duration </duration>    // opt
        <unit> value_unit </unit>       // opt
    </getObservedTagIDs>
 </cmd>
</frame>
```

// opt → Optional: Line can be omitted.

Reply

```
<frame>
 <reply>
    <id> value_id </id>
    <resultCode> 0 </resultCode>
    <getObservedTagIDs>
        <returnValue>
            <tag>
                <tagID> value_tagID </tagID>
                <tagPC> value_tagPC </tagPC>               // opt
                <utcTime> value_utcTime </utcTime>             // opt
                <antennaName> value_antennaName </antennaName>  // opt
                <rSSI> value_rSSI </rSSI>             // opt
```

```
                <channel> value_channel </channel>   // opt
                <power> value_power </power>       // opt
                <polarization> value_polarization </polarization> // opt
                <inventoried> value_inventoried </inventoried> // opt
                <filterDataAvailable> value_filterDataAvailable
</filterDataAvailable> // opt
            </tag>
            …
            <tag>     // opt
                …
            </tag>    // opt
        </returnValue>
    </getObservedTagIDs>
 </reply>
</frame>
```

// opt → Optional: Line can be omitted.

The error codes for negative replies ("resultCode" ≠ 0) are described in the section "Negative XML replies (Page 262)".

Parameter

Parameter	Type	Values	Description
value_id	Decimal value 0...9	0...4294967295	Unique command identifier
value_ sourceName	Text	--	Read point name The name is specified using the WBM (refer to the section "The "Settings - Read points" menu item (Page 54)"). In the standard configuration, there is only one read point with the name "Readpoint_1".
value_duration	Decimal value 0...9	0...65535	Optional Period of time for which the selected read point should read transponders. If a value "0" is set or the parameter is empty, the transponders are returned immediately to the "Observed" status without a time or a read cycle being executed. This behavior is particularly interesting when the data source is controlled by other points (e.g. inputs).
value_unit	Fixed values	Time Count	Optional Specifies the unit for the duration. • Time = time in milliseconds • Count = number of inventories If no value is set, the duration is specified in milliseconds.

Parameter	Type	Values	Description
value_tagID	Hexadecimal value 0...9, A...F	--	EPC-ID in "RAW Hex Data Format". Example of a 96-bit EPC-ID: 3005FB63AC1F3681EC880468 For additional information, refer to the "EPC Global Specification".
value_tagPC	Hexadecimal value 0...9, A...F	--	Optional Tag PC (Protocol Control) 16-bit value represented by four hexa-decimal characters. Example: The value "1234" corresponds to the binary value "0001.0010.0011.0100".
value_utcTime	Time	--	Optional UTC time stamp (Universal Time Co-ordinated) in ISO 8601 format: yyyy-MM-ddTHH:mm:ss.fffzzz e.g.: 2009-12-24T18:34:56.929+00:00.
value_ antennaName	Fixed values	Antenna01 Antenna02 Antenna03 Antenna04	Optional Name of the antenna
value_rSSI	Decimal value 0...9	0...255	Optional Largest measured RSSI value
value_channel	Decimal value 0...9	1...50	Optional Channel number on which the tran-sponder was detected.
value_power	Decimal value 0...9	0, 5.00...33.00	Optional Used radiated power of the antenna in [dB] Increment: 0.25 dB
value_polarization	Fixed values	Default Circular Linear_vertical Linear_horizontal All	Optional Polarization of the antenna Currently, this parameter can only be set for the internal antenna of the RF685R.

Parameter	Type	Values	Description
value_inventoried	Decimal value 0...9	0...65535	Optional Indicates how often the transponder was identified via the air interface before it changed to the "Observed" status.
value_ filterDataAvailable	Fixed values	True False	Optional Indicates whether or not a filter criterion was received. • True: All the data was read or there was no filter set. • False: Data could not be read.

10.3.3.6 writeTagID

This command writes a new EPC-ID to the transponder. To ensure clear identification when writing the ID, there must be only one transponder in the antenna field. If there is more than one transponder in the antenna field, a negative reply is returned.

Command

```
<frame>
 <cmd>
    <id> value_id </id>
    <writeTagID>
        <sourceName> value_sourceName </sourceName>
        <tagID> value_tagID </tagID>           // opt
        <newID> value_newID </newID>
        <idLength> value_idLength </idLength>   // opt
        <password> value_password </password>   // opt
    </writeTagID>
 </cmd>
</frame>
```

// opt → Optional: Line can be omitted.

Reply

```
<frame>
 <reply>
    <id> value_id </id>
    <resultCode> 0 </resultCode>
    <writeTagID>
        <returnValue>
            <tag>
                <tagID> value_tagID </tagID>
                <tagPC> value_tagPC </tagPC>                // opt
                <utcTime> value_utcTime </utcTime>            // opt
                <antennaName> value_antennaName </antennaName>  // opt
                <rSSI> value_rSSI </rSSI>      // opt
                <channel> value_channel </channel>   // opt
                <power> value_power </power>     // opt
                <polarization> value_polarization </polarization> // opt
                <commandRetry> value_commandRetry </commandRetry> // opt
                <airRetry> value_airRetry </airRetry> // opt
                <filterDataAvailable> value_filterDataAvailable
</filterDataAvailable> // opt
            </tag>
        </returnValue>
    </writeTagIDs>
 </reply>
</frame>
```

// opt → Optional: Line can be omitted.

The error codes for negative replies ("resultCode" ≠ 0) are described in the section "Negative XML replies (Page 262)".

Parameter

Parameter	Type	Values	Description
value_id	Decimal value 0...9	0...4294967295	Unique command identifier
value_ sourceName	Text	--	Read point name The name is specified using the WBM (refer to the section "The "Settings - Read points" menu item (Page 54)"). In the standard configuration, there is only one read point with the name "Readpoint_1".
value_tagID	Hexadecimal value 0...9, A...F	--	Optional EPC-ID in "RAW Hex Data Format". This function applies to all transponders with this ID. If this parameter is empty or not even transferred, the function applies to all transponders. Nevertheless only one transponder is then permitted in the antenna field. Example of a 96-bit EPC-ID: 3005FB63AC1F3681EC880468 For additional information, refer to the "EPC Global Specification".
value_newID	Hexadecimal value 0...9, A...F	--	New EPC-ID in "RAW Hex Data Format" to be written to the transponder. Example of a 96-bit EPC-ID: 3005FB63AC1F3681EC880468 For additional information, refer to the "EPC Global Specification".
value_idLength	Decimal value 0...9	16, 32, 48...496	Optional Length of the new EPC-ID in bits. If this parameter is set, the reader checks the correct length of "value_newID". If the check fails, a negative reply is sent. Without this parameter, the new EPC-ID is only checked if the length is a multiple of 16 bits.
value_password	Hexadecimal value 0...9, A...F	00000000…. FFFFFFFF	Optional Access password for the transponder This parameter does not need to be defined if there is no password protection activated for the transponder.
value_utcTime	Time	--	Optional UTC time stamp (Universal Time Coordinated) in ISO 8601 format: yyyy-MM-ddTHH:mm:ss.fffzzz e.g.: 2009-12-24T18:34:56.929+00:00.

Parameter	Type	Values	Description
value_ antennaName	Fixed values	Antenna01 Antenna02 Antenna03 Antenna04	Optional Name of the antenna
value_rSSI	Decimal value 0...9	0...255	Optional RSSI value
value_channel	Decimal value 0...9	1...50	Optional Channel number on which the transponder was detected.
value_power	Decimal value 0...9	0, 5.00...33.00	Optional Used radiated power of the antenna in [dB] Increment: 0.25 dB
value_polarization	Fixed values	Default Circular Linear_vertical Linear_horizontal All	Optional Polarization of the antenna Currently, this parameter can only be set for the internal antenna of the RF685R.
value_ commandRetry	Decimal value 0...9	0...65535	Optional Number of times the reader repeated commands attempting to obtain correct data. "0" corresponds to no attempt. The maximum number of attempts is set using the WBM.
value_airRetry	Decimal value 0...9	0...65535	Optional Number of times the reader repeated air interface commands attempting to obtain correct data. "0" corresponds to no attempt. The maximum number of air interface commands is specified in the reader firmware and cannot be modified.
value_ filterDataAvailable	Fixed values	True False	Optional Indicates whether or not a filter criterion was received. • True: No problem All the data was read or there was no filter set. • False: Data could not be read.

10.3.3.7 readTagMemory

This command reads data from the requested transponder. If no EPC-ID is made available or detected, the command is executed with all the transponders recognized from the read point.

Note

If no EPC-ID is specified, the results are influenced by all the set filter mechanisms (refer to the section "The "Settings - Filters" menu item (Page 68)"). Then in the reply frame, only the transponders that were not filtered out appear. If an EPC-ID is specified, the data filter has no effect.

The reply frame contains the IDs of all identified transponders with the information as to whether the requested data for the transponder could be read or not.

If no transponder was identified, a positive reply without transponder data is returned.

Command

```
<frame>
 <cmd>
    <id> value_id </id>
    <readTagMemory>
        <sourceName> value_sourceName </sourceName>
        <tagID> value_tagID </tagID>           // opt
        <password> value_password </password>   // opt
        <tagField>
            <bank> value_bank </bank>
            <startAddress> value_startAddress </startAddress>
            <dataLength> value_dataLength </dataLength>
        </tagField>
            …
        <tagField>     // opt
            …
        </tagField>    // opt
    </readTagMemory>
 </cmd>
</frame>
```

// opt → Optional: Line can be omitted.

Reply

```
<frame>
 <reply>
    <id> value_id </id>
    <resultCode> 0 </resultCode>
    <readTagMemory>
        <returnValue>
            <tag>
                <tagID> value_tagID </tagID>
                <tagPC> value_tagPC </tagPC>                // opt
                <success> value_success </success>
                <utcTime> value_utcTime </utcTime>             // opt
                <antennaName> value_antennaName </antennaName>  // opt
                <rSSI> value_rSSI </rSSI>          // opt
                <channel> value_channel </channel>   // opt
                <power> value_power </power>       // opt
                <polarization> value_polarization </polarization> // opt
                <commandRetry> value_commandRetry </commandRetry> // opt
                <airRetry> value_airRetry </airRetry> // opt
                <filterDataAvailable> value_filterDataAvailable
</filterDataAvailable> // opt
                <tagField>     // opt
                  <bank> value_bank </bank>
                  <startAddress> value_startAddress </startAddress>
                  <dataLength> value_dataLength </dataLength>
                  <data> value_data </data>
                </tagField>    // opt
                …
                <tagField>     // opt
                  …
                </tagField>    // opt
            </tag>
            …
            <tag>     // opt
                …
            </tag>    // opt
        </returnValue>
    </readTagMemory>
 </reply>
</frame>
```

// opt → Optional: Line can be omitted. In the reply, the parameter is transferred depending on the configuration settings (engineering/communication).

The error codes for negative replies ("resultCode" ≠ 0) are described in the section "Negative XML replies (Page 262)".

Parameter

Parameter	Type	Values	Description
value_id	Decimal value 0...9	0...4294967295	Unique command identifier
value_ sourceName	Text	--	Read point name The name is specified using the WBM (refer to the section "The "Settings - Read points" menu item (Page 54)"). In the standard configuration, there is only one read point with the name "Readpoint_1".
value_tagID	Hexadecimal value 0...9, A...F	--	Optional EPC-ID in "RAW Hex Data Format". This function applies to all transponders with this ID. If this parameter is empty or not even transferred, the function applies to all transponders. Nevertheless only one transponder is then permitted in the antenna field. Example of a 96-bit EPC-ID: 3005FB63AC1F3681EC880468 For additional information, refer to the "EPC Global Specification".
value_tagPC	Hexadecimal value 0...9, A...F	--	Optional Tag PC (Protocol Control) 16-bit value represented by four hexadecimal characters. Example: The value "1234" corresponds to the binary value "0001.0010.0011.0100".
value_bank	--	0...3	Memory bank of the transponder • 0: Reserved • 1: EPC • 2: TID • 3: USER MEMORY
value_ startAddress	Decimal value 0...9	0...65535	Start address of the first byte in the memory bank where reading will start.
value_dataLength	Decimal value 0...9	1...1024	Number of bytes to be read.
value_password	Hexadecimal value 0...9, A...F	00000000... FFFFFFFF	Optional Access password for the transponder This parameter does not need to be defined if there is no password protection activated for the transponder.

Parameter	Type	Values	Description
value_success	Fixed values	True False	Flag to indicate whether or not the command was successful for this transponder. • True: Command successful • False: Command unsuccessful
value_utcTime	Time	--	Optional UTC time stamp (Universal Time Coordinated) in ISO 8601 format: yyyy-MM-ddTHH:mm:ss.fffzzz e.g.: 2009-12-24T18:34:56.929+00:00.
value_ antennaName	Fixed values	Antenna01 Antenna02 Antenna03 Antenna04	Optional Name of the antenna
value_rSSI	Decimal value 0...9	0..255	Optional RSSI value
value_channel	Decimal value 0...9	1...50	Optional Channel number on which the transponder was detected.
value_power	Decimal value 0...9	0, 5.00...33.00	Optional Used radiated power of the antenna in [dB] Increment: 0.25 dB
value_polarization	Fixed values	Default Circular Linear_vertical Linear_horizontal All	Optional Polarization of the antenna Currently, this parameter can only be set for the internal antenna of the RF685R.
value_ commandRetry	Decimal value 0...9	0...65535	Optional Number of times the reader repeated commands attempting to obtain correct data "0" corresponds to no attempt. The maximum number of attempts is set using the WBM
value_airRetry	Decimal value 0...9	0...65535	Optional Number of times the reader repeated air interface commands attempting to obtain correct data "0" corresponds to no attempt. The maximum number of attempts is specified in the reader firmware and cannot be modified

Parameter	Type	Values	Description
value_ filterDataAvailable	Fixed values	True False	Optional Indicates whether or not a filter criterion was received. • True: No problem All the data was read or there was no filter set. • False: Data could not be read.
value_data	Hexadecimal value 0...9, A...F	--	Data that should be read. Each byte is represented by two hexadecimal characters. Example: The byte sequence "0x12, 0x34, 0xA3" is represented as the character string "1234A3" in the "value_data" parameter. "value_dataLength" is 3 in this example. If the transponder is identified but the data cannot be read (e.g. if the transponder has no user memory as required), this field remains empty. "value_success" is then set to "False".

10.3.3.8 writeTagMemory

This command writes data to the requested transponder. If no EPC-ID is made available or detected, the command is executed with all the transponders recognized from the read point.

Note

If no EPC-ID is specified, the results are influenced by all the set filter mechanisms (refer to the section "The "Settings - Filters" menu item (Page 68)"). Then in the reply frame, only the transponders that were not filtered out appear. If an EPC-ID is specified, the data filter has no effect.

The reply frame contains the IDs of all identified transponders. A flag for each transponder indicates whether or not the command was successful for this transponder.

If no transponder was identified, a negative reply is returned.

Command

```
<frame>
 <cmd>
    <id> value_id </id>
    <writeTagMemory>
        <sourceName> value_sourceName </sourceName>
        <tagID> value_tagID </tagID>           // opt
        <password> value_password </password>   // opt
        <tagField>
            <bank> value_bank </bank>
            <startAddress> value_startAddress </startAddress>
            <dataLength> value_dataLength </dataLength>
            <data> value_data </data>        // opt
        </tagField>
        …
        <tagField>     // opt
            …
        </tagField>    // opt
    </writeTagMemory>
 </cmd>
</frame>
```

// opt → Optional: Line can be omitted.

Reply

```
<frame>
 <reply>
    <id> value_id </id>
    <resultCode> 0 </resultCode>
    <writeTagMemory>
        <returnValue>
            <tag>
                <tagID> value_tagID </tagID>
                <tagPC> value_tagPC </tagPC>                // opt
                <success> value_success </success>
                <utcTime> value_utcTime </utcTime>              // opt
                <antennaName> value_antennaName </antennaName>  // opt
                <rSSI> value_rSSI </rSSI>         // opt
                <channel> value_channel </channel>   // opt
                <power> value_power </power>      // opt
                <polarization> value_polarization </polarization> // opt
                <commandRetry> value_commandRetry </commandRetry> // opt
                <airRetry> value_airRetry </airRetry> // opt
                <filterDataAvailable> value_filterDataAvailable
</filterDataAvailable> // opt
            </tag>
            …
```

```
            <tag>     // opt
                …
            </tag>    // opt
        </returnValue>
    </writeTagMemory>
 </reply>
</frame>
```

// opt → Optional: Line can be omitted.

The error codes for negative replies ("resultCode" ≠ 0) are described in the section "Negative XML replies (Page 262)".

Parameter

Parameter	Type	Values	Description
value_id	Decimal value 0...9	0...4294967295	Unique command identifier
value_ sourceName	Text	--	Read point name The name is specified using the WBM (refer to the section "The "Settings - Read points" menu item (Page 54)"). In the standard configuration, there is only one read point with the name "Readpoint_1".
value_tagID	Hexadecimal value 0...9, A...F	--	Optional EPC-ID in "RAW Hex Data Format". This function applies to all transponders with this ID. If this parameter is empty or not even transferred, the function applies to all transponders. Nevertheless only one transponder is then permitted in the antenna field. Example of a 96-bit EPC-ID: 3005FB63AC1F3681EC880468 For additional information, refer to the "EPC Global Specification".
value_tagPC	Hexadecimal value 0...9, A...F	--	Optional Tag PC (Protocol Control) 16-bit value represented by four hexadecimal characters. Example: The value "1234" corresponds to the binary value "0001.0010.0011.0100".

Parameter	Type	Values	Description
value_bank	--	0...3	Memory bank of the transponder • 0: Reserved • 1: EPC • 2: TID • 3: USER MEMORY
value_ startAddress	Decimal value 0...9	0...65535	Start address of the first byte in the memory bank where writing will start.
value_dataLength	Decimal value 0...9	1...1024	Number of bytes to be written. The reader checks the correct length of "value_data". If the check is negative, a negative reply is sent.
value_password	Hexadecimal value 0...9, A...F	00000000... FFFFFFFF	Optional Access password for the transponder This parameter does not need to be defined if there is no password protection activated for the transponder.
value_data	Hexadecimal value 0...9, A...F	--	Data that should be written. Each byte is represented by two hexadecimal characters. Example: The byte sequence "0x12, 0x34, 0xA3" is represented as the character string "1234A3" in the "value_data" parameter. "value_dataLength" is 3 in this example.
value_success	Fixed values	True False	Flag to indicate whether or not the command was successful for this transponder. • True: Command successful • False: Command unsuccessful
value_utcTime	Time	--	Optional UTC time stamp (Universal Time Coordinated) in ISO 8601 format: yyyy-MM-ddTHH:mm:ss.fffzzz e.g.: 2009-12-24T18:34:56.929+00:00.
value_ antennaName	Fixed values	Antenna01 Antenna02 Antenna03 Antenna04	Optional Name of the antenna
value_rSSI	Decimal value 0...9	0...255	Optional RSSI value
value_channel	Decimal value 0...9	1...50	Optional Channel number on which the transponder was detected.

Parameter	Type	Values	Description
value_power	Decimal value 0...9	0, 5.00...33.00	Optional Used radiated power of the antenna in [dB] Increment: 0.25 dB
value_polarization	Fixed values	Default Circular Linear_vertical Linear_horizontal All	Optional Polarization of the antenna Currently, this parameter can only be set for the internal antenna of the RF685R.
value_ commandRetry	Decimal value 0...9	0..65535	Optional Number of times the reader repeated commands attempting to obtain correct data. "0" corresponds to no attempt. The maximum number of attempts is set using the WBM.
value_airRetry	Decimal value 0...9	0..65535	Optional Number of times the reader repeated air interface commands attempting to obtain correct data. "0" corresponds to no attempt. The maximum number of attempts is specified in the reader firmware and cannot be modified.
value_ filterDataAvailable	Fixed values	True False	Optional Indicates whether or not a filter criteri-on was received. • True: No problem All the data was read or there was no filter set. • False: Data could not be read.

10.3.3.9 readTagField

This command reads data from the selected transponder. The address of the data area is specified by the name of a tag field. The tag field and the name of the field are specified using the WBM. If no EPC-ID is made available or detected, the command is executed with all the transponders recognized from the read point.

Note

If no EPC-ID is specified, the results are influenced by all the set filter mechanisms (refer to the section "The "Settings - Filters" menu item (Page 68)"). Then in the reply frame, only the tags that were not filtered out appear. If an EPC-ID is specified, the data filter has no effect.

The reply frame contains the IDs of all identified transponders. A flag for each transponder indicates whether or not the command was successful for this transponder.

If no transponder was identified, a negative reply is returned.

Command

