SIEMENS

SIMOTION

Motion Control Task Trace

Function Manual

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Valid as from Version 4.4

04/2014

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Preface 1

1.1 SIMOTION Documentation

An overview of the SIMOTION documentation can be found in the SIMOTION Documentation Overview document.

This documentation is included as electronic documentation in the scope of delivery of SIMOTION SCOUT. It comprises ten documentation packages.

The following documentation packages are available for SIMOTION V4.4:

- SIMOTION Engineering System Handling
- SIMOTION System and Function Descriptions
- SIMOTION Service and Diagnostics
- SIMOTION IT
- SIMOTION Programming
- SIMOTION Programming - References
- SIMOTION C
- SIMOTION P
- SIMOTION D
- SIMOTION Supplementary Documentation

1.2 Hotline and Internet addresses

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- Ordering documentation / overview of documentation
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Frequently Asked Questions can be found in SIMOTION Utilities & Applications, which are included in the scope of delivery of SIMOTION SCOUT, and in the Service&Support pages in **Product Support**:

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Technical support

Country-specific telephone numbers for technical support are provided on the Internet under **Contact**:

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Overview

2

Field of application

The **SIMOTION Task Trace** supports you when troubleshooting in the SIMOTION multitasking environment. The SIMOTION Task Trace records the sequence of individual tasks, identifies user events that you can generate via a program command, and displays these graphically. This makes the interaction between programs and tasks easily traceable, thereby affording better control over them.

Structure of the Task Trace

The SIMOTION Task Trace includes two main components:

- The **SIMOTION Task Tracer**, which writes the task change and events to a buffer on the target device
- The **SIMOTION Task Profiler**, an application for displaying the recorded data

