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## RTOS Debugger for VxWorks

**ARM**  
**Cortex**  
**MIPS**  
**PowerPC**  
**X64**  
**X86**  
**XSCALE**

- Real time, non-intrusive display of VxWorks system resources
- Task stack coverage
- Task related breakpoints
- Task context display
- Debugging of dynamic kernel modules
- Debugging of real time processes (RTPs)
- SMP support
- Task related performance measurement
- Statistic evaluation and graphic display of task run times
- Task related evaluation of function run times
- PRACTICE functions for OS data
- Easy access via VxWorks specific 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 VxWorks real-time kernel from Wind River.

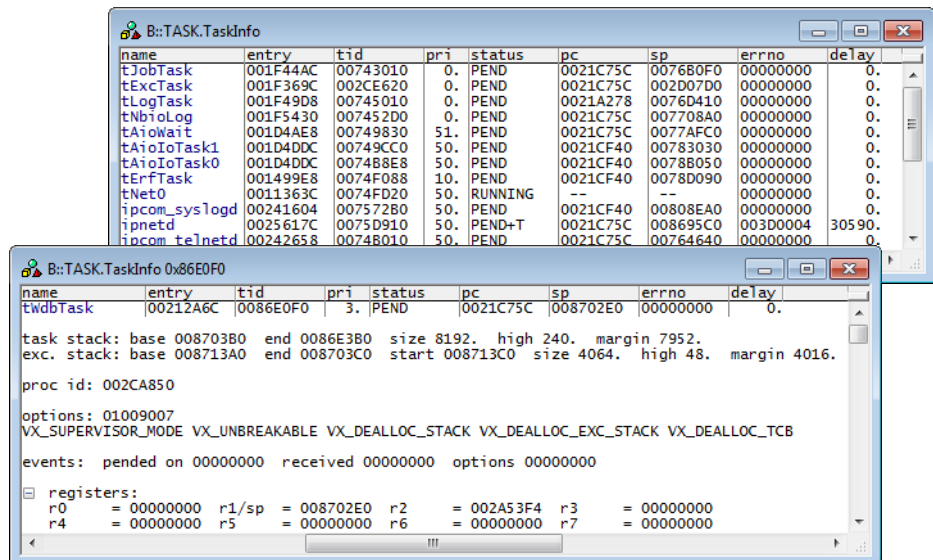
In close cooperation with Wind River, we built a high sophisticated VxWorks awareness, which enables you to do a most effective debugging with the TRACE32 systems on targets running VxWorks.

## RTOS Awareness on TRACE32 with VxWorks

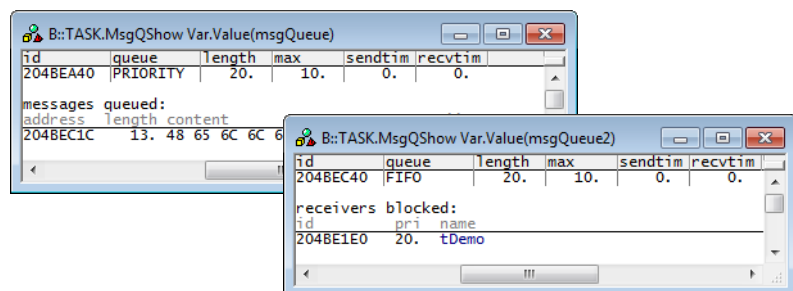
### Real-Time, Non-Intrusive Display of VxWorks System Resources

The TRACE32 RTOS debugger for VxWorks provides display functions, closely mirroring the command set of the WindShell. The system resources of tasks, semaphores, message queues, memory partitions, modules and RTPs can be displayed. In addition, if the system allows reading mem-

ory while running, 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. Moreover, these functions are still available, when the WindShell is not linked to your software.