```
<frame>
 <cmd>
    <id> value_id </id>
        <readTagField>
        <sourceName> value_sourceName </sourceName>
        <tagID> value_tagID </tagID>           // opt
        <password> value_password </password>   // opt
        <tagField>
            <fieldName> value_fieldName </fieldName>
        </tagField>
        …
        <tagField>     // opt
            …
        </tagField>    // opt
    </readTagField>
 </cmd>
</frame>
```

// opt → Optional: Line can be omitted.

Reply

```
<frame>
 <reply>
    <id> value_id </id>
    <resultCode> 0 </resultCode>
    <readTagField>
        <returnValue>
            <tag>
                <tagID> value_tagID </tagID>
                <tagPC> value_tagPC </tagPC>                // opt
                <success> value_success </success>
                <utcTime> value_utcTime </utcTime>             // opt
                <antennaName> value_antennaName </antennaName>  // opt
                <rSSI> value_rSSI </rSSI>          // opt
                <channel> value_channel </channel>   // opt
                <power> value_power </power>          // opt
                <polarization> value_polarization </polarization> // opt
                <commandRetry> value_commandRetry </commandRetry> // opt
                <airRetry> value_airRetry </airRetry> // opt
                        <filterDataAvailable> value_filterDataAvailable
</filterDataAvailable> // opt
                <tagField>    // opt
                    <data> value_data </data>
                </tagField>   // opt
                …
                <tagField>     // opt
                …
                </tagField>   // opt
            </tag>
            …
            <tag>     // opt
            …
            </tag>    // opt
        </returnValue>
    </readTagField>
 </reply>
</frame>
```

// opt → Optional: Line can be omitted. In the reply, the parameter is transferred depending on the configuration settings (engineering/communication).

The error codes for negative replies ("resultCode" ≠ 0) are described in the section "Negative XML replies (Page 262)".

Parameter

Parameter	Type	Values	Description
value_id	Decimal value 0...9	0...4294967295	Unique command identifier
value_ sourceName	Text	--	Read point name The name is specified using the WBM (refer to the section "The "Settings - Read points" menu item (Page 54)"). In the standard configuration, there is only one read point with the name "Readpoint_1".
value_tagID	Hexadecimal value 0...9, A...F	--	Optional EPC-ID in "RAW Hex Data Format". This function applies to all transponders with this ID. If this parameter is empty or not even transferred, the function applies to all transponders. Nevertheless only one transponder is then permitted in the antenna field. Example of a 96-bit EPC-ID: 3005FB63AC1F3681EC880468 For additional information, refer to the "EPC Global Specification".
value_tagPC	Hexadecimal value 0...9, A...F	--	Optional Tag PC (Protocol Control) 16-bit value represented by four hexadecimal characters. Example: The value "1234" corresponds to the binary value "0001.0010.0011.0100".
value_fieldName	Hexadecimal value 0...9, A...F	--	Name of tag field Is specified using the WBM.
value_password	Hexadecimal value 0...9, A...F	00000000... FFFFFFFF	Optional Access password for the transponder This parameter does not need to be defined if there is no password protection activated for the transponder.
value_success	Fixed values	True False	Flag to indicate whether or not the command was successful for this transponder. • True: Command successful • False: Command unsuccessful
value_utcTime	Time	--	Optional UTC time stamp (Universal Time Coordinated) in ISO 8601 format: yyyy-MM-ddTHH:mm:ss.fffzzz e.g.: 2009-12-24T18:34:56.929+00:00.

Parameter	Type	Values	Description
value_ antennaName	Fixed values	Antenna01 Antenna02 Antenna03 Antenna04	Optional Name of the antenna
value_rSSI	Decimal value 0...9	0...255	Optional RSSI value
value_channel	Decimal value 0...9	1...50	Optional Channel number on which the transponder was detected.
value_power	Decimal value 0...9	0, 5.00...33.00	Optional Used radiated power of the antenna in [dB] Increment: 0.25 dB
value_polarization	Fixed values	Default Circular Linear_vertical Linear_horizontal All	Optional Polarization of the antenna Currently, this parameter can only be set for the internal antenna of the RF685R.
value_ commandRetry	Decimal value 0...9	0...65535	Optional Number of times the reader repeated commands attempting to obtain correct data. "0" corresponds to no attempt. The maximum number of attempts is set using the WBM.
value_airRetry	Decimal value 0...9	0...65535	Optional Number of times the reader repeated air interface commands attempting to obtain correct data. "0" corresponds to no attempt. The maximum number of attempts is specified in the reader firmware and cannot be modified.

Parameter	Type	Values	Description
value_ filterDataAvailable	Fixed values	True False	Optional Indicates whether or not a filter criterion was received. • True: No problem All the data was read or there was no filter set. • False: Data could not be read.
value_data	Hexadecimal value 0...9, A...F	--	Data that should be read. Each byte is represented by two hexadecimal characters. Example: The byte sequence "0x12, 0x34, 0xA3" is represented as the character string "1234A3" in the "value_data" parameter. "value_dataLength" is 3 in this example. If the transponder is identified but the data cannot be read (e.g. if the transponder has no user memory as required), this field remains empty. "value_success" is then set to "False".

10.3.3.10 writeTagField

This command writes data to the selected transponder. The address of the data area is specified by the name of a tag field. The tag field and the name of the field are specified using the WBM.

If no EPC-ID is made available or detected, the command is executed with all the transponders recognized from the read point.

Note

If no EPC-ID is specified, the results are influenced by all the set filter mechanisms (refer to the section "The "Settings - Filters" menu item (Page 68)"). Then in the reply frame, only the tags that were not filtered out appear. If an EPC-ID is specified, the data filter has no effect.

The reply frame contains the IDs of all identified transponders. A flag for each transponder indicates whether or not the command was successful for this transponder.

If no transponder was identified, a negative reply is returned.

Command

```
<frame>
 <cmd>
    <id> value_id </id>
        <writeTagField>
        <sourceName> value_sourceName </sourceName>
        <tagID> value_tagID </tagID>           // opt
        <password> value_password </password>   // opt
        <tagField>
            <fieldName> value_fieldName </fieldName>
            <data> value_data </data>
        </tagField>
        …
        <tagField>     // opt
            …
        </tagField>    // opt
    </writeTagField>
 </cmd>
</frame>
```

// opt → Optional: Line can be omitted.

Reply

```
<frame>
 <reply>
    <id> value_id </id>
    <resultCode> 0 </resultCode>
    <writeTagField>
        <returnValue>
            <tag>
                <tagID> value_tagID </tagID>
                <tagPC> value_tagPC </tagPC>                // opt
                <success> value_success </success>
                <utcTime> value_utcTime </utcTime>             // opt
                <antennaName> value_antennaName </antennaName>  // opt
                <rSSI> value_rSSI </rSSI>         // opt
                <channel> value_channel </channel>   // opt
                <power> value_power </power>       // opt
                <polarization> value_polarization </polarization> // opt
                <commandRetry> value_commandRetry </commandRetry> // opt
                <airRetry> value_airRetry </airRetry> // opt
                        <filterDataAvailable> value_filterDataAvailable
</filterDataAvailable> // opt
            </tag>
            …
            <tag>     // opt
                …
```

```
            </tag>    // opt
        </returnValue>
    </writeTagField>
 </reply>
</frame>
```

// opt → Optional: Line can be omitted. In the reply, the parameter is transferred depending on the configuration settings (engineering/communication).

The error codes for negative replies ("resultCode" ≠ 0) are described in the section "Negative XML replies (Page 262)".

Parameter

Parameter	Type	Values	Description
value_id	Decimal value 0...9	0...4294967295	Unique command identifier
value_ sourceName	Text	--	Read point name The name is specified using the WBM (refer to the section "The "Settings - Read points" menu item (Page 54)"). In the standard configuration, there is only one read point with the name "Readpoint_1".
value_tagID	Hexadecimal value 0...9, A...F	--	Optional EPC-ID in "RAW Hex Data Format". This function applies to all transponders with this ID. If this parameter is empty or not even transferred, the function applies to all transponders. Nevertheless only one transponder is then permitted in the antenna field. Example of a 96-bit EPC-ID: 3005FB63AC1F3681EC880468 For additional information, refer to the "EPC Global Specification".
value_tagPC	Hexadecimal value 0...9, A...F	--	Optional Tag PC (Protocol Control) 16-bit value represented by four hexadecimal characters. Example: The value "1234" corresponds to the binary value "0001.0010.0011.0100".
value_fieldName	Hexadecimal value 0...9, A...F	--	Name of tag field Is specified using the WBM.

Parameter	Type	Values	Description
value_password	Hexadecimal value 0...9, A...F	00000000... FFFFFFFF	Optional Access password for the transponder This parameter does not need to be defined if there is no password protection activated for the transponder.
value_data	Hexadecimal value 0...9, A...F	--	Data that should be written. Each byte is represented by two hexadecimal characters. Example: The byte sequence "0x12, 0x34, 0xA3" is represented as the character string "1234A3" in the "value_data" parameter. "value_dataLength" is 3 in this example.
value_success	Fixed values	True False	Flag to indicate whether or not the command was successful for this transponder. • True: Command successful • False: Command unsuccessful
value_utcTime	Time	--	Optional UTC time stamp (Universal Time Coordinated) in ISO 8601 format: yyyy-MM-ddTHH:mm:ss.fffzzz e.g.: 2009-12-24T18:34:56.929+00:00.
value_ antennaName	Fixed values	Antenna01 Antenna02 Antenna03 Antenna04	Optional Name of the antenna
value_rSSI	Decimal value 0...9	0...255	Optional RSSI value
value_channel	Decimal value 0...9	1...50	Optional Channel number on which the transponder was detected.
value_power	Decimal value 0...9	0, 5.00...33.00	Optional Used radiated power of the antenna in [dB] Increment: 0.25 dB
value_polarization	Fixed values	Default Circular Linear_vertical Linear_horizontal All	Optional Polarization of the antenna Currently, this parameter can only be set for the internal antenna of the RF685R.

Parameter	Type	Values	Description
value_ commandRetry	Decimal value 0...9	0...65535	Optional Number of times the reader repeated commands attempting to obtain correct data. "0" corresponds to no attempt. The maximum number of attempts is set using the WBM.
value_airRetry	Decimal value 0...9	0...65535	Optional Number of times the reader repeated air interface commands attempting to obtain correct data. "0" corresponds to no attempt. The maximum number of attempts is specified in the reader firmware and cannot be modified.
value_ filterDataAvailable	Fixed values	True False	Optional Indicates whether or not a filter criteri-on was received. • True: No problem All the data was read or there was no filter set. • False: Data could not be read.

10.3.3.11 killTag

With this command, the selected transponder is deactivated. If no EPC-ID is made available or detected, the command is executed with all the transponders recognized from the read point.

Note

If no EPC-ID is specified, the results are influenced by all the set filter mechanisms (refer to the section "The "Settings - Filters" menu item (Page 68)"). Then in the reply frame, only the transponders that were not filtered out appear. If an EPC-ID is specified, the data filter has no effect.

The reply frame contains the IDs of all identified transponders. A flag for each transponder indicates whether or not the command was successful for this transponder.

If no transponder was identified, a negative reply is returned.

Command

```
<frame>
 <cmd>
    <id> value_id </id>
    <killTag>
        <sourceName> value_sourceName </sourceName>
        <tagID> value_tagID </tagID>           // opt
        <password> value_password </password>
    </killTag>
 </cmd>
</frame>
```

// opt → Optional: Line can be omitted.

Reply

```
<frame>
 <reply>
    <id> value_id </id>
    <resultCode> 0 </resultCode>
    <killTag>
        <returnValue>
            <tag>
                <tagID> value_tagID </tagID>
                <tagPC> value_tagPC </tagPC>                // opt
                <success> value_success </success>
                <utcTime> value_utcTime </utcTime>             // opt
                <antennaName> value_antennaName </antennaName>  // opt
                <rSSI> value_rSSI </rSSI>            // opt
                <channel> value_channel </channel>   // opt
                <power> value_power </power>         // opt
                <polarization> value_polarization </polarization> // opt
                <commandRetry> value_commandRetry </commandRetry> // opt
                <airRetry> value_airRetry </airRetry> // opt
                <filterDataAvailable> value_filterDataAvailable
</filterDataAvailable> // opt
            </tag>
            …
            <tag>     // opt
                …
            </tag>    // opt
        </returnValue>
    </killTag>
 </reply>
</frame>
```

// opt → Optional: Line can be omitted. In the reply, the parameter is transferred depending on the configuration settings (engineering/communication).

The error codes for negative replies ("resultCode" ≠ 0) are described in the section "Negative XML replies (Page 262)".

Parameter

Parameter	Type	Values	Description
value_id	Decimal value 0...9	0...4294967295	Unique command identifier
value_ sourceName	Text	--	Read point name The name is specified using the WBM (refer to the section "The "Settings - Read points" menu item (Page 54)"). In the standard configuration, there is only one read point with the name "Readpoint_1".
value_tagID	Hexadecimal value 0...9, A...F	--	Optional EPC-ID in "RAW Hex Data Format". This function applies to all transponders with this ID. If this parameter is empty or not even transferred, the function applies to all transponders. Nevertheless only one transponder is then permitted in the antenna field. Example of a 96-bit EPC-ID: 3005FB63AC1F3681EC880468 For additional information, refer to the "EPC Global Specification".
value_tagPC	Hexadecimal value 0...9, A...F	--	Optional Tag PC (Protocol Control) 16-bit value represented by four hexadecimal characters. Example: The value "1234" corresponds to the binary value "0001.0010.0011.0100".
value_password	Hexadecimal value 0...9, A...F	00000000…. FFFFFFFF	Disable the kill password of the transponder
value_success	Fixed values	True False	Flag to indicate whether or not the command was successful for this transponder. • True: Command successful • False: Command unsuccessful
value_utcTime	Time	--	Optional UTC time stamp (Universal Time Coordinated) in ISO 8601 format: yyyy-MM-ddTHH:mm:ss.fffzzz e.g.: 2009-12-24T18:34:56.929+00:00.

Parameter	Type	Values	Description
value_ antennaName	Fixed values	Antenna01 Antenna02 Antenna03 Antenna04	Optional Name of the antenna
value_rSSI	Decimal value 0...9	0...255	Optional RSSI value
value_channel	Decimal value 0...9	1...50	Optional Channel number on which the transponder was detected.
value_power	Decimal value 0...9	0, 5.00...33.00	Optional Used radiated power of the antenna in [dB] Increment: 0.25 dB
value_polarization	Fixed values	Default Circular Linear_vertical Linear_horizontal All	Optional Polarization of the antenna Currently, this parameter can only be set for the internal antenna of the RF685R.
value_ commandRetry	Decimal value 0...9	0...65535	Optional Number of times the reader repeated commands attempting to obtain correct data. "0" corresponds to no attempt. The maximum number of attempts is set using the WBM.
value_airRetry	Decimal value 0...9	0...65535	Optional Number of times the reader repeated air interface commands attempting to obtain correct data. "0" corresponds to no attempt. The maximum number of attempts is specified in the reader firmware and cannot be modified.
value_ filterDataAvailable	Fixed values	True False	Optional Indicates whether or not a filter criterion was received. • True: No problem All the data was read or there was no filter set. • False: Data could not be read.

10.3.3.12 lockTagBank

This command locks the memory area of the selected transponder. If no EPC-ID is made available or detected, the command is executed with all the transponders recognized from the read point.

Note

If no EPC-ID is specified, the results are influenced by all the set filter mechanisms (refer to the section "The "Settings - Filters" menu item (Page 68)"). Then in the reply frame, only the transponders that were not filtered out appear. If an EPC-ID is specified, the data filter has no effect.

The reply frame contains the IDs of all identified transponders. A flag for each transponder indicates whether or not the command was successful for this transponder.

If no transponder was identified, a negative reply is returned.

Below, there is a brief description of the "epcGen2LockAction" and "epcGen2LockMask" parameters. The first row of the table ('Bit') indicates the bit positions of the action and the masking values. The masking and action values are specified first with the MSB.

Further information on the parameters can be found in the "EPCglobal Specification (http://www.gs1.org)."

Table 10- 2 Structure of the parameters "epcGen2LockAction" and "epcGen2LockMask"

Bank	**Kill PWD**		**Access PWD**		**EPC memory**		**TID memory**		**User memory**	
Bit	9	8	7	6	5	4	3	2	1	0
Masking	s/w	s/w	s/w	s/w	s/w	s/w	s/w	s/w	s/w	s/w
Action	r/w	p	r/w	p	w	p	w	p	w	p

- The masking value specifies which action value bit is to be set as s/w as shown in the table above ("skip/write" where "skip=0" and "write=1").
- The action value specifies which lock should be defined for each memory bank.
- The "r/w" flag locks the password for read and write access.
- The "w" flag locks the password for write access (read access permitted).
- The "p" flag specifies a permanent lock.

The following tables show possible combinations of the "r/w" and "w" flags with "p" flags and the meaning of the combination for a memory bank.

The transponder is in the "open" status when it is identified and in the "secure" status when its access password is verified.

Table 10- 3 Possible combinations of the "w" and "p" flags

w	p	Description
0	0	Write access to the particular memory bank is possible from both the "open" and the "secure" status.
0	1	Write access to the particular memory bank is permanently possible from both the "open" and the "secure" status, it cannot be locked.
1	0	Write access to the particular memory bank is possible from the "secure" status but not from the "open" status.
1	1	No write access to the particular memory bank is possible.

Table 10- 4 Possible combinations of the "r/w" and "p" flags

r/w	p	Description
0	0	Read and write access to the particular password is possible from both the "open" and the "secure" status.
0	1	Read and write access to the particular password is permanently possible from both the "open" and the "secure" status, it cannot be locked.
1	0	Read and write access to the particular password is possible from the "secure" status but not from the "open" status.
1	1	No read or write access to the particular memory bank is possible.

Example

Bank	Kill PWD	Access PWD	EPC Memory	TID Memory	User Memory	Hex string value
Masking	(00) 1 1	1 1	1 1	0 0	0 0	3F0
Action	(00) 1 0	1 0	1 0	0 0	0 0	2A0

In the example above "lockMask = 11 1111 0000" (hexadecimal 3F0). This means that only write access to the memory locations Kill, Access and EPC is possible. The fields for "lockAction" are "10 1010 0000" (hexadecimal 2A0), which means:

- Kill password

  Read and write access is possible from the "secure" status but not from the "open" status. The access password for the transponder must be known before the Kill password can be read or modified.

- EPC memory bank

  Write access is possible from the "secure" status but not from the "open" status. The access password must be known before a new ID can be written to the transponder. You will find more detailed information on "epcGen2LockAction" and "epcGen2LockMask" in the "EPC Radio Frequency Identity Protocols Standard Specification".

Command

```
<frame>
 <cmd>
    <id> value_id </id>
    <lockTagBank>
        <sourceName> value_sourceName </sourceName>
        <tagID> value_tagID </tagID>           // opt
        <lockAction> value_lockAction </lockAction>
        <lockMask> value_lockMask </lockMask>
        <password> value_password </password>
    </lockTagBank>
 </cmd>
</frame>
```

// opt → Optional: Line can be omitted.

Reply

