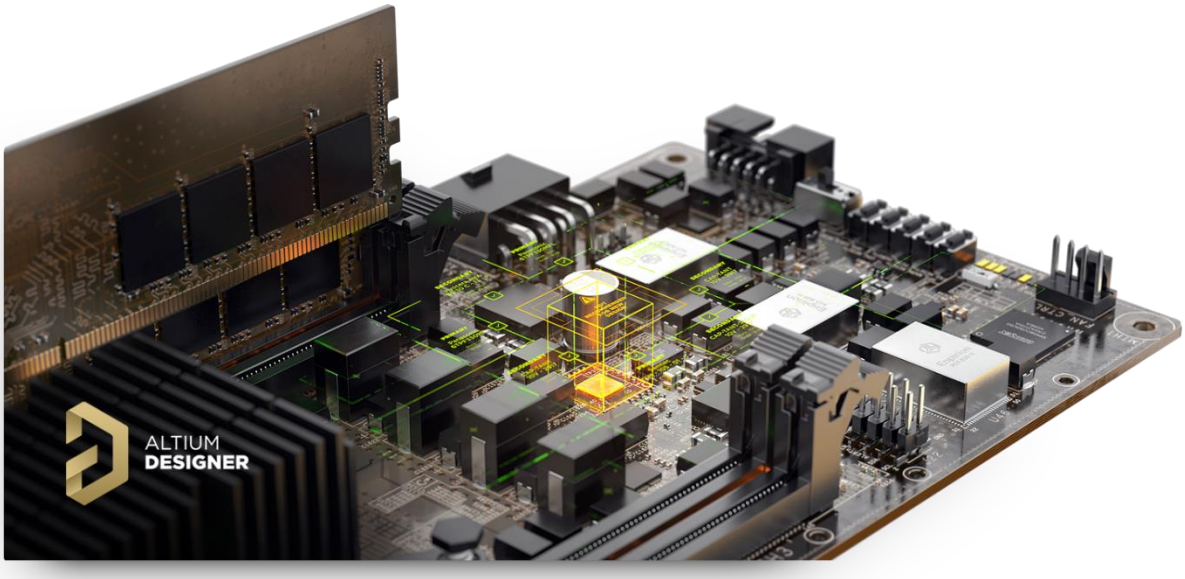

Altium Designer

Advanced Course

Module: Creating Multiple Layer Stacks - Advanced Mode

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Creating Multiple Layer Stacks - Advanced Mode

1.1 Purpose

When it comes to creating a Rigid-flex PCB, this requires the creation of multiple layer stacks for each of the rigid and flex regions. We will explore how to create multiple layer stacks from the Layer Stack Manager for the Advanced Mode.

1.2 Shortcuts

Shortcuts when working with Creating Multiple Layer Stacks - Advanced Mode

F1:	**Help**
D-K:	**Open Layer Stack Manager**
CTRL+S:	**Save Document**

1.3 Preparation

1. **Close all existing projects and documents.**
2. Open the `Creating Multiple Layer Stacks.PrjPCB` project found in its respective folder of the Advanced Training.

1.4 Layer Stack Manager

1.4.1 Viewing the Current Stack

3. Right-click on the project from the *Projects* panel and **Add New to Project » PCB.**
4. Save the new PCB as `Flex.PcbDoc`
5. From the **Design** menu, select the **Layer Stack Manager…** . The *Layer Stack Manager* will open as shown in Figure 1.

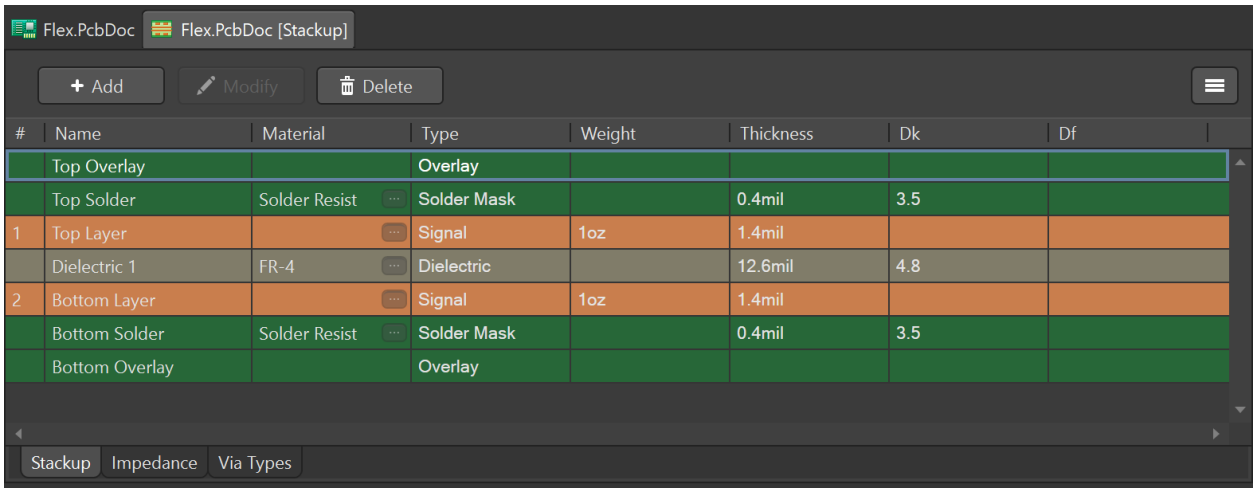


Figure 1. Layer Stack Manager for default 2-layer board

1.4.2 **Modifying the Simple Stack**

6. Right-click on the `Top Layer` cell, then select **Insert layer below** from the drop-down menu.
7. Select **Signal** to add a signal copper layer as shown in Figure 2.

