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RackScan Analyzer

Software operating manual

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1 Operating instructions

1.1 Using this manual

- ▶ Read this entire manual before using the device for the first time. Take note of any instructions in the documentation for the *RackScan s* and *RackScan b*.
- ▶ This manual is part of the product. Keep it in a place that is easily accessible.
- ▶ Enclose this operating manual when transferring the device to third parties.
- ▶ The current version of the operating manual for all available languages can be found on our webpage www.eppendorf.com/manuals.

1.2 Symbols used

Symbol	Meaning
1. 2.	Actions in the specified order
▶	Actions without a specified order
•	List
<i>Text</i>	Display or software texts
<i>Button</i>	Buttons/keys in software interface, displayed as text
	Additional information

Operating instructions

RackScan Analyzer

English (EN)

2 Safety

2.1 Intended use

The **RackScan Analyzer** software is used to register 2D data matrix codes on consumables in molecular biological, biochemical and cell biological research laboratories and to transfer the information contained in the 2D data matrix codes for further use in software applications.

The **RackScan Analyzer** software was developed for use with **RackScan b** and **RackScan s**.

The **RackScan Analyzer** software may only be used for research purposes.

2.2 User profile

The device, software and accessories may only be operated by trained and skilled personnel.

Before using the device, carefully read the *RackScan b* operating manual and the instructions for use included with the accessories. Familiarize yourself with the mode of operation for the software and the device.

3 Product description

3.1 Features

The **RackScan Analyzer** software was developed for the storage of samples within a laboratory, with or without a laboratory information system (e.g. LIMS, ELN, Inventory System).

3.2 Software description

The software converts and structures the data imported from the 2D matrix codes in the following output formats:

- Excel file
- Text file
- JSON file
- XML file
- Image file

3.2.1 User interface

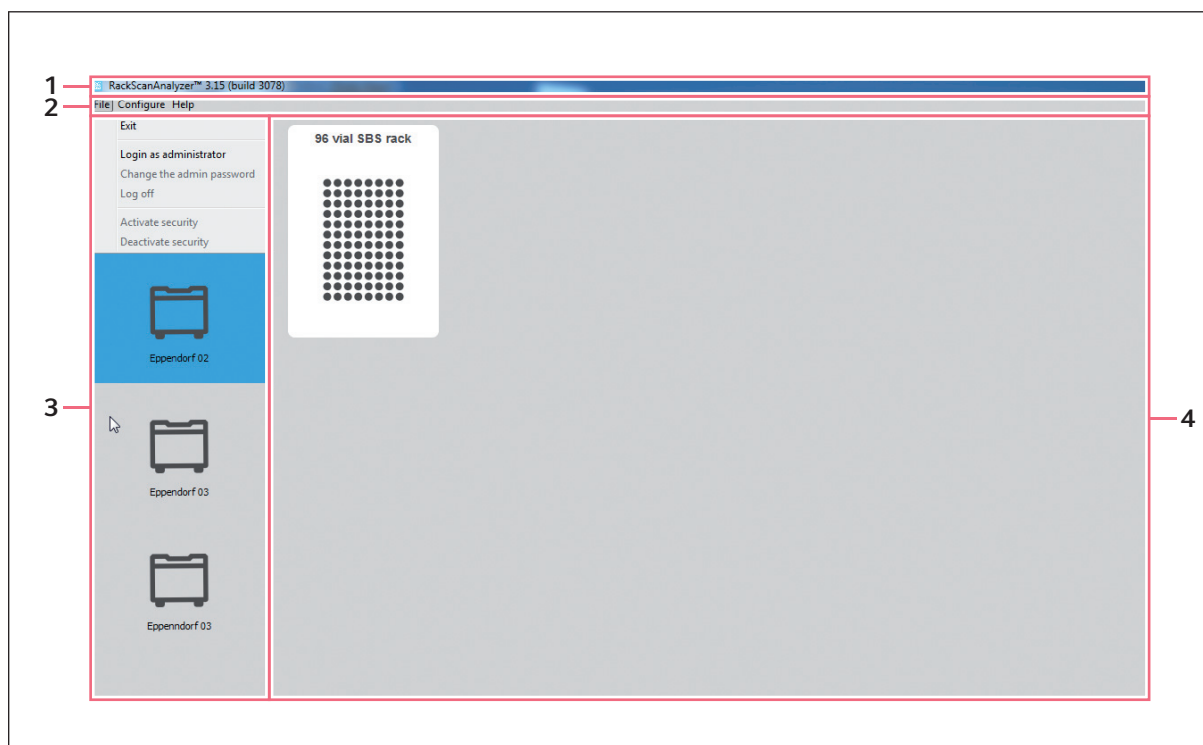


Fig. 3-1: Overview of user interface

- 1 Header
- 2 Menu bar

- 3 Device selection area
- 4 Rack selection area

3.2.2 Header

The software version and the user are shown in the header.

3.2.3 Menu bar

The three menus for the system configuration are found in the menu bar.

- *File* menu
- *Configure* menu
- *Help* menu

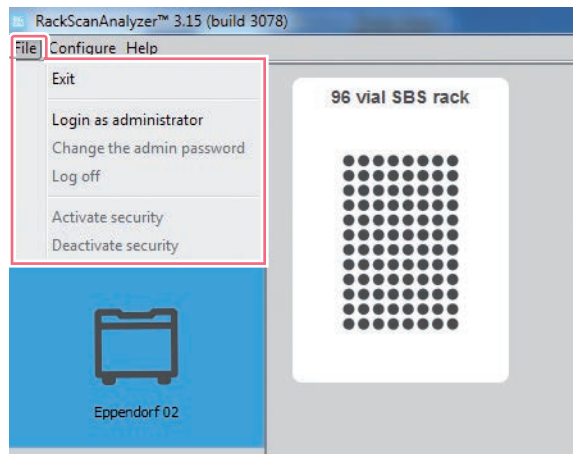
3.2.4 Device selection area

The devices available in the system are shown here.