```
<frame>
 <reply>
    <id> value_id </id>
    <resultCode> 0 </resultCode>
    <lockTagBank>
        <returnValue>
            <tag>
                <tagID> value_tagID </tagID>
                <tagPC> value_tagPC </tagPC>                // opt
                <success> value_success </success>
                <utcTime> value_utcTime </utcTime>             // opt
                <antennaName> value_antennaName </antennaName>  // opt
                <rSSI> value_rSSI </rSSI>              // opt
                <channel> value_channel </channel>   // opt
                <power> value_power </power>         // opt
                <polarization> value_polarization </polarization> // opt
                <commandRetry> value_commandRetry </commandRetry> // opt
                <airRetry> value_airRetry </airRetry> // opt
                <filterDataAvailable> value_filterDataAvailable
</filterDataAvailable> // opt
            </tag>
            …
            <tag>     // opt
                …
            </tag>    // opt
        </returnValue>
    </lockTagBank>
 </reply>
</frame>
```

// opt → Optional: Line can be omitted. In the reply, the parameter is transferred depending on the configuration settings (engineering/communication).

The error codes for negative replies ("resultCode" ≠ 0) are described in the section "Negative XML replies (Page 262)".

Parameter

Parameter	Type	Values	Description
value_id	Decimal value 0...9	0...4294967295	Unique command identifier.
value_ sourceName	Text	--	Name of the read point. The name is specified using the WBM (refer to the section "The "Settings - Read points" menu item (Page 54)"). In the standard configuration, there is only one read point with the name "Readpoint_1".
value_tagID	Hexadecimal value 0...9, A...F	--	Optional EPC-ID in "RAW Hex Data Format". This function applies to all transpond- ers with this ID. If this parameter is empty or not even transferred, the function applies to all transponders. Nevertheless only one transponder is then permitted in the antenna field. Example of a 96-bit EPC-ID: 3005FB63AC1F3681EC880468 For additional information, refer to the "EPC Global Specification".
value_tagPC	Hexadecimal value 0...9, A...F	--	Optional Tag PC (Protocol Control) 16-bit value represented by four hexa- decimal characters. Example: The value "1234" corresponds to the binary value "0001.0010.0011.0100".
value_lockAction	Boolean value 0, 1	0000000000... 1111111111	"LockAction" is a 10 digit Boolean value. The least significant bits decide the "USER Memory". You will find a full description of the "LockAction" parameter in the "EPC Global Specification".
value_lockMask	Boolean value 0, 1	0000000000... 1111111111	"LockMask" is a 10 digit Boolean value. The least significant bits decide the "USER Memory". You will find a full description of the "LockMask" parameter in the "EPC Global Specification".

Parameter	Type	Values	Description
value_password	Hexadecimal value 0...9, A...F	00000000... FFFFFFFF	Access password for the transponder
value_success	Fixed values	True False	Flag to indicate whether or not the command was successful for this transponder. • True: Command successful • False: Command unsuccessful
value_utcTime	Time	--	Optional UTC time stamp (Universal Time Coordinated) in ISO 8601 format: yyyy-MM-ddTHH:mm:ss.fffzzz e.g.: 2009-12-24T18:34:56.929+00:00.
value_ antennaName	Fixed values	Antenna01 Antenna02 Antenna03 Antenna04	Optional Name of the antenna
value_rSSI	Decimal value 0...9	0...255	Optional RSSI value
value_channel	Decimal value 0...9	1...50	Optional Channel number on which the transponder was detected.
value_power	Decimal value 0...9	0, 5.00...33.00	Optional Used radiated power of the antenna in [dB] Increment: 0.25 dB
value_polarization	Fixed values	Default Circular Linear_vertical Linear_horizontal All	Optional Polarization of the antenna Currently, this parameter can only be set for the internal antenna of the RF685R.
value_ commandRetry	Decimal value 0...9	0...65535	Optional Number of times the reader repeated commands attempting to obtain correct data. "0" corresponds to no attempt. The maximum number of attempts is set using the WBM.

Parameter	Type	Values	Description
value_airRetry	Decimal value 0...9	0...65535	Optional Number of times the reader repeated air interface commands attempting to obtain correct data. "0" corresponds to no attempt. The maximum number of attempts is specified in the reader firmware and cannot be modified.
value_ filterDataAvailable	Fixed values	True False	Optional Indicates whether or not a filter criteri-on was received. • True: No problem All the data was read or there was no filter set. • False: Data could not be read.

10.3.4 Negative XML replies

If problems occur during the execution of the command, the reader reports this to the user application. These error messages always include an event code ≠ 0 and information about the problem.

Reply

```
<frame>
 <reply>
    <id> value_id </id>
    <resultCode> value_resultCode </resultCode>
    <error>
        <name> value_name </name>
        <cause> value_cause </cause>
    </error>
 </reply>
</frame>
```

Parameter

Parameter	Type	Values	Description
value_id	Decimal value 0...9	0...4294967295	Unique command identifier
value_resultCode	Decimal value 0...9	0...65535	Identification number of the error You will find a list of possible return codes in the following table.
value_name	Text	--	Textual description of the error You will find descriptions of the problems in the following table.
value_cause	Text	--	Brief description of the cause of the negative reply.

List of possible result codes

Result code		Name	Description
hex	dec		
0x00	0	NO_ERROR	Positive reply, command processed successfully.
0x13	19	ERROR_MEMORY_OVERRUN	Access outside the addressed memory area.
0x1A	26	ERROR_TAG_LOCKED	The transponder to which data is meant to be written or which should be deactivated is locked.
0x91	145	ERROR_NO_ASWER_FROM_TAG	The transponder is not responding.
0x92	146	ERROR_WRONG_PASSWORD	The password you entered is incorrect. Access to the transponder was denied.
0x93	147	ERROR_VERIFY_TAG_FAILED	Verification of the transponder failed.
0x94	148	ERROR_TAG_UNSPECIFIED	General transponder error.
0x95	149	ERROR_TAG_INSUFFICIENT_ POWER	There is not enough transponder power.
0x22	34	ERROR_TOO_MANY_TAGS	There are too many transponders in the antenna field.
0xA1	161	ERROR_NO_TAG	There is no transponder with the relevant EPC-ID in the antenna field.
0xA2	162	ERROR_NO_DATA	The requested data is not available.
0xA3	163	ERROR_INVALID_CRC	Bad checksum
0xA5	165	ERROR_NO_FREQUENCY	No radio channel activated.
0xA6	166	ERROR_NO_CARRIER	No carrier signal activated.
0xA7	167	ERROR_MORE_THAN_ONE_ TAG_IN_FIELD	There is more than one transponder in the antenna field.
0xA8	168	ERROR_AIR_PROTOCOL_ UNSPECIFIED	General radio protocol error
0x41	65	ERROR_POWER_SUPPLY	Fault in power supply.
0x43	67	ERROR_ANTENNA	An antenna error was detected when executing the command.

Result code		Name	Description
hex	dec		
0x46	70	ERROR_INVALID_READER_ STATUS	The specified command is not permitted in the current reader status.
0xC1	193	ERROR_TAGFIELD_NOT_FOUND	The specified tag field is unknown.
0xCA	202	ERROR_MISCELLANEOUS	A general error has occurred.
0xCB	203	ERROR_CONFIGURATION	A configuration error has occurred.
0x61	97	ERROR_COMMAND_NOT_ SUPPORTED	The command is not supported by the reader or is unknown.
0x63	99	ERROR_PARAMETER_INVALID_ VALUE	A parameter has an invalid value.
0xE1	225	ERROR_PARAMETER_MISSING	A necessary parameter has not been speci-fied.
0xE2	226	ERROR_PARAMETER_INVALID_ FORMAT	A parameter has an incorrect format.
0xE3	227	ERROR_PARAMETER_INVALID_ TYPE	A parameter has the wrong format or the wrong data type.
0xE4	228	ERROR_PARAMETER_NOT_ SUPPORTED	A parameter is not supported by this reader.
0xE5	229	ERROR_WRONG_MESSAGE_ FORMAT	The XML format is incorrect. An error was detected when parsing the command.
0xE6	230	ERROR_INVENTORY_COMMAND_ FAILED	The inventory command failed.
0xE7	231	ERROR_READ_COMMAND_ FAILED	The read command failed.
0xE8	232	ERROR_WRITE_COMMAND_ FAILED	The write command failed.
0xE9	233	ERROR_WRITETAGID_COMMAND_ FAILED	Writing the EPC-ID failed.
0xEA	234	ERROR_LOCK_COMMAND_ FAILED	The Lock command failed.
0xEB	235	ERROR_KILL_COMMAND_ FAILED	The Kill command failed.
0xFA 7	4007	ERROR_READPOINT_NOT_FOUND	The specified read point is inactive because it was not assigned to any antenna.

10.4 XML EventReports

This section describes all the frames that can be sent by the reader to the user application (XML reports). The reports can be transferred reliably or without verification. You will find more information on XML reports in the section "Functionality of the XML interface (Page 185)".

10.4.1 Events

This section describes all events. Events are asynchronous messages sent by the reader containing data acquired by the reader itself.

10.4.1.1 tagEventReport

A triggered read point acquires transponder data that is sent to the user application with a tag event report.

The configuration of the trigger (continuous, I/O level, ...) and the definition of the transponder data (tag fields, RSSI value, ...) to be sent are taken from the stored configuration. These parameters cannot only be changed using the WBM.

The transponder data in every event report is grouped according to the read points.

A reply frame from the user application is necessary only when secure mode is set. A reply frame can, however, also be sent in non-secure mode and this has no negative influence.

Report

```
<frame>
 <report>
    <id> value_id </id>
    <ter>
        <source>
            <sourceName> value_sourceName </sourceName>
            <tag>
                <tagID> value_tagID </tagID>
                <tagPC> value_tagPC </tagPC>                // opt
                <event> value_event </event>                // opt
                <utcTime> value_utcTime </utcTime>             // opt
                <antennaName> value_antennaName </antennaName>  // opt
                <rSSI> value_rSSI </rSSI>              // opt
                <rSSIMin> value_rSSIMin </rSSIMin>             // opt
                <rSSIMax> value_rSSIMax </rSSIMax>             // opt
                <channel> value_channel </channel>     // opt
                <power> value_power </power>           // opt
                <polarization> value_polarization </polarization> // opt
                <inventoried> value_inventoried </inventoried> // opt
                <filterDataAvailable> value_filterDataAvailable
</filterDataAvailable> // opt
```

```
                <tagField>     // opt
                    <fieldName> value_fieldName </fieldName>
                    <bank> value_bank </bank>
                    <startAddress> value_startAddress </startAddress>
                    <dataLength> value_dataLength </dataLength>
                    <data> value_data </data>
                </tagField>    // opt
                <tagField>     // opt
                    …
                </tagField>    // opt
            </tag>
            …
            <tag>     // opt
                …
            </tag>    // opt
        </source>
        <source>       // opt
        …
        </source>      // opt
    </ter>
 </report>
</frame>
```

// opt → Optional: The parameter is transferred depending on the configuration settings (Settings - Communication).

Reply

```
<frame>
 <reply>
    <id> value_id </id>
    <resultCode> 0 </resultCode>
    <ter/>
 </reply>
</frame>
```

The error codes for negative replies ("resultCode" ≠ 0) are described in the section "Negative XML replies (Page 262)".

Parameter

Parameter	Type	Values	Description
value_id	Decimal value 0...9	0...4294967295	Unique command identifier
value_ sourceName	Text	--	Read point name The name is specified using the WBM (refer to the section "The "Settings - Read points" menu item (Page 54)"). In the standard configuration, there is only one read point with the name "Readpoint_1".
value_tagID	Hexadecimal value 0...9, A...F	--	EPC-ID in "RAW Hex Data Format". Example of a 96-bit EPC-ID: 3005FB63AC1F3681EC880468 For additional information, refer to the "EPC Global Specification".
value_tagPC	Hexadecimal value 0...9, A...F	--	Optional Tag PC (Protocol Control) 16-bit value represented by four hexa-decimal characters. Example: The value "1234" corresponds to the binary value "0001.0010.0011.0100".
value_event	Fixed values	New Glimpsed Observed Lost	The transponder events are also generated by a smoothing algorithm in the read point. The algorithms are specified in the WBM. A report can also contain more than one event for the same transponder. Each individual event has its own transponder structure. If a report contains two events for the same transponder, two transponder structures exist with the same "value_tagID" but different values for "value_event".
value_utcTime	Time	--	UTC time stamp (Universal Time Coordinated) in ISO 8601 format: yyyy-MM-ddTHH:mm:ss.fffzzz e.g.: 2009-12-24T18:34:56.929+00:00.
value_ antennaName	Fixed values	Antenna01 Antenna02 Antenna03 Antenna04	Name of the antenna
value_rSSI	Decimal value 0...9	0...255	RSSI value
rSSIMin	Decimal value 0...9	0...255	The lowest RSSI value with which the transponder was detected. This is a value without a unit and without direct reference to the power strength.

Parameter	Type	Values	Description
rSSIMax	Decimal value 0...9	0...255	The highest RSSI value with which the transponder was detected. This is a value without a unit and without direct reference to the power strength.
value_channel	Decimal value 0...9	1...50	Optional Channel number on which the transponder was detected.
value_power	Decimal value 0...9	0, 5.00...33.00	Optional Used radiated power of the antenna in [dB] Increment: 0.25 dB
value_polarization	Fixed values	Circular Vertical Horizontal Unknown	Polarization of the antenna. With external antennas always unknown.
value_inventoried	Decimal value 0...9	0...65535	Optional Indicates how often the transponder was identified via the air interface before it changed to the "Observed" status.
Value_ filterDataAvailable	Fixed values	True False	Optional Indicates whether or not a filter criterion was received. • True: No problem All the data was read or there was no filter set. • False: Data could not be read.
value_fieldName	Text	--	Name of tag field Is specified in the WBM (refer to the section "The "Settings - Tag fields" menu item (Page 66)").
value_bank	--	0...3	Memory bank of the tag field • 0: Reserved • 1: EPC • 2: TID • 3: USER MEMORY
value_ startAddress	Decimal value 0...9	0...65535	Start address of the first byte in the memory bank where reading will start.

Parameter	Type	Values	Description
value_dataLength	Decimal value 0...9	1...510	Number of bytes to be read.
value_data	Hexadecimal value 0...9, A...F	--	Data that should be read. Each byte is represented by two hexadecimal characters. Example: The byte sequence "0x12, 0x34, 0xA3" is represented as the character string "1234A3" in the "value_data" parameter. "value_dataLength" is 3 in this example. If the transponder is identified but the data cannot be read (e.g. if the transponder has no user memory as required), this field remains empty. "value_success" is then set to "False".

10.4.1.2 rssiEventReport

An RSSI event report signals a change in the RSSI values when reading the transponders. RSSI events are generated separately for each antenna.

The data type and amount are specified by the settings in the basic configuration in the WBM.

Report

```
<frame>
 <report>
    <id> value_id </id>
    <rssier>
        <tag>
            <sourceName> value_sourceName </sourceName>
            <tag>
                <tagID> value_tagID </tagID>
                <tagPC> value_tagPC </tagPC>                // opt
                <utcTime> value_utcTime </utcTime>            // opt
                <antennaName> value_antennaName </antennaName>  // opt
                <rSSI> value_rSSI </rSSI>              // opt
                <channel> value_channel </channel>   // opt
                <power> value_power </power>         // opt
                <polarization> value_polarization </polarization> // opt
            </tag>
            …
            <tag>     // opt
                …
            </tag>    // opt
    </rssier>
```

```
 </report>
</frame>
```

// opt → Optional: Depending on the parameter assignment or the amount of data, the line can be omitted.

Reply

```
<frame>
 <reply>
    <id> value_id </id>
    <resultCode> 0 </resultCode>
    <rssier/>
 </reply>
</frame>
```

The error codes for negative replies ("resultCode" ≠ 0) are described in the section "Negative XML replies (Page 262)".

Parameter

Parameter	Type	Values	Description
value_id	Decimal value 0...9	0...4294967295	Unique command identifier
value_tagID	Hexadecimal value 0...9, A...F	--	EPC-ID in "RAW Hex Data Format". Example of a 96-bit EPC-ID: 3005FB63AC1F3681EC880468 For additional information, refer to the "EPC Global Specification".
value_tagPC	Hexadecimal value 0...9, A...F	--	Optional Tag PC (Protocol Control) 16-bit value represented by four hexa-decimal characters. Example: The value "1234" corresponds to the binary value "0001.0010.0011.0100".
value_utcTime	Time	--	UTC time stamp (Universal Time Co-ordinated) in ISO 8601 format: yyyy-MM-ddTHH:mm:ss.fffzzz e.g.: 2009-12-24T18:34:56.929+00:00.
value_ antennaName	Fixed values	Antenna01 Antenna02 Antenna03 Antenna04	Name of the antenna

Parameter	Type	Values	Description
value_rSSI	Decimal value 0...9	0...255	RSSI value This is a value without a unit and without direct reference to the power strength.
value_channel	Decimal value 0...9	1...50	Optional Channel number on which the transponder was detected.
value_power	Decimal value 0...9	0, 5.00...33.00	Optional Used radiated power of the antenna in [dB] Increment: 0.25 dB
value_polarization	Fixed values	Circular Vertical Horizontal Unknown	Polarization of the antenna. With external antennas always unknown.

10.4.1.3 ioEventReport

An I/O event report signals changes at an input or output.

In the WBM, the sending of I/O events can be configured. You will find more information on events in the section "The "Settings - Communication" menu item (Page 74)".

Report

```
<frame>
 <report>
    <id> value_id </id>
    <ioer>
        <io>
            <ioName> value_ioName </ioName>
            <ioEvent> value_ioEvent </ioEvent>
            <utcTime> value_utcTime </utcTime>
        </io>
        <io>     // opt
        …
        </io>    // opt
    </ioer>
 </report>
</frame>
```

// opt → Optional: Line can be omitted.

Reply

```
<frame>
 <reply>
    <id> value_id </id>
    <resultCode> 0 </resultCode>
    <ioer/>
 </reply>
</frame>
```

The error codes for negative replies ("resultCode" ≠ 0) are described in the section "Negative XML replies (Page 262)".

Parameter

Parameter	Type	Values	Description
value_id	Decimal value 0...9	0...4294967295	Unique command identifier
value_ioName	Fixed values	Inport00 Inport01 Inport02 Inport03 Outport00 Outport01 Outport02 Outport03	Name of IO port
value_ioEvent	Fixed values	High Low	Indicates the new status of the in-put/output.
value_utcTime	Time	--	UTC time stamp (Universal Time Co-ordinated) in ISO 8601 format: yyyy-MM-ddTHH:mm:ss.fffzzz e.g.: 2009-12-24T18:34:56.929+00:00.

10.4.2 Interrupts

This section describes all alarms. Alarms are asynchronous messages and are used as status, warning or error messages of the reader.

The meaning of an alarm is indicated by the error number and other optional parameters.

Report

```
<frame>
 <alarm>
    <id> value_id </id>
    <error>
        <utcTime>value_utcTime </utcTime>
        <errorNumber>value_errorNnumber </errorNumber>
        <errorText>value_errorText </errorText>
        <eventType>value eventType </eventType>    // opt
        <paramXY>value_param_xy </paramXY>         // opt
        …
    </error>
 </alarm>
</frame>
```

// opt → Optional: Depending on the parameter assignment or the amount of data, the line can be omitted.

Reply

