Exercise 11-1: Creating and Using a SubVI

Goal

Create the icon and connector pane for a VI so that you can use the VI as a subVI.

Scenario

You will explore a VI that generates a timestamped file path in the same directory containing the project. Create an icon and a connector pane so that you can use this VI as a subVI.

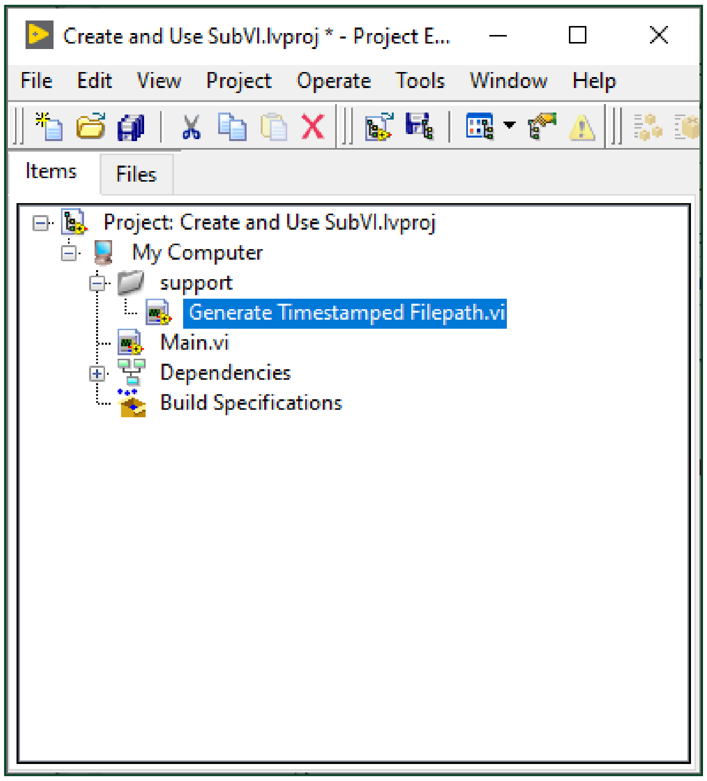
Design

The Generate Timestamped Filepath VI contains the following inputs and outputs.

Inputs	Outputs
Appended filename	Timestamped relative filepath
Error In	Error Out

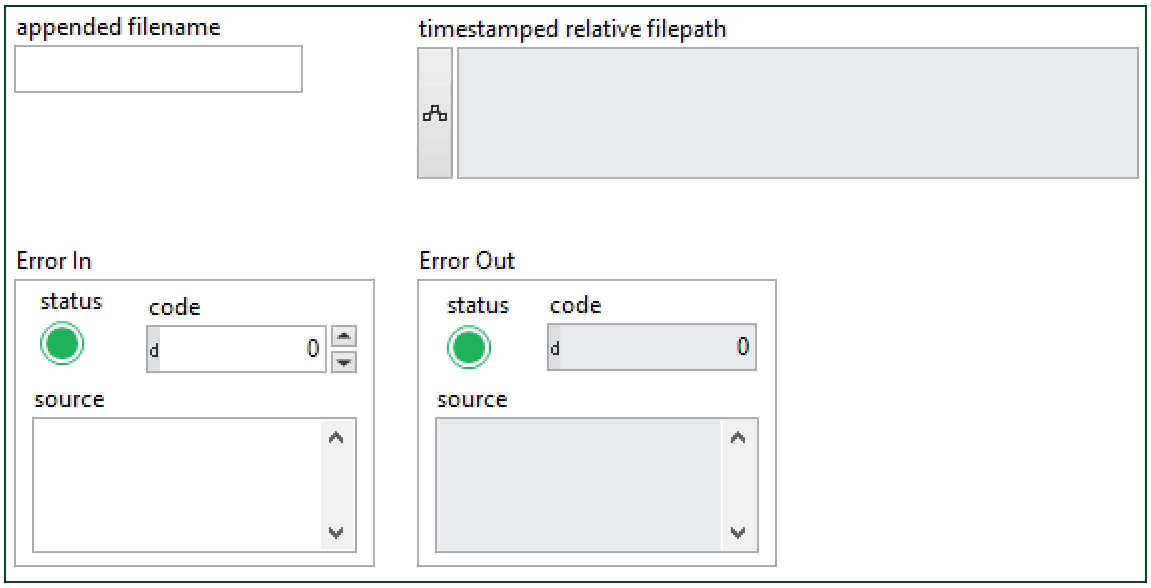
Creating a SubVI

1. Open `C:\Exercises\LabVIEW Core 1\Create SubVI\Create and Use SubVI.lvproj`.
2. From the support folder of the **Project Explorer** window, open the open the Generate Timestmped Filepath VI.

