

LabVIEW™ Real-Time Module Release and Upgrade Notes

Version 2009

This document provides system requirements, installation instructions, descriptions of new features, and information about upgrade and compatibility issues for the LabVIEW 2009 Real-Time Module.

Refer to the *Getting Started with the LabVIEW Real-Time Module* manual for exercises you can complete to familiarize yourself with the RT Module.

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System Requirements

Table 1 describes the system requirements to run the LabVIEW 2009 Real-Time Module. The Real-Time Module system requirements are in addition to the LabVIEW system requirements listed in the *LabVIEW Release Notes*.

Table 1. System Requirements for the Real-Time Module 2009

Supported Platform	Media and System Requirements	Important Notes
<ul style="list-style-type: none"> Windows XP Pro (Service Pack 1, 2, or 3) Windows Vista (32-bit) Windows Vista (64-bit) running LabVIEW 32-bit only Windows 2000 Pro (Service Pack 1, 2, 3, or 4) 	<ul style="list-style-type: none"> LabVIEW 2009 Full or Professional Development System RT target hardware and driver software 	<ul style="list-style-type: none"> You might need more memory than the LabVIEW-recommended minimum depending on the size of the application you design in LabVIEW on the host computer.

Installing the Real-Time Module 2009

This section includes information about installing the Real-Time Module on a development computer.



Note You must install LabVIEW 2009 before attempting to install the Real-Time Module 2009. Refer to the *LabVIEW Release Notes* for the LabVIEW installation instructions.

Complete the following steps to install the Real-Time Module on the host computer.

1. Disable any automatic virus detection programs before you install. Some virus detection programs interfere with the installation program.
2. Log in to the development computer as an administrator or as a user with administrative privileges.
3. Insert the LabVIEW Platform DVD and select to install LabVIEW.

4. Follow the instructions on the screen for installing software.
 - a. Select the following software from the product list tree:
 - **LabVIEW**
 - **Real-Time Module** in the **Embedded (Real-Time, FPGA, and Microprocessor)** folder
 - **NI Measurement & Automation Explorer (MAX)**
 - **Device Drivers**
 - b. Continue to follow the instructions on the screen to complete installation of the software. The installer might prompt you to insert another DVD to continue installation. The LabVIEW Platform DVD installs program files and documentation for the software you selected.

Activating the Real-Time Module

The Real-Time Module relies on licensing activation. You have a temporary license for a 30-day evaluation period. When the evaluation period expires, you must activate a valid Real-Time Module license to continue using the Real-Time Module.

You can use the NI License Manager, available by selecting **Start» All Programs»National Instruments»NI License Manager**, to activate National Instruments products. Refer to the *National Instruments License Manager Help*, available by selecting **Help»Contents** in the NI License Manager, for information about activating NI products.

Configuring Real-Time Targets

Use Measurement & Automation Explorer (MAX) to configure RT targets and to install software and drivers on targets. You can install MAX from the LabVIEW Platform DVD.

- **Networked RT Targets**—Refer to the **MAX Remote Systems Help** book in the *Measurement & Automation Explorer Help*, available by selecting **Help»MAX Help** from MAX, for information about configuring networked RT targets.
- **Desktop PC Targets**—Refer to the *Using Desktop PCs as RT Targets with the LabVIEW Real-Time Module* document for information about configuring a desktop PC as a networked RT target. Select **Start» All Programs»National Instruments»LabVIEW 2009»LabVIEW Manuals** to open the `labview\manuals` directory and then double-click `RT_Using_PC_as_RT_Target.pdf` to open the document.

Real-Time Module 2009 Features

The Real-Time Module 2009 includes the following new features. Refer to the *LabVIEW Help*, available by selecting **Help»Search the LabVIEW Help**, for information about these features.

NI Real-Time Hypervisor Support

The Real-Time Module 2009 supports NI Real-Time Hypervisor software, which you can use to run Windows host VIs and LabVIEW Real-Time VIs simultaneously on a single controller. You can purchase NI Real-Time Hypervisor software when you purchase a supported multi-core PXI controller or Industrial controller. NI Real-Time Hypervisor software supports most of the same devices and drivers as the LabVIEW Real-Time Module. Refer to ni.com/info and enter the info code HV_Devices for information about hardware devices and drivers that the NI Real-Time Hypervisor does not support.

