

# RTS Simulator™

The RTS real-time simulator is Applied Dynamics' premier hardware-in-the-loop system. It is designed for projects requiring the robustness, flexibility, and high-end system performance of our VMEbus-based products. The RTS uses a host/target architecture with a PC host connected across Ethernet to the RTS target. All project development is performed on the host PC. The host/target architecture allows the RTS to be a network resource accessible from any host on the network.



RTS 6216

## System Architecture

The RTS is an open architecture, VMEbus-based system that features support for multiple compute engines and a wide variety of integrated I/O devices. VMEbus is an industry standard with an extensive range of interfaces available.

The RTS architecture has one processor serving as a User Interface Processor (UIP). This processor manages the network activity and interactions with the host computer. The UIP facilitates the high-performance data acquisition system and data management. Another processor serves as the primary processor and typically runs the user's model. All I/O or other models may be synced to the primary processor.

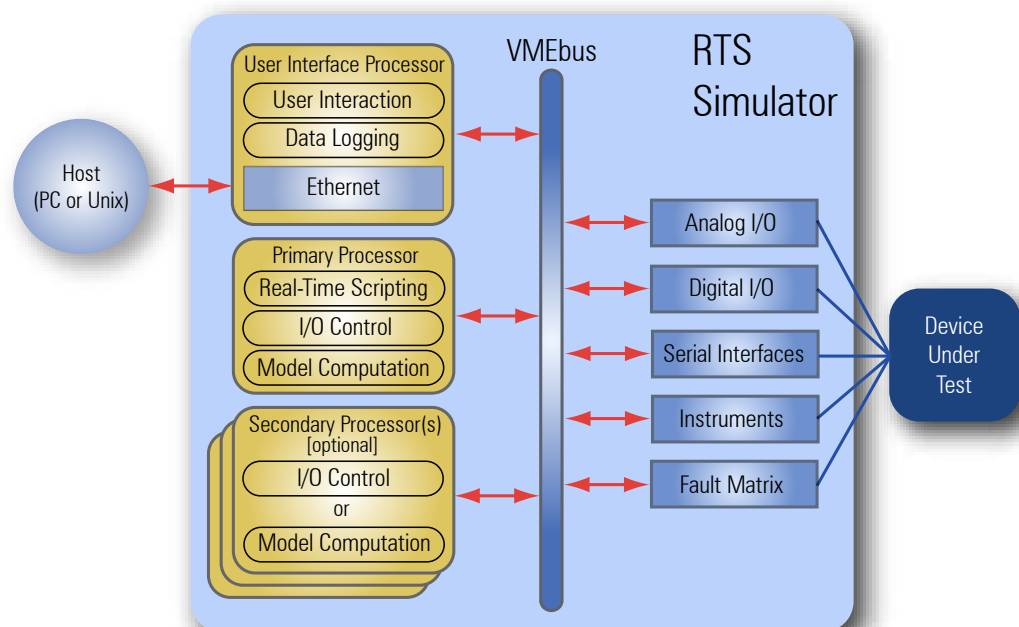
Multiple RTS systems can be connected via reflective memory or bus extenders for large or distributed applications.

## Real-Time Performance

The current RTS compute processor is Motorola's flagship product, the MVME5500 PowerPC running at 1 GHz with a high-speed memory architecture. The compute processors execute models and handle I/O interfacing. The models are layered on an extremely deterministic OS - RTexec. RTexec is a powerful real-time, multi-thread kernel that guarantees microsecond-level determinism. Tasks may be scheduled based on rates or priorities or both.

## Features

- Highly deterministic real-time performance
- Robust system architecture
- ADvantage Framework software for co-simulation and hardware-in-the-loop testing
- Integrated run-time software with interactive and automated test environment
- Integrated data acquisition system
- High-performance data visualization at run time
- High-performance PowerPC 1 Ghz compute engine for handling complex models
- Multiple compute engines can be utilized for each model subsystem
- Wide range of VME, PMC and IPs including analog, digital and communication - CANbus, MIL-STD1553, etc.
- Sensor/actuator simulation such as thermocouples, LVDTs, RVDTs, wheel speed sensors, PWM outputs/inputs, etc.



High-Performance Real-Time Simulator

## Easily Manage and Create Test Projects

The RTS is an ADvantage Framework-based simulation system. ADvantageDE allows simulation models to be easily specified and mapped to the processors in an RTS 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
- Fortran
- ADSIM

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

## Highly Interactive Run Time

ADvantage run time supports PowerPC technology layered with a highly deterministic real-time operating system. Multiple processors are supported – only limited by slot availability. One model is supported per processor available in the RTS. 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 RTS provides 20 VMEbus 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 an additional VME chassis that can be populated with a wide range of commercial boards supported in:

- PMC and Industry Pack (IP) Modules
- VME I/O

Applied Dynamics also provides specialized COTS or custom solutions in:

- Industry-Pack
- VME I/O
- 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).

VME I/O Boards	The VMEbus I/O board form factor includes a wide selection of commercially available boards to handle a vast range of I/O requirements.
PMC I/O Modules	PMC I/O cards are daughter board modules that are plugged into compute engine or carrier boards, and communicate across a local PCI bus. PMC modules are ideal for communication interfaces with high data transfer rates.
IP I/O Modules	Industry Pack (IP) I/O cards are a high density, highly configurable (4-5 IPs per VME slot) daughter board modules. IP is a standard form factor offering many specialized cards (IP-ARB, IP-uc336).
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 RTS 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.