RELEASE NOTES

LabWindows™/CVI™

Version 2013

These release notes introduce LabWindows™/CVI™ 2013. Refer to this document for system requirements, installation and activation instructions, and information about new features in LabWindows/CVI.

Contents

NATIONAL INSTRUMENTS™

LabWindows/CVI System Requirements

To run LabWindows/CVI, you must have the following:

- Personal computer using a Pentium 4/M or equivalent processor
- Microsoft operating systems:
  - Windows 8 (32-bit and 64-bit)
  - Windows 7 (32-bit and 64-bit), including Starter Edition
  - Windows Vista Service Pack 1 (32-bit and 64-bit)
  - Windows XP Service Pack 3
  - Windows Server 2008 R2 Service Pack 2 (64-bit)
  - Windows Server 2003 R2 Service Pack 2 (32-bit)

Note LabWindows/CVI supports only R2 editions of Windows Server.

- 1024 × 768 resolution (or higher) video adapter
- Minimum of 512 MB of RAM, 2 GB recommended
- 1.4 GB free hard disk space for full installation, which includes the Interface to Win32 Application Programmatic Interface (API); additional space needed for National Instruments Device Drivers and for the Microsoft .NET Framework 4.0
- Microsoft-compatible mouse

Installing LabWindows/CVI

The LabWindows/CVI Platform DVD includes LabWindows/CVI and the following modules and toolkits:

Modules

- Real-Time Module
- Vision Development Module

Toolkits

- Real-Time Execution Trace Toolkit
- SQL Toolkit
- Signal Processing Toolkit
- PID Toolkit
- Execution Profiler Toolkit
- ECU Measurement and Calibration Toolkit
- Automotive Diagnostic Command Set

If you purchased any of these modules or toolkits, you can install them using the LabWindows/CVI Platform DVD. If you want to evaluate any of these modules or toolkits before purchasing them, you can install these add-ons from the LabWindows/CVI Platform DVD.

Before Installation

Keep the following points in mind before you install LabWindows/CVI:

- If you already have a different version of LabWindows/CVI installed on your computer, be sure to install version 2013 in a different directory. If you want to install to an existing directory, uninstall the other version before installing LabWindows/CVI 2013.
- You must have administrator privileges to install LabWindows/CVI.

Running the Installation

Complete the following steps to install LabWindows/CVI.

> **Caution** Installing LabWindows/CVI 2013 replaces any previous version of the LabWindows/CVI Run-Time Engine with the LabWindows/CVI 2013 Run-Time Engine. To restore the previous Run-Time Engine, uninstall LabWindows/CVI 2013, the LabWindows/CVI 2013 Run-Time Engine, and any previous versions of LabWindows/CVI and the LabWindows/CVI Run-Time Engine on the computer. Then reinstall the LabWindows/CVI version you want to use, along with any additional National Instruments software you might have installed.

1. Insert the LabWindows/CVI media into the disk drive. If the media does not run automatically, open Windows Explorer, right-click the disk drive icon, and select **AutoPlay**.
2. On installation startup, the National Instruments LabWindows/CVI 2013 screen appears. Click **Install LabWindows/CVI, Modules, and Toolkits**.
3. Continue to follow the instructions on the screen.

> **Note** If you have a serial number for the product you want to install, enter the number during installation when you are prompted. You also can activate the product after installation. For more information about finding serial numbers, refer to `ni.com/info` and enter `SerialNumbers_en` as the Info Code.
>
> Each product on the LabWindows/CVI Platform DVD has a different serial number, with the possible exception of the LabWindows/CVI Execution Profiler Toolkit. The Execution Profiler Toolkit does not require a separate license if you have a LabWindows/CVI Full Development System license. If you have the LabWindows/CVI Base Package, you can install the Execution Profiler Toolkit for evaluation.

4. If you select **Device Drivers** in the **Features** panel, the LabWindows/CVI installer prompts you to insert the National Instruments Device Drivers media, which is available on `ni.com`. The NI Device Drivers media is required only if you want to upgrade existing driver software to the latest version. Otherwise, you can ignore this prompt.
5. To activate a National Instruments product, refer to the *Activating LabWindows/CVI* section of this document.

Activating LabWindows/CVI

If you did not enter a serial number during installation, click **Activate Products** in the License Status dialog box to launch the NI Activation Wizard.

Once you choose your activation method and launch the NI Activation Wizard, follow the instructions on the screen to activate LabWindows/CVI. For more information about activation, refer to the *Activating Your Software* topic in the *LabWindows/CVI Help*.

Note If you are unable to activate LabWindows/CVI, refer to the web page at `ni.com/activate`.