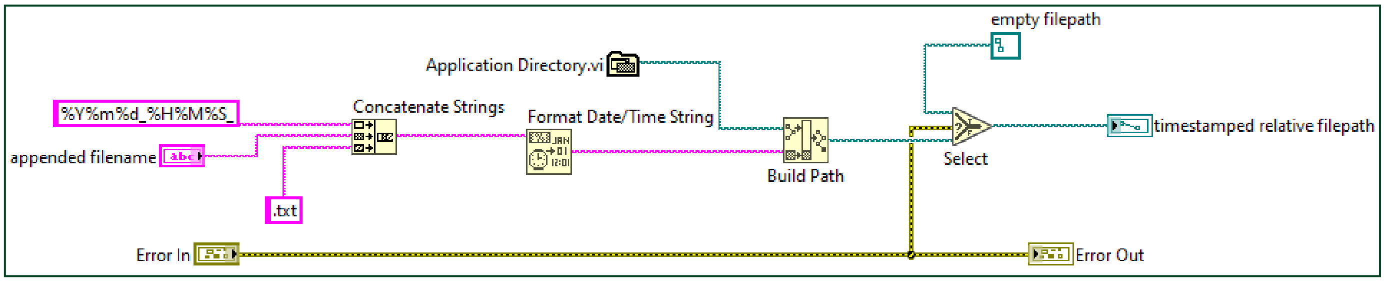

Create and Use SubVI.lvproj * - Project E...
File Edit View Project Operate Tools Window Help
Items Files
Project: Create and Use SubVI.lvproj
My Computer
support
Generate Timestamped Filepath.vi
Main.vi
Dependencies
Build Specifications

Note: It is common practice to place subVIs and support files in a subdirectory and place the main top- level VI in the parent directory. This allows the main top-level VI to be more visible and accessible to the user.

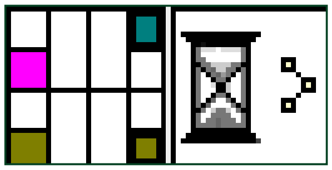
3. Place an **Error In** control and **Error Out** indicator on the front panel, as shown in the figure below.



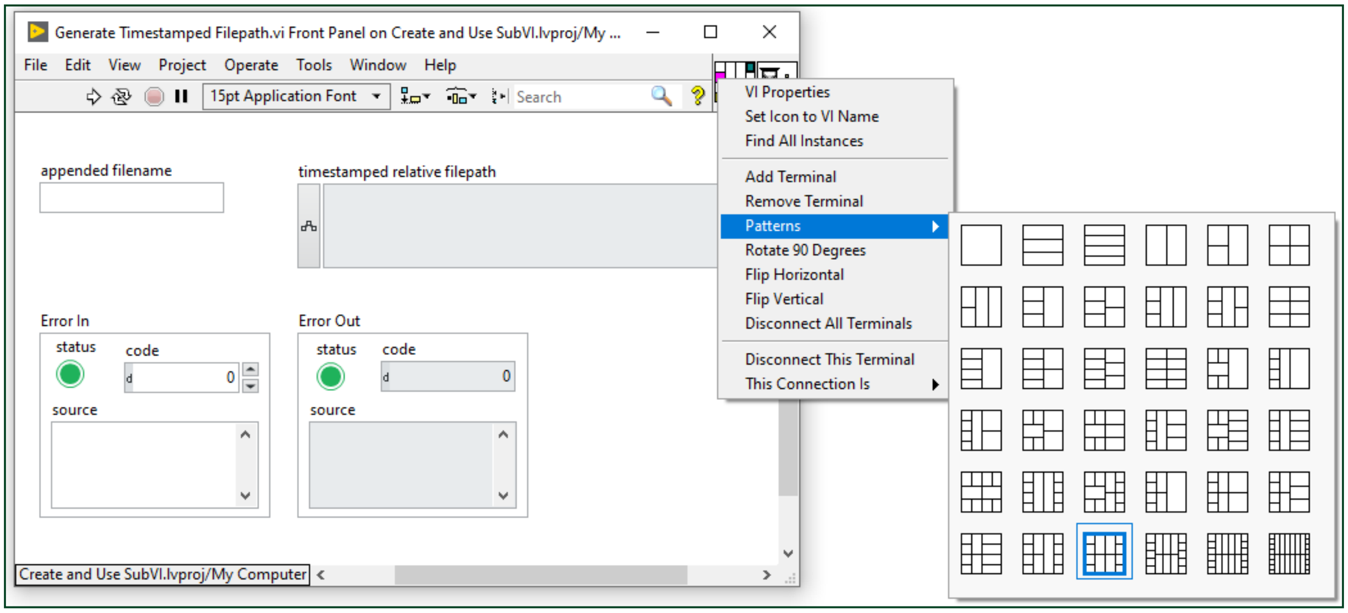
4. Modify the block diagram, as shown in the following figure.
   - Drag a **Select** function and **Path** constant to the block diagram from the Quick Drop menu.
   - Wire the block diagram as shown in the figure below.



