

INTERRUPTS

The application's interrupt handlers can suspend or activate threads. Interrupt handlers can be programmed completely in 'C' within the application. They can freely exchange signals or data with threads using semaphores or mailboxes. Semaphore or mailbox operations may then initiate a task switch, if required. Interrupts from any hardware can be processed.

DEBUGGING

RTKernel-RISC is delivered in two versions. The Standard Version is optimized for minimum size and best performance, while the Debug Version contains additional code for parameter and consistency checks at run-time. The Debug Version recognizes usage errors and issues corresponding error messages. Moreover, the Debug Version offers numerous debugging aids. For example, the current source code position of a thread can be displayed, all locked resources can be listed, or the CPU time requirements can be determined for each thread and interrupt handler. An especially powerful tool is the Kernel Tracer; it can log kernel and application events in real-time for off-line analysis.

As an additional aid to debugging, RTKernel-RISC (Debug and Standard Version) offers a number of informational functions. For example, a list of all threads, semaphores, or mailboxes can be displayed, or the state of a specific thread can be queried. Furthermore, RTKernel-RISC keeps statistics of the stack usage of all threads and interrupt handlers.

RTKERNEL-32 COMPATIBILITY

With a few exceptions Rtkernel-RISC is compatible with RTKernel-32. RTKernel-32 is part of the RTOS-32 development suite for protected mode X86. RTOS-32 has a large installed base and worldwide reputation for rock solid value and reliability.

SUPPLEMENTAL MODULES

RTKernel-RISC is supplied with the following supplemental modules, always delivered in full source code:

- **FineTime** - high resolution time measurement
- **Clock** - timer interrupt management
- **Console** - Serial and Telnet (requires EBSnet's TCP-IP stack) based console drivers
- **QUICC** - Full support for ethernet and UART with the 860 QUICC
- **Board Support** - Embedded Planet, Motorola MBX, ADS, FADS.

OPTIONAL MODULES

Tightly integrated versions of the EBSnet's TCP-IP stack and ERTFS DOS compatible file system packages are available for RTKernel-RISC.

RTKERNEL-RISC PERFORMANCE DATA

RTKernel RISC offers excellent performance. It comes with a benchmark program that may be used to measure its performance on any computer. The table to the right gives some results for four typical X86 based target computers and for a 24 MHz MPC860 processor.

Note: Times are given in μ s • Note: Times may vary due to instruction caching

20MHz 386EX	33MHz 486	120MHZ Pentium	24MHz 860	RTKernel Operation
43	5	0.73	15	Round-Robin task switch
79	10	1.61	20	Semaphore task switch
37	6	1.18	16	Semaphore Signal
25	4	1.24	14	Semaphore Wait
100	13	3.13	23	Task activation (Signal, Wait)
31	12	3.95	22	Store data in a mailbox
30	10	2.77	20	Retrieve data from a mailbox
96	12	2.50	22	Task-to-task communication
107	18	4.03	38	Task-to-mailbox-to-task-communication

