

LabVIEW™ Real-Time Module Release and Upgrade Notes

Version 8.5

This document provides system requirements, installation instructions, descriptions of new features, and information about upgrade and compatibility issues for version 8.5 of the LabVIEW Real-Time Module.

Refer to the *Getting Started with the LabVIEW Real-Time Module* manual for an introduction to the LabVIEW Real-Time Module.

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System Requirements

Table 1 describes the system requirements to run version 8.5 of the 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 8.5

Platform	Media and System Requirements	Important Notes
Windows 2000/XP/Vista	National Instruments recommends that you have at least 300 MB of disk space for the minimum Real-Time Module installation or 750 MB of disk space for the complete Real-Time Module installation, which includes the Real-Time and Embedded drivers from the National Instruments Device Drivers CD.	<p>You might need more memory than the LabVIEW-recommended 512 MB of RAM depending on the size of the application you design in LabVIEW on the host computer.</p> <p>To view and control the front panel of a VI running on an RT target remotely using a Web browser, National Instruments recommends Internet Explorer 5.5 with Service Pack 2 or later.</p>

Installing the Real-Time Module 8.5

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



Note You must install LabVIEW 8.5 before attempting to install the Real-Time Module 8.5. Refer to the *LabVIEW Release Notes* for the LabVIEW installation instructions.

Complete the following steps to install the LabVIEW 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 on as an administrator or as a user with administrator privileges.
3. Insert the LabVIEW Real-Time Module installation CD into the CD-ROM drive. The LabVIEW Real-Time Module installation program runs automatically.
4. Follow the instructions that appear on the screen.
5. Install the Real-Time and Embedded drivers and any other drivers that you require from the National Instruments Device Driver CD.

RT Target Configuration

Use Measurement & Automation Explorer (MAX) to configure RT targets and to install software and drivers on targets.

- **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. You can access the document from Windows by selecting to install the Real-Time Module documentation when you install the Real-Time Module. Select **Start»All Programs»National Instruments»LabVIEW 8.5»Manuals** to open the `labview\manuals` directory and then double-click `RT_Using_PC_as_RT_Target.pdf` to open the document.

Real-Time Execution Trace Toolkit 2.0

The LabVIEW 8.5 Real-Time Module includes a 30-day full-featured evaluation of the Real-Time Execution Trace Toolkit 2.0. 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 Execution Trace Toolkit** 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 full-featured evaluation period. If you do not activate the Real-Time Execution Trace Toolkit license, the toolkit functions in evaluation mode for a 30-day evaluation period. The evaluation period begins the first time you launch the Trace Tool by clicking the **Evaluate** button in the **NI Real-Time Execution Trace Toolkit** dialog box. 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.

After you launch the Real-Time Execution Trace Toolkit in evaluation mode, you can click the **Purchase** button in the **NI Real-Time Execution Trace Toolkit** dialog box to purchase the toolkit.

To activate the Real-Time Execution Trace Toolkit, use the serial number you receive as part of your installation package. You can activate the LabVIEW license in either of the following ways:

- During installation, enter the serial number and select to run the NI Activation Wizard at the end of the installation.
- When you launch the Trace Tool, click the **Activate** button in the **NI Real-Time Execution Trace Toolkit** dialog box.

If you do not activate the Real-Time Execution Trace Toolkit during installation, the Trace Tool prompts you for activation on launch. After you activate the Real-Time Execution Trace Toolkit license, you no longer see this prompt. If activation fails, the Real-Time Execution Trace Toolkit remains in evaluation mode until the 30-day evaluation period expires.

New Real-Time Module 8.5 Features

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

Multiple CPU Support

The Real-Time Module 8.5 supports parallel processing for increased performance on ETS targets with multiple CPUs. When multiple-CPU support is enabled, the real-time operating system automatically allocates threads across CPUs. As a result, many existing applications can realize an immediate performance improvement on multiple-CPU systems.

You might be able to achieve further performance improvements by implementing a pipelined architecture or by manually assigning Timed Loops to particular CPUs. To take advantage of parallel processing on a multiple-CPU system, use the LabVIEW Real-Time Software Wizard in MAX to install the NI RT Extensions for SMP. Refer to the *MAX Help* for information about using the LabVIEW Real-Time Software Wizard. Refer to the *LabVIEW Help* for information about optimizing RT applications for systems with multiple CPUs.



Note Single-CPU systems perform best without the NI RT Extensions for SMP. Also, some applications, such as those that consist mainly of single-point I/O, can achieve lower latency using a single CPU without the NI RT Extensions for SMP. Refer to the National Instruments Web site at ni.com/info and enter the info code `rt_smp` for further details about optimizing RT applications for systems with multiple CPUs.

Timed Loop CPU Assignment

The Real-Time Module 8.5 supports manual CPU assignment for Timed Loops. The Timed Loop now includes an **Assigned CPU** input that you can use to optimize an application for execution on systems with multiple CPUs. Refer to the *LabVIEW Help* for information about manually assigning Timed Loops to particular CPUs.