3.2.5 Rack selection area

All the racks available for a device are shown here.

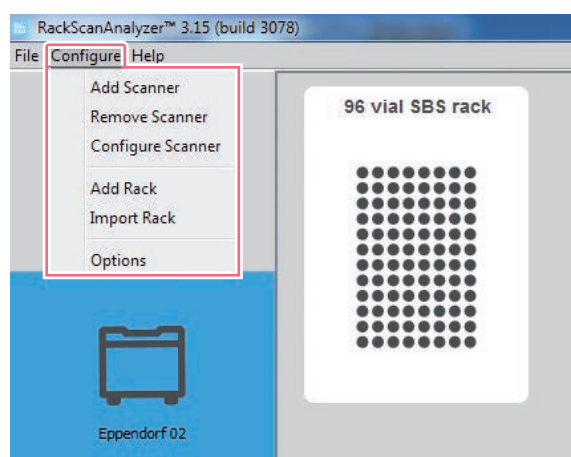
3.2.6 *File* menu



The following functions are available in the *File* menu:

Functions	Description
<i>Exit</i>	Exit the program
<i>Login as administrator</i>	Logging in as an Administrator
<i>Change the admin password</i>	Changing an Administrator password
<i>Log off</i>	Logging off as an Operator
<i>Activate security</i>	Activating security settings
<i>Deactivate security</i>	Deactivating security settings

3.2.7 Configure menu



The following functions are available in the *Configure* menu:

Functions	Description
<i>Add Scanner</i>	Add new device to list.
<i>Remove Scanner</i>	Remove device from list.
<i>Configure Scanner</i>	Assign name to device.
<i>Add Rack</i>	Add registered rack to list.
<i>Import Rack</i>	Import unregistered rack to list.
<i>Options</i>	Configuration options for data export.

3.2.8 Options function

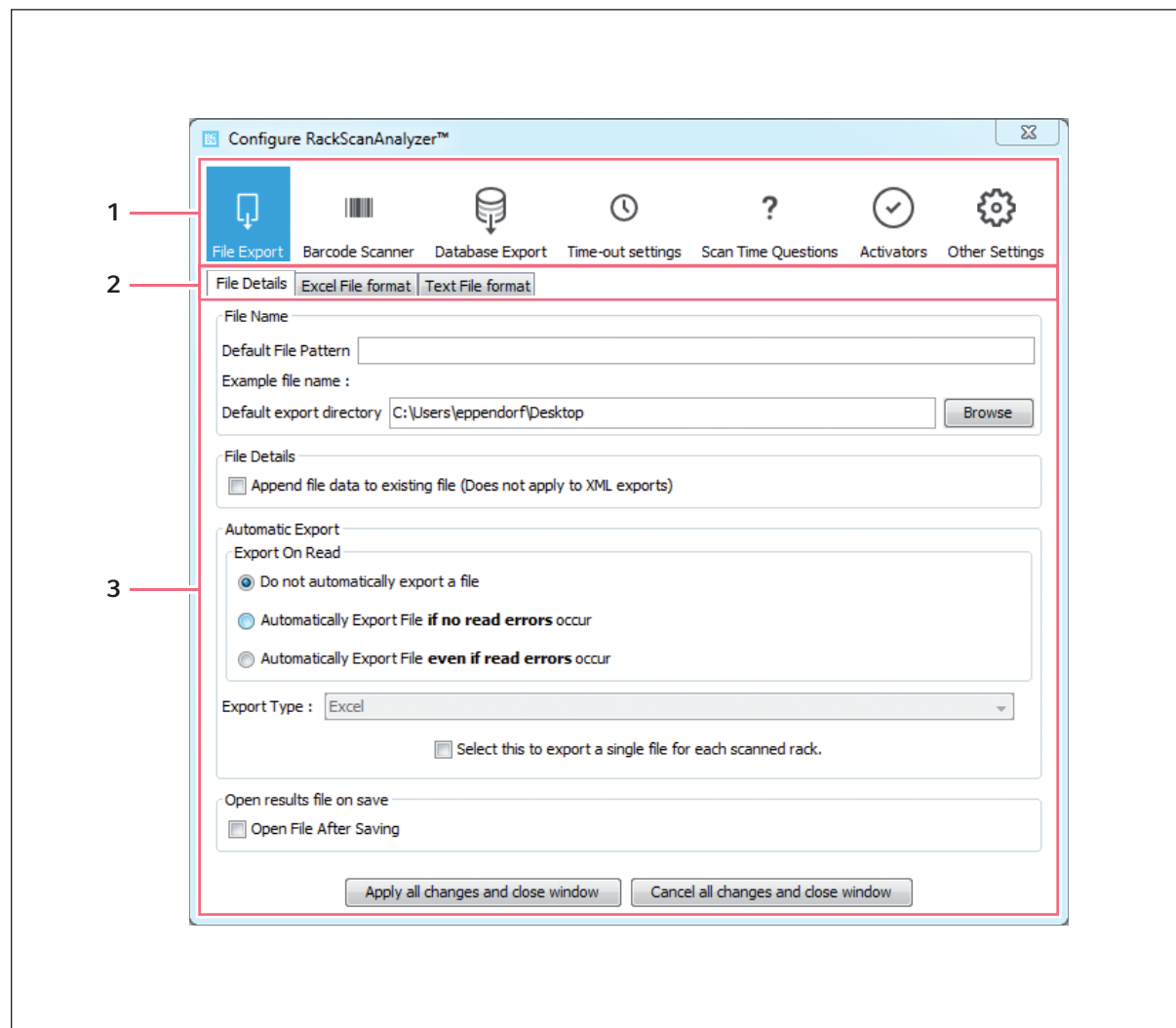


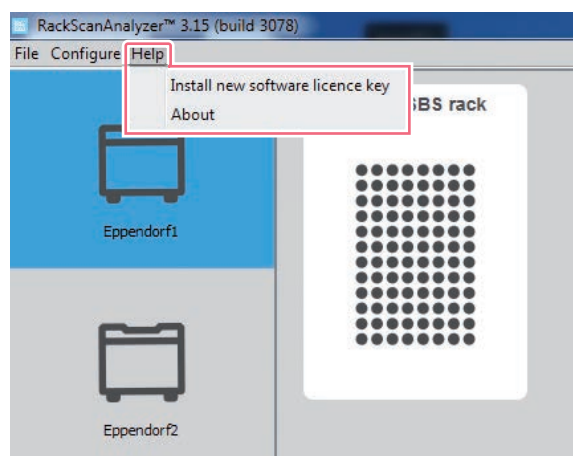
Fig. 3-2: Options function

- | | |
|--|--|
| <p>1 Subfunctions: Selection of subfunctions.</p> <p>2 Tabs: Configuration option for the data export.</p> | <p>3 Configuration: Configuration options within a subfunction.</p> |
|--|--|