```
<frame>
 <reply>
    <id> value_id </id>
    <resultCode> 0 </resultCode>
    <error/>
 </reply>
</frame>
```

The error codes for negative replies ("resultCode" ≠ 0) are described in the section "Negative XML replies (Page 262)".

Parameter

Parameter	Type	Values	Description
value_id	Decimal value 0...9	0...4294967295	Unique command identifier
value_ errorNumber	Decimal value 0 - 9	0...65535	Error number You will find a list of error numbers in the following table.

Parameter	Type	Values	Description
value_utcTime	Text	--	UTC time stamp (Universal Time Co-ordinated) in ISO 8601 format: yyyy-MM-ddTHH:mm:ss.fffzzz e.g.: 2009-12-24T18:34:56.929+00:00.
value_errorText	Text	--	Message text of the alarm
Value_eventType	Text	Coming Going	Status display Some alarms have a simple status indication. This indicates whether the error occurred and is still present or whether it has been eliminated.
value_paramXY	Text	--	Additional parameter The name of the parameter depends on the error. Depending on the error number, an alarm contains a different number of parameters.

List of possible alarm messages

Error number		Description
hex	dec	
0x1511	5393	ERROR_NO_ANSWER_FROM_TAG The transponder is not responding.
0x1512	5394	ERROR_WRONG_PASSWORD The password you entered is incorrect. Access to the transponder was denied.
0x1513	5395	ERROR_VERIFY_TAG_FAILED Verification of the transponder failed.
0x1514	5396	ERROR_TAG_UNSPECIFIED General transponder error.
0x1515	5397	ERROR_TAG_INSUFFICIENT_POWER There is not enough transponder power.
0x1521	5409	ERROR_NO_TAG There is no transponder in the antenna field.
0x1522	5410	ERROR_NO_DATA The requested data is not available.
0x1523	5411	ERROR_INVALID_CRC Bad checksum
0x1525	5413	ERROR_NO_FREQUENCY No radio channel activated.
0x1526	5414	ERROR_NO_CARRIER No carrier signal activated.
0x1527	5415	ERROR_MORE_THAN_ONE_TAG_IN_FIELD There is more than one transponder in the antenna field.
0x1528	5416	ERROR_AIR_PROTOCOL_UNSPECIFIED General radio protocol error

Error number		Description
hex	dec	
0x1599	5529	ERROR_WRONG_TYPE_OR_VERSION_ANTENNA_1 Wrong antenna type or wrong antenna version at connector ANT 1.
0x159A	5530	ERROR_WRONG_TYPE_OR_VERSION_ANTENNA_2 Wrong antenna type or wrong antenna version at connector ANT 2.
0x159B	5531	ERROR_WRONG_TYPE_OR_VERSION_ANTENNA_3 Wrong antenna type or wrong antenna version at connector ANT 3.
0x159C	5532	ERROR_WRONG_TYPE_OR_VERSION_ANTENNA_4 Wrong antenna type or wrong antenna version at connector ANT 4.
0x154A	5450	General error
0x154D	5453	Internal firmware error
0x1567	5479	ERROR_READ_COMMAND_FAILED The read command failed.
0x1591	5521	Antenna error at connector ANT 1
0x1592	5522	Antenna error at connector ANT 2
0x1593	5523	Antenna error at connector ANT 3
0x1594	5524	Antenna error at connector ANT 4
0x7B71	31601	"Overflow - Alarms": Send buffer for "Interrupts" is full. Interrupt messages can be discarded until the next "Interrupt" is received.
0x7B73	31603	"Overflow - TagEventReports": Send buffer for "TagEventReports" is full. Data can be lost until the next "TagEventReport" is received.
0x9BFD	39933	ERROR_PARAMETER_INVALID_VALUE A parameter has an invalid value.
0x9CC5	40133	ERROR_ANTENNA An antenna error was detected when executing the command.
0x9CC7	40135	Power supply error. The power supply is very close to the low limit.
0x9D8E	40334	ERROR_TOO_MANY_TAGS There are too many transponders in the antenna field.
0x9DF1	40433	ERROR_MEMORY_OVERRUN Access outside the addressed memory area.
0x9DEA	40426	ERROR_TAG_LOCKED The transponder to which data is meant to be written or which should be deac-tivated is locked.
0x7A152	500050	Connection attempt failed.
0x7A153	500051	Configuration successfully loaded.
0x7A154	500052	Connection established.
0x7A155	500053	Connection interrupted.

Programming via the OPC UA interface 11

This section is intended only for OPC UA users.

This section describes the use of the OPC UA interface.

Description of OPC UA

OPC UA is a standardized communications protocol. It allows data exchange between all types of industrial devices that support OPC UA and that are integrated in the same network. In this context, devices that provide or publish data, information and command calls are known as OPC UA servers. Devices that use this data, information and these command calls are known as OPC UA clients.

The standard "OPC Unified Architecture for AutoID Companion Specification" was defined by the organizations "AIM Germany" and "OPC Foundation". This describes the connection of identification devices via OPC UA. The identification devices can be subdivided as follows:

- Text recognition devices (OCR)
- Optical readers (e.g. barcode),
- RFID readers and
- Devices for localization (RTLS).

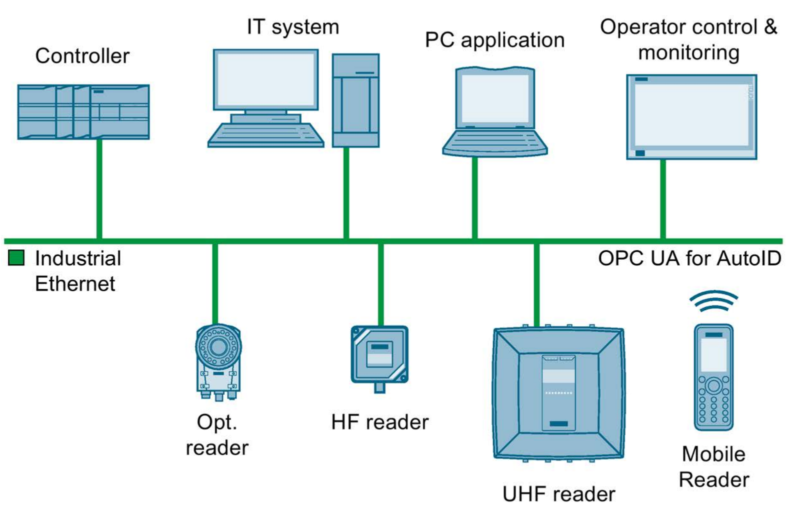


Figure 11-1 Identification devices in an OPC UA network

All SIMATIC RF600 readers have OPC UA servers implemented with a range of functions defined by "OPC Unified Architecture for AutoID". For this "OPC Unified Architecture for AutoID" defines the "AutoIdDevice" and derived from this the "RfidReaderDevice". With the RF600 readers, each read point stands for an independent "AutoIdDevice" or "RfidReaderDevice".

Supported methods functions

OPC UA basic methods / functions

The integrated OPC UA servers of the readers of the SIMATIC RF600 product family support the following OPC UA basic methods / functions:

- OPC UA server basic functions according to the "Embedded UA Server Profile" of the OPC UA Foundation
  - As an extension of the "Embedded UA Server Profile" the "Standard Event Subscription Server Facet".
  - As an extension of the "Embedded UA Server Profile" the "SecurityPolicy - Basic256"
  - As an extension of the "Embedded UA Server Profile" the "SecurityPolicy - Basic 256Sha256"
  - As an extension of the "Embedded UA Server Profile" maximum of 5 OPC UA client connections
- "Full AutoID Server Facet" according to the specification "OPC Unified Architecture for AutoID".

  Each read point stands for an independent "AutoIdDevice" or "RfidReaderDevice".
- The maximum 5 permitted OPC UA client connections are not dependent on the number of configured read points.

  Several clients can also work with one read point.

RFID-specific methods / functions

The integrated OPC UA servers of the readers of the SIMATIC RF600 product family support the following RFID-specific methods / functions per read point:

Table 11- 1 RFID-specific methods / functions

OPC UA methods		
	Scan, ScanStart, ScanStop	Triggering the read points to start inventories.
	KillTag	Destroy transponders
	LockTag	Lock areas on the transponder
	SetTagPassword	Set transponder-specific passwords
	ReadTag	Read out transponder data
	WriteTag	Write transponder data
OPC UA events		
	RfidScanEventType	Receive TagEvents and RssiEvents
OPC UA variables		
	DeviceStatus	Device status of the RFID reader
	LastScanStatus	Last seen/processed transponder of the RFID reader
	IO-Data	DigitalInputs Digital inputs of the reader DigitalOutputs Digital outputs of the reader
	Runtime parameters	RfPower Radiated power of the antenna MinRSSI RSSI threshold of the read point

Note

OPC UA does not support alarm messages

Note that OPC UA does not support alarm messages such as "Antenna error" or "Undervoltage".

You will find more information on OPC UA on the pages of the "OPC Foundation (https://opcfoundation.org/)". The Companion Specification "OPC UA for AutoID" can be obtained via the "AIM Germany (www.aim-d.de)".

Service and maintenance 12

12.1 Diagnostics

You have the following diagnostics options available for the reader:

- via the LED status displays of the reader

  for RF650R/RF680R/RF685R
- using the WBM

  for RF650R/RF680R/RF685R
- using the TIA Portal (STEP 7 Basic / Professional V13 or higher)

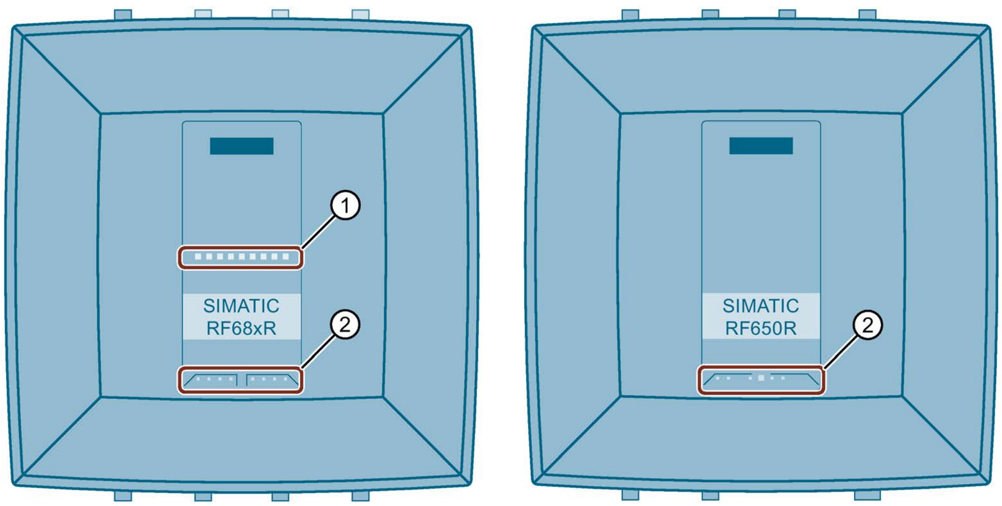
  for RF680R/RF685R

These alternative methods are described below.

12.1.1 Diagnostics via the LED displays

Note that the RF650R reader does not provide an LED status display. With the help of the LED displays, you can recognize the reader status and the error messages of the RF680R/RF685R readers.

The LED status display is in the middle on the front of the reader. The LED operating display it is at the bottom on the front of the reader.



① LED status display (ST1 - ST9) - RF680R/RF685R only

② LED operating display

• RUN/STOP (R/S)	Shows whether the reader is ready for operation.
• ERROR (ER)	Indicates whether an error has occurred.
• MAINTENANCE (MAINT) - RF680R/RF685R only	Shows whether the reader needs maintenance.
• POWER (PWR)	Shows whether the reader is supplied with power.
• PRESENCE (PRE) - RF650R only	Among other things, indicates whether or not there are multiple transponders in the antenna field. With the RF680R/RF685R readers, this is displayed with the status display.
• LINK 1 (LK1)	Indicates that there is a connection via Ethernet interface "1".
• RECEIVE/TRANSMIT 1 (R/T1)	Indicates that data is being sent and/or received via Ethernet interface "1".
• LINK 2 (LK2) - RF680R/RF685R only	Indicates that there is a connection via Ethernet interface "2".
• RECEIVE/TRANSMIT 2 (R/T2) - RF680R/RF685R only	Indicates that data is being sent and/or received via Ethernet interface "2".

Figure 12-1 LED displays of the reader

Functions of the LED status bar (RF680R/RF685R)

With the LED operating display, you can read out the various operational statuses of the readers. The LED status display of the RF680R and RF685R readers has several functions. Among other things, the status display performs the following functions:

- Starting up the reader

  The startup process of the reader is displayed by a status bar lit yellow. After the basic Initialization, the reader requires several seconds before it is operational. This phase is indicated by a status bar flashing yellow. During a firmware update, the startup takes longer.

  The reader is ready for operation when the "R/S" LED is lit/flashes green. If the "R/S" LED is flashing, the reader is waiting for a connection. If the "R/S" LED is lit constantly, the reader is connected to the controller or PC.

- Error display

  If there is an error, the actual error is indicated by the lighting/flashing pattern. The "ER" LED of the LED operating display also flashes. You will find more information on error messages in the section "Error messages (Page 288)".

- Display of RF activity

  Indicates whether or not the reader is sending via the antenna (constant green), whether or not transponders were detected by the reader (flashing yellow) and whether or not a transponder was sent to the user application (constant yellow).

- Indication of the quality of the antenna alignment (RSSI)

  When aligning the antenna, using the WBM, the status display indicates the RSSI value with which the transponder was detected. You will find more information on the antenna alignment in the section "The "Settings - Adjust antenna" menu item (Page 84)".

12.1.2 Diagnostics via LED display elements

The operating statuses of the reader are displayed by the "RUN/STOP", "ERROR", "MAINTENANCE" and "PRESENCE" LEDs. The LEDs can adopt the colors green, red or yellow and the statuses off , on , flashing :

Table 12- 1 Display of operating statuses

R/S	ER	MAINT [1]	PRE [2]	Meaning
				The device is turned off.
				The device is starting up.
		--	--	The device is ready for operation. The connection to the XML application or S7 CPU is not established or the connection is established but there is an error.
		--	--	The device is ready for operation. The connection to the XML application or S7 CPU is established.
		--	--	The device is working. • STEP 7, Ethernet/IP: The "writeconfig" command was received. • XML application, OPC UA: The "hostGreeting" command was received.
				Flash test for reader identification.
--		--	--	There is an error. You will find more information on error messages in the section "RF650R/RF680R/RF685R error messages (Page 290)".
--		--	--	The network load too high. The functioning of the device is being disturbed due to receiving too many network packets.
--	--	--		The antenna is switched on. There is no transponder in the antenna field.
--	--	--		There is at least one transponder in the antenna field.
--	--	--		One or more transponders have been detected as valid.

1) Only exists with RF680R/RF685R.

2) Only exists with RF650R.

12.1.3 Diagnostics via SNMP

Using the SNMP, you have extensive diagnostics options for the network functions of the reader. The following diagnostics options (MIBs) are supported by the readers:

- RFC1213 MIB II (system, interfaces, ip, icmp, tcp, udp, snmp)
- LLDP-MIB
- MRP-MIB
- Automation-MIB

The readers support the SNPv1 protocol. When supplied from the factory SNMP is deactivated and needs to be activated prior to using it the first time (see section "The "Settings - Communication" menu item (Page 74)").
You will find detailed information on using SNMP and in particular the structure of the Automation MIB in the diagnostics manual "Network management diagnostics and configuration with SNMP (https://support.industry.siemens.com/cs/ww/en/view/103949062)".

See also

Network management diagnostics and configuration with SNMP (https://support.industry.siemens.com/cs/ww/en/view/103949062)

12.1.4 Diagnostics using the WBM

Using the WBM, you have extensive diagnostics options. The various diagnostics options are described below.

Tag monitor

Using "Tag monitor", you can read out how well which transponder was identified using which antenna. on the basis of this information, you can then adapt the various parameters and optimize the read procedure. You will find further information on the "Tag monitor" in the section "The "Diagnostics - Tag monitor" menu item (Page 91)".

Log

In the "Log" menu, you will find all the diagnostics messages of the reader that have occurred. The log helps SIEMENS specialists to analyze errors. You will find further information on the "Log" in the section "The "Diagnostics - Log" menu item (Page 95)".

Messages

In the "Messages" menu item, you will find all the messages (error messages, warnings and system errors) of the WBM that have occurred. You will find more information on the "Messages" in the section "The "Diagnostics - Messages" menu item (Page 97)".

12.1.5 Diagnostics using the TIA Portal (STEP 7 Basic / Professional)

This section is intended only for S7 users (RF680R/RF685R).

Remember that you can only run diagnostics on RF680R/RF685R readers using the TIA Portal.

Note

Diagnostics of the readers with the TIA Portal for PROFIBUS operation

You will find information on diagnostics the communications module you are using for PROFIBUS operation in the manual of the relevant communications module.

Requirements

The reader is connected to the PC via Industrial Ethernet or PROFINET.

Procedure

Follow the steps below to read out the diagnostics status of the reader using the TIA Portal:

1. Start the TIA Portal.
2. Open your existing project and change to the project view.
3. Change to the network view.
4. Right-click on the required reader and select the "Online & diagnostics" entry in the shortcut menu.

5. Make sure that you are connected online to the reader.
6. Select the "Diagnostics" option.

   In the diagnostics window, you have the following options for diagnosing the reader:

   – The identifier and the firmware version of the reader are displayed below the "General" entry.

   – Under the "Diagnostic status" entry, you can see current status information of the reader.

   – Below the "PROFINET interface" entry, you will find status information and further information about the PROFINET interface.

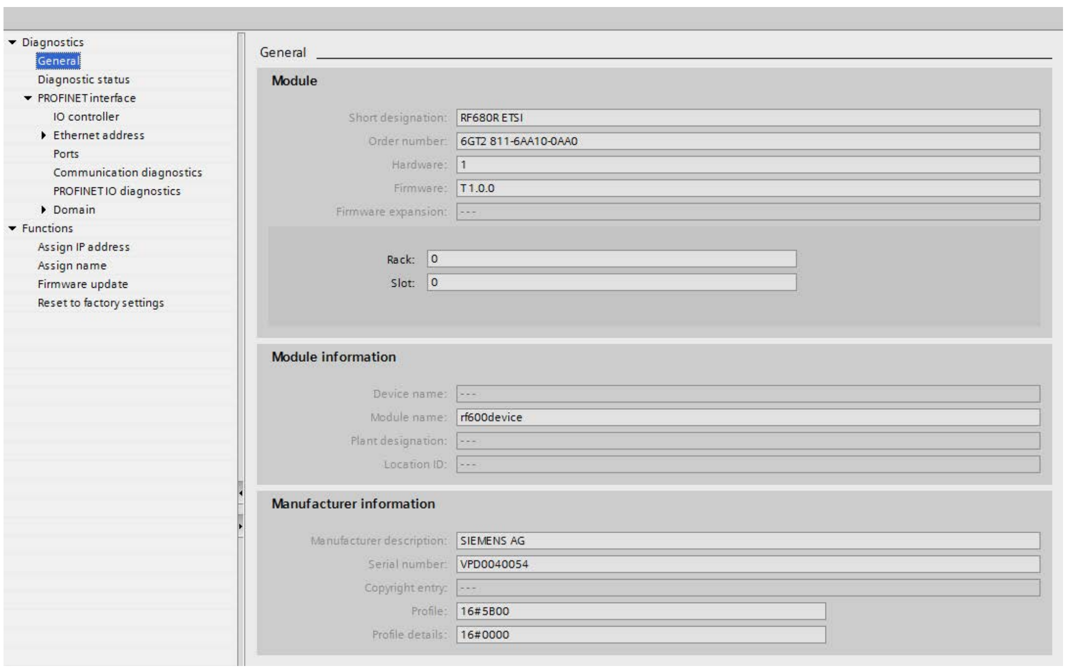


Figure 12-2 The Diagnostics window

Diagnostics with enabled diagnostics interrupt messages

If diagnostics interrupt messages are enabled, the error messages are stored in the CPU diagnostics buffer in plain text. You can further process these messages with the appropriate function blocks, e.g. so that they are forwarded to an HMI.

Channel diagnostics is also available. This displays pending diagnostics information in plain text. You can see this by right clicking on the module "RFID communication" in the device overview of the reader and clicking the entry "Online & Diagnostics" in the shortcut menu.

12.1.6 Diagnostics using Studio 5000 Logix Designer

This section is intended only for users of Rockwell controllers (RF680R/RF685R).

You will find information on diagnostics using the Studio 5000 Logix Designer in the Studio 5000 Logix Designer manual.

12.2 Error messages

You have the following options for error analysis of the modules:

- via the LED status display of the reader

  for RF680R/RF685R
- XML error messages

  for RF650R/RF680R/RF685R

  You will find more information on XML error messages in the section "Interrupts (Page 273)".
- STEP 7 - block error messages

  for RF680R/RF685R
- using the WBM

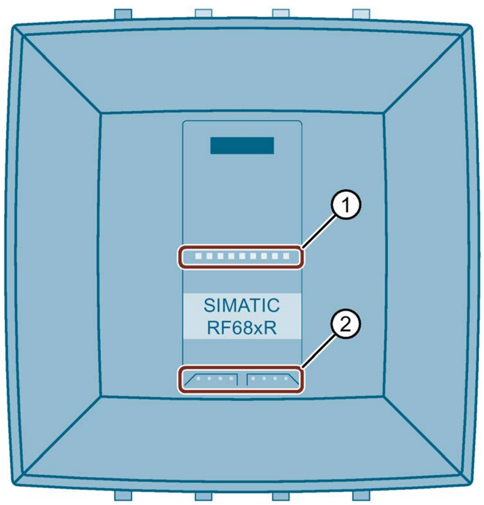
  for RF650R/RF680R/RF685R

These alternative methods are described below.

12.2.1 How the LED status display works

Note that the RF650R reader does not provide an LED status display. The LED status display displays the error messages of the RF680R/RF685R readers.

The LED status display is in the middle on the front of the reader. The LED operating display is at the bottom on the front of the reader.



① LED status display (ST1 - ST9)

② LED operating display

Figure 12-3 LED displays of the RF680R/RF685R readers

Error messages are indicated by red flashing status LEDs and the red flashing "ER" LED. A distinction is made between hardware errors (faults) and normal errors. With hardware errors, the LEDs flash with a fast frequency of 4 Hz. With all other errors, the LEDs flash with a slow frequency of 2 Hz.

The detailed LED error display described here is enabled as default. If required, you can disable this in the "Settings - General" menu item of the WBM. If the LED error display is enabled, a separate LED pattern is assigned to every error in the LED status display. The displayed LED patterns are based on the error code of the hexadecimal error message converted to binary.

Example

The error "0x12" (XML error message) is displayed. Converted to binary, this results in the value "0001 0010". This converted value is displayed in the LED status display. The value "0" means that the corresponding LED does not light up, whereas the value "1" means that the corresponding LED is lit red. The middle (5th LED) of the LED status display serves as a "delimiter" and is always lit yellow.

XML error message hexadecimal	Error message binary	LED fault display
0x12	0001 0010	

12.2.2 RF650R/RF680R/RF685R error messages