Enhancements to the Multiple Variable Editor

Use the **Multiple Variable Editor** window to configure a large number of shared variables at one time. Right-click a project library or shared variable and select **Edit Variables** from the shortcut menu to display the **Multiple Variable Editor** window.

The **Multiple Variable Editor** window includes the following improvements:

- Edit multiple shared variables at once using the new table format.

- Search across several shared variables at once using the new advanced search options. Click the **Find** button to display the search options.
- Copy and paste property values across shared variables by clicking the **Copy** and **Paste** buttons.
- Sort shared variable properties by right-clicking a property column and selecting **Sort Ascending** or **Sort Descending** from the shortcut menu.

You no longer need to use the **Multiple Variable Editor** window to import or export shared variable configuration information to or from a spreadsheet file. To import the information, right-click a project library and select **Import Variables** from the shortcut menu. To export the information, right-click a project library and select **Export Variables** from the shortcut menu.

Real-Time Performance Improvements

The Real-Time Module 8.5 includes the following performance improvements.

Linear Algebra Performance Improvements

In addition to the performance improvements documented in the *LabVIEW Upgrade Notes*, the Real-Time Module 8.5 features significant performance improvements for the VIs on the **Linear Algebra** palette.

Jitter Reduction in Math and Signal Processing VIs

The Real-Time Module 8.5 includes a new **Real-Time Analysis Utilities** palette that installs as a subpalette of both the **Mathematics** palette and the **Signal Processing** palette. You can use the Real-Time Analysis Utilities VIs to handle the resource requirements of certain Mathematics and Signal Processing VIs in a dedicated analysis workspace. To prevent race conditions, priority inversions, and other undefined behavior, you must use the Real-Time Analysis Utilities VIs according to a strict set of guidelines. Refer to the *Creating Deterministic Applications with the Real-Time Module* topic in the *LabVIEW Help* for guidelines and information about using the analysis workspace to reduce execution jitter.

Serial ATA Hard Drive Support

In the Real-Time Module 8.2.1 and earlier, you can use Serial ATA (SATA) hard drives only in legacy mode. The LabVIEW Real-Time Module 8.5 includes native support for SATA drives.

Improved Support for RT Desktop PCs

The Real-Time Module 8.5 includes improved BIOS compatibility for desktop PCs used as RT targets. Also, the Real-Time Module 8.5 supports new multiple-CPU systems, ethernet chipsets, and SATA hard drives. Refer to the National Instruments Web site at ni.com/info and enter the info code `etspc` for up-to-date information about supported hardware and the specific specifications that National Instruments recommends.

On-Screen CPU Monitor

RT targets with the Real-Time Module 8.5 software installed include an on-screen CPU monitor that displays CPU utilization information when you connect the target to a monitor. You can use the CPU monitor to diagnose performance issues in RT applications and to help determine the load balance on multiple-CPU systems.

Running Real-Time Applications

To run a stand-alone real-time application in the Real-Time Module 8.2.1 and earlier, you must right-click the build specification in the **Project Explorer** window, select **Set as startup** and then **Deploy** from the shortcut menu, and reboot the target. In the Real-Time Module 8.5, you can set the application to run in one step by right-clicking the application and selecting **Run as startup** from the shortcut menu. The **Run as startup** shortcut menu item sets the application as the startup application, deploys the application to the target, and prompts you to reboot the RT target.

Upgrade and Compatibility Issues

You might encounter the following compatibility issues when upgrading to the LabVIEW 8.5 Real-Time Module.

RTX Support Discontinued

As of version 8.5, 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

As of version 8.5, the LabVIEW Real-Time Module no longer supports the IrDA protocol and no longer contains the associated IrDA VIs.

Timed Loop Priority Restriction

In the Real-Time Module 8.5, the Timed Loop only supports **Priority** values less than 65,535.

Compatibility with VxWorks 6.1

When you install the Real-Time Module 8.5 on the host computer, you also must install version 8.5 of the Real-Time Module software on cRIO-901x targets. The Real-Time Module 8.5 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 more information.

Front Panel:Open Method Error

In the Real-Time Module 8.2.1 and earlier, the Front Panel:Open method failed without returning an error. In the Real-Time Module 8.5, the FP.Open method returns error 53.

Real-Time Module 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.

Known Issues with the Real-Time Module 8.5

Refer to the `readme_RT.html` file on the LabVIEW 8.5 Real-Time Module installation CD for information about known issues with the Real-Time Module 8.5.

You also can launch the `readme_RT.html` file from Windows after you install the Real-Time Module. Complete the following steps to access the `readme_RT.html` file from Windows.

1. Select **Start»All Programs»National Instruments»LabVIEW 8.5»Readme** to open the `labview\readme` directory.

The `labview\readme` directory contains the HTML readme files for LabVIEW and any installed LabVIEW modules and add-ons.

2. Double-click `readme_RT.html` to open the *LabVIEW Real-Time Module Readme*.

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