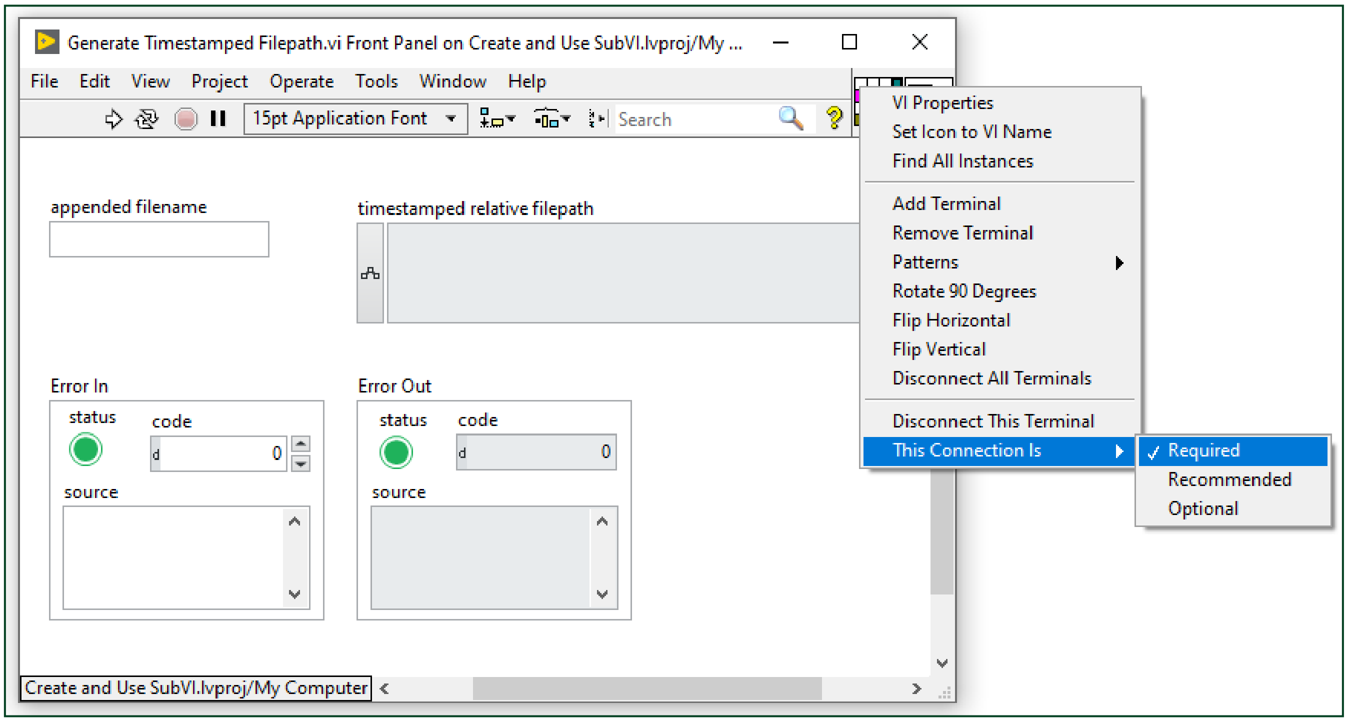
5. Connect the inputs and outputs to the connector pane, as shown in the following figure below.