Note that if there are error messages, the error LED ("ER") of the reader flashes. You can read out the error using the XML or STEP 7 block error codes. As an alternative, you can also recognize the error using the LED status display of the RF680R and RF685R readers as described in the section "How the LED status display works (Page 289)".

The following table lists only the STEP 7 block error codes specific to the RF680R/RF685R.

Table 12- 2 Error messages of the RF650R, RF680R and RF685R readers

"ER" LED	XML/ LED (hex)	S7 block (hex)	Error description
2 Hz	0x11	0xE1FE01	Memory of the transponder cannot be written to • Transponder memory is defective. • Transponder EEPROM was written too frequently and has reached the end of its service life
2 Hz	0x12	0xE1FE02	Presence error The transponder is no longer within the transmission window of the reader. The command was not or only partially executed. Read command: There is no valid data in "IDENT_DATA". Write command: The transponder that has just left the antenna field contains an incomplete data record. Possible causes: • Operating distance between reader and transponder is not being maintained. • Configuration error: The data record to be processed is too large (in dynamic mode).
2 Hz	0x13	0xE1FE03	Address error The address area of the transponder has been exceeded. Possible causes: • Start address of the command start has been incorrectly set. • Wrong transponder type • The area to be written to is write-protected.
2 Hz	0x1A	0xE1FE0A	The transponder is read/write-protected.
2 Hz	0x91	0xE1FE81	The transponder is not responding.
2 Hz	0x92	0xE1FE82	The transponder password is incorrect. Access is denied.
2 Hz	0x93	0xE1FE83	The verification of the written transponder data has failed.
2 Hz	0x94	0xE1FE84	General transponder error
2 Hz	0x95	0xE1FE85	The transponder has too little power to execute the command.
2 Hz	0x22	0xE2FE02	More transponders are located in the transmission window than can be processed at the same time by the reader.
2 Hz	0xA1	0xE2FE81	There is no transponder with the required EPC-ID in the transmission window or there is no transponder at all in the antenna field.
2 Hz	0xA2	0xE2FE82	The requested data is not available.
2 Hz	0xA3	0xE2FE83	The transponder signals a CRC error.
2 Hz	0xA4	0xE2FE84	The selected antenna is not enabled.
2 Hz	0xA5	0xE2FE85	The selected frequency is not enabled.

"ER" LED	XML/ LED (hex)	S7 block (hex)	Error description
2 Hz	0xA6	0xE2FE86	The carrier signal is not activated.
2 Hz	0xA7	0xE2FE87	There is more than one transponder is in the transmission window.
2 Hz	0xA8	0xE2FE88	General radio protocol error
4 Hz	0x41	0xE4FE01	Error in power supply The power supply is very close to the low limit.
4 Hz	0x43	0xE4FE03	Antenna error • The antenna or the antenna cable is defective. • Error in the connection to the reader; the reader is not answering (in PROFIBUS operation). – The cable between the communications module and reader is wired incorrectly or there is a cable break – The 24 V supply voltage is not connected or is turned off or has failed briefly – Automatic fuse on the communications module has blown – Hardware defect – Another reader is in the vicinity and is active – There is a reflecting metal surface in the vicinity that is disrupting the antenna field – Execute "init_run" after correcting the error
2 Hz	0x44	0xE4FE04	The buffer on the communications module or reader is not adequate to store the command temporarily.
2 Hz	0x45	0xE4FE05	The buffer on the communications module or reader is not adequate to store the data temporarily.
2 Hz	0x46	0xE4FE06	The command is not permitted in this status or is not supported. Possible cause: • "INIT" was chained. • Command repetition was started without "Presence mode".
2 Hz	0x47	0xE4FE07	Startup message from reader/communications module The reader or communications module was off and has not yet received a "Reset_Reader" ("WRITE-CONFIG") command. • Execute "INIT" • The same physical address in the "IID_HW_CONNECT" parameter is being used more than once. Check your "IID_HW_CONNECT" parameter settings. • Check connection to the reader • The baud rate was switched over but power has not yet been cycled
2 Hz	0xC1	0xE4FE81	The specified tag field of the transponder is unknown.
2 Hz	0xCA	0xE4FE8A	General error
2 Hz	0xCB	0xE4FE8B	No or bad configuration data/parameters were transferred. Possible cause: • You are accessing an unconfigured read point.

"ER" LED	XML/ LED (hex)	S7 block (hex)	Error description
--	0xCC	0xE4FE8C	• Communication error between Ident profile and communications module. Handshake error. – UDT of this communications module is overwritten by other program sections – Check parameter settings of communications module in the UDT – Check the Ident profile command that caused this error – Start "INIT" after correcting the error • Backplane bus / PROFIBUS DP / PROFINET error occurred This error is only indicated when access monitoring has been enabled in the PROFIBUS configuration. – Backplane bus / PROFIBUS DP / PROFINET bus connection was interrupted (wire break on the bus; bus connector on the communications module was briefly unplugged) – Backplane bus / PROFIBUS DP / PROFINET master no longer addressing communications module – Execute "INIT" – The communications module has detected a frame interruption on the bus. The backplane bus, PROFIBUS or PROFINET may have been reconfigured (e.g. with HW Config or TIA Portal)
2 Hz	0xCD	0xE4FE8D	• Firmware error Possible cause: The firmware update was not run completely. • Internal communications error of the communications module/reader – Connector contact problem on the communications module / reader – Hardware of the communications module / reader has a defect; → Send in communications module / reader for repair – Start "INIT" after correcting the error • Internal monitoring error of the communications module/reader – Program execution error on the communications module / reader – Turn the power supply of the communications module/reader off and on again – Start "INIT" after correcting the error
2 Hz	0xCE	0xE4FE8E	The current command was aborted by the "WRITE-CONFIG" ("INIT" or "SRESET") command for the bus connector was pulled. Possible causes: • Communication with the transponder was aborted by "INIT". • This error can only be reported if there is an "INIT" or "SRESET".
2 Hz	0x51	0xE5FE01	Incorrect sequence number order (SN) on the reader/communications module.
--	0x52	0xE5FE02	Incorrect sequence number order (SN) in the Ident profile
2 Hz	0x54	0xE5FE04	Invalid data block number (DBN) on the reader/communications module
--	0x55	0xE5FE05	Invalid data block number (DBN) in the Ident profile
2 Hz	0x56	0xE5FE06	Invalid data block length (DBL) on the reader/communications module
--	0x57	0xE5FE07	Invalid data block length (DBL) in the Ident profile

"ER" LED	XML/ LED (hex)	S7 block (hex)	Error description
2 Hz	0x58	0xE5FE08	The previous command is still active or the buffer is full. A new command was sent to the reader or communications module although the last command is still active. • The active command can only be aborted with "INIT". • Before a new command can be started, "DONE bit = 1" must be set (exception: "INIT"). • Two Ident profile calls had the same "HW_ID", "CM_CHANNEL" and "LADDR" parameter settings. • Two Ident profile calls are using the same pointer. • After eliminating the error, an "INIT" must be executed. • When working with command repetition (e.g., fixed code transponder), no data is being fetched from the transponder. The data buffer on the reader/communications module has overflowed. Transponder data has been lost.
--	0x59	0xE5FE09	The reader/communications module runs a hardware reset ("INIT_ACTIVE" set to "1"). The Ident profile expects an "INIT" (bit 15 in the cyclic control word).
--	0x5A	0xE5FE0A	The "CMD" command code and the relevant acknowledgement do not match. This can be a software error or synchronization error that cannot occur in normal operation.
--	0x5B	0xE5FE0B	Incorrect sequence of acknowledgement frames (TDB / DBN)
--	0x5C	0xE5FE0C	Synchronization error (incorrect increment of AC_H / AC_L and CC_H / CC_L in the cyclic control word). "INIT" had to be executed.
--	--	0xE5FE81	Communications error between reader and communications module Access denied
--	--	0xE5FE82	Communications error between reader and communications module Resource is occupied
--	--	0xE5FE83	Communications error between reader and communications module Functional error of the serial interface
--	--	0xE5FE84	Communications error between reader and communications module Other faults/errors
2 Hz	0x61	0xE6FE01	Unknown command An uninterpretable XML command was sent to the reader or the Ident profile sends an uninterpretable command to the reader. Possible causes: • The "AdvancedCmd" block was supplied with an incorrect "CMD". • The "CMD" input of the "AdvancedCmd" block was overwritten.
--	0x62	0xE6FE02	Invalid command index (CI)

"ER" LED	XML/ LED (hex)	S7 block (hex)	Error description
2 Hz	0x63	0xE6FE03	• A parameter of an XML command has an invalid value or the parameter assignment of the communications module or the reader was incorrect. Possible causes / action to be taken: – Check the parameters in the Ident profile. – Check the relevant XML command. – Check the parameter assignment in HW Config / STEP 7 (TIA Portal). – The "WRITE-CONFIG" command has incorrect parameter settings. – After a startup, the reader or communications module has still not received an INIT". • The parameter assignment of the reader or communications module on PROFIBUS/PROFINET was incorrect and the command cannot be executed. Possible causes / action to be taken: – Length of the input/output areas is too small for the cyclic I/O word. – Check whether you have used the correct GSD file. – User data length set with the command (e.g. "READ") is too high. • Error when processing the command. Possible causes / action to be taken: – The data in "AdvancedCmd" or "IID_CMD_STRUCT" is incorrect (e.g. "WRITE" command with length = 0). Check "AdvancedCmd" or "IID_CMD_STRUCT" and execute an "INIT". – The hardware of the reader/communications module is defective. The reader or communications module receives bad data with an "INIT". – The AB byte does not match the user data length. • The wrong reset block was selected. Possible causes / action to be taken: – Regardless of the selected reader system, use the "Reset_Reader" function block.
--	0x64	0xE6FE04	Presence error A transponder has passed through the transmission window of a reader without being processed. • This error message is not reported immediately. Instead, the reader or communications module waits for the next write / read command. This command is replied to immediately with this error and the write/read command is not executed. The next command is executed normally again by the reader/communications module. • You can reset this error status using an "INIT". • Bit 2 is set in the "OPT1" parameter and there is no transponder in the transmission window.
--	0x65	0xE6FE05	An error has occurred that makes a Reset_Reader ("WRITE-CONFIG" with "Config = 3") necessary. Possible causes / action to be taken: • The "WRITE-CONFIG" command is incorrect. • After eliminating the error, execute an "INIT". • Check the "IID_HW_CONNECT" parameter.

"ER" LED	XML/ LED (hex)	S7 block (hex)	Error description
--	0x66	0xE6FE06	The reset timer has expired.
2 Hz	0xE1	0xE6FE81	A parameter is missing.
2 Hz	0xE2	0xE6FE82	The parameter has an invalid format.
2 Hz	0xE3	0xE6FE83	The parameter type is invalid.
2 Hz	0xE4	0xE6FE84	Unknown parameter.
2 Hz	0xE5	0xE6FE85	The command or the frame has an invalid format.
2 Hz	0xE6	0xE6FE86	The inventory command failed.
2 Hz	0xE7	0xE6FE87	Read access to the transponder has failed.
2 Hz	0xE8	0xE6FE88	Write access to the transponder has failed.
2 Hz	0xE9	0xE6FE89	Writing the EPC-ID on the transponder has failed.
2 Hz	0xEA	0xE6FE8A	Enabling write protection on the transponder has failed.
2 Hz	0xEB	0xE6FE8B	The "Kill" command failed.
2 Hz	0x71	0xE7FE01	In this status, only the "Reset_Reader" command ("WRITE-CONFIG") is permitted.
--	0x72	0xE7FE02	The "CMD" command code is not permitted.
--	0x73	0xE7FE03	The "LEN_DATA" parameter of the command is too long and does not match the global data reserved within the send data buffer (TXBUF).
--	0x74	0xE7FE04	The receive data buffer (RXBUF) or the send data buffer (TXBUF) is too small, the buffer created at TXBUF/RXBUF does not have the correct data types or the parameter "LEN_DATA" as a negative value. Possible cause / action to be taken: • Check whether the buffers TXBUF/RXBUF are at least as large as specified in LEN_DATA. • With S7-1200/1500: – In the Ident profile, only an "Array of Byte" may be created for TXBUF and RXBUF. – In the "Reader_Status" block, only an "Array of Byte" or the corresponding data types ("IID_TAG_STATUS_XX_XXX" or "IID_READER_STATUS_XX_XXX") may be created
--	0x75	0xE7FE05	Error message that informs you that only an "INIT" command is permitted as the next command. All other commands are rejected.
--	0x76	0xE7FE06	Wrong index Permitted index is in the ranges "101 ... 108" and "-20401 ... -20418".
--	0x77	0xE7FE07	The reader or communications module does not respond to "INIT" ("INIT_ACTIVE" is expected in the cyclic status message). The next steps: • Check the address parameter "LADDR".
--	0x78	0xE7FE08	Timeout during "INIT" (60 seconds according to "TC3WG9")
--	0x97	0xE7FE09	Command repetition is not supported.
--	0x7A	0xE7FE0A	Error during the transfer of the PDU (Protocol Data Unit).

"--" means that the error is not displayed by the LEDs.

12.2.3 OPC UA error messages

The following table lists the OPC UA-specific error codes.

Table 12- 3 OPC UA error messages of the RF680R and RF685R readers

XML/ LED (hex)	OPC UA status	AutoId status	AutoId text	Error description
0x13	good	7	OUT_OF_RANGE_ ERROR	Address error The address area of the transponder has been exceeded. Possible causes: • Start address of the command start has been incorrectly set. • Wrong transponder type • The area to be written to is write-protected.
0x1A	good	3	PERMISSON_ ERROR	The transponder is read/write-protected.
0x91	good	19	RF_COMMUNICATION_ ERROR	The transponder is not responding.
0x92	good	4	PASSWORD_ ERROR	The transponder password is incorrect. Access is denied.
0x93	good	19	RF_COMMUNICATION_ ERROR	The verification of the written transponder data has failed.
0x94	good	19	RF_COMMUNICATION_ ERROR	General transponder error
0x95	good	19	RF_COMMUNICATION_ ERROR	The transponder has too little power to execute the command.
0x22	good	9	MULTIPLE_ IDENTIFIERS	More transponders are located in the transmission window than can be processed at the same time by the reader.
0xA1	good	8	NO_ IDENTIFIER	There is no transponder with the required EPC-ID in the transmission window or there is no transponder at all in the antenna field.
0xA2	good	7	OUT_OF_ RANGE_ERROR	The requested data is not available.
0xA3	good	19	RF_COMMUNICATION_ ERROR	The transponder signals a CRC error.
0xA4	--	--	--	The selected antenna is not enabled.
0xA5	good	19	RF_COMMUNICATION_ ERROR	The selected frequency is not enabled.
0xA6	good	19	RF_COMMUNICATION_ ERROR	The carrier signal is not activated.
0xA7	good	9	MULTIPLE_ IDENTIFIERS	There is more than one transponder in the transmission window.
0xA8	good	19	RF_COMMUNICATION_ ERROR	General radio protocol error

XML/ LED (hex)	OPC UA status	AutoId status	AutoId text	Error description
0x41	good	20	DEVICE_FAULT	Fault in power supply The power supply is very close to the low limit.
0x43	good	20	DEVICE_FAULT	Antenna errors • The antenna or the antenna cable is defective. • Error in the connection to the reader; the reader is not answering (in PROFIBUS operation). – The cable between the communications module and reader is wired incorrectly or there is a cable break – The 24 V supply voltage is not connected or is turned off or has failed briefly – Automatic fuse on the communications module has blown – Hardware defective – Another reader is in the vicinity and is active – There is a reflecting metal surface in the vicinity that is disrupting the antenna field – Execute "init_run" after correcting the error
0x46	OpcUa_ BadInva-lidState	--	--	The command is not permitted in this status or is not supported. Possible cause: • "INIT" was chained. • Command repetition was started without "Presence mode".
0xC1	good	18	INVALID_ CONFIGURATION	The specified tag field of the transponder is unknown.
0xCA	good	1	MISC_ERROR_ TOTAL	General error
0xCB	OpcUa_ BadOutOf Range / OpcUa_ Bad Configura-tion Error	--	--	No or bad configuration data/parameters were trans-ferred. Possible cause: • You are accessing a read point that is not configured.

XML/ LED (hex)	OPC UA status	AutoId status	AutoId text	Error description
0xCD	good	1	MISC_ERROR_ TOTAL	• Firmware errors Possible cause: The firmware update was not run completely. • Internal communications error of the communications module/reader – Connector contact problem on the communications module / reader – Hardware of the communications module / reader is a defective; → Send in communications module / reader for repair – Start "INIT" after correcting the error • Internal monitoring error of the communications module/reader – Program execution error on the communications module / reader – Turn the power supply of the communications module/reader off and on again – Start "INIT" after correcting the error
0x61	good	15	NOT_SUPPORTED_ BY_DEVICE	Unknown command An uninterpretable XML command was sent to the reader or the Ident profile sends an uninterpretable command to the reader. Possible causes: • The "AdvancedCmd" block was supplied with an incorrect "CMD". • The "CMD" input of the "AdvancedCmd" block was overwritten.

XML/ LED (hex)	OPC UA status	AutoId status	AutoId text	Error description
0x63	Bad Invalid Argument / good	5	REGION_NOT_ FOUND_ERROR	• A parameter of an XML command has an invalid value or the parameter assignment of the communications module or the reader was incorrect. Possible causes / action to be taken: – Check the parameters in the Ident profile. – Check the relevant XML command. – Check the parameter assignment in HW Config / STEP 7 (TIA Portal). – The "WRITE-CONFIG" command has incorrect parameter settings. – After a startup, the reader or communications module has still not received an "INIT". • The parameter assignment of the reader or communications module on PROFIBUS/PROFINET was incorrect and the command cannot be executed. Possible causes / action to be taken: – Length of the input/output areas is too small for the cyclic I/O word. – Check whether you have used the correct GSD file. – User data length set with the command (e.g. "READ") is too high. • Error when processing the command. Possible causes / action to be taken: – The data in "AdvancedCmd" or "IID_CMD_STRUCT" is incorrect (e.g. "WRITE" command with length = 0). Check "AdvancedCmd" or "IID_CMD_STRUCT" and execute an "INIT". – The hardware of the reader/communications module is defective. The reader or communications module receives bad data with an "INIT". – The AB byte does not match the user data length. • The wrong reset block was selected. Possible causes / action to be taken: – Regardless of the selected reader system, use the "Reset_Reader" function block.