Backing Up, Restoring, and Replicating RT Targets

You can use RT target disk images to back up, restore, and replicate RT targets. An RT target disk image is a copy of the primary RT target hard drive. Use the following new VIs to create and apply RT target disk images.

- RT Create Target Disk Image
- RT Apply Target Disk Image

You also can use an RT Desktop PC Utility USB drive to create and apply RT target disk images. Refer to the **Real-Time Module»Real-Time Module Concepts»Backing Up, Restoring, and Replicating RT Targets** topic on the **Contents** tab in the *LabVIEW Help* for information about backing up, restoring, and replicating RT targets.

New Real-Time Utilities VIs

The Real-Time Utilities palette includes the following new VIs.

- RT Apply Target Network Settings
- RT Format Target
- RT Lock Target
- RT Unlock Target

Refer to the **VI and Function Reference»Real-Time VIs»Real-Time Utilities VIs** book on the **Contents** tab in the *LabVIEW Help* for information about the Real-Time Utilities VIs.

Synchronizing Timed Structures on Multiple Targets

You can use the new 1 kHz <absolute time> and 1 MHz <absolute time> timing sources to synchronize the start of timed structures running on multiple networked RT targets. Refer to the **Fundamentals»Loops and Structures»Concepts»Timed Structures»Synchronizing the Start of Timed Structures** topic on the **Contents** tab in the *LabVIEW Help* for information about synchronizing timed structures.

LabVIEW Classes Support

You can deploy VIs and stand-alone applications that use LabVIEW classes to an RT target. You also can create new classes under RT targets in the **Project Explorer** window. Refer to the **Fundamentals»LabVIEW Object-Oriented Programming** book on the **Contents** tab in the *LabVIEW Help* for information about LabVIEW classes.

MathScript RT Module Support

If you purchase the MathScript RT Module, you can use the MathScript RT Module functions on RT targets. However, National Instruments does not guarantee and is not responsible for the jitter characteristics of the Mathscript RT Module functions. Depending on the functions and data types you use, memory allocations might be required at run time, which can cause jitter in the real-time application. To ensure that the application meets timing requirements, National Instruments recommends that you benchmark (and you are solely responsible for testing) the jitter in your application before you deploy the application to the field. Refer to the **MathScript RT Module Functions** book on the **Contents** tab in the *LabVIEW Help* for information about the MathScript RT Module functions.

Programmatically Finding, Reading, and Writing Variables

LabVIEW 2009 includes new functions, classes, properties, and methods you can use to find, read and write network-published shared variables and I/O variables programmatically. Refer to the **Fundamentals»Networking in LabVIEW»Concepts»Finding, Reading, and Writing Shared Variables Programmatically** topic on the **Contents** tab in the *LabVIEW Help* for information about accessing shared variables programmatically.

I/O Variable Improvements

The Real-Time Module 2009 includes the following improvements for I/O variables.

Transferring Custom FPGA I/O Data

You can create user-defined I/O variables to transfer custom I/O data between FPGA VIs and RT VIs running on a single supported hardware device. An I/O variable is a type of shared variable that uses the NI Scan Engine for single-point access to I/O data. Refer to the **Fundamentals» Accessing Scanned I/O Data» Concepts» Using I/O Variables** topic on the **Contents** tab in the *LabVIEW Help* for information about user-defined I/O variables.

Fixed-Point Support

I/O variables now support the fixed-point data type.

NI Scan Engine Fault Configuration

You can configure the level and triggering behavior of system faults either interactively or programmatically. Use the Fault Configuration section of the **Scan Engine** page to configure system faults interactively. Use the Fault Configuration VIs to configure system faults programmatically. Refer to the **Fundamentals» Accessing Scanned I/O Data» Concepts» NI Scan Engine Faults** topic on the **Contents** tab in the *LabVIEW Help* for information about NI Scan Engine faults.