- The connector pane is located in the upper-right corner of the front panel.
- Click any input or output you want to assign and then click the corresponding control or indicator on the front panel.
- You can change the number of input and output terminals by right-clicking the connector pane and selecting a suitable connector pane pattern in the **Patterns** shortcut menu.

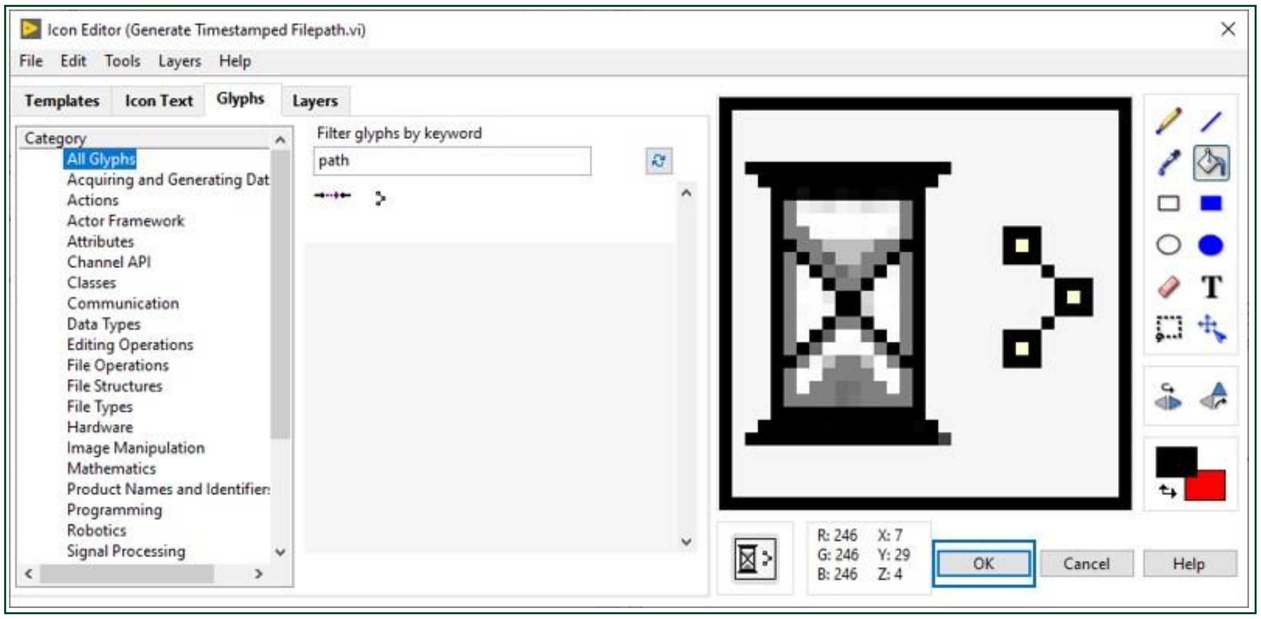


- Right-click the **appended filename** input terminal and select **This Connection Is» Required** from the shortcut menu.



- Now when you use this subVI in a main VI, the **Run** button of the man VI will be broken until the **appended filename** input terminal is wired.

6. Create an icon, as shown in the figure below.
   - Double-click the VI icon in the upper-right corner of the front panel to open the Icon Editor. Search for `delay` and `path` and place the corresponding graphics onto the VI icon.
   - Click the **OK** button when finished.