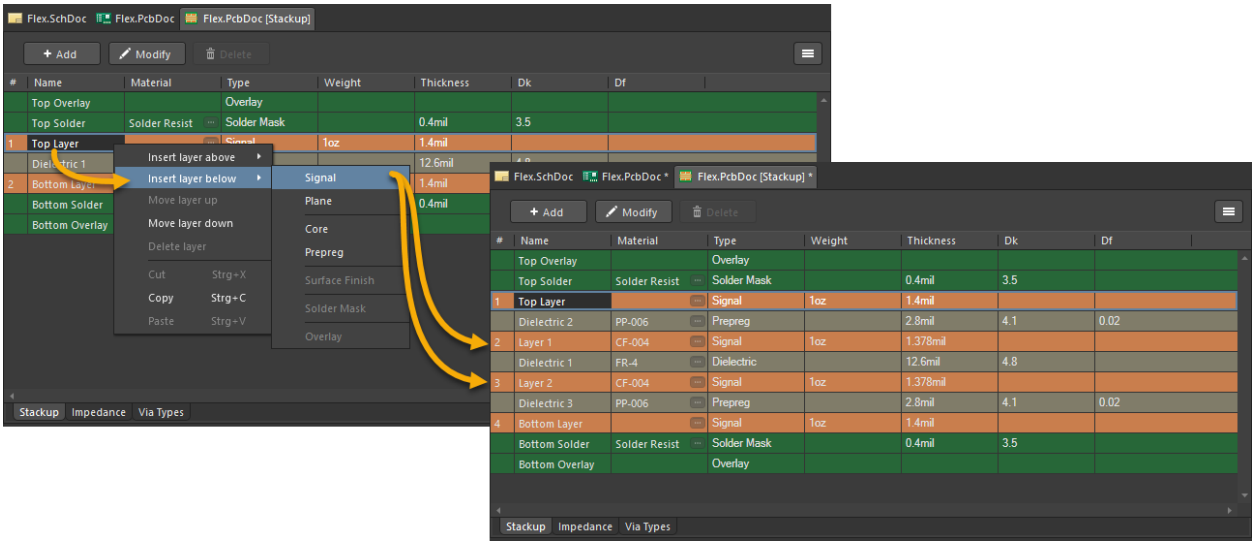


Figure 2. Adding a new layer in Layer Stack Manager

8. After inserting the signal layer, you'll notice that 2 signal layers we're added, `Layer 1` and `Layer 2`. This is because the **Stack Symmetry** option is enabled as shown in Figure 3. This option can be enabled or disabled in the future as you wish.

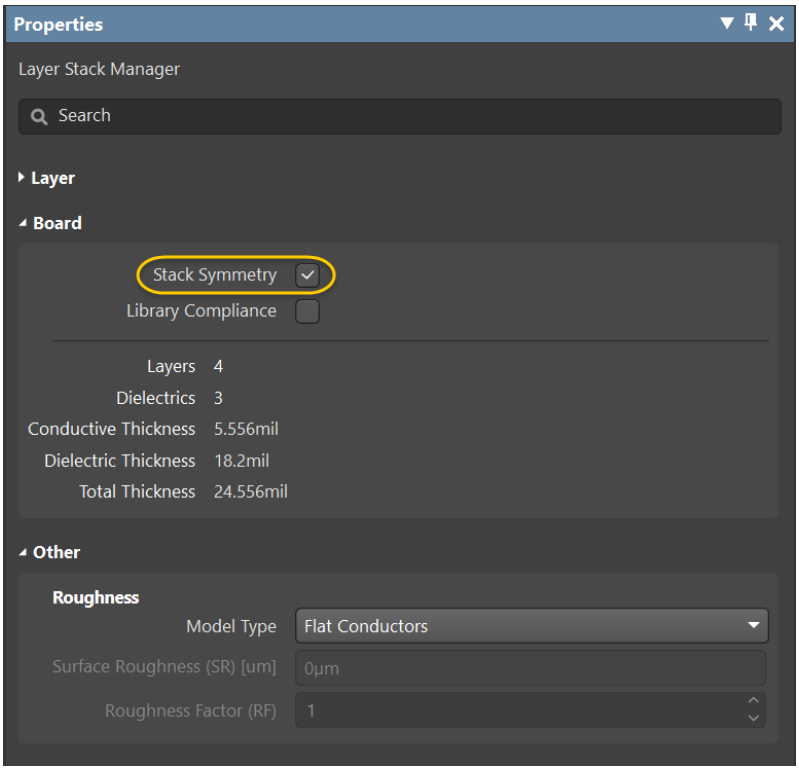


Figure 3. Stack Symmetry option

9. If this option was disabled for you, insert a Signal layer below `Layer 1` so that your stackup is the same as Figure 2.
10. Double-click on the `Layer 1` cell to rename it to `Mid 1` as shown in Figure 4.
11. Repeat the previous step and rename `Layer 2` to `Mid 2`.

