



RFID systems

SIMATIC Ident
SIMATIC RF-DIAG




Operating Manual

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Legal information

Warning notice system

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.

 DANGER
indicates that death or severe personal injury will result if proper precautions are not taken.
 WARNING
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.


If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

Qualified Personnel

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.

Proper use of Siemens products

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 WARNING
Siemens products may only be used for the applications described in the catalog and in the relevant technical documentation. If products and components from other manufacturers are used, these must be recommended or approved by Siemens. Proper transport, storage, installation, assembly, commissioning, operation and maintenance are required to ensure that the products operate safely and without any problems. The permissible ambient conditions must be complied with. The information in the relevant documentation must be observed.

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Disclaimer of Liability

We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

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Introduction

1.1 Preliminary information

Purpose of this document

This manual contains information on the installation and operation of the SIMATIC RF-DIAG diagnostics tool. The diagnostics tool supports you during commissioning and diagnostics of UHF reading points and helps you to optimize the reader settings.

It is intended for machine operators, production line operators, configuration engineers and maintenance and servicing staff who are responsible for the smooth operation of the system.

To work with the diagnostics tool, you require knowledge of the Windows version you are using, Windows XP or Windows 7.

To configure the RFID components, you require knowledge of the following:

- Structure of the particular plant
- Configuration of the plant
- Basic knowledge of RFID and UHF

Only perform the installation and subsequent configuration if you have this knowledge.

Registered trademarks

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History

The following edition(s) of this manual have been published previously:

Edition	Note
09/2012	First edition

Additional documentation

You will find additional information on setting parameters for the RF620R/RF630R readers in "Parameter assignment manual RF620R/RF620R (<http://support.automation.siemens.com/WW/view/en/33287195>)".

You will find additional information on setting parameters for the RF640R/RF670R readers in the manuals "RF-MANAGER Basic" and "XML Programming".

You will find further information on the RF600 readers, antennas and accessories in the "RF600 system manual (<http://support.automation.siemens.com/WW/view/en/22437600>)".

1.2 Abbreviations and naming conventions

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

Read/write device, RWD

Reader

Mobile data storage, MDS, data carrier

Transponder, tag

Interface module, IM

Communications module, CM

Description

2.1 Requirements and notices

Minimum requirements

Table 2- 1 Hardware requirements

Processor	> 1 GHz
Main memory	> 1 GB RAM
Memory space	≥ 50 MB
Graphics resolution	<ul style="list-style-type: none"> Minimum: 1024 × 786 Recommended: 1280 × 1024
Additional hardware	CD-ROM drive

Table 2- 2 Software requirements

Operating system	<ul style="list-style-type: none"> Windows XP Professional, SP3 or higher Windows 7 Professional 32-bit, SP1 or higher Windows 7 Professional 64-bit, SP1 or higher
Additional software	Microsoft .NET-Framework 2.0 ¹
Additional USB drivers ²	Silicon Labs CP210x USB to UART Bridge ³

¹ The installation file for Microsoft .NET-Framework 2.0 is on the CD in the folder "DotNet Framework 2.0".

² Is required for communication with the RF620R/RF630R readers via the PC adapter for SIMATIC RF-DIAG

³ The installation file for the USB driver is on the CD in the folder "Silabs"

Note

No multiple instance capability

The diagnostics tool cannot be opened and operated more than once at any one time.

2.2 Area of application and scenarios

Where the diagnostics tool is used

The SIMATIC RF-DIAG diagnostics tool supports diagnostics of the following RF600 readers:

- Ethernet-based readers RF640R/RF670R
- Serial RF620R/RF630R readers

(In conjunction with the PC adapter that ships with the product)

Note

Parameter assignment of the RF640R/RF670R

To assign parameters to the RF640R and RF670R readers, you require the RF-MANAGER Basic.

Note

Functionalities depend on the firmware version of the UHF reader

The functionality provided by the software depends on the type, version and firmware version of the connected UHF reader.

Using the diagnostics tool

SIMATIC RF-DIAG supports you during commissioning and diagnostics of UHF reading points and helps you to optimize the reader settings. The aim of the diagnostics tool is to allow you to read out current values from readers so that you can adapt parameters according to the values read out. This allows you to align readers and antenna optimally and to achieve the best possible write/read results.

In an isolated test environment, for example, you can analyze the write/read behavior of readers. You can obtain specific information about the various influences on the write/read result and how the result can be optimized by the spatial arrangement or by adapting the parameters.

Readers, for example, that do not return ideal write/read results in an industrial environment can be diagnosed selectively. You can adapt the parameters and optimize the write/read behavior taking into account the current environmental conditions.

Based on these examples, the following scenarios emerge:

- Diagnostics of an Ethernet-based reader
- Diagnostics of a serial reader in an isolated test environment
- Diagnostics of a serial reader in industrial applications

The various scenarios require different procedures when connecting the readers. Connecting the readers is described in the section "Connecting the hardware (Page 19)".

2.3 Components of the product and ordering data

Components of SIMATIC RF-DIAG

- CD with SIMATIC RF-DIAG software, USB driver and documentation
- PC adapter for SIMATIC RF-DIAG for connecting the SIMATIC RF readers to SIMATIC RF-DIAG software
- RS-422 cable, length 2 m
- USB connecting cable (USB 2.0 standard A at PC end to USB 2.0 mini-B at adapter end), length 1.8 m

Ordering data

Product	Order number
SIMATIC RF-DIAG	6GT2080-3GA00
Accessories for SIMATIC RF-DIAG	
Adapter cable for wide-range power supply 24 VDC connecting cable for PC adapter for SIMATIC RF-DIAG, length 5 m	6GT2891-0PH50
RS-422 cable, length 2 m (spare part)	6GT2891-4FH20
Wide-range power supply unit for SIMATIC RF systems (100 - 240 VAC / 24 VDC / 3 A) with 2 m connecting cable with country-specific plug	EU: 6GT2898-0AA00 UK: 6GT2898-0AA10 US: 6GT2898-0AA20

2.3 Components of the product and ordering data

Connecting hardware

To be able to read out data from readers using the diagnostics tool or to assign parameters to the reader, you need to connect the reader involved to a PC.

The Ethernet-based readers RF640R/RF670R can be connected quickly and simply to the PC using a crossover cable or with an Ethernet adapter capable of cross-linking. The serial readers RF620R/RF630R need to be connected to the PC using the PC adapter that ships with the product. You will find further information about the PC adapter and connecting the readers in the following sections.

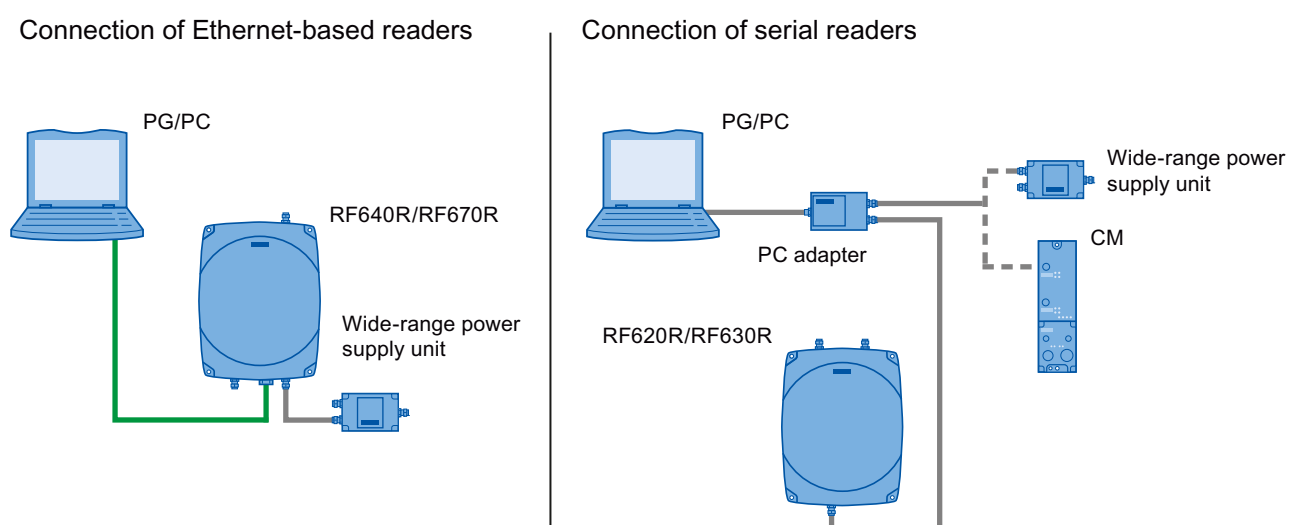
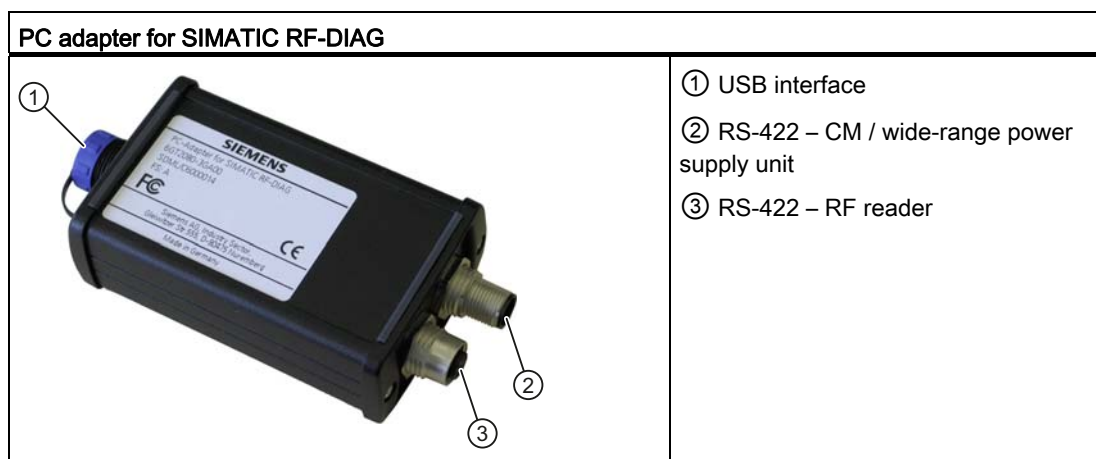


Figure 3-1 Connecting the reader to a PC

3.1 The PC adapter for SIMATIC RF-DIAG

3.1.1 Description



The SIMATIC RF-DIAG product consists of a CD with software and documentation and a hardware packet. The hardware packet consists of a PC adapter for SIMATIC RF-DIAG, a USB connecting cable and an RS-422 cable.

The PC adapter for SIMATIC RF-DIAG is a converter from USB to RS-422. Communication between the PC and reader can be established using the PC adapter.

Characteristics

- RS-422 to USB converter for communication with the RF620R and RF630R
- Dimensions without connecting cables: 101 x 63 x 35 mm
- CE-compliant (EU and UK versions)
- FCC-compliant for use in the USA and Canada
- Mechanically and electrically rugged design
- RS-422 interface
 - With 24 VDC / 3 A for CM or wide-range power supply unit
 - With 24 VDC / 3 A for reader
- Short-circuit proof

Highlights

- Diagnostics via a PC with the reader supplied with power from the system
- IP65 degree of protection
- Can be used in high temperature ranges
- Use in productive operation possible
- Switchover to diagnostics mode "on the fly" (parallel to regular operation)

Note

Protection from environmental influences

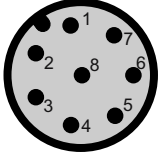
The IP65 degree of protection of the PC adapter is only valid if the USB protective cap is fitted and the corresponding RS-422 cable is connected. During diagnostics, this degree of protection is not present.

3.1.2 Pin assignment of the RS-422 interface

Pin assignment for connection to the CM or wide-range power supply unit

Pin assignment of the connector for PC adapter and CM or wide-range power supply unit

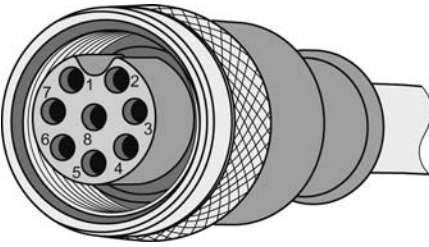
Table 3- 1 RS-422 interface of the PC adapter (male connector)

Pin	Pin Device end 8- pin M12	Assignment for CM	Assignment for wide-range power supply unit
	1	+ 24 V	+ 24 V
	2	- Transmit	Free
	3	0 V	0 V
	4	+ Transmit	Free
	5	+ Receive	Free
	6	- Receive	Free
	7	Free	Free
	8	Ground (shield)	Ground (shield)

The knurled bolt of the M12 plug does not contact the shield (reader end).

Pin assignment of the connecting cable between PC adapter and CM or wide-range power supply unit

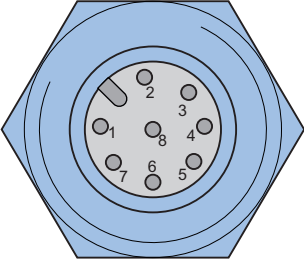
Table 3- 2 RS-422 connecting cable

View of M12 socket	M12 pin	Core color	Pin assignment for CM	Pin assignment for wide-range power supply unit
	1	White	24 VDC	24 VDC
	2	Brown	TX neg	Not used
	3	green	GND	GND
	4	Yellow	TX pos	Not used
	5	gray	RX pos	Not used
	6	pink	RX neg	Not used
	7	Blue	Not used	Not used
	8	Red	Ground (shield)	Ground (shield)

Pin assignment for connecting to the RF readers

Pin assignment of the connector for PC adapter and UHF reader

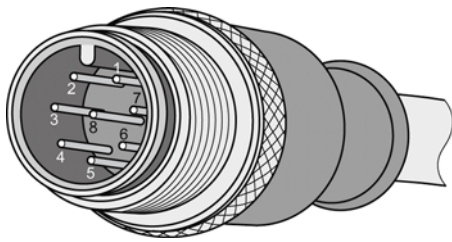
Table 3- 3 RS-422 interface of the PC adapter (female connector)

Pin	Pin Device end 8- pin M12	Assignment for the RF readers
	1	+ 24 V
	2	- Transmit
	3	0 V
	4	+ Transmit
	5	+ Receive
	6	- Receive
	7	Free
	8	Ground (shield)

The knurled bolt of the M12 plug does not contact the shield (reader end).

Pin assignment of the connecting cable between PC adapter and UHF reader

Table 3- 4 RS-422 connecting cable

View of M12 plug	M12 pin	Wire color	Pin assignment
	1	White	24 VDC
	2	Brown	TX neg
	3	green	GND
	4	Yellow	TX pos
	5	gray	RX pos
	6	pink	RX neg
	7	Blue	Not used
	8	Red	Ground (shield)

Pin assignment for connection to the PC

Table 3- 5 USB 2.0 mini-B connector socket of the PC adapter

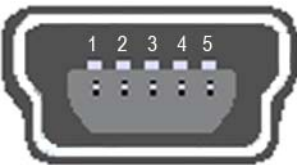
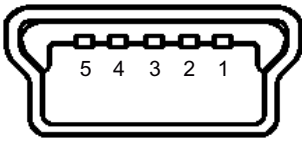
View of connection socket	Pin Device side	Assignment
	1	+ 5 V
	2	Data -
	3	Data +
	4	ID (not used)
	5	GND

Table 3- 6 USB 2.0 mini-B plug of the connecting cable

View of mini-B plug	Pin Device side	Wire color	Assignment
	1	Red	+ 5 V
	2	White	Data -
	3	green	Data +
	4	-	ID (not used)
	5	Black	GND

3.1.3 Technical specifications

Table 3- 7 Mechanical data

Property		Description
Weight		310 g
Dimensions (L x W x H)		101 × 63 × 35 mm
Enclosure material		Aluminum (painted)
Housing color		Black
Installation		No securing aids
Interfaces		
	RS422	<ul style="list-style-type: none"> 1 x pin (8-pin M12, connection to CM/wide-range power supply) 1 x socket (8-pin M12, connection to the reader)
	USB	USB 2.0 Mini-B
MTBF in years		1.1x10 ³

Table 3- 8 Software interfaces

Property		Description
Software – RS-422		SIMATIC S7 / TIA
Software – USB <ul style="list-style-type: none"> RF600 		<ul style="list-style-type: none"> 3964R & RF-DIAG

Table 3- 9 Electrical data

Property		Description
Power supply of the PC adapter via USB (during operation) <ul style="list-style-type: none"> Nominal value Permitted range 		<ul style="list-style-type: none"> 5 V DC 4.0 to 5.25 VDC
Power supply of the RF readers via RS-422 <ul style="list-style-type: none"> Nominal value Permitted range 		<ul style="list-style-type: none"> 24 VDC 20 to 30 VDC
Current consumption <ul style="list-style-type: none"> Connection via USB and RS-422 No connection via USB 		<ul style="list-style-type: none"> Via 5 VDC, approx. 30 mA; 24 VDC, approx. 15 mA Via 24 VDC, ≤ 5 mA
Transmission rates USB / RS-422		<ul style="list-style-type: none"> 19.2 Kbps 57.6 Kbps 115.2 Kbps

Table 3- 10 Ambient conditions

Property	Description
Temperature range during operation	-25 °C to +70 °C
Temperature range during storage	-40 °C to +85 °C
Shock resistant to EN 60068-2-27	50 g, ¹⁾
Vibration resistant to EN 60068-2-6	20 g, ¹⁾
Degree of protection in accordance with EN 60529	IP65 ²⁾

¹⁾ The values for shock and vibration are maximum values and must not be applied continuously nor when the USB plug is plugged in.

