Overview
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 operating system. Select from a variety of real-time targets based on the performance, platform, and I/O requirements of your application.

By using 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 operating system or code will work 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 data flow program. Numerous built-in libraries help create powerful applications that include standard programming functions as well as routines to connect to National Instruments and third-party I/O devices. Create custom user interfaces by selecting from built-in objects such as charts and graphs, numerical representations, and Boolean operators such as switches. Easily debug applications using tools such as probes, breakpoints, single-stepping, execution highlighting, and graphical differencing.

Building Stand-Alone Executables
With the LabVIEW Professional Development System and LabVIEW Real-Time Module, you can create a stand-alone executable and download it to an 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.
LabVIEW Real-Time Module
Add-On Software for Designing Reliable, Deterministic Systems

Real-Time Performance
Each RT Series hardware target contains an embedded processor running a real-time operating system. The LabVIEW Real-Time Module embeds compiled code on the RT Series hardware target and runs it independently of the host computer. Use the VI Properties dialog in LabVIEW to assign the appropriate execution priority to each embedded VI. The embedded real-time operating system 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 39 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.

System Monitoring and Debug Tools
The LabVIEW Real-Time Module provides native tools for debugging your application. You can use the Real-Time System Manager to monitor systems resources such as CPU and memory VIs executing on your real-time target. With other debugging tools, you can view where memory buffers are being allocated and the amount of memory consumed by each VI as it is downloaded 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 RT Series FieldPoint; a small rugged embedded controller with Compact FieldPoint; a high-performance, stand-alone, real-time system with RT Series PXI; a low-cost real-time system using PCI hardware and the latest computing technologies with a certified desktop PC; or integrate a real-time component into a Windows-based system using an RT PCI Series plug-in board. As your system requirements evolve, you can port the real-time application to a new hardware target with minimal software modifications. For additional information about LabVIEW Real-Time hardware, visit ni.com/info and enter rtwitwhitepaper to download the Selecting Your LabVIEW Real-Time Deployment Platform white paper.

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 RT Series PXI, RT Series FieldPoint, RT Series Compact FieldPoint systems, and two Compact Vision Systems 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.
LabVIEW Real-Time Module
Add-On Software for Designing Reliable, Deterministic Systems

LabVIEW Real-Time Module Packages
The LabVIEW Real-Time Module is an add-on component for the LabVIEW Development System. When installed, this software compiles LabVIEW graphical code and optimizes it for the selected real-time target. All LabVIEW Real-Time Module packages include the NI PID Control Toolkit so you can easily integrate PID, fuzzy logic, and custom control algorithms in your LabVIEW Real-Time application.

NI Developer Suite Professional Control Edition
NI Developer Suite Professional Control Edition is a subscription package for Windows that includes the LabVIEW Development System and the LabVIEW Real-Time Module for ETS Targets. As an owner of this package, you receive automatic quarterly updates with the latest software releases for your system.

LabVIEW Real-Time Module (ETS) for Windows
Using the LabVIEW Real-Time Module (ETS) for Windows targets you can develop and deploy applications to all NI real-time hardware targets including PXI, Compact FieldPoint, FieldPoint, PCI plug-in boards, and certified desktop PCs. The embedded RTOS for these targets is a single dedicated kernel that provides maximum reliability for embedded code.

LabVIEW Real-Time Module (ETS) for Mac OS X
Using the LabVIEW Real-Time Module (ETS) for Mac OS X you can develop applications on a Macintosh computer running MAC OS X and deploy applications to NI PXI real-time hardware targets. The embedded RTOS for these targets is a single dedicated kernel that provides maximum reliability for embedded code.

LabVIEW Real-Time Module (RTX) for Windows
Using the LabVIEW Real-Time Module for RTX targets you can develop and deploy applications on a variety of desktop PCs. RTX, a real-time extension for windows, allows you to run both Windows tasks and real-time tasks on the same PC, delivering a single box solution for user interface and real-time operations.

Hands-On Training
Achieving reliable deterministic performance for your applications requires more than just deploying an application to a real-time operating system. You must also implement good program architecture and proper programming techniques. National Instruments provides a variety of tools to help you quickly learn these tips and techniques. From self-paced content such as online tutorials and product manuals to a hands-on classroom environment with dedicated instructors, you can easily find the training media that best suits your needs.

Ordering Information

<table>
<thead>
<tr>
<th>Product Selections</th>
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</tr>
</thead>
<tbody>
<tr>
<td>NI LabVIEW Real-Time Module (ETS) for Windows</td>
<td>777844-03</td>
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<td>NI LabVIEW Real-Time Module (ETS) for Mac OS X</td>
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<td>NI LabVIEW Real-Time Module (RTX) for Windows</td>
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<td>777906-03</td>
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<tr>
<td>LabVIEW Execution Trace Toolkit</td>
<td>778915-03</td>
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Training Selections
LabVIEW Real-Time Application Development 910642-xx

1 Requires current version of LabVIEW Full or Professional Development System
2 01 (NI Corporate or Branch), 11 (Regional), 21 (On-Site)

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