



RTOS Debugger for Windows

- Non-intrusive Display of Windows system Resources
- Debugging Windows Device Drivers
- Debugging Several Windows Applications At Once
- Dynamic Thread Performance Measurement
- Windows Specific Evaluation of Real Time Trace Listing
- PRACTICE Functions for OS Data
- Windows related Pull-Down Menu

x86

x64

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 Windows OS from Microsoft Corporation.

In close cooperation with Microsoft, we built a high sophisticated Windows awareness, which enables you to do a most effective debugging with the TRACE32 systems on targets running Windows Standard, supporting Windows XP, Vista, Windows7, Windows8 and Windows10.

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RTOS Debugging in TRACE32 with Windows Standard

Non-Intrusive Display of Windows System Resources

The TRACE32 RTOS Debugger for Windows provides display functions to show internal information. The system resources processes, threads, DLLs and kernel modules (device drivers) can be displayed. All this information is

read out of the target by only reading the memory. No target function is called, thus the current program flow isn't affected at all, and no instrumentation is necessary.

The screenshot displays the TRACE32 RTOS Debugger interface with four overlapping windows showing system resources:

- B::TASK.Process**: A list of system processes including System, smss.exe, csrss.exe, wininit.exe, services.exe, lsass.exe, svchost.exe, sppsvc.exe, and others.
- B::TASK.Process "loader"**: A detailed view of the 'loader' process, showing its magic, name, cid, session, handles, and path. It also displays loaded modules like loader.exe, ntdll.dll, and kernel32.dll.
- B::TASK.Thread**: A list of threads for the 'loader' process, including SystemSettings, slui, taskhost, and msixexec.
- B::TASK.MODULE**: A list of loaded modules, including rpsndr.sys, HTTP.sys, browser.sys, mpsdrv.sys, mrxsmmb.sys, Ndu.sys, peauth.sys, secdrv.sys, srvcnt.sys, tcpipreg.sys, srv2.sys, condrv.sys, asyncmac.sys, fastfat.SYS, wudfpp.sys, rdppvideominipor, cdfs.sys, Mpks12850fa67.s, cdd.dll, and mydriver.sys.

Process list, detailed view of one process, thread list and module list

Driver and/or Application Debugging

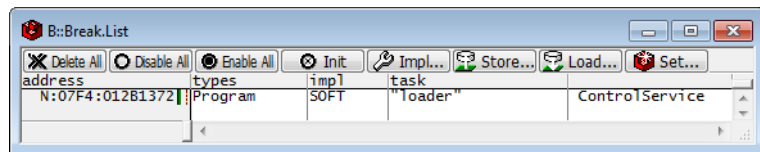
Due to the fact, that TRACE32 is a hardware debugging tool, you are able to debug anything you want, including interrupt routines, drivers, etc. TRACE32 includes a complete MMU support, providing mechanisms to inspect the target memory using virtual addresses or physical addresses and to show the translation tables.

Additionally, TRACE32 has a special MMU support for several address spaces, which allows you to debug several Windows applications (processes) at once. An internal logic provides you with an easy access to all process memory spaces. A special process detection mechanism allows to halt the application exactly on the entry point of a process, allowing you to debug your process right from main().

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.



Breakpoint list window with thread specific breakpoint

Thread Context Display

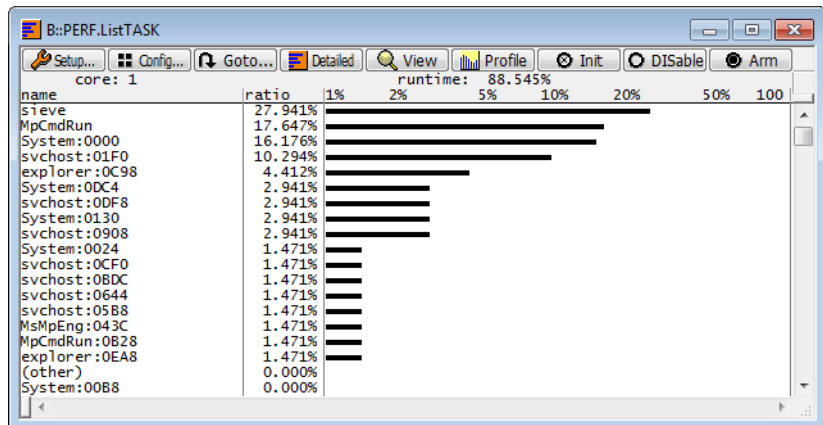
The TRACE32 RTOS debugger provides an easy way to switch the current displayed context to another task. Normally all register related windows (e.g. listing at current PC, local variables or function call stack)

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.