²⁾ Only when the USB protective cap is fitted and the corresponding RS-422 cables are connected.

3.1.4 Dimension drawing

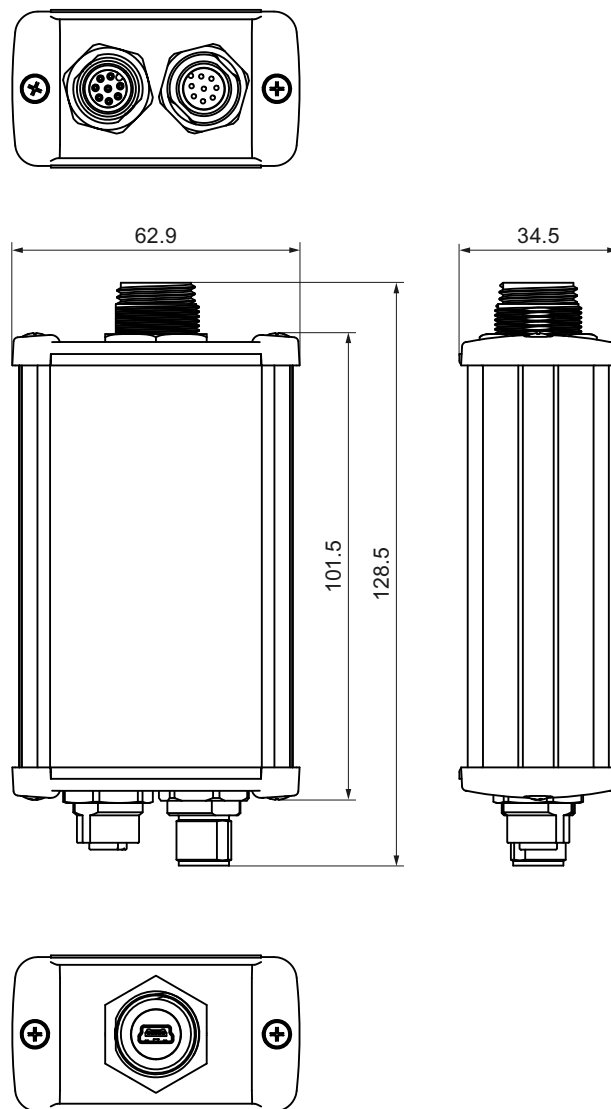




Figure 3-2 Dimension drawing of the PC adapter for SIMATIC RF-DIAG (all dimensions in mm)

When the USB protective cap is screwed on, the length of the adapter is 134 mm. The tolerances are ± 1 mm.

3.1.5 Certificates and approvals

Table 3- 11 Certificates and approvals for the PC adapter

Certificate	Description
	CE approval complying with 2004/108/EC EMC
	FCC Rules, Part 15, Subpart B, Sections 15.107 and 15.109
Industry Canada Radio Standards Specifications	CAN/CSA-CISPR 22-10 - Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement

3.2 Connecting the hardware

3.2.1 Connecting an Ethernet-based reader

Connecting an Ethernet-based reader in an isolated test environment

To set up or to diagnose an Ethernet-based reader RF640R/RF670R, you can connect the reader to the PC using a crossover cable or an Ethernet adapter capable of cross-linking.

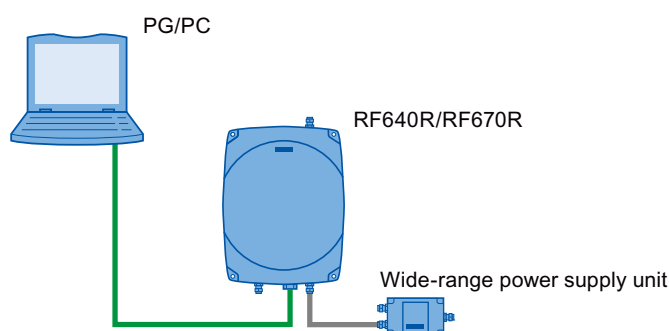


Figure 3-3 Connecting Ethernet-based readers to a PC

Note

Reader parameter assignment with RF-MANAGER Basic

Remember that you assign parameters and correct the readers using the RF-MANAGER Basic. SIMATIC RF-DIAG is used only to check the current settings.

Note that the reader cannot communicate with more than one software tool at any one time.

You will find further information on connecting up and assigning parameters for an Ethernet-based reader in the manual "RF-MANAGER Basic".

3.2 Connecting the hardware

You require the following:

- Ethernet cable
- Adapter cable for wide-range power supply unit
- Wide-range power supply unit

Follow the steps below to connect an Ethernet-based reader to a PC:

1. Connect the PC to the reader using a crossover cable.
2. Start the SIMATIC RF-DIAG diagnostics tool and establish the connection between the PC and reader using the software user interface as described in the sections "Starting the software (Page 25)" and "Operating the software (Page 29)".

3.2.2 Connecting a serial reader

The serial readers need to be connected to the PC using the PC adapter. The following scenarios are possible:

- Diagnostics of a serial reader in an isolated test environment
- Diagnostics of a serial reader in industrial applications

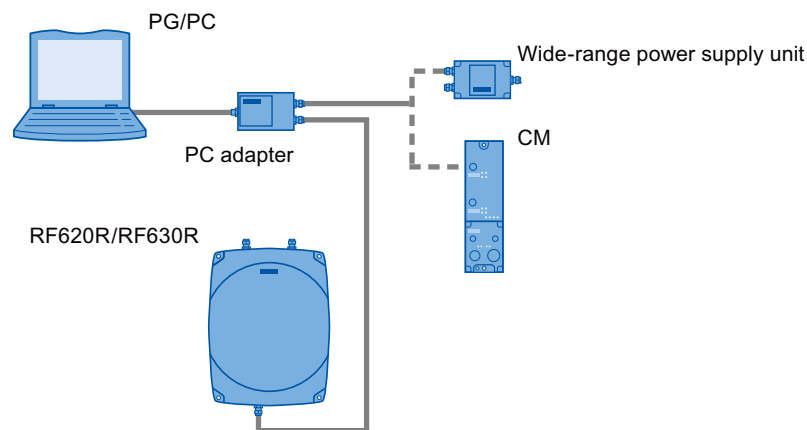


Figure 3-4 Connecting serial readers to a PC

Diagnostics of a serial reader in an isolated test environment:

To set up an RF620R/RF630R serial reader or to run diagnostics on it, you require the supplied PC adapter for SIMATIC RF-DIAG. To run diagnostics in an isolated test environment, you require neither a master module nor a communications module.

You require the following:

- Wide-range power supply unit
- Adapter cable for wide-range power supply unit
- RS-422 cable (ships with product)
- USB cable (ships with product)

Follow the steps below to operate a serial reader from a PC:

1. Connect the wide-range power supply unit to the interface with an RS-422 cable.
The connected wide-range power supply unit supplies the reader with power.
2. Connect the reader to the interface with an RS-422 cable.
3. Connect the PC to the USB interface using the USB connecting cable.
4. Start the SIMATIC RF-DIAG diagnostics tool and establish the connection between the PC and reader using the software user interface.

Diagnostics of a serial reader in industrial applications:

When using a serial reader in an industrial environment, the reader is operated using CMs and a master module. To set up an RF620R//RF630R serial reader or to run diagnostics on it, you also require the PC adapter for SIMATIC RF-DIAG.

To run diagnostics, you need to disconnect the reader from the CM and connect both devices to the PC adapter via the RS-422 interface. Communication between the reader and CM is via the PC adapter.

To run diagnostics, you now need to connect the PC to the reader via the USB interface of the PC adapter. As soon as the PC has been connected to the PC adapter, communication between the CM and reader is interrupted. You can now read out the data or adapt parameters using the PC. If you disconnect the PC and PC adapter in the software user interface, the reader is automatically restarted. Then disconnect the USB cable to prevent a restart of the reader in diagnostics mode and to restore the communications connection between reader and CM. Data that has not been saved is lost. During this procedure, the power supply is always maintained.

Note

Sequence when disconnecting

Always disconnect the PC and PC adapter first using the software user interface before you unplug the USB cable.

You require the following:

- Operational CM connected using a suitable connecting cable between the CM and reader
- 2 x RS-422 cable (one cable ships with the product, use a second cable from the plant)
- USB cable (ships with product)

Follow the steps below to operate a serial reader in an industrial environment:

1. Connect the CM to the interface with an RS-422 cable.

The reader is supplied with power via the connected CM.

2. Connect the reader to the interface with an RS-422 cable.
3. Connect the PC to the USB interface using the USB connecting cable.

As soon as you connect the PC, the connection between the CM and reader is interrupted. Communication with the connected PC is now via the USB interface.

4. Start the SIMATIC RF-DIAG diagnostics tool and establish the connection between the PC and reader using the software user interface.

Software installation

4.1 Installing the software

To use the SIMATIC RF-DIAG diagnostics tool, you do not need to perform any installation. Follow the steps below to copy the diagnostics tool to your PC:

1. Insert the supplied CD in your CD drive.
2. Right-click on the "SIMATIC RF-DIAG" folder on the CD and select the "Copy" command in the shortcut menu.
3. Select the folder on your PC to which you want to copy the diagnostics tool.
4. Right-click on the folder and select the "Paste" command in the shortcut menu.

Note

Installing .NET Framework

If an error message appears when you start the diagnostics tool SIMATIC RF-DIAG, this indicates that the required version of .NET Framework is not yet on your system.

The required version of .NET Framework is available on the CD in the "DotNET Framework 2.0" folder.

Run both setups "NetFx20SP2_x86.exe" and then "NDP20SP2-KB958481-x86.exe" to install the required components.

4.2 Installation and use of the USB driver

To operate the SIMATIC RF-DIAG application with a serial reader (RF620R/RF630R), the appropriate USB driver "Silicon Labs CP210x USB to UART Bridge" Version 6.5.3.0 is required for communication via the PC adapter for SIMATIC RF-DIAG. The following steps are described based on the "Windows XP" operating system.

A. Check for and uninstall older variants of the USB driver "Silicon Labs CP210x USB to UART Bridge" version 6.5.3.0

1. Open "Computer Management " with "Start > Settings > Control Panel > Administrative Tools".
2. Select "Device Manager" and open the subfolder "Ports (COM & LPT)".

If the USB driver "Silicon Labs CP210x USB to UART Bridge" was installed previously, you will find the following as one of the entries:
"Silicon Labs CP210x USB to UART Bridge (COM<x >)" (e.g. "Silicon Labs CP210x USB to UART Bridge (COM5)").

If there is no "Silicon Labs CP210x USB to UART Bridge" entry in the "Ports (COM & LPT)" subfolder, you can cancel the steps already taken in the open dialog boxes and start installation of the USB driver.
3. Select the entry with the right mouse button and then select "Properties" in the shortcut menu.

In the "Driver" tab of the dialog box that now opens, you will find the "Driver Version" entry.
4. If the driver version is lower than 6.5.3, click "Cancel".
5. Uninstall the driver by selecting the USB driver with the right mouse button and selecting "Uninstall" in the shortcut menu.
6. Follow the instructions of the wizard.

B. Installation of the USB driver for the PC adapter for SIMATIC RF-DIAG

1. Install the correct variant (32/64-bit) of the USB driver using the setup "CP210xVCPInstaller.exe" in "<CD>\SiLabs\MCU\CP210x\Windows_XP_S2K3_Vista_7".
2. Following installation, insert the USB cable that is already connected to the PC adapter into the PC.

At the bottom right of the screen, you will see a message that a new device has been detected and the initialization of the PC adapter is completed.
3. The new device appears in the Device Manager as "Silicon Labs CP210x USB to UART Bridge".

To identify the COM port that needs to be set in the SIMATIC RF-DIAG application for serial readers, follow the steps below:

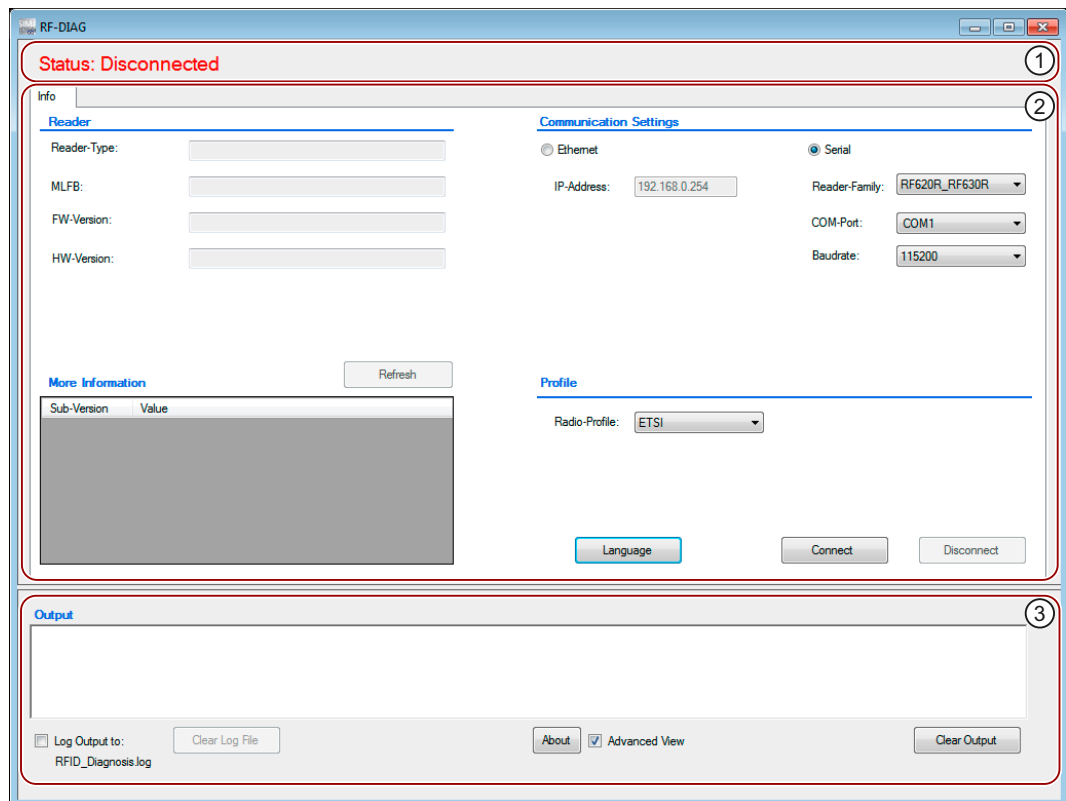
C. Selecting the COM port using SIMATIC RF-DIAG

1. Open "Computer Management " with "Start > Settings > Control Panel > Administrative Tools".
2. Select "Device Manager" and open the subfolder "Ports (COM & LPT)".
3. If the USB driver of the PC adapter for SIMATIC RF-DIAG was correctly installed earlier, you will find the following as one of the entries:
"Silicon Labs CP210x USB to UART Bridge (COM<x >)" (e.g. "Silicon Labs CP210x USB to UART Bridge (COM5)").

This means that you select COM<x> from the drop-down list in the SIMATIC RF-DIAG application as the port (in the example above "COM5").

4.3 Starting the software

Once you have copied the diagnostics tool, you can start SIMATIC RF-DIAG by double-clicking on the "SIMATIC_RF-DIAG.exe" file. After starting the software, the user interface of the diagnostics tool appears:



The 3 areas of the software user interface

- ① Status area
- ② Reader-specific functionalities
- ③ Protocol area

Figure 4-1 User interface of the SIMATIC RF-DIAG software

Status area ①

The status area shows which reader type is currently connected to the PC as well as the current status of the connection.

Display of the active UHF algorithms:

only with RF620R / RF630R

As soon as the connection is established to a serial reader, the possible UHF algorithms are also displayed. The UHF algorithms that were activated are highlighted on a green background.

