

MICROSAR OS

The Vector Real-Time Operating System per the AUTOSAR Standard

The AUTOSAR OS specification defined by the AUTOSAR Consortium is an extension of the practice-proven OSEK OS operating system standard. This standard was expanded to include time monitoring, memory protection and functionalities for supporting distributed applications in networks.

MICROSAR OS is a preemptive real-time multitasking operating system with optimized properties for use on microcontrollers. Vector Informatik's many years of experience in developing operating systems and drivers for microcontrollers has culminated in a small, robust operating system core.

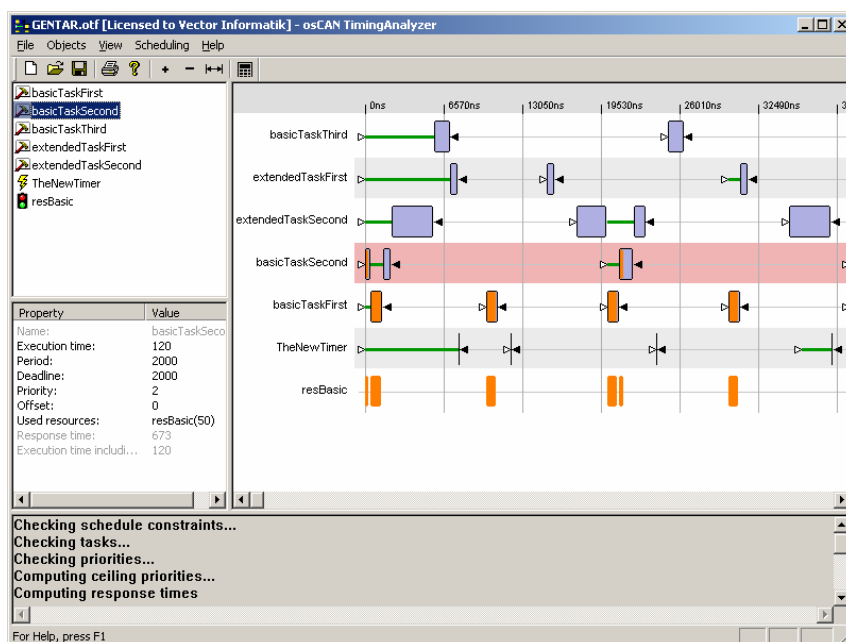
Vector's MICROSAR OS implementation was developed in full conformance to the AUTOSAR OS specification and supports all scalability classes:

- SC1:** Compatible with the OSEK OS standard and supplemental scheduling tables
- SC2:** Time OS, monitoring for correct time behavior of individual tasks and time synchronization
- SC3:** Protected OS, support of memory protection mechanisms of the specific microcontroller
- SC4:** Combination of scalability classes SC2 and SC3

In addition, experience gained in a large number of customer projects was applied to the design, and this led to further improvements in system behavior and handling in development projects.

Properties and advantages

- > Easy migration of existing OSEK operating systems to MICROSAR OS
- > MICROSAR OS offers an ideal development environment for embedded software and lays the foundation for migration to AUTOSAR-conformant applications
- > Accelerates the development of microcontroller software
- > Parallel development of sub-applications by component management
- > Protects investments due to long-term availability and stability
- > Easy porting of the ECU software to different processors and compilers
- > Supports all development processes – from design to simulation and testing – by integration in Vector product lineup
- > Graphic configuration tool for easy scaling of the operating system
- > Tests executability of MICROSAR OS applications based on specific ECU resources using osCAN TimingAnalyzer
- > Small, resource-economizing and fast operating system core
- > Available for many of today's 8, 16 and 32-bit microcontrollers



osCAN TimingAnalyzer (optional)

Training courses

As part of our training program we offer courses and workshops on operating systems at our classrooms and at our customers' sites.

For additional information on individual courses and dates on the Internet go to: www.vector-academy.de

Functions

Scheduling tables

Scheduling tables facilitate clear definition of action sequences with fixed, defined processing time. Scheduling tables can be executed either once or with repetition.

Timing Protection

Timing Protection ensures that execution time assumptions made during the design phase are also maintained at runtime. Protection violations are handled such that defective parts of one application do not affect other running applications.

Synchronization with global system time

Scheduling tables can be synchronized with the global system time, which may be transmitted over the Flexray Bus, for example. This enables synchronized and simultaneous execution of tasks over the entire system.

Measurements

The standard functions of scalability classes 2 and 4 enable measurement of execution times and interrupt blocking times of applications. These measured data later serve as ideal practice-based values for use in designing and integrating future applications.

Memory protection

Memory protection enables reliable integration of applications by protecting the memory area. It ensures that defective application parts cannot destroy the data of other non-defective applications.

Integration of TimingAnalyzer

The osCAN TimingAnalyzer can be used together with MICROSAR OS. It enables simulation of scheduling tables and computation of schedulability. The analysis is performed for each task and each ISR with this information: Priority, period, execution time and deadline. The graphic interface offers a clear and concise visualization of system behavior.

Component Management

To simplify the integration process, the graphic configuration tool provides import and export mechanisms for the component configurations.

Special functions

- > Component management
- > Analysis of time-based executability of applications
- > Graphic representation of the execution sequence
- > Measurement of execution time and interrupt blocking time

Kernel type:

- > Multitasking real-time operating system
- > AUTOSAR Scalability Classes 1 to 4

Size:

- > 1 – 20 kB ROM, depending on platform and configuration

Scheduling strategies:

- > All (preemptive / non-preemptive / mixed)

Product components:

- > Operating system kernel as source code
- > Graphic operating system configurator
- > Documentation
- > Sample programs

Configuration tool

- > Easy to operate graphic interface
- > Automatic checking for completeness and consistency
- > Easy system scaling
- > Offers ORTI support

Availability

The MICROSAR OS real-time operating system from Vector is available for many of today's 8, 16 and 32-bit microcontrollers.

For additional information on the Internet go to: www.microsar.com

Related Vector products:

- > osCAN (OSEK/VDX)
- > CANoe osCAN Library
- > osCAN TimingAnalyzer
- > High Resolution Timer