



RTOS Debugger for osCAN

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- Real time, non-intrusive display of osCAN system resources
- osCAN specific display of analyzer listing
- Statistic evaluation and graphic display of task run times
- Statistic evaluation and graphic display of service run times
- Task related evaluation of function run times
- Task stack coverage
- PRACTICE functions for OS data
- osCAN related pull-down menu

The TRACE32 System includes a multitask debugger to provide symbolic debugging in real time operating systems. Our software package contains a ready-to-run configuration for the OSEK/VDX conform Real Time Kernel osCAN from Vector Informatik.

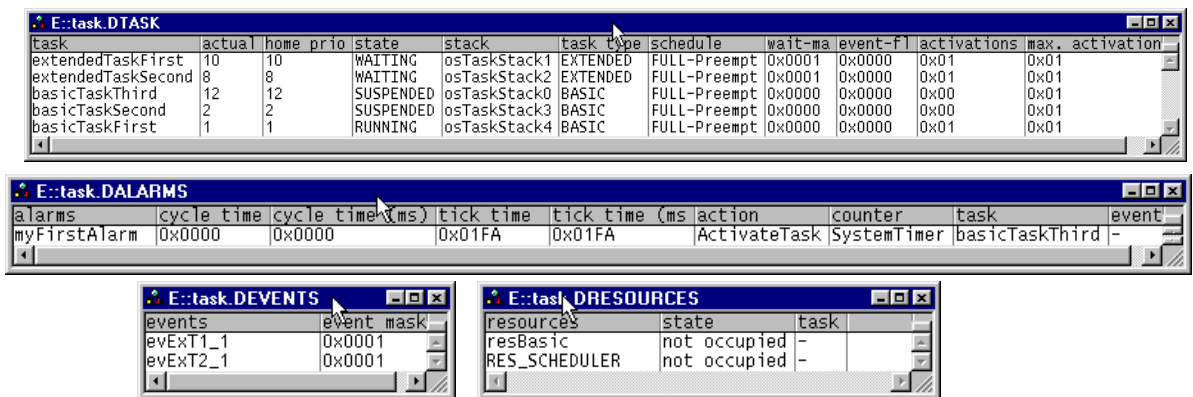
Based on the ORTI (OSEK Runtime Interface) all informations of the osCAN RTOS and its configuration can be explored. This leaflet will guide you through the additional implemented features in TRACE32, to do an effective debugging on osCAN systems.

Multitask Debugging on TRACE32 with osCAN

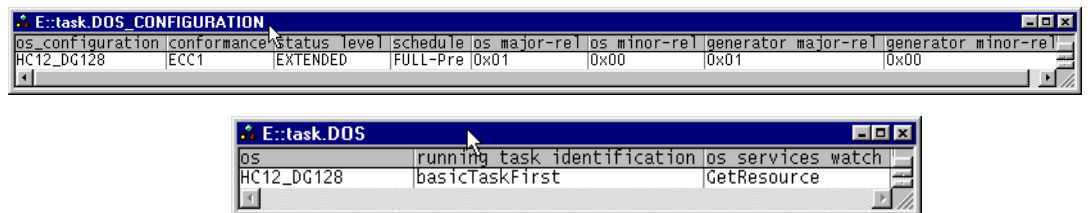
Real time, non-intrusive display of osCAN system resources

The TRACE32 multitask debugger for osCAN provides special display functions. The system resources such as task list, messages, counters, alarms, stacks and resources can be displayed. In addition, by using the emulators

dual-port memory, 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.



