



a modular and optimized RTOS for 8, 16, 32 bit microcontrollers

ERIKA Enterprise supports multi processor platforms for automotive applications featuring two 32-bit ARM processors connected by a crossbar switch to multiple memory banks and peripheral buses for I/O processing. ERIKA Enterprise takes advantage of the architecture, enabling application developers to easily exploit multiprocessor power.

### **Overview**

ERIKA Enterprise is the state of the art Real Time Operating System (RTOS) for minimal embedded systems on a chip. ERIKA Enterprise is the first commercial Real-Time System with minimal footprint that supports advanced scheduling mechanisms for multiprocessor-on-a-chip architectures.

ERIKA Enterprise is available for a wide variety of 8, 16, and 32 bit CPUs. It is fully configurable in terms of services to be included in the final ROM image, and in terms of the number of objects (tasks, resources, events, ...). ERIKA Enterprise can be successfully used in all the situations where performance, small footprint, and effective usage of the hardware platform are needed.

ERIKA Enterprise will be submitted for compliancy with the OSEK standard during 2004.

### **Benefits**

By using ERIKA Enterprise, embedded designers can:

- Include in their applications only the needed components, adapting the RTOS to the needs of the application, and minimizing the memory footprint.
- Easily migrate to more powerful (faster, or multiprocessor) HW architectures without changing their software development process.
- Reduce development costs through a modular RTOS architecture that enables re-use of software
- Enlarge the lifetime of an embedded system by using optimal scheduling technologies.

### **Multiprocessor support**

ERIKA Enterprise is the first minimal kernel for embedded system-on-a-chip that explicitly takes advantage of multiprocessor architectures. Many embedded systems are becoming increasingly complex in terms of functionality to be supported: it is clear that a standard uniprocessor microcontroller architecture will not be able to support the needed computing power even taking into account the IC technology advances.

ERIKA Enterprise makes multiprocessor applications easy: application development is only marginally impacted by the switch to multiprocessor architectures, and applications can be written as if they were on a single processor platforms.



## ERIKA Enterprise Features

- Minimal RAM/ROM footprint
- Scalability (from 8 bit microcontrollers to symmetric multiprocessing)
- Support for 8, 16, 32 bit ECUs
- Advanced static and dynamic scheduling algorithms
- Fast context switch
- Support for multistack and stack sharing between application tasks and ISRs to reduce RAM usage
- Tools for computing optimal task binding
- development tools for multiprocessor on a chip

## Available Scheduling Algorithms

- Fixed Priority with Immediate Priority Ceiling
- EDF with SRP
- Soft Resource Reservation
- Non preemptive scheduling
- Multiprocessor scheduling
- OSEK Certification (planned during year 2004)

## Additional libraries

- Blocking and non-blocking Semaphores
- Cyclic Asynchronous Buffers
- Synchronization Events
- Alarms
- Message passing Inter- and Intra- ECU

## Configuration options

Configurability is a hot topic in minimal Real-Time Kernels. Only the components that are really needed, nothing more, are linked in the kernel binary image, saving the unnecessary extra bytes that can increase production costs, due to the fixed sizes of system memory.

The architecture of ERIKA Enterprise has been designed since its inception with the objective of being configurable. Each service is encapsulated in a single module, and can be included or not depending on internal configuration scripts.

Moreover, ERIKA Enterprise is fully configurable with many options, starting from the number of objects that are needed for application control, down to low-scale details like the size of the kernel basic types.

To further reduce the code footprint of the kernel the user controls the optional inclusion of many run-time checks and debugger options.

Minimal versions of the user interfaces are also available to get maximum access to the application.

## Configuration and debugging

- Kernel Configuration language
- Debugger Kernel Awareness using appropriate Configuration Language

## Supported architectures

- Hitachi H8
- ST Microelectronics ST10 / Infineon C167
- ARM 7
- Multiprocessor ARM 7
- Other architectures may be available on demand (please contact us for details.)

## Typical Performance

(HW Target is an ARM7 16 Mhz)

Description	Performance
ISR Entry	2 $\mu$ s
ISR Exit with return to the preempted task/to a new task	4.5/7.26 $\mu$ s
Task termination with return to a preempted task	9 $\mu$ s
Task activation	5.24 $\mu$ s
ROM code footprint (boot and startup code, thread activation, mutex lock/unlock, basic IRQ handling, ARM7 interworking)	1604 bytes

## More information

For more information on ERIKA Enterprise and other Evidence Products, please send an e-mail to [info@evidence.eu.com](mailto:info@evidence.eu.com), or visit the web site at <http://www.evidence.eu.com>.

## About Evidence Srl

Evidence is a spin-off company of the ReTiS Lab of the Scuola Superiore S. Anna. People at Evidence are experts in the domain of embedded and real-time systems with a deep knowledge of the design and specification flow of embedded SW, especially for the automotive market. We keep providing significant advances in the state of the art of real-time analysis and multiprocessor scheduling .

Our solutions aims at bringing new approaches to conventional embedded systems as well to the frontier of embedded computing, such as multiprocessor-on-a-chip, reconfigurable hardware, dynamic scheduling and much more!