

# LabVIEW™ Report Generation Toolkit for Microsoft Office User Guide

Version 1.1

The LabVIEW Report Generation Toolkit for Microsoft Office provides tools you can use to create and edit reports in Microsoft Word and Excel formats from LabVIEW.

The Report Generation Toolkit modifies the VIs on the **Report Generation** palette in LabVIEW Full and Professional Development Systems to support Word and Excel formats in addition to HTML and standard LabVIEW report formats. The toolkit also adds palettes of Word-specific and Excel-specific VIs to the **Report Generation** palette. You can use the Report Generation Toolkit with the LabVIEW Base Package.

You can use Report Generation Toolkit VIs to perform the following tasks:

- Create and edit Word documents and Excel worksheets.
- Use Word and Excel templates to create reports with a consistent, uniform style.
- Insert, format, and edit text, tables, images, and graphs within Word documents and Excel worksheets. Report Generation Toolkit VIs can handle several Word documents at the same time or several Excel worksheets in the same workbook.
- Run Microsoft Visual Basic for Applications macros from Word documents and Excel workbooks.

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## Upgrading from Report Generation Toolkit 1.0.x

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The Report Generation Toolkit 1.1 contains the following changes from the Report Generation Toolkit 1.0.x:

- You can use the Report Generation Toolkit with Office 2003 as well as Office 2000, XP, and 97.
- The Report Generation Toolkit runs only with LabVIEW 7.0 or later.
- Use the MS Office Report Express VI to generate reports using Word and Excel templates.
- The VIs on the **Report Generation** palette reflect the following changes made to the corresponding VIs in LabVIEW 7.0:
  - Use the Report Express VI to generate preformatted reports.
  - Use the Easy Print VI Panel or Documentation VI to print or save front panels and VI documentation.
  - Use the VIs on the **VI Documentation** palette to customize VI documentation that you print or save to a report.
  - Use the Query Available Printers VI to list the printers available on the computer, including the default printer in LabVIEW.
  - Use the Print Report VI to print a Word, Excel, or standard report to the default printer.
  - The Append Front Panel Image to Report VI is polymorphic. You can wire a path, VI reference, or string to the VI to specify which front panel to append to a report.
  - The Append Table to Report VI is polymorphic and has instances that replace the Append Text Table to Report VI and the Append Numeric Table Report VI.
- Use the Excel Set Page Numbering VI to add and format page numbers in an Excel worksheet.
- The Word VI Template and Excel VI Template VIs no longer appear on the palettes, but you still can access them from LLBs.

# Selecting Report Types

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When you create a report in LabVIEW, you must decide which type of report you want. Consider whether you need to print, save, or email the report, and whether you want to use a template to create the report. You also should consider the applications that are available on other computers from which users access the report.

You can use the Report Generation Toolkit to create the following types of reports:

- **Standard**—The standard LabVIEW report requires no additional software on the computer you use to create the report. You can insert text, tables, and images into a standard report. You can print a standard report, but you cannot save the report. LabVIEW supports a limited number of formatting options, and you cannot use templates.
- **HTML**—HTML reports require no additional software on the computer you use to create the report. However, users need a Web browser to read the report. You can save an HTML report, but the report might not print with consistent formatting. LabVIEW supports a limited number of formatting options for HTML reports, and you cannot use templates.
- **Word and Excel**—Word and Excel reports require that users who want to read or print the reports have the appropriate application on their computers. You can insert text, tables, images, and graphs into Word and Excel reports. You can save, print, and email the reports. You can set a variety of formatting options with text and tables, and you can use templates to create a consistent report style.

## Using Report Generation Express VIs

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The Report and MS Office Report Express VIs provide easy ways to create reports in standard, HTML, Word, and Excel formats. These Express VIs appear on the **Report Generation** palette with white backgrounds surrounded by a blue border. When you place an Express VI on the block diagram, a configuration dialog box appears that you can use to configure the settings for that instance of the Express VI. Refer to the *Getting Started with LabVIEW* manual for more information about using Express VIs.