Task list window and detailed window of one specific task

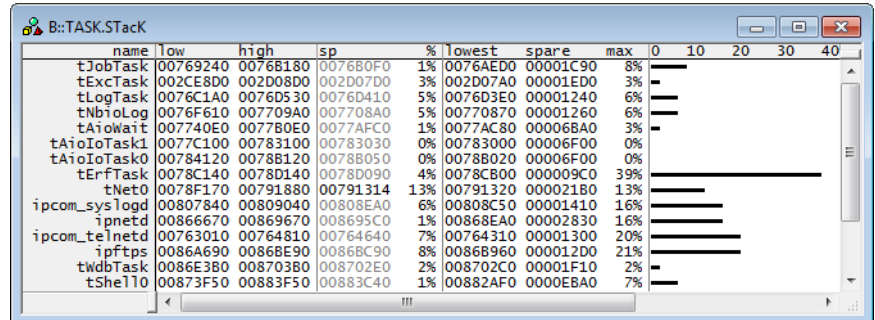


Detailed view of message queues

## 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.

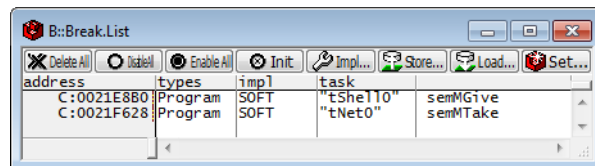


Task stack coverage window

## Task Related Breakpoints

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

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

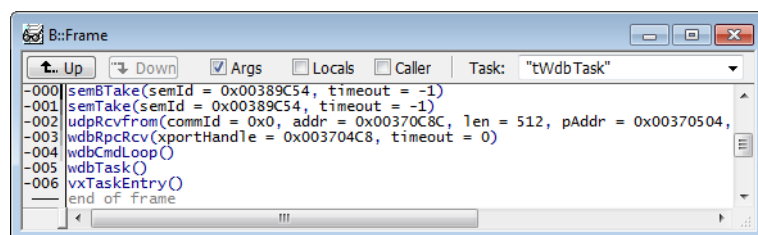


Breakpoint list with task dependent breakpoints

## Task Context Display

The TRACE32 RTOS debugger provides an easy way to switch the current displayed context to another task. Normally all register related windows (e.g. listing at current PC, local variables of a function call stack) are displayed

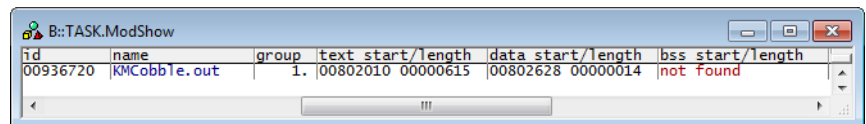
related to the actual context (i.e. current executed task). You can switch to the context of another task to see all this information at the time this task was scheduled.



Function call hierarchy of a waiting task

## Debugging of Dynamic Kernel Modules

TRACE32 is able to detect dynamically loaded kernel modules and to load the symbols of such modules. Hence, you can debug kernel modules and all tasks and functions therein without any limitation, side by side with other modules and the kernel application itself.

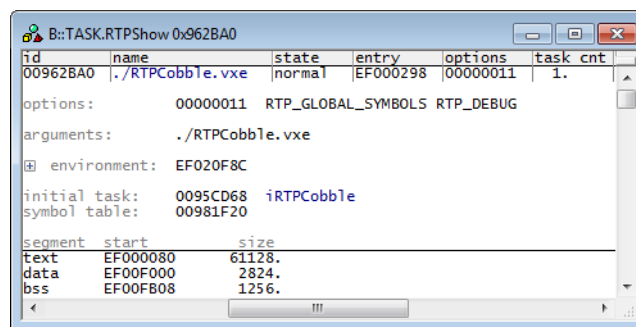


Dynamic kernel module

## Debugging of Real Time Processes

The RTOS Debugger for VxWorks also detects real time processes (aka RTPs). Real time processes are separate, MMU mapped applications loaded dynamically to your kernel application. TRACE32 is aware of the MMU transla-

tions of each RTPs, and by reading these translations and loading the symbol files, the user can debug RTPs just the same way as the kernel application. Moreover, several RTPs can be debugged at the same time.

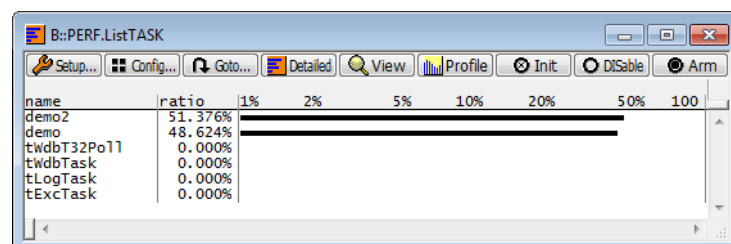


Characteristics of an RTP

## Task Related Performance Measurement

While VxWorks 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.

