



## RTOS Debugger for ThreadX

**ARM**  
**BlackFin**  
**ColdFire**  
**MIPS**  
**Nios II**  
**PowerPC**  
**SH4**  
**StarCore**  
**XScale**  
**XTENSA**

- Real time, non-intrusive display of ThreadX system resources
- ThreadX specific display of analyzer listing
- Statistic evaluation and graphic display of thread run times
- Thread related evaluation of function run times
- Statistic evaluation and graphic display of thread states
- Thread stack coverage
- Thread Context display
- PRACTICE functions for OS data

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 ThreadX Real Time Kernel from Express Logic.

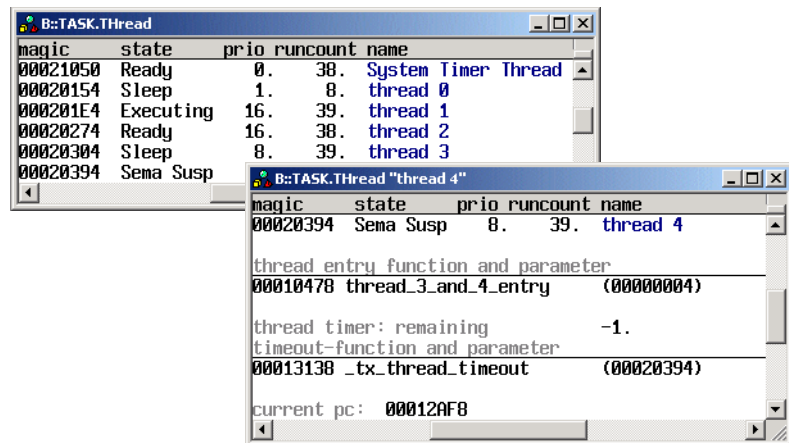
In close cooperation with Express Logic, we built a high sophisticated ThreadX awareness, which enables you to do a most effective debugging with the TRACE32 systems on targets running ThreadX.

## Multitask Debugging on TRACE32 with ThreadX

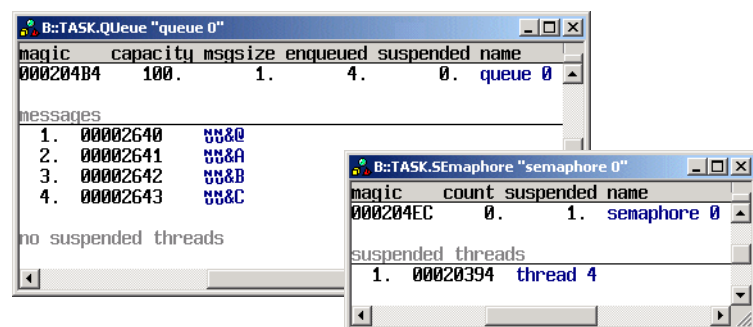
### Real time, non-intrusive display of ThreadX system resources

The TRACE32 multitask debugger for ThreadX provides display functions for all ThreadX resources. The system resources threads, application timers, queues, semaphores, events, block pools and byte pools 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.