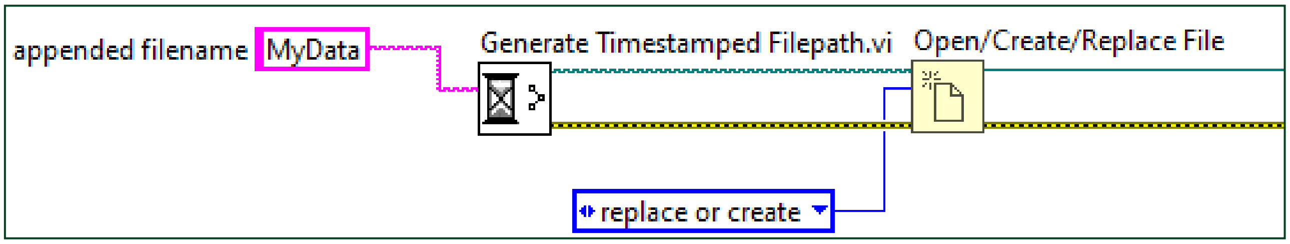


7. Create a description for the subVI.
   - Click **File** in the upper-left corner of the VI and select **VI Properties.**
   - Select **Documentation** from the **Category** pull-down menu and enter the following description: `Generates a timestamped filepath with an appended user-specified name and the same directory containing the project.`
   - Click **OK**.
8. Save the VI.
9. Test the VI when **Error In** contains no error.
   - On the front panel, set the **appended filename** control to a string value, such as `MyData`.
   - Verify that the **Error In** control has a status of False.
   - Run the VI.
   - Notice that the VI returns a timestamped relative file path similar to `C:\Exercises\LabVIEW Core 1\Create SubVI\20190509_093000_MyData.txt.`
10. Test the VI when **Error In** contains an error.
   - Set the status element of the **Error In** control to TRUE. Set the code element to `−1`.
   - Run the VI

   Notice that the VI returns an empty path in the **timestamped relative filepath** indicator. Notice that the error information is passed to the **Error Out** indicator.

Use the SubVI in a Main VI

1. From the **Project Explorer** window, open the Main VI.
2. Examine the Open/Create/Replace File function on the block diagram.
   Notice that its file path input is unwired, which means when you run the VI, this function will launch a file dialog for you to specify the file path.
3. Use the Generate Timestamped Filepath subVI to output a timestamped filename in the same directory as the current project file (.lvproj).
   - Drag the **Generate Timestamped File** VI from the **Project Explorer** window to the block diagram of the Main VI.
   - Right-click the **appended filename** input and select **Create Constant**. Set the constant to string value, such as `MyData`.
   - Wire the **timestamped relative filepath** output of the Generate Timestamped Filepath VI to the Open/Create/Replace File function.

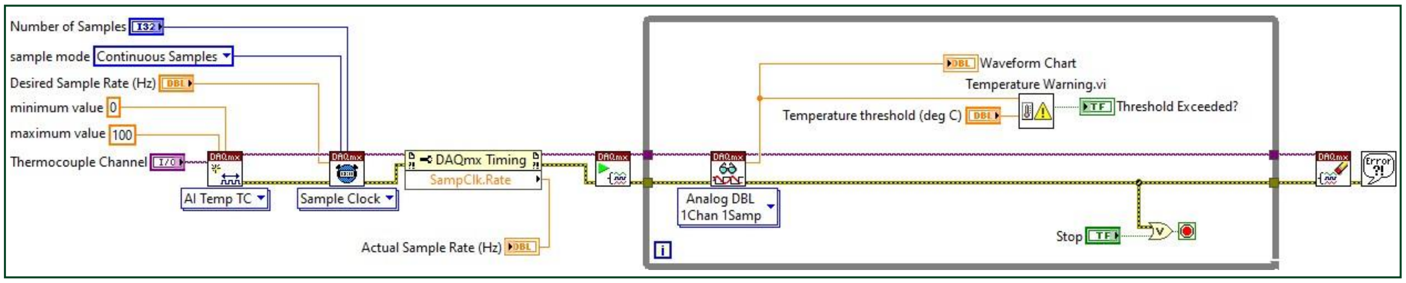


4. View the subVI description.
   - Open the Context Help window by pressing <Ctrl-H>.
   - Hover your mouse cursor over your subVI. Notice that the Context Help window populates with the text that you previously entered for the subVI's VI Description.
5. Examine the behavior of the VI.
   - Set the Thermocouple Channel to an appropriate channel.
   - Run the VI. After a few seconds, stop the VI.
   - In Windows Explorer, go to the `C:\Exercises\...\Create and Use SubVI` directory and notice the timestamped file created by the VI.
   - Run the VI a couple more times. Notice the additional timestamped files created by the VI.
6. Now you can reuse the Generate Timestamped Filepath subVI in other VIs where you want the same functionality.

Your Turn

Create a subVI that reads a temperature measurement, compares it to the set temperature threshold, and returns if the threshold is exceeded or not.

The following figure shows how your completed Temperature Warning subVI could be used in an example VI.



Note: For the answer, refer to the `C:\Solutions\LabVIEW Core 1\11-1\[Your Turn] Create SubVI` directory.

On the Job

Is there code you will commonly reuse in your applications? Would the application benefit from putting that code in a subVI?

Do you have any code that uses a lot of nodes but accomplishes one modular task (for example, algorithm)? Would the top-level application be more readable if that code was put inside a subVI?

End of Exercise 11-1