### Using the Report Express VI

The Report Express VI generates a preformatted report that contains VI documentation, data, and report properties, such as the author, company, and number of pages. You can configure the VI to print the report to a printer or to save it as an HTML, Word, or Excel file.

# Using the MS Office Report Express VI with Word and Excel Templates

The MS Office Report Express VI uses Word and Excel templates to create reports. Word and Excel templates contain placeholders for data and components that are common to all reports. The MS Office Report Express VI inserts data into the placeholders so you can display, print, or save the resulting report.

The Report Generation Toolkit includes basic templates for Word documents and Excel worksheets. Complete the following steps to use the MS Office Report Express VI to create a report with basic templates.

1. Place the MS Office Report Express VI on the block diagram. The configuration dialog box appears.
2. Select **Basic Template for Word** or **Basic Template for Excel** from the **Template** control.
3. Click an entry in the **Bookmarks in the Selected Template** (Word) or the **Named Range in the Selected Template** (Excel) listbox. Each entry represents a placeholder in the template.
4. Use the **Value Source** control to determine whether you want to configure the selected bookmark or named range as an input, fixed value, or system-defined value.
5. If you configure the bookmark or named range as an input, use the **Input Appearance in Report** control to determine how you want the data to appear in the report. The default is **Automatic**, in which the VI formats the data as a text field or, if it is an array, as a table. If the data is in an array, you also can select the **Table** or **Graph** options.
6. Use the **Report Destination** control to select the method in which you want to generate the report. You can open the report in Word or Excel, print it, or save it as a Word or Excel file. If you select **Save to File**, click the **Configure Save to File** button to select the filename and location.
7. Click the **OK** button. The Express VI icon on the block diagram displays inputs for all bookmarks or named ranges you configured as inputs.
8. Wire data to the inputs and run the VI. The report prints, saves as a file, or opens in Word or Excel, depending on the option you selected in the **Report Destination** control.

Use custom templates if you want to change report attributes or add placeholders. Refer to the [Creating Custom Templates](#) section for information about creating templates.



**Note** Do not change the Report Generation Toolkit basic templates for Word and Excel. If you want to edit the basic templates, save them with different filenames and select **Custom Template for Word** or **Custom Template for Excel** in the configuration dialog box of the MS Office Report Express VI.

## Using Graphs in Reports

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The Graph and Picture VIs in the Report Generation Toolkit provide an interface to the Microsoft Graph application, which is part of the Microsoft Office package. The Microsoft Office installation must include Microsoft Graph if you want to use these VIs.

When you insert graphs into reports, you must send data to the graph as a 2D array of numbers. You can send row and column headers, or values and categories, as 1D arrays of strings. Graphs can hold up to 4,000 rows and 4,000 columns including row and column headers, and they can display up to 256 data series.

Graphs and images form a collection for each Word document or Excel worksheet. Each object in a collection has an index value based on the order of the objects in the document or worksheet. Index values begin at 0. For example, if an Excel report contains an image, a second image, and a graph, the index value for the graph is 2.

Enter index values in the **graph index** or **picture index** inputs of the Graph and Picture VIs to specify which graph or image you want the VI to format. By default, Graph and Picture VIs apply to the last object in a collection of a document or worksheet. You can avoid confusion with collection index values by formatting graphs and images immediately after you insert them into a report.

The Graph and Picture VIs support all graph types that Microsoft Graph uses. If you want to format a graph in a way that the Graph and Picture VIs do not support, insert the graph in a Word or Excel template, format the graph, and use the Word Update Graph VI or the Excel Update Graph VI to fill the graph with data.

Refer to the *LabVIEW Help* for more information about specific Graph and Picture VIs. Refer to the `examples\office` directory for examples of inserting and formatting graphs in Word and Excel reports.