What's New in LabWindows/CVI?

This section includes information about changes and enhancements in LabWindows/CVI 2013.

Updated LabWindows/CVI Compiler and Build System

The LabWindows/CVI compiler is now using the LLVM compiler infrastructure with a Clang C front end. The updated compiler generates optimized code, meaning that you no longer need to use an external optimizing compiler for this purpose.

The updated build system provides the following features:

- Build source files in parallel
- Edit while building
- Clean and rebuild
- Specify project build dependencies
- Take advantage of faster build times

LabWindows/CVI Debugging Updates

Along with the updated LabWindows/CVI compiler, the LabWindows/CVI debugger is also updated. The new LabWindows/CVI debugger is implemented using the DWARF format. The LabWindows/CVI debugger produces debug information that consumes less space on disk, which increases performance.

The following general changes affect debugging in LabWindows/CVI 2013:

- You can create debuggable static libraries in LabWindows/CVI 2013.
- You can now detach the LabWindows/CVI debugger from a process to which it is attached by selecting from the following options:
  - **Detach from Process** in the **<<Running>>** menu of an executing process.
  - **Run»Detach from Process** from a suspended application.

The following sections include information about changes and enhancements to debugging tools.

Array Display

The String Display window is deprecated. You can view and edit string variables and one-dimensional and multidimensional string arrays in the Array Display window.

The Array Display window launches confined to the Debugging Region by default. You can release the window by right-clicking in the window and selecting **Release Window** from the context menu. In the Array Display window, the **Options»Reset Indices** option is renamed to **Options»Change Data Slice**.

Refer to the *Using LabWindows/CVI»Debugging Tools»Using the Array Display Window» Array Display Window* topic in the *LabWindows/CVI Help* for more information about the Array Display window.

Graphical Array View

The Graphical Array View launches confined to the Debugging Region by default. You can release the window by right-clicking in the window and selecting **Release Window** from the context menu. The **Interpret data as** option is now the **Interleaved Arrays** option.

Refer to the *Using LabWindows/CVI»Debugging Tools»Using the Array Display Window» Graphical Array View* topic in the *LabWindows/CVI Help* for more information about the Graphical Array View.

Variables and Call Stack Window

The Variables and Call Stack window, formerly called the Variables window, includes the following changes:

- The **Run»Stack Trace** menu item is no longer available. Use the Call Stack section of the Variables and Call Stack window to view the current call stack of functions in the program.

Refer to the *Using LabWindows/CVI»Debugging Tools»Using the Variables and Call Stack and Watch Windows»Variables and Call Stack Window* topic in the *LabWindows/CVI Help* for more information about the Variables and Call Stack window.

Watch Window

The Watch Window and watch expressions include the following changes in LabWindows/CVI 2013:

- The Add/Edit Watch Expression dialog box is deprecated. Click a cell in the Watch window to put the cell in edit mode. You can then edit the value of the expression directly in the window.
- The **Break On Change** Watch expression option, formerly the **Break when value changes** option, can now be triggered as a result of changes in the memory address of a watch expression that happened outside of the scope of the original watch expression.

- The **Break On Change** Watch expression option is available only when the expression you are watching represents the contents of a memory address in your program.
- Watch expressions can now reference variables defined inside of a block statement.

Refer to the *Using LabWindows/CVI»Debugging Tools»Using the Variables and Call Stack and Watch Windows»Watch Window* topic in the *LabWindows/CVI Help* for more information about the Watch window.

Debugging DLLs, Remote Debugging, and Debugging on Real-Time Systems

Several aspects of debugging DLLs, remote debugging, and debugging on real-time systems have changed.

- LabWindows/CVI no longer creates a `.cdb` file with debugging information for DLLs or EXEs. The debugging information is now included in the DLL or EXE.
- The remote debugging utility, `ConfigureRemoteDebugger.exe`, is now `RemoteDebugger32bit.exe` for 32-bit configurations or `RemoteDebugger64bit.exe` for 64-bit configurations.
- When debugging a real-time application via LabVIEW, LabWindows/CVI does not stop listening when the VI is unloaded, which means you do not have to restart debugging in LabWindows/CVI through multiple instances of running your VI. This behavior also increases stability. You can select either **Disconnect** or **Abort and reboot** from the **<<Running>>** menu when you are ready to stop debugging.