Improvements for Shared Variables with the RT FIFO Enabled

The Real-Time Module 2009 includes the following improvements for shared variables with the Real-Time FIFO enabled.

Cluster Support

Shared variables with the RT FIFO enabled now support flat clusters, which are clusters that do not contain arrays or strings.

Blocking Read Mode

You can enable the **ms timeout** input on the block diagram node of a single-process shared variable with the RT FIFO enabled. You can use this feature to wait for new data and avoid reading identical values repeatedly.

UDP Multicast Support

Use the UDP Multicast Open VI on an RT target to initiate a UDP multicast session. Refer to the **Fundamentals»Networking in LabVIEW»Concepts»Using LabVIEW with TCP/IP and UDP** topic on the **Contents** tab in the *LabVIEW Help* for information about UDP multicast technology.

Visual C++ 9 (VC9) Compiler Support (ETS)

The RT Module 2009 includes a VC9 component that you can install on ETS RT targets using the LabVIEW Real-Time Software Wizard in NI Measurement & Automation Explorer (MAX). If you install VC9 support on an ETS RT target, you can call DLLs compiled with the Microsoft VC9 compiler in VIs that run on the target.

Improved Daylight Saving Time Support (ETS)

ETS RT targets now support the latest rules for Daylight Saving Time (DST). If you need to use DST rules other than those used in the US, you can specify different DST start and end times to match the rules of your region. Refer to ni.com/info and enter the info code `rtdst` for information about updating the DST rules used by an ETS RT target.

FTP VIs

The RT Module 2009 includes the FTP VIs, which previously installed only with the Internet Toolkit. Refer to the **Real-Time Module»Real-Time VIs»FTP VIs** book on the **Contents** tab in the *LabVIEW Help* for information about the FTP VIs.

Real-Time Execution Trace Toolkit 2.0.1

The LabVIEW Real-Time Module includes a 30-day full-featured evaluation of the Real-Time Execution Trace Toolkit 2.0.1. The Real-Time Execution Trace Toolkit includes the Real-Time Execution Trace Tool and the Execution Trace Tool VIs. You can use the Execution Trace Tool VIs to capture the timing and execution data of VI and thread events for applications running on an RT target. The Real-Time Execution Trace Tool displays the timing and event data, or trace session, on the host computer. In LabVIEW, select **Tools»Real-Time Module»Execution Trace Tool** to display the Real-Time Execution Trace Tool.

Refer to the **Real-Time Execution Trace Toolkit** book in the *LabVIEW Help* for information about using the Real-Time Execution Trace Toolkit to debug real-time applications. Select **Help»Search the LabVIEW Help** to display the *LabVIEW Help*. In the *LabVIEW Help*, browse to **Toolkits»**

Real-Time Execution Trace Toolkit to view the **Real-Time Execution Trace Toolkit** book.

Activating the Real-Time Execution Trace Toolkit

The Real-Time Execution Trace Toolkit relies on licensing activation. You have a temporary license for a 30-day evaluation period. When the evaluation period expires, you must activate a valid Real-Time Execution Trace Toolkit license to continue using the Real-Time Execution Trace Toolkit.

You can use the NI License Manager, available by selecting **Start»All Programs»National Instruments»NI License Manager**, to activate National Instruments products. Refer to the *National Instruments License Manager Help*, available by selecting **Help»Contents** in the NI License Manager, for information about activating NI products.

Upgrade and Compatibility Issues

The following sections provide information about upgrade and compatibility issues specific to different versions of the RT Module.

Changes Made in Version 2009

You might encounter the following compatibility issues when upgrading to the latest version of the Real-Time Module from the Real-Time Module 8.6.x and earlier.

RT Communication Wizard Discontinued

The Real-Time Module 2009 does not include the RT Communication Wizard.

Deprecated Real-Time Utilities VIs

The Real-Time Utilities palette no longer includes the following VIs.