The following submenus are available in the *Options* function:

Subfunctions	Description
<i>File Export</i>	Configuration of output format
<i>Barcode Scanner</i>	Configuration of side scanner
<i>Database Export</i>	Configuration of connection to various database systems
<i>Time-out settings</i>	Configuration of time interval for scanning errors
<i>Scan Time Questions</i>	Configuration of queries during scanning
<i>Activators</i>	Facilitates automatic scanning of rack ID, side scanner
<i>Other Settings</i>	Configuration of additional parameters such as sound, displaying empty position

3.2.9 Help menu



The following functions are available in the *Help* menu:

Functions	Description
<i>Install new software licence code</i>	Option to enter new Software Licence Key.
<i>About</i>	Display of software version and Software Licence Key.

Product description

RackScan Analyzer
English (EN)

4 Installation

4.1 Installing the software

The software may only be installed by trained personnel.

Prerequisites

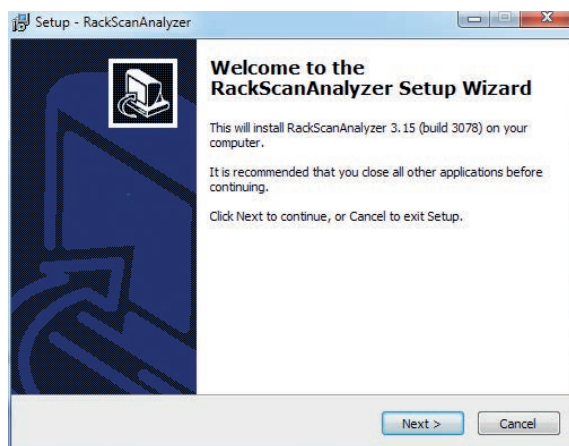
System requirements:

- RAM: min. 1 GB RAM
- Hard disk capacity: 10 GB
- Processor performance: Intel core 2 duo
- Operating system: Windows Vista, Windows 7, Windows 8, Windows 10
- Connection options: 2 USB interfaces, Internet and CD drive
- Administrator rights are available for the PC.
- The Software Licence Key is identified.
- The computer is started.



First, install the software and then connect the device with the computer.

Perform the following steps to install the software:



1. Download the software from the *Scanner Driver* folder on the data carrier provided.
2. Start the setup file.
The Start Setup window is shown.
3. Follow the installation instructions on the screen.
The installation starts.
4. Confirm the *License Agreement*.
5. Select the storage location.
6. Select *Select Components > Full installation*.
7. Select *Select Additional Tasks > For all users*.
8. Start the installation with *Install*.
The software is installed.
9. Complete the installation with *Finish*.
The software is installed.
The input window for assigning the Administrator's password appears.
10. Enter password.

The installed software is ready for registration.

4.2 Register software

The software must be registered before being used for the first time.

If the computer is connected with the Internet, registration may be completed online. If there is no Internet connection, registration is carried out offline.

4.2.1 Register software online

Prerequisites

- The computer is connected to the Internet.
- The software is started.
- The software license key is identified.
- The window for activating the software appears.

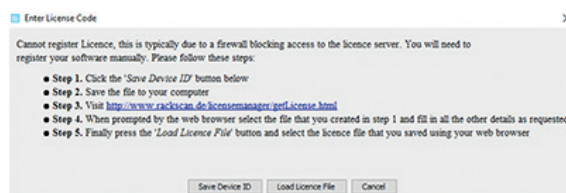
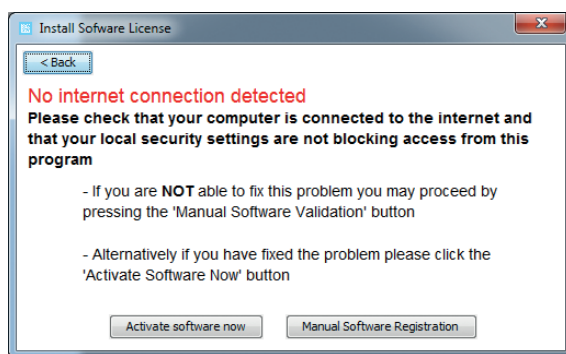


1. Select *Activate software now*.
2. Enter the software license key and confirm with *Activate software now*.
Registration is complete.

4.2.2 Register software offline

Prerequisites

- The software is started on an offline computer.
- The software license key is identified.
- A second computer with Internet connection is available.
- The window for activating the software appears.



1. Select *Other Options*.
The dialog window for registering the software appears.
2. Select *Manual Software Registration*.
The list of steps to be taken for manual registration appears.
3. Select *Save Device ID*.
4. Save the *Device ID* file to an external data carrier.
5. Call up the website <http://www.rackscan.de/licensmanager/getLicense.html> on the computer with an Internet connection.
6. Navigate to the *Device ID* file on this website.
The request to enter the software license key appears.
7. Enter the software license key and confirm with *submit*.
The window for downloading the registration code appears.
8. Click on the *here* link with the right mouse button.
9. In the selection menu shown, select *Ziel speichern unter...* and save the *license.key* text file to the external data carrier.
10. On the offline computer, select *Load License File* in the software, load the *license.key* text file and confirm with *OK*.
The input window for assigning the Administrator's password appears.
11. Assign Administrator password.
The software is registered.