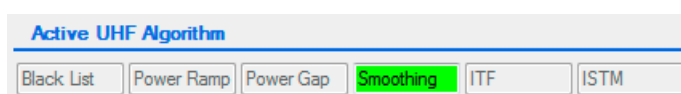


Figure 4-2 Display of the active UHF algorithms

The following table shows the tabs of the software user interface that are affected by the active UHF algorithms:

Tab	Active UHF algorithm					
	Black List	Power Ramp	Power Gap	Smoothing	ITF	ISTM
Info	-	-	-	-	-	-
Tag Data	X	-	-	-	-	-
RSSI	X	-	-	-	-	-
Power Ramp	X	X	-	-	-	-
Tag list	X	X	X	X	X	X
VSWR	-	-	-	-	-	-
Firmware update	-	-	-	-	-	-

Reader-specific functionalities ②

After starting the program only the "Info" tab is displayed. This tab is always displayed regardless of the connection status and the reader type. It serves as the central starting point for establishing a connection to the reader.

Various tabs are displayed depending on the reader you connect to. The "Reader-specific functionalities" area depends on the particular tab and displays reader-specific functions.

If you have established the connection to a reader, various functions of the diagnostics tool are displayed in tabs depending on the connected reader.

You will find the list of all tabs and a detailed description of the functions in the section "Operating the software (Page 29)".

Logging area ③

This part of the application provides a logging function with which all actions performed, events and error messages are logged. You will find more detailed information on the logging area in the section "The log area (Page 30)".

Operating the software

Note**Entry of incorrect values**

Newly entered values are checked only when they are changed or written to the reader. If you enter incorrect or invalid values in input boxes, these values are not transferred to the reader when you attempt to make changes or write to the reader. Following attempted changes/writing, these invalid values are highlighted in the user interface in orange.

Note**Display of changed values**

Changed values that have not yet been transferred to the reader are shown in green.

5.1 The log area

Setting options for the log area

The log area is included in all tabs. All the actions taken are logged in the output window of the logging area. The output is stored in a ring buffer. When the buffer is full, the oldest entries are overwritten by the newer entries.

You can save the displayed entries in a log file ("RFID_Diagnosis.log"). Apart from the information displayed in the user interface, all communication from and to the reader is also logged. This allows a more thorough analysis later if problems occur. The log file is located in the same directory as the executable program "SIMATIC_RF-DIAG.exe".

The maximum size of the log file is only limited by the file system and the space on the hard disk of the computer you are using.

With the "About" button, you can display the version of the software.

To display all tabs of the diagnostics tool, you need to select the "Advanced View" check box. In the default setting, the only tabs displayed are those with which you can only read out data. By selecting the "Advanced View" check box, you also see the tabs with which you can change parameters. You will find a list of the tabs in the following section.

Once you have selected the check box, you need to enter the password and confirm with "OK". The default password set in the factory is "1234". Click the "Change" button to change the password.

Both the content of the display window as well as the log file can be emptied separately using the "Clear Output" or "Clear Log File" buttons.

Note

Forgotten password

If the password is forgotten, the software needs to be reinstalled.

5.2 Tab overview

After successful establishment of a connection to the reader, the following tabs are available depending on the connected reader type and the firmware version:

Table 5- 1 The tabs of the Ethernet-based readers RF640R/RF670R

Tab	Functionality	Note/uses	Adv. View
Info	<ul style="list-style-type: none"> • Connection establishment to reader • Display of reader-specific information • Change language 	Always visible Precise indication of which reader type is connected.	<input type="checkbox"/>
Tag Data	Read and write functions for the memory areas of a transponder.	Test of the functionality of the reader Check of transponder data	<input checked="" type="checkbox"/>
Tag Events	Visualization of the transponder events sent by the reader.	Test of the functionality of the reader	<input type="checkbox"/>
IO	Setting outputs and visualization of the current statuses of the inputs.	Test of the functionality of the reader	<input type="checkbox"/>
RSSI	Display of the RSSI values of the read transponders	Optimization of the antenna alignment	<input type="checkbox"/>

Table 5- 2 The tabs of the serial readers RF620R/RF630R

Tab	Functionality	Note/uses	Adv. View
Info	<ul style="list-style-type: none"> • Connection establishment to reader • Display of reader-specific information • Change language 	Always visible. Precise indication of which reader type is connected.	<input type="checkbox"/>
Tag Data	Read and write functions for the memory areas of a transponder.	Test of the functionality of the reader Check of transponder data	<input checked="" type="checkbox"/>
RSSI	Display of the RSSI values of the read transponders	Optimization of the antenna alignment	<input type="checkbox"/>
Power Ramp (as of V2.0*)	Visualization of the power set by the reader per read cycle	Setting the optimum power ramp values.	<input checked="" type="checkbox"/>
Tag List (as of V2.0*)	Display of the RSSI values read over time and the read power used for them by the reader.	Check of the effectiveness of the set UHF features.	<input checked="" type="checkbox"/>
Parameter (as of V2.0*)	Boxes for setting the selected features	Setting of all UHF features	<input checked="" type="checkbox"/>
VSWR	Display of the VSWR value (voltage standing wave ratio) of the connected antennas.	Read out of the quality characteristics of the air interface	<input checked="" type="checkbox"/>
Firmware-Update (as of V1.04*)	Updating the firmware	-	<input type="checkbox"/>

*)Firmware version of the reader

5.3 The tabs of the RF640R/RF670R readers

Note

Configuration of the RF640R/RF670R readers is possible only using the RF-MANAGER Basic

If an RF640R/RF670R reader is connected, the data sources can only be configured with the RF-MANAGER Basic. The SIMATIC RF-DIAG diagnostics tool only accesses the configuration loaded on the reader.

5.3.1 The "Info" tab

With the functions on the "Info" tab, you can establish the connection to the reader. This tab is always displayed regardless of the connected reader type or the current connection status.

Following successful connection establishment to a reader, important basic information of the reader is displayed.

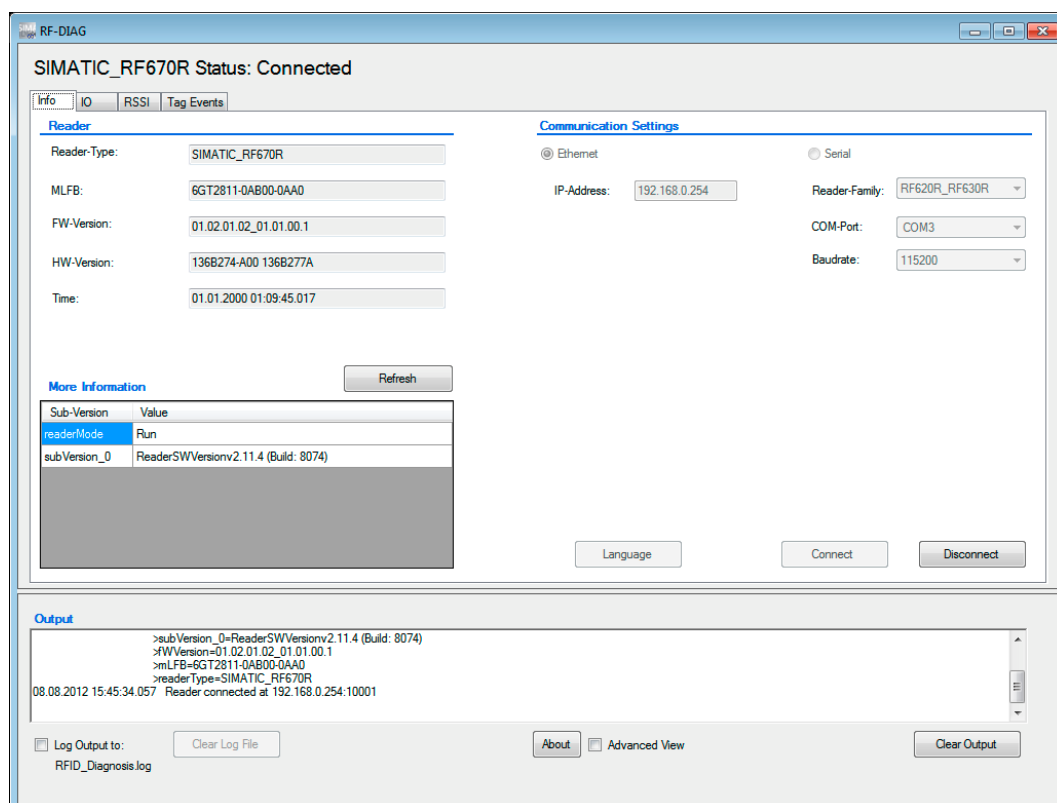


Figure 5-1 The "Info" tab following successful connection establishment to an RF670R

Establishing a connection to Ethernet-based readers

To establish a connection to an Ethernet-based reader, follow the steps below:

1. In the "Communication Settings" area, select "Ethernet".
2. Enter the IP address of the reader currently connected to the PC in the "IP-Address" input box.

To be able to establish the connection to the reader, this address must be known. Each reader is assigned the default IP address 192.168.0.254 in the factory.

Note

Reading out and changing the IP address of the reader

You can only read out or change the IP address of a reader using the RF-MANAGER Basic.

3. Click the "Connect" button.

Reaction: The connection to the reader is established. The basic information of the reader is displayed in the "Reader" area.

Changing the language

In the "Info" tab, you can change the language of the software user interface. Click the "Language" button to change the software user interface to German or English.

5.3.2 The "Tag Data" tab

The "Tag Data" tab is displayed only in the advanced view.

Using the "Tag Data" tab, you can verify the transponder data and the basic function of a reading point quickly and simply. You can read out any data from the transponder or write to the transponder. When writing to the transponder, you can address all memory areas of the transponder. With a single command, a maximum of 64 bytes can be read or written.

You can also change the EPC-ID of the transponder.

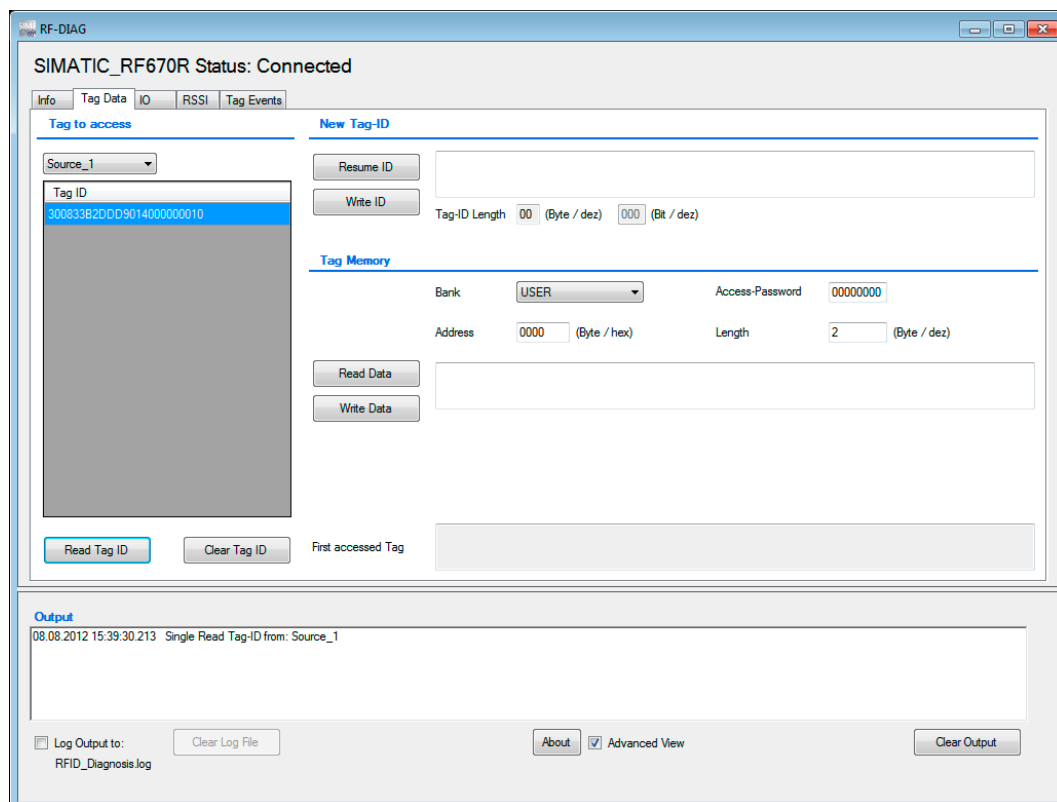


Figure 5-2 The "Tag Data" tab

Selecting transponders

In the drop-down list of the "Tag to access" area, you can choose the data source via which the reader will establish the connection to the transponder.

The "Tag ID" list contains all the transponders in the antenna field. You can update the list with the "Read Tag ID" button. From this list, select the transponder for which you want to use write or read operations.

Assigning a new tag ID

To assign a new tag ID to a transponder, follow the steps below:

1. Select the required transponder in the "Tag ID" list.
2. In the "New Tag-ID" area, click the "Resume ID" button to accept the current tag ID of the transponder.

Reaction: The ID of the transponder is displayed as a hexadecimal character string in the input box.

3. Adapt the tag ID displayed in the input field as required.

The tag ID length to be written is decided by the number of characters and specified in bytes or bits in two output boxes.

4. Click the "Write ID" button to transfer the new ID to the transponder.

Reaction: The tag ID is written to the transponder.

Note

Error message "Weak Power"

If the error message "Weak Power" appears after writing the tag ID, it is possible that the new tag ID of the transponder was not overwritten. In this case read out the tag ID again and, if necessary repeat the write function.

Reading/writing tag data

In the "Tag Memory" area, you can address all memory areas of an ISO 18000-6C transponder. You can read/write specific data using the "Bank" drop-down list and the two input boxes "Address" and "Length". To read/write a protected transponder, you will need to specify the "Access Password" of the transponder.

Click the "Read Data" button to read out the data of the transponder. The data read out is displayed in the input box as a hexadecimal character string. With the "Write Data" button, you can write the data in the input box to the transponder.

Note

"Address" input box

In the "Address" input box, you set the address offset (in bytes) of the selected memory bank (EPC, USER, RESERVED, TID). The meaning of the bytes for each memory bank is according to ISO 18000-6C.

Note

"Tag to access" list empty or deleted

If the "Tag to access" list is empty or has been deleted, read/write commands then apply to all transponders in the input box.

Note

"First accessed Tag"

The first transponder to be processed is always displayed. If more than one transponder was processed in the input box, the list of the EPC IDs of all processed transponders can be seen in "Output". If there is only one tag that was processed in the input box, this is displayed.

5.3.3 The "IO" tab

Using the "IO" tab (Inport/Output), you can read out the inputs and outputs of the connected readers. In this tab, you can also set specific outputs.

The inputs/outputs of the readers can only be read out synchronously. The reader can also send IO events for changes at its inputs/outputs. IO events are, however, only sent by the reader if the reader was suitably configured.

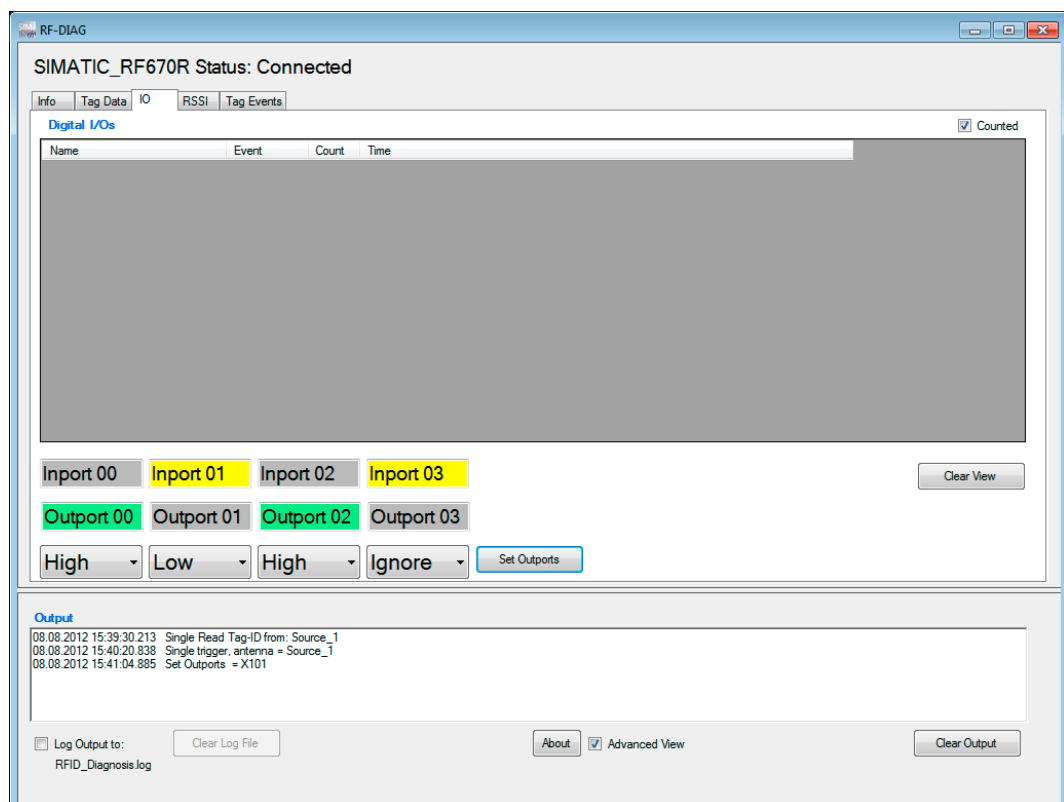


Figure 5-3 The "IO" tab

Displaying the IO events

As soon as you open the "IO" tab, the diagnostics tool starts to record all events (state changes) of the inputs/outputs (IO events). The detected IO events are displayed in the form of a table. IO events are, however, only sent by the reader if the reader was suitably configured. With the default setting, no IO events are sent.