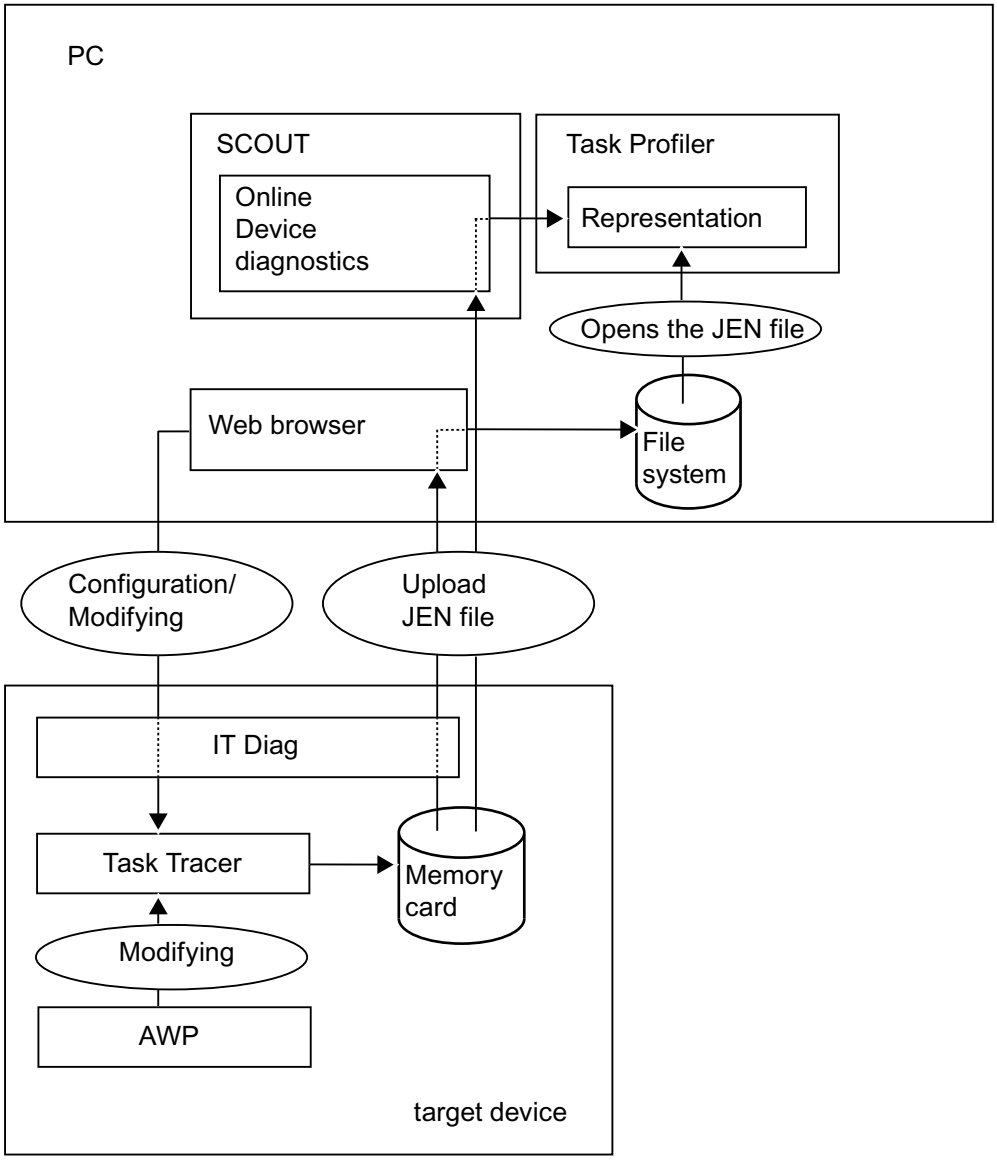


Figure 2-1 Schematic representation of SIMOTION Task Trace

SIMOTION IT DIAG (standard web pages) is used to configure the SIMOTION Task Tracer. The recording data is saved as a JEN file on the memory card of the target device.

If you start the Task Profiler via the device diagnostics, the trace data is automatically read from the memory card via the online connection and displayed. Alternatively, you can also save the JEN file from the target device to the file system of the PC using the SIMOTION standard web pages and then open the file in the SIMOTION Task Profiler.

Configuring 3

Overview

Configuring the SIMOTION Task Tracer is only necessary in exceptional circumstances, as the default configuration is used for recording. If you require a different configuration than the default, with Version V4.1.2 and higher this can be carried out on the target device via the standard web pages (SIMOTION IT DIAG).

Note

The functionality must be activated in the SIMOTION SCOUT project in the hardware configuration of the CPU. You can activate the required services in the hardware configuration on the "Ethernet extended/Webserver" tab in the object properties of the CPU.

Note

The changes you make to the configuration using the standard web pages remain in effect until the next time the target device is powered up. Following power-up, the default settings and the settings in the SIMOTION.ini file apply.

SIMOTION IT DIAG (standard web pages)

Configuration and control functionality of the Task Tracer are available on the standard web pages of SIMOTION IT DIAG.

Use the **Open IT Diag** button to start the standard web pages in the SCOUT device diagnostics.

Note

If there is no Ethernet connection from SCOUT to the target device, the button is deactivated (grayed out).

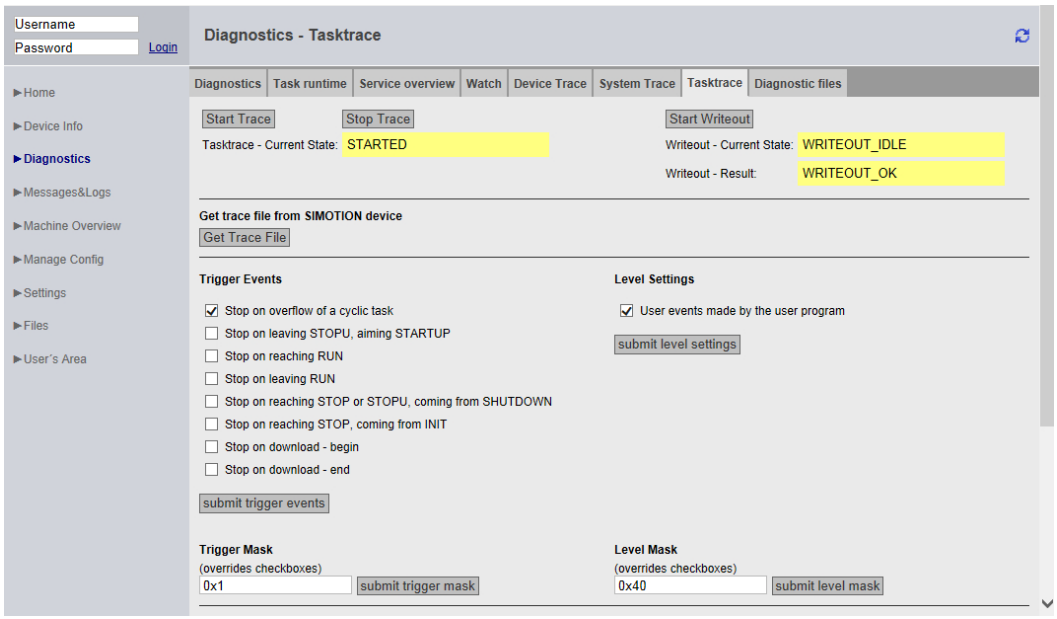


Figure 3-1 SIMOTION IT DIAG standard web pages - Task Trace (part 1)