4.3 Start program and activate/deactivate security function

The program may be started in the role of Operator or Administrator.

The Administrator configures the system.

The Operator starts the scanning process and changes the file output formats.

4.3.1 Start the program

1. The software starts with a double-click on the program icon.
The program starts.

4.3.2 Activate security function

Prerequisites

The program is started.

The system can be configured to only allow an Administrator to change settings.

1. In the *File* menu under *Login as administrator*, log in as an Administrator with your assigned password.
It is possible to change the settings.
Activation and deactivation of the security settings is also possible.
2. Click on *Activate security* to activate the security setting.
3. Log off as Administrator.
Only the Administrator can change settings.
The system is protected against changes.

4.3.3 Deactivate security function

1. In the *File* menu under *Login as administrator*, log in as an Administrator.
2. Click on *Deactivate security* to deactivate the security setting.

Settings may be changed.



If the security function is deactivated when the Administrator logs off, all operators will be able to change the settings.

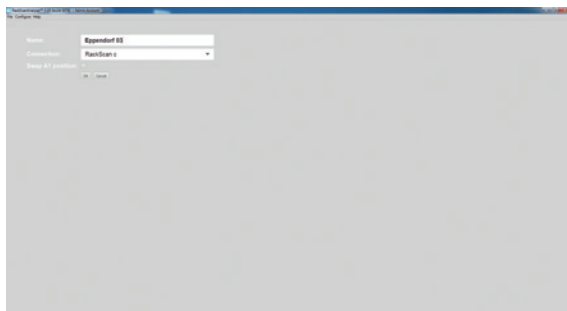
5 Configuring the system

5.1 Add device

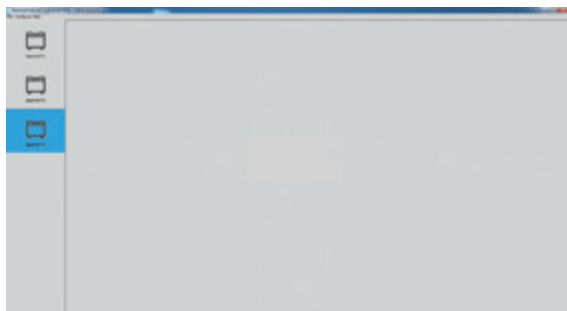
Configure > Add Scanner

Prerequisites

- The device is connected to the computer and ready for operation.



1. Select *Configure > Add Scanner* from the menu.



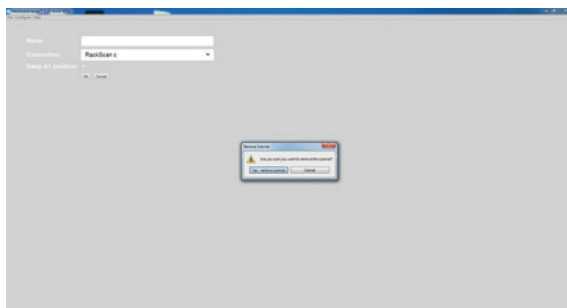
2. Enter a name for the device in the input window and confirm with *OK*.
The device will appear on the left in the selection list.

5.2 Remove device

Configure > Remove Scanner

Prerequisites

- The device is connected to the computer and ready for operation.



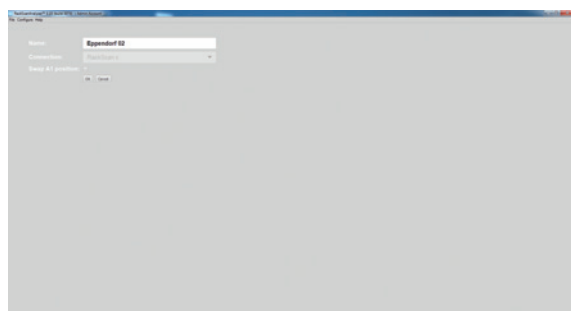
1. Select *Configure > Remove Scanner* from the menu.
2. Enter the name of the device and remove the scanner from the list with *Yes-remove scanner*.
The device is then removed from the selection provided.

5.3 Assign device name

Configure > Configure Scanner

Prerequisites

- The device is connected to the computer and ready for operation.
- The device is selected from the list of devices.



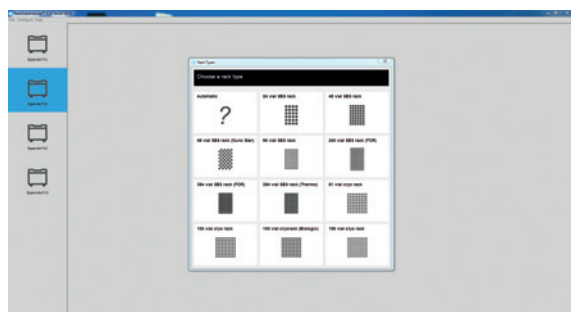
1. Select *Configure > Configure Scanner* from the menu.
The input window appears.
2. Complete the edit boxes and confirm with *OK*.
The name of the device appears in the list of devices on the left.

5.4 Add rack to device

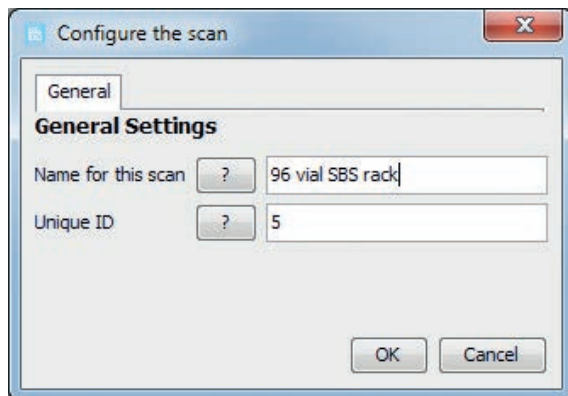
Configure > Add rack

Prerequisites

- The device is connected to the computer and ready for operation.
- The device is selected from the list of devices.