Miscellaneous

The following are miscellaneous debugging changes:

- The **Command Line** button of the Add Configuration dialog box and the Edit Configuration dialog box is now **Executable and Arguments**.
- The **Set Next Statement** option is not available when you are suspended inside a library function. For example, you cannot set the next statement while suspended in `RunUserInterface` or when you have hit a non-fatal run-time error. You must step out of the library function before you can set the next statement.
- The **Run»Command Line** command is deprecated. The **Run»Specify Executable to Debug** command is now **Run»Specify Executable and Command Line**, and you specify command line arguments in the associated dialog box. Also, the Specify Executable and Command Line dialog box includes an **Environment options** field where you can set environment options for your project.
- You can debug interactive statements in the Interactive Execution window while a project is suspended.

Source Code Browsing Updates

LabWindows/CVI 2013 includes updated source code browsing through the updated LabWindows/CVI compiler.

Show Completions

The **Edit»Show Completions** option provides the following changes and enhancements:

- The drop-down list displays only identifiers that are appropriate for the function or block scope you are working within.
- The option displays an icon for each symbol in the drop-down list. The icon represents the type of symbol displayed.
- Macros appear in the drop-down list even when they have not been used.

Show Prototype

The **Edit»Show Prototype** option provides the following changes and enhancements:

- LabWindows/CVI displays function prototype tooltips for functions with no parameter list or a void parameter list.
- LabWindows/CVI does not display prototype tooltips for empty macros.
- LabWindows/CVI displays unnamed types as `<`*`type`*`>_unknown`.

Source Code Browse Information and Source Code Browser

Source code browse information and the Source Code Browser have the following changes and enhancements:

- The **Generate source code browse information** option has moved from the Build Options dialog box to the Environment dialog box and is called **Generate browse information policy**. You can choose to generate source code browse information while editing a file, when you save a file, or when you compile a file. This option no longer applies per-configuration-per-workspace, but is now global to LabWindows/CVI.
- Source code browse information is available in release and debug configurations.
- The **Definitions** item of the **View** column is now the **Declarations** item.
- LabWindows/CVI creates source code browse information for functions that are declared even if they are not called in the project.
- When LabWindows/CVI generates source code browse information, a message is displayed in the status bar indicating for which file the information is generating.
- When you select **Go to Source** from the **Referencing** and **Referenced from** views, LabWindows/CVI highlights the import declaration of the function rather than the definition of the function.

Miscellaneous

The following are miscellaneous source code browsing changes:

- You can view and jump to functions available in a source file by using the pull-down list in the toolbar of the Source window.
- Use the keyboard shortcut <Ctrl-0> to go to the beginning of the next function in a file. Use the keyboard shortcut <Ctrl-9> to go to the beginning of the previous function in a file.

- The **Edit»Go to»Go to Next Reference** command includes going to the next definition of an identifier.
- The **Edit»Go to»Go to Definition** command no longer highlights the forward declaration when one exists; LabWindows/CVI highlights the type from the parameter declaration instead.
- LabWindows/CVI displays the value of a struct member, when you hover your mouse over the struct member.

Refer to the *Using LabWindows/CVI»Writing Source Code»Browsing Source Code* book in the *LabWindows/CVI Help* for more information about source code browse information in LabWindows/CVI.

Compiler Warning Levels

Use the Compiler Warnings dialog box to customize warnings that display in the Build Output window. To access this dialog box, select **Options»Build Options** and then select the **...** button next to the **Warning Level** field.

Support for Soft Dependencies in Distributions

When you create a distribution, you can select or omit soft dependencies for any National Instruments installer components that include soft dependencies. A soft dependency of a product refers to a component that might or might not be required by the product, depending on the specific needs of your application. Use the **Drivers & Components** tab of the Edit Installer dialog box to include soft dependencies.

Refer to the *Using LabWindows/CVI»Distributing Applications»Creating and Editing an Installer»National Instruments Dependencies in LabWindows/CVI Installers* topic for more information and caveats to omitting any soft dependencies.

OpenMP Support

OpenMP, Open Multi-Processing, is a set of compiler directives and related clauses, an application programming interface (API), and environment variables that allow you to easily create applications that execute on multiple threads. The OpenMP model allows you to complete the following tasks:

- Define parallel regions of code and create teams of threads that execute the parallel regions.
- Specify how to share work among the threads in the team.
- Declare data that is shared among the threads and data that is private to each thread.
- Synchronize threads, protect shared data from concurrent access, and define regions that execute by a single thread exclusively.

You must enable OpenMP by selecting **Enable OpenMP Support** in the Build Options dialog box.

Refer to the *Library Reference»OpenMP Runtime Library* book in the *LabWindows/CVI Help* for more information about using OpenMP in LabWindows/CVI.

Network Streams Library

Use functions in the Network Streams Library to exchange data between LabWindows/CVI applications. A network stream is a lossless, unidirectional, one-to-one communication channel that consists of a writer and a reader endpoint.