Task list window, alarm window, event window and resources window

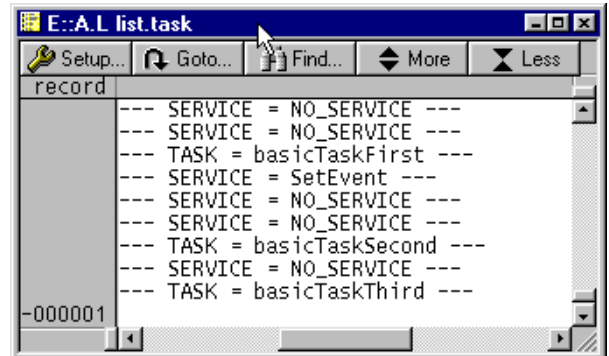


Configuration of osCAN operating system window

osCAN specific display of analyzer listing

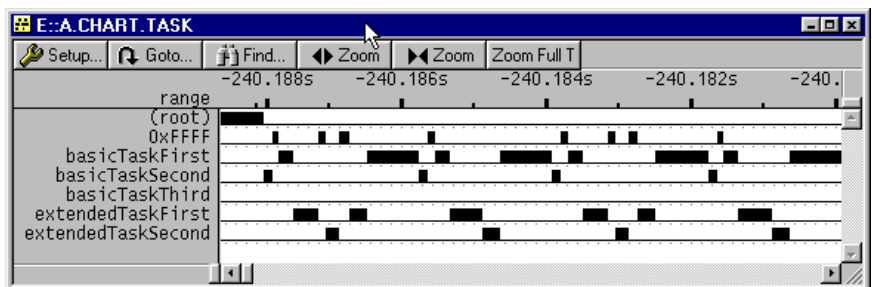
The data recorded in the analyzer can be displayed and interpreted specific to the operating system. Task switches are displayed symbolically.

Analyzer listing, task selective recording, display of task switches and assembler mnemonics



Statistic evaluation and graphic display of task run times

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.



The screenshot shows a window titled "E::A.STAT.TASK" displaying a table of statistics for various tasks. The total time is 240.189s.

| range | time | avr | maxintr | count | ratio 1% | 2% | 5% | 10% | 20% |
|--------------------|-----------|-----------|---------|-------|----------|----|----|-----|-----|
| (root) | 583.975us | 583.975us | 0.000 | 0. | 0.000% | | | | |
| 0xFFFF | 59.961s | 12.014ms | 0.000 | 4991. | 24.964% | | | | |
| basicTaskFirst | 83.947s | 16.830ms | 0.000 | 4988. | 34.950% | | | | |
| basicTaskSecond | 7.353s | 2.947ms | 0.000 | 2495. | 3.061% | | | | |
| basicTaskThird | 35.322s | 11.774s | 0.000 | 3. | 14.705% | | | | |
| extendedTaskFirst | 5.633s | 1.505ms | 0.000 | 3742. | 2.345% | | | | |
| extendedTaskSecond | 47.973s | 19.235ms | 0.000 | 2494. | 19.972% | | | | |

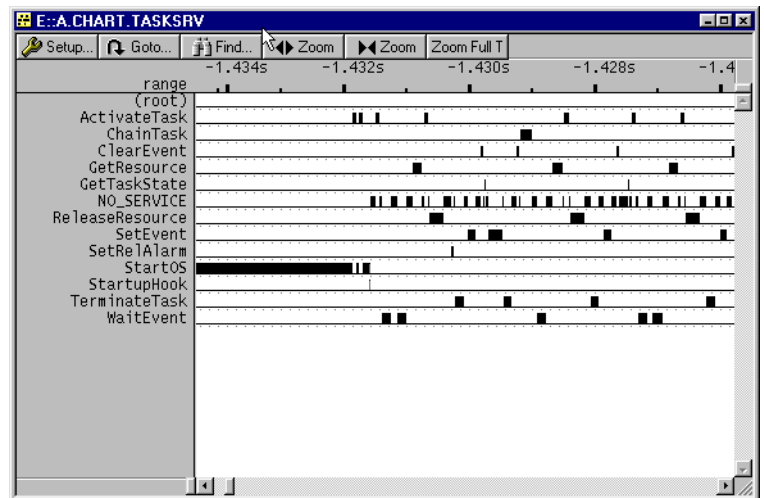
Statistics and flow of tasks

Statistic evaluation and graphic display of service run times

The statistic and graphic evaluation of service calls and service run times can be done. This is necessary, if one ser-

vice need much time and is called very often the performance of the operating system goes down..