0xE1	BadInvalid Argument	--	--	A parameter is missing.
0xE2	BadInvalid Argument	--	--	The parameter has an invalid format.
0xE3	BadInvalid Argument	--	--	The parameter type is invalid.

XML/ LED (hex)	OPC UA status	AutoId status	AutoId text	Error description
0xE4	BadInvalid Argument	--	--	Unknown parameter.
0xE5	Bad	--	--	The command or the frame has an invalid format.
0xE6	good	1	MISC_ERROR_ TOTAL	The inventory command failed.
0xE7	good	10	READ_ ERROR	Read access to the transponder has failed.
0xE8	good	14	WRITE_ ERROR	Write access to the transponder has failed.
0xE9	good	14	WRITE_ ERROR	Writing the EPC-ID on the transponder has failed.
0xEA	good	1	MISC_ERROR_ TOTAL	Enabling write protection on the transponder has failed.
0xEB	good	1	MISC_ERROR_ TOTAL	The "Kill" command has failed.
0xFA7	OpcUa_ Bad Configura- tion Error	--	--	The specified read point is inactive because it was not assigned to any antenna.

Reading out error messages using the WBM

All the diagnostics messages of the reader are entered in the "Log" if a check mark was set for "ERRORS" in the WBM configuration in "Settings - General". The log helps SIEMENS specialists to analyze errors. You will find further information on the "Log" in the section "The "Diagnostics - Log" menu item (Page 95)".

12.3 Module replacement

Before replacing a module

NOTICE
Backing up the configuration   Prior to replacing the module, make sure that you back up the configuration stored on the reader so that you can transfer this to the newly connected reader following module replacement.

12.3.1 Backup configuration data

Options for backing up the configuration

To back up the current configuration of the reader and to restore it on the new connected reader following module replacement, you have the following options:

- on the controller

  for RF680R/RF685R
- using the TIA Portal (STEP 7 Basic / Professional as of V13) in a STEP 7 project

  for RF680R/RF685R
- with the WBM or XML-API as an *.xml file on your PC

  for RF650R/RF680R/RF685R

These alternative methods are described below.

Table 12- 4 Properties and requirements for the backup options

Backup options	Properties
Backup on the controller	• Module replacement possible without PG • Automatic sequence possible ⇒ The automatic sequence needs to be programmed by the user.
Backup in the STEP 7 project	• Download to the reader only possible manually in STEP 7 • No management of configuration versions ⇒ Only the last version is ever stored (no storage of older versions). ⇒ You need to update the configuration version in the project yourself manually.
Backup as an *.xml file on the PC	• Configuration data is saved regardless of the project and controller ⇒ The download to the reader can be performed manually using the WBM or using the XML API by the user application. • Option of copying for other readers of the same type • Older configuration versions can be saved (versioning) ⇒ The updating and versioning of the configuration versions needs to be started and managed manually by you yourself.

Backup on the controller

Using the "Config_Upload" and "Config_Download" blocks, you can read out ("Config_Upload") or write ("Config_Download") the configuration of the RF680R/RF685R readers via the control program. Since the configuration is stored permanently, you need to reserve a data block for this on the controller.

If you have uploaded again, based on the version identifier (Config ID) that can be read out with the reader status, you can check whether the configuration of the reader differs from the configuration stored on your controller.

You will find further information on programming the blocks and the structure of the configuration data in the section "Config_Upload/-_Download (Page 123)".

Backup into a STEP 7 project

From the device view of the TIA Portal, you can access the "Properties" tab of the reader. When configuring with HSP, in the "Configuration management" entry, you can save the configuration of the reader in your project and also load this on the reader again.

Requirement

- The "PROFINET interface [X1]" entry contains the correct IP address of the reader.
- The user name and corresponding password have been entered correctly.
- The entered user has the required rights to run the download/upload (refer to the section "The "User management" menu item (Page 102)").

Note

User name and password only necessary if user management is enabled

The "User name" and "Password" text boxes only need to be completed if the user management of the WBM is enabled.

Following the upload/download the status bar indicates whether or not the action was successful.

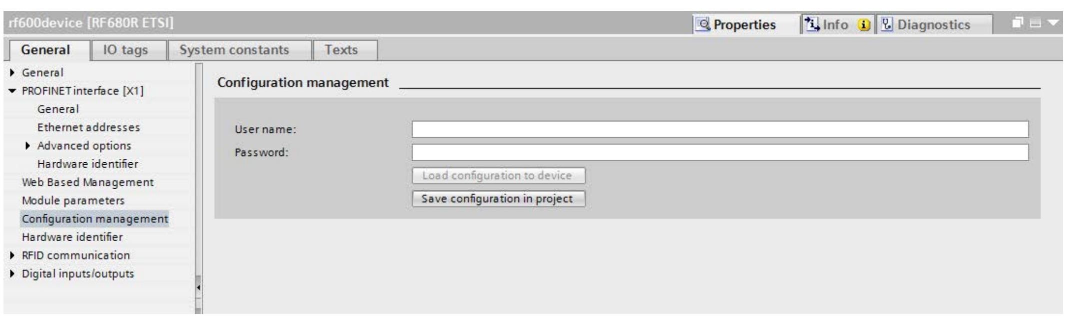


Figure 12-4 Successful upload of the configuration

Backup on your PC

On the upper toolbar of the WBM, there are two buttons for loading and saving configurations. Using these buttons, you can back up configurations, re-load them and transfer them to other readers. You will find further information on saving and loading the configuration on or from the PC in the section "The WBM (Page 43)".

Note

Loading a configuration

Note that you cannot transfer any user profiles and passwords to other readers using the configuration file. After loading the configuration file on a new reader, you need to enable user management and create new user profiles and passwords.

12.3.2 Replacing a module

Before replacing a module

WARNING
Read the manual of the SIMATIC controller you using
Prior to installation, connecting up and commissioning, read the relevant sections in the manual of the SIMATIC controller you are using. When installing and connecting up, keep to the procedures described in the manual.

NOTICE
Installation/removal with the power off
Wire up the SIMATIC controller and modules to be connected only when the power is off. Make sure that the power supply is turned off when installing/uninstalling the devices.

Before replacing the module, back up the configuration of the reader so that you can transfer this to the new reader.

Procedure

Follow the steps below to replace a reader (Ethernet/PROFIBUS connection):

1. Make sure that the reader is disconnected from the power supply supply.

   If you work via a SIMATIC controller, make sure that this is disconnected from the power supply.
2. Pull the cable from the reader.
3. Remove the reader from its mounting.
4. Mount the new reader.
5. Connect the reader to the PC or the SIMATIC controller using an Ethernet cable.
   – For the Ethernet connection to the RF650R reader, use a connecting cable with an RJ-45 plug.
   – For the PROFINET connection of the RF680R/RF685R reader, use a connecting cable with an M12 plug (4-pin).
6. If necessary, connect the reader to one or more external antennas.
7. Connect the reader to the power supply using the connecting cable.

   Wait until the reader has started up and is ready for operation ("R/S" LED is lit/flashes green).
8. Assign the reader a unique IP address and a unique device name.
9. Load the configuration to the reader.

Module replacement with automatic device name assignment

When you replace a module, you have the option of assigning the device names automatically based on the configured PROFINET topology. This function is only possible when replacing a device.

Requirement

- The PROFINET topology has been configured.
- The "Device replacement without exchangeable medium" option is enabled in the PROFINET settings on the CPU.
- The new reader has the factory settings; in other words, no device name and no IP address have been assigned.

  If the reader does not have the factory settings, the module must be reset to the factory settings.

12.4 Firmware update

Requirements

- The reader is connected to the PC via Ethernet.
- The reader was disconnected from runtime operation (S7/XML applications).
- All user applications are closed.
- The required update file is stored locally.

Procedure

Follow the steps below to run a firmware update using the WBM:

1. Start your Web browser.
2. Enter the IP address of the reader in the address field of your browser.
3. If not logged in, log in to the WBM.

   Note that you as "User" can only run a firmware update if the reader is in the "Idle" status.
4. Click on the "System" menu item.
5. In the "Firmware update" area, click the "Select firmware file" icon .
6. Select the update file.
7. Click the "Open" button.
8. Click the "Update" button.

Result: The firmware is updated. The update process is indicated in the information bar.

After the update has completed, the reader is restarted. The reader is ready for operation when the "R/S" LED is lit/flashes green. Note that during a firmware update, the startup takes longer.

The updated firmware is active following the restart.

12.5 Restore to factory settings

You can reset the configuration of the reader to the factory settings at any time. To reset to the factory settings, you have the following options available:

- using the WBM

  for RF650R/RF680R/RF685R
- using the XML interface

  for RF650R/RF680R/RF685R

These alternative methods are described below.

Note

IP address is required

Note that to reset a reader, you always require the IP address. If the IP address of a reader is not known, you can assign the reader a new IP address using the Primary Setup Tool. You will find information on assigning an IP address section "Assign the IP address / device name (Page 27)".

Restoring factory settings using the WBM

Follow the steps below to reset all settings to the factory settings using the WBM:

1. Start your Web browser.
2. Enter the IP address of the reader in the address field of your browser.
3. If not logged in, log in to the WBM.

   Note: If you have forgotten the administrator password, you need to reset the reader via the XML interface.
4. Click on the "System" menu item.
5. In the "Restore" area, click the "Restore" button.

Result: The reader is reset to the original factory settings. The restore process is indicated in the information bar.

Note that if you restore to factory settings the RF650R reader is assigned the factory default IP address "192.168.0.254". In the factory settings, the RF680R and RF685R readers are set to DHCP. Because the IP address is discarded, it is possible that the connection between the WBM and browser is lost. You can only recognize when the restore process is completed based on the "R/S" LED. After restoring, the reader is restarted. The reader is ready for operation when the "R/S" LED is lit/flashes green.

After restarting the reader, you may need to assign a new IP address or a new device name to the reader.

Restoring the factory settings via the XML interface

Via the XML interface, you can use the command "resetReader" to reset all settings to the factory settings.

Appendix A

A.1 Planning and installation of UHF read points

RFID UHF systems (frequency band 865 - 928 MHz) due to their comparatively large effective range have different requirements in terms of planning, commissioning and operation compared with the HF systems commonly used up to now in automation (frequency band 13.56 MHz). This section describes important rules for preparation and implementation of the RFID UHF systems.

A.1.1 Technical basics

General

In contrast to inductively coupled HF systems, in UHF technology, there is full propagation of the radio waves just as in other wireless systems (radio, TV etc). There are both magnetic and electrical field components present. The following graphic shows the structure of a UHF system. One characteristic is the design of the transponder that differs greatly from the structure used in HF systems, e.g. the use of a dipole or helix antenna.

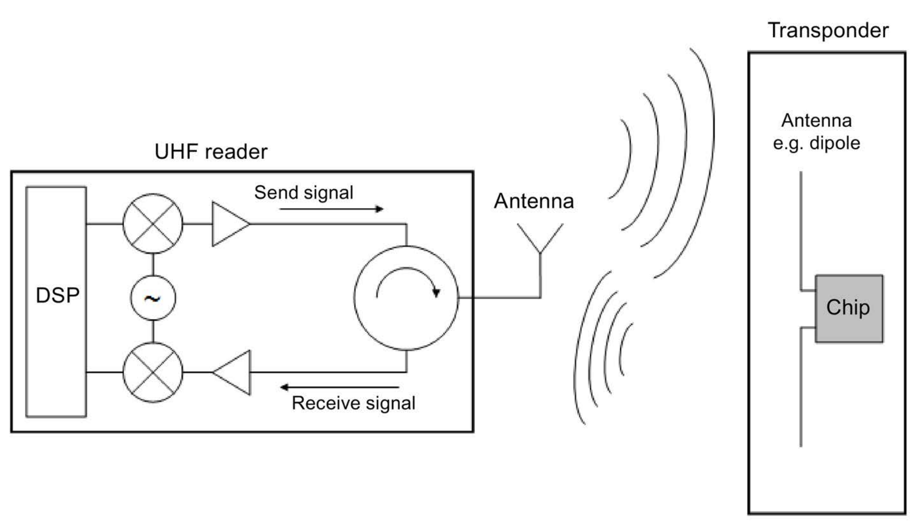


Figure A-1 Structure of a UHF RFID system

RSSI value

The signal strength of the transponder response is known as the RSSI value (Received Signal Strength Indicator). The RSSI value is a one byte value (0 to 255), the higher the value the better the signal strength (according to the IEEE 802.11 standard).

The actual RSSI value depends on numerous parameters:

- transponder type used,
- chip used in the transponder,
- connected antenna,
- transmit power,
- distance between antenna and transponder,
- reflections,
- noise level in the channel used and in neighboring channels

The RSSI value is important for the automatic evaluation of the read point and for filtering. A simple comparison of the RSSI values of two transponders is nevertheless not possible because the values are influenced by the transponder tolerances and the non-homogeneous antenna field. This means that it is possible that a transponder positioned closer to the RFID antenna has a lower RSSI value than a transponder much further away.

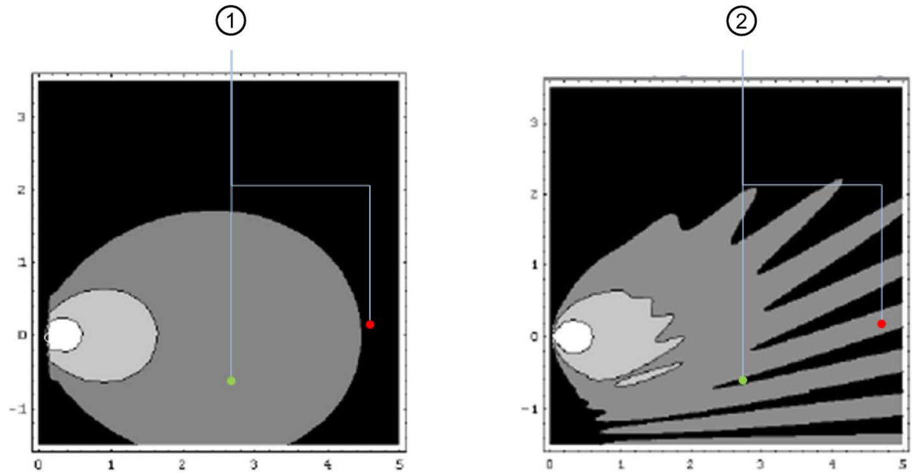
Propagation of the antenna field

The waves do not propagate as a homogeneous field, there is superposition of the waves that can cause the following effects:

- Overshoots and field gaps due to obliteration of two waves

  These are caused by reflection and the resulting propagation on different paths (comparable with fading effects on the car radio, e.g. noise when the vehicle is standing)
- Generation of overshoots due to reflecting objects and surfaces

This can be illustrated by comparing it with a "hall of mirrors". The signal transmitted by the reader is reflected (several times) by metallic objects such as housings, steel supports or grilles and this can lead to unwanted effects and read errors. Is also possible that a transponder is not identified although it is located in the assumed direct identification range of the reader. It can also happen that a transponder moving outside the antenna field is read out due to overshoots.



① Identification situation with two transponders in an ideal radio/antenna field

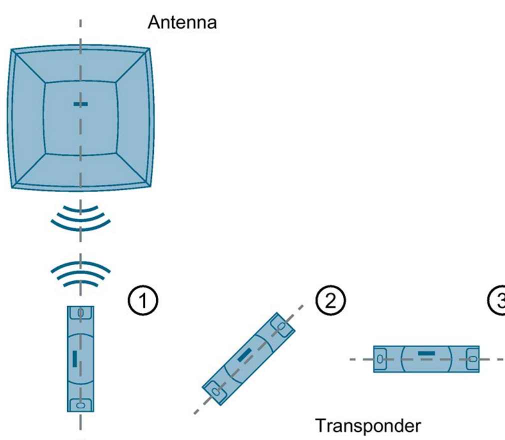
② Identification situation with two transponders in a real radio/antenna field with reflections that can lead to obliteration and overshoots

Figure A-2 Propagation of UHF RFID antenna fields

Properties of the transmitting antenna

Depending on their design, UHF RFID antennas provide different properties. They differ in the polarization and antenna gain.

The direction of the electrical field component of an electromagnetic wave and the alignment of the antenna decide the polarization of the radiation. A distinction is made between linear and circular polarization of an antenna. With linear polarization you achieve the maximum write/read distances when the polarization axes of the antenna and transponder are parallel to each other. As the deviation increases, the received power deteriorates.



① Polarization axes parallel: approx. 100 % range

② Polarization axis turned through 45°: approx. 50% range

③ Polarization axis turned through 90°: approx. 10% range

Figure A-3 Effect of the polarization axes on the write/read distance with linear antennas

Linear antennas can only be used if the alignment of the transponder is defined. On the other hand, one advantage of linear antennas is that they react less sensitively to reflections. This restriction does not apply with circular polarization. Circular antennas can also be used with differing alignments of the transponder and achieve constant results (e.g. RF680A or RF685R). It has been shown that with a defined transponder alignment, the linear antenna normally produces the best results.

A.1.2 Implementation of UHF RFID installations

The use of UHF RFID systems requires careful planning and preparation to avoid problems during commissioning and operation.

A.1.2.1 Preparation phase

Device selection

When selecting the suitable RFID hardware, remember the following minimum criteria:

- Integration in a control/IT environment
- Degree of protection
- Size of the identification range
- Type, number and position of the transponders in the antenna field
- Reflecting and absorbent materials in the vicinity of the antenna
- Distance between the antenna or the reader and the transponder

The following application examples illustrate the requirements for specific use cases and provide suitable solutions:

- RFID gate at the incoming goods / outgoing goods department:

  Several transponders are located on different packaging of products on a pallet. These need to be identified when passing through the RFID gate.

  Possible configuration: RF650R with four circular antennas (e.g. RF650A, RF660A depending on the required radiated power)
- Four read points along the production line:

  A product needs to be processed by different machines along the production line. The information for this is contained on a transponder attached to the product that must be read out at each machine.

  Possible configuration: RF680R with four antennas (e.g. RF620A, RF680A)
- Read point on a production line with a predominantly metallic environment:

  A product needs to be processed by different machines along the production line. The information for this is contained on a transponder attached to the product that must be read out at each machine.

  Possible configuration: RF685R with integrated adaptive antenna

Dynamic identification

Dead spots cannot be excluded. To be able to compensate for dead spots, we recommend that you give preference to dynamic identification rather than static identification. Dynamic identification means that the transponders are read while they are moving (e.g. on the conveyor belt). If static identification is necessary, the antenna field can e virtually dynamized with the RF685R antenna or RF680A.

Triggering

To read out all right transponder data, you can have the readers perform permanent write/read actions or have specific write/read actions triggered. For the following reasons, we recommend that you trigger specific write/read actions:

- The RFID system only performs write/read actions when an object to be identified enters the antenna field. This reduces the number of process errors and they can be identified more quickly.
- Due to the fact that the various RFID systems only perform write/read actions when necessary, this reduces the possibility of antenna fields disrupting each other. This increases process reliability in plants, particularly when there is a high reader density.

Decoupling third-party RFID systems

If you are using different RFID systems, make sure that no two systems are active at the same time or operate separately from each other. Ideally there should be no mixed usage.

Training

