Coupling LabWindows™/CVI™ with NI Requirements Gateway

This document explains how NI Requirements Gateway interfaces with LabWindows™/CVI™. Use this document to familiarize yourself with using the LabWindows/CVI type in Requirements Gateway. Refer to Chapter 9, *Using NI Requirements Gateway with LabWindows/CVI*, of the *Getting Started with NI Requirements Gateway* manual for more information about the elements of the LabWindows/CVI type and for a tutorial about using LabWindows/CVI documents in a Requirements Gateway project.

Contents

Covering Requirements

When you use the LabWindows/CVI type in a project, you typically use a LabWindows/CVI document to cover requirements sourced in an external document, such as a text file.

NATIONAL INSTRUMENTS™

Figure 1 shows an example of a project configuration on the Project pane of the Configuration dialog box. Source Code and Function Panel, two LabWindows/CVI documents, cover requirements in Specification, a Microsoft Word document.
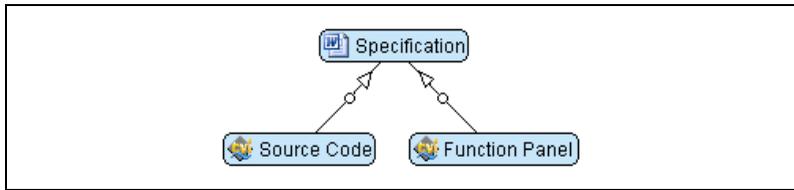

Figure 1. LabWindows/CVI Document Covering Requirements

Selecting LabWindows/CVI Files to Analyze

When you add a LabWindows/CVI document to a project, you must specify the files to include in the document. Click the **File Browse** button in the File or Directory column on the Project pane to display the Select Files to Include in Document dialog box, as shown in Figure 2.
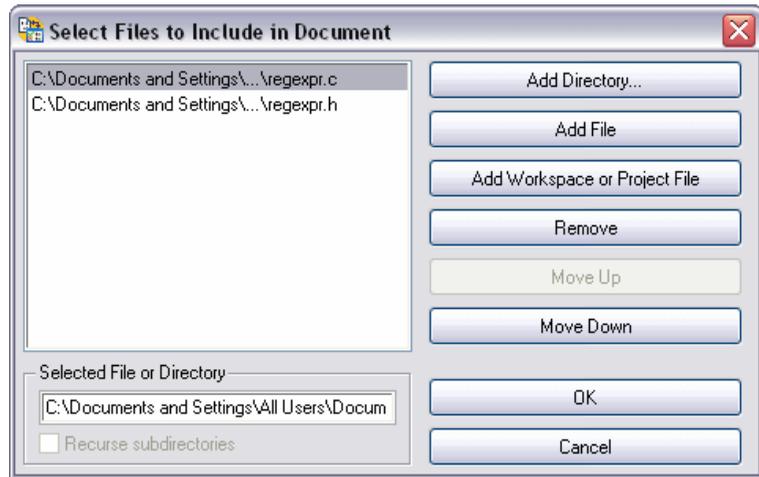

Figure 2. Select Files to Include in Document Dialog Box

Requirements Gateway includes all the selected files in the project document. Project requirements are considered covered if the combination of all the files in the document covers the requirements.

The Select Files to Include in Document dialog box contains the following options for a LabWindows/CVI document:

- **Files List**—The selected files to analyze. Requirements Gateway displays the file in red if the file cannot be found on disk.

- **Add Directory**—Select a directory that contains multiple LabWindows/CVI files. Requirements Gateway includes all LabWindows/CVI files with `.c`, `.h`, and `.fp` extensions from the selected directory for the LabWindows/CVI document.

- **Add File**—Select individual files with `.c`, `.h`, and `.fp` extensions.

- **Add Workspace or Project File**—Select a project (`.prj`) or a workspace (`.cws`) file. Requirements Gateway selects all source and function panel files in the project or workspace.

- **Remove**—Removes a file from the Files List.

- **Move Up**—Moves the selected file up in the Files List.

- **Move Down**—Moves the selected file down in the Files List.

- **Selected File or Directory**—The full path of the file or directory selected in the Files List.

- **Recurse subdirectories**—Instructs Requirements Gateway to recursively browse for LabWindows/CVI files in the subdirectories of the directory selected in the Files List.

Variables of the LabWindows/CVI Type

When you add a LabWindows/CVI document to a project, no document variables exist for the LabWindows/CVI document.

Requirements Traceability

You can perform traceability analysis on LabWindows/CVI documents by capturing traceability information from the comments of a source code file or by capturing traceability information in the help fields of a function panel and control. The reference must contain the correct syntax for LabWindows/CVI references. The default LabWindows/CVI type captures references that use the syntax `//Implements reqid`, where `reqid` is the requirement identifier.

Adding References to Source Code Comments

You can capture traceability information from a LabWindows/CVI document if the comments of a source code file contain the correct syntax for LabWindows/CVI references.