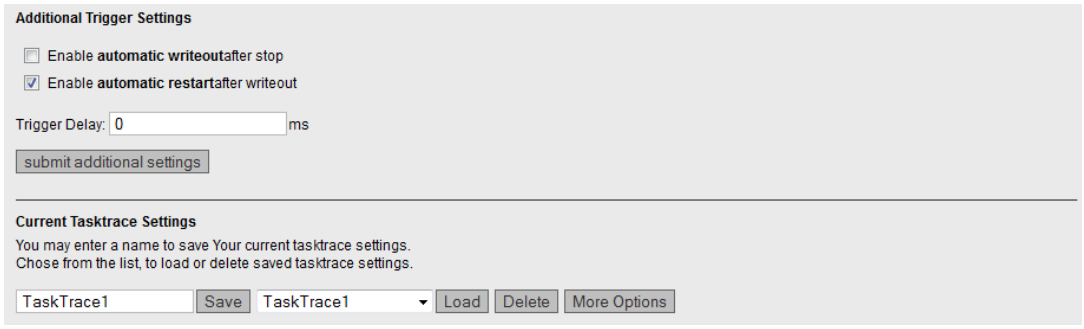


Figure 3-2 SIMOTION IT DIAG standard web pages - Task Trace (part 1)

Default configuration

The following table summarizes the default configuration of the Task Tracer and the setting options (configuration and control) using the standard web pages of the target device or the SIMOTION.ini file.

Note

The SIMOTION.ini is not created automatically and may need to be created and stored in the root directory of the memory card.

Note

For additional information regarding the configuration and status displays using standard web pages, refer to the "SIMOTION SCOUT Overview about Service and Diagnostic Options" documentation.

Table 3-1 Default configuration of the Task Tracer

Variable name in SIMOTION.ini	Meaning	Default setting	Can be changed via IT-Diag standard web pages
TT_BUFSIZE	Size of the trace buffer in KB	512,000 bytes (the maximum setting depends on the available RAM)	No
TT_WROUT	Activate automatic writing of the trace data to the memory card after the trace has stopped TT_WROUT =1	The trace data is not written automatically to the memory card (Because this is a default setting, no entry in the SIMOTION.ini)	Additional Trigger Settings: Enable **automatic writeout** after triggered stop
TT_RSTRTOFF	Trace is not started automatically after the trace data is written to the memory card TT_RSTRTOFF=1	The trace is started automatically once the trace data has been written to the memory card (Because this is a default setting, no entry in the SIMOTION.ini)	Additional Trigger Settings: Enable **automatic restart** after writeout
TT_LEVEL	Mask for specifying the events that are to be recorded in the Task Trace (see "Masking of events to be recorded") TT_LEVEL=0x0040	0x0040 (User_Events)	Level Settings
TT_TRIGGER	Mask for specifying the stop trigger of the trace (see "Masking of STOP trigger") TT_TRIGGER=0x0001	0x0001	Trigger Events or Trigger Mask
TT_TRGDELAY	Delay time [ms] after the trigger event until Task Trace is stopped	0 ms	Trigger Delay

Masking of events to be recorded

```
Level masks:
0x0040 user events made by the user program
```

Masking of STOP trigger

```
Trigger masks:
0x0001 stop on overflow of a cyclic task
0x0002 stop on leaving BZ STOPU, aiming STARTUP
0x0004 stop on reaching BZ RUN
0x0008 stop on leaving BZ RUN
```

0x0010 stop on reaching BZ STOP or STOPU, coming from SHUTDOWN

0x0020 stop on reaching BZ STOP, coming from INIT

0x0040 stop on leaving BZ INIT

0x0100 stop on Download-Begin

0x0200 stop on Download-End

You can also combine masking instances if required, for example 0x0009 from

0X0001 stop on overflow of a cyclic task and 0x0008 stop on leaving BZ RUN.

Creating the SIMOTION.ini file

The following example shows how you can modify the configuration using the SIMOTION.ini file. In this process, it should be specified that the CPU mode will be recorded until it changes to STOP mode. The buffer size is specified as 1,000,000 bytes. The automatic writing of the trace data to the memory card is activated once the trace has stopped.

Example:

TT_BUFSIZE = 1000000

TT_TRIGGER= 0x0010

TT_WROUT=1

Note

The maximum buffer size depends on the available memory capacity of the RAM and the memory card.