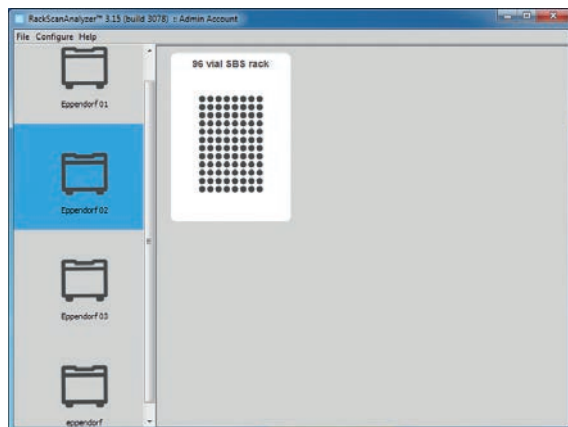


1. Select *Configure > Add rack* from the menu.
The *Choose a rack type* window appears.



2. Select the applicable rack from the selection shown.

The *General Settings* input window appears.



3. Enter the rack type designation in *Name for this scan* and confirm with *OK*.

The selected rack appears in the list of racks.



The *Unique ID* is only required when connecting to an automated laboratory system.

5.5 Import rack

Configure > Import Rack

Preconfigured local XML import files may be added to existing rack groups. These import files must be requested from the rack manufacturer.

Prerequisites

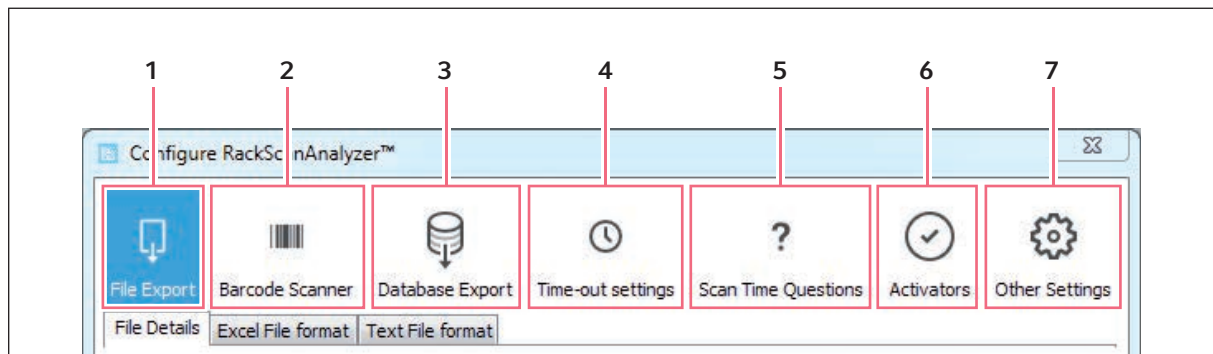
The device is connected to the computer and ready for operation.

1. Select *Configure > Import Rack* from the menu.
The Explorer window appears.
2. Enter local XML import file in the edit box in the Explorer window and import with *öffnen*.
The XML import file is imported and appears in the rack selection.

5.6 Options function

In the *Options* function, the settings are configured for exporting the data.

The function is divided into the following submenus:



1 File Export

2 Barcode Scanner

3 Database Export

4 Timeout settings

5 Scan Time Questions

6 Activators

7 Other Settings

5.6.1 File Export submenu

Configure > Options > File Export

The *File Export* submenu is divided into 3 tabs:

- *File Details*
- *Excel File Format*
- *Text File format*

File Details for general settings.

Configure > Options > File Export > File Details

The screenshot shows the 'Configure RackScanAnalyzer' window with the 'File Export' tab selected. The 'File Details' sub-tab is active. The window contains the following elements:

- File Name:** A text input field.
- Default File Pattern:** A text input field.
- Example file name:** A text input field.
- Default export directory:** A text input field showing 'C:\Users\jppendorf\Desktop' with a 'Browse' button.
- File Details:** A section with a checkbox labeled 'Append file data to existing file (Does not apply to XML exports)'.
- Automatic Export:** A section with the label 'Export On Read' and three radio button options:
 - ☒ Do not automatically export a file
 - ☐ Automatically Export File **if no read errors** occur
 - ☐ Automatically Export File **even if read errors** occur
- Export Type:** A dropdown menu currently set to 'Excel'.
- ☐ Select this to export a single file for each scanned rack.
- Open results file on save:** A section with a checkbox labeled 'Open File After Saving'.
- Buttons:** 'Apply all changes and close window' and 'Cancel all changes and close window' at the bottom.

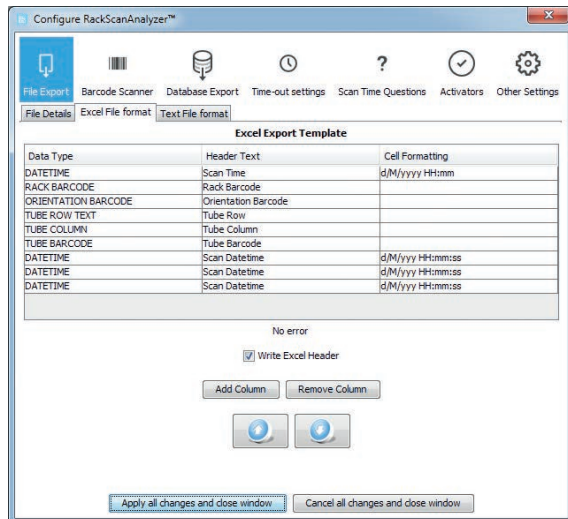
Configuring the system

RackScan Analyzer
English (EN)

Parameters		Meaning
<i>Default file Pattern</i>		Settings for the standard file name
	<date>	Enter date
	<time>	Enter time
	<n>	Enter rack ID (ALL for all racks)
	<barcode>	Enter barcode (if all racks are to be exported, the barcode is separated using an underscore character in the file name)
	<groupname>	Enter name for sample group
	<uniqueid>	Enter unique Scan-ID
<i>Default Export Directory</i>		Definition of storage location for data export
<i>File Details</i>		Overwrite function when saving existing files, except for XML files.
<i>Automatic Export</i>		The data is automatically saved. Different settings are possible.
	Do not automatically export a file	No automatic data export after Scanvorgang
	automatically Export File if no read errors occur	Automatic data export only with error-free Scanvorgang
	Automatically Export File even if read errors occur	Automatic data export even with faulty Scanvorgang
<i>Export Type</i>		File format setting for the data export
<i>Open file after saving</i>		Setting for automatically opening the file after saving

Excel File format for data export settings in Excel format.

