Software for Designing Reliable, Deterministic LabVIEW Systems

NI LabVIEW Real-Time Module

- Design real-time systems with LabVIEW graphical development
- Download to a dedicated real-time target for reliable, deterministic performance
- Deploy as a distributed, stand-alone, autonomous, or embedded system
- Use integrated libraries for acquisition, analysis, and presentation of data acquired with NI or third-party hardware

System Requirements

- Windows 2000/XP
- 128 MB RAM; 256 MB[1]
- Pentium III/Celeron; 600 MHz
- Pentium 4[1], Pentium M
- 250 MB disk space; 670 MB[1]

[1]Recommended

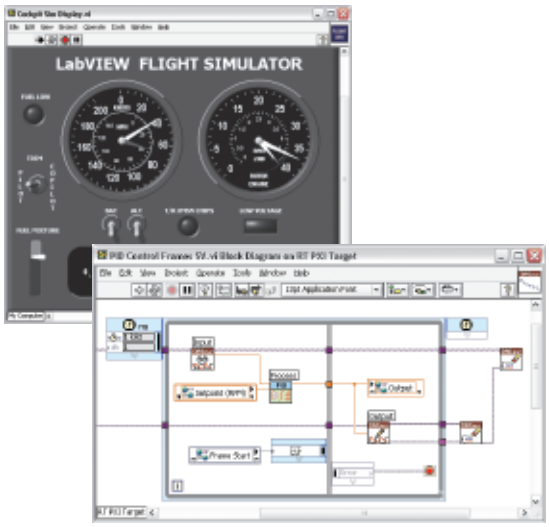
Required Software

- LabVIEW development system, current version

Compatible LabVIEW Real-Time Targets

- RT Series PXI controllers
- Compact FieldPoint
- FieldPoint
- CompactRIO
- RT Series PCI plug-in board
- Compact Vision System
- Standard PC[2]

[2]See **ni.com/realtime** for requirements.



Overview

The National Instruments LabVIEW Real-Time Module extends the LabVIEW development environment to deliver deterministic, real-time performance. Develop your application on a host computer using graphical programming and then download the application to run on an independent hardware target with a real-time OS (RTOS). Select from a variety of real-time targets based on the performance, platform, and I/O requirements of your application.

By using NI LabVIEW to design your real-time application, you benefit from the rapid application development of graphical programming. Because National Instruments provides commercial off-the-shelf hardware for your real-time target, you do not need to spend time verifying that the OS or code works on your hardware. LabVIEW graphical programming includes tools for low-level system debugging and precise execution timing so that you can increase the flexibility and functionality of your deterministic real-time application.

The LabVIEW Real-Time Module also includes the LabVIEW PID Control Toolkit so you can implement control systems using PID, fuzzy logic, and advanced control algorithms. Finally, with the tight hardware and software integration provided by NI measurement services software, you spend less time integrating a wide range of I/O that includes analog, digital, counter, CAN, serial, GPIB, vision, and motion.

Graphical Development Environment

To create your real-time system, assemble graphical functions on a block diagram and wire the objects to create a LabVIEW dataflow program.

Distributed Project Development

Easily configure and develop a distributed real-time application with LabVIEW project management features. The LabVIEW Project Explorer displays all real-time devices used in a project. Drag and drop VI source code files to each target to specify where the code runs. Create shared variables to easily pass data among VIs executing on various targets. You can enable additional shared variable features such as network buffering and non-blocking FIFOs to reduce jitter when transferring data.

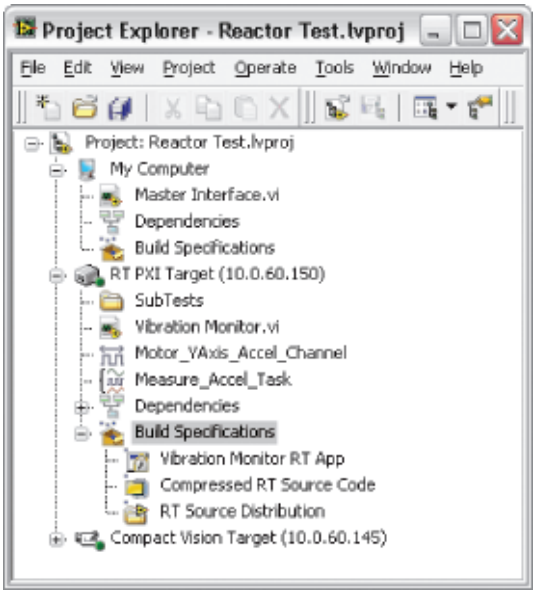


Figure 1. LabVIEW Project Explorer

NATIONAL INSTRUMENTS™

Stand-Alone Application Deployment

With the LabVIEW Professional Development System and LabVIEW Real-Time Module, you can create a stand-alone executable and download it to an NI RT Series hardware target with one simple step. You can permanently embed the code on the nonvolatile memory of the real-time system so it starts automatically when the system boots for autonomous field applications.

Real-Time Performance

Each RT Series hardware target contains an embedded processor running an RTOS. The LabVIEW Real-Time Module embeds compiled code on the RT Series hardware target and runs it independently of the host computer. Assign the appropriate execution priority to each real-time task. The embedded RTOS then uses a combination of round-robin and preemptive scheduling to ensure deterministic execution of your time-critical tasks. With this dedicated performance, you can run time-critical PID control loops at up to 77 kHz for a single PID loop on a real-time PXI controller. Additionally, you can implement multirate applications to include up to 128 independent tasks running at unique priorities.