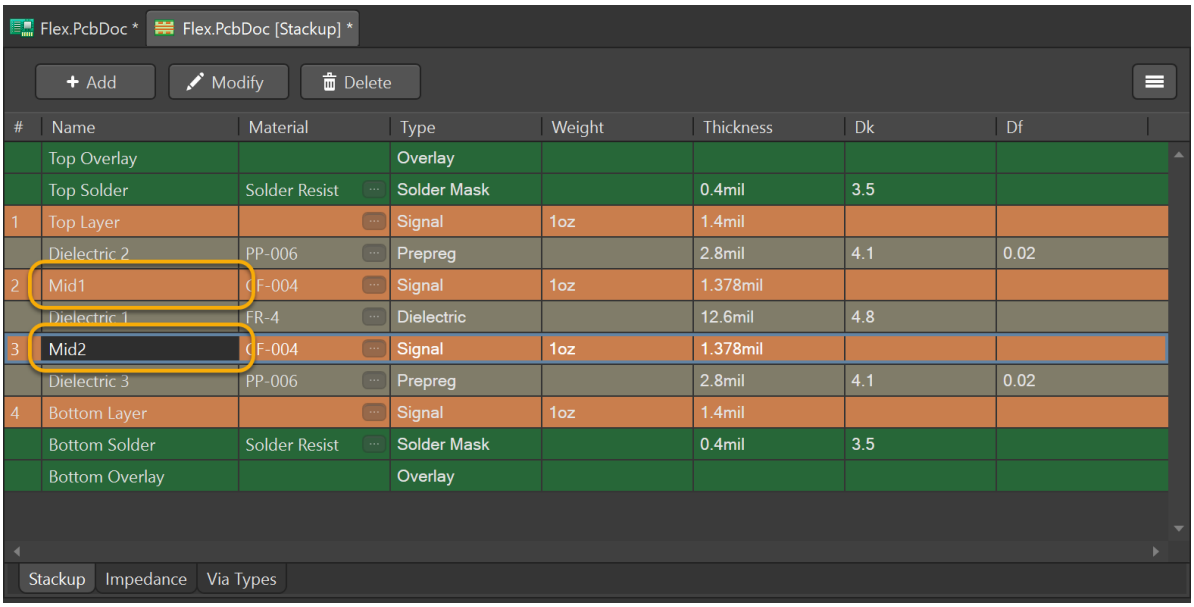


Figure 4. Layer renaming

12. We will now add some internal Plane Layers for Power and GND:
    a) Right-click on the `Top Layer`, choose **Insert layer below** and then choose **Plane**. Similar to earlier, 2 plane layers will be inserted to ensure stack symmetry.
    b) Rename `Layer 1` to `GND`.
    c) Rename `Layer 2` to `PWR`.
13. You can alter the layer ordering by right-clicking on a layer and selecting **Move Layer Up** or **Move Layer Down** where available. Your layer stack should now look like Figure 5.

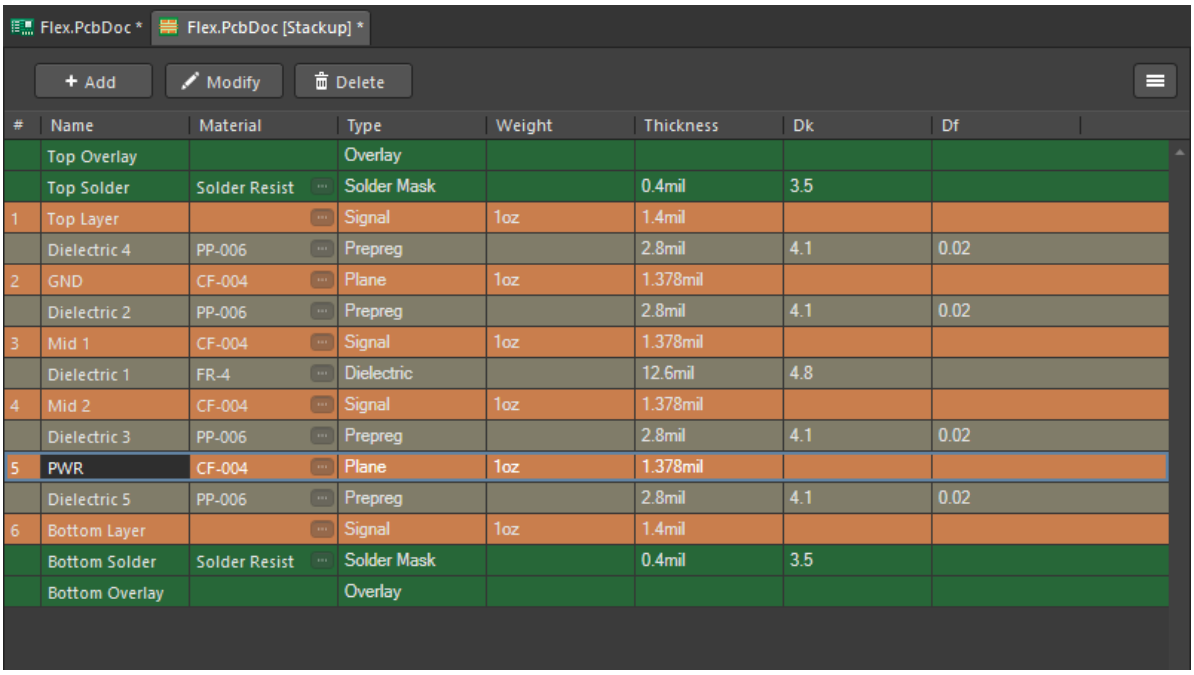


Figure 5. Complete Layer Stack

1.4.3 **Modifying the Advanced Stack**

14. Click the **Features** button in the top right corner and select **Rigid/Flex (Advanced)** as shown in Figure 6. This will allow us to add multiple layer stacks.