# Creating Custom Templates

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You can create custom report templates in Word and Excel to ensure a consistent appearance in multiple reports. Use templates to define page size, text formatting, and other aspects of report appearance. You also can specify placeholders for text, tables, graphs, and images. Both Word and Excel provide ways to insert placeholders into documents and worksheets. Use bookmarks in Word and named ranges in Excel to define placeholders.

## Creating Bookmarks in Word

You can use bookmarks to insert text, numbers, tables, or pictures into a Word document template. Word template filenames include the `.dot` extension. Complete the following steps to define a bookmark in a Word template.

1. In Word, open the report template you want to use.
2. Place the cursor in the location where you want to add a bookmark.
3. Select **Insert»Bookmark**.
4. Enter the bookmark name you want to use and click the **Add** button.

To view all bookmarks in a Word template, select **Tools»Options** in Word. From the **Options** dialog box, click the **View** tab and place a checkmark in the **Bookmarks** checkbox.

You can use the MS Office Report Express VI to generate reports using templates. For each bookmark, you can specify whether you want the Express VI to format data as text or, if it is an array, as a table or graph.

You also can use Word-specific VIs to insert text, tables, and graphs into bookmark locations. Specify the bookmark where the VI inserts data in the **MS Office parameters** input. If you do not specify a bookmark, the VI inserts data at the end of the document.

Use the Word Edit Cell VI to send data to a preformatted table in a template. The VI can update either individual table cells or a complete range. Use the **start** parameter to specify the location of the cell or range to update. Use the **table index** parameter to specify the location of the table to update. A value of  $n$  in the **table index** parameter represents the  $(n + 1)$  table of the current document. The default value of  $-1$  represents the last table of the document.

Use the Word Update Graph VI to update empty graphs in Word templates.

## Creating Named Ranges in Excel

You can define a named range in Excel to insert text, numbers, tables, or pictures into a template. Excel template filenames include the `.xlt` extension. Complete the following steps to define a named range in a report template.

1. In Excel, open the report template you want to use.
2. Select the cell or the range of cells that you want to include in the named range.
3. Select **Insert»Name»Define**.
4. Enter the name you want to use for the named range and click the **Add** button.

You can use the MS Office Report Express VI to generate reports using templates. For each named range, you can specify whether you want the Express VI to format data as text or, if it is an array, as a table or graph.

You also can use Excel-specific VIs to insert text, tables, and graphs into named range locations. Specify the named range where the VI inserts data in the **MS Office parameters** input. If you do not specify a named range, the VI inserts data into the cell that the **position** input defines.

## Running Visual Basic Macros in Word and Excel

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You can use the Word Run Macro VI and the Excel Run Macro VI to run Visual Basic for Applications (VBA) macros in Word and Excel. The VIs can run existing VBA macros and macros that you program to implement functionality that the Report Generation Toolkit does not include.

If the macro you want to run requires input arguments, enter them into the **parameters** input of the VI. The data type for this input is an array of variants. You must convert all the input parameters sent to the macro to variants and bundle the parameters into an array. Use the To Variant function to convert the parameters to variants. Use the Build Array function to build the parameters into an array.

If you want to retrieve an output value from a macro that LabVIEW runs, you can find this value in the **return value** parameter of the Word Run Macro VI or the Excel Run Macro VI. The VI returns the output value as a variant. Use the Variant To Data function to convert the value to LabVIEW-compatible data.



**Note** Word 97 does not support the ability to send data to and retrieve data from a macro.

Before running a macro, make sure you include the module that defines the macro in the VBA project associated with the report or in the template on which you based the report.

