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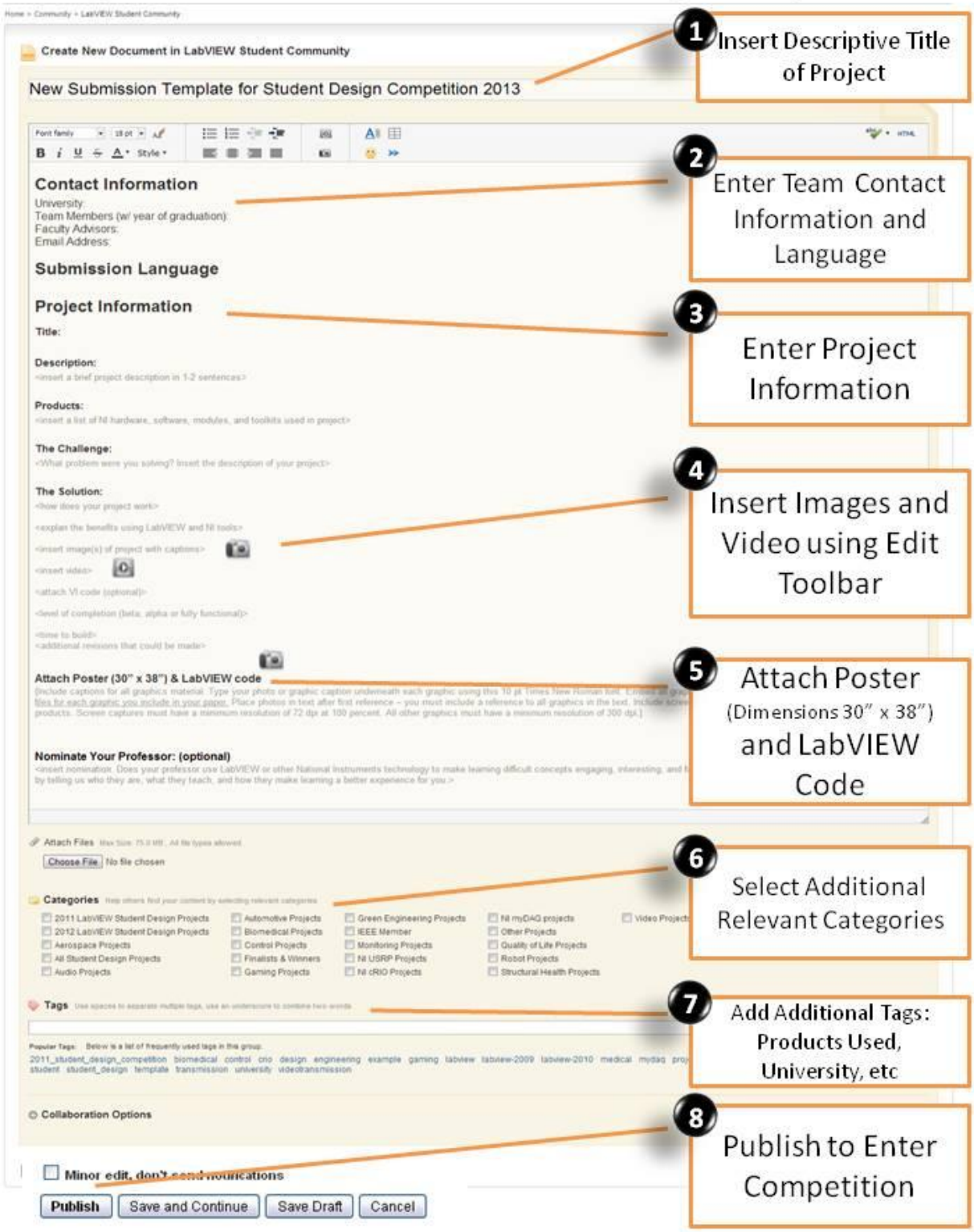
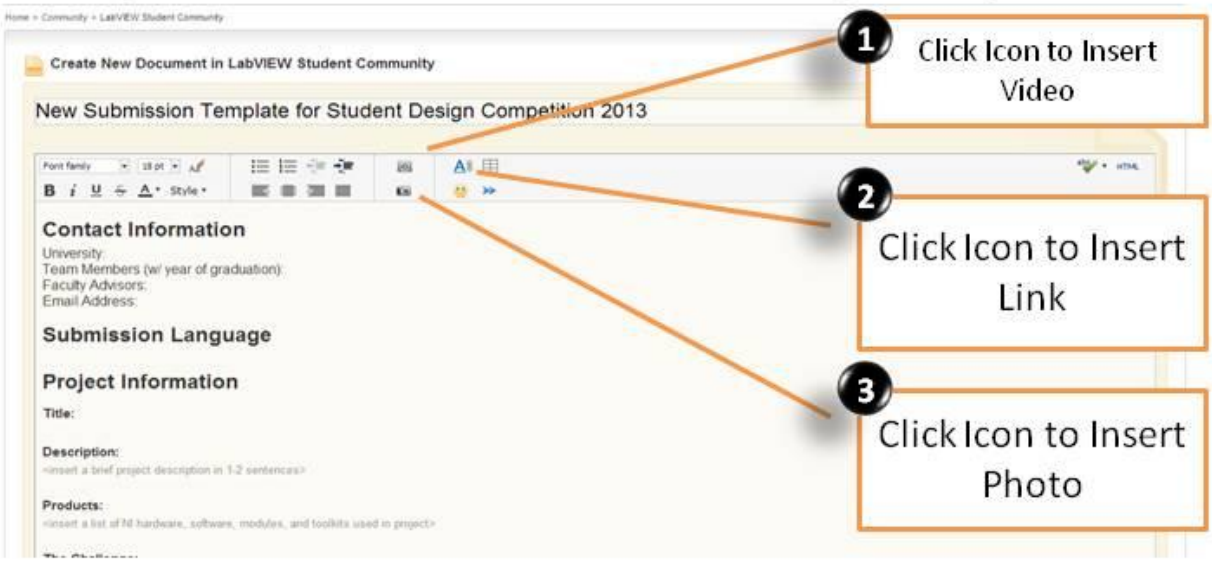