Working with the SIMOTION Task Profiler 4

4.1 Starting the SIMOTION Task Profiler

You can open the SIMOTION Task Profiler

- as an application from the STEP7 program folder or
- from the SCOUT device diagnostics.

Start via STEP7 program folder

You can open the SIMOTION Task Profiler as an application in the STEP 7 program folder (see figure below).

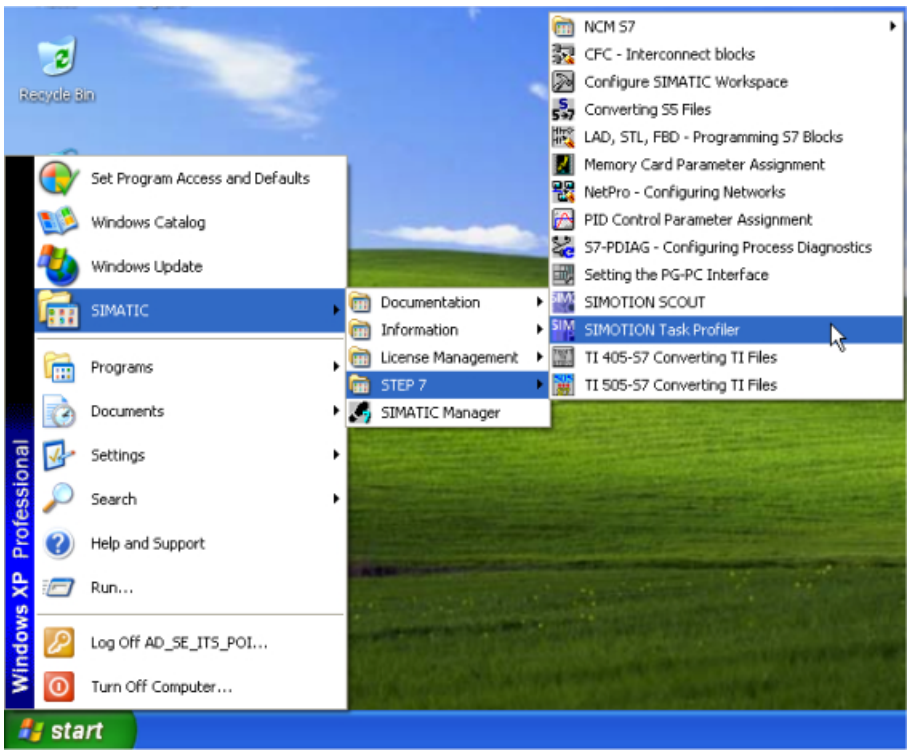


Figure 4-1 Opening the Task Profiler in the STEP7 program folder

When the Task Profiler is closed, the settings (e.g. most recently loaded Task Trace recording) are not saved. On reopening, the window for the display is empty (see figure below).

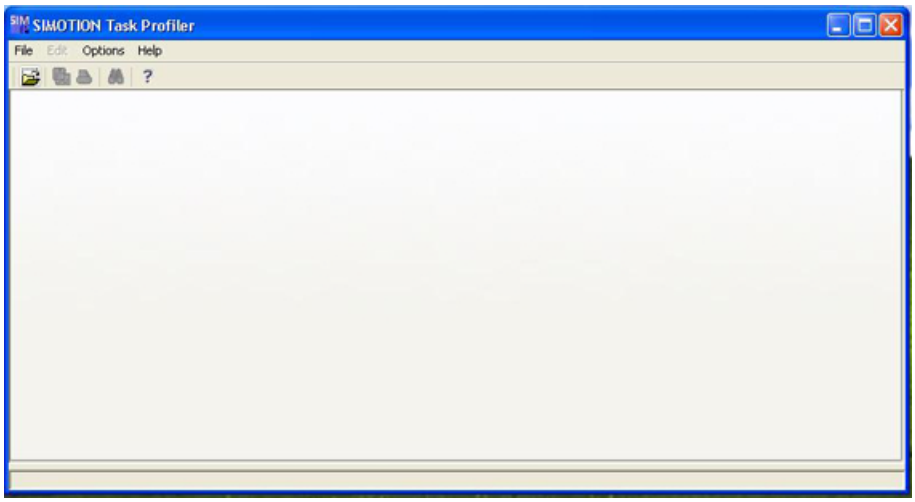


Figure 4-2 SIMOTION Task Profiler upon opening via the STEP7 program folder

Start using SCOUT device diagnostics

Note

In order to start the device diagnostics, an online connection to the target device must exist.