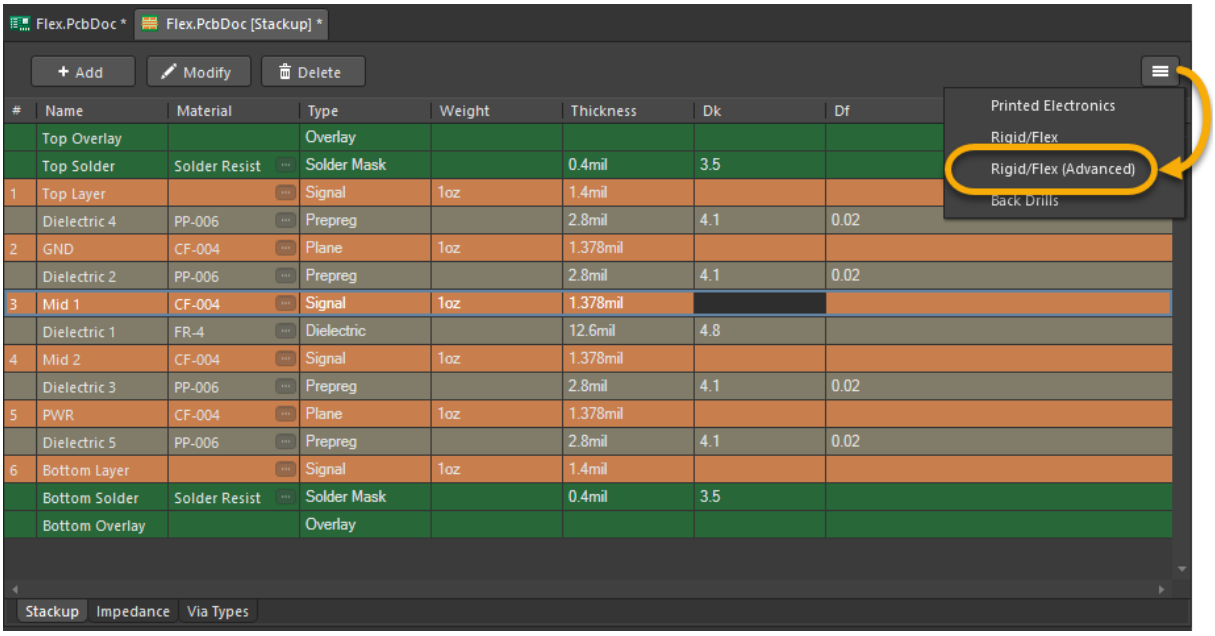


Figure 6. Advanced Layer Stack Manager View

15. With `Stack1` as the active stackup, open the *Properties* panel (Figure 7) and
    a) change the new Substack's name to `Rigid 1`
    b) change the description to `Rigid 1 - Board Layer Stack - Left Side`
    c) deactivate the option `Realistic Ratio`

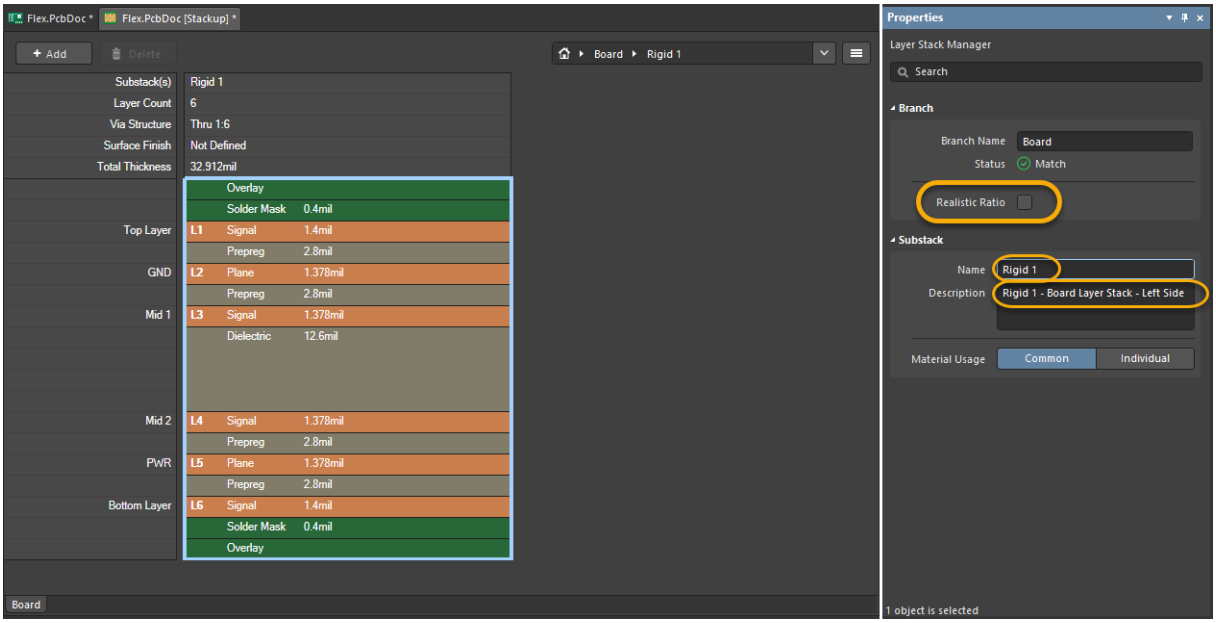


Figure 7. Change Layer Stack Properties in Properties Panel

16. Next we will add a new Flex Layer stackup as seen in Figure 8.
    a) By pressing and holding the `Shift Key` select in the current stack `L5 - Prepreg - L6.`
    b) Drag and drop the selected layers to the right side of the current stack.