Steps to Enter the LabVIEW Student Design Competition



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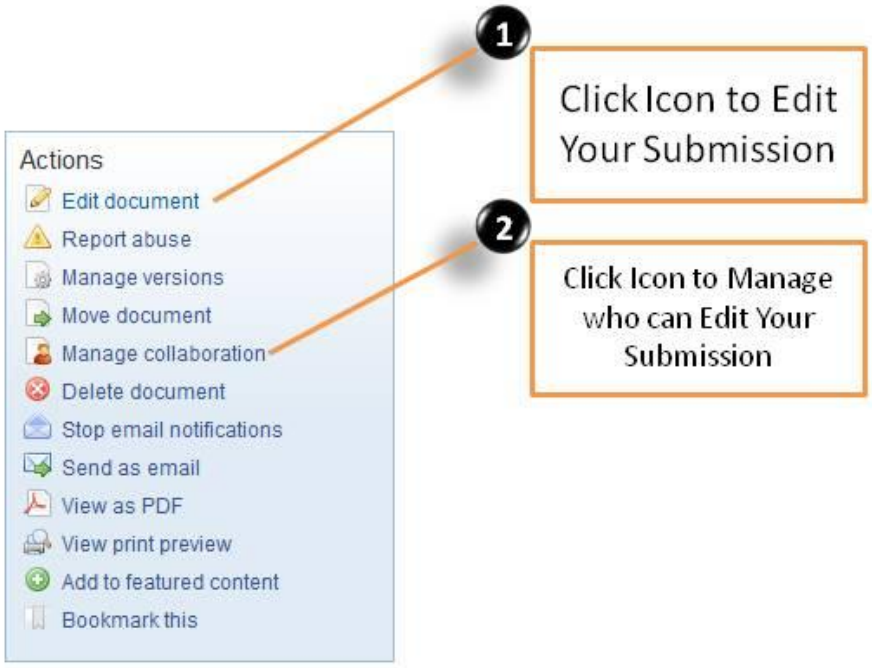

NI LabVIEW Student Design Competition Official Rules, Terms, and Conditions

National Instruments Corporation ("National Instruments") sponsors the NI LabVIEW Student Design Competition as part of National Instruments' 2013 Graphical System Design Achievement Awards in order to recognize and reward excellence and innovation in student design of applications using National Instruments' LabVIEW®.