Make sure that the engineers commissioning the UHF RFID systems are adequately trained.

A.1.2.2 Test phase

Metals and absorbent materials have a major influence on the functioning of UHF RFID systems. Since every environment has different conditions, we recommend that you run a test with all the objects to be identified for each read point. Include neighboring readers in these tests as well as scenarios for overshoots. Run through the tests an adequate number of times to make sure that any sporadically occurring influences on the antenna fields are also tested.

The final position of the transponder should only be decided after an adequately intensive test phase so that suitable variations can be tried out if errors occur.

A.1.2.3 Setting up read points

Adjust antennas

Follow the steps below to optimize the antenna alignment:

1. Position the object fitted with a transponder and to be identified at the required read point.
2. Align the reader or the antenna so that its front points in the direction of the object (transponder) to be identified.

   Keep to the minimum distances between antennas and transponders to avoid antenna errors.

   When using linear antennas, make sure the polarization direction is correct.

3. In the "Settings - Adjust antenna" menu item, select the connected antenna and click the "Start adjustment" button.

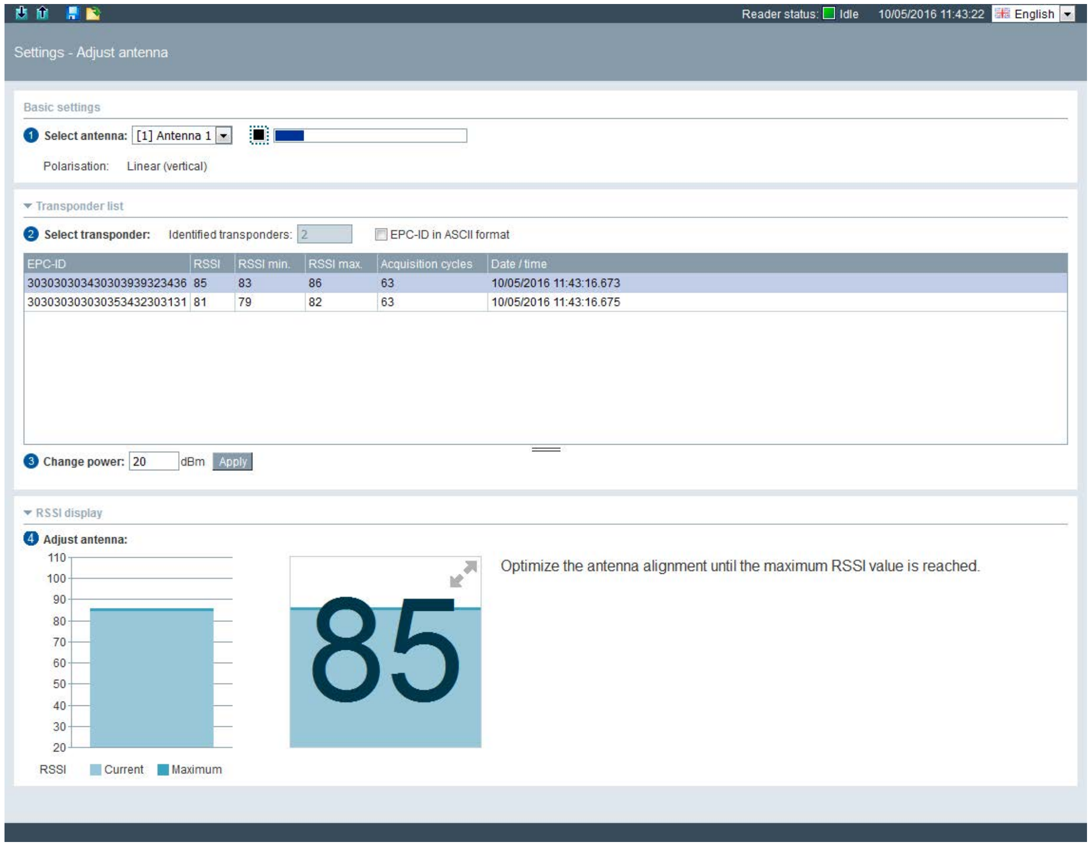


Figure A-4 Optimizing the antenna alignment with the "Settings - Adjust antenna" menu item of the WBM

4. In the "RSSI display" area, you can see the current (light blue) and maximum reached (dark blue) RSSI values.

Note

Transponder is not identified

If no transponder is identified, first increase the radiated power as described in the following section. Then repeat the antenna adjustment.

Also check the polarization of your antenna. If the transponder always has the same alignment, the antenna polarization should be adapted accordingly. If the transponder moves or the alignment of the transponder varies, it is advisable to combine several antenna polarization types or to select a circular polarization.

---

5. Optimize the antenna adjustment until the maximum possible RSSI value is reached.
6. Secure the antenna.

Note that the RSSI value depends on the following components:

- transponder used,
- antenna used,
- Polarization,
- reflecting and absorbent materials in the vicinity of the antenna.

Radiated power

Using the "Settings - Read points" menu item of the WBM, you can set the radiated power. Select the radiated power so that the required transponders can be identified reliably but without overreach. In this case, the following applies: "as much as necessary, as little as possible".

In the "Settings - Activation power" menu item, you can find the optimum radiated power for reliable transponder access.

Detect activation power

Follow the steps below to detect the activation power:

1. In the "Settings - Activation power" menu item, select the connected antenna and click the "Start measurement" button.
2. In the "Min. power" column of the transponder list, you can see the required activation power. The value "Min. power" of the transponder last selected in the transponder list is automatically transferred to the "Accept power" box with 2 dB added.

Note

Optimizing the radiated power

The value entered automatically in the "Accept power" box corresponds to the minimum value with which the transponder was identified by the antenna (Min. power) plus a power reserve of 2 dB. This value serves as a guideline and you can adapt it. To be sure that the antenna reliably detects the transponders regularly, we recommend that you accept the automatically adapted default value.

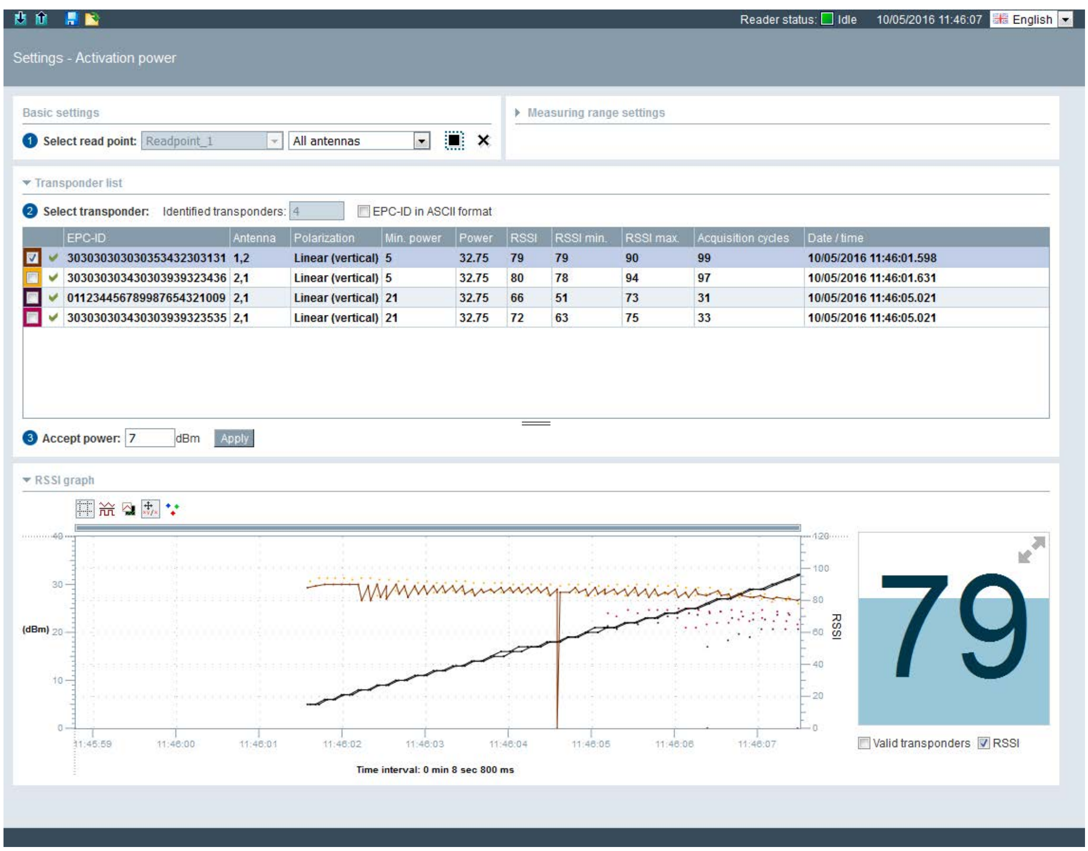


Figure A-5 Determining the activation power using the "Settings - Activation power" menu item

3. Click the "Apply" button to transfer the value entered in the "Radiated power" input box of the "Settings - Read points" menu item.
4. Click the symbol to transfer the configuration to the reader.

A.1.3 Dealing with field disturbances

A.1.3.1 Types and approaches to solutions

The superposition of radio waves and reflection by conductive materials (in particular metal) can lead to weakening or strengthening of the antenna field at certain points in space. These effects can lead to disruptions when identifying RFID transponders that can be distinguished as follows:

- Overshoots due to increasing field strength: Transponders are detected that are actually beyond the read distance.

  Approaches to solutions:

  - Reduction of the radiated power
  - Specifying input attenuation
  - Use of UHF algorithms
  - Changing the antenna position
  - Shielding measures
  - Varying the antenna polarization
  - Use antennas with a lower gain
  - Use antennas with adjustable polarization

- Lack of separation of transponders: Transponders positioned close together are detected together although the application logic requires individual detection (for example to determine the positioning order). All transponders are within the read distance.

  Approaches to solutions:

  - Reduction of the radiated power
  - Use of UHF algorithms
  - Changing the antenna position
  - Shielding measures
  - Use antennas with a lower gain

- Field obliteration: Due to the superposition of waves, obliteration effects occur within the read distance.

  Approaches to solutions:

  - Varying the antenna polarization
  - Using additional antennas
  - Use of UHF algorithms
  - Changing the antenna position
  - Shielding measures
  - Use antennas with a lower gain

- Reader ↔ reader influence: Several readers influence or disturb each other during transponder identification.

  Approaches to solutions:

  – "Interconnect" neighboring readers so that they do not send at the same time

  – Enable intermissions ("Settings - General" menu item)

  – Channel management

- Reader ↔ transponder influence: A reader communicates with a transponder that is also in the identification area of another reader.

  Solution approaches:

  – "Interconnect" neighboring readers so that they do not send at the same time

- Other sources of disturbances that can lead to restriction of transponder identification.

  Other sources of disturbances can occur if there are devices with similar frequency bands (for example 900 MHz) in the vicinity of the reader. The diagnostics corresponds to the influence of one reader on another. Mobile phones can also disturb identification. This is the case if a reader of the type FCC or CMIIT is operated in Europe.

  Solution approaches:

  – The disturbances can be eliminated by temporarily turning off the suspected source of interference or its shielding. Interference can also occur with devices in other frequency bands if these are located in the immediate vicinity of the RFID antenna (e.g. DECT telephone directly in front of the RFID antenna). Common industrial interference mechanisms, such as the harmonics of frequency converters or static discharge (ESD) can also cause disturbances.

Note

Occurrence of disturbances

Remember that these disturbances can also occur sporadically or in certain combinations.

A.1.3.2 Measures for eliminating field disturbances

Using shields

To avoid reflections, you can fit UHF absorbent material. To do this, the absorbent material is mounted at various suspected reflection points until the field disturbance no longer occurs. Where possible, avoid the use of metal structures (for example housings) and use plastic instead.

Even with reader-to-reader influence, you can use absorbent plates or shielding sheets.

Channel management

To operate the readers, depending on the country profile, you have between four and fifty send channels available. Ideally, you should make the channel assignments manually in STEP 7 Basic / Professional (TIA Portal) or in the WBM. This allows you to reduce reader-to reader influence and if applicable field obliteration.

Table A- 1 Example of a channel plan according to ETSI

Reader	Reader 1	Reader 2	Reader 3	Reader 4	Reader 5	...
Transmission channel	4	10	7	13	4	...
Frequency (MHz)	865.7	866.9	866.3	867.5	865.7	...

Use of multiple antennas

If you do not find the ideal antenna position to be able to identify the transponders in the various positions and alignments, you have the option of using more antennas. Multiple antennas mounted at different positions enlarge the identification range.

Enabling send pauses

If too many neighboring readers send at the same time, this causes overload of the radio channels. In this case, enable the "Intermissions" function in the "Settings - General" menu item to improve read reliability.

Varying the antenna polarization

By using linear or circular antennas, you can reduce field obliteration. This improves the reader reliability in difficult radio conditions.

The RF685R and RF680 readers also provide the option of operating the internal or external antenna both as a linear, vertical, linear horizontal and circular antenna. If more than one polarization is enabled, the polarization is changed automatically with each inventory. This increases the probability of identification in difficult radio conditions.

Changing the antenna position

In difficult radio conditions (e.g. where there is a lot of metal) it is possible that the communication between transponders and readers is impaired. You can counter this by changing the position of the antenna relative to the transponder. This also changes the multipath propagation of the radio waves and obliteration is reduced or shifted.

Use of UHF algorithms

In the "Settings - Read points" menu item of the WBM, you will find various "Tools" in the "Algorithms" area that you can use to improve the read/write reliability.

A.2 Application examples of the algorithms

This section describes some of the algorithms of the menu item "Settings - Read points" of the WBM based on application examples.

A.2.1 Minimizing radiated power

Description

In this example, the read points are mounted very close to each other. This makes it very likely that these read points will influence each other if the radiated power is too high. There is always roughly the same number of transponders in the antenna field (1-3 transponders).

The aim is to reliably identify the transponders without the read points influencing each other.

Algorithms used

- Inventory Power Ramp
- Read/Write Power Ramp

Requirement

The read points are mounted, equipped and aligned and during reading there are transponders in the antenna field.

Note that this example is only of practical use when the reader searches for transponders for a defined period. This is controlled by a light barrier which for example triggers a trigger "IO_LEVEL" or "IO_EDGE" or by parameter assignment of the period of an inventory command.

If there are no transponders in the antenna field during the reading, the read point will automatically always use the maximum possible set dB value.

Parameter assignment

Follow the steps below to ensure that the transponders are reliably identified without the read points influencing each other.

1. In the menu item "Settings - Read points", in the area "Assigned antennas" specify the radiated power with which the antenna normally reads/writes.

   You can find out the suitable radiated power at with which the transponders will be identified in the menu item "Settings - Activation power".

2. In the area "Algorithms" enable the algorithm "Inventory Power Ramp" and specify the values as follows:

   – Expected Tags: Enter the minimum number of transponders that are always located in the antenna field (e.g. 2).

   – Boost max [dB]: Enter the value by which [dB] the radiated power may be increased as maximum (e.g. 4 dB).

   – Inventories: Enter the number of inventories to be taken until the maximum radiated power is reached (e.g. 4).

     Note: The higher the number of inventories the higher the likelihood that transponders will be identified with as low a radiated power as possible. The more inventories you specify, however, the longer it may take in an unfavorable situation before there is access to the transponder.

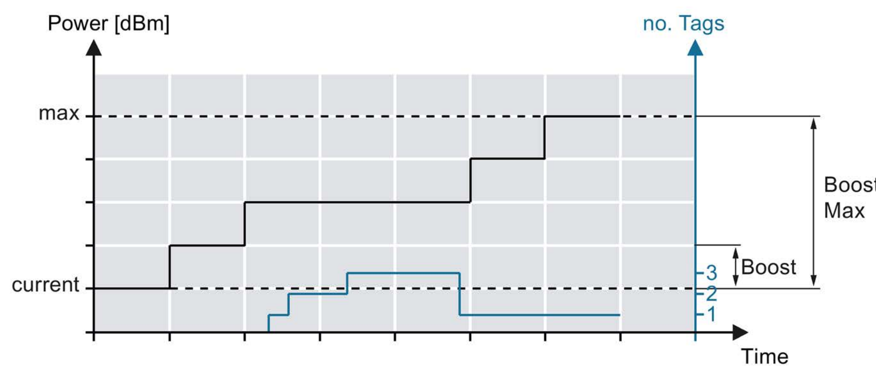


Figure A-6 Access with minimum radiated power using the algorithms "Inventory Power Ramp" and "Read/Write Power Ramp"

3. In the area "Algorithms" activate the algorithm "Read/Write Power Ramp" and specify the values as follows:

   – Boost [dB]: Write access to a transponder normally requires more power than inventories. For this reason, you should enter a value here by how much [dB] the radiated power should be increased (in steps) if the execution of a command fails. With a "Write" command, the power is increased by this value directly the first time the command executes, with a "Read" command only when the command fails to execute.

   – Boost max [dB]: Enter by how much [dB] the radiated power may be increased as maximum (e.g. 6 dB). Here, you can also enter a value = 0, while you enter a value of 2 dB for "Boost [dB]". This brings about that only with a "Write" command, the power is increased once.

Note: The algorithm "Read/Write Power Ramp" is based on the algorithm "Inventory Power Ramp". This means that the dB values of the "Read/Write Power Ramp" are added to the existing values increased by the "Inventory Power Ramp".

A.2.2 Inventories limited by time

Description

In this example inventories will be taken as soon as an event occurs - e.g. when a forklift truck passes and interrupts a light barrier (input 1). The aim is that all transponders on the palette of the forklift truck are reported as ""reliably identified" if they are scanned often enough.

In this example there are different procedures depending on the user type (S7/Rockwell user or XML/OPC user).

In addition, there are two different examples (A and B) in which a distinction is made as to when the inventories are ended again.

- Example A:

  The inventories are taken over a specified time of 10 seconds.
- Example B:

  The inventories are taken until the light barrier is no longer interrupted.

Algorithms used

- Smoothing

Requirement

The read points are mounted, equipped and aligned.

Parameter assignment - S7 / Rockwell user

Follow the steps below to activate the "Smoothing" algorithm:

1. In the menu item "Settings - Read points" in the "Algorithms" area activate the "Smoothing" algorithm and specify the values as follows:
   – Observed Count: Here enter a value that guarantees reliable identification of the transponders and at the same time ensures that transponders identified by sporadic overshoots are sorted out. With the menu item "Diagnostics - Tag monitor" you can determine which value is ideal here for your application.
   – Lost Count: Enter the maximum value "65535" to ensure that all transponders are identified during the specified period (status: observed). With this value you ensure that the identified transponders are reported as "identified" over the entire time of the inventory, even if the transponders have already left the antenna field.

Example A - further procedure

Follow the steps below to take inventories for 10 seconds if the light barrier is interrupted.

1. Create an If condition that then always triggers the "Inventory" block when the light barrier (input 1) is interrupted.
2. Specify the block parameters as follows;
   – ATTRIBUTE = 0x80 or 0x81
   – DURATION = 0x0A
   – DUR_UNIT = 0x00

Example B - further procedure

Follow the steps below to take inventories if the light barrier is interrupted until the light barrier is no longer interrupted:

1. Create an If condition that then always triggers the "Inventory" block (ATTRIBUTE = 0x86) when the light barrier (input 1) is interrupted.
2. Program the condition so that as soon as the light barrier is no longer interrupted, the transponder data is fetched. Execute a further "Inventory" command with the following parameters:
   – ATTRIBUTE = 0x80
   – DURATION = 0x00
   – DUR_UNIT = 0x00
3. End the IF condition using a further "Inventory" command with the parameter "ATTRIBUTE =0x87".

Parameter assignment - XML / OPC UA user

Follow the steps below to activate the "Smoothing" algorithm:

1. In the menu item "Settings - Read points" in the "Algorithms" area activate the "Smoothing" algorithm and specify the values as follows:
   - Observed Count: Here enter a value that guarantees reliable identification of the transponders and at the same time ensures that transponders identified by sporadic overshoots are sorted out. With the menu item "Diagnostics - Tag monitor" you can determine which value is ideal here for your application.
   - Lost Count: Enter the maximum value "65535" to ensure that all transponders are identified during the specified period and are also not reported more than once. This ensures that transponders located at the front of the palette do not leave the list of identified transponders while the forklift truck passes the antenna and these transponders already leave the antenna field while inventories are still being taken.

Example A - further procedure

Follow the steps below to take inventories for 10 seconds if the light barrier is interrupted.

1. Create an If condition that then always triggers the command "getObservedTagIDs" when the light barrier (input 1) is interrupted.
2. Specify the command parameters as follows;
   - value_duration = 1000
   - value_unit = Time

Example B - further procedure

Follow the steps below to take inventories if the light barrier is interrupted until the light barrier is no longer interrupted:

1. Create an If condition that then always triggers the command "riggerSource" (value_triggerMode = Start) when the light barrier (input 1) is interrupted.
2. Program the condition so that as soon as the light barrier is no longer interrupted, the transponder data is fetched by the command getObservedTagIDs".
   - value_duration = 0
   - value_unit = Time

   As an alternative the transponder data can also be fetched automatically using "Events".
3. End the If condition or the command with "value_triggerMode = Stop".

A.2.3 Filtering out transponders detected due to overshoot

Description

In this example there are production lines close together that are controlled by read points. This can lead to the read point of a production line identifying the transponders of the other production line due to overshoot.

The aim is that the read point involved recognizes these transponders and filters them out.

Antenna parameters and algorithms used

- RSSI threshold
- Input attenuation
- Smoothing
- RSSI delta

Requirement

The read points are mounted, equipped and aligned.

Note that this example is only of practical use when the reader searches for transponders for a defined period. This is controlled by a light barrier which for example triggers a trigger "IO_LEVEL" or "IO_EDGE" or by parameter assignment of the period of an inventory command.

