



RTOS Debugger for VRTX32/68K, VRTXsa and VRTXmc/68K and VRTX80

68332
PowerPC 860

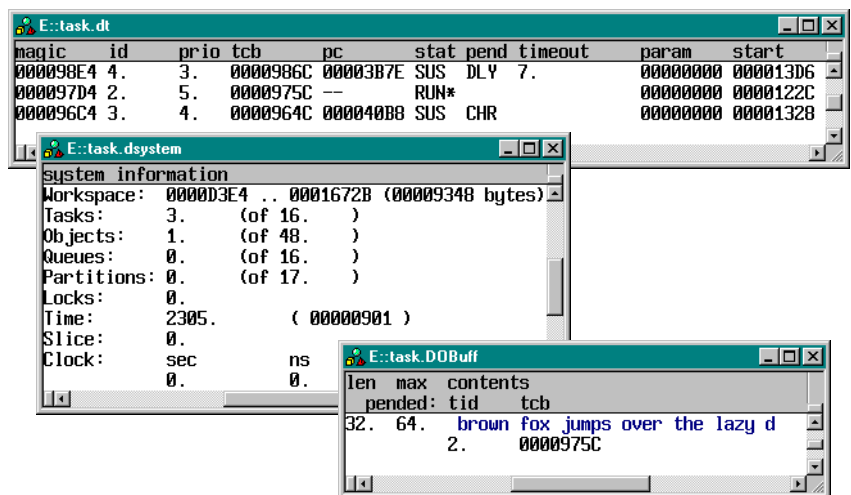
- Real time, non-intrusive display of VRTXsa system resources
- VRTXsa specific display of analyzer listing
- Statistic evaluation and graphic display of task run times
- Task related evaluation of function run times
- Statistic evaluation and graphic display of task states
- Task stack coverage
- Manual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

The TRACE32 System includes a configurable multitask debugger to provide symbolic debugging in real time operating systems. Our software package contains a ready-to-run configuration for the VRTXsa Real Time Kernel from Microtec.

Real time, non-intrusive display of VRTXsa system resources

The TRACE32 multitask debugger for VRTXsa provides special display functions. The system resources such as task list and message queues can be displayed. In addition, by using the emulators dual-port memory, the dis-

play 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, VRTXsa system information and Output Buffer display

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.

The screenshot shows the 'E::TASK.STK' window with the following data:

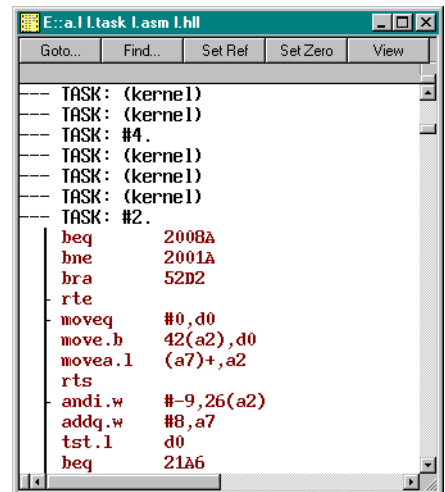
magic	bottom	top	sp(stk)	sp(req)	curr	max	usage	0	10	20
0.	00288E00	00286E00	00288BA0		7%	00288AD8	9%	=====		
2.	0028AE00	00288E00	0028ABF0	0028ACC0	3%	0028AB28	8%	=====		
3.	0028CE00	0028AE00	0028CB80		7%	0028CABB	10%	=====		

Task stack coverage window

VRTXsa specific display of analyzer listing

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

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



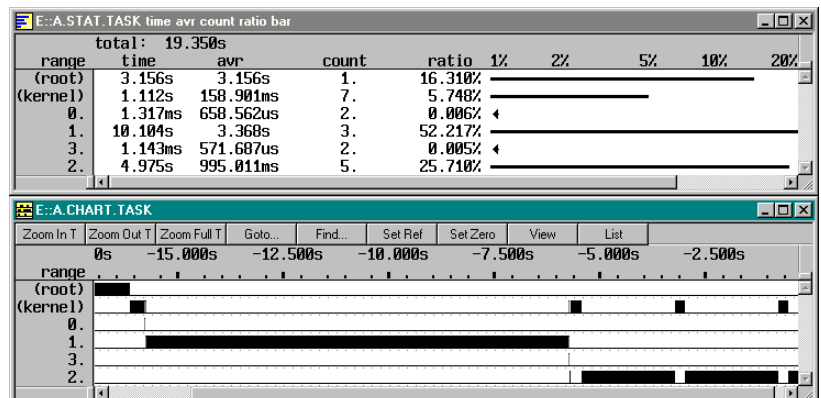
```

E::a.l.task.l.asm.l.hll
Goto... Find... Set Ref Set Zero View
--- TASK: (kernel)
--- TASK: (kernel)
--- TASK: #4.
--- TASK: (kernel)
--- TASK: (kernel)
--- TASK: (kernel)
--- TASK: #2.
  beq      200BA
  bne      2001A
  bra      52D2
  rte
  moveq    #0,d0
  move.b   42(a2),d0
  movea.l  (a7)+,a2
  rts
  andi.w   #-9,26(a2)
  addq.w   #8,a7
  tst.l    d0
  beq      21A6
  
```

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.

