

# rtX Simulator™

The rtX is a high-value solution for real-time hardware-in-the-loop testing. This PC-based, real-time simulator is affordable enough to be used on small test projects, but the scalable and modular architecture enables the rtX to be applied to large, complex test projects.

The rtX inherits the rich software features of the ADvantage Framework, including project development using ADvantage for simulation setup and configuration. In addition, ADvantageDE on the rtX provides a comprehensive test environment, including run-time control and automation with ADvantageVI, real-time plotting with SIMplotter, and virtual panel interfaces with Altia.

The rtX is based on standard PC technology, allowing the latest PC technology to be applied to simulation projects. The rtX utilizes the industry-standard, POSIX-compliant features of the QNX operating system to provide high-performance parallel processing. Each model runs as a separate multi-threaded process.

## High-Performance Compute Power

The rtX is available in single and multi-processor configurations. The rtX real-time simulator utilizes standard PC technology to provide incredibly high performance real-time simulation.

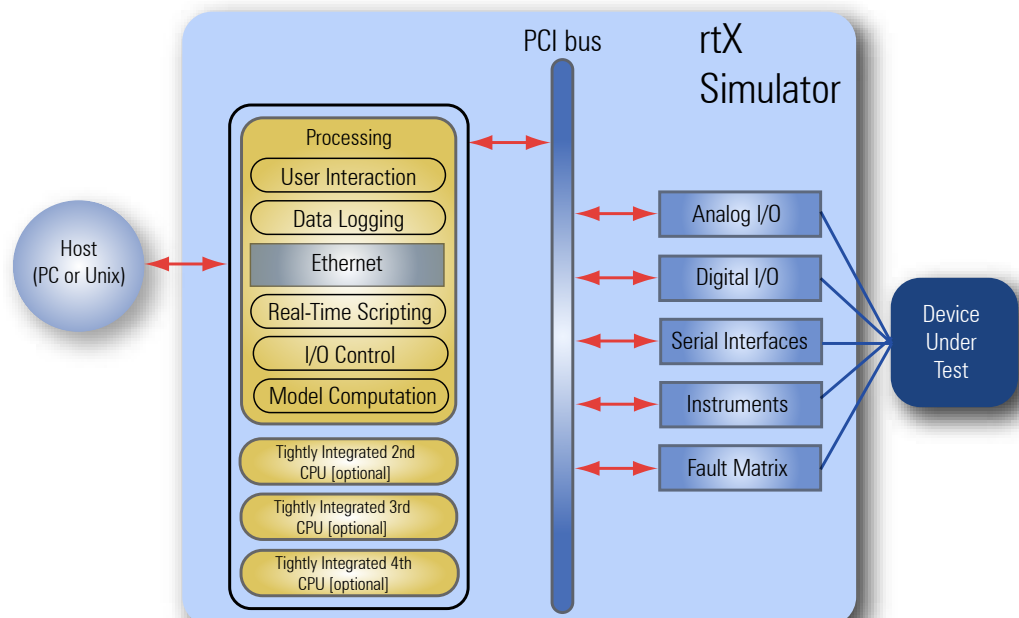
An important requirement for the multi-processor high-performance parallel computation is the need for ultra high-speed communication between the processors. The rtx-DX & MX meet this requirement with tightly coupled CPUs communicating through the 533 MHz system memory bus with bandwidth up to 4.36GB/s. Therefore, memory access for each CPU and communication from CPU to CPU is executed at remarkably high speeds.



The rack-mount rtX

## Features

- Real-time, deterministic behavior for open-loop or closed-loop testing
- ADvantageDE for easy point-and-click access to I/O and integration with a variety of model types
- Automated or interactive testing
- QNX POSIX-compliant real-time operating system with GNU C/C++ compiler
- Various motherboard configurations including Pentium and Opteron systems
- Available in desktop or rack-mount configurations
- 5 to 6 PCI slots in base system
- Expandable with PCI or PXI eXpansion Box(es)
- Integrated signal conditioning for complete sensor/actuator solutions
- PCI, PXI and Industry Pack I/O cards
- Extensible expansion with optional accessories including conneXions Box, Fault InserXion Box and integrated programmable power supplies



The expandable Real-Time Simulator

## Easily Manage and Create Test Projects

The rtX is an ADvantage Framework-based simulation system. ADvantageDE allows simulation models to be easily specified and mapped to the processors in an rtX system. I/O is easily “connected” to simulation models through a project assembly. ADvantage projects represent integration projects of models (virtual subsystems) and real hardware (connected via I/O interfaces/buses) in the loop.

## Supported Model Types

- Simulink
- SystemBuild
- C
- C++
- Fortran
- ADSIM

Utilizing the ADvantage Framework, the simulator can be kept current and able to meet future needs – new processor support, new model tools, new O/S support, or new I/O.

## Highly Interactive Run-Time

ADvantage run-time supports PC technology layered on a posix-compliant commercial RTOS. Multi-processor and multi-core technology is supported. One or more models can be supported per processor available in the rtX. Subsystems or model(s) can be locked to a processor or core. The hardware and system level functions are transparent to the user.

ADvantageVI provides a rich run-time interface for interactive or automated testing. Simulation data can be accessed at run-time via a signal browser and simulation data can easily be logged and connected to interface panels. Open interfaces and APIs allow easy integration with other tools.

## I/O Capabilities

The ADvantage Framework supports a wide range of integrated device drivers for a variety of COTS I/O boards making it easy to interface these devices to models or control algorithms.

The rtX Simulator provides PCI slots that can be populated with a variety of I/O interfaces including:

- Analog
- Digital
- Specialized sensor/actuator interfaces
- Communication bus interfaces

The number of I/O slots can be easily increased by adding a variety of I/O expansion options including a wide range of commercial boards supported in:

- PCI
- PXI /cPCI
- PMC and Industry Pack (IP) Modules

Applied Dynamics also provides specialized COTS or custom solutions in:

- PCI
- Industry-Pack
- DIOS (firewire-based I/O)

## Supported I/O

For a complete list of supported I/O boards, please visit our website at : [http://www.adi.com/z\\_index.htm](http://www.adi.com/z_index.htm).

PCI I/O expansion subsystem	PCI I/O boards include a wide selection of commercially available boards to handle a vast range of I/O requirements. Edge-style connector plugs directly into an rtX Simulator.
PXI I/O expansion subsystem	PXI I/O boards include a wide selection of commercially available boards to handle a vast range of I/O requirements. PXI boards have insertion-style bus connectors.
PMC or Industry (IP) Modules	PMC and IP modules are supported in PCI, PXI or xPCI slots by plugging into the appropriate carrier boards. A variety of I/O is supported using these modules.
DIOS subsystem (firewire interface)	The Distributed I/O System (DIOS) uses a Firewire cable bus to enable distributed I/O with minimal cabling. DIOS is ideal for large real-time integration labs. DIOS boards include I/O and signal conditioning circuits.

## Turnkey System Integration

In addition to I/O integration, Applied Dynamics can also extend the rtX functionality to include fault insertion capability, auto-test, auto-calibration systems, flexible interconnects, breakout panels, and power supplies. Applied Dynamics can develop systems to customer requirements including standard and custom components.

## Distributed Simulation Support

System integration labs (SILs) can be made up of a set of distributed rtX nodes. The ADvantage Framework simplifies the use of distributed nodes through multi-target project assemblies and support of distributed run-time control through a primary node. The interface between nodes is configurable depending on the user application.