Configure > Options > File Export > Excel File format



Every line in the display corresponds to a column in the Excel export file.

The column 1 *Data Type* contains the information groups that are exported.

Tab. 5-1: Column 1 content

Data type	Description
Rack Barcode	Rack barcode (Rack ID)
Tube Barcode	2D data matrix code of sample
Orientation Barcode	Barcode at the bottom of the rack
Tube Position	Position of sample
Tube Column	Sample column
Tube Row	Sample row
Tube Row Text	Sample row as text, starting with A
Date	Read-in date
Time	Time of scan
Datetime	Time and date of Scanvorgang

The Column 2 *Format Type* describes the text in the header of the Excel file.

Tab. 5-2: Column 2 content

Format type	Description
Rack Barcode	The cell formatting column is not used. The rack ID is written to the Excel file.
Tube Barcode	The cell formatting column is not used. The 2D data matrix code of the sample is written to the Excel file; this is classified as a text column so that barcodes with leading zeros are not truncated.
Orientation Barcode	The cell formatting column is not used. The 2D data matrix code of the sample is written to the Excel file; this is classified as a text column so that barcodes with leading zeros are not truncated.
Tube Row	The cell formatting column is not used. The sample line.
Tube Column	The cell formatting column is not used. The sample column.
Tube Row Text	The cell formatting column is not used. The sample line text.
Tube Position	The cell formatting column defines how many digits are used to identify the column. Enter <i>an</i> to write in the A1 column, enter <i>ann</i> to write in the A01 column, enter <i>annn</i> to write in the A001 column.
Datetime	The cell formatting column specifies the format in which the date and duration of the scan are shown.

The column 3 *Cell Formatting* describes how the data is shown in the Excel table.

Tab. 5-3: Column 3 content

Letter	Date and time component	Output format	Example
G	Area designation	Text	AD
Y	Year	Year	1996; 96
M	Month in year	Month	July; Jul; 07
W	Week in year	Number	27
W	Week in month	Number	2
D	Day in year	Number	189
D	Day in month	Number	10
F	Day of week in month	Number	2
E	Day of week	Text	Tuesday; Tue
A	AM/PM	Text	PM
H	Hour of day (0-23)	Number	0
K	Hour of day (1-24)	Number	24
K	Hour in AM/PM (0-11)	Number	0
H	Hour in AM/PM (1-12)	Number	12
M	Minute of hour	Number	30
S	Second of minute	Number	55
S	Millisecond	Number	978
Z	Time zone	Time zone	Pacific Standard Time; PST;
Z	Time zone	RFC 822 time zone	-0800

Tab. 5-4: Example:

Date and time	Results
yyyy.MM.dd G 'at' HH:mm:ss z	2001.07.04 AD at 12:08:56 PDT
EEE, MMM d, 'yy"	Wed, Jul 4, '01
h:mm a	12:08 PM
hh 'o'clock' a, zzzz	12 o'clock PM, Pacific Daylight Time
K:mm a, z	0:08 PM, PDT
yyyy.MMMMMM.dd GGG hh:mmaaa	2001.July.04 AD 12:08 PM
EEE, d MMM yyyyHH:mm:ss Z	Wed, 4 Jul 2001 12:08:56 -0700
yyMMddHHmmssZ	010704120856-0700
yyyy-MM-dd'T'HH:mm:ss.SSSZ	2001-07-04T12:08:56.235-0700

Date shows the date of the scan. Any formatting characters that refer to the date are not permitted in the format string.

Configuring the system

RackScan Analyzer
English (EN)

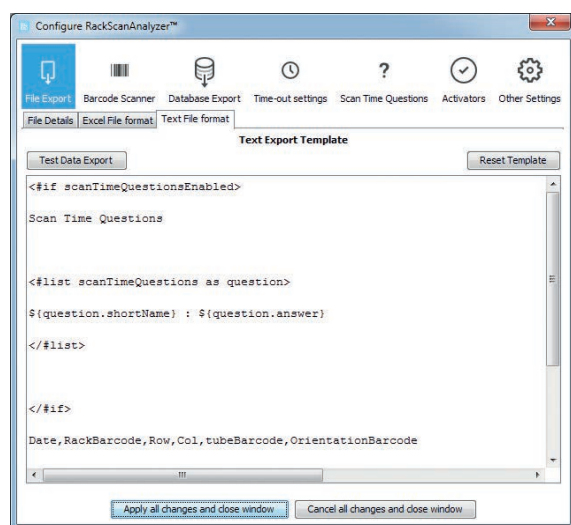
Time shows the time of the scan. Any formatting characters that refer to the time are not permitted in the format string.