With the "Counted" check box, you can change the table mode to display a compact table.

Note

Enabling or disabling "Counted"

When you enable or disable "Counted", the displayed list is deleted and the displayed events re-initialized.

The two table modes:

- Counted (default)
Compact overview - recommended if large numbers of IO events are involved. In this mode only one row of the table is used per input/output and possible event (High, Low). If an event is repeated on a transponder, only the existing row is updated. Multiple occurrences of the same event are indicated in the "Count" column. In this mode, it is easy to recognize how often the state of an input/output has changed.
- Time
Detailed overview - each event is displayed in a separate row. This makes the chronological sequence of the IO events clear.

Table 5- 3 Displayed properties of the inputs/outputs

Property	Description
Name	Name of IO port.
Event	Type of the event. The level (High, Low) at which the input/output changed.
Count	Number of identical events of this input/output.
Time	Time stamp when the event was sent.

Setting the outputs

The digital inputs/outputs are displayed below the table. If an input is occupied, this is highlighted with a yellow background. To set the outputs again, select the required status from the drop-down lists and activate this using the "Set Outputs" button. Active outputs are highlighted in green. Changes to the outputs are documented in the logging area (X = no change, 0 = Low, 1 = High).

Remains: Output is not changed.

Off: Output is changed to "Low" state.

On: Output is changed to "High" state.

5.3.4 The "RSSI" tab

With the "RSSI" tab (Received Signal Strength Indikator) you can display the strength of the received antenna signal and, if necessary, optimize the antenna alignment or transponder position/distance. To allow optimum adaptation of the antenna, the RSSI values of the signal strength with which a transponder was recognized.

You will find further information on adapting the environmental conditions and the RSSI value in "RF600 system manual

(<http://support.automation.siemens.com/WW/view/en/22437600>)".

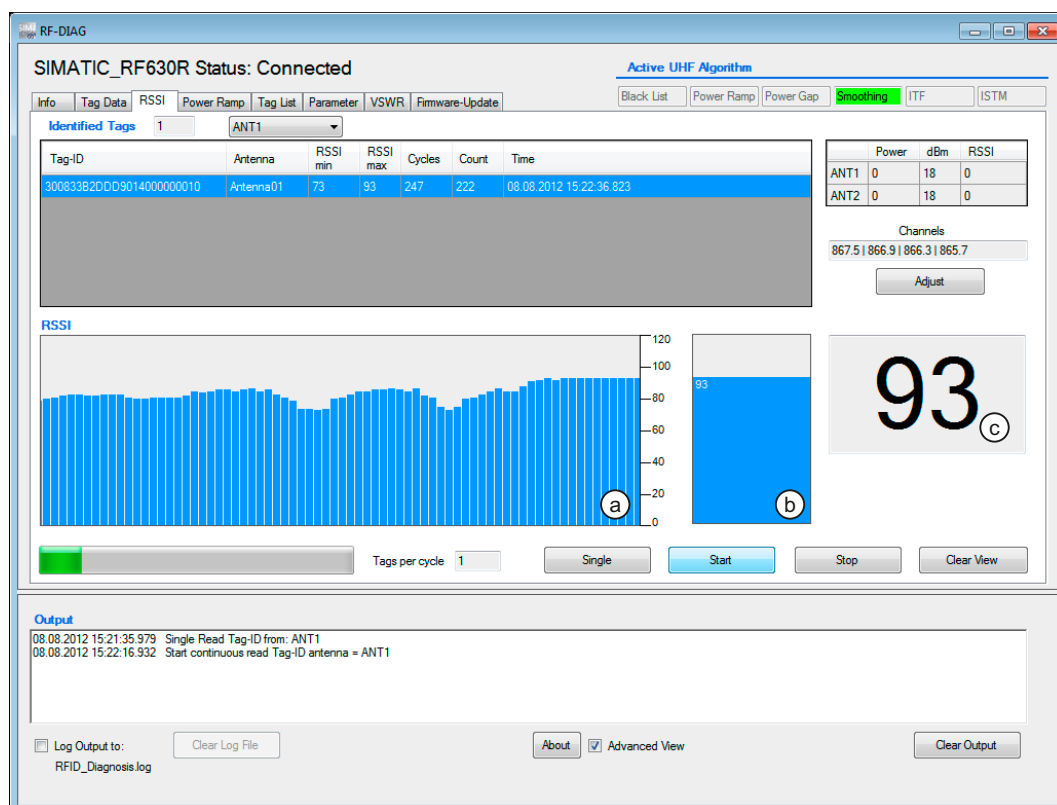


Figure 5-4 The "RSSI" tab

From the drop-down list, you can select the data source with which the recording will be made.

Controlling the recording

Using the "Single", "Start", "Stop" and "Clear View", you can control the recording of the RSSI values:

- Single setting
A single read of the selected data source is triggered and the measured values obtained are displayed.
- Start
Existing values from a previous recording are deleted. A new recording is then started. Reads of the selected data source are performed cyclically.
- Stop
Stopping the recording
- Deleting the display
Existing values from the last recording are deleted.

A progress bar indicates that the recording is active. The output box displays the number of transponders read with the last read operation.

List of identified transponders

After you have started recording the RSSI values, all the transponders identified by the reader are listed in the table.

Table 5- 4 Displayed properties of the recognized transponders

Property	Description
Tag ID	EPC ID of the detected transponder
Antenna	Antenna with which the transponder was detected. Do not forget that the transponder may also have been detected on a different antenna.
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.
Cycles	Number of inventories taken of this transponder.
Count	Number of successful inventories of this transponder.
Time	Time stamp when the transponder was last read.

To make it easier to identify the transponders and to assign the RSSI values, the transponders are shown in different colors. 10 different colors are available for distinguishing the transponders. If more transponders were read than the available colors, the colors are repeated.

Transponders can be selected individually in the table. The selected transponder is highlighted with the selection color set in Windows.

The sum of the identified transponders is displayed in the "Identified Tags" output box.

Display of the RSSI values

The RSSI values of the transponders are shown in three representations:

- RSSI value according to transponders (a)

The bar diagram shows the RSSI values of the identified transponders in chronological order. The Y axis shows the RSSI values of the transponder that were read. The X axis shows the read access to the various transponders. With each read access, the RSSI values of all identified transponders are represented as a bar.

The transponders are assigned the same colors as in the table above. If a transponder is selected in the table, the transponder in the bar diagram also changes to the selection color.

If no transponder is identified during the read, a bar with the RSSI value "0" (no bar) is displayed.

With this representation, you can recognize quickly and simply when a transponder is not read with every access.

- Current RSSI value (b, c)

The last measured RSSI value is shown in a further bar. With the aid of this view, you can quickly find the ideal alignment for the highest RSSI value by varying the antenna position.

The current RSSI value of the selected transponder is also displayed as a numeric value.

Note

RSSI display when changing data sources

If the data source is changed in other tabs when recording RSSI values, the display of the previously measured RSSI values of the previous data source is retained on screen. The RSSI values of the other data source are added.

This behavior can be avoided using "Clear View".

5.3.5 The "Tag Events" tab

Using the "Tag Events" tab, you can verify tag events quickly and simply.

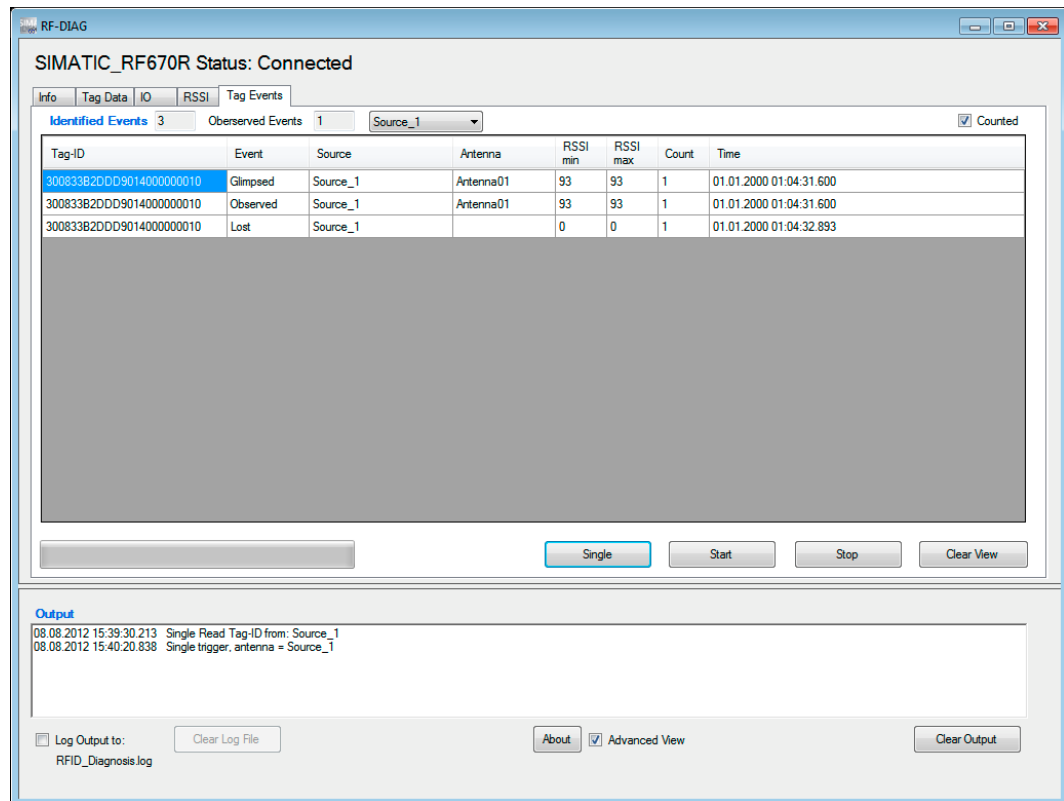


Figure 5-5 The "Tag Events" tab

From the drop-down list, you can select the data source with which the recording will be made.

Controlling recordings

Using the "Single", "Start", "Stop" and "Clear View", you can control the recording of the events:

- **Single setting**
A single read of the selected data source is triggered and the measured values obtained are displayed.
- **Start**
Any existing values from a previous recording are not deleted. A new recording is then started. Reads of the selected data source are performed cyclically.

- Stop
Stopping the recording
 - Deleting the display
Existing values from the last recording are deleted.
- A progress bar indicates that the recording is active.

Displaying the events

After starting the recording of the events, the number of identified events and the number of observed events are displayed. The table lists all the events sent by the reader.

With the "Counted" check box, you can change the table mode to display a compressed table. If you have selected the check box the "Counted" mode is active. If you have not selected the check box the "Time" mode is active.

The two table modes:

- Quantity
Compact overview - recommended if large numbers of transponders are involved. In this mode, only different events are displayed. If an event is repeated on a transponder, only the existing row is updated.
- Time (default)
Detailed overview - each event is displayed in a separate row. This makes the chronological sequence of the events clear.

Table 5- 5 Displayed properties of the Tag Events

Property	Description
Tag ID	EPC ID of the detected transponder
Event	Type of event (New, Glimpsed, Observed, Lost). Depending on the configuration in RF-MANAGER Basic, only a selection of the possible events is generated.
Data source	Data source with which the transponder was detected.
Antenna	Antenna with which the transponder was detected. Do not forget that the transponder may also have been detected on a different antenna.
RSSI ¹⁾	RSSI value of the transponder that was calculated for this event.
RSSI min ²⁾	Minimum RSSI value of the transponder. Calculated over all events of this transponder.
RSSI max ²⁾	Maximum RSSI value of the transponder. Calculated over all events of this transponder.
Count ²⁾	Number of identical events of this transponder.
Time	Time stamp when the transponder was last read.

¹⁾ exists only in "Time" mode

²⁾ exists only in "Counted" mode

5.4 The tabs of the RF620R/RF630R readers

5.4.1 The "Info" tab

With the functions on the "Info" tab, you can establish the connection to the reader. This tab is always displayed regardless of the connected reader type or the current connection status.

Following successful connection establishment to a reader, important basic information of the reader is displayed.

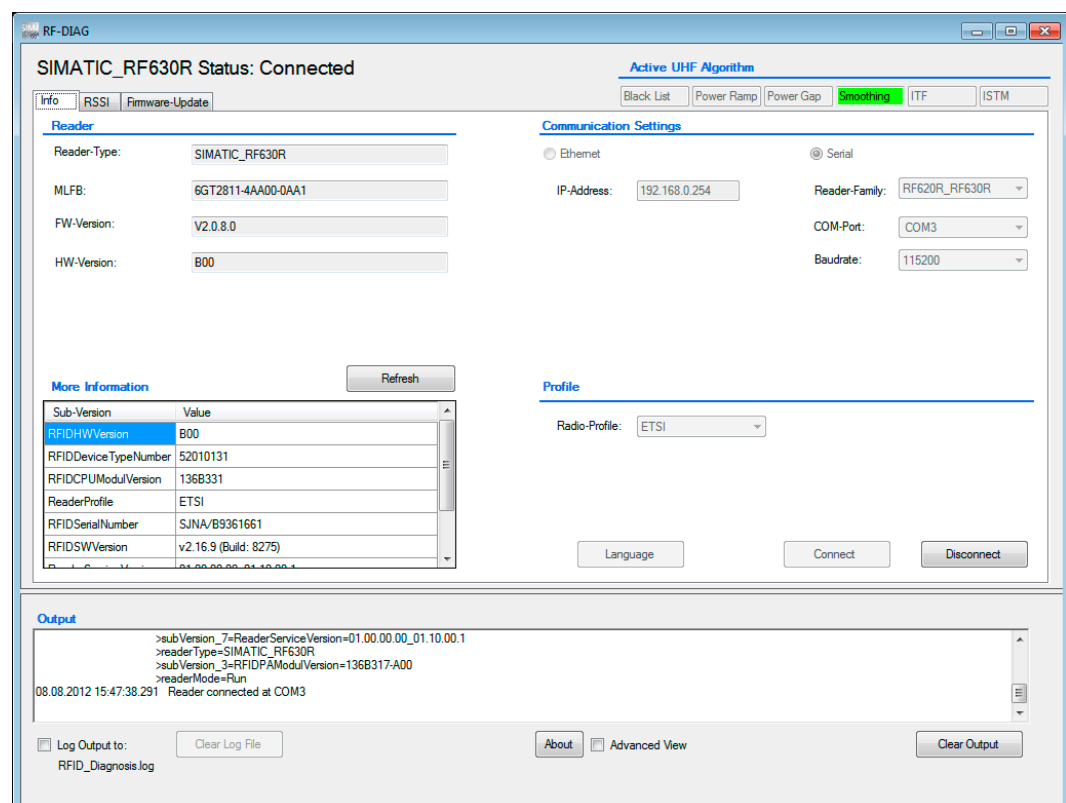


Figure 5-6 The "Info" tab following successful connection establishment to an RF630R

Establishing a connection to serially connected readers

To establish a connection to a serially connected reader, follow the steps below:

1. In the "Communication Settings" area, select "Serial".
2. From the "Reader Family" drop-down list, select the reader type currently connected to the PC.
3. From the "COM Port" drop-down list, select the port currently being used. The requirements for communication using the USB driver of the PC adapter for SIMATIC RF-DIAG and the selection of the COM port can be found in the section "Installation and use of the USB driver (Page 23)".
4. From the "Baudrate" drop-down list, select the baud rate that was stored on the CM.
5. In the "Profile" area, select the radio profile used by the reader currently connected to the PC from the "Radio Profile" drop-down list.
6. Click the "Connect" button.

Reaction: The connection to the reader is established. The basic information of the reader is displayed in the "Reader" area.

Note

Switchover to diagnostics mode

As soon as the connection to a reader is established via the diagnostics tool, the reader changes to diagnostics mode. During diagnostics mode, you can change parameters on the reader using the diagnostics tool.

Switching back to communication mode

To disconnect the diagnostics tool from the reader, follow the steps below:

1. Click the "Disconnect" button.
2. Disconnect the USB cable from the adapter.

The reader is automatically returned to communications mode to be able to communicate with the CM. This ensures problem-free communication between the reader and controller.

Note

Return to communications mode with the CM

If the reader is disconnected from the USB cable during diagnostics mode, you may need to restart the reader to be able to operate it via the CM again.

