Altium Designer

Advanced Training with Altium 365

Defining the Board Shape from a 3D Model

Software, documentation and related materials:

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Defining the Board Shape from a 3D Model

1 Purpose

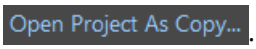
The board shape, also referred to as the board outline, is a closed shape that defines the boundary or extents of the PCB. Defining the board shape from selected objects is typically done when the board shape has been defined and imported from another tool, such as a mechanical CAD package. As the enclosure is being designed, the MCAD designer typically includes a solid model of the raw PCB, which can be referenced directly by Altium Designer to define the board shape. In this exercise, you will define the board shape using a 3D body imported as a STEP assembly.

2 Shortcuts

Shortcuts used when working with Defining the Board Shape from a 3D Model

F1	Help
P » O	Place a 3D Model
2	2D Mode
3	3D Mode
CTRL+S	Save Document

3 Preparation

1. Close all existing projects and documents.
2. Next, create a copy of the Training Project: `Defining the Board Shape from a 3D Model`.
3. Select **File » Open Project...** to open the *Open Project* dialog.
4. Enable the folder view button  .
5. Navigate to the predefined Training Project `Defining the Board Shape from a 3D Model (Top\Projects\Altium Designer Advanced Training Course\...)`.
6. Select **Open Project as Copy...** 

.
7. In the new dialog *Create Project Copy:*
   a) Add your name to the project name: `Defining the Board Shape from a 3D Model – [Your Name]`.
   b) Add a description: `Altium Advanced Training – [Your name]`.
   c) Open the *Advanced* section.
   d) Select the **Ellipsis Button**  from the *Folder* configuration to open the *Choose Folder* dialog.
      i) Select the folder with your name: `Project\For Attendees\[Your name]`.
      ii) Select **OK**.
   e) Change the **Local Storage** path if needed.
   f) Select **OK** to create the copy.
8. Wait until Altium Designer creates the copy of the project and opened the Project for you in the *Projects* panel, this may take up to 1 minute.

Hint: For details how to copy the predefined training project, see module *03 Getting started - Opening a Project*.

4 Defining the Board Shape

For the Training, you will use the STEP DT01 model that was uploaded to the workspace.

9. Open the PCB `Defining the Board Shape from a 3D Model.PcbDoc`.
10. Open the *Explorer* panel **K » R** and browse to the folder `Mechatronik 3D Models` → `Case – Housing`.

> Note: The *Explorer* panel shouldn't overlap the workspace with the loaded PCB.

11. Select the STEP with the name `DT01`:
    a) Right click and select **Place...**
    b) Move your cursor back in the PCB area.
    c) Wait until Altium Designer prepares the STEP Model and changes the focus to the PCB File. This may take up to 1 minute, depending on the complexity of the Model and the Internet connection.
12. After the tool prepared the STEP Model, you will see a hatched rectangle attached to the cursor in the PCB.
13. With the 3D body on your cursor, hit the **TAB key** to pause the placement.
14. In the *Properties* panel, follow the steps below, as shown in Figure 1:
    a) Change the *Layer* to `6_External 3D Body`.
    b) Change the *Rotation Z°* to `90`.

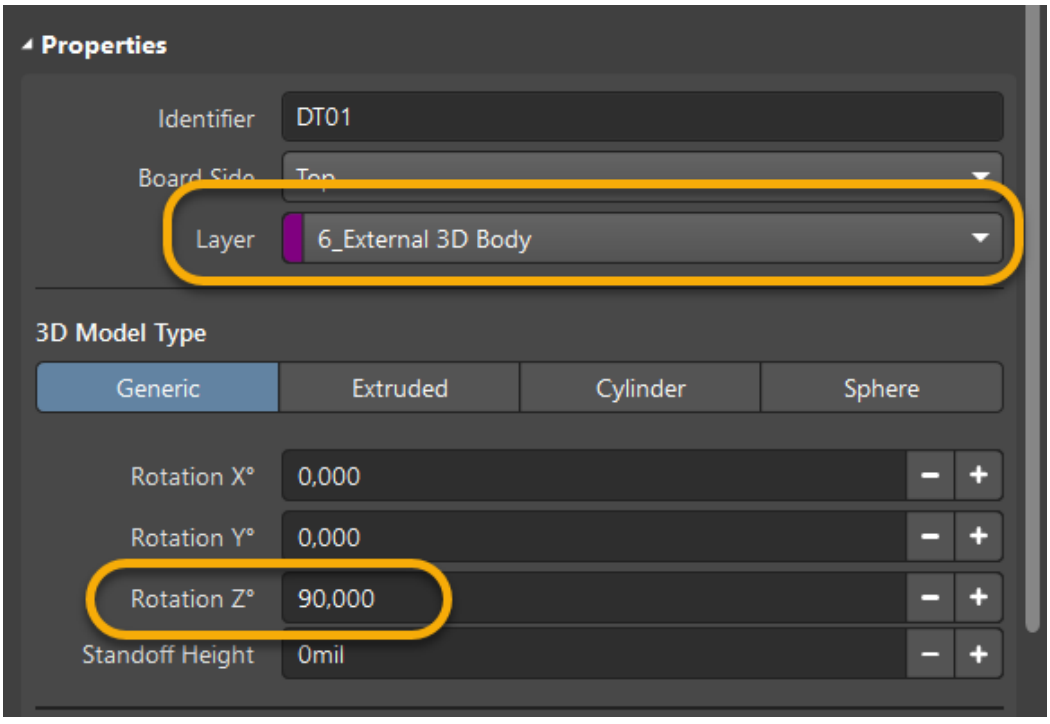


Figure 1. Change Model Rotation in 3D Body Dialog

15. Select the **Pause icon** to continue placing the 3D body.
16. Left-click to set the location of the 3D body within the current board shape.
17. Right-click to exit the command.
18. Left-click in any open space to deselect the 3D Body.

19. Switch to the 3D view by pressing the **3** key on the keyboard. You will see the added 3D model, as shown in Figure 2 below.