Tab. 5-5: Further configuration options:

Parameters	Description
<i>No error</i>	Display of error messages when processing
<i>Write Excel Header</i>	When enabling this function, the name of the <i>data type</i> is entered as the column heading
<i>Add Column</i>	Adding additional columns to the Export template for special information
<i>Remove Column</i>	Removing marked rows
<i>Up Arrow</i>	Moving the marked row up
<i>Down Arrow</i>	Moving the marked row down

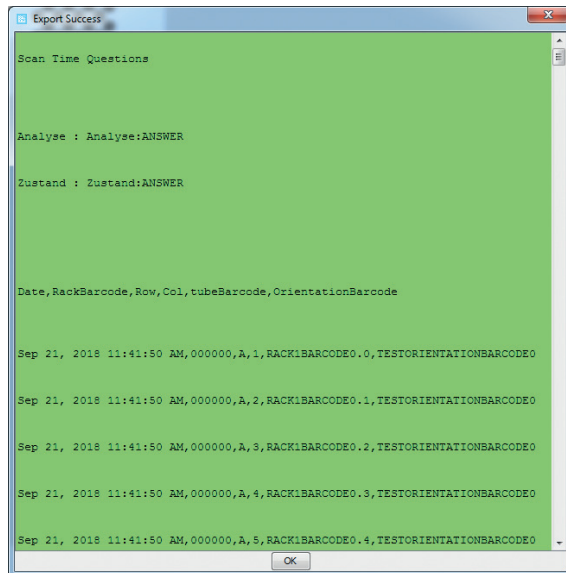
Text File format for data export settings in text format.

Configure > Options > File Export > Text File format

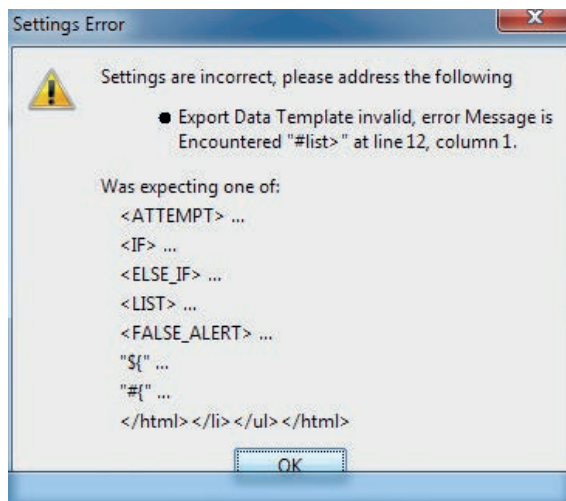


The content is created in markup language.

Output in the form of a text file.



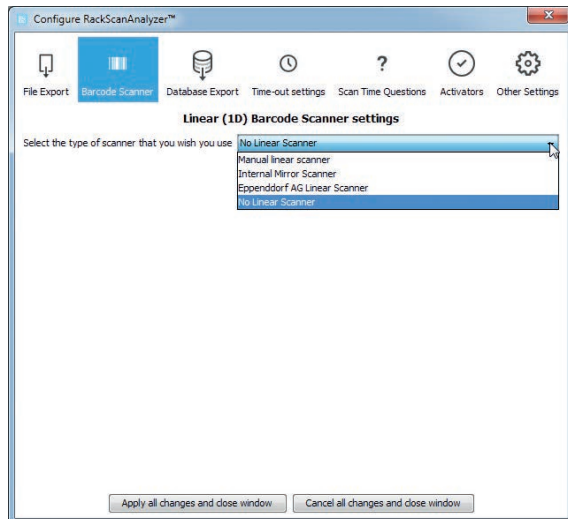
In the event of structure errors in the text file, the following error message is shown.



5.6.2 Barcode Scanner submenu

Configure > Options > Barcodescanner

Accept the settings for the side scanner.



The settings are:

- Manual Linear Scanner
- Linear RackScan s
- No linear scanner

The debug window opens in a separate window. The debug window shows the results of the **RackScan s** with different exposure, which is used for identification of a rack ID. This is a specific troubleshooting measure, should the **RackScan s** not function correctly.



When using just one barcode type, deactivate the barcode types not in use. This is particularly important for barcodes without checksums, as a random external noise will not be recognized.

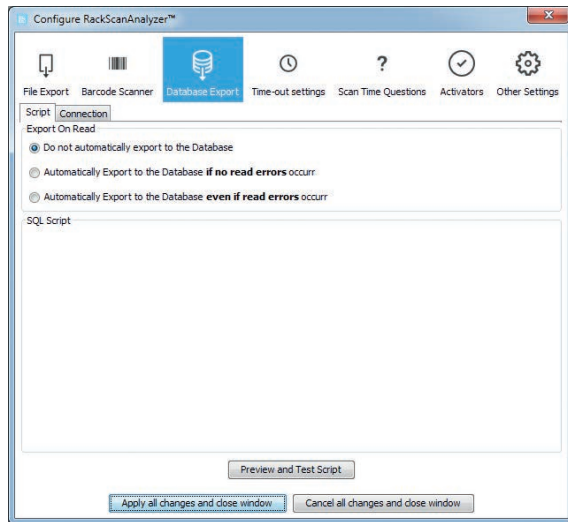


It is possible to display the barcodes using the *Help menu*.

5.6.3 Database Export submenu

Configure > Options > Database Export

Configure the settings for connecting to a database system.



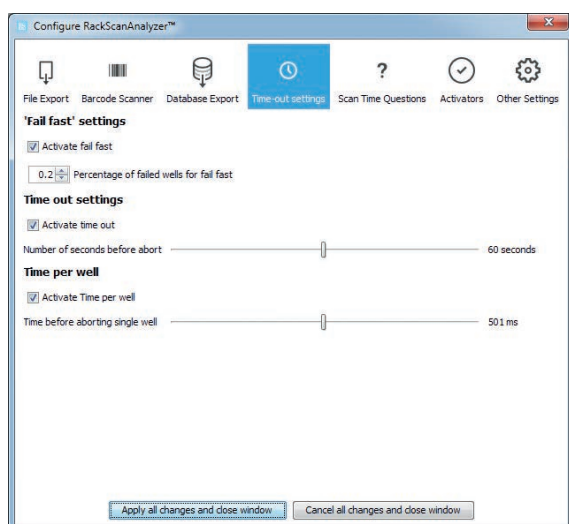
A database may be directly connected to the most popular database systems (Oracle, Postgres, MySQL, SQL Server) using an ODBC connection.

Connection to other database systems is also possible (e.g. Derby, SQLite).

5.6.4 Timeout settings submenu

Configure > Options > Timeout settings

Setting option to determine how often the scanning process is repeated in the event of a read error.