Eligibility. To be eligible to enter this competition, a team
(1) must be made up of one or more individuals, all of whom must be: (a) 18 years of age or older on the date of entry; and
(b) enrolled, at any time between August 1, 2012, and July 31, 2013, as a student of an academic program of an accredited college or university that would award an associates, bachelor's, master's, or doctorate degree;
(2) must have used National Instruments' LabVIEW® in their project application; and
(3) must author an original technical paper, including an abstract, describing such use; and
(4) must submit all materials no later than 11:59 p.m., Austin, Texas, time on May 31, 2013.
The employees of National Instruments and its subsidiaries, affiliates, advertising agencies, and promotional partners and the relatives and household members of those employees are not eligible to enter.

Entry. To register for the competition, visit and follow the instructions at www.ni.com/studentdesign. By entering this competition, teams agree that entries will not be maintained in confidence and that all entries (including abstracts and papers) become the property of National Instruments and will not be returned. National Instruments is not responsible for late, damaged, incomplete, illegible, lost, delayed, or misdirected entries.

Subject to applicable laws and regulations. This competition is subject to all the laws and regulations governing any applicable jurisdiction, including all United States federal, state and local laws and regulations, and the competition is void in any jurisdiction where it is prohibited or restricted by any such laws and regulations.

The Critics Vote. An anonymous panel of judges will evaluate all entries and select four finalists according to criteria that include:
How technically challenging is the application?
What are the benefits of the solution and are those benefits clearly articulated? How innovative is the solution?
How well did the project submission follow directions outlined in the 2013 LabVIEW Student Design Submission Template?
How thorough and detailed is the overall project submission?
The judges will make their evaluations using their own discretion and all decisions of the judges are final. Each of the four teams chosen as finalists will receive (1) two full conference passes to the NIWeek 2013 Conference and Expo, and (2) airfare and hotel accommodations (booked by and billed directly to National Instruments). At the conference, National Instruments will announce one team receiving the grand prize of $2,000 (USD).

The Popular vote. During the voting phase of the challenge, National Instruments will allow public voting of all the submissions in the competition in the online project library at www.ni.com/studentdesign. Vote for the entry you believe represents the best use of National Instruments' LabVIEW®. The three teams whose entries receive the most number of votes will receive prizes of $750 (USD), $500 (USD), and $250(USD). In the event of any ties, winners will be selected at random. The public voting for all submissions ends at 11:59 p.m., Austin, Texas, time on July 15, 2013.

Winners and finalists. National Instruments will announce winning and finalist teams on or before August 1, 2013. Every member of a winning or finalist team must sign a declaration of eligibility, prize claim form and liability and publicity releases in order for the team to redeem its prize. Every team that does not return the declaration, claim form and release to National Instruments within 30 days automatically forfeits its prize.

Prizes. All prizes are non-transferrable and National Instruments will not substitute prizes or offer cash redemptions for prizes. Teams are responsible for all taxes and duties payable on any prize and National Instruments will neither pay nor reimburse any taxes or duties payable on any prize. Odds of winning a prize cannot be determined objectively because they depend on the quality of eligible entries received and the subjective opinion of the judges.

By entering this competition, a team (1) consents to the use of their names, pictures, voices, evaluation data, biographical data, and likenesses in National Instruments' advertising and promotional materials without additional compensation; (2) agrees that National Instruments and its subsidiaries, affiliates, advertising agencies, and promotional partners are not liable for injury, loss, or damage of any kind resulting from participating in this contest or from the acceptance or use of any prize awarded; and (3) warrants that their entry is original, that no false information is given, and that no other person owns or has any rights to any element of the entry, including any copyrights in it. National Instruments will verify all declarations of eligibility, prize claim forms, and liability and publicity. National Instruments' will exercise its own discretion to interpret all contest rules and to award of the prizes and its decisions are final.