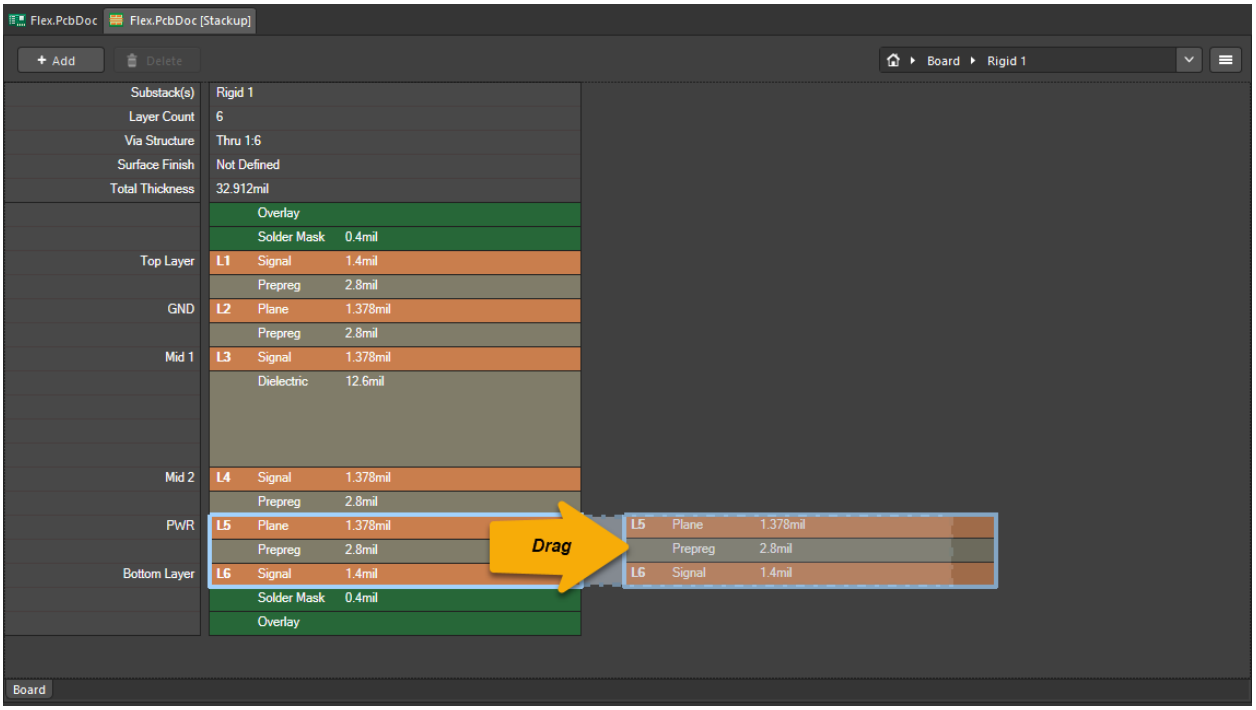
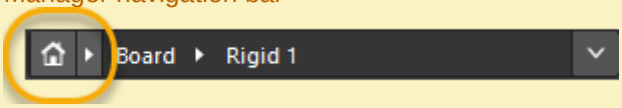


Figure 8. Adding a new Layer Stackup

If, by accident, you change the view, click on the Home Symbol at the Layer Stack Manager navigation bar



17. With `Stack2` as the active stackup, open the *Properties* panel if needed (Figure 9) and
    a) change the new Substack's name to `Flex`
    b) change the description to `Flex - Board Layer Stack`
18. The new `Flex` stackup will not have the same layers or materials as the `Rigid 1` stackup of our PCB. This means that later we need to make some modifications to the `Flex` stackup itself.
    a) Change *Material Usage* to **Individual** as shown in Figure 9.

When creating a multi-stack PCB, it would be advisable to contact your board manufacturer to obtain the correct flex material type and copper thickness information for your PCB.