Changing the language

In the "Info" tab, you can change the language of the software user interface. Click the "Language" button to change the software user interface to German or English.

5.4.2 The "Tag Data" tab

The "Tag Data" tab is displayed only in the advanced view.

Using the "Tag Data" tab, you can verify the transponder data and the basic function of a reading point quickly and simply. In this tab, you can read out any data from the transponder or write to the transponder. When writing to the transponder, you can address all memory areas of the transponder. With a single command, a maximum of 64 bytes can be read or written.

You can also change the EPC-ID of the transponder.

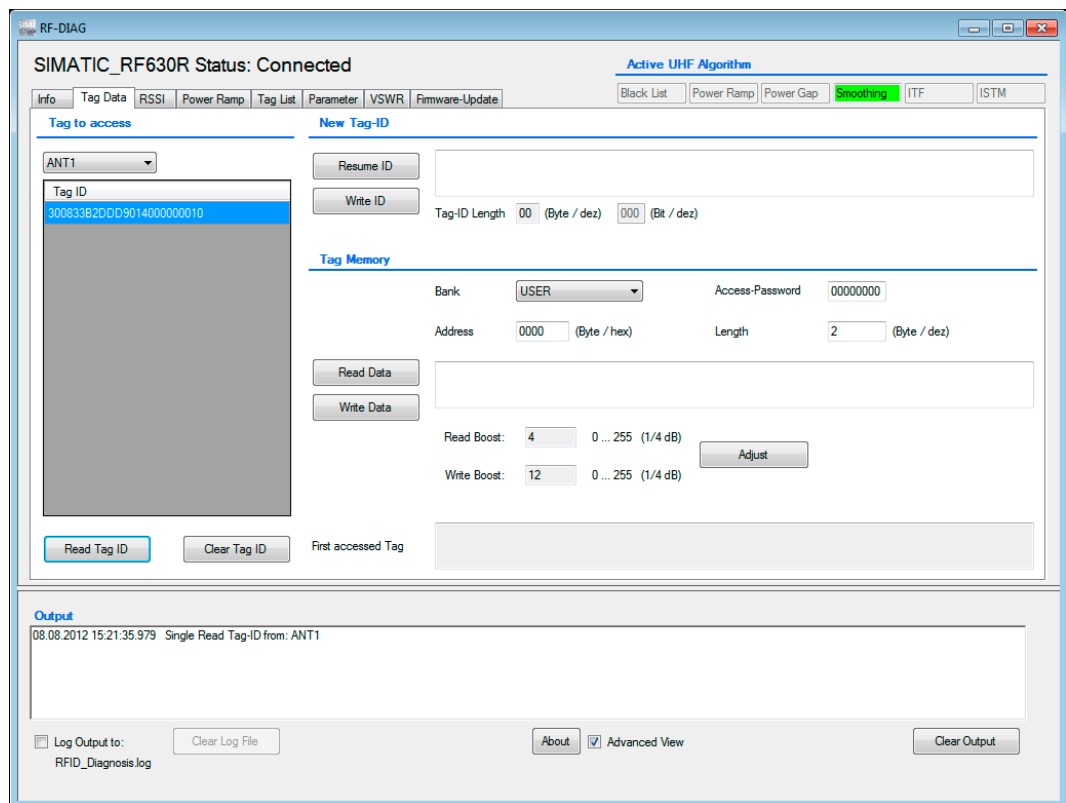


Figure 5-7 The "Tag Data" tab

Selecting transponders

In the drop-down list of the "Tag to access" area, you can choose the antenna via which the reader will establish the connection to the transponder.

The "Tag ID" list contains all the transponders in the antenna field. You can update the list with the "Read Tag ID" button. From this list, select the transponder for which you want to use write or read operations.

Assigning a new tag ID

To assign a new tag ID to a transponder, follow the steps below:

1. Click the "Read Tag ID" button.
2. Select the required transponder in the "Tag ID" list.
3. In the "New Tag-ID" area, click the "Resume ID" button to accept the current tag ID of the transponder.

Reaction: The ID of the transponder is displayed as a hexadecimal character string in the input box.

4. Adapt the tag ID displayed in the input field as required.

The tag ID length to be written is decided by the number of characters and specified in bytes or bits in two output boxes.

5. Click the "Write ID" button to transfer the new ID to the transponder.

Reaction: The tag ID is written to the transponder.

Note

Error message "Weak Power"

If the error message "Weak Power" appears after writing the tag ID, it is possible that the new tag ID of the transponder was not overwritten. In this case read out the tag ID again and, if necessary repeat the write function.

If necessary, increase the transmit power as described in the section "6.2 (Page 67)".

Reading/writing tag data

In the "Tag Memory" area, you can address all memory areas of an ISO 18000-6C transponder. You can read/write specific data using the "Bank" drop-down list and the two input boxes "Address" and "Length". To read/write a protected transponder, you will need to specify the "Access Password" of the transponder.

Click the "Read Data" button to read out the data of the transponder. The data read out is displayed in the input box as a hexadecimal character string. With the "Write Data" button, you can write the data in the input box to the transponder.

In the "Address" input box, you set the address offset (in bytes) of the selected memory bank (EPC, USER, RESERVED, TID). The meaning of the bytes for each memory bank is according to ISO 18000-6C.

Note

"Tag to access" list is empty or was deleted

If the "Tag to access" list is empty or has been deleted, read/write commands then apply to all transponders in the input box.

Note**"First accessed Tag"**

The first transponder to be processed is always displayed. If more than one transponder was processed in the input box, the list of the EPC IDs of all processed transponders can be seen in "Output". If there is only one transponder that was processed in the input box, this is displayed.

Note**Increasing the power setting if reading the tag IDs is unsuccessful**

"Read Boost" and "Write Boost" are only added to the power setting, see "RSSI" or "Power Ramp" tabs. If you want to improve recognition of transponders, increase the power "Distance limiting (Power)" in one of the tabs "RSSI", "Power Ramp" or "Parameter".

When the maximum possible power setting of a reader has been reached, "Read Boost" or "Write Boost" no cause an increase in power.

If reading out or writing to a transponder fails, you can increase the power. Click the "Change" button. In the dialog box that opens, specify the number of 1/4 dB steps by which you want to increase the power. Changes in the "Read Boost" input box increase the power when reading data. Changes in the "Write Boost" input box increase the power when writing data.

Note**Effect of "Read Boost"**

"Read Boost" is only effective with "Read Data" and otherwise it is not effective, for example with "Read Tag ID".

5.4.3 The "RSSI" tab

With the "RSSI" tab (Received Signal Strength Indicator) you can display the strength of the received antenna signal and, if necessary, optimize the antenna alignment or transponder position/distance. To allow optimum adaptation of the antenna, the RSSI values of the signal strength with which a transponder was recognized.

You will find further information on adapting the environmental conditions and the RSSI value in "RF600 system manual

(<http://support.automation.siemens.com/WW/view/en/22437600>)".

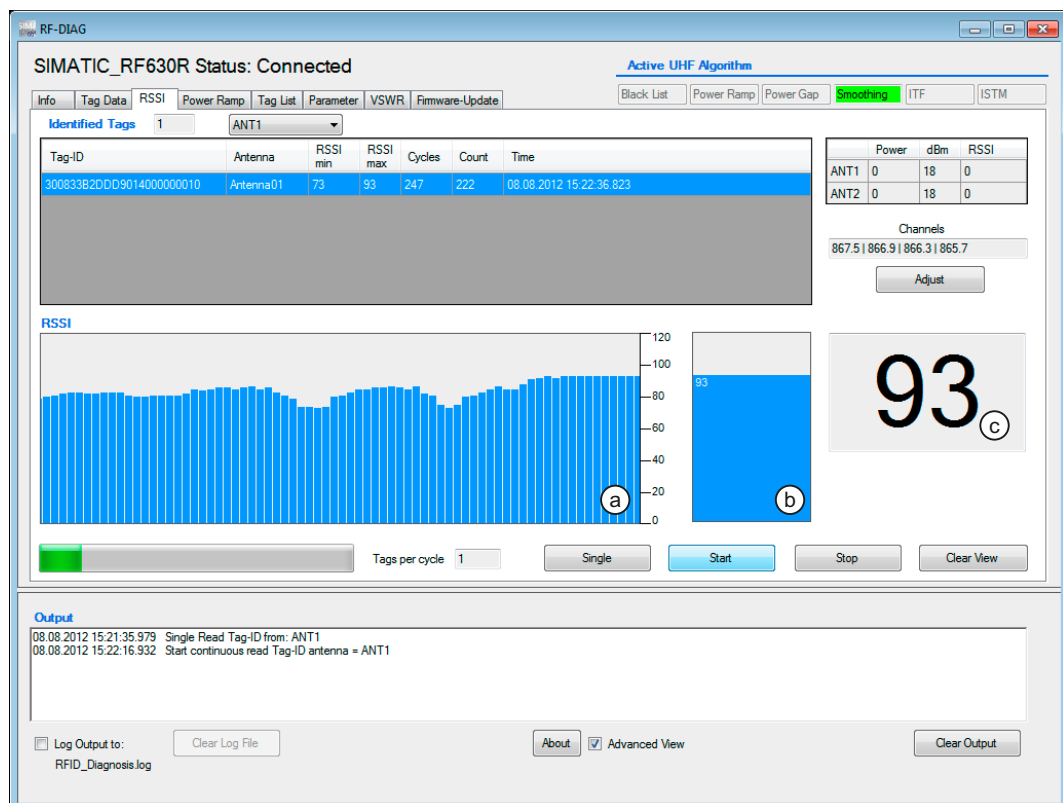


Figure 5-8 The "RSSI" tab

From the drop-down list, you can select the antenna with which the recording will be made.

Controlling the recording

Using the "Single", "Start", "Stop" and "Clear View", you can control the recording of the RSSI values:

- **Single setting**
A single read of the selected antenna is triggered and the measured values obtained are displayed.
- **Start**
Existing values from a previous recording are deleted. A new recording is then started. Reads of the selected antenna are performed cyclically.
- **Stop**
Stopping the recording
- **Deleting the display**
Existing values from the last recording are deleted.

A progress bar indicates that the recording is active. The output box displays the number of transponders read with the last read operation.

List of identified transponders

After you have started recording the RSSI values, all the transponders identified by the reader are listed in the table.

Table 5- 6 Displayed properties of the recognized transponders

Property	Description
Tag ID	EPC ID of the detected transponder
Antenna	Antenna with which the transponder was detected. Do not forget that the transponder may also have been detected on a different antenna.
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.
Cycles	Number of inventories taken of this transponder.
Count	Number of successful inventories of this transponder.
Time	Time stamp when the transponder was last read.

To make it easier to identify the transponders and to assign the RSSI values, the transponders are shown in different colors. 10 different colors are available for distinguishing the transponders. If more transponders were read than the available colors, the colors are repeated.

Transponders can be selected individually in the table. The selected transponder is highlighted with the selection color set in Windows.

The sum of the identified transponders is displayed in the "Identified Tags" output box.

Display of the RSSI values

The RSSI values of the transponders are shown in three representations:

- RSSI value according to transponders (a)

The bar diagram shows the RSSI values of the identified transponders in chronological order. The Y axis shows the RSSI values of the transponder that were read. The X axis shows the read access to the various transponders. With each read access, the RSSI values of all identified transponders are represented as a bar.

The transponders are assigned the same colors as in the table above. If a transponder is selected in the table, the transponder in the bar diagram also changes to the selection color.

If no transponder is identified during the read, a bar with RSSI value "0" (no bar) is displayed.

With this representation, you can recognize quickly and simply when a transponder is not read with every access.

- Current RSSI value (b, c)

The last measured RSSI value is shown in a further bar. With the aid of this view, you can quickly find the ideal alignment for the highest RSSI value by varying the antenna position.

The current RSSI value of the selected transponder is also displayed as a numeric value.

Setting reader parameters

With the "Adjust" button, you can change the most important reader parameters, such as antenna power or RSSI Threshold. With readers for the ETSI radio profile, you can also specify the ETSI channels that the reader will use in this dialog box.

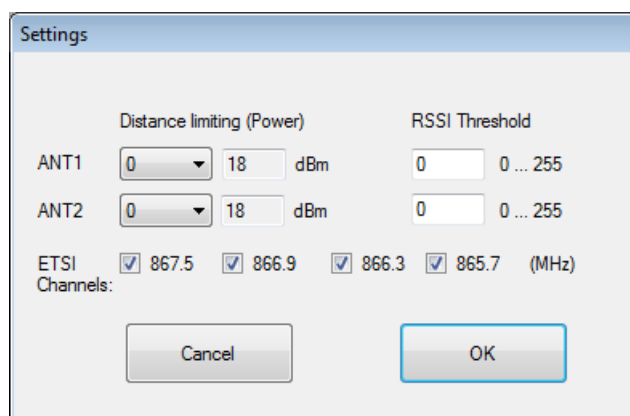


Figure 5-9 Changing reader parameters in the "RSSI" tab

The changed parameters are only valid when the program is running. In other words, the parameters are not stored permanently on the reader. In the "Parameter" tab, you can save the parameter configurations retentively.

You will find more information on parameters in the section "The "Parameters" tab (Page 58)" or in "Parameter assignment manual RF620R/RF630R (<http://support.automation.siemens.com/WW/view/en/33287195>)".

5.4.4 The "Power Ramp" tab

The "Power Ramp" tab is displayed only in the advanced view.

With the "Power Ramp" tab, you can display the current transmit/radiated power of the readers/antennas. This allows you to make an optimum setting for the "Power Ramp".

The currently used transmit power (RF630R) or radiated power (RF620R) of the reader per read access is displayed.

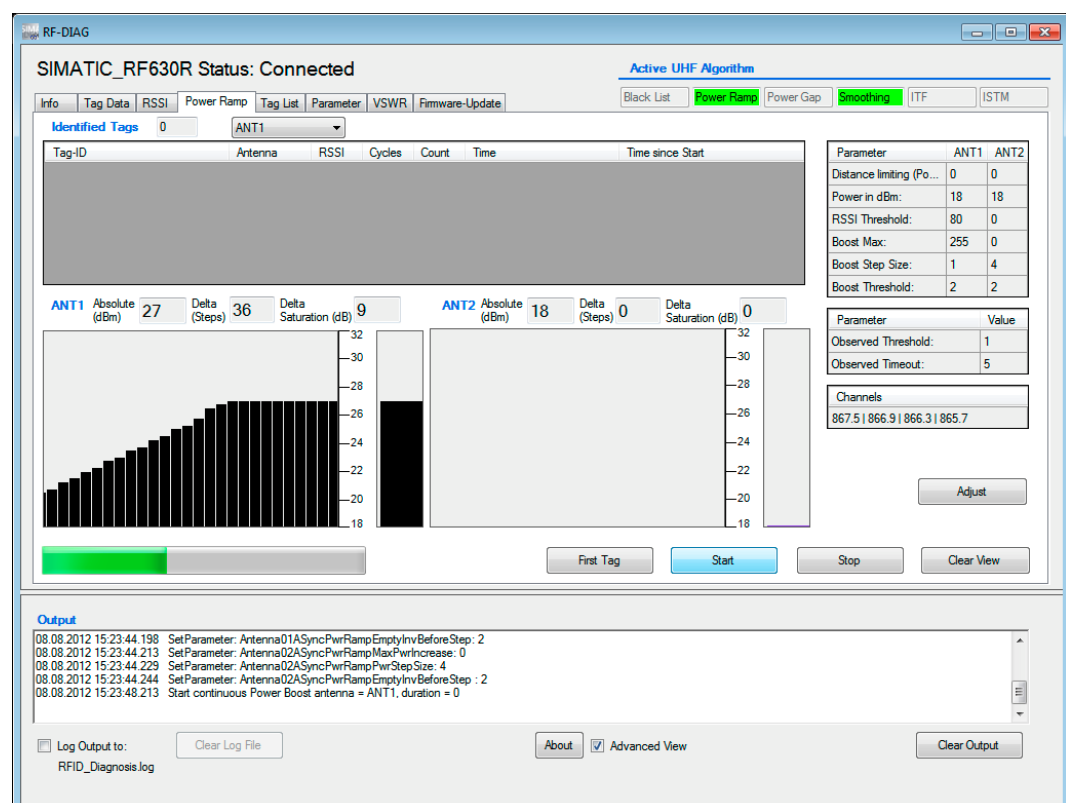


Figure 5-10 The "Power Ramp" tab

Controlling recordings

Using the "First Tag", "Start", "Stop" and "Clear View", you can control the recording of the transmit/radiated power:

- **First Tag**
Cyclic reads are triggered on the selected antenna and the measured values obtained are displayed. The recording is stopped automatically when a transponder is identified the first time.
- **Start**
Any existing values from a previous recording are deleted. A new recording is then started. Reads of the selected antenna are performed cyclically.
- **Stop**
Stopping the recording
- **Deleting the display**
Existing values from the last recording are deleted.