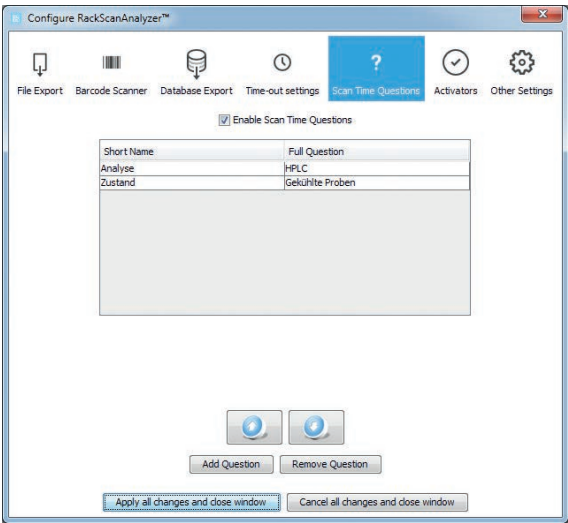
The settings are:

Parameters	Description
<i>Fail fast</i>	Percentage of samples that could not be read before the scan came to an end.
<i>Timeout settings</i>	Length of time (in seconds) the scanner waits when reading the data before aborting.
<i>Time per well</i>	Length of time (in milliseconds) the scanner spends trying to read the samples from a rack. (Take PC performance and current utilization into consideration here.)

5.6.5 Scan Time Question submenu

Configure > Options > Scan Time Questions

Setting option for *Scan Time Question* function. Save queries for the user which may be shown on the screen before the scan starts.



Parameters	Description
Short Name	Brief description used for classification of answers.
Full Question	Question text shown to the user during the Scanvorgang.
Answer	Answer text entered by the user during the Scanvorgang.

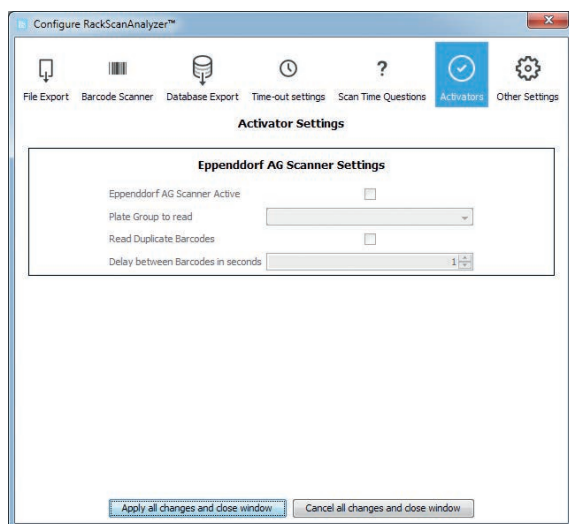
Further settings are possible:

Parameters	Description
Edit Question	Short names or changing the entire question.
Add Question	Add question for user.
Remove Question	Remove question.
Change Question Order	Change question order.
Enable Scan Time Question	Enable display of questions for the user.

5.6.6 Activators submenu

Setting option for automatic reading of rack ID, with placement of a rack on the device.

Configure > Options > Activators



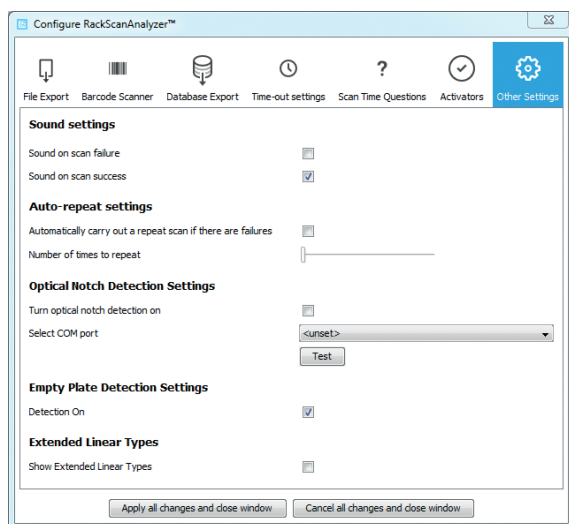
The settings are:

Parameters	Description
<i>Scanner Active</i>	Activates the side scanner.
<i>Plate Group to Read</i>	The scanning process starts as soon as the rack has been identified.
<i>Read Duplicate Barcodes</i>	Enabling this function will mean the barcodes are read on a rack, even if identical, until the rack is removed from the device.
<i>Delay between barcodes</i>	Time interval between 2 scans with side scanner activated.

5.6.7 Other Settings submenu

Configure > Options > Other Settings

Additional settings for the scan.



The settings are:

Parameters		Description
<i>Sound settings</i>		Output of acoustic signals.
	<i>Sound on scan failure</i>	Signal for reading error.
	<i>Sound on scan success</i>	Signal for error-free reading.
<i>Auto-repeat settings</i>		Option of re-reading a rack in the event of an error when reading the sample (due to external influences).
	<i>Automatically carry out a repeat scan if there are...</i>	Enable automatic repeat of scan with reading error of 2D data matrix code.
	<i>Number of times to repeat</i>	Number of times scan is repeated.
<i>Optical Notch Detection Settings</i>		Enable optical rack placement check. If present, a sensor detects whether the rack has been correctly placed on the device (e.g. barcode front left).
	<i>Turn optical notch detection on</i>	Enable optical rack placement check.
<i>Empty Plate Detection Settings</i>		Function for reading empty racks.
	<i>Detection on</i>	Activate the function.
<i>Extended Linear Types</i>		When using the barcode types: EAN8, EAN13 and CODABAR.
	<i>Show Extended Linear Types</i>	Display of further barcodes.

6 Troubleshooting

6.1 General errors

Follow the instructions that appear on the screen in the event of any error messages.

7 Technical data

7.1 System requirements

Components	Minimum requirements
Memory	1 GB RAM
Processor performance	Intel core 2 duo
Operating system	Windows Vista, Windows 7, Windows 8, Windows 10
Connection options	2 USB interfaces, Internet or CD drive

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