In Requirements Gateway, right-click an upstream requirement covered by a downstream LabWindows/CVI document and select **Copy For» LabWindows/CVI Comment** from the context menu to create the proper syntax for a reference in which the comment of a LabWindows/CVI source code file covers an upstream requirement. Requirements Gateway places the reference statement on the clipboard.

When you create reference syntax for a LabWindows/CVI comment, you can paste the syntax in the source code file in LabWindows/CVI to create a reference to the requirement, as shown in Figure 3.

```
void CVIFUNC RegExpr_Destroy (int handle)
{
    int tmpHandle = handle;

    //Implements RegExpr_Destroy
    RemoveRegExpr ((RegExprNodePtr *)&tmpHandle);
}
```

Figure 3. Reference Pasted in a LabWindows/CVI Source Code Comment

Adding References to Function Panel Help

When you create reference syntax for a LabWindows/CVI comment, you can paste the syntax in the help for a function panel or control to create a reference to the requirement, as highlighted in Figure 4.
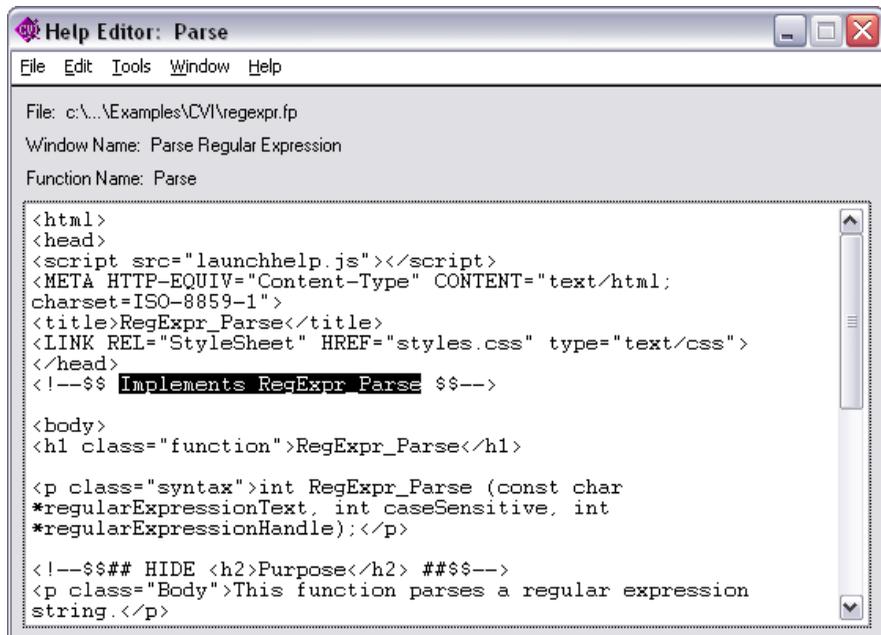
Figure 4. Reference Pasted in LabWindows/CVI Function Panel Help

Creating References from Requirements Gateway

You can use the Graphical View to create references between a requirement and a LabWindows/CVI document or an element of a LabWindows/CVI document. Refer to the *NI Requirements Gateway Help* for more information about creating references using the Graphical View.

After you create a reference, you can click the Coverage Analysis View tab and select the covering document or element in the Selection column. The Upstream Coverage Information column shows all the requirements that the selected document covers. For references that you created in the Graphical View, Requirements Gateway identifies the covered requirements with an `internal creation` reference attribute.

Associating References with Functions

The LabWindows/CVI type reads the content of a source code file and locates the functions and comments in the source file. If you paste a reference statement into a comment in a source code file, the LabWindows/CVI type associates the reference with a function if the reference comment is placed before or in the function. For example, Figure 5 shows two functions, `function1` and `function2`, with the reference statement appearing before `function2`.


```c
int function1(void)
{
    return 1;
}
//Implements REQ1
int function2(void)
{
    return 1;
```

Figure 5. Reference Statement Inserted Before a Function

In this example, the LabWindows/CVI type associates the reference `//Implements REQ1` with `function2`.

You can also include several commented lines between the function and the line of code that contains the reference, as shown in Figure 6.

```
//--------------------
//Implements REQ1
//--------------------
int function2(void)
{
    return 1;
}
```

Figure 6. Reference Statement with Additional Commented Lines

If you use comment blocks (/* ... */) to attach a reference to a function, you must locate the comment blocks just before the function, with no additional lines between the function and the reference comment. If you do have any additional lines between the reference and the function, as shown in Figure 7, the LabWindows/CVI type attaches the reference to the source file itself, not the function.

```
/* -------------------- */
/* Implements REQ1      */
/* -------------------- */

int function2(void)
{
    return 1;
}
```

Figure 7. Reference Statement Separated from the Function by an Additional Line

Exporting to Telelogic DOORS

You can export a LabWindows/CVI document into Telelogic DOORS so that you can store the traceability information in LabWindows/CVI source code files and function panels as a DOORS module. Refer to the *Coupling Telelogic DOORS with NI Requirements Gateway* document for a tutorial and more information about exporting information from Requirements Gateway documents to DOORS.