A progress bar indicates that the recording is active.

List of identified transponders

After you have started recording the transmit/radiated power, all the transponders identified by the reader are listed in the table.

Table 5- 7 Displayed properties of the recognized transponders

Property	Description
Tag ID	EPC ID of the detected transponder
Antenna	Antenna with which the transponder was detected. Only one antenna is ever displayed here. With this display, you cannot recognize the antenna or antennas that detected the transponder or whether several antennas detected the transponder.
RSSI	RSSI value with which the transponder was last read.
Cycles	Number of inventories since this transponder was identified the first time
Count	Number of successful inventories of this transponder.
Time	Time stamp when the transponder was last read.
Time since Start	The time in [ms] that has elapsed since the start of the test and the first successful read of the transponder.

The color in the table row indicates whether or not the transponder was identified during the last inventories:

- Green Transponder was identified during the last inventory
- Light green Transponder was not identified only during the last inventory
- Red Transponder was not identified during the last two inventories

The sum of the identified transponders is displayed in the "Identified Tags" output box.

Display of the transmit power/radiated power

The current values for the transmit/radiated power of the readers/antennas is shown in two identically structured views.

The output boxes

The output boxes "Absolute", "Delta" and "Delta Saturation" display the absolute transmit/radiated power, the number of power increases in 0.25 dB steps and the effective increase in power in [dB]. Theoretically the transmit/radiated power can be increased by up to 255 steps (63.75 dB) ("Delta"). Since the maximum transmit/radiated power of the reader is limited, the "Delta Saturation" output box displays the effective increase in power.

The bar diagram

The bar diagram shows the transmit/radiated power over time. For each read access, a bar is shown on the X axis with the transmit/radiated power used.

With this representation, you can see very quickly and easily how the transmit/radiated power changes. In particular, this visualizes the use of the Power Ramp and its effects on the transmit/radiated power.

The transmit/radiated power used for the last measurement is shown separately as a bar. With this view, you can see the current value at a glance.

Note

Dependency of the bar diagram representation of reader hardware, PC hardware and operating system

The bar diagram representation of Power Ramp depends on the performance of the PC hardware, the operating system and the reader hardware.

Power Ramp - setting parameters

Using the "Adjust" button, you can change the parameters required for the Power ramp and select ETSI channels (analogous to the "RSSI" tab). You can also activate automatic increases in the transmit/radiated power. Depending on your entries, the transmit/radiated power of the antenna is increased in ¼ dB steps if the transponder is not identified during an inventory.

For readers with the ETSI radio profile, you can also specify the ETSI channels for which the changes will be effective in this dialog box.

	ANT1	ANT2	
Distance limiting: (Power)	0	0	
	18	18	dBm
RSSI Threshold:	0	0	0 ... 255
	0	0	hex
Boost Max: (1/4 dB)	0	0	0 ... 255
	0	0	hex
Boost Step Size: (1/4 dB)	4	4	0 ... 255
	4	4	hex
Boost Threshold: (Inventories)	2	2	0 ... 255
	2	2	hex
Observed Threshold: (Inventories)	1	0 ... 255	
	1		hex
Observed Timeout: (Inventories)	5	0 ... 255	
	5		hex
ETSI Channels:			
<input checked="" type="checkbox"/> 867.5	<input checked="" type="checkbox"/> 866.9	<input checked="" type="checkbox"/> 866.3	<input checked="" type="checkbox"/> 865.7 (MHz)
Cancel		OK	

Figure 5-11 "Power Ramp - changing parameters

The changed parameters are only valid when the program is running. In other words, the parameters are not stored permanently on the reader. In the "Parameter" tab, you can save the parameter configurations retentively.

You will find more information on parameters in the section "The "Parameters" tab (Page 58)" or in "Parameter assignment manual RF620R/RF630R (<http://support.automation.siemens.com/WW/view/en/33287195>)".

5.4.5 The "Tag List" tab

The "Tag List" tab is displayed only in the advanced view.

In the "Tag List" tab, you will see list of all the transponders identified by the reader. With this tab, you can read out the RSSI values of each individual identification of a transponder and therefore check the effectiveness of all active UHF algorithms (for example Power Ramp, Smoothing, ISTM). Disabled transponders are displayed in the Black List assuming that you have activated the Black List in the "Parameter" tab.

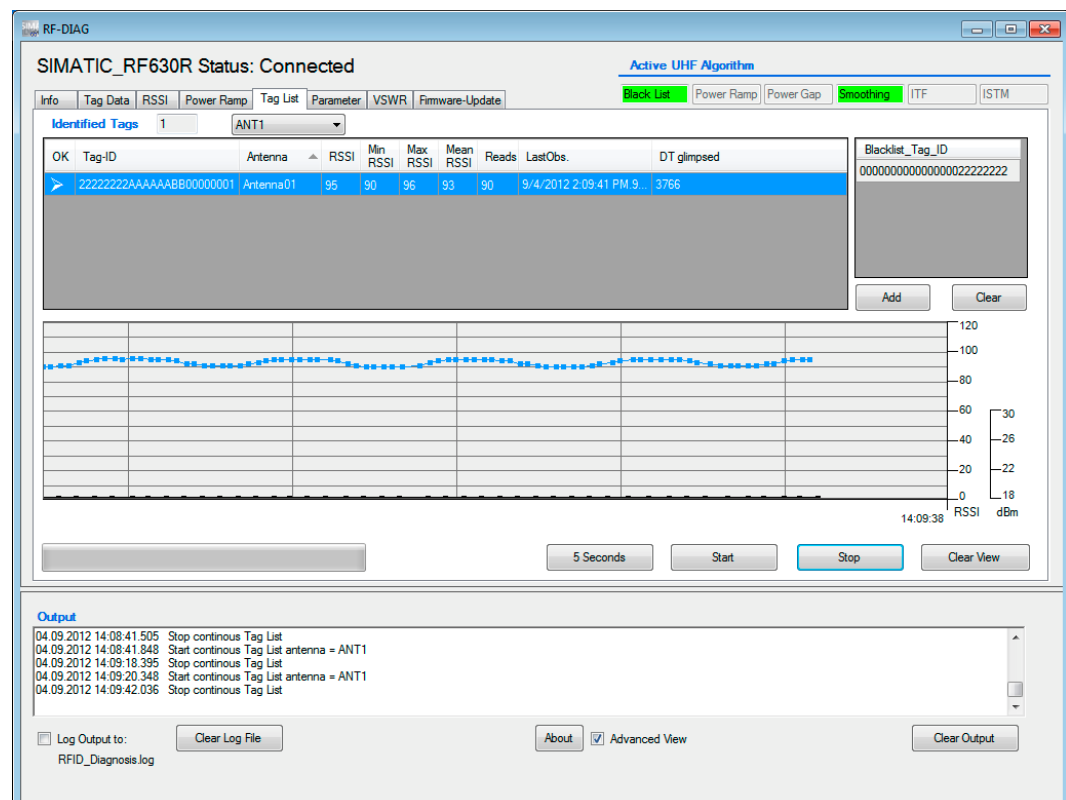


Figure 5-12 The "Tag List" tab

Controlling recordings

Using the "5 Seconds", "Start", "Stop" and "Clear View", you can control the recording of the transponders:

- 5 Seconds

The recording is started and automatically stopped after 5 seconds. This functionality cannot be selected if the ITF feature is active.

- Start

Any existing values from a previous recording are deleted. A new recording is then started.

- Stop
Stopping the recording
 - Deleting the display
Existing values from the last recording are deleted.
- A progress bar indicates that the recording is active.

List of identified transponders

After you have started recording, all the transponders identified by the reader are listed in the table.

Table 5- 8 Displayed properties of the recognized transponders

Property	Description
OK	Symbol indicating whether the transponder was detected as valid by the reader. If the reader is operating in Smoothing mode, the transponder needs to be detected Observed Threshold number of times.
Tag ID	EPC ID of the detected transponder
Antenna	Antenna with which the transponder was detected. Only one antenna is ever displayed here. With this display, you cannot recognize the antenna or antennas that detected the transponder or whether several antennas detected the transponder.
RSSI	RSSI value with which the transponder was last read.
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.
Mean RSSI	Average RSSI value of the transponder.
Reads	Number of successful inventories of the transponder.
LastObs.	Time stamp when the transponder was last read.
DT glimpsed	Time that has elapsed in [ms] between the first and last successful transponder read.

Note**Marking the transponders**

All transponders that remain following filtering of all activated algorithms are marked "OK". The possible activated filters include the following:

1. Black List
2. Smoothing or Inventory Threshold Filter
3. Sorting the ISTM

If the ISTM is activated, all transponders remaining after filtering 1 and 2 and that are within the minimum distance of the set sorting criterion are marked as OK.

During processing on the PLC in the case above, if more than 1 transponder is marked with "OK, no tag would be displayed in the Tag List. This applies only to Singletag Mode.

To make it easier to identify the transponders and to assign the transmit/radiated power, the transponders are shown in different colors. 10 different colors are available for distinguishing the transponders. If more transponders were read than the available colors, the colors are repeated.

Transponders can be selected individually in the table. The selected transponder is highlighted with the selection color set in Windows.

The sum of the identified transponders is displayed in the "Identified Tags" output box.

Displaying and working with the Black List

This is only displayed if the UHF algorithm "Black List" has been activated in the "Parameter" tab. With the "Add" buttons, you can transfer selected transponders from the list of identified transponders to the Black List. These transponders are removed from the list and the tag ID of the transponder is entered in the Black List. Transponders in the Black List are no longer read out and are no longer displayed during future recordings.

With the "Clear" button, all the transponders in the "Black List" can be deleted from the Black List.

Display of the RSSI values and the transmit/radiated power

The diagram shows both the RSSI values of all read transponders as well as the transmit/radiated power of the reader.

To make identification easier, the lines of the RSSI values of the transponders are shown in the same color that was assigned to the transponders earlier in the list of identified transponders.

The RSSI values of the transponders are shown as individual dots. If you select a transponder in the list of identified transponders, the dots in the diagram are connected together by a thin line.

The transmit power of the reader is shown as a thick line. The measuring points are highlighted as dots on the line.

The transmit power of ANT1 is shown as a black line and the transmit power of ANT2 as a violet line.

Note

Time stamp of the transmit/radiated power

The time stamp for the transmit/radiated power is generated by the diagnostics tool. This means that there may be slight deviations in the times of RSSI measured values and the times of the measured transmit/radiated power.

5.4.6 The "Parameters" tab

The "Parameter" tab is displayed only in the advanced view.

With the "Parameter" tab, you can activate, read out, enter, adapt and write the various parameters and store them on the reader. This gives you the option of generating different configurations and loading them again later. Laborious manual re-entry of configurations is therefore unnecessary.

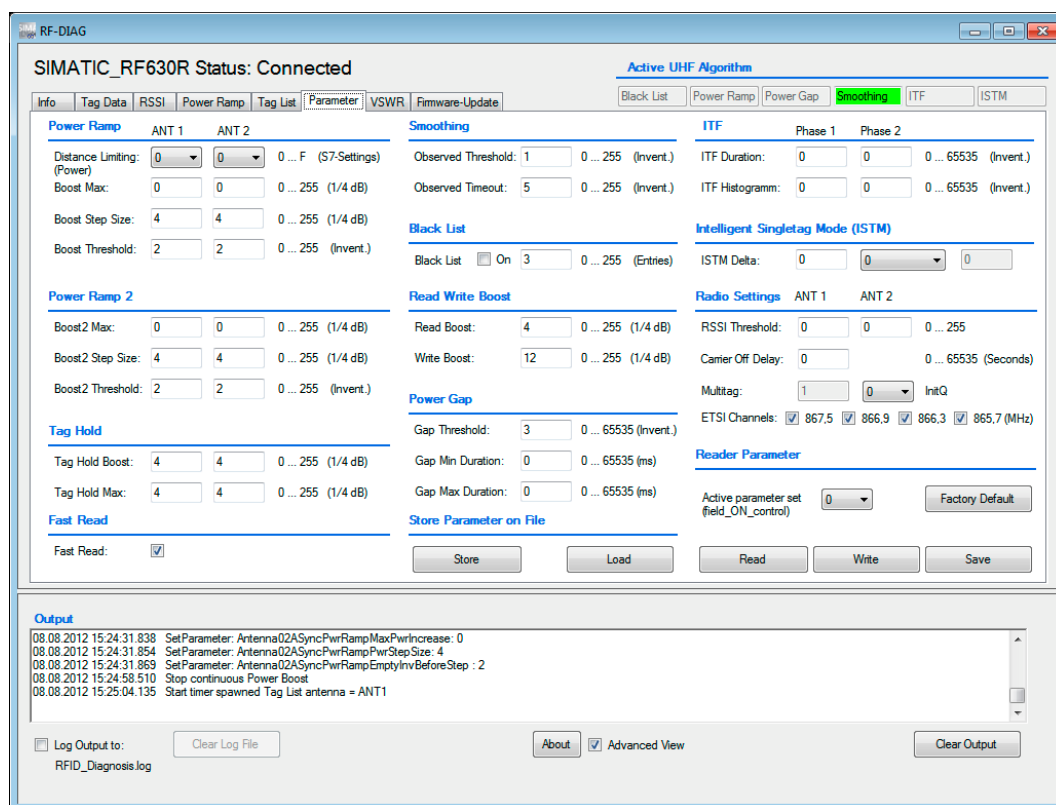


Figure 5-13 The "Parameters" tab

You will find a description of the UHF algorithms and the individual parameters in "Parameter assignment manual RF620R/RF630R

(<http://support.automation.siemens.com/WW/view/en/33287195>)".

The buttons of the "Parameter" tab:

- Back up

Click the "Store" button to store all currently set parameters on your PC or PG. You can select the name and storage location of the file yourself.

Note**File with prefix "AUP:" or "RESET:"**

All the parameters that represent expert parameters are given the "AUP:" prefix in the file when they are written.

All parameters that were set in communications mode or using Reset are given the "RESET:" prefix in the file when they are written.

- Download

Click the "Load" button to reload the parameters from the saved file.

- Factory setting

Click the "Factory Default" button to reset the reader to the factory settings.

Note**Changed parameters are lost**

All changed parameters in the active parameter set on the reader and on the user interface are reset to the factory settings.

- Active parameters set

Two parameter sets are stored on the reader. Using the drop-down list, you can read out, write and save different parameter sets (0 and 2). To be able to process a parameter set with the diagnostics tool, you need to select the parameter set from the drop-down list and then click the "Read" button.

- Read

Click the "Read" button to read out all the parameters from the reader and enter them in the display boxes.

- Write

Click the "Write" button to transfer changed parameters to the reader.

Note**Parameters not permanently overwritten**

Parameters that were set using "init_run" in PLC mode are NOT stored retentively on the reader, not even after clicking the "Store" button. With the next "init_run", the data is overwritten again. This applies to the parameters "Distance Limiting (Power)", "Multitag", "InitQ", "ETSI Channels" and "Black List".

- Store

Click the "Store" button to save the parameters permanently on the reader.

The parameters

Parameter	Description
Power Ramp	Specifies the step-by-step increase in the transmit/radiated power per antenna. Power Ramp automatically increases the power if a transponder was not identified during read/write access.
Power Ramp 2	Specifies the step-by-step increase in the transmit/radiated power per antenna. Power Ramp increases the power automatically if a transponder was not identified during read/write access and ITF phase 2 was activated in the parameter settings.
Tag Hold	If the Tag Hold algorithm is active, an identified transponder is saved on the reader with the first "READ" / "WRITE" access. In contrast to the normal mode, if Tag Hold is activated, all subsequent "READ" / "WRITE" commands execute only for this transponder.
Fast Read	Specifies whether the transponder ID is read out again (deactivated) or whether the ID is read out from the reader memory (activated).
Smoothing	Specifies how often a transponder must be detected before the reader performs read/write access. Alternative to ITF. Smoothing is the default setting.
Black List	The Black List algorithm is used to hide transponders that have already been processed. Using the Black List algorithm, overshoots etc. can be avoided in difficult UHF environments. With the aid of the Black List, you can specify the size of the ring buffer (entries).
Read/Write Boost	Specifies a fixed transmit/radiated power increase of an antenna in ¼ dB steps for read/write access.
Power Gap	Specifies gaps between read/write accesses. Power Gap allows undisturbed reading/writing of transponders when there is a high reader density.
ITF	Specifies the number of inventories in which a transponder must be detected before the reader performs read/write access. Alternative to Smoothing.
ISTM	Sorting mechanism to allow processing of one of the transponders located in the antenna field in Singletag Mode. Specifies the minimum distance of the ISTM delta and the sorting criterion.
Radio Settings	Specifies an RSSI limit value. A transponder needs to be identified with the minimum signal strength defined here before it is entered in the Tag List so that read/write access is possible. You can also make settings for the following radio parameters: "RSSI Threshold", "Carrier Off Delay", "InitQ" and "ETSI Channels". "Multitag" is defined using "InitQ".