| E::A.STAT_TASKSRV | | | | | | | | | | |
|-------------------|-----------|-----------|---------|-------|---------|----|----|----|-----|-----|
| range | total: | 1.465s | | | | | | | | |
| | time | avr | maxintr | count | ratio | 1% | 2% | 5% | 10% | 20% |
| (root) | 25.953ms | 25.953ms | 0.000 | 0. | 1.771% | | | | | |
| ActivateTask | 77.759ms | 69.428us | 0.000 | 1120. | 5.307% | | | | | |
| ChainTask | 68.222ms | 191.635us | 0.000 | 356. | 4.656% | | | | | |
| ClearEvent | 44.334ms | 41.473us | 0.000 | 1069. | 3.026% | | | | | |
| GetResource | 178.450ms | 115.801us | 0.000 | 1541. | 12.181% | | | | | |
| GetTaskState | 18.109ms | 25.151us | 0.000 | 720. | 1.236% | | | | | |
| NO_SERVICE | 428.528ms | 51.088us | 0.000 | 8388. | 29.251% | | | | | |
| ReleaseResource | 176.522ms | 203.133us | 0.000 | 869. | 12.049% | | | | | |
| SetEvent | 131.384ms | 102.724us | 0.000 | 1279. | 8.968% | | | | | |
| SetRelAlarm | 46.000us | 46.000us | 0.000 | 1. | 0.003% | | | | | |
| StartOS | 7.237ms | 1.809ms | 0.000 | 4. | 0.493% | | | | | |
| StartupHook | 9.500us | 9.500us | 0.000 | 1. | 0.000% | | | | | |
| TerminateTask | 144.586ms | 135.254us | 0.000 | 1069. | 9.869% | | | | | |
| WaitEvent | 163.839ms | 148.540us | 0.000 | 1103. | 11.183% | | | | | |

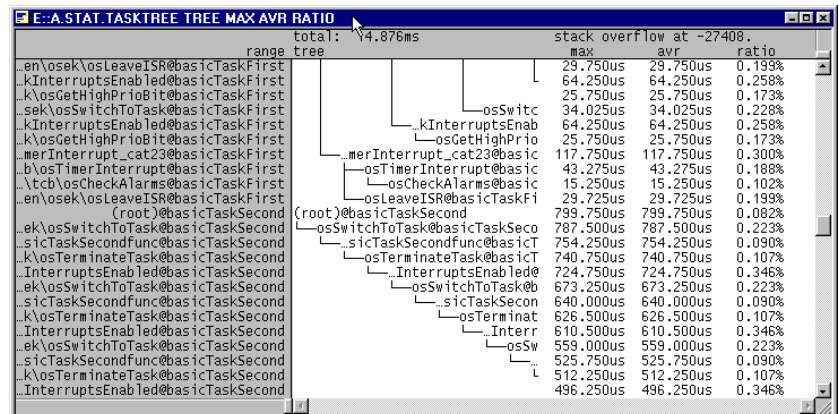


Statistics and flow of services

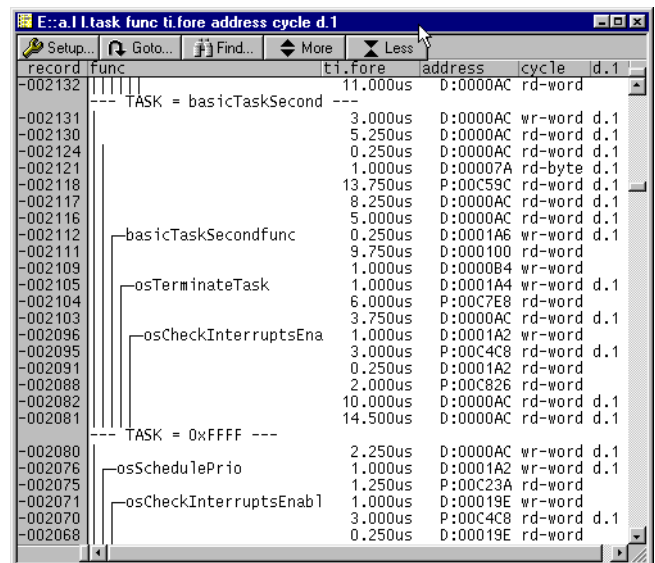
Task related evaluation of function run times