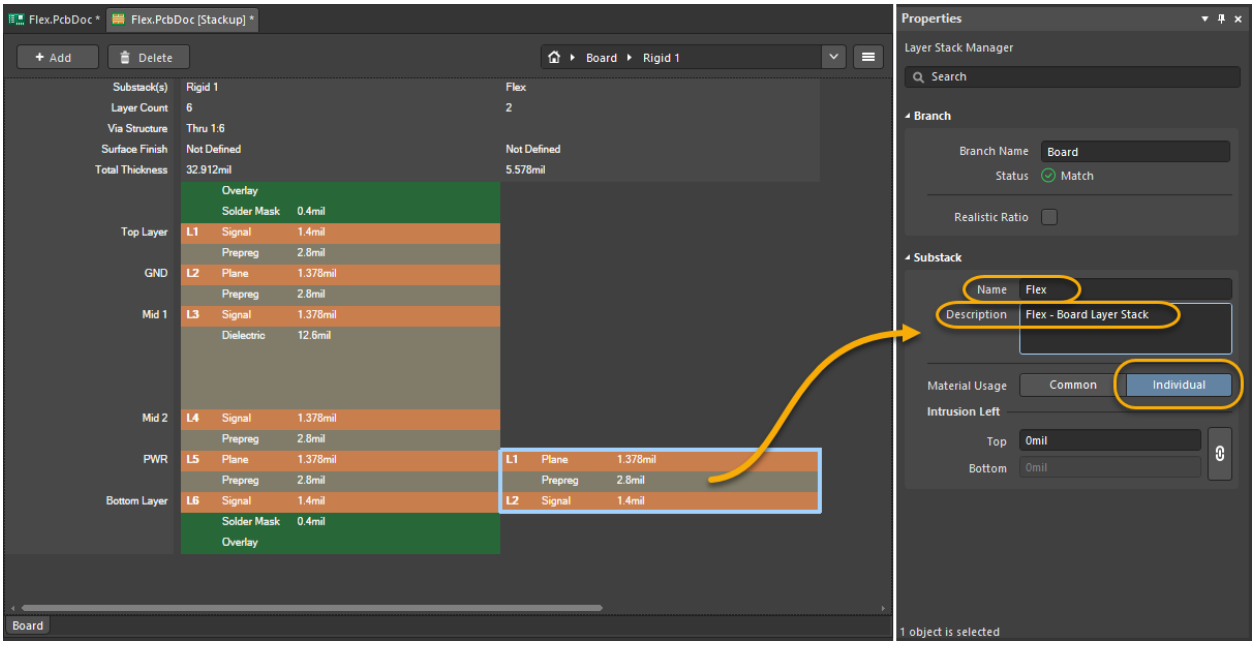


Figure 9. Name the second stack for the Flex section

19. Double-click on the Flex Substack or select the *Flex* from the Layer Stack Manager navigation bar to open it for editing in the Stackup mode of the *Layer Stack Manager*.

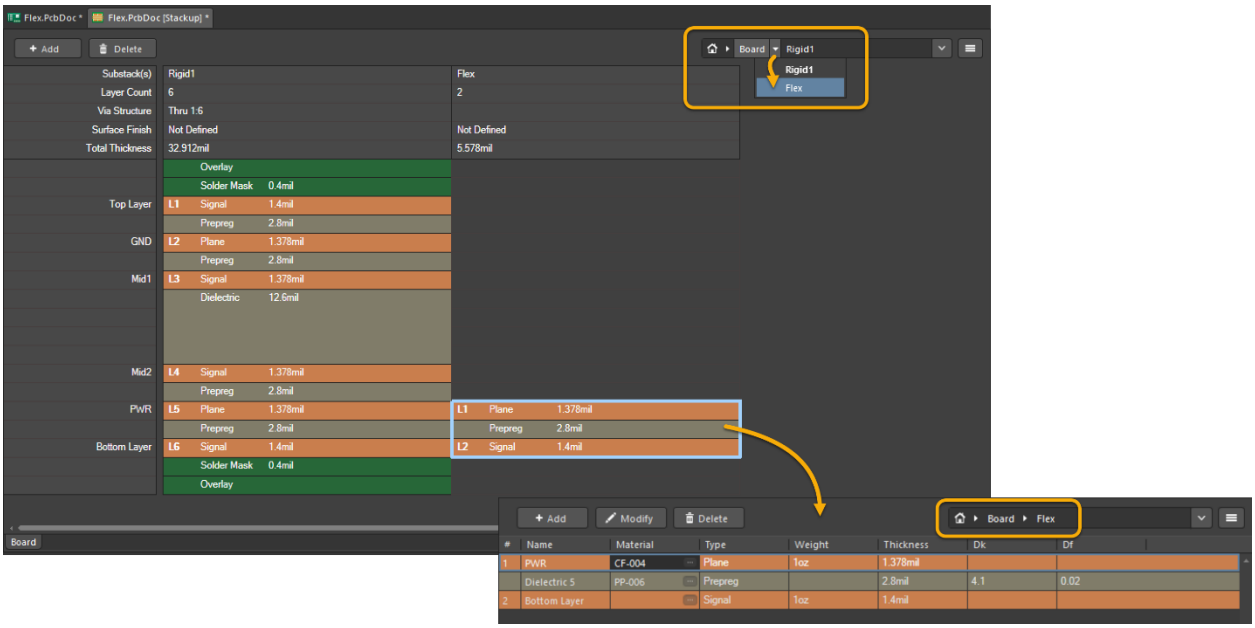


Figure 10 . Open the Stackup Mode for the Flex section

20. In the *Properties* panel activate the option **Flex** for the Sub Stack `Flex`, as seen in Figure 11.

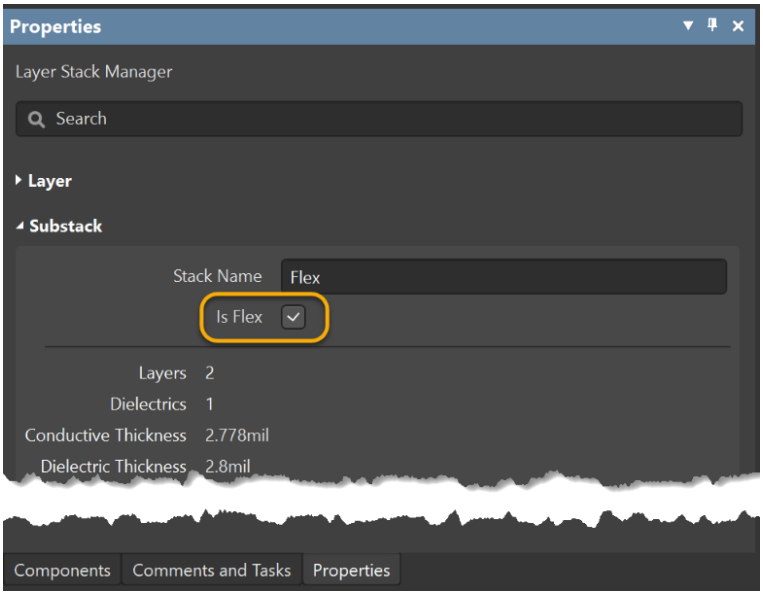


Figure 11. Properties Panel with Option Flex

21. From the layer stack, right-click on the `Bottom Layer` and choose **Insert layer below**, then select **Coverlay**.
22. Right-click on the new `Flex Bottom Solder` layer, select **Insert layer below**, and select **Overlay**. This is equivalent to the silkscreen layer for a flex stack.
23. Right-click on the `PWR` layer, select **Insert layer above**, and select **Coverlay**.
24. Right-click on the new `Flex Top Solder` , select **Insert layer above**, and select **Overlay**. When you're done, your `Flex` stackup should look similar to Figure 12.

