**RT-LAB™ Distributed Real-Time Power**

Model-Based Design and Virtual Prototyping
Control Prototyping and Testing
Embedded Control
Data Logging

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**Key Features**

**Real-Time Model Development**
- Fully integrated with Matlab/Simulink/Stateflow/SimPowerSystems/Real Time Workshop, and MATRIXx/SystemBuild/AutoCode
- Specialized Blockset to prepare the model for distributed processing, inter-node communication and signal I/O
- "Six Clicks to Real-Time" User interface
- Comprehensive API for developing your own on-line application, including tools for LabVIEW, C++, Matlab, Visual Basic, Python and 3D Virtual Reality Tools
- Supports models from CarSim/TruckSim, GT-Power, AMEsim, Dymola, as well legacy models in FORTRAN 90/95

**Run-time Features**
- Distributed, synchronized execution across multiple processors, including multiple CPU motherboards
- Shared Memory or FireWire inter-processor communication
- RT-SCOPE: Integrated Signal Visualization and Control Panel
- Dynamic Signal Tracing - select any signal for monitoring during run-time
- On-line Parameter Editor - change parameters on-the-fly (manually or load parameter files)
- Extensive I/O card support - over 80 devices supported
- Choice of RTOS : QNX, RedHawk Linux

**Performance Features**
- XHP Mode - high speed mode to give closed-loop cycle times below 20 microseconds
- Optimized Hard-Real-Time Scheduler - high performance, low jitter

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**RT-LAB™** is the distributed real-time platform that is revolutionizing the design process for engineering systems. Through its openness, it has the flexibility to be applied to the most complex simulation and control problem, whether it is for real-time hardware-in-the-loop applications or for dramatically speeding up model execution, and its scalability provides a low-risk entry point for any real-time engineering application, allowing the developer to add compute-power where and when needed.

**Handling Complexity and Simplicity**

RT-LAB is an industrial grade, open, scalable real-time platform for engineers who need to use mathematical models of dynamic systems built using MATLAB/Simulink or MATRIXx/SystemBuild for simulation, control testing and related applications.

Since these models can be very complex, it is often not possible to run them in real-time on a single processor. RT-LAB provides tools for running and simulations of highly complex models on a network of distributed run-time targets, communicating via ultra low-latency technologies, in order to achieve the required performance.

And, RT-LAB’s scalability goes both ways. Its modular design enables the delivery of economical systems by supplying only the modules needed for the application in order to minimize computational requirements and meet end-user price targets. This is essential for high-volume embedded applications.
Off-the-Shelf Technologies
RT-LAB is the first fully scalable simulation and control package that allows you to separate models for execution in parallel on a network of Pentium-based targets - standard desktop PCs, PC/104s or on SMP (symmetric multi-processor) servers.

Driven by the demands of a mass market, users take advantage of rapid advancements in a wide range of readily available technologies, as well as relatively low costs. RT-LAB uses standard Ethernet and FireWire (IEEE 1394) communications, and an extensive range of EISA, PCI, VME and PXI analog and digital I/O boards.

Hard Real-Time Performance
Through many years of research, RT-LAB delivers the best hard-real-time performance on any PC-based platform, and makes sure that parallel execution does not subtly alter model behavior, introduce real-time glitches or cause deadlocks. Also with its new XHP mode, RT-LAB can achieve closed-loop cycle times down below 20 microseconds (40 kHz), with jitter in the nanosecond range.

Choice of Real-Time Operating System
RT-LAB is the only real-time simulation framework that offers you a choice of two high-performance Real-Time Operating Systems (RTOS).

RT-LAB is available for QNX - the world’s best-established RTOS for mission-critical engineering applications - and RedHawk Linux - the premier real-time version of the popular open-source Linux operating system - from Concurrent Computer Corp.

Rapid Productivity
RT-LAB provides many usability features to allow you to develop your real-time solution in minimal time. Its tight integration with Simulink and SystemBuild means you only need to design your model and incorporate our real-time specific blocks and, if necessary, our special fixed-step solvers to prepare it for distribution and execution on the target processor or processors.

RT-LAB handles the rest with an easy-to-use interface that takes your model to real-time simulation with a few mouse clicks.

RT-LAB provides support for several specialized high-fidelity modeling tools that allow you to create a system, model and incorporate it into Simulink, and then into the real-time model. See the separate section on third party modeling tools currently supported.

Finally, to complete your application, RT-LAB’s API tools allow you readily connect to on-line visualization tools such as LabVIEW, WorldUp and Altia without programming. It also allows you to connect to your own applications written in MATLAB, Python, Visual Basic and C++.

Reducing Risk
RT-LAB will get you from Simulink or SystemBuild dynamic model to real-time for your hardware-in-the-loop application in a very short time at a low cost. Through its scalability and use of off-the-shelf components, your initial investment will be very low, but it gives you the flexibility to add computation power as your requirements grow. Its performance and usability features will ensure you avoid the computational and development problems usually associated with real-time engineering applications, allowing you to deliver the optimal solution, on time and within budget.