The statistic and graphic evaluation of function calls and function run times can be done dependant to the actual running task. This is necessary, if dif-

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



Statistics on function hierarchy, process related



Analyzer listing, function call hierarchy and process switches

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 each separate task.

| name | low | high | sp | % | low | spare | max | 0 | 10 | 20 | 30 | 40 |
|---------------|----------|----------|----------|----|----------|----------|------|----------------|----|----|----|----|
| osSystemStack | 00000000 | 00000050 | | | 00000040 | 00000040 | 20% | [Progress bar] | | | | |
| osTaskStack0 | 000001A8 | 000001F8 | | | 000001E8 | 00000043 | 16% | [Progress bar] | | | | |
| osTaskStack1 | 00000248 | 00000298 | | | 00000280 | 00000038 | 30% | [Progress bar] | | | | |
| osTaskStack2 | 000001F8 | 00000248 | | | 00000233 | 0000003B | 26% | [Progress bar] | | | | |
| osTaskStack3 | 00000158 | 000001A8 | | | 00000197 | 0000003F | 2.1% | [Progress bar] | | | | |
| osTaskStack4 | 00000108 | 00000158 | 00000152 | 7% | 00000142 | 0000003A | 27% | [Progress bar] | | | | |

Process stack coverage window

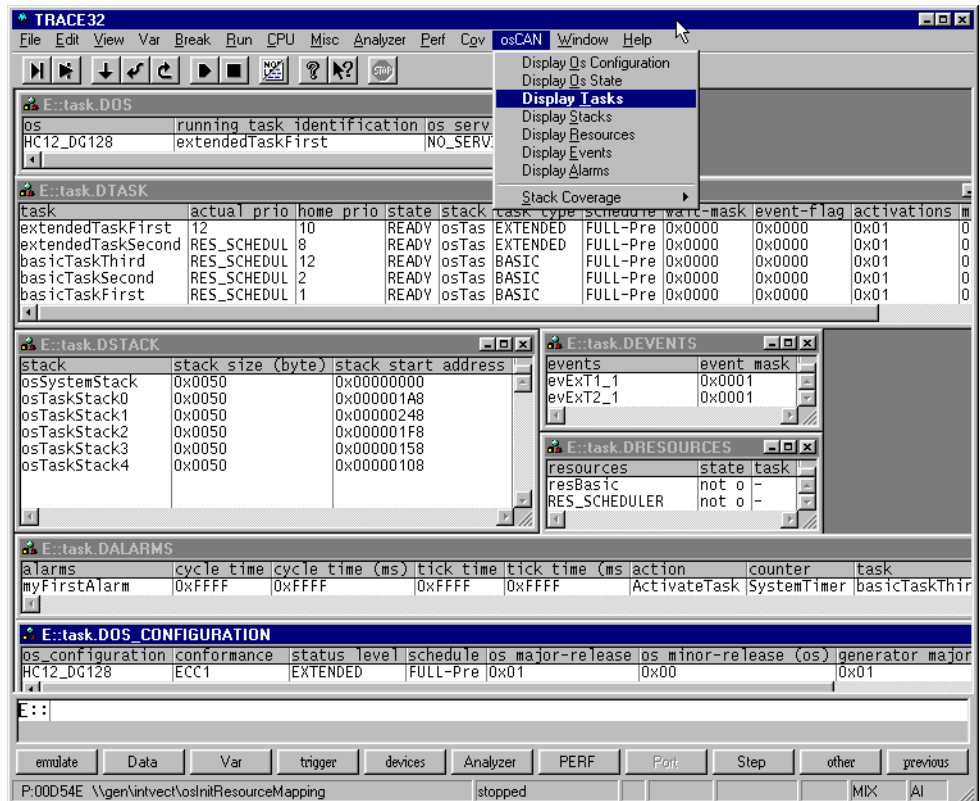
PRACTICE functions for OS data

The support includes extended PRACTICE functions for process specific data. E.g. the function "TASK.CONFIG(magic)" returns the address of the so called magic value.

osCAN 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 sys-

tem specific commands. We deliver osCAN support with an example for such specific menus, which provides fast access to the osCAN features.



TRACE32 with osCAN menu

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