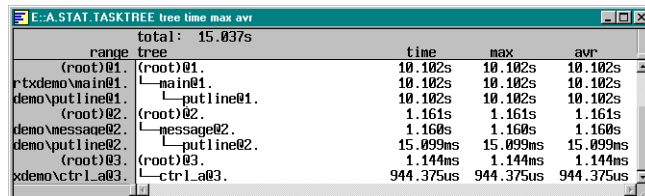


Statistics and flow of tasks

Task related evaluation of function run times

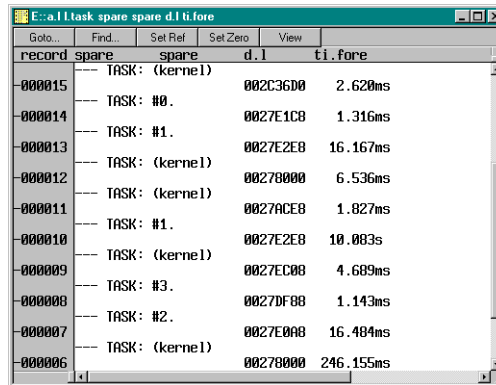
The statistic and graphic evaluation of function calls and function run times can be done dependant to the actual running task. This is necessary, if dif-

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



range		tree	time	max	avr
total: 15.037s					
(root)01.	(root)01.		10.102s	10.102s	10.102s
rtxdemo\main01.	└─main01.		10.102s	10.102s	10.102s
demo\putline01.	└─putline01.		10.102s	10.102s	10.102s
(root)02.	(root)02.		1.161s	1.161s	1.161s
demo\message02.	└─message02.		1.160s	1.160s	1.160s
demo\putline02.	└─putline02.		15.099ms	15.099ms	15.099ms
(root)03.	(root)03.		1.144ms	1.144ms	1.144ms
xdemo\ctrl_a03.	└─ctrl_a03.		944.375us	944.375us	944.375us

Statistics on function hierarchy, task related



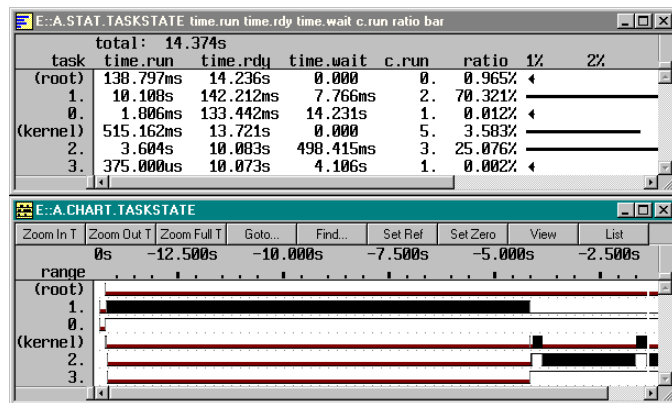
record	spare	spare	d.l	t.i.	fore
000015	---	TASK: (kernel)	002C36D0	2.620ms	
000014	---	TASK: #0.	0027E1CB	1.316ms	
000013	---	TASK: #1.	0027E2EB	16.167ms	
000012	---	TASK: (kernel)	00278000	6.536ms	
000011	---	TASK: #1.	0027ACEB	1.827ms	
000010	---	TASK: (kernel)	0027E2EB	10.003s	
000009	---	TASK: #3.	0027EC0B	4.689ms	
000008	---	TASK: #2.	0027DF8B	1.143ms	
000007	---	TASK: (kernel)	0027E0AB	16.484ms	
000006	---	TASK: (kernel)	00278000	246.155ms	

Analyzer listing, function call hierarchy and task switches

Statistic evaluation and graphic display of task states

These tabular and graphical analyses of the status of tasks show the various states (i.e. running, ready, waiting, suspended and undefined) and 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

Manual executed system calls

In VRTXsa on 68k it is possible to execute system calls, initiated with PRACTICE from the TRACE32 surface. This technique can be used, for example to

set specific signals, to suspend tasks or simulate some other special condition.

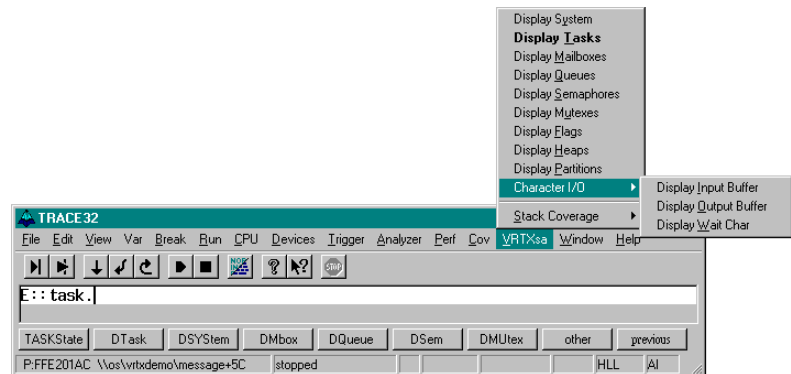
PRACTICE functions for OS data

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

VRTXsa 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

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



TRACE32 with VRTXsa menu

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