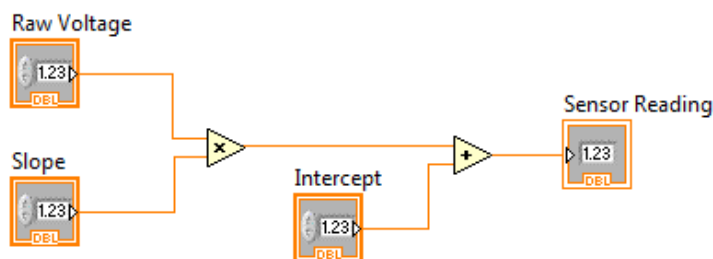


SubVIs

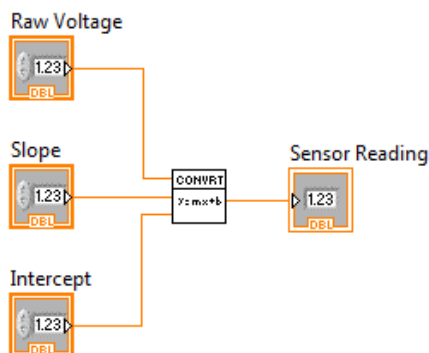
CREATING SUBVIS

After you build a VI, you can use it in the block diagram of another VI. A VI called from the block diagram of another VI is called a subVI. Creating and using subVIs within your LabVIEW program is essential for keeping your code readable, reusable, and easy to modify. In addition, it is helpful for debugging a program. In other programming environments, sub VIs would be called “subroutines.”

A subVI works best if it is code that is focused on performing a single discrete task. Again, this helps for readability, reusability, and debugging.



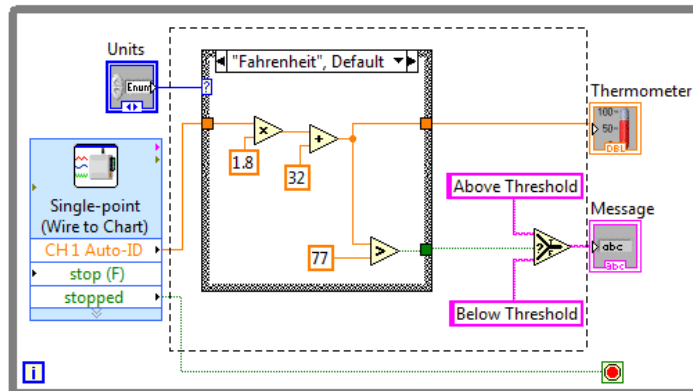
For example, in the figure above, the code is taking the raw voltage reading of a sensor and computing the reading in proper sensor units using a linear conversion. This conversion code is useful because it performs a discrete task that could be used in many other VIs. A subVI could be created from this code, and then used in the block diagram of other VIs that require this linear conversion. The figure below performs the same task, but performs the conversion within the code of the subVI.



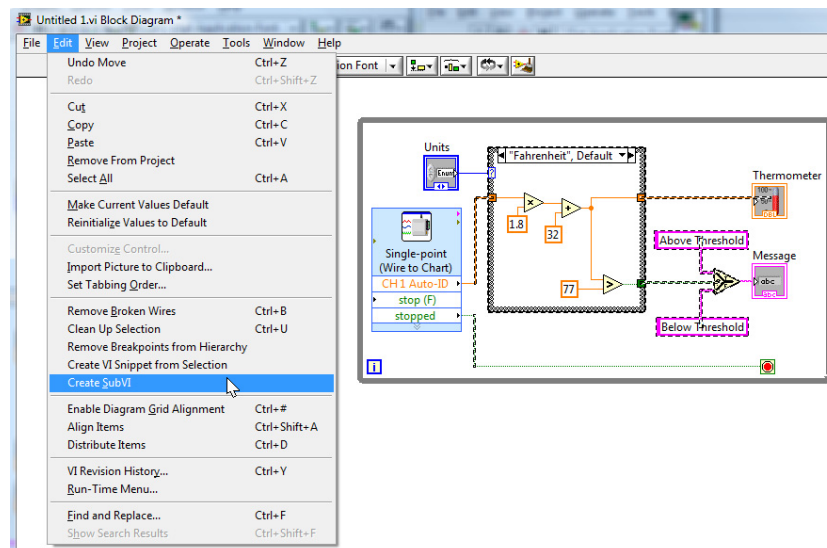
When you create a subVI and use it, you see an icon within your block diagram that represents the subVI. SubVIs are like VIs in that they contain front panels and block diagrams, but you call them from within a VI. The block diagram of a subVI may also contain subVIs, and the block diagram of these subVIs can contain subVIs. There is no limit to the number of nested subVIs.

There are two methods for creating subVIs. One is to open a New Blank VI and design that VI to be used as a subVI. The steps to convert a VI into a usable subVI include customizing the icon for the subVI and configuring the input and output terminals for your block diagram wiring. The steps for this method are explained in the next section.

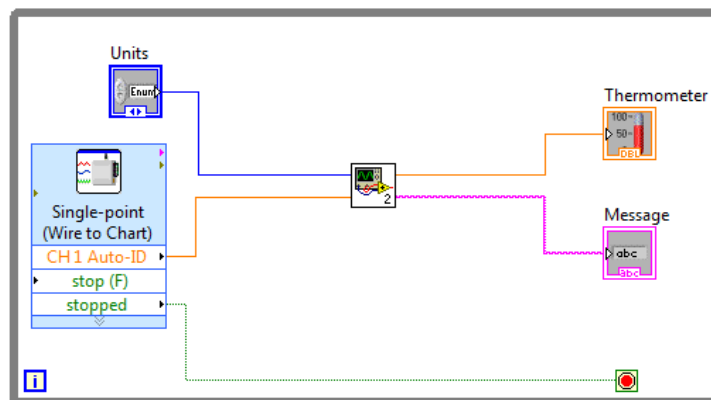
The other method is to convert a section of an existing VI into a subVI. To do this, start by using the Positioning tool to select the section of the block diagram you want to turn into a subVI.



After the selection has been made, choose Create SubVI from the Edit menu.

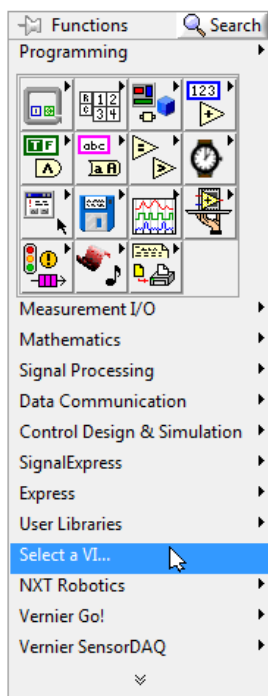


The selected code is automatically turned into a subVI. LabVIEW creates controls and indicators for the new subVI, configures the connector pane based on the number of control and indicator terminals you selected, and wires the subVI to the existing wires. This is now a functional subVI.



It is good practice to open the front panel of this subVI and clean it up. To open the front panel of a subVI from the calling VI, double-click the subVI on the block diagram. Like any other VI, to view the block diagram use the <Ctrl-E> shortcut. To open the front panel without opening the calling VI, simply open it like any other VI, by choosing Open from the File menu.

When you have created a subVI and saved it, it will be available to be used again. To access the subVI, go to the block diagram workspace, open the Functions palette, and choose Select a VI.



Browse to your subVI, and select it to drop it into the block diagram of your VI. If you edit and save a subVI, the changes affect all future calls to the subVI, not just the current instance. The subVI will contain all the saved changes, even if the calling VI is not open at the time of the changes. Once the calling VI is opened, the subVI will be loaded onto the block diagram with any changes previously made and saved.

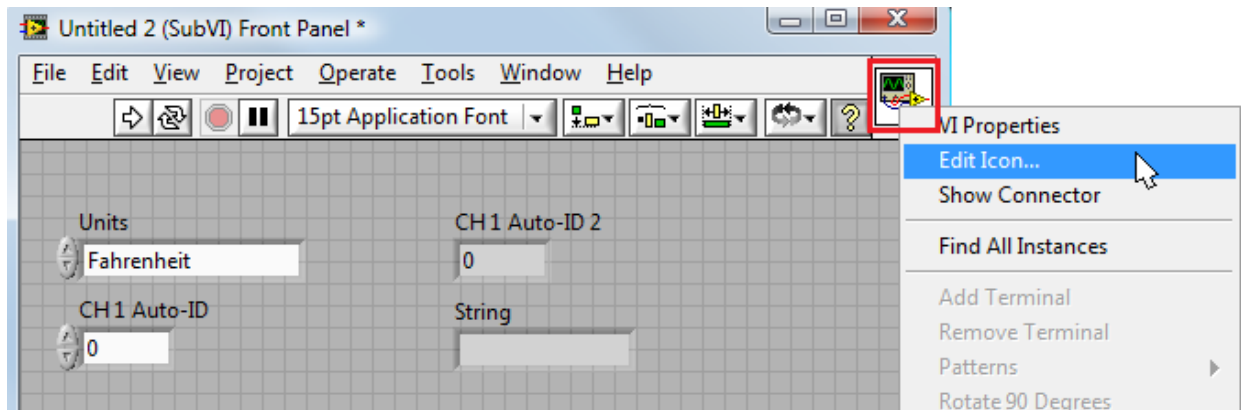
It is important to note that the subVI is a separate file; therefore, if you are sharing a LabVIEW program that contains a subVI, you must send both the program and the subVI file. If you only send the main VI, and a user on a different computer tries to open it, it will open with a broken Run button and an error message asking for the missing subVI file.

ICON

SubVIs show up on the block diagram as an icon. LabVIEW provides a default icon that looks like the icon below. This icon is also viewed when you open the front panel of the subVI. It is in the upper-right corner.



The icon can be customized using the Icon Editor dialog box. Access the Icon Editor by double-clicking the icon in the upper-right corner of the front panel. You can also access the Icon Editor by right-clicking the icon in the upper-right corner of the front panel or block diagram, and choosing Edit Icon.

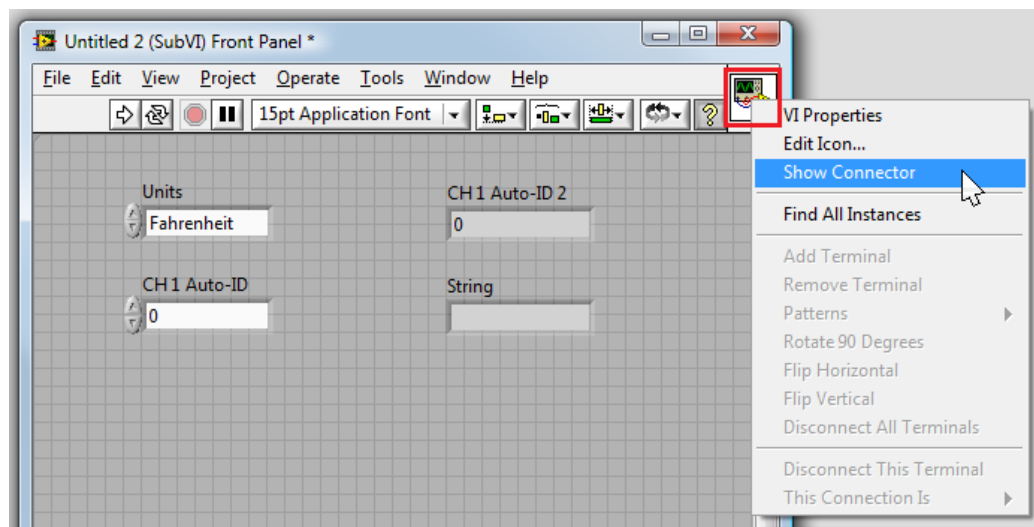


Once you open the Icon Editor, you have many tools for creating a custom icon or importing an image. It is important to think about the design of your icon so that it contributes to the overall understanding of how your program works. An icon designed with descriptive text may be the most useful. Graphics can be helpful, but be aware that they may also cause confusion if they are not meaningful.

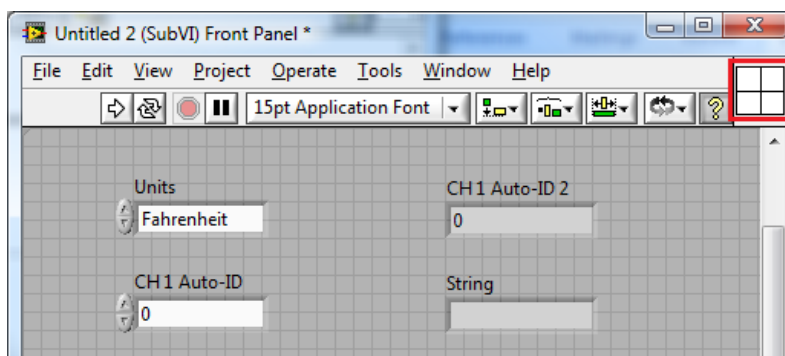
CONNECTOR PANE

The connector pane is a visual representation of the subVI terminals. The terminals correspond to the front panel controls and indicators of the VI. When a VI is run, you have direct access and control of the front panel controls and indicators. But when the VI is used as a subVI, the front panel controls and indicators are accessed without the use of a visible front panel. Instead, the connector pane of the subVI, linked to the front panel controls and indicators, allows wires to be connected as inputs and outputs. This allows data from the calling VI to be passed into and out of the subVI.

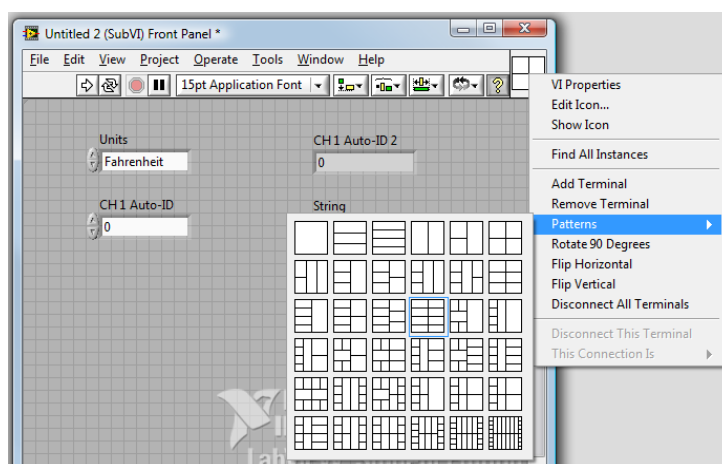
The connector pane is viewed and configured by right-clicking the icon in the upper-right corner of the front panel, and selecting Show Connector from the menu.



The icon will change to show the connector pane pattern. Each pattern has boxes that represent the location of terminals on the icon. You will use those boxes to assign inputs and outputs.



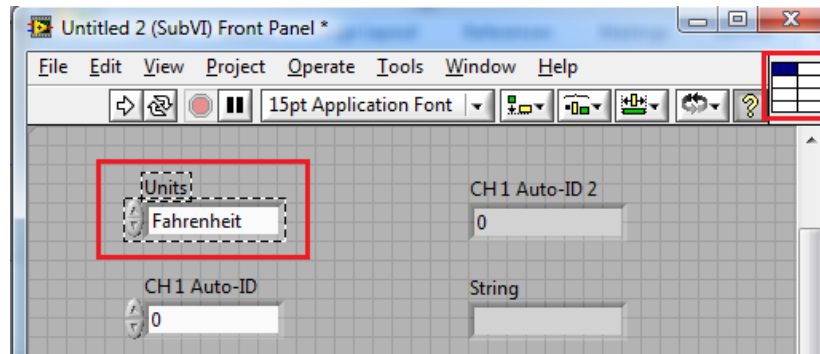
You can select a different pattern by right-clicking the connector pane, and selecting Patterns from the menu.



After you select a pattern to use for the connector pane, you assign a front panel control or indicator to a connector pane terminal (one of the boxes). It is generally good programming practice to organize the inputs to a subVI on the left and the outputs on the right.

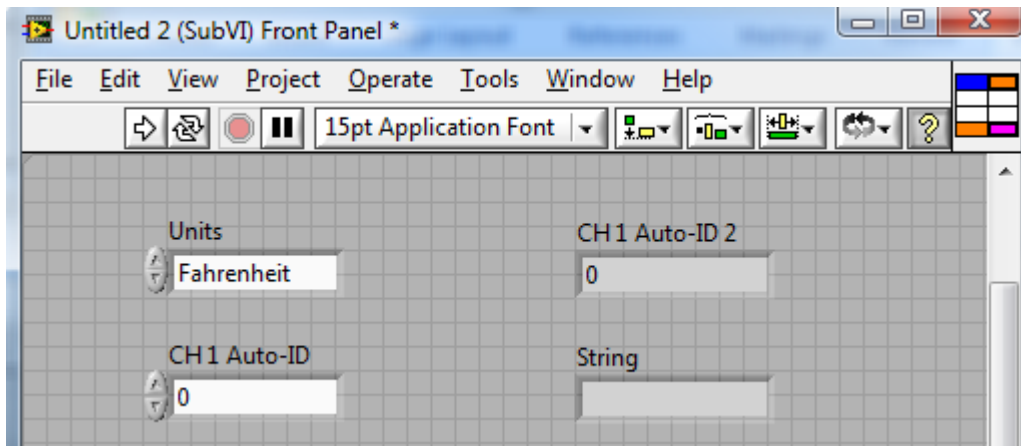
To assign a terminal to a front panel control or indicator:

1. Click a terminal box of the connector pane.
2. Click the front panel control or indicator you want to assign to that terminal.



Note, that in this example, the original 4-terminal pattern would have been sufficient, but we chose the 8-terminal pattern to allow for greater separation between the terminal nodes on the subVI. Note, too, that the terminal color changes to that of the data type to which you have connected it. You can also select the control or indicator first and then select the terminal.

3. Repeat these steps for all the controls and indicators that you will use to pass data to and from the calling VI.



If you make a mistake, and need to modify the connector pane, simply right-click on the terminal that was mistakenly created and choose Disconnect This Terminal. In addition, you can choose the Disconnect All Terminals selection to start over.