Parameter assignment

Follow the steps below to ensure that the transponders identified due to overshoot are filtered out.

1. With the menu item "Diagnostics - Tag monitor" determine the RSSI values of the identified transponders of the read point involved.

   Based on the RSSI values you can determine when transponders are identified due to overshoot. Transponders identified due to overshoot normally have significantly poorer RSSI values than transponders located in the regular antenna field.
2. With the antenna parameters "RSSI threshold" and "Input attenuation" contained in the menu item "Settings - Read point" and the algorithm "Smoothing" filter out the transponders identified due to overshoot.
3. Check your settings using the menu item "Diagnostics - Tag monitor".

The "RSSI delta" algorithm

As an alternative to the antenna parameters named above, you can also use the algorithm "RSSI delta". When using this algorithm, you must, however, remember the following points:

- This algorithm is only useful for applications that use time-limited inventories.
- Transponders found to be valid once, must remain valid for the remaining time. To do this in "Smoothing" the value of "Lost Count" must be set to the maximum value "65535".
- The evaluation of which transponders are valid, may only take place at the end of the taking of inventories.

For this reason we recommend to limit overshoots first with the antenna parameters and algorithms listed above.

A.2.4 Filtering out transponders using the "Black list"

Description

In this example, transponders already identified by the read point will be filtered out using the "Black list". The aim is that already identified transponders are not displayed again.

In this example there are different procedures depending on the user type (S7/Rockwell or XML user). As an XML user, the description of the commands is self-explanatory (see Section "editBlackList (Page 221)"). The following examples are intended for S7 users and help them to understand how the black list works and to configure it.

Below two different examples (A and V) are described in which a distinction is made between the way in which transponders are added to the "Black list".

- Example A:

  All transponders currently in the antenna field of the read point and that have already been identified are added to the "Black list". This can only take place while inventories are being taken. In other words when previously an "INVENTORY" command with "ATTRIBUTE=0x86" was sent.

- Example B:

  Individual transponders are added selectively to the "Black list".

In the way it works, the "Black list" is similar to the menu item "Settings - Filters" of the WBM. However the filter of the WBM can only be created and removed manually. The "Black list" on the other hand can be programmed with the aid of S7 controllers or XML. This means that the automated "Black list" can filter out transponders temporarily.

Algorithms used

- Black list

Requirement

The read points are mounted, equipped and aligned and during reading there are transponders in the antenna field.

Parameter assignment - S7 / Rockwell user

Follow the steps below to activate the "Black list" algorithm:

1. In the menu item "Settings - Read points" in the "Algorithms" area activate the "Black list" algorithm.
2. In the "Size" input box, specify the maximum number of transponders that can be included in the "Black list".

Example A - further procedure

Follow the steps below to include all transponders currently identified (status: OBSERVED), in the "Black List":

1. Execute the "INVENTORY" command (0x86) to start identification of the transponders.
2. Execute the "EDIT-BLACKLIST" command (0x7A) with the parameter "EDIT_ BLACKLIST_MODE = 0x01" when you are sure that all transponders have been identified. E.g. at the end of passing through a gate.
3. Execute the "INVENTORY" command (0x87) to end identification of the transponders.

Example B - further procedure

Follow the steps below to add individual transponders selectively to the "Black list":

1. Execute the "EDIT-BLACKLIST" command (0x7A).
2. Specify the block parameters as follows;
   - EDIT_ BLACKLIST_MODE = 0x00
   - EPCID_ UID ≠ 0

     Enter the EPC-ID of the transponder to be included in the black list.
   - LEN_ID ≠ 0

     Enter the EPC-ID length of the transponder to be included in the black list.

A.3 Command and acknowledgement frames

This section is intended for both S7 and Rockwell users.

The communications principle of the Ident blocks described in this manual is based on the "Proxy Ident Function Block" specification. If you want to program your own blocks for configuring your RF680R/RF685R readers, make sure that they are created so that they conform to this specification.

You can obtain the specification of the "Proxy Ident Function Block" from the PROFIBUS User Organization. You will also find further information in the manual "Ident Profile and Ident Blocks, Standard Function for RFID systems".

NOTICE
Deviations from the specification
Some of the command frames of the specification were adapted and differ from those listed in the specification. These adapted command frames as well as the unchanged command frames used are described in the following sections.

A.3.1 General structure of the adapted commend frame

Table A- 2 Command for SIMATIC readers

Byte	0, 1	2, 3	4	5 *	6, 7	8	9	10	11
Meaning	DBL	SN	CC	CI	TDB	DBN_H	DBN_L	DBL	MODE
Value	--	--	--	'-'	--	--	1	--	0
Byte	12	13	14, 15	16, 17	18 ... 21	22, 23	24, 25	26	27 ... 88
Meaning	SOURCE	BANK	ADDRESS	LENGTH	PSWD	ACTION	MASK	IDLENGTH	EPC-ID
Value	--	--	--	--	--	--	--	--	--

* Identifies a chained command in the CI byte:

- Uppercase letters (A - Z): no chained command or end of the command chain

- Lowercase letter (a - z): Chained command

A.3.2 READER-STATUS or DEV-STATUS

Reads out the status of a reader/communications module.

Table A- 3 Command

Byte	0, 1	2, 3	4	5	6, 7	8	9	10	11	12 ... 19	20 ... 27
Meaning	DBL	SN	CC	CI	TDB	DBN_H	DBN_L	DBL	--	--	--
Value	35	--	't'	'A'	1	--	1	35	0	0	0
Byte	28 ... 31	32, 33	34	35	36, 37	38	39	40, 41	42, 43	44, 45	
Meaning	--	--	--	--	--	ATT	--	--	--	--	
Value	0	0	0	0	0	89	0	0	0	0	

Table A- 4 Reply

Byte	0, 1	2, 3	4	5	6, 7	8	9	10	11 ... 239
Meaning	DBL	SN	CC	STATUS	TDB	DBN_H	DBN_L	DBL	SLG-STATUS
Value	--	--	't'	xx	1	--	1	--	--

A.3.3 INVENTORY

Requests a list of all currently accessible transponders within the antenna range.

Table A- 5 Command

Byte	0, 1	2, 3	4	5	6, 7	8	9	10	11	12	13 ... 19
Meaning	DBL	SN	CC	CI	TDB	DBN_H	DBN_L	DBL	--	SOURCE	--
Value	35	--	'i'	'A'	1	0	1	35	0	0	0
Byte	20 ... 27	28 ... 31	32, 33	34	35	36, 37	38	39	40, 41	42, 43	44, 45
Meaning	--	--	--	--	--	--	ATT	--	DURATION	UNIT	--
Value	0	0	0	0	0	0	xx	0	xx	xx	0

Table A- 6 Reply

Byte	0, 1	2, 3	4	5	6, 7	8	9	10	11 ... 239
Meaning	DBL	SN	CC	STATUS	TDB	DBN_H	DBN_L	DBL	INVENTORY
Value	--	--	'i'	xx	--	--	--	--	--

Table A- 7 Description of the bytes

Byte	Description
12	Reserved (value = 0)
38	Attribute: • 128 (0x80) = EPC-ID without additional information • 129 (0x81) = EPC-ID with additional information on the RSSI value and reserved bytes • 134 (0x86) = Activate presence mode • 136 (0x87) = Deactivate presence mode
40, 41	Duration: The value depends on the unit selected in byte 42, 43. Example: • 0x00 = no inventory (if "DURATION" = 0x00 or 0x01) • 0x00 = one transponder (if "DURATION" = 0x02)
42, 43	Unit for "DURATION": • 0x00 = ms • 0x01 = inventories • 0x02 = number of "OBSERVED" events

A.3.4 PHYSICAL-READ

Reads data from a transponder by specifying the physical start address, the memory bank (UHF) and length.

Table A- 8 Command

Byte	0, 1	2, 3	4	5	6, 7	8	9	10	11
Meaning	DBL	SN	CC	CI	TDB	DBN_H	DBN_L	DBL	--
Value	78	--	'p'	'U'	1	0	1	--	0
Byte	12	13	14, 15	16, 17	18 ... 21	22, 23	24, 25	26	27 ... 88
Meaning	SOURCE	BANK	ADRESS	LENGTH	PSWD	--	--	IDLENGTH	EPC-ID
Value	0	xx	xx	xx	xx	0	0	xx	xx

Table A- 9 Reply

Byte	0, 1	2, 3	4	5	6, 7	8	9	10	11 ... 239
Meaning	DBL	SN	CC	STATUS	TDB	DBN_H	DBN_L	DBL	DATA
Value	--	--	'p'	xx	--	--	--	--	--

Table A- 10 Description of the bytes

Byte	Description
Command	
12	Reserved (value = 0)
13	Memory bank on the transponder: • 0x00 = RESERVED • 0x01 = EPC • 0x02 = TID • 0x03 = USER
14, 15	Physical start address on the transponder: • 0 ... 0xFFFF
16, 17	Number of bytes to be read
18 ... 21	Password for transponder access: • 0x00 = no password
26	Length of the EPC ID: • 0x00 = not addressed
27 ... 88	Buffer for up to 62 bytes EPC-ID
Response	
11 ... 239	Data that exceeds 239 bytes is transferred in several blocks.

A.3.5 PHYSICAL-WRITE

Writes data to a transponder by specifying the physical start address, the memory bank (UHF) and length.

Table A- 11 Command

Byte	0, 1	2, 3	4	5	6, 7	8	9	10	11	12
Mean-ing	DBL	SN	CC	CI	TDB	DBN_H	DBN_L	DBL	--	SOURCE
Value	--	--	'g'	'U'	--	0	--	--	0	0
Byte	13	14, 15	16, 17	18 ... 21	22, 23	24, 25	26	27 ... 88	89 ... 239	
Mean-ing	BANK	ADRESS	LENGTH	PSWD	--	--	IDLENGTH	EPC-ID	DATA	
Value	xx	xx	xx	xx	0	0	xx	xx	--	

Table A- 12 Reply

Byte	0, 1	2, 3	4	5	6, 7	8	9	10
Mean-ing	DBL	SN	CC	STATUS	TDB	DBN_H	DBN_L	DBL
Value	--	--	'q'	xx	1	--	--	--

Table A- 13 Description of the bytes

Byte	**Description**
12	Reserved (value = 0)
13	Memory bank on the transponder: • 0x00 = RESERVED • 0x01 = EPC • 0x02 = TID • 0x03 = USER
14, 15	Physical start address on the transponder: • 0 ... 0xFFFF
16, 17	Number of bytes to be written
18 ... 21	Password for transponder access: • 0x00 = no password
26	Length of the EPC ID: • 0x00 = not addressed
27 ... 88	Buffer for up to 62 bytes EPC-ID
89 ... 239	Data that exceeds 239 bytes is transferred in several blocks.

A.3.6 WRITE-ID

Writes a new EPC-ID to the transponder.

Table A- 14 Command

Byte	0, 1	2, 3	4	5	6, 7	8	9	10	11	12
Meaning	DBL	SN	CC	CI	TDB	DBN_H	DBN_L	DBL	--	SOURCE
Value	--	--	'g'	'U'	1	--	1	--	0	0
Byte	13	14, 15	16, 17	18 ... 21	22, 23	24, 25	26	27 ... 88	89 ... 150	
Meaning	--	--	NEW-IDLENGTH	PSWD	--	--	IDLENGTH	EPC-ID	NEW-EPC-ID	
Value	0	0	xx	xx	0	0	xx	xx	xx	

Table A- 15 Reply

Byte	0, 1	2, 3	4	5	6, 7	8	9	10
Meaning	DBL	SN	CC	STATUS	TDB	DBN_H	DBN_L	DBL
Value	0	--	'g'	xx	1	--	1	0

Table A- 16 Description of the bytes

Byte	Description
12	Reserved (value = 0)
16, 17	Length of the new EPC-ID (2 ... 62 bytes)
18, 19	Password for transponder access: • 0x00 = no password
26	Length of the EPC ID: • 0x00 = not addressed
27 ... 88	Buffer for up to 62 bytes EPC-ID
89 ... 150	Length of the new EPC ID The length is specified in byte 16, 17.

A.3.7 KILL-TAG

The transponder is permanently deactivated.

Table A- 17 Command

Byte	0, 1	2, 3	4	5	6, 7	8	9	10	11
Mean-ing	DBL	SN	CC	CI	TDB	DBN_H	DBN_L	DBL	--
Value	78	--	'j'	'U'	1	0	1	--	0
Byte	12	13	14, 15	16, 17	18 ... 21	22, 23	24, 25	26	27 ... 88
Mean-ing	SOURCE	--	--	--	PSWD	--	--	IDLENGTH	EPC-ID
Value	0	0	0	0	0	0	0	--	--

Table A- 18 Reply

Byte	0, 1	2, 3	4	5	6, 7	8	9	10
Meaning	DBL	SN	CC	STATUS	TDB	DBN_H	DBN_L	DBL
Value	0	--	'j'	xx	1	--	1	0

Table A- 19 Description of the bytes

Byte	Description
12	Reserved (value = 0)
18, 19	Password for transponder access: • 0x00 = no password
26	Length of the EPC ID: • 0x00 = not addressed
27 ... 88	Buffer for up to 62 bytes EPC-ID

A.3.8 LOCK-TAG-BANK

Defines a password for transponder access.

Table A- 20 Command

Byte	0, 1	2, 3	4	5	6, 7	8	9	10	11
Mean-ing	DBL	SN	CC	CI	TDB	DBN_H	DBN_L	DBL	--
Value	78	--	'y'	'U'	1	0	1	--	0
Byte	12	13	14, 15	16, 17	18 ... 21	22, 23	24, 25	26	27 ... 88
Mean-ing	SOURCE	--	--	--	PSWD	ACTION	MASK	IDLENGTH	EPC-ID
Value	0	0	0	0	xx	xx	xx	xx	xx

Table A- 21 Reply

Byte	0, 1	2, 3	4	5	6, 7	8	9	10
Meaning	DBL	SN	CC	STATUS	TDB	DBN_H	DBN_L	DBL
Value	0	--	'y'	xx	1	--	1	0

Table A- 22 Description of the bytes

Byte	Description
12	Reserved (value = 0)
18 ... 21	Password for transponder access: • 0x00 = no password
22, 23	See EPC standard
26	Length of the EPC ID: • 0x00 = not addressed
27 ... 88	Buffer for up to 62 bytes EPC-ID

A.3.9 EDIT-BLACKLIST

The black list is processed. The current transponder can be added, all identified transponders added, individual transponders deleted or all transponders deleted.

Table A- 23 Command

Byte	0, 1	2, 3	4	5	6, 7	8	9	10	11
Mean-ing	DBL	SN	CC	CI	TDB	DBN_H	DBN_L	DBL	MODE
Value	78	--	'z'	'U'	1	0	1	--	xx
Byte	12	13	14, 15	16, 17	18 ... 21	22, 23	24, 25	26	27 ... 88
Mean-ing	SOURCE	--	--	--	--	--	--	IDLENGTH	EPC-ID
Value	0	0	0	0	0	0	0	xx	xx

Table A- 24 Reply

Byte	0, 1	2, 3	4	5	6, 7	8	9	10
Meaning	DBL	SN	CC	STATUS	TDB	DBN_H	DBN_L	DBL
Value	0	--	'z'	xx	1	--	1	0

Table A- 25 Description of the bytes

Byte	Description
11	Mode: • 0x00 = add TagID • 0x01 = add all "OBSERVED" transponders • 0x02 = delete TagID • 0x03 = delete all
12	Reserved (value = 0)
26	Length of the EPC ID: • 0x00 = not addressed
27 ... 88	Buffer for up to 62 bytes EPC-ID

A.3.10 GET-BLACKLIST

The entire TagIDs are read out from the black list.

Table A- 26 Command

Byte	0, 1	2, 3	4	5	6, 7	8	9	10	11
Meaning	DBL	SN	CC	CI	TDB	DBN_H	DBN_L	DBL	--
Value	78	--	'I'	'U'	1	0	1	--	0
Byte	12	13	14, 15	16, 17	18 ... 21	22, 23	24, 25	26	27 ... 88
Meaning	SOURCE	--	--	--	--	--	--	--	--
Value	0	0	0	0	0	0	0	--	--

Table A- 27 Reply

Byte	0, 1	2, 3	4	5	6, 7	8	9	10	11 ... 239
Meaning	DBL	SN	CC	STATUS	TDB	DBN_H	DBN_L	DBL	DATA
Value	0	--	'I'	xx	--	--	1	0	--

Table A- 28 Description of the bytes

Byte	Description
12	Reserved (value = 0)

A.3.11 READ-CONFIG

Reads out the parameters from the reader/communications module.

Table A- 29 Command

Byte	0, 1	2, 3	4	5	6, 7	8	9	10	11	12 ... 19	20 ... 27
Meaning	DBL	SN	CC	CI	TDB	DBN_H	DBN_L	DBL	--	--	--
Value	35	--	'a'	'A'	1	0	1	35	0	0	0
Byte	28 ... 31	32, 33	34	35	36, 37	38	39	40, 41	42, 43	44, 45	
Meaning	--	--	--	--	--	--	--	--	--	--	
Value	0	0	0	0	0	0	0	0	0	0	

Table A- 30 Reply

Byte	0, 1	2, 3	4	5	6, 7	8	9	10	11 ... 239
Meaning	DBL	SN	CC	STATUS	TDB	DBN_H	DBN_L	DBL	CONFIG_ DATA
Value	--	--	'a'	xx	--	--	--	--	xx

Table A- 31 Description of the bytes

Byte	Description
11 ... 239	Buffer for up to 32 KB configuration data. Data that exceeds 239 bytes is transferred in several blocks.

A.3.12 WRITE-CONFIG

Sends new parameters to the reader/communications module.

Table A- 32 Command

Byte	0, 1	2, 3	4	5	6, 7	8	9	10	11	12 ... 19	20 ... 27
Mean-ing	DBL	SN	CC	CI	TDB	DBN_H	DBN_L	DBL	CONFIG	--	--
Value	--	--	'x'	'A'	--	--	--	--	xx	0	0
Byte	28 ... 31	32, 33	34	35	36, 37	38	39	40, 41	42, 43	44, 45	46 ... 239
Mean-ing	--	LENGTH	--	--	--	--	--	--	--	--	CONFIG_DATA
Value	0	xx	0	0	0	0	0	0	0	0	xx

Table A- 33 Reply

Byte	0, 1	2, 3	4	5	6, 7	8	9	10	11 ... 13
Mean-ing	DBL	SN	CC	STATUS	TDB	DBN_H	DBN_L	DBL	MAX_ PACKAGE SIZE
Value	2	--	'x'	xx	1	--	1	2	xx

Table A- 34 Description of the bytes

Byte	Description
Command	
11	Mode for writing the configuration data: • 0x01 = communication reset, no configuration data • 0x02 = no communication reset, configuration data to be sent • 0x03 = communication reset, configuration data to be sent • 0x80 = no communication reset, individual parameters
32, 33	Number of bytes to be written
46 ... 239	Buffer for up to 32 KB configuration data. Data that exceeds 239 bytes is transferred in several blocks.
Reply	
11 ... 13	Configuration data: • If "CONFIG" = 1, 2 or 3, the value = 0 • If "CONFIG" = 0, the value = 240 in bytes 11 and 12 the value in byte 13 is then = 1 (RF68xR) • If "CONFIG" = 4, the value = 1035 in bytes 11 and 12 the value in byte 13 is then = 1 (RF68xR)

A.4 National approvals

Table A- 35 Country approvals for the readers RF650R, RF680R, RF685R

Country	Approval available	Country profile
Albania	no	--
Algeria	no	--
Argentina	yes	Standard, FCC
Armenia	no	--
Australia	yes	Australia, FCC_AUSTRALIA
Austria	yes	Standard, ETSI
Azerbaijan	no	--
Bahrain	no	--
Bangladesh	no	--
Belarus	no	--
Belgium	yes	Standard, ETSI
Bolivia	no	--
Bosnia and Herzegovina	no	--
Botswana	no	--
Brazil	yes	Brazil, FCC_BRAZIL
Brunei Darussalam	no	--
Bulgaria	yes	Standard, ETSI
Cambodia	no	--
Cameroon	no	--
Canada	yes	Standard, FCC
Chile	no	--
China	yes	Standard, CMIIT
Colombia	yes	Standard, FCC
Congo, Rep.	no	--
Costa Rica	no	--
Côte d'Ivoire	no	--
Croatia	yes	Standard, ETSI
Cuba	no	--
Cyprus	yes	Standard, ETSI
Czech Republic	yes	Standard, ETSI
Denmark	yes	Standard, ETSI
Dominican Republic	no	--
Ecuador	no	--
Egypt, Arab Rep.	no	--
El Salvador	no	--
Estonia	yes	Standard, ETSI
Finland	yes	Standard, ETSI
France	yes	Standard, ETSI

Country	Approval available	Country profile
Georgia	no	--
Germany	yes	Standard, ETSI
Ghana	no	--
Greece	yes	Standard, ETSI
Guatemala	no	--
Honduras	no	--
Hong Kong, China	no	--
Hungary	yes	Standard, ETSI
Iceland	yes	Standard, ETSI
India	yes	India, ETSI_INDIA
Indonesia	in preparation	Indonesia , FCC_INDONESIA
Iran, Islamic Rep.	no	--
Ireland	yes	Standard, ETSI
Israel	yes	Israel, FCC_ISRAEL
Italy	yes	Standard, ETSI
Jamaica	no	--
Japan	yes	Japan, CMIIT_JAPAN
Jordan	no	--
Kazakhstan	no	--
Kenya	no	--
Korea, Rep.	yes	South Korea, FCC_SOUTHKOREA
Korea (DPR)	no	--
Kuwait NA	no	--
Kyrgyz Republic	no	--
Latvia	yes	Standard, ETSI
Lebanon	no	--
Libya	no	--
Liechtenstein	yes	Standard, ETSI
Lithuania	yes	Standard, ETSI
Luxembourg	yes	Standard, ETSI
Macao, China	no	--
Macedonia, FYR	no	--
Malaysia	no	--
Malta	yes	Standard, ETSI
Mauritius	no	--
Mexico	yes	Standard, FCC
Moldova	no	--
Mongolia	no	--
Montenegro	no	--
Morocco	no	--
Netherlands	yes	Standard, ETSI

Country	Approval available	Country profile
New Zealand	no	--
Nicaragua	no	--
Nigeria	no	--
Norway	yes	Standard, ETSI
Oman	no	--
Pakistan	no	--
Panama	no	--
Paraguay	no	--
Peru	no	--
Philippines	no	--
Poland	yes	Standard, ETSI
Portugal	yes	Standard, ETSI
Romania	yes	Standard, ETSI
Russian Federation	yes	Russia, ETSI_RUSSIA
Saudi Arabia	no	--
Senegal	no	--
Serbia	no	--
Singapore	no	--
Slovak Republic	yes	Standard, ETSI
Slovenia	yes	Standard, ETSI
South Africa	yes	Standard, ETSI
Spain	yes	Standard, ETSI
Sri Lanka	no	--
Sudan	no	--
Sweden	yes	Standard, ETSI
Switzerland	yes	Standard, ETSI
Syrian Arab Rep.	no	--
Taiwan	no	--
Tajikistan	no	--
Tanzania	no	--
Thailand	in preparation	Thailand, FCC_THAILAND
Trinidad and Tobago	no	--
Tunisia	no	--
Turkey	yes	Standard, ETSI
Turkmenistan	no	--
Uganda	no	--
Ukraine	no	--
United Arab Emirates	no	--
United Kingdom	yes	Standard, ETSI
United States	yes	Standard, FCC
Uruguay	no	--
Uzbekistan	no	--

Country	Approval available	Country profile
Venezuela	no	--
Vietnam	no	--
Yemen, Rep.	no	--
Zimbabwe	no	--

A.5 Service & Support

Industry Online Support

In addition to the product documentation, the comprehensive online information platform of Siemens Industry Online Support at the following Internet address:
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- Contacts, Technical Forum
- The option submitting a support query:
  link 2: (https://support.industry.siemens.com/My/ww/en/requests)
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