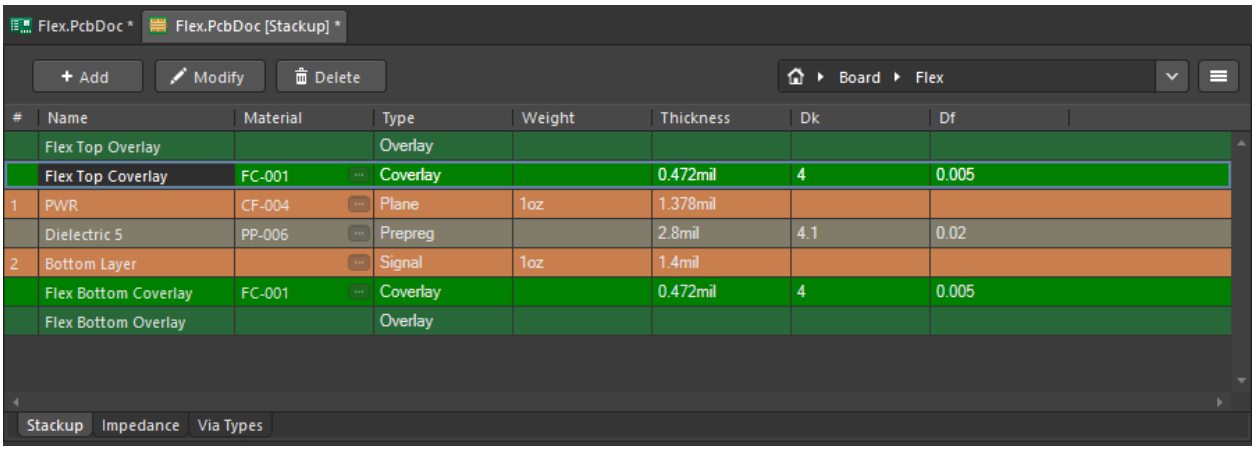


Figure 12. Stack with Flex Solder and Overlay

25. Now that we're done with the flex stack, we will add a third stack
    a) Click on the **Home** button to change back to the Board Mode 
    b) Select the `Rigid1` Substack
    c) Right click and Select **Insert Selected After > Flex** as shown in Figure 13.