Refer to the *Library Reference»Network Streams Library* book in the *LabWindows/CVI Help* for more information about the Network Streams Library.

Advanced TDM Streaming Library Functions

LabWindows/CVI 2013 includes the following advanced TDM Streaming Library functions:

- `TDMS_AdvancedAsyncRead`
- `TDMS_AdvancedAsyncWrite`
- `TDMS_AdvancedCloseFile`
- `TDMS_AdvancedCreateFile`
- `TDMS_AdvancedOpenFile`
- `TDMS_AdvancedSyncRead`
- `TDMS_AdvancedSyncWrite`
- `TDMS_AllocateAlignedMemory`
- `TDMS_ConfigureAsyncReads`
- `TDMS_ConfigureAsyncWrites`
- `TDMS_CreateLinearScalingInfo`
- `TDMS_CreatePolynomialScalingInfo`
- `TDMS_CreateReciprocalScalingInfo`
- `TDMS_CreateRTDScalingInfo`
- `TDMS_CreateStrainGageScalingInfo`
- `TDMS_CreateTableScalingInfo`
- `TDMS_CreateThermistorScalingInfo`
- `TDMS_CreateThermocoupleScalingInfo`
- `TDMS_FreeAlignedMemory`
- `TDMS_GetAsyncReadStatus`
- `TDMS_GetAsyncWriteStatus`
- `TDMS_GetDataTypeSize`
- `TDMS_ReserveFileSize`
- `TDMS_SetChannelInfo`
- `TDMS_SetNextReadPosition`
- `TDMS_SetNextWritePosition`

These functions add new advanced functionality to the library. Examples of the functionality include:

- Writing metadata and raw data separately
- **(Windows)** Reading and writing data asynchronously to increase streaming performance in some applications
- Overwriting a subset of data in a `.tdms` file
- Pre-allocating disk space for the data you want to write, which can prevent fragmentation and increase performance
- Add scaling information to channels in a `.tdms` file that will be applied when reading data from the file

Refer to the *Library Reference»TDM Streaming Library* book in the *LabWindows/CVI Help* for more information about using the new functions.

Batch Auto-Indent Support in the Source Window

You can auto-indent lines of text in LabWindows/CVI 2013. To auto-indent specified lines, select lines of text in the Source window, and select **Edit»Format Selection**. To auto-indent an entire file, select **Edit»Format File**. Select **Options»Editor Preferences** and then click the **Formatting Options** button to specify bracket style and indent options.

Additional LabWindows/CVI Enhancements

LabWindows/CVI 2013 includes the following additional enhancements.

Functions

The following functions are new for LabWindows/CVI 2013.

LabWindows/CVI ActiveX Server Interface

- `SetEnvironmentOptions`
- `SetBrowseInformationPolicy`
- `GetBrowseInformationPolicy`
- `FormatFileSelection`
- `SetFormattingOptions`
- `GetFormattingOptions`
- `DetachDebugger`

Programmer’s Toolbox (toolbox.fp)

- `FP32_Compare`

Localize User Interface (localui.fp)

- `LoadLocalizedPanelEx`
- `LoadLocalizedMenuBarEx`

Attributes

The following attributes are new in LabWindows/CVI 2013.

User Interface

- `ATTR_GRID_STYLE`
- `ATTR_PLOT_OPACITY`
- `ATTR_TRACE_OPACITY`
- `ATTR_NUM_DIGITS_FLOATING_POINT`
- `ATTR_ROW_OFFSET`
- `ATTR_COLUMN_OFFSET`
- `ATTR_TOOLTIP_HIDE_DELAY`

Events

- `EVENT_RING_BEGIN_MENU`

Environment Changes

- Create subfolders under existing subfolders in the Project Tree. Right-click a project or folder and select **Add Folder** to create a subfolder.
- Rearrange folders in the Project Tree.
- The Build Errors windows is now the Build Output window.
- The **Display status dialog during build** option in the Build Options dialog is no longer available. You can view build status by selecting the **Show Build Output window when build starts** option in the Build Options dialog box.
- The Build menu includes new menu items to build, rebuild, and clean all projects in the workspace or a single project; cancel a build; and specify project dependencies.
- The **Edit»Go to»Go to Definition**, **Go to Next Reference**, and **Go Back** commands are valid for release configurations.
- The Batch Build dialog box includes a **Clean** button, which deletes files in the `cvibuild` folder for the project and all of its dependencies.
- The Menu Bar Editor includes a **Delete** button, which removes the selected item from the menu.
- Right-click any project in a workspace and select **Build**, even if that project is not the active project.
- The right-click menu of the Build Output window contains new options, **Show Warnings** and **Hide Warnings**.
- The Distributions Needed dialog box is now called the Select Source dialog box.
- The **Force project files in Interactive window** option in the Environment dialog box is now called **Include project files in Interactive window**.

