

How to create a component in PSCAD/EMTDC

PSCAD/EMTDC is an advantageous power system electromagnetic transient simulation tool. PSCAD is able to simulate a power grid with up to 100 buses, so keeping the canvas well organized is very important, especially for a large-scale network simulation project. This tutorial gives a detailed explanation on how to create a “component” which can include multiple models into a sub-page, which not only allows users to customize the model, but also helps the canvas keep cleaner and better organized.

A component can be created in the *component wizard* according to the following steps:

Step 1: Open the component wizard. Right-click the canvas, highlight “*Create...*”, then left-click the “*Component*” on the pop-up page as illustrated in Fig.1. The *component wizard* pane will show up on the right side of the workspace window.

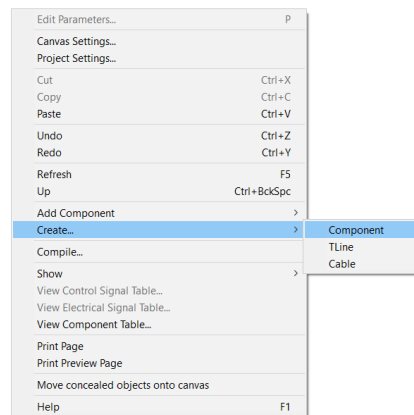


Fig.1. Open the component wizard.

Step 2: Enter required component information. The component information includes *Name*, *Module*, *Title*, *Paper Size*, and *Orientation*.

Name: Enter a name for the new component definition. This name must conform to Fortran standards (i.e., it cannot begin with a number or contain any spaces or other illegal characters).

Title (Optional): If text is detected in any of the three fields provided in this section, a text label containing the text will be added to the component graphic.

Module: Select this checkbox if you want the new component to be a module (also referred to as a page component or a sub-page). If not, only the definition will be created without attaching an instance to the mouse pointer.

More detailed explanation for the component information can be founded in the following link:
https://hvdc.ca/webhelp/PSCAD/Features_and_Operations/Components_and_Modules/Creating_a_New_Component_or_Module.htm

An example component is illustrated in Fig.2:

Fig.2. Component information example.

Step 3: Design the component ports. After finishing entering the component information, enter the number of ports for each side of the component as illustrated in Fig.3, then click “Add port” button. The number of ports you choose on each side decides what your component finally looks like. For example, a component with one port on each side is illustrated in Fig.4:

Fig.3. Define the port number in each side.

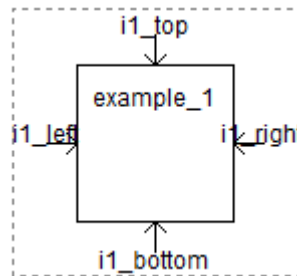


Fig.4. Example component: with one port on each side.

After entering the number, the port information window shows up as illustrates in Fig.5. The port information includes the *Name*, *Dim*, *Port type* and *Node/Data Type*. Detailed explanations are listed below:

Name: Enter a Symbol name for the port connection. This name must conform to Fortran standards.

Dim: Enter a dimension for the port connection. Entering 0 indicates that this port is to assume the dimension of whatever it is connected to. Entering a 1 defines a scalar.

Port Type: Select the port connection type here. Note that for Input Data type, the Component Wizard will automatically draw an input arrow graphic for the port connection.

Node/Data Type: Select the type of electrical or data port connection here.

After finishing editing the port information, click *finish*, then pull your component to the canvas.

Left-Side Ports			
Port Name	Dim	Port Type	Node/Data Type
i1_left	1	Input	Logical

Top Ports			
Port Name	Dim	Port Type	Node/Data Type
i1_top	1	Input	Logical

Right-Side Ports			
Port Name	Dim	Port Type	Node/Data Type
i1_right	1	Input	Logical

Bottom Ports			
Port Name	Dim	Port Type	Node/Data Type
i1_bot	1	Input	Logical

Finish Reset Help

Fig.5. Port information.

Step 4: Further adjust the component by using the “Graphic” page if necessary. Double left-click the component icon, then click the “graphic” page below the workspace window, you will see the component illustration with port name on each side. Double click the component name, the port connection window will pop up as illustrated in Fig.7. The port information can be adjusted in this window:

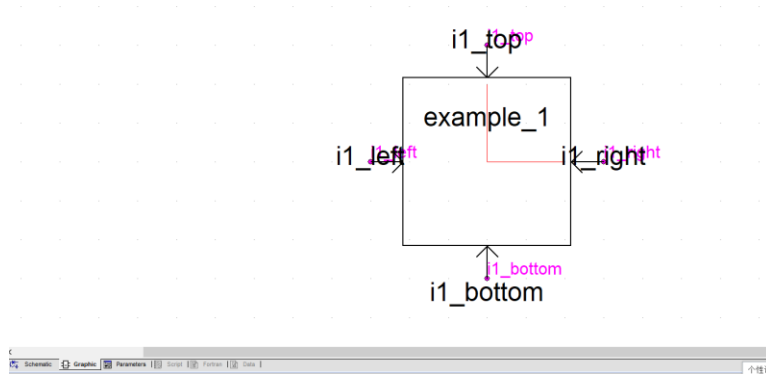


Fig.6. Graphic page below the workspace window.

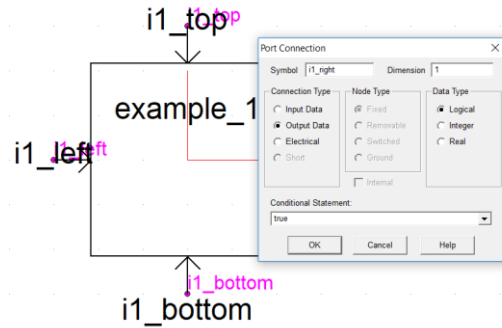


Fig.7. Redefine the port information.

Step 5: Port connection inside of the component. The port connection nodes in the component is illustrated in Fig.8. In my example, *i1_left* and *i1_right* are input ports, *o1_top* is the output port, and *n1_bottom* is the electrical port. The input and output ports can be called by using a data signal label with identical name as illustrated in Fig.8. The electrical port should be connected with real wire as illustrated in Fig.8.

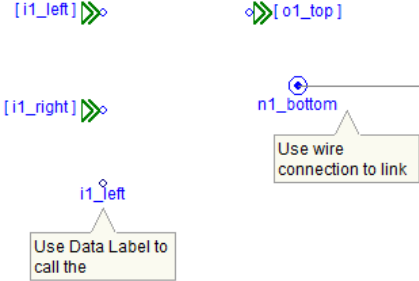


Fig.8. Component ports connection.