RT-LAB™ Rapid Prototyping Controller

Based on RT-LAB and other off-the-shelf software and hardware components, RT-LAB Rapid Prototyping Controller is a modular rapid prototyping system for control algorithm development using MATLAB/Simulink and MATRIXx/SystemBuild. With powerful data acquisition support, a parameter editor, and a flexible user interface package, RT-LAB Rapid Prototyping Controllers provides a mature and affordable platform for electronic control unit (ECU) development, calibration, and fleet testing.

Key Benefits / Features

**Integrated**
Well integrated with a range of best-in-the-class development tools, such as parameter browsing, data acquisition control, and flash programming.

**Connected**
Operating-system-level support for networked environment for remote program update, data sharing, and error diagnostics.

**Modular**
Supports many processor modules. I/O devices can be added or removed depending on project needs.

**Open**
Can be easily integrated into a larger system through off-the-shelf devices for analog, digital, pulse, data bus, and special purpose interfaces.

**Low Cost**
Cost effective without compromising system performance.

Figure 1  RT-LAB Rapid Prototyping Controller
(PCI-104 based system shown)

Figure 2  RT-LAB Parameter Editor for “on-the-fly” tuning
RT-LAB Rapid Prototyping Controller's rugged enclosure is well suited for in-vehicle operation. Once flashed, RT-LAB Rapid Prototyping Controller boots up by itself in embedded mode, just like an automotive electronic control unit (ECU). While operating in embedded mode, RT-LAB Rapid Prototyping Controller's flight recorder can continue to log data to flash disk or hard drive, providing a solution for long-term data tracing, which facilitates field-testing.

RT-LAB Rapid Prototyping Controller is configured through the RT-LAB Main Control Panel, which runs on the host PC and features a simple graphical user interface based on the typical model development process. All frequently used functions are available through a single mouse click; there is no need to memorize text commands.

RT-LAB automatically creates a user interface from your original Simulink and SystemBuild diagram, so you can interact with an algorithm running on the RT-LABe target. When you need more elaborate operator panels, you have the choice of LabVIEW or Altia. RT-LAB also provides several LabVIEW template panels and a set of routines to access all RT-LAB functions. Users can just wire the blocks and go!

Figure 3 RT-LAB Main Control panel

Figure 4 Sample user interface panel in LabVIEW
Specifications:

- **Host PC Platform**: Windows NT, 2000 and XP
- **Console Software**: RT-LAB Main Control Panel
- **Operator Interface**: RT-Scope, LabVIEW or Simulink
- **Algorithm Development**: MATLAB/Simulink or Matrixx/System Build
- **Real-Time Processor**: 233/300/866 MHz on higher
- **Real-Time Operating System**: 800 MHz - 2.8 GHz (or faster!)
- **Real-Time Operating System**: QNX
- **Host to Target Link**: 10/100 Mbps Ethernet

**I/O Devices**

- **Analog Output**: 16-bit and 12-bit DAC
- **Analog Input**: 16-bit and 12-bit ADC
- **Discrete I/O**: TTL or high voltage
- **Timing I/O**: PWM generation, period/frequency measurement, and event capturing
- **CAN**: Dual channel standard or extended CAN interface, low speed OAN available
- **I/O Expansion**: Prototyping board

**Recommended Configurations**

**Base Configuration**
- RT-LAB software - development version
- RT-LAB software - embedded self-booting option
- RT-LAB software - unattended flight recording
- RT-LAB target - 1G Hz Pentium III
- RT-LAB target - DC power supply
- RT-LAB target - NI-6025E: 16 analog input, 2 analog output, 32 digital I/O, and timer for hardware synchronization.
- QNX 6.1 real-time operating system
- Fully assembled and tested

**Options**
- Multi-processor option
- Compact PCI/PXI system for high I/O counts applications
- Rugged PC/104 system for harsh environment applications
- Additional analog input interfaces: bank of 16 or 48 channels
- Additional analog output interfaces: bank of 8 channels
- Additional digital I/O interfaces: bank of 8 channels
- High speed analog input interfaces, 1.25M samples/sec
- High speed PWM interface, 80MHz clock frequency
- Flash boot
- Signal conditioning interfaces for sensor input and actuator drives.
- Servo amplifiers for AC/DC brush/brush less motors

**Technical Specifications**

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