- The **Force loaded instrument drivers into Interactive window** option in the Environment dialog box is now called **Include loaded instrument drivers in Interactive window**.
- The **Generate help from source** option of the Target Settings dialog box is available in release and debug configurations.

Miscellaneous

- User Interface controls display up to 17 digits of floating point data in standard decimal notation. If more digits are required the number is displayed in scientific notation.
- LabWindows/CVI defines the `_CVI_CONFIGURATION_NAME_` predefined macro, which is defined as the active configuration of the project.
- The `pow` function in the ANSI C Library sets the **errno** global variable to `ERANGE` for overflow and underflow conditions.
- Use <Ctrl-Shift-Backspace> and <Ctrl-Shift-Delete> to navigate in text and string controls; use <Ctrl-Home> and <Ctrl-End> to navigate in text box controls.
- LabWindows/CVI displays a list of user interface features that were not saved when you select a version of LabWindows/CVI in the **Save as type** option that does not include those user interface features.
- If you specify a remote debugging target, you can attach the LabWindows/CVI debugger to a process on the remote target.
- The LabWindows/CVI evaluation period no longer includes restrictions. The evaluation period lasts for seven days, but you can increase the evaluation period to 45 days by creating a user profile on `ni.com`.
- Scrolling the mouse wheel includes built-in functionality for the following user interface controls:
  - **Numeric controls**—Scrolling increments and decrements the value of the control.
  - **Ring controls**—Scrolling cycles through the values in the ring control.
  - **Binary switches**—Scrolling up turns the switch to the on state; scrolling down turns the switch to the off state.
  - **Combo box and numeric cells in table controls**—When you put the cells in edit mode, scrolling updates the value of the cell.
- Starting with LabWindows/CVI 2013, rebuilding a project with no changes results in identical build output, such as `.exe`, `.dll`, and `.lib` files.

Bug Fixes

For a list of bugs fixed in LabWindows/CVI 2013, refer to the National Instruments web page at `ni.com/info` and enter the Info Code `exmvwx`.

LabWindows/CVI Resources

How do I get started?

Read the *Getting Started with LabWindows/CVI* manual, which provides a tutorial for learning basic LabWindows/CVI program development techniques.

Are there known issues or late-breaking information?

Refer to the *LabWindows/CVI Readme*, which you can access from **Start»All Programs» National Instruments»LabWindows CVI 2013»LabWindows CVI 2013 Readme**. The readme file contains information about known issues.

Where can I find reference information?

The *LabWindows/CVI Help* contains complete reference information. The help file includes the following sections:

- *Using LabWindows/CVI* describes the LabWindows/CVI development environment and features.
- *Library Reference* provides information about functions you can call in LabWindows/CVI.
- *Programmer Reference* provides information to help you develop applications.
- *Tools Library* provides information about the LabWindows/CVI Toolslib controls.
- *LabWindows/CVI Real-Time Module Help* includes an introduction to the LabWindows/CVI Real-Time Module, programming considerations for RT applications, and function reference information for the LabWindows/CVI Real-Time Utility Library. You must have the LabWindows/CVI Real-Time Module installed to view this help file.

Use the **Search** tab in the *LabWindows/CVI Help* to quickly locate specific information. For information about how to use the search functionality, refer to the *Using Help»Searching Help* topic of the *LabWindows/CVI Help*.

Where can I find examples?

Find examples with the NI Example Finder, which you can access by selecting **Help»Find Examples**.

LabWindows/CVI example programs are located in the following location on Windows 8/7/Vista/Server 2008: `C:\Users\Public\Documents\National Instruments\CVI2013\samples`. On Windows XP/Server 2003, example programs are located in the following location: `C:\Documents and Settings\All Users\Documents\National Instruments\CVI2013\samples`.

Is there a list of LabWindows/CVI documentation?

The *Guide to LabWindows/CVI Documentation* topic describes documentation available for new users and upgrade users. In addition, this topic provides links to LabWindows/CVI documentation, including manuals and web resources. You can access the *Guide to LabWindows/CVI Documentation* topic through the *LabWindows/CVI Help*.

Where else can I go for LabWindows/CVI information?

Visit the LabWindows/CVI Web site and NI Developer Zone at `ni.com` for the most up-to-date information about LabWindows/CVI.

373607M-01 Aug13