Note**"Multitag" and "Initial Q"**

With EPC Class1 Gen2, you can use "InitQ" to specify the maximum number of transponders that can be expected to be located in the measuring field at the same time so that collisions can be prevented.

The following formula applies:

$2 \text{ Initial Q value} = \text{Number of expected transponders (corresponds to "Multitag")}$.

It is important to note here that the length of a read cycle increases the higher the value of Initial Q is. This value is calculated from the "Multitag" variable that is set by an "init_run" command of the RF620R/RF630R readers. Note the following rule of thumb if you want to optimize performance; the value should be as low as possible and as high as necessary.

The setting of "Multitag" can be found in the description of the "init_run" command for FB55 in the "RF620R/RF630R parameter assignment manual

(<http://support.automation.siemens.com/WW/view/en/33287195>)".

The parameter settings in the "RSSI", "Power Ramp" and "Special" tabs are adopted in the "Parameter" tab and if they are saved, they are also saved on the reader.

The following table shows the tabs of the software user interfaces that are affected by changes to the parameters in the "Parameter" tab:

Tab	Parameter settings in the "Parameter" tab have effects in the following tabs												
	Active UHF algorithm ¹⁾						Other non-displayed UHF algorithms ²⁾						
	Black List	Power Ramp	Power Gap	Smoothing	ITF	ISTM	Power Ramp ^{2 3)}	Tag Hold	Fast Read	Read/Write Boost	Radio Settings	Reader Parameter	Store Parameter on File
Info	-	-	-	-	-	-	-	-	-	-	-	-	-
Tag Data	X	-	-	-	-	-	-	-	-	X	X	X	-
RSSI	X	-	-	-	-	-	-	-	-	-	X	X	-
Power Ramp	X	X	-	-	-	-	-	-	-	-	X	X	-
Tag list	X	X	X	X	X	X	X	-	-	-	X	X	-
VSWR	-	-	-	-	-	-	-	-	-	-	-	-	-
Firmware update	-	-	-	-	-	-	-	-	-	-	-	-	-

¹⁾ Are shown in the status bar of the software user interface.

²⁾ Are not shown in the status bar of the software user interface.

³⁾ Only in conjunction with activating ITF(phase 2).

5.4.7 The "VSWR" tab

With the "VSWR" tab, you can read out HF values, quality characteristics of the air interface.

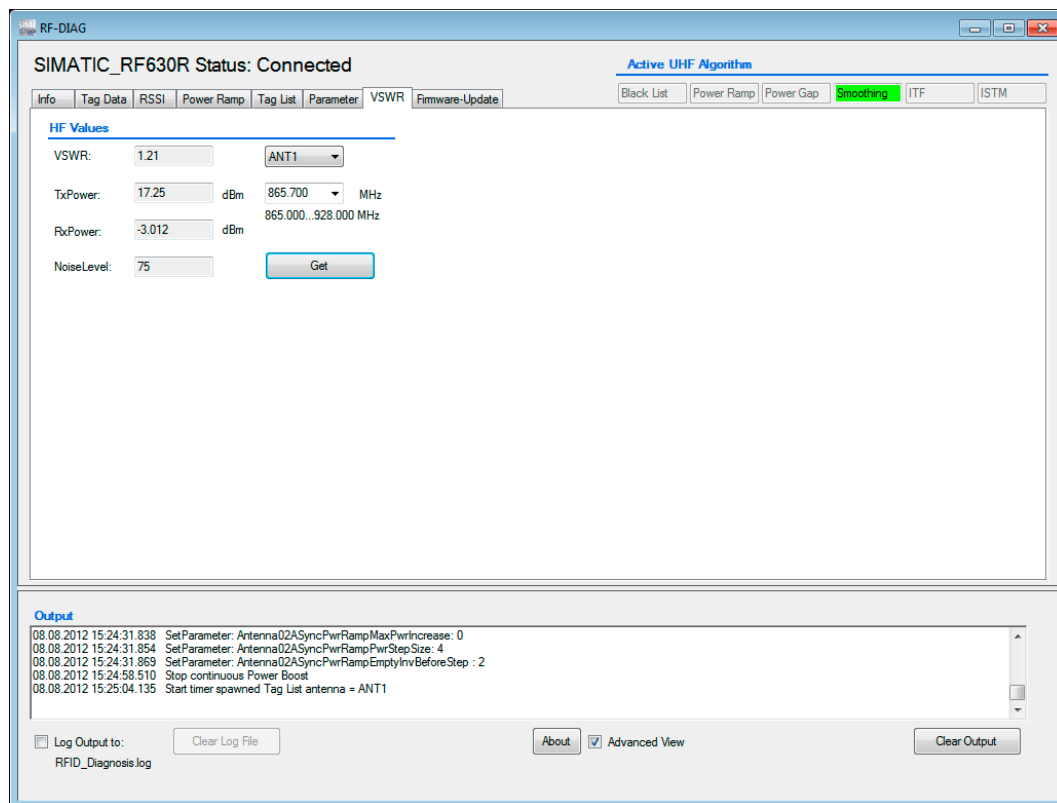


Figure 5-14 The "VSWR" tab

The HF Values

Parameter	Description
VSWR	Voltage standing wave ratio: Is calculated from Tx and Rx Power. *)
Tx Power	Power at output in [dBm]
Rx Power	Power at input in [dBm]
Noise Level	Noise level: Wideband RSSI value measured by reader

*) A value ≥ 1.5 may indicate a hardware defect. Contact Customer Support in this case.

From the upper drop-down list, you can select the antenna with which you want to read out the HF values. From the lower drop-down list, you can select the frequency range of the antenna. If the frequency you require cannot be selected, you can also enter this value. You will find the frequency bands of the various reader types in the following table:

Reader type	Frequency band
ETSI	865,7 ... 867.5 MHz
FCC	USA: 902 ... 928 MHz Brazil: 515,25 ... 527.75 MHz South Korea: 917,3 ... 920.3 MHz
CMIIT	920,125 ... 924.875 MHz

Click the "Read" button to read out the HF values of the selected antenna.

5.4.8 The "Firmware-Update" tab

With the "Firmware-Update" tab, you can update the firmware of the serial RF600 readers (RF620R/RF630R). You will find more detailed information on the firmware in the section "Service & Support (Page 79)" and on the Internet on the "Support homepage (<http://www.siemens.com/automation/service&support>)".

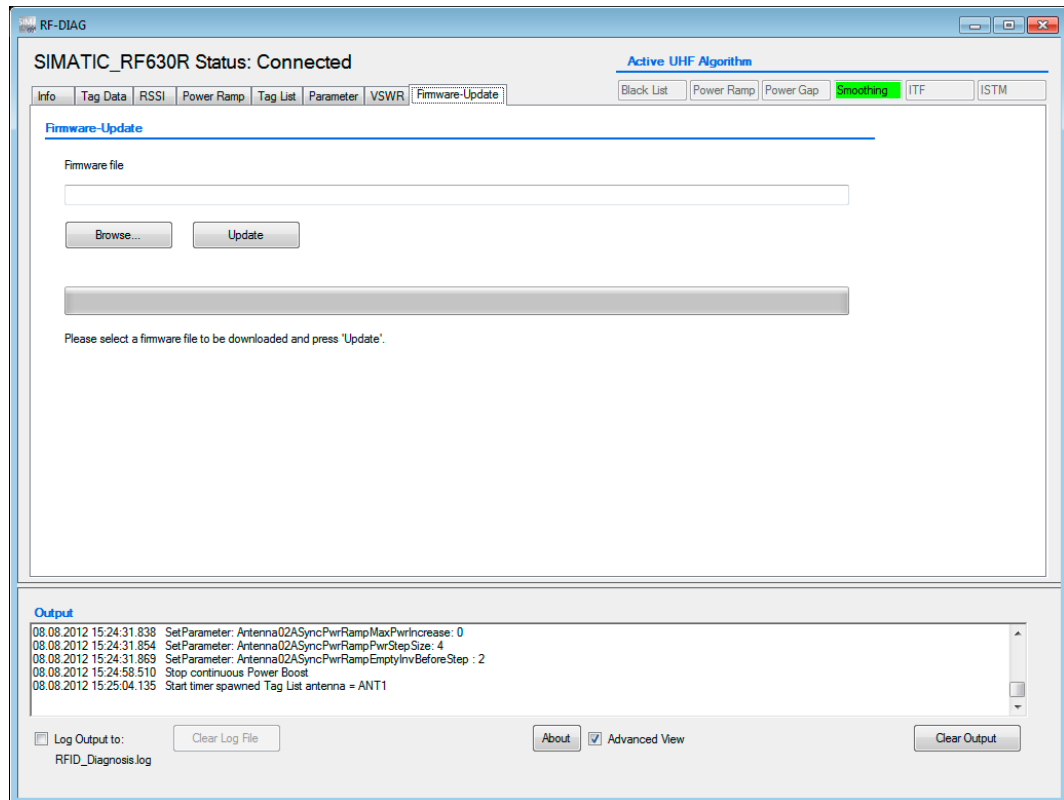


Figure 5-15 The "Firmware-Update" tab

To update the firmware, proceed as follows:

1. Copy the update file to your PC or programming device.
2. Select the update file.

You can enter the path of the update file in the input box or select the update file using the "Browse..." button.

3. Click the "Update" button to start the update.

Reaction: The update is started and the update progress is shown.

Reaction: Following a successful update, the "Info" tab is opened automatically.

Application Examples

6.1 Scenarios for use of the PC adapter for RF-DIAG

SIMATIC RF-DIAG can be used in conjunction with the PC adapter in two different scenarios:

- "Operation in the plant"
- "Operation in a test setup"

Operation in the plant

SIMATIC RF-DIAG is used to set up, assign parameters to or diagnose an RF620R/RF630R reader installed in the plant.

The RF620R/RF630R reader is installed in the plant and connected to a communications module.

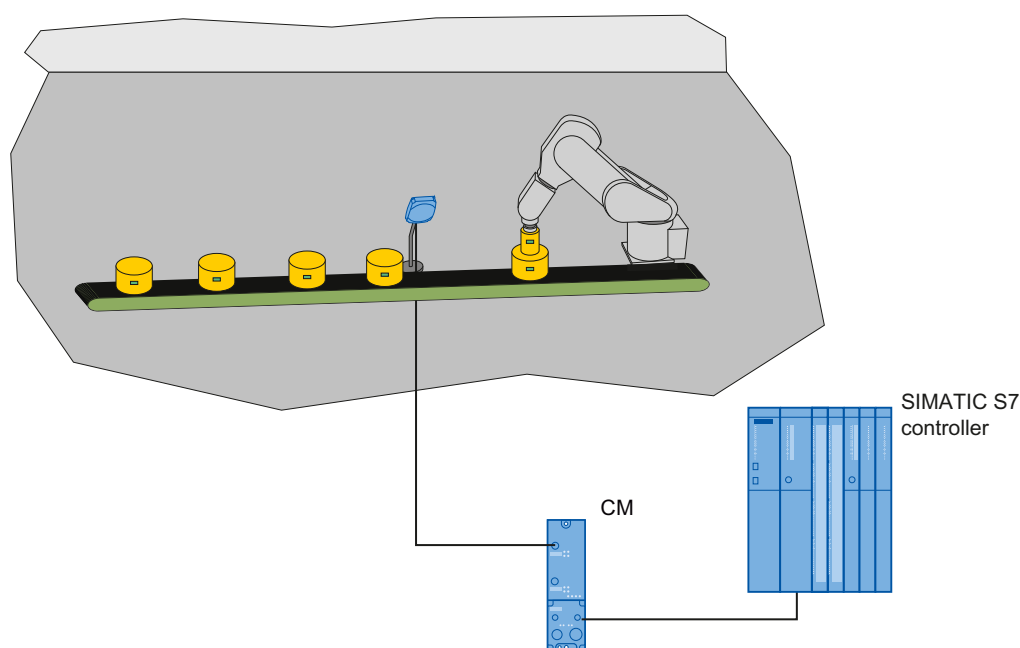


Figure 6-1 Operating a serial reader in the plant

The PC adapter for RF-DIAG is now inserted between the communications module and reader and the sequence is restarted in the plant. As long as no PC is connected to the adapter via USB, communication between the communications module and reader remains unaffected. The adapter does not disrupt operation. As soon as a PC is connected to the adapter via USB, communication from the reader is redirected to the PC. The power supply of the reader via the communications module is not interrupted. No separate power supply is necessary.

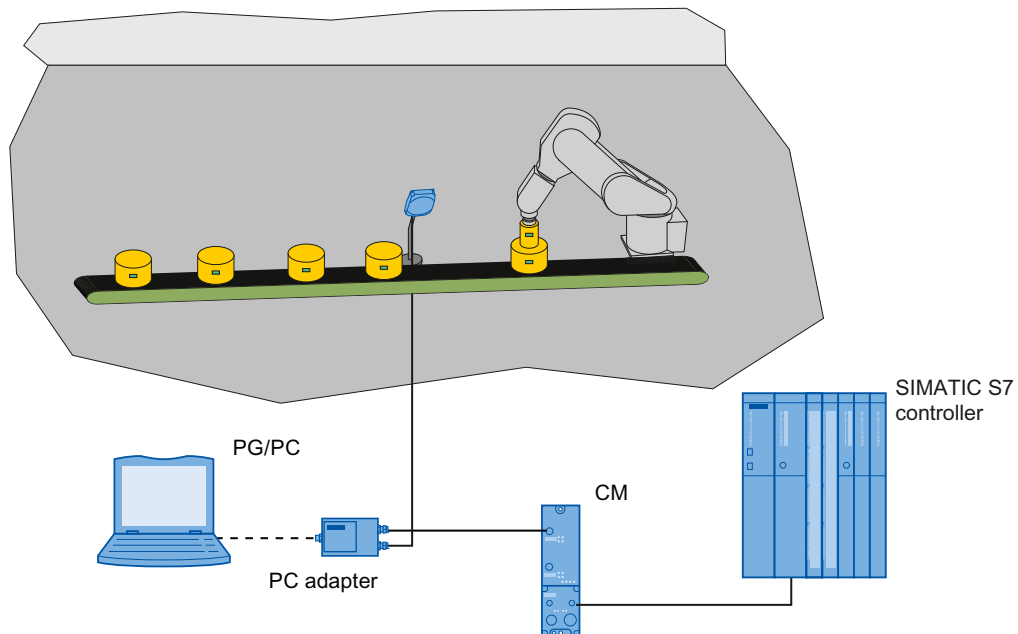


Figure 6-2 Operating a serial reader in the plant with connected PC adapter

After completing the tasks with RF-DIAG, restarting the reader and unplugging the USB cable, the connection between the reader and communications module is restored. A subsequent "init_run" command changes the reader to the required operational status.

Operation in a test setup

SIMATIC RF-DIAG is used to test, assign parameters to or diagnose an RF620R/RF630R reader outside the plant.

The RF620R/RF630R is connected to the PC adapter. The PC with RF-DIAG is connected to the PC adapter via USB. To supply the reader with power, the wide-range power supply unit is connected to the PC adapter via the connecting cable.

The following application examples are based one on the other. It is advisable to read through the application examples in the order in which they appear.

6.2 Example of an application "optimize antenna position"

Aim

The aim is to find the optimum antenna position of an RFID reading point as quickly as possible. A good antenna position should have a high and stable RSSI value.

Background

The position and alignment of the RFID antennas has a significant influence on the quality of the read results. For this reason, mounting the antennas is an important step during commissioning of an RFID reading point. With SIMATIC RF-DIAG it is possible to find the optimum antenna position and alignment simply and quickly.

The strength of the transponder reply is known as the RSSI value (Received Signal Strength Indication). The RSSI value can be between 0 and 255. The higher the RSSI value, the better the signal strength. The actual value depends on numerous parameters including the transponder type, the chip used in the transponder, antenna, transmit power, distance between antenna and transponder, reflections, noise level in the channels used and in neighboring channels etc.

In practice, RSSI values of approximately 65 to approximately 115 can be detected with SIMATIC RF600 readers.

Procedure

1. Mount the antenna in its approximate position at the selected installation location.
2. Then connect the reader to the commissioning PC with RF-DIAG via the PC adapter and select the "RSSI" tab in the tool.
3. Create a typical identification situation. In other words, position the object including the transponder at the point at which it needs to be identified later during operation.

Note

Make sure there is line-of-sight contact between the antenna and transponder

Make sure that there are no persons or objects between the antenna and the transponder and that the neighboring antenna fields are deactivated that could otherwise disturb transmission.

4. Set the transmit power to level 0. When necessary, deactivate all additional functions (Power Ramp, Black List, ITF, Tag Hold, RSSI Threshold etc.). In the factory setting, these are deactivated.