Reliable Operation

To ensure reliable operations for real-time control, embedded LabVIEW Real-Time applications continue to run even if the host computer is interrupted or the operator performs a soft reboot. Because most RT Series hardware targets have dedicated power supplies, you can shut down the host computer entirely without disrupting the embedded program. Then you can seamlessly reconnect to the LabVIEW Real-Time application after the host computer recovers.

System Monitoring and Debugging Tools

The LabVIEW Real-Time Module provides native tools for debugging your application. You can use the Real-Time System Manager to monitor system resources such as CPU and memory usage of your real-time target. With other debugging tools, you can keep track of memory buffer allocation and the amount of memory consumed by each VI as it downloads to your target. Additionally, you can use the LabVIEW Execution Trace Toolkit, a LabVIEW Real-Time Module add-on, for advanced debugging to visualize the task execution of your application.

Scalable Development

Choose from a variety of RT Series hardware targets to create a customized system that meets the needs of your application. Develop a distributed intelligent I/O system with Compact FieldPoint; a small rugged embedded controller with CompactRIO; a high-performance, stand-alone, real-time system with PXI; and a low-cost, real-time system using PCI hardware and the latest computing technologies with a desktop or industrial PC. As your system requirements evolve, you can port the real-time application to a new hardware target with minimal software modifications.

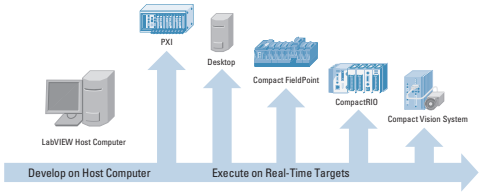


Figure 2. LabVIEW Real-Time Targets

Control Design Software Integration

Use the LabVIEW Real-Time Module with LabVIEW control design and simulation tools for control algorithm design, rapid control prototyping, and hardware-in-the-loop testing. You can add real-world I/O signals to The MathWorks, Inc. Simulink® control models using the LabVIEW Simulation Interface Toolkit to download and run models on RT Series hardware.

NI Developer Suite Control Edition

The NI Developer Suite Control Edition is a subscription program that delivers quarterly NI software updates and priority technical support. This offering bundles complementary software into one package. The NI Developer Suite Professional Control Edition includes the LabVIEW Professional Development System, the LabVIEW Real-Time Module, and the LabVIEW Datalogging and Supervisory Control Module, as well as other tools to develop distributed monitoring and control systems.

Ordering Information

NI LabVIEW Real-Time Module (ETS)
Windows 2000/XP[1] 777844-03
NI Developer Suite Professional Control Edition 777906-03

Training Selections

LabVIEW Real-Time
Application Development .....910642-xx[2]

[1] Requires LabVIEW Development System
[2] 01 (NI Corporate), 11 (Regional), 21 (On-Site)

BUY NOW!

For complete product specifications, pricing, and accessory information, call 800 813 3693 (U.S. only) or go to **ni.com/realtime**.

Simulink® is a registered trademark of The MathWorks, Inc.

NI Services and Support

NI has the services and support to meet your needs around the globe and through the application life cycle – from planning and development through deployment and ongoing maintenance. We offer services and service levels to meet customer requirements in research, design, validation, and manufacturing. Visit **ni.com/services**.

Local Sales and Technical Support

In offices worldwide, our staff is local to the country, giving you access to engineers who speak your language. NI delivers industry-leading technical support through online knowledge bases, our applications engineers, and access to 14,000 measurement and automation professionals within NI Developer Exchange forums. Find immediate answers to your questions at **ni.com/support**.

Training and Certification

NI training is the fastest, most certain route to productivity with our tools. NI training can shorten your learning curve, save development time, and reduce maintenance costs over the application life cycle. We schedule instructor-led courses in cities worldwide, or we can hold a course at your facility. We also offer a professional certification program that identifies individuals who have high levels of skill and knowledge on using NI products. Visit **ni.com/training**.

NATIONAL INSTRUMENTS™
Certified Alliance Partner

Professional Services

Our Professional Services Team is comprised of NI applications engineers, NI Consulting Services, and a worldwide National Instruments Alliance Partner program of more than 600 independent consultants and integrators. Services range from start-up assistance to turnkey system integration. Visit **ni.com/alliance**.

Software Service Programs

NI offers service programs that provide automatic upgrades to your application development environment and higher levels of technical support. Our service programs ensure that you always have the latest advances in productivity and receive live, on-demand access to NI applications engineers through phone and e-mail to assist in developing your solutions. Service programs are cost effective and simplify software purchasing as an annual, fixed cost, making it easier to plan and budget than intermittent individual upgrades. You also receive discounts for our training courses and materials. For details, visit **ni.com/ssp**.

Basic Service Level

- Upgrades purchased separately
- Support by NI applications engineers, R&D engineers, partners, and community members through online Developer Exchange
- Access to KnowledgeBase, example code, troubleshooting wizards, solutions, and white papers

Standard Service Level

- Automatic upgrades included
- All the benefits of Basic Service
- Support by NI applications engineers through direct phone or e-mail access
- Exclusive access to on-demand training through Services Resource Center

Premier Service Level

- All the benefits of Standard Service
- Support by NI senior applications engineers through direct phone or e-mail access with extended hours of operation

NATIONAL INSTRUMENTS™

ni.com • (800) 813 3693

National Instruments • info@ni.com

2005-5694-821-101-D