By entering and participating in the contest, every member of a team:
(1) warrants and represents that he or she has read these official rules and terms and conditions and agrees to comply with them;
(2) warrants and represents that he or she has read National Instruments' Terms of Use (available at www.ni.com/legal/termsofuse/unitedstates/us/) and agrees: (a) to comply with them; and
(b) that his or her team's submission is a "Communication" under those Terms of Use;
(3) warrants and represents that the team's submission is not and will not be subject to any restrictions or requirements on use, copying, modification, disclosure, or distribution by National Instruments and its subsidiaries, affiliates, advertising agencies, and promotional partners including without limitation:
(a) requirements that any code incorporated into, commingled with, or otherwise associated with the submission ("Associated Works") be disclosed in source code form to others;

Tips and Tricks to Win the Critics Vote

1. Provide a clear explanation of how the project demonstrates an effort to engineer a better world or solve a problem that exists in the world today.
2. Provide a clear explanation of the benefits gained from incorporating NI technologies, specifically NI LabVIEW.
3. Complete the submission form as fully as possible. Leaving required fields blank could cause jurors to not consider your application.
4. Upload high-resolution photos, video, and a project poster.
5. Attach LabVIEW virtual instrument (VI) code so everyone can see how much work you have done.

Tips and Tricks to Win the Popular Vote

1. Follow all of the above tips and tricks to win the critics vote.
2. Submit your project as early as possible.
3. Share your project submission URL with your friends using email, Facebook, LinkedIn, Twitter, your school newspaper, and so on.
4. Tell your friends to “like” your project (“like” button located on the bottom-right of the submission template).

Screen Capture Guidelines

To achieve the highest degree of quality for printing, follow these guidelines before sending us screen captures. All appropriate data must be displayed on the screen before capture.
Make arrangements for shipping or electronic transmission of your file with your National Instruments marketing contact. If you mail or ship your screen capture on disk via FedEx, address it specifically to your marketing contact person.

For Windows Users

XP Silver Screens

1. Under Display Properties»Appearance»Windows and Buttons, select the Windows XP Style.
2. To avoid blurred text, adjust Display Properties»Appearance»Effects. Select Standard for the second line for the method to smooth edges on screen fonts. Screens with blurred text will be sent back for adjusting. See example for settings below.
3. Make sure all appropriate data is displayed on the screen before capture—what you see on the screen is exactly what you will capture.
4. Set video mode to the highest number of colors possible—right-click on the desktop, choose Properties from the menu, and then choose Settings from the Display Properties window. True Color (24 bits) is preferred, but High Color (16 bits) and 256 Color will also work.
5. Run your application and then press the Print Screen key (this copies your screen to the clipboard).
6. Open Paint from the Windows Accessories group and press CTRL-V to paste the clipboard into Paint. If a dialog box appears, choose “OK” to crop the canvas to the size of the image and then save. (In low memory situations, you might not be able to paste from the clipboard. In this case, you should follow steps 1 through 3 above, close your application, and then open the Microsoft Paint program and paste the image.)
7. Although you may use graphics programs other than Microsoft Paint to create screens, you should not import the screen into any secondary application such as Microsoft Word or PowerPoint. You should not use the JPEG format for screens either—this compresses the file and causes dithering, which is unacceptable for color correction. If you need to compress a file, use PKZip. Self-extracting archives are acceptable.

Windows/DOS

1. Windows 2000 users: To ensure image quality, set video mode to the highest number of colors possible. To do this, right-click on the desktop, select Properties from the menu, and then choose Settings from the Display Properties window. We prefer True Color (32 bits), which is often available without optimization.
2. Run your application. Press ALT-PRINT SCREEN to capture the screen. This takes a screenshot of the window only. Open Paint from the Windows Accessories group. Press CTRL-V to paste the clipboard into Paint. If a dialog box appears, choose “OK” to scale the canvas to the size of the image. Save the image. Paint should default to the same bit depth you chose for your monitor. In low-memory situations, you might not be able to paste from the clipboard. In this case, capture the screen as before, close your application, and open the Paint program and paste the image.
3. You can use a different paint program instead of the Microsoft Paint program if you prefer. Do NOT import the screen into any secondary applications, such as Microsoft Word or PowerPoint. The file should be saved with a color bit depth of 24 bits if possible, but 16 bits and eight bits are

also acceptable. We can work with PCX, BPM, TIF, or GIF file formats. Avoid the JPEG format. If you need to compress a file, use WinZIP. Self-extracting archives are acceptable.