6.2 Example of an application "optimize antenna position"

5. By adjusting the antenna or transponder horizontally or vertically and by adapting the angle of inclination, find the position at which the highest RSSI value is displayed in the diagnostics tool.

The display of the RSSI value is indicated in a large font and can therefore be read at the distance of several meters. A good antenna position results in a high and stable RSSI value.

If the transponder cannot be identified at any position, increase the transmit power by one level and repeat step 5.

6. Once you have found the optimum position secure the antenna in this position.

Possible error symptoms and how to counter them

Error symptom 1:

Despite optimization measures, the transponder data cannot be read out regularly.

Countermeasure 1:

Select an adequately high transmit power (see example "Example of an application "Determining transmit power" (Page 69)") and optimize this, if necessary using further UHF algorithms.

Error symptom 2:

Despite adapting the transmit power, the transponder data cannot be read out regularly.

Countermeasure 2:

Optimizing the reading point:

- Antenna position and alignment
- Transponder alignment
- possibly use of absorption materials

Further options open to you include the choice of alternative antennas or the use of multiple antennas for a reading point (diversity).

You will find further information on the set and achievable distances in the section "RF600 system planning" in the "RF600 system manual (<http://support.automation.siemens.com/WW/view/en/22437600>)".

6.3 Example of an application "Determining transmit power"

Aim

The aim is to find the minimum transmit power with which a transponder can be identified.

Background

The "Power Ramp" function of the RF620R and RF630R readers allows the reader to increase the transmit power automatically if no transponder is identified in the field. This function can be used to obtain the power settings of a reading point.

Procedure

Requirements:

The reading point is fully installed and the reader is connected to the SIMATIC RF-DIAG tool via the PC adapter. Make sure that you make changes to the values of the Power Ramp based on real environmental conditions.

1. Select the "Power Ramp" tab in SIMATIC RF-DIAG. You will find a precise description of the Power ramp algorithm in the relevant section of the "SIMATIC RF620R/RF630R Configuration Manual (<http://support.automation.siemens.com/WW/view/en/33287195>)".
2. Make the settings for the Power Ramp as follows:
 - For each antenna to be used, select a low power limit (corresponds to ANT1: RESET[distance_limiting, bit 0-3] and ANT2: RESET[distance_limiting, bit 4-7])
 - Select a power increase per step (Boost Step Size ANT1, Boost Step Size ANT2)
 - Select the maximum power increase to be reached after n steps (Boost Max ANT1, Boost Max ANT2)
 - Select the number of consecutive inventories to be taken via ANT1 or ANT2 before the power is increased by a step (Boost Threshold ANT1, Boost Threshold ANT2)
 - The Power Ramp remains at the transmit power at which the transponder was identified.

If the parameter settings for the setup have been optimized, the required power is selected automatically by the algorithm to perform transponder inventories. After several runs, the necessary power for identifying the transponders reaches a maximum value between the Power Ramp low limit and the Power Ramp high limit.

Adopt the power settings in SIMATIC RF-DIAG in the PLC or STEP 7 application:

- By selecting the achieved maximum power for ANT1 using RESET[distance_limiting, bit 0-3] and for ANT2 using, RESET[distance_limiting, bit 4-7], it is possible to ensure identification of the transponder.
- By using the Power Ramp algorithm set here, situation-specific adaptation of the power is possible.

Note

Maximum transmit power is limited by the hardware

Remember that the maximum achievable transmit power is limited physically by the reader. When using the Power Ramp, remember to include already active UHF algorithms that affect the transmit power (Read/Write Boost). The maximum physical transmit power cannot be exceeded.

Possible error symptoms and how to counter them:

Error symptom 1:

The power setting usually has a value close to or identical to the set Power Ramp high limit.

Countermeasure 1:

Increase the Power Ramp high limit. If this is not possible, modify the antenna configuration (see example "Example of an application "optimize antenna position" (Page 67)") or select a different antenna.

Error symptom 2:

The Power Ramp low limit is not adequate to identify the transponders. Too many steps are required to reach the necessary power.

Countermeasure 2:

Increase the Power Ramp low limit and, if necessary the step size (Boost Step Size ANT1 or Boost Step Size ANT2).

6.4 Example of an application "Setting the Power Ramp and RSSI Threshold"

Aim

The aim is to increase the robustness of the reading point by using the Power Ramp in read mode and using the RSSI Threshold to avoid overshoot.

Background

The Power Ramp algorithm is useful when a transponder needs to be identified with an output power as low as possible (inventory). This power can vary by several dB between inventories taken at different times.

The use of an RSSI threshold is a practical solution when an RSSI value is detected at a reading point for the transponders to be identified that is always higher than the minimum value (RSSI Threshold) and other transponders outside the reading point are always below this threshold.

Procedure

To evaluate an optimized parameter assignment of Power Ramp and RSSI Threshold, use the "Tag List" tab. Use the "RSSI" tab to assign the RSSI threshold values (RSSI Threshold ANT1, RSSI Threshold ANT2). To make settings for Power Ramp, use the "Power Ramp" tab.

The following values have proved useful in typical use cases:

- Monitor the RSSI values of the transponders in the Tag List. Note down the typical RSSI value of the required transponder (overreach). Set the value of RSSI Threshold ANT1 / RSSI Threshold ANT2 half way between the two obtained values. In many situations, this results in an RSSI Threshold of approximately 88% of the RSSI value of the required transponder.
- Set Boost Max ANT1 / Boost Max ANT2 to 8 (+2 dB), Boost Step Size ANT1 / Boost Step Size ANT2 to 4 (1 dB) and Boost Threshold ANT1 / Boost Threshold ANT2 to 2 (2 inventories).

Note

Ensuring data access reliability

It is advisable to include a recording of SLG-STATUS and MDS-STATUS during operation in the PLC or STEP 7 application. With the help of the data, you can evaluate and ensure data access reliability during read/write access to various transponders. If the result is satisfactory, follow the steps below:

- Adapt the RSSI Threshold more accurately to the actual situation based on the actually measured RSSI values.
 - Adjust the transmit power. If the actual transmit power is regularly higher than the set transmit power, the Power Ramp will be active often. This is an indication that the basic transmit power is too low.
-

Adapting the Power Ramp:

If the transmit power goes up to the higher power value in at least 25% of the reads (actual transmit power = basic power + Power Ramp value) the Power Ramp is set somewhat too low or has too little power reserve. Here, it is advisable to increase the Power Ramp. The procedure is analogous to "Example of an application "Determining transmit power" (Page 69)".

If a suitable parameter assignment was selected for the setup, a suitable power will be selected in an adequately short time by the algorithm to be able to take inventories of the transponders and transponders that should not be identified can be rejected by the RSSI filter. After several runs, the necessary power for identifying the transponders reaches a maximum value between the Power Ramp low limit and the Power Ramp high limit.

Possible error symptoms and how to counter them

Error symptom 1:

Optimization measures do not lead to successful data access often enough.

Countermeasure 1:

Select an adequately high transmit power (see example "Example of an application "Determining transmit power" (Page 69)") and optimize this, if necessary using further UHF algorithms.

Error symptom 2:

Despite adjusting the transmit power, the antenna position cannot be optimized.

Countermeasure 2:

Optimize the RSSI thresholds. If this measure is not successful, optimization by using further UHF algorithms (e.g. ISTM) may bring about improvements.

Optimize the reading point. Further options open to you include the choice of alternative antennas or the use of multiple antennas for a reading point (diversity).

Error symptom 3:

The power setting usually has a value close to or identical to the set Power Ramp high limit.

Countermeasure 3:

Increase the Power Ramp high limit. If this is not possible, modify the antenna configuration (see example Example of an application "optimize antenna position" (Page 67)) or select a different antenna.

Error symptom 4:

The Power Ramp low limit is never adequate to identify the transponders. Too many steps are required to reach the necessary power.

Countermeasure 4:

Increase the Power Ramp low limit and, if necessary the step size (Boost Step Size ANT1 or Boost Step Size ANT2).

6.5 Example of an application "Testing and setting parameters for industrial UHF algorithms"

Aim

The aim is to test whether the behavior of the reading point can be improved by the use of industrial UHF algorithms and to find the optimum parameter settings for them.

Background

If antenna optimization and the Power Ramp do not lead to a satisfactory result, further industrial algorithms need to be activated:

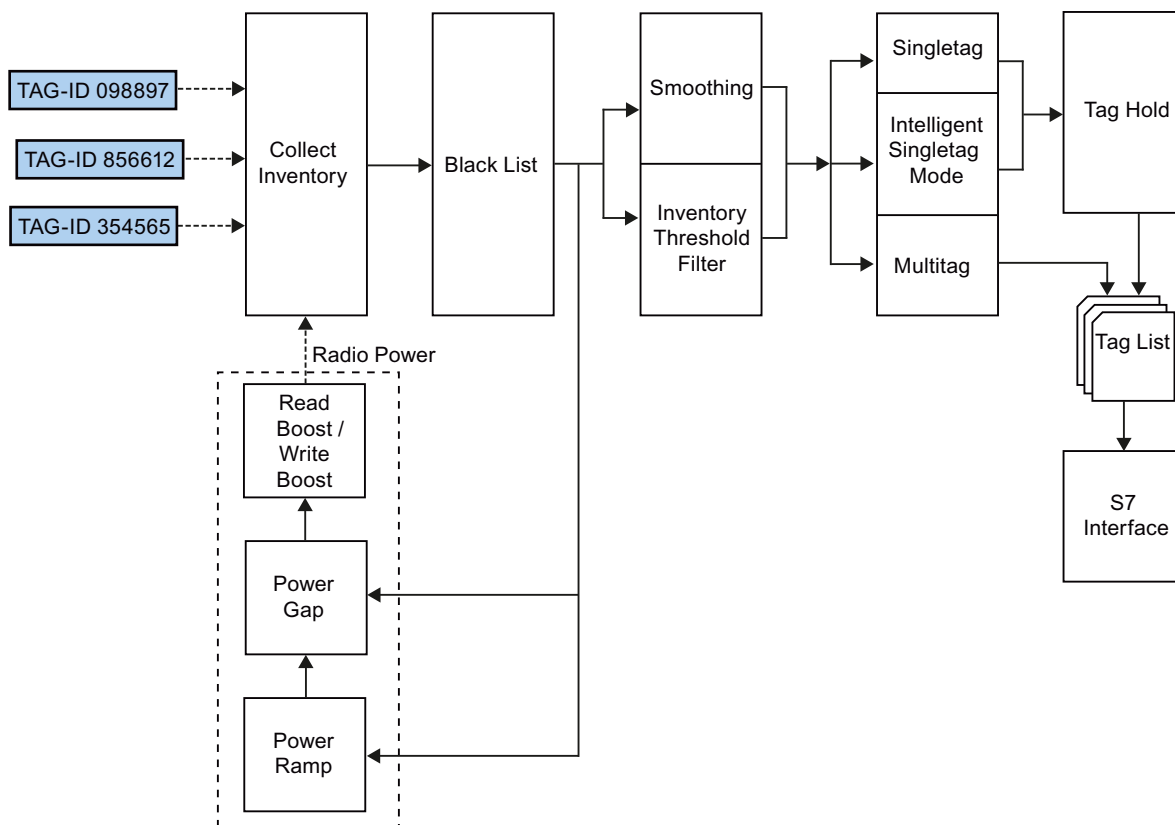


Figure 6-3 Tag List Processing by the industrial SIMATIC UHF algorithms of the RF600 reader

6.5 Example of an application "Testing and setting parameters for industrial UHF algorithms"

Brief description of the UHF algorithms:

- Black List: Filtering out of transponders that have already been processed
- Smoothing: Filtering if transponders are not constantly detectable
- Inventory Threshold Filter: Filtering of transponders based on their read frequency
- Intelligent Singletag Mode: Automatic selection of a transponder based on its properties in the wireless field
- Tag Hold: Reliable process access to a transponder that has already been processed
- Power Ramp: Automatic adaptation of the transmit power
- Power Gap: Improved interference immunity when operating readers installed close together
- Read/Write Boost: Increased power when reading and writing transponders

This results in the following options for combining filters:

Table 6- 1 Possible combinations of the UHF algorithms

Operating mode	Read/Write Boost	Power Ramp / Power Gap	Black List	ISTM ¹⁾	Tag Hold
Smoothing Single tag mode	X	X	X	X	X
Smoothing Multitag mode	X	X	X	-	-
ITF Single tag mode	X	X	X	X	X
ITF Multitag mode	X	X	X	-	-

¹⁾ Intelligent Singletag Mode

You will find further details on the algorithms in section 6.3 in Parameter assignment manual RF620R/RF630R (<http://support.automation.siemens.com/WW/view/en/33287195>).

The parameters to be used here are displayed in the "Parameter" tab and can be adapted there and stored directly on the reader. The meaning of the parameters is also described in section 6.3 of the Parameter assignment manual RF620R/RF630R (<http://support.automation.siemens.com/WW/view/en/33287195>).

The tag list events are visualized in the "Tag List" tab.

Procedure

When deciding which algorithms need to be activated, we suggest the following procedure:

For single tag mode:

1. Optimize the antenna configuration (see Example of an application "optimize antenna position" (Page 67)) including the RSSI Threshold.
2. Set the parameters for the Power Gap and the Power Ramp and optimize.

6.5 Example of an application "Testing and setting parameters for industrial UHF algorithms"

3. Set the parameters for Read Boost /Write Boost and optimize them if the inventories are very successful but the reads and writes are less reliable.
4. Set parameters for the Black List filter and optimize them.
5. Decide whether parameter assignment and optimization of inventories should be filtered using Smoothing or ITF so that these can then have parameters assigned and be optimized.
6. Decide whether single tag mode or Intelligent Singletag Mode (ISTM) and Sorting are necessary to be able to assign parameters and optimize ISTM later.
7. Decide whether Tag Hold should also be activated if the inventories return good tag identification but subsequent reads and writes are less often successful and a permanently set Read Boost /Write Boost with the required power increase leads to too much interference in the plant.

Since all algorithms are dependent on each other, steps 1 to 7 may need to be worked through several times.

For multitag mode:

1. Optimize the antenna configuration (see Example of an application "optimize antenna position" (Page 67)) including the RSSI Threshold.
2. Set the parameters for the Power Gap and the Power Ramp and optimize.
3. Set the parameters for Read Boost /Write Boost and optimize them if the inventories are very successful but the reads and writes are less reliable.
4. Set parameters for the Black List filter and optimize them.

Since all algorithms are dependent on each other, steps 1 to 4 may need to be worked through several times.

If the parameter assignment for the setup was selected suitably, the suitable power will be selected by the algorithm in an adequately short time to be able to take inventories of the transponders. The transponders that cannot be identified are discarded by the RSSI filter. Read and write access is always to the required transponder with the required Read/Write Boost or Tag Hold.

Possible error symptoms and how to counter them

The possible error symptoms result from the data access statistics of each separate step (1 to 7) achieved for the application. The countermeasures for each error are listed for steps 1 and 2.

For each of the steps 3 to 7, the countermeasure is to set the parameters of each parameter set and optimize them. You are supported by a log file and the "Tag List" tab allowing you to evaluate the parameter assignment of all the parameters.

Error and system messages

Fault messages

Error message	Note
ERROR: Windows Environment Variable "TZ={0}" found! Tool will calculate wrong time stamps!	Delete the variable.
ERROR: weak power	Increase the power.

Appendix A

A.1 Service & Support

Contacts

If you have any further questions on the use of our products, please contact one of our representatives at your local Siemens office.

The addresses are found on the following pages:

- On the Contact partner (www.siemens.com/automation/partner)
- In Catalog CA 01
- In Catalog ID 10 specifically for industrial communication / industrial identification systems

Technical Support

You can access technical support for all IA/DT projects via the following:

- Phone: + 49 (0) 911 895 7222
- Fax: + 49 (0) 911 895 7223
- E-mail (<mailto:support.automation@siemens.com>)
- Internet: Online support request form: (www.siemens.com/automation/support-request)

Service & support for industrial automation and drive technologies

You can find various services on the Support homepage (www.siemens.com/automation/service&support) of IA/DT on the Internet.

There you will find the following information, for example:

- Our newsletter containing up-to-date information on your products.
- Relevant documentation for your application, which you can access via the search function in "Product Support".
- A forum for global information exchange by users and specialists.
- Your local contact for IA/DT on site.
- Information about on-site service, repairs, and spare parts. Much more can be found under "Our service offer".

RFID homepage

For general information about our identification systems, visit RFID homepage (<http://www.siemens.com/ident/rfid>).

Technical documentation on the Internet

A guide to the technical documentation for the various products and systems is available on the Internet:

SIMATIC Guide manuals (www.siemens.com/simatic-tech-doku-portal)

Online catalog and ordering system

The online catalog and the online ordering system can also be found on the Industry Mall Homepage (<http://www.siemens.de/industrial-controls/mall>).

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