

PrKERNEL v4

RTOS Debugger for PrKERNEL

NIOS II

- Real Time, Non-Intrusive Display of PrKERNEL System Resources
- Task Related Breakpoints
- Task Stack Coverage
- Dynamic Task Performance Measurement
- PrKERNEL Specific Display of Trace Listing
- Statistic Evaluation and Graphic Display of Task Run Times
- Statistic Evaluation and Graphic Display of Task States
- PRACTICE Functions for OS Data
- PrKERNEL Related Pull-Down Menu

The TRACE32 System includes a configurable RTOS debugger to provide symbolic debugging in real time operating systems. Our software package contains a ready-to-run configuration for the PrKERNEL Real Time Operating System from eSOL Co., Ltd.

The PrKERNEL awareness provides easy access to task lists and other kernel information, generates performance analysis data and enables you to do a most effective debugging with the TRACE32 systems on targets running PrKERNEL.

RTOS Debugging on TRACE32 with PrKERNEL

Real Time, Non-Intrusive Display of PrKERNEL System Resources

The TRACE32 RTOS debugger for PrKERNEL provides display functions to show the system resources of PrKERNEL. All objects, such as tasks, memory pools, mailboxes, semaphores etc. can be displayed and inspected. In

addition, by using the emulators dual-port memory (if available), the display of all these regions can be viewed non-intrusively in real time. The tables are updated permanently ("On The Fly"), without affecting the application at all.

The screenshot displays three overlapping windows from the TRACE32 RTOS debugger:

- B::TASK.TaSK 0x24AB8**: Shows a table with columns 'magic', 'id', 'state', 'prio', and 'entry'. It lists one task: task_A with magic 00024AB8, id 2, state running, prio 10, and entry 00000170.
- B::TASK.TaSK**: Shows a table with columns 'magic', 'id', 'state', 'prio', and 'entry'. It lists three tasks: initask (magic 00024A88, id 1, state dormant, prio 1, entry 00000138), task_A (magic 00024AB8, id 2, state running, prio 10, entry 00000170), and task_B (magic 00024AE8, id 3, state ready, prio 10, entry 00000534).
- B::TASK.SEMaphore**: Shows a table with columns 'magic', 'id', 'attr', 'count', 'max', and 'waiting'. It lists five semaphore instances with various attributes and counts.
- B::TASK.MaiBoX**: Shows a table with columns 'magic', 'id', 'attr', 'count', and 'waiting'. It lists two mailbox instances with attributes like TPRI MPRI and TFIFO MFIFO.

Task, semaphore and mailbox list window and detailed task window

Task Related Breakpoints

Any breakpoint set in the TRACE32 debugger can be set dependent to a specific task. This means, that the

breakpoint will then only halt, if hit by the specified task. This allows task related debugging even in shared code.

The screenshot shows the 'B::Break.List' window with the following data:

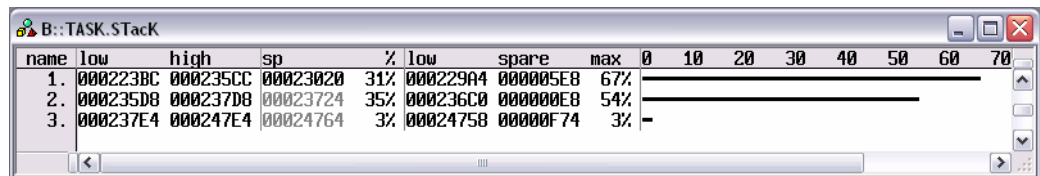
address	types	impl	task
C:0000C6E0	Program	SOFT	2. ksig_sem
C:0000D190	Program	SOFT	3. ktwai_sem

Breakpoint list with task dependent breakpoints

Task Stack Coverage

In real time systems it is quite important to know, how much stack space each task consumes. For this purpose,

a special window shows the current and the maximum usage of the stack of each separate task