Thread Status list window and detailed window of one specific thread

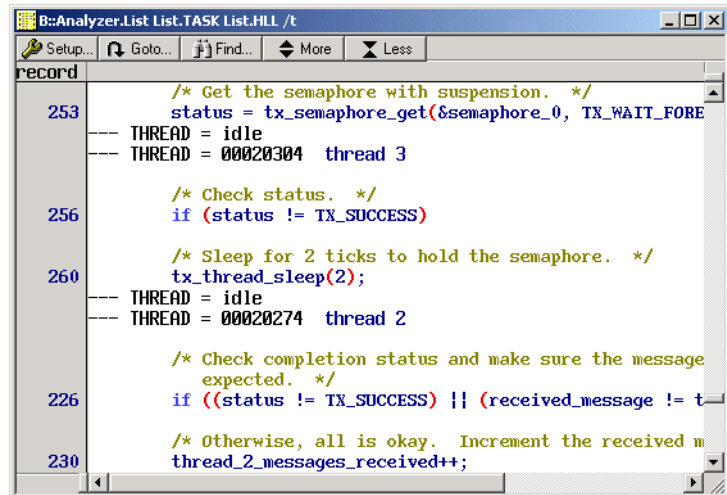


Detailed window of a queue and a semaphore

## ThreadX specific display of analyzer listing

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

The thread switches can be displayed symbolically.



```

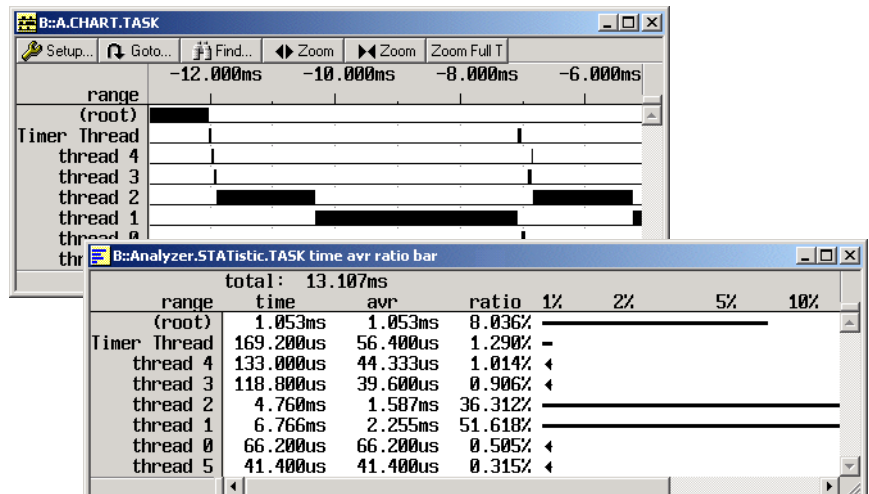
B::Analyzer.List List.TASK List.HLL /t
record
253      /* Get the semaphore with suspension. */
        status = tx_semaphore_get(&semaphore_0, TX_WAIT_FORE
--- THREAD = idle
--- THREAD = 00020304 thread 3
        /* Check status. */
256      if (status != TX_SUCCESS)
        /* Sleep for 2 ticks to hold the semaphore. */
260      tx_thread_sleep(2);
--- THREAD = idle
--- THREAD = 00020274 thread 2
        /* Check completion status and make sure the message
        expected. */
226      if ((status != TX_SUCCESS) || (received_message != t
        /* Otherwise, all is okay. Increment the received m
230      thread_2_messages_received++;
  
```

Analyzer listing, display of task switches and source lines

## Statistic evaluation and graphic display of thread run times

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 behaviour of the system.