For Macintosh

1. To ensure image quality, set the video mode to 256 colors or higher using the Monitors control panel.
2. Send high-resolution (300 dpi) files in PICT, EPS, or TIF format. If you are unable to obtain a high-resolution image, a low-resolution image is acceptable in a minimum dimension of 12x10 in. or
3. 864x720 pixels.
4. For Mac OS 7.x, 8.x, and 9.x, simply press COMMAND-SHIFT-3. You will hear a shutter click; after a brief pause, a file called “picture 1” appears at the root level of your startup drive. By default, this is a Macintosh PICT format file.
5. You can edit your screen using a color paint program and then save it as a PICT or TIF. Do NOT import the screen into any secondary applications, such as Microsoft Word or PowerPoint.If you need to compress a file, use DiskDoubler, Compact Pro, or Stuff-It. Self-extracting archives are acceptable.

Printing LabVIEW VIs

Print or save VIs and VI documentation to keep a record you can refer to later. You can use the following primary ways to print VIs:

- Select **File»Print Window** to print the contents of the active window.
- Select **File»Print** to print more comprehensive information about a VI, including information about the front panel, block diagram, subVIs, controls, VI history, and so on.
- Programmatically print or save a VI or a report that contains VI documentation or data the VI returns.

You can configure how LabVIEW prints a VI when you select **File»Print Window** or when you print programmatically by selecting **File»VI Properties**.

Printing the Active Window

You can print the contents of the active front panel or block diagram window by selecting **File»Print Window**. LabVIEW prints the workspace of the active window, including any objects not in the visible portion of the window. LabVIEW does not print the title bar, menu bar, toolbar, or scroll bars.

Printing Documentation

You can print VI documentation or save it to HTML, RTF, or text files by selecting **File»Print**. You can select whether to print documentation for a single VI or for multiple VIs. You also can select a built-in documentation style or create a custom style for documentation.

The documentation you create can include the following items:

- Icon and connector pane
- Front panel and block diagram
- Controls, indicators, and data type terminals
- Labels and captions for controls and indicators
- VI and object descriptions
- VI hierarchy
- List of subVIs
- Revision history

Note The documentation you create for certain types of VIs cannot include all the previous items. For example, a polymorphic VI does not have a front panel or a block diagram, so you cannot include those items in the documentation you create for a polymorphic VI.

Saving Documentation to HTML, RTF, or Text Files

You can save VI documentation to HTML, RTF, or text files. You can import HTML and RTF files into most word processing applications, and you can use HTML and RTF files to create compiled help files. You also can use the HTML files LabVIEW generates to display VI documentation on the web. In addition, you can print and save documentation to HTML, RTF, and text files programmatically.

When you save documentation to an RTF file, specify if you want to create a file suitable for help files or for word processing. In the help file format, LabVIEW saves the graphics to external bitmap files. In the word processing file format, LabVIEW embeds the graphics in the document. For HTML files, LabVIEW saves all graphics externally in the JPEG, PNG, or GIF formats.

Selecting Graphic Formats for HTML Files
When you save documentation to an HTML file, you can select the format of the graphics files and the color depth.

The JPEG format compresses graphics well but can lose some graphic detail. This format works best for photos. For line art, front panels, and block diagrams, JPEG compression can result in fuzzy graphics and uneven colors. JPEG graphics are always 24-bit graphics. If you select a lower color depth such as black-and-white, graphics save with the depth you requested, but the result is still a 24-bit graphic.

The PNG format also compresses graphics well, although not always as well as the JPEG format. However, PNG compression does not lose any detail. Also, it supports 1-bit, 4-bit, 8-bit, and 24-bit graphics. For lower bit depth, the resulting graphic compresses much better than JPEG.