- RT Ping Controllers (replaced by RT Get Target Information)
- RT Reboot Controller (replaced by RT Restart Target)

Refer to the **VI and Function Reference»Real-Time VIs»Real-Time Utilities VIs** book on the **Contents** tab in the *LabVIEW Help* for information about the Real-Time Utilities VIs.

Changes Made in Version 8.6.x

You might encounter the following compatibility issues when upgrading to the latest version of the Real-Time Module from the Real-Time Module 8.5.x and earlier.

Floppy Disk Support Discontinued

The Real-Time Module no longer includes updated versions of the PXI and Desktop PC Floppy Disk Utilities. You can still use Measurement & Automation Explorer (MAX) to create previous versions of the RT floppy disks, which will continue to work with newer versions of the Real-Time Module. However, older versions of the RT floppy disks do not support device drivers added to subsequent versions of the Real-Time Module. If you need to use the latest device drivers, you must use MAX to create an RT 8.6 USB Utility drive.

FieldPoint 20x0 Support Discontinued

The Real-Time Module no longer supports FP-20x0 and cFP-20x0 targets. You can still use FP-20x0 and cFP-20x0 targets with LabVIEW, but you cannot install the Real-Time Module 8.6 on FP-20x0 and cFP-20x0 targets.

Changes Made in Version 8.5.x

You might encounter the following compatibility issues when upgrading to the latest version of the Real-Time Module from the Real-Time Module 8.2.x and earlier.

RTX Support Discontinued

The Real-Time Module no longer supports RTX desktop targets and no longer contains the Shared Memory VIs. Refer to the *Using Desktop PCs as RT Targets with the LabVIEW Real-Time Module* document for information about configuring a PC as an ETS RT target.

IrDA Support Discontinued

The Real-Time Module no longer supports the IrDA protocol and no longer contains the associated IrDA VIs.

Timed Loop Priority Restriction

The Timed Loop does not support **Priority** values greater than 65,535.

Compatibility with VxWorks 6.1

When you install the Real-Time Module 8.6 on the host computer, you also must install version 8.6 of the Real-Time Module software on cRIO-901x targets. The Real-Time Module 8.6 updates the operating system on cRIO-901x targets from VxWorks 6.1 to VxWorks 6.3. Some functions in VxWorks 6.3 are not compatible with VxWorks 6.1. If you use custom C code in a LabVIEW application running on a cRIO-901x target, you must recompile the *.OUT files for VxWorks 6.3. Refer to the NI Web site at ni.com/info and enter the info code `rtvx` for information.

Front Panel:Open Method Error

In the Real-Time Module 8.2.1 and earlier, the Front Panel:Open method failed without an error. The FP.Open method now returns error 53.

Where to Go from Here

National Instruments provides many resources to help you succeed with your NI products. Use the following resources as you start exploring LabVIEW and the Real-Time Module.

Related Documentation and Examples

Use the following resources to learn more about using LabVIEW and the RT Module.

- **LabVIEW Help**—Available by selecting **Help»Search the LabVIEW Help** in LabVIEW. Browse the **Real-Time Module** book in the **Contents** tab for an overview of the RT Module.
- **Context Help Window**—Available by selecting **Help»Show Context Help**. Context help provides brief descriptions of VIs, functions, and dialog boxes. Context help for most VIs and functions include a link to the complete reference for a VI or function.
- **Hardware-Specific Documentation**—Some RT targets provide printed documentation as well as content in the *LabVIEW Help*. Use the hardware documentation for information about using the RT target with LabVIEW and for information about hardware specifications.
- **Examples**—Use the NI Example Finder, available by selecting **Help»Find Examples** from LabVIEW, to browse or search for RT example VIs. You also can access example VIs from the `labview\examples\real-time` directory.

NI Web Site

Refer to ni.com/info and enter the info code `rtinfo` for the latest NI Developer Zone articles, examples, and support information for the RT Module.

Refer to ni.com/info and enter the info code `rttrn` to access online training for the RT Module.

Known Issues with the Real-Time Module 2009

Refer to the National Instruments Web site at ni.com/info and enter the info code `LVRT2009KIL` to access the known issues for the RT Module.

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