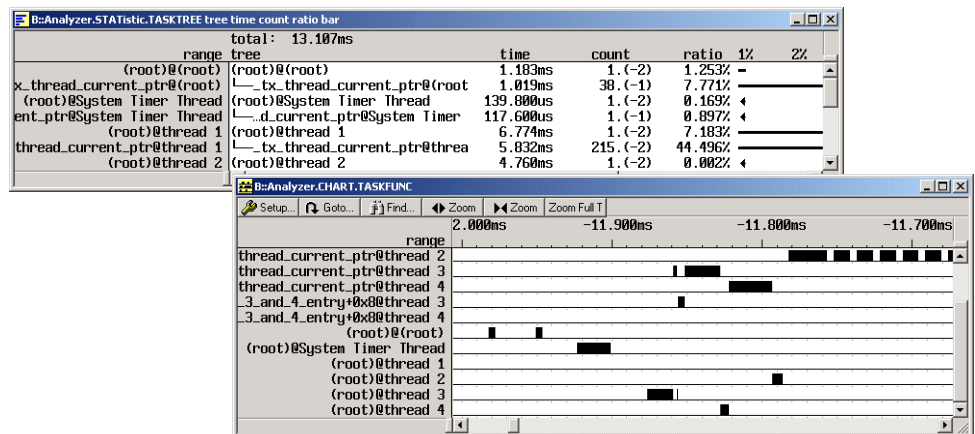


Statistics and flow of tasks

## Thread 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 thread. This is necessary, if dif-

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

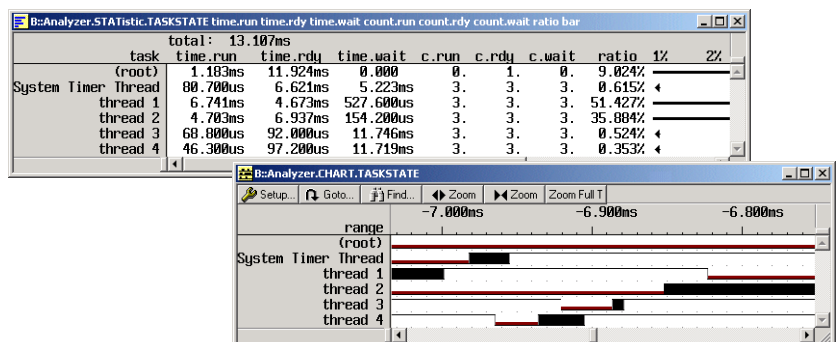


Statistics and flow of thread dependent function run times

## Statistic evaluation and graphic display of thread states

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

each thread spent in each state. A graphical view of the data can help to highlight prioritisation problems, critical paths etc.

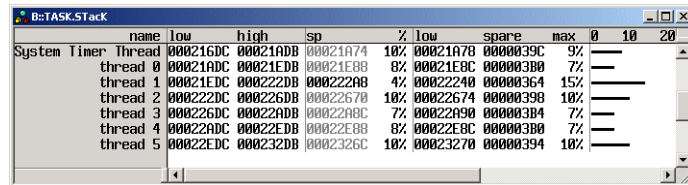


Statistics and flow of thread states

## Thread Stack Coverage

In real time systems it is quite important to know, how much stack space each thread consumes. For this purpose

a special window shows the current and the maximum usage of each separate thread.



	name	low	high	sp	%	low	spare	max	0	10	20
System Timer	Thread	000216DC	00021ADB	00021A74	10%	00021A78	0000039C	9%			
thread 0		00021ADC	00021EDB	00021E88	8%	00021E8C	00000380	7%			
thread 1		000222DC	000222DB	000222A8	4%	00022240	00000364	15%			
thread 2		000222DC	000226DB	00022670	10%	00022674	00000398	10%			
thread 3		000226DC	00022ADB	00022A8C	7%	00022A90	00000384	7%			
thread 4		00022ADC	00022EDB	00022E88	8%	00022E8C	00000380	7%			
thread 5		00022EDC	000232DB	0002326C	10%	00023270	00000394	10%			

Thread stack coverage window

## Thread Context Display

The TRACE32 Multitask debugger provides an easy way to switch the current displayed context to another thread. 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 thread). You can switch to the context of another thread to see all this information at the time this thread was scheduled.

## PRACTICE functions for OS data.

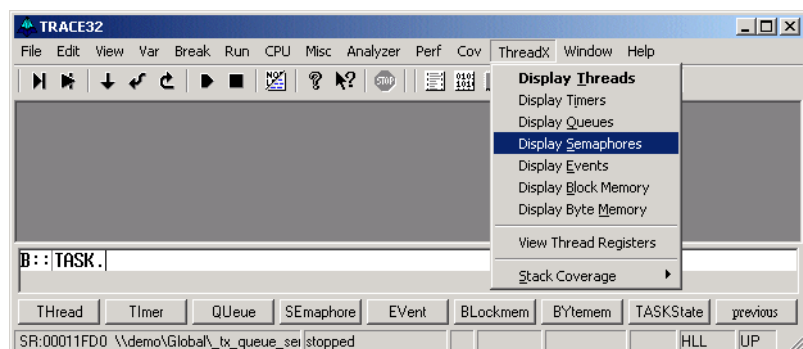
The support includes extended PRACTICE functions for ThreadX specific data. E.g. the function "TASK.CONFIG

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

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



TRACE32 with ThreadX menu

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