



RTOS Debugger for CMX

- Improved support for the CMX debugger CMXBug
- Real time, non-intrusive display of CMX system resources
- CMX 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
- PRACTICE functions for OS data
- CMX related pull-down menu

H8S

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 CMX Real Time Kernel from CMX Company.

In close cooperation with CMX Company we built a special multitask support for CMX on Infineon C166/167 controllers, 8051 Derivates, Renesas controllers and Z80 based microcontrollers. This leaflet will guide you through the additional implemented features in TRACE32, to do an effective debugging on CMX systems.

Multitask Debugging on TRACE32 with CMX-TINY+

Real time, non-intrusive display of CMX-TINY+ system resources

The TRACE32 multitask debugger for CMX-TINY+ provides display functions for all CMX-TINY+ resources. The system resources tasks, cyclic timers, resources and mailboxes can be displayed. In addition, by using the emula-

tors 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.

The image shows three overlapping windows from the TRACE32 debugger. The top window, titled 'B:\task.dt', displays a table of tasks. The middle window, titled 'B:\TASK.DCyclic', displays a table of cyclic timers. The bottom window, titled 'B:\TASK.DMailbox 1606 12.', displays a mailbox with a list of queued messages.

magic	id	state	prio	flag	matc	(TIME)	addr
00001532	0.	dead	0.	00	00		00000FA0 _K_I_Timer_Task
00001542	1.	resume	5.	00	00		00000250 task1
00001552	2.	running	3.	00	00		000002FA task2
00001562	3.	idle	6.	00	00		00000364 task3
00001572	4.	idle	4.	00	00		00000370 task4
00001582	5.	idle	4.	00	00		0000037E task5
00001592	6.	evt+tim	4.	00	01		00000392 task6
000015A2	7.	dead	0.	00	00		000003CA task7
000015B2	8.	dead					
000015C2	9.	dead					

magic	id	started	left cycl	mode	task/pri	event
000015E2	0.	YES	0008 000A	Task number	6.	01
000015EA	1.	YES	000D 000F	Task number	6.	02
000015F2	2.	NO	0000 0000	Task number	0.	00

magic	id	count	waiting	signalling	event
00001606	0.	3.	NONE		

messages queued

68 65 6C 6C 6F 20 77 6F 72 6C 64 31	hello world1
68 65 6C 6C 6F 20 77 6F 72 6C 64 32	hello world2
68 65 6C 6C 6F 20 77 6F 72 6C 64 33	hello world3

Task list window, cyclic timers and a detailed mailbox window

CMX-TINY+ specific display of analyzer listing

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

The task switches can be displayed symbolically.

```

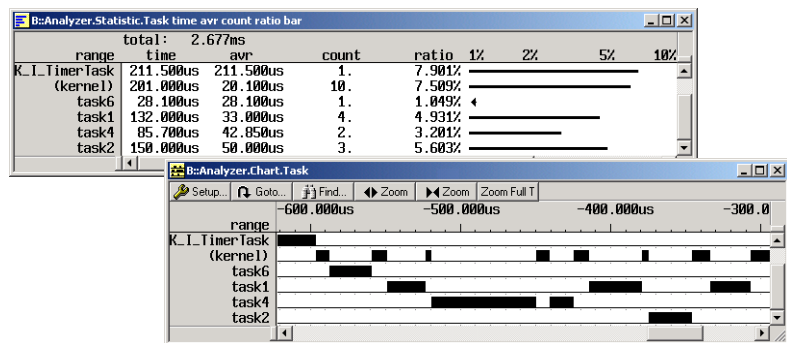
B:\Analyzer.List.Task List.Hill /t
record
162 BCLR.B #bit_do_coop_sched,GER3 ;clear coop sched flag
163 BCLR.B #bit_preempted,GER3 ;clear preempted flag
164 BSET.B #bit_idle_flag,GER3 ;set idle flag
--- IDLE ---
165 MOV.L #_cmx_tcb,ER0
166 MOV.L @(&nxttcb,ER0),ER0 ;load in highest priority user task
167 BRB wldpaus2 ;now go see if ready
206 resume_good:
209 MOV.B #0,R1L
210 MOV.B R1L,@_locked_out ;clear locked out count
211 MOV.B R1L,@_int_count ;clear interrupt count
212 MOV.L ER0,@_activetcb ;load _activetcb with current task
--- TASK = 00001572, 4.
214 MOV.B @(&tcbstate,ER0),R1L ;get the task states again
215 AND.B #low("READY | RESUME"),r1l ;reset state
216 OR.B #RUNNING,R1L ;identify running now
  
```

Analyzer listing, display of task switches and source lines

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.