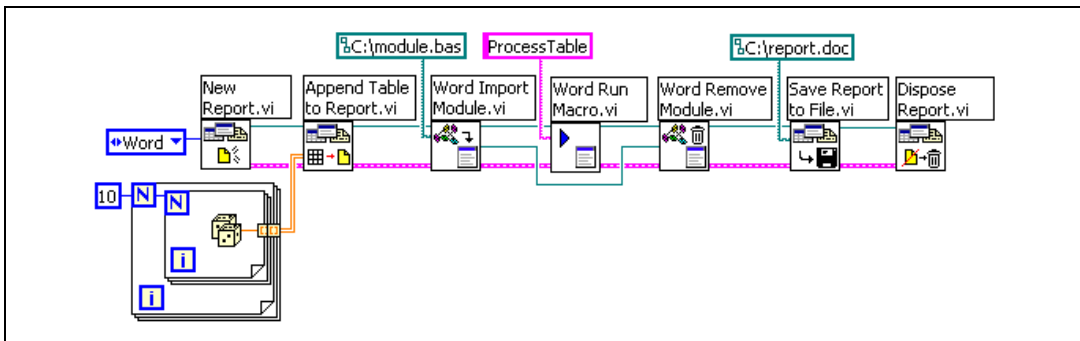
If you are using a Word or Excel template, you can import the module containing the macro manually into the VBA project associated with the template. Complete the following steps to import the module manually.

1. Open the template in Word or Excel.
2. Select **Tools»Macro»Visual Basic Editor**.
3. In the project window of the Visual Basic editor, right-click the template and select **Import File** from the shortcut menu.
4. Select the file in which the macro is defined and click the **OK** button.

The Word Import Module VI and the Excel Import Module VI can import modules dynamically from a VBA function file (.bas) or from a LabVIEW string that contains the module source code.

To run a macro that manipulates objects from another application, set a reference to the application type library. This allows easy access to objects that use either the Word Add Reference to VBproj VI or the Excel Add Reference to VBproj VI. Refer to the *Microsoft Visual Basic Help* for more information on type libraries.

The following example uses Report Generation Toolkit VIs to run a Word macro. The New Report VI creates a new Word document. The Append Table to Report VI inserts a table into the report. The Word Import Module VI adds a VBA module to the report. The Word Run Macro VI runs the ProcessTable macro that the module defines. The Word Remove Module VI deletes the module from the report. The Save Report to File VI saves the report as a Word document. The Dispose Report VI closes the Word document.





# Creating Stand-Alone Applications

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You can include Report Generation VIs when you build stand-alone applications and create shared libraries in LabVIEW. You must use the Application Builder to build stand-alone applications.



**Note** The LabVIEW Professional Development System includes the Application Builder. If you use the LabVIEW Base or Full Development System, you can purchase the Application Builder separately by visiting the National Instruments Web site at [ni.com](http://ni.com).

When building applications with Report Generation Toolkit VIs, you must complete the following additional steps:

- From the **Source Files** tab of the **Build Application or Shared Library (DLL)** dialog box, click the **Add Dynamic VI** button to add the following two VIs to the application:

- `_Excel Dynamic VIs.vi` in `vi.lib\addons\_office\_exclsub.llb`
- `_Word Dynamic VIs.vi` in `vi.lib\addons\_office\_wordsub.llb`

- If the application you are building contains the MS Office Report Express VI, you must add any Word or Excel templates that you use to the built application. From the **Source Files** tab, click the **Add Support File** button to add the template files to the application. By default, the custom destination for the templates is the same as the path that appears in the **Destination directory** field on the **Target** tab with a `data` subdirectory appended. Do not change the custom destination for the files you add.

For example, if you are using the basic Excel template with the MS Office Report Express VI, add `Msoffice_RGT_Template.xlt` to the application. The basic template files are located in the `templates\Report` directory.

Refer to the *LabVIEW Help* for more information about building stand-alone applications.

# Related Documentation

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The following documents contain information that you might find helpful:

- The *LabVIEW Help* includes information about Report Generation Toolkit VIs. Access the *LabVIEW Help* by selecting **Help»VI, Function, & How-To Help**. Navigate to the **VI and Function Reference»Report Generation VIs** book in the **Contents** tab for information specific to Report Generation Toolkit VIs.
- *LabVIEW Application Builder User Guide*
- *Microsoft Word Help* and *Microsoft Excel Help* are available with any version of Microsoft Office.