

REAL TIME TOOLBOX

for use with MATLAB® and Simulink®



Real Time Toolbox brings the power of MATLAB and Simulink to the real world. It allows you to access external analog and digital signals, with almost no hardware knowledge. You can experiment with control system design, signal processing, data acquisition and similar tasks directly from the Simulink environment using powerful block library without the need to use any additional tool. Based on a high performance real-time kernel and drivers for popular A/D and D/A boards, **Real Time Toolbox** is your interface to real-time and data acquisition capabilities of your computer.

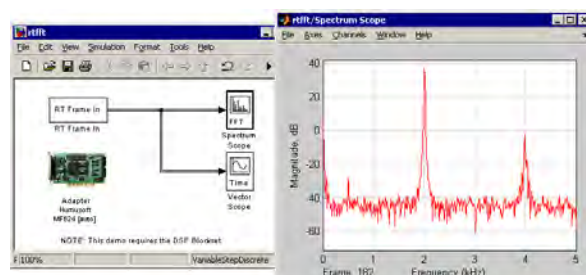
Application Areas

- Data acquisition
- Real-time process control
- Signal processing
- Hardware-in-the-loop simulation
- Rapid prototyping
- Education

Key Features

The latest version, **Real Time Toolbox 4** offers major new features and enhancements over previous versions.

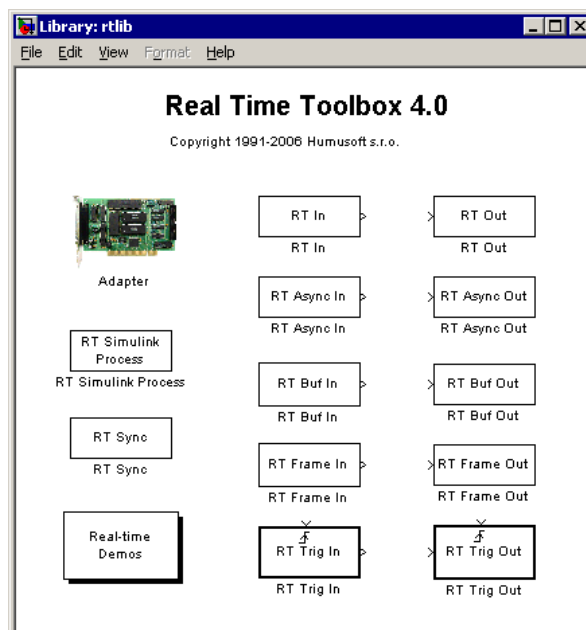
- complete off-the-shelf solution with drivers for your favorite data acquisition board or, optionally, bundled with a compatible data acquisition board
- **runs with MATLAB R14 SP3, R2006 and higher**
- **compatible with Microsoft Windows 2000, Windows XP and Windows Vista**
- new Simulink block library with improved I/O interface for creating real-time simulations and control loops
- drivers for more than 300 industry-standard data acquisition boards including A/D, D/A, digital I/O, quadrature encoders, counters, joystick and more
- supports ISA, PCI, PCMCIA, PC104, Compact PCI and PCI Express boards
- real-time kernel with sampling frequencies up to 66 kHz with no external clock source required
- improved data throughput for higher sampling frequencies
- triggered blocks for Stateflow applications
- frame based blocks for DSP applications with full support of frame based signals



Block diagram of real-time spectral analysis using Real Time Toolbox and Signal Processing Blockset working with frame based data.

Real-Time Simulation

Real-time simulation is one of the most challenging computing tasks. Yet it is incredibly easy with the **Real Time Toolbox**: you just create a simulation diagram as



Simulink real-time block library

you would normally do in Simulink, add one or more real-time blocks from the **Real Time Toolbox** library and that's it!

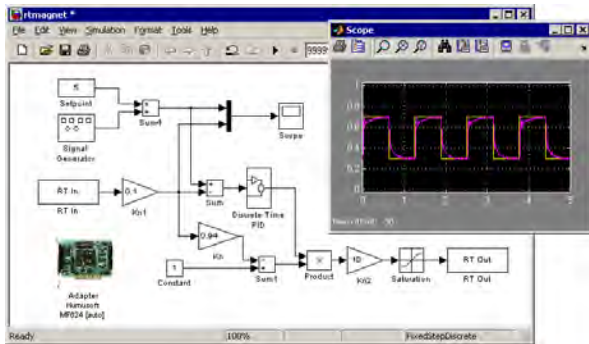
Your data acquisition board is represented by an **Adapter** block which allows easy board configuration. The inputs and outputs are represented by input and output blocks, and a different sampling period can be specified for each I/O block. This enables creating multirate simulations, control loops and signal processing applications.

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Real-time simulation diagrams preserve most of the Simulink advantages, such as fully interactive work, extreme ease of use and 100% compatibility with Stateflow and blocksets. Wide range of simple, buffered, frame-based and triggered blocks with different I/O functionality offers the best solution for wide range of applications. Depending on model complexity usual applications are able to run at sampling rates between 100 Hz - 10 kHz and are suitable for most laboratory experiments.

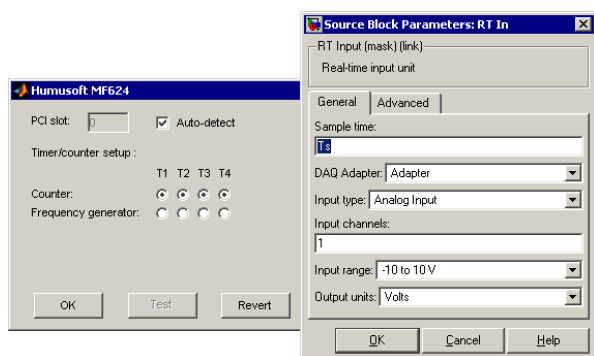
To achieve the best real-time performance model execution priority can be set using the new RT Simulink Process control block.



Real-time PID controller with gain scheduling.

Easy Access to Hardware

One of the most difficult tasks while getting a data acquisition experiment ready is to correctly set all the hardware options of the data acquisition board. **Real Time Toolbox** simplifies this as much as possible: the only thing you need to do is to set the board parameters in the driver GUI, and if you use your board with factory-default settings you don't need to change anything at all.



Driver GUI for the HUMUSOFT MF624 multifunction board.

Block GUI offers easy to use environment for setting I/O type, channels, ranges, engineering units and other parameters.

Frame based I/O blocks with direct connectivity to frame signal processing blocks are available for all peripheral types including also counters, encoders and digital I/O.

Channel assignment has been greatly simplified and improved over previous versions. It is easy and self-explanatory with channels divided into groups and with independent channel numbering for each board and peripheral type.

Data Acquisition Boards

A wide range of industry standard data acquisition boards and other peripherals is supported, including those manufactured by Advantech, Analog Devices, Axiom, Data Translation, Humusoft, ICP DAS, Keithley MetraByte, Measurement Computing, or National Instruments. Besides standard analog and digital I/O many specialized devices like a stepping motor controller, quadrature encoders, counters, PWM, mouse or joystick are also supported. Multiple boards of the same or different type can be used simultaneously to offer sufficient I/O even for complex industrial applications.

Real Time Toolbox can optionally be delivered in bundle with Humusoft data acquisition hardware and drivers to provide a complete optimized working environment.

These bundled data acquisition boards are available at discounted prices. Please contact us for more information.



MF 624 multifunction board

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