Dynamic Thread Performance Measurement

While Windows is running, TRACE32 is capable of recurrently evaluating the current running thread and collecting the results. The percentage, each thread consumes of the system, is then

displayed 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

Windows Specific Display of Trace Listing

The data recorded in the real time trace buffer (if available) can be displayed and interpreted specific to the operating system. The thread switches are

displayed symbolically, either exclusively or in addition to other information.

Statistic Evaluation and Graphic Display of Thread Run Times

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

shows which thread was active at a specific time, giving a clear view of the behavior of the system.

Thread 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 thread. This is nec-

essary, if different threads call one single function at the same time, or if a thread switch occurs in between the function.

PRACTICE Functions for OS Data

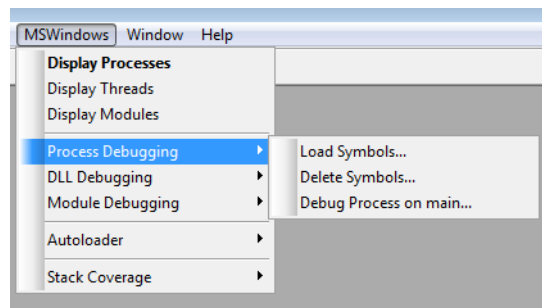
The support includes extended PRACTICE functions for process specific data. E.g. the function “task.proc.spa-

ceid (“ping”)” returns an id specifying the MMU memory area that this process uses.

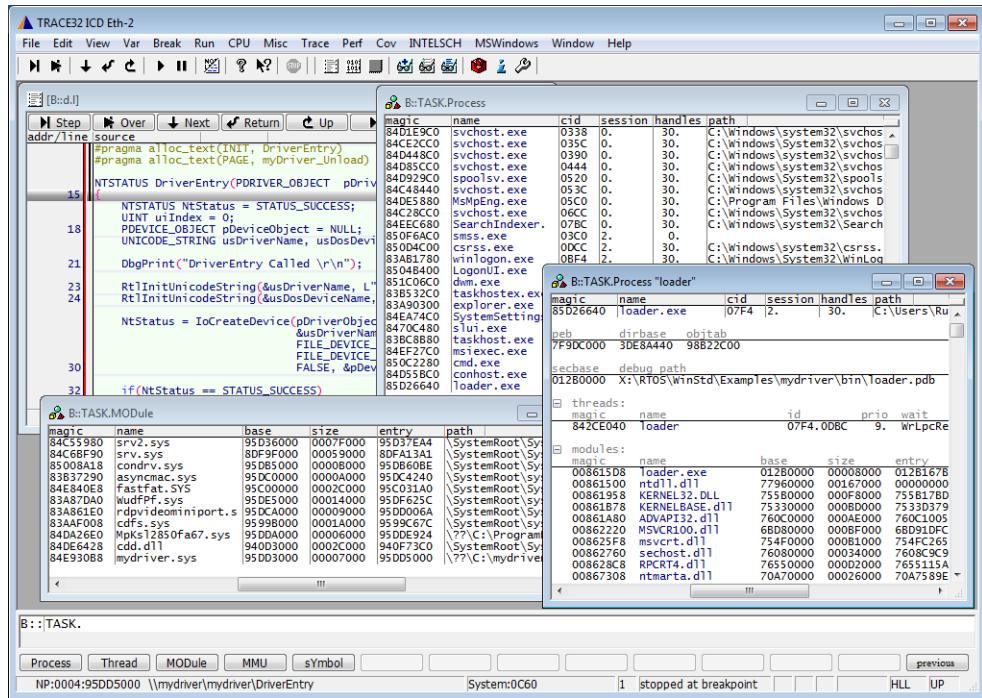
Windows Related Pull-Down Menu

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

Windows support with an example for such specific menues, which provides fast and easy access to the Windows specific features.



Windows specific menu items



TRACE32 with source window and opened Windows specific displays

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