Start the Task Profiler in the device diagnostics as described below:

1. Switch to the **Task Manager** tab.
2. The following options are available:
   - Click the **Display** button. The Task Profiler starts. In addition, the trace file is loaded from the memory card of the target device and opened in a new tab in the Task Profiler. If you click the button again, the same file is read again.
   - Click the **Create snapshot** button. The setting that you have made using IT-Diag is reset to the default state. The settings made using the SIMOTION.ini file are retained. The Task Trace is started, written to the memory card, and then the Task Profiler started. If you click the button again, a new recording is started.

Note

If a trace file is not stored on the CF card of the target device, a new tab for the display is not shown.

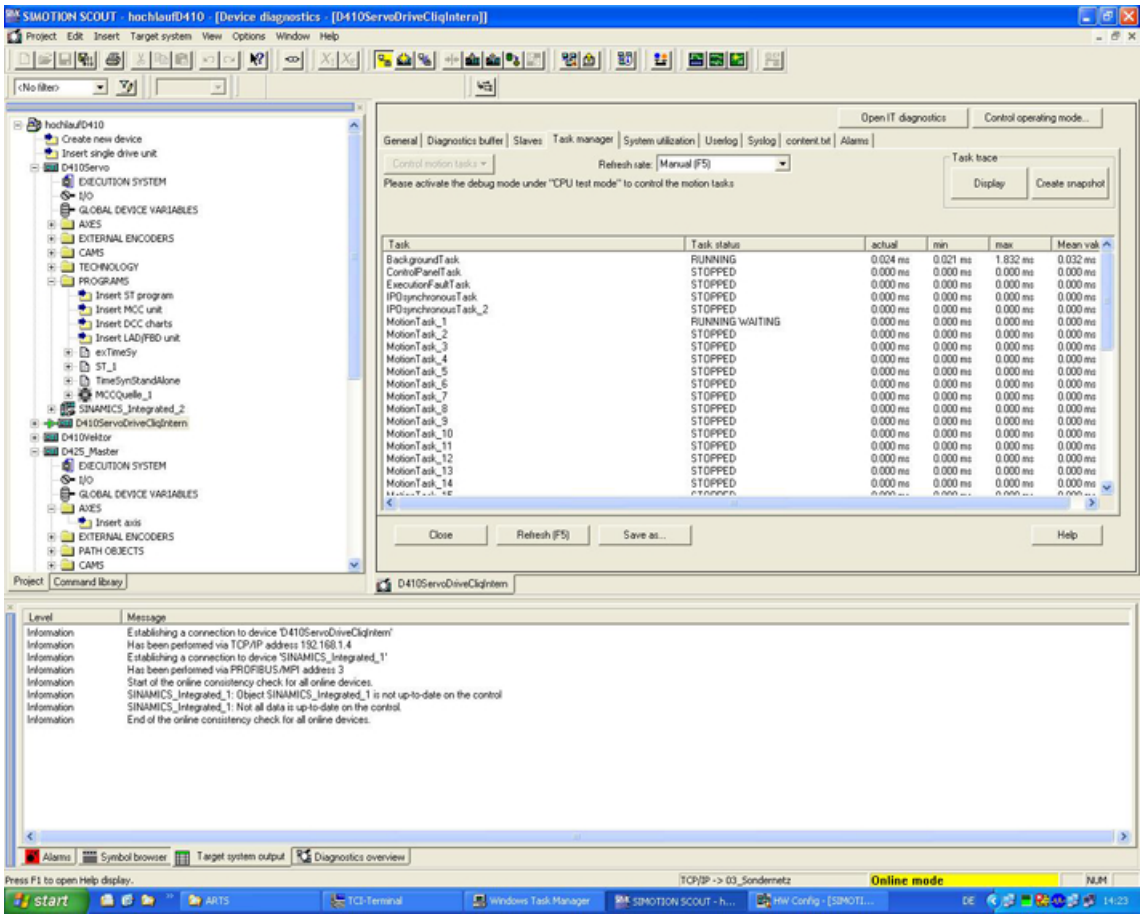


Figure 4-3 Start of Task Profiler via the device diagnostics

4.2 Structure of the SIMOTION Task Profiler

4.2.1 Structure of the interface

The structure of the SIMOTION Task Profiler is described below.

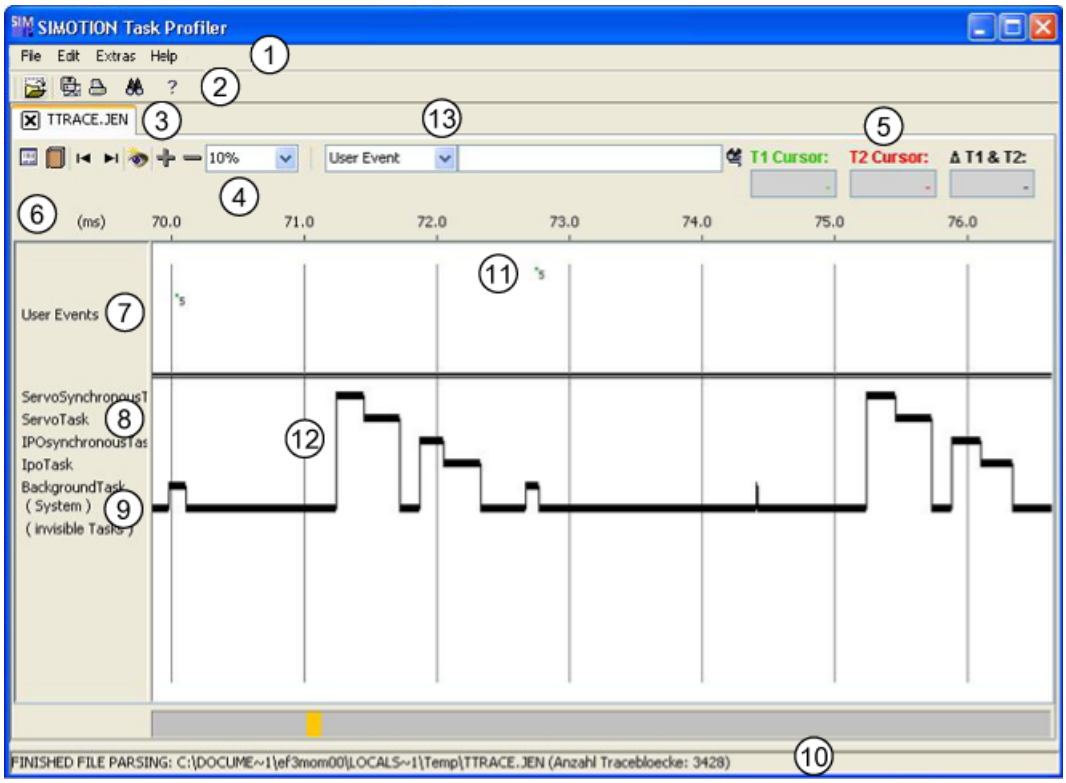


Figure 4-4 Structure of the user interface of the Task Profiler

No.	Description
1	Menu bar: File, Edit, Options, Help
2	Global toolbar
3	Tab with current trace. Several traces can be opened simultaneously.
4	Local toolbar
5	Display of T-measurement cursor
6	Time markings of the timing diagram
7	Labeling of user events
8	Display of task names
9	System tasks not displayed individually
10	Status bar
11	Marking of user events in the timing diagram
12	Timing diagram of tasks
13	Quick search

4.2.2 Structure of the menus

The menus are explained below. For more detailed information, refer to "Working with the SIMOTION Task Profiler".

File menu

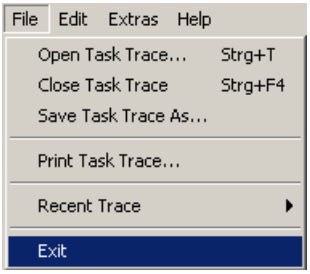


Figure 4-5 File menu

Table 4-1 Entries in the File menu

Entry	Description
Open Task Trace ...	Opens the JEN file
Close Task Trace ...	Closes the current Trace tab
Save Task Trace As ...	Saves the current trace
Print Task Trace ...	Prints the current trace
Recent trace	Selection of the most recently opened trace recordings
Exit	Exits the Task Profiler

Edit menu

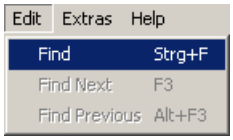


Figure 4-6 Edit menu

Table 4-2 Entries in the Edit menu

Entry	Description
Find	Opens the Find Options dialog box
Find Next	Searches for the next event corresponding to the Find Options
Find Previous	Searches for the previous event corresponding to the Find Options

Options - Menu



Figure 4-7 Options - Menu

Table 4-3 Entries in the Options menu

Entry	Description
User Event Configuration	Opens the dialog for assigning names to the user events of the current recording. You can export the configuration as an XML file and, if required, import it.

Help menu



Figure 4-8 Help menu

Table 4-4 Entries in the Help menu

Entry	Description
Help	Opens the Help system
About	Opens the About dialog box

4.2.3 Global toolbar

The following functions are available in the global toolbar:

Table 4-5 Global toolbar

Icon	Function
	Open Task Trace
	Saves Task Trace under a different name
	Print Task Trace
	Browses Task Trace for events
	Open help

For a description of the functions of the local toolbar, refer to "Analyzing a Task Trace".

4.3 Opening a Task Trace

Proceed as follows to open a trace file (trace stored on the PG/PC):

1. Open the **Open Task Trace...** dialog from the **File** > **Open Task Trace** menu

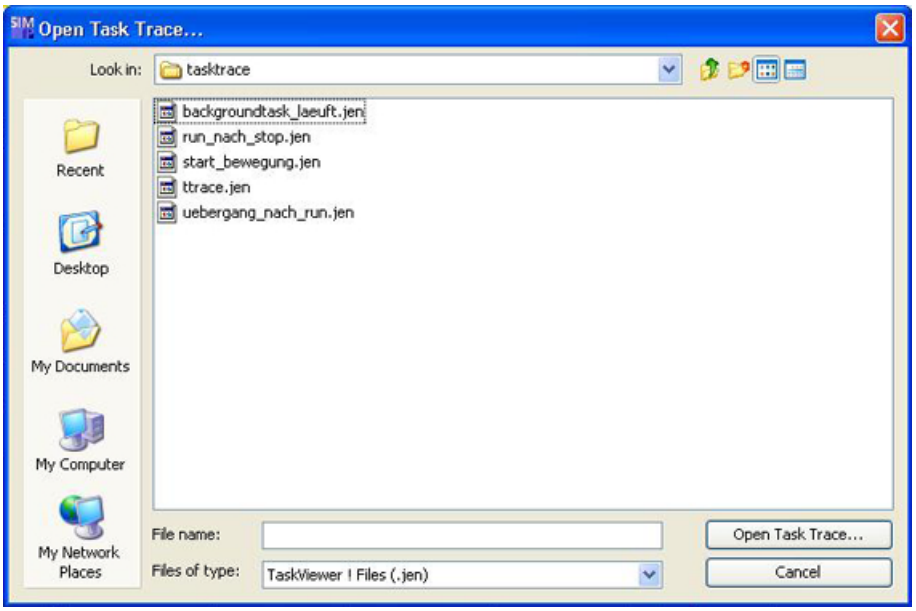


Figure 4-9 Open Task Trace

2. Select the JEN file you want to open in the Task Profiler, and confirm with **Open Task Trace...**

4.4 Control of Task Tracer

Control

You can control the Task Tracer using SIMOTION IT DIAG (standard web pages) of the target device or with system functions in the user program.

Note

For additional information, refer to the "Technology Packages System Functions" and "SIMOTION SCOUT Overview about Service and Diagnostic Options" documentation.

System functions in the user program

The following table provides an overview of the available system functions:

System function	Description
_taskTraceUserEvent	This function enters an event with a user-defined ID from 0 to 255 in the buffer of the SIMOTION Task Tracer.
_taskTraceStop	This function stops an active Task Tracer recording.
_taskTraceStart	This function starts the Task Trace recording. **Note:** When the function is called, whether or nor the Task Tracer has already been started is irrelevant. If the Task Tracer is active after the call, the function supplies 0 as return value.
_taskTraceWriteOut	The function stops a Task Trace recording that is already in progress and saves the Trace data as a JEN file (ttrace.jen) on the target device memory card under the following path: /USER/SIMOTION/HMI/SYSLOG/TASKTRACE/DIAG

4.5 Analyzing a Task Trace

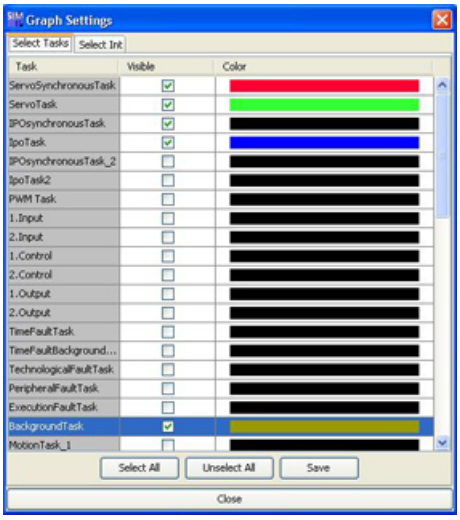
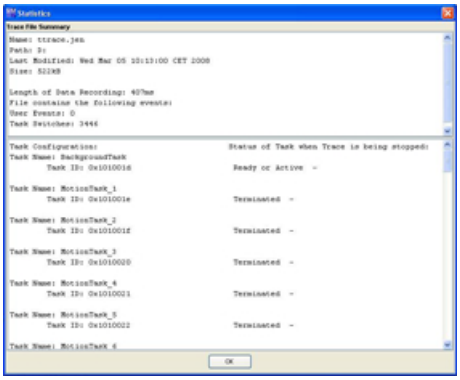
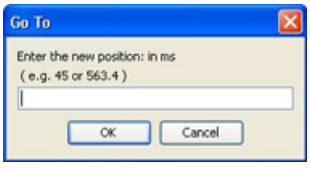
Note

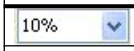
Peaks can occur during the recording, which indicate whether they can be re-started by means of background task testing. These peaks are irrelevant to the analysis.

The following options are available for analyzing the trace recording and for modifying the view:

Control via the local toolbar

Table 4-6 Functions of the local toolbar

Icon	Description
	Open the **Graph Settings** dialog. You can show or hide tasks and specify the color for each task in this dialog. 
	Open the statistics. This dialog provides an overview of the tasks available in the system and their status at the end of the trace. 
	Go to start of trace.
	Go to end of trace.
	Open the **Go To** dialog. You can use this dialog to jump to the entered time value. 
	Zoom In
	Zoom Out

Icon	Description
	Zoom factor can be entered (between 1 and 5,000).
	Fast search using User Event or Task Switch

Control via the mouse

Table 4-7 Functions via mouse or shortcut

Click button or shortcut	Description
Right-click event icon	Info box on selected event.
Left- or right-click	Generates a red or green vertical guide line, at whose upper end the time is displayed in ms. The values are displayed in the following information panel. 
Shift + left- or right-click	Removes the red or green guide line.
Ctrl + left-click	Generates a horizontal guide marking. This can also be generated by directly left-clicking the task name.
Ctrl + right-click	Removes the horizontal marking. Clicking the currently selected task name also removes the horizontal marking.
Right-click task name	Info box for corresponding task.

4.6 Saving the trace data

The recorded trace data is stored as a JEN file (ttrace.jen) on the memory card of the target device under the following path: /USER/SIMOTION/HMI/SYSLOG/TASKTRACE/DIAG

To save trace data under a different name, follow the procedure described below:

1. Open the **Save Task Trace As** dialog from the **File > Save Task Trace As ..** menu.
2. Enter the desired file name and save it. If a file of the same name already exists, it is overwritten.

If required, you can use a card reader to read out the JEN files on the memory card.

4.7 Find

You can use the find function (can be invoked in the main menu using **Edit > Find**) to search for the next user event or the next task in the trace recording.

If you are searching for a specific event or task, you must also specify the event ID or the task designator. You can use the **Find Previous** or **Find Next** button to search backwards or forwards, respectively.

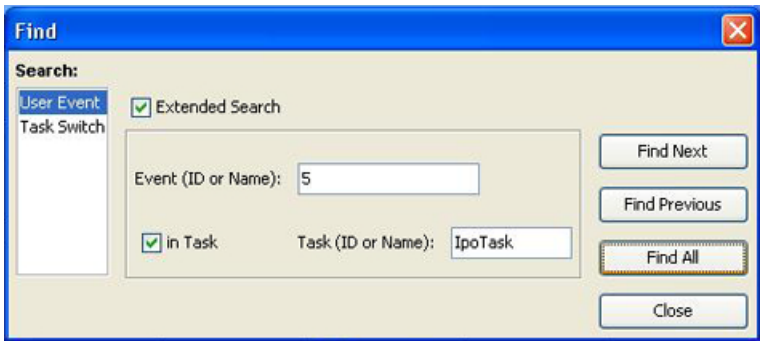


Figure 4-10 Find Event

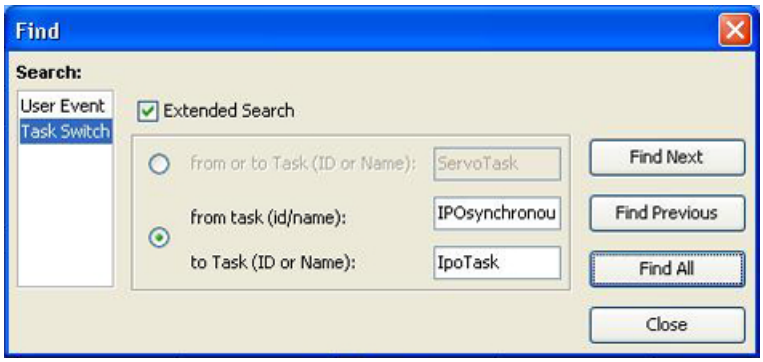


Figure 4-11 Find Task

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