LabVIEW does not save graphics as compressed GIF files. Use a graphics format converter to convert the uncompressed GIF files that LabVIEW saves to compressed GIF files. For higher quality compressed GIF files, select the PNG format when you save the documentation and use a graphics format converter to convert the PNG files that LabVIEW saves to GIF files. Starting with the PNG format produces higher quality graphics because the PNG format is an exact reproduction of the original graphic. Modify the HTML file that LabVIEW generated to refer to the GIF files with the .gif extension.

Naming Conventions for Graphic Files
When you generate HTML or RTF documentation with external graphics, LabVIEW saves the control and indicator data type terminals to graphic files with consistent names. If a VI has multiple terminals of the same type, LabVIEW creates only one graphic file for that type. For example, if a VI has three 32-bit signed integer inputs, LabVIEW creates a single ci32. *x* file, where *x* is the extension corresponding to the graphic format.

Creating Your Own Help Files
You can use the HTML or RTF files LabVIEW generates to create your own compiled help files. (Windows) You can compile the individual HTML files LabVIEW generates into an HTML Help file. (Mac OS X) You can use the individual HTML files LabVIEW generates in Apple Help.

You can compile the RTF files LabVIEW generates into a (Windows) WinHelp or (Linux) HyperHelp file.

After creating and compiling the help files, add them to the **Help** menu of LabVIEW or to the custom application by placing them in the labview\help directory.

Create links from VIs to HTML files or compiled help files by selecting **File»VI Properties** and choosing **Documentation** from the **Category** pull-down menu.

Printing VIs Programmatically
Use any of the following ways to programmatically print VIs or data the VIs return:

- Set a VI to automatically print its front panel every time it finishes running.
- Create a subVI to print the VI.
- Use the Report Generation VIs to print reports or to save HTML reports that contain VI documentation or data the VI returns.
- Use the VI Server to programmatically print a VI window or to print VI documentation or save it to HTML, RTF, or text files at any time.

If you print VI documentation from a stand-alone application, you can print only the front panels.

Printing the Front Panel of a VI After the VI Runs

Select **Operate»Print at Completion** to print the front panel of a VI when it finishes running. You also can select **File»VI Properties**, select **Print Options** from the **Category** pull-down menu, and place a checkmark in the **Automatically Print Panel Every Time VI Completes Execution** checkbox.

Selecting these options is similar to selecting **File»Print Window** when the front panel is the active window.

If you use the VI as a subVI, LabVIEW prints when that subVI finishes running and before the subVI returns to the caller.

Using a SubVI to Print Data From a Higher Level VI

In some cases, you might not want a VI to print every time it finishes running. You might want printing to occur only if the user clicks a button or if some condition occurs, such as a test failure. You also might want more control over the format for the printout, or you might want to print only a subset of the controls. In these cases, you can use a subVI that is set to print at completion.

Create a subVI and format the front panel the way you want LabVIEW to print it. Instead of selecting **Operate»Print at Completion** in the higher level VI, select it in the subVI. When you want to print, call the subVI and wire the data you want to print to the subVI.

Generating and Printing Reports

Use the Report Generation VIs to print reports or to save HTML reports that contain VI documentation or data the VI returns. Use the Easy Print VI Panel or Documentation VI to generate a basic report that contains VI documentation. Use the Easy Text Report VI to generate a basic report that contains data the VI returns. Use the other Report Generation VIs to generate more complex reports.

Use the Report Express VI to generate a preformatted report that contains VI documentation, data the VI returns, and report properties, such as the author, company, and number of pages.

Use the Report Generation VIs to perform the following tasks:

- Append text, graphics, tables, or VI documentation to a report.
- Set text font, size, style, and color.
- Set the report orientation—portrait or landscape.
- Set the report headers and footers.
- Set margins and tabs.

Additional Printing Techniques

If standard LabVIEW printing methods do not meet your needs, you can use the following additional techniques:

- Export data to other applications, such as Microsoft Excel, save the data to a file, and print from the other application.
- Use the System Exec VI.
- (Windows) Use ActiveX to make another application print data.