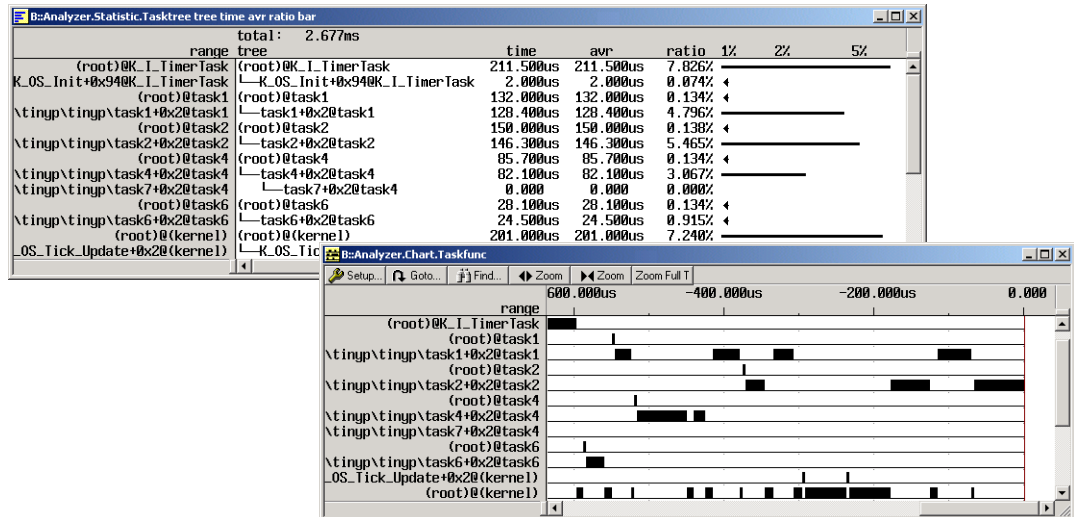


Statistics and flow of tasks

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

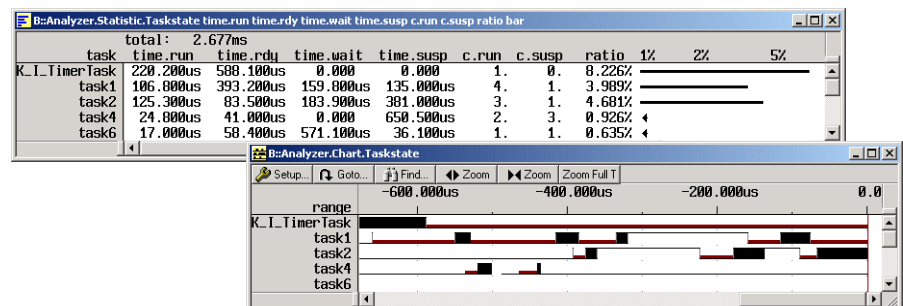


Statistics and flow of task dependent function run times

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

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
task1	000014BC	00001520	000014D0	70%	000014DE	00000022	66%
task2	0000145B	000014BC	00001472	74%	00001476	0000001E	70%
task3	000013F4	00001458				00000064	0%
task4	00001390	000013F4	000013D6	30%	000013CE	0000003E	38%
task5	0000132C	00001390				00000064	0%
task6	000012C8	0000132C	000012E2	74%	000012E6	0000001E	70%
task7 (other)			00003774				

Task stack coverage window

PRACTICE functions for OS data.

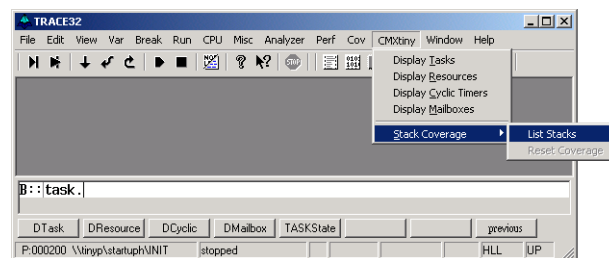
The support includes extended PRACTICE functions for CMX-TINY+ specific data. E.g. the function "TASK.CONFIG

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

CMX-TINY+ 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

CMX-TINY+ support with an example for such specific menus, which provides fast access to the CMX-TINY+ features.



TRACE32 with CMX-TINY menu

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