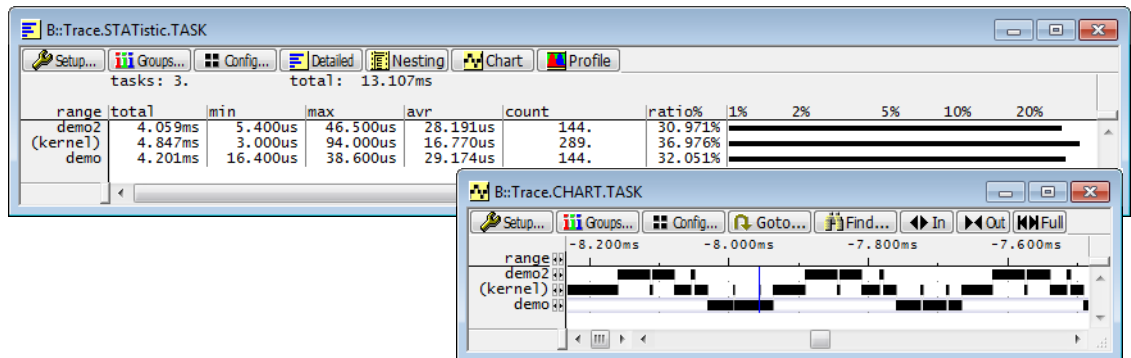


Performance measurement list

## 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.

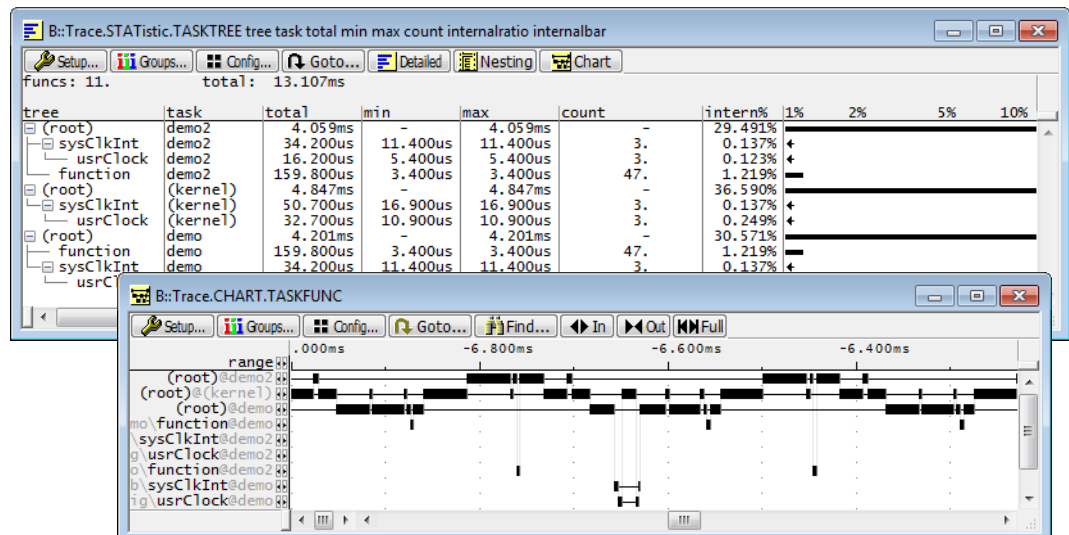


Statistics and flow of tasks

## Task Related Evaluation of Function Run Times

The statistic and graphic evaluation of function calls and function run times (if available) can be done dependent on 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.



Function call hierarchy with statistics and flow of functions

## PRACTICE Functions for OS Data

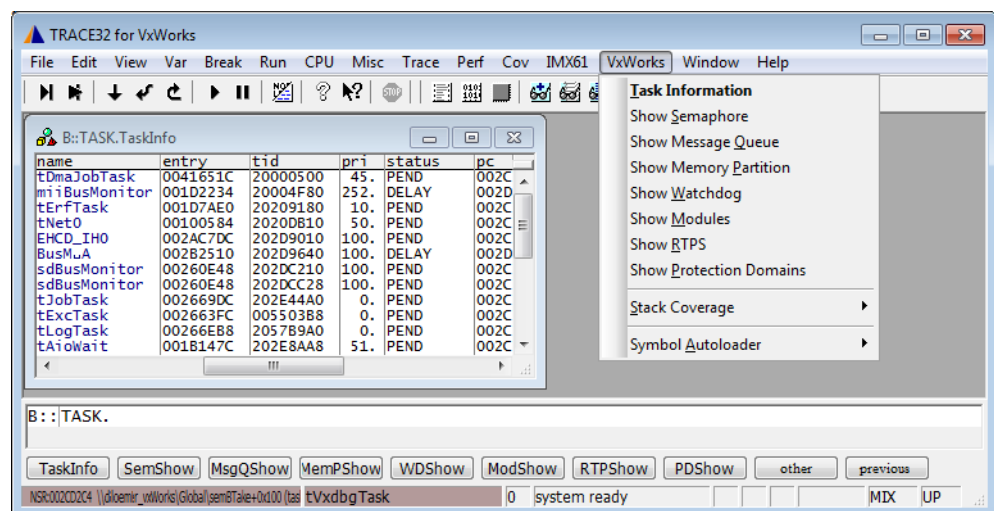
The support includes extended PRACTICE functions for VxWorks specific data, to be used in setup and test scripts. E.g. the function “TASK.CON-

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

## Easy Access via VxWorks Specific 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

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



TRACE32 with VxWorks menu

## About Wind River

Wind River®, a wholly owned subsidiary of Intel® Corporation (NASDAQ: INTC), is a world leader in delivering software for intelligent connected systems. The company has been pioneering computing inside embedded devices since 1981, and its technology is found in nearly 2 billion products. Wind River offers the industry’s most comprehensive embedded software

portfolio supported by world-class global professional services and support, and a broad partner ecosystem. Wind River delivers the technology and expertise that enables the innovation and deployment of safe, secure, and reliable intelligent systems. To learn more, visit Wind River at [www.windriver.com](http://www.windriver.com).

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