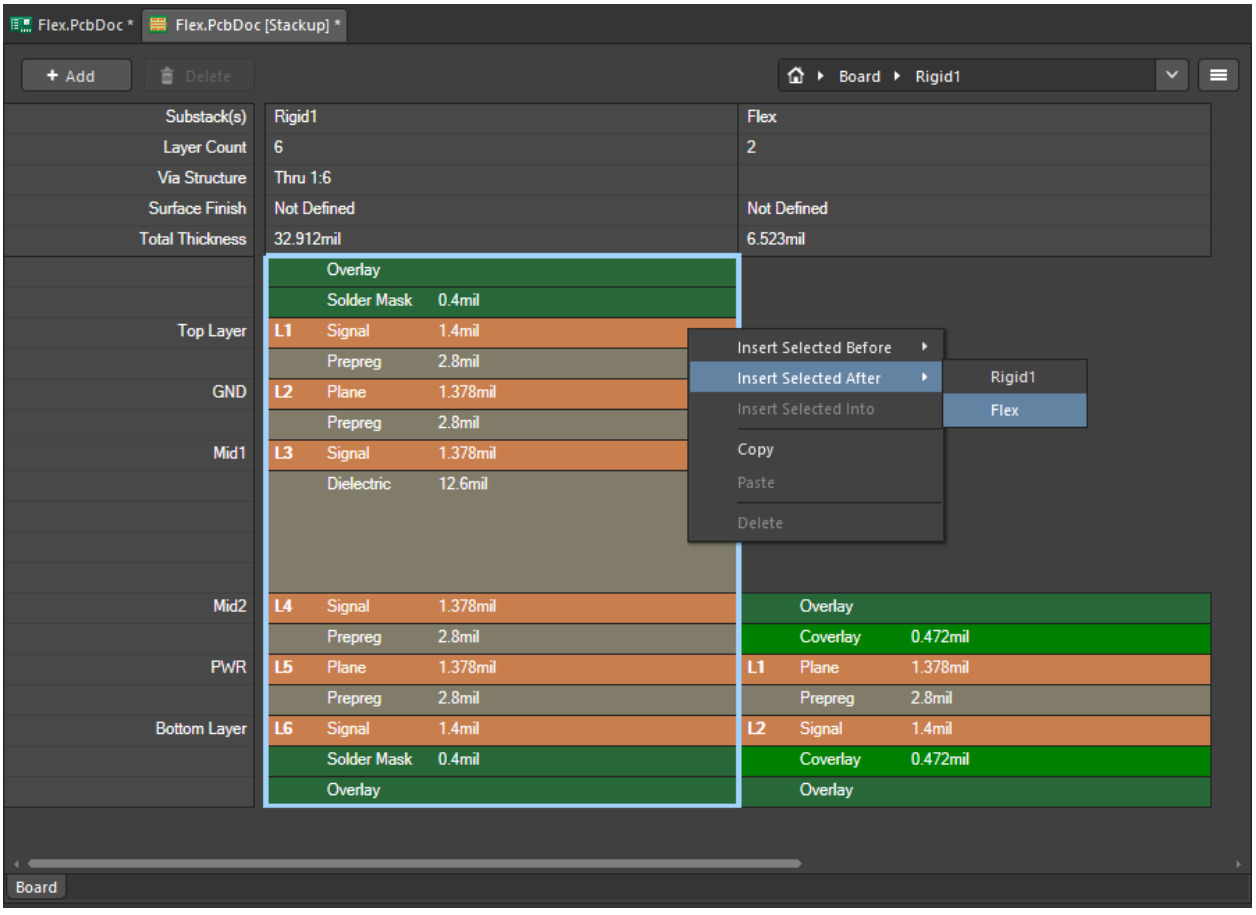


Figure 13. Adding a new third stackup

26. From the *Properties* panel, change the description to `Rigid 2 - Board Layer Stack - Right Side`. As this is the same stack as the left side the name will not be changed.

27. It can be difficult to envision what our PCB looks like, but we can use the Layer Stack Visualizer to give us an idea.
28. From the **Tools** menu, select the **Layer Stack Visualizer**. This will give you a 3D view of the PCB.
29. To see all 3 stacks in our design, enable the **Show Full Stack** checkbox near the bottom of the *Layerstack Visualizer* window as shown in Figure 14.
30. Click on the **3D** button to see all of the stackups in an isometric view.
31. Feel free to rotate the view using the **Right-Mouse-Button**. Holding **Shift+Right-Mouse-Button** will allow you to pan in this window.

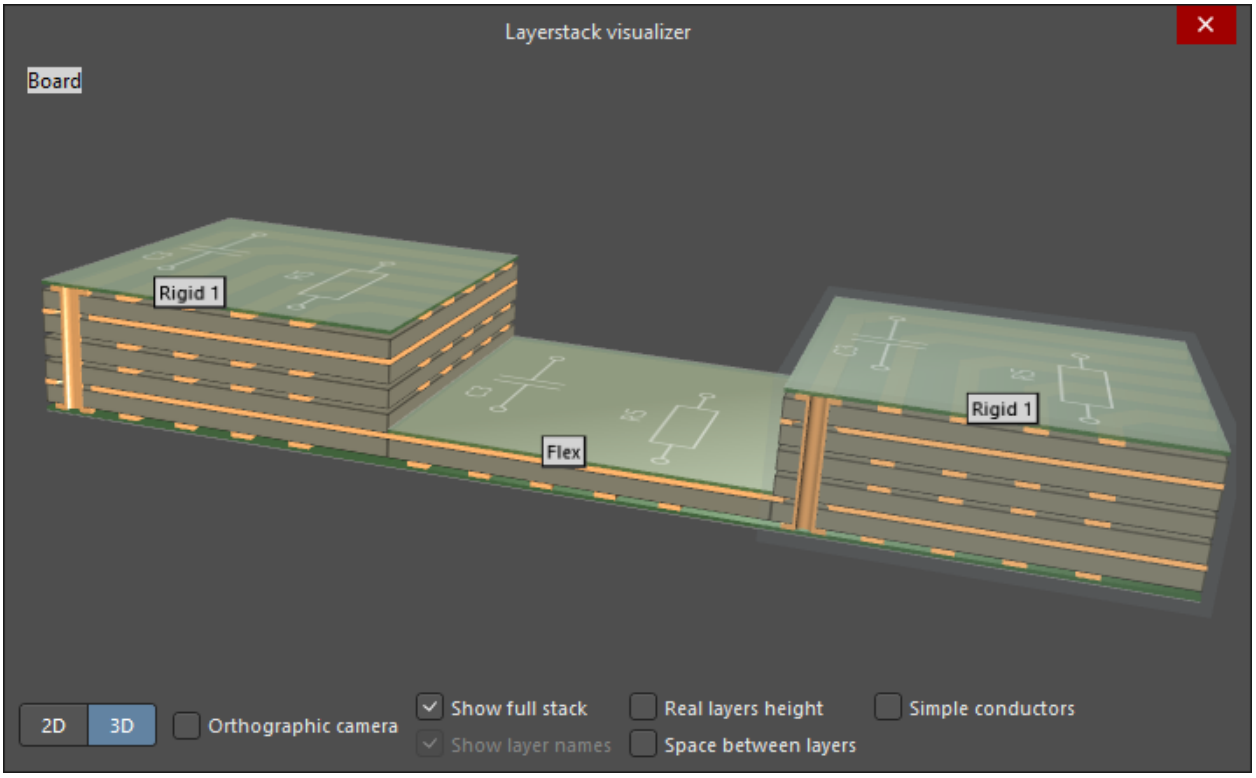


Figure 14. Rigid-Flex-Rigid Stack in 3D

For future designs, the **[Stackup]** document needs to be saved for the changes to be reflected in the PCB. If you exit the Layer Stack Manager without saving any changes, those changes will not be applied.

32. Save the modifications you made for the Layer Stack and the PCB.
33. **Close the project and any open documents.**

Congratulations on completing module

Creating Multiple Layer Stacks - Advanced Mode

from the

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Thank you for choosing Altium Designer