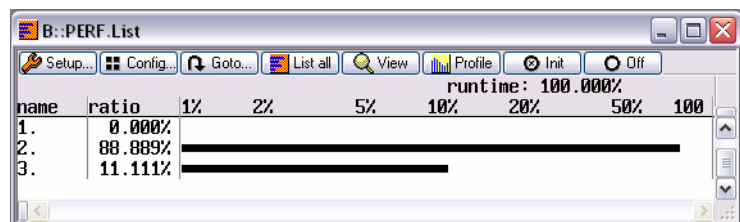


Task stack coverage window

Dynamic Task Performance Measurement

While PrKERNEL is running, TRACE32 is capable of recurrently evaluating the current running task and collecting the results. The percentage, each task consumes of the system, is then dis-

played graphically and updated permanently. The longer time you let the measurement run, the more exact are the results. This feature is available even without any hardware trace.



Dynamic Performance window

PrKERNEL Specific Display of Trace Listing

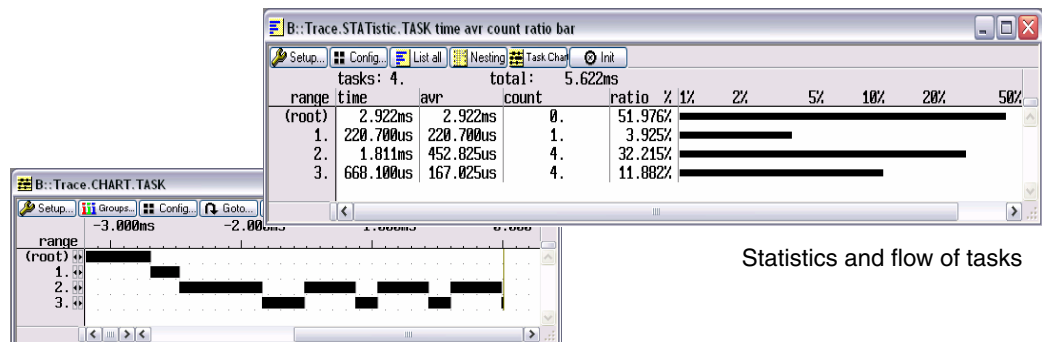
The data recorded in the real time trace buffer (if available) can be displayed and interpreted specific to the operat-

ing system. The task switches are displayed symbolically, either exclusively or in addition to other information.

Statistic Evaluation and Graphic Display of Task Run Times

Out of the real time trace buffer (if available), the analyzer can calculate statistic tables of task run times and task switches. A graphical diagram shows

which task was active at a specific time, giving a clear view of the behaviour of the system.

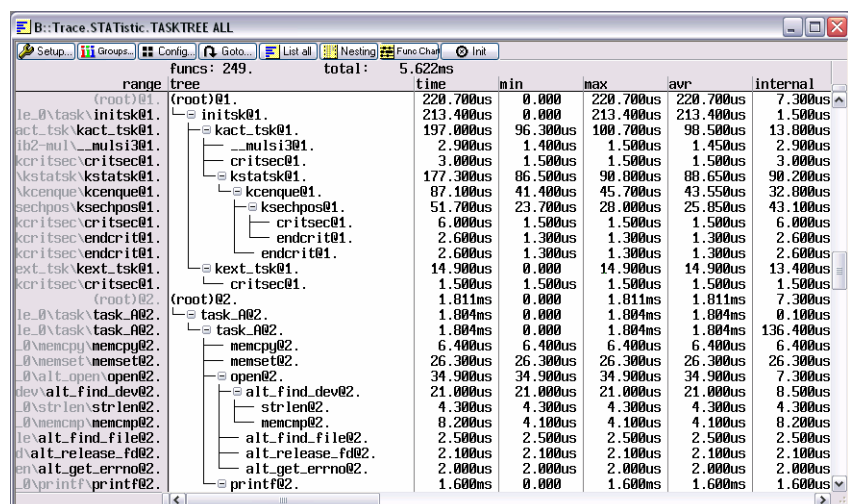


Statistics and flow of tasks

Task Related Evaluation of Function Run Times

The statistic and graphic evaluation of function calls and function run times (if available) can be done dependant to the actual running task. This is neces-

sary, if different tasks call one single function at the same time, or if a task switch occurs in between the function.

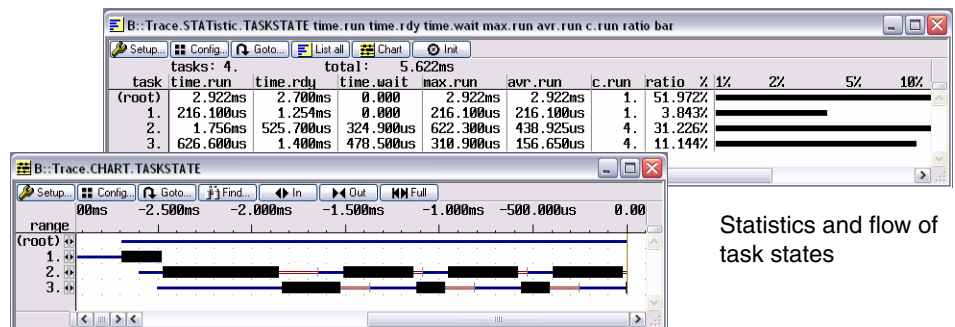


Call Tree Analysis of Task 1 and 2

Statistic Evaluation and Graphic Display of Task States

If covered by the real time trace, these tabular and graphical analyses of the status of tasks show the various states (i.e. running, ready, waiting, suspended

and undefined) and the times each task spent in each state. A graphical view of the data can help to highlight prioritisation problems, critical paths etc.



Statistics and flow of task states

PRACTICE Functions for OS Data.

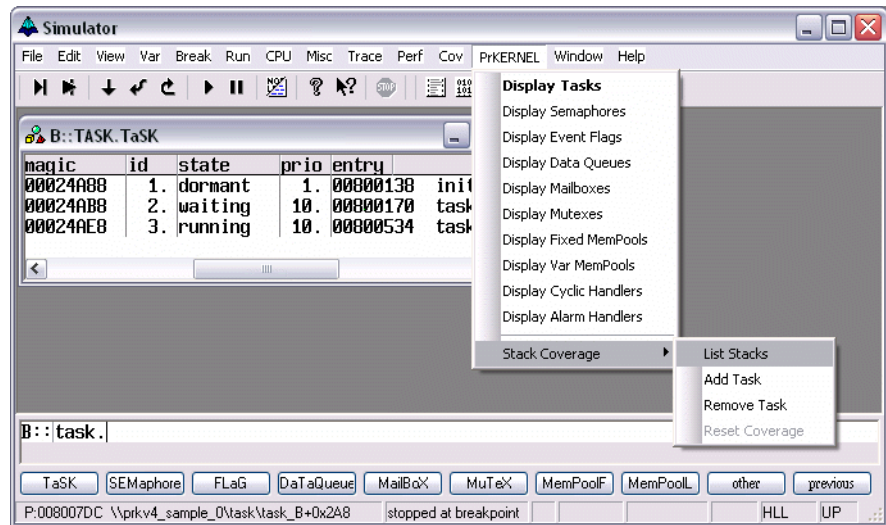
The support includes extended PRACTICE functions for PrKERNEL specific data, to be used in setup and test scripts. E.g. the function "task.con-

fig(magic)" returns the address of the so called magic value, which corresponds to the id of the current executing task.

PrKERNEL related pull-down menu

Because the menu bar of the TRACE32 user interface can be fully customized, you can create a new pull down menu, including operating system specific commands. We deliver

PrKERNEL support with an example for such specific menus, which provides access to the PrKERNEL awareness features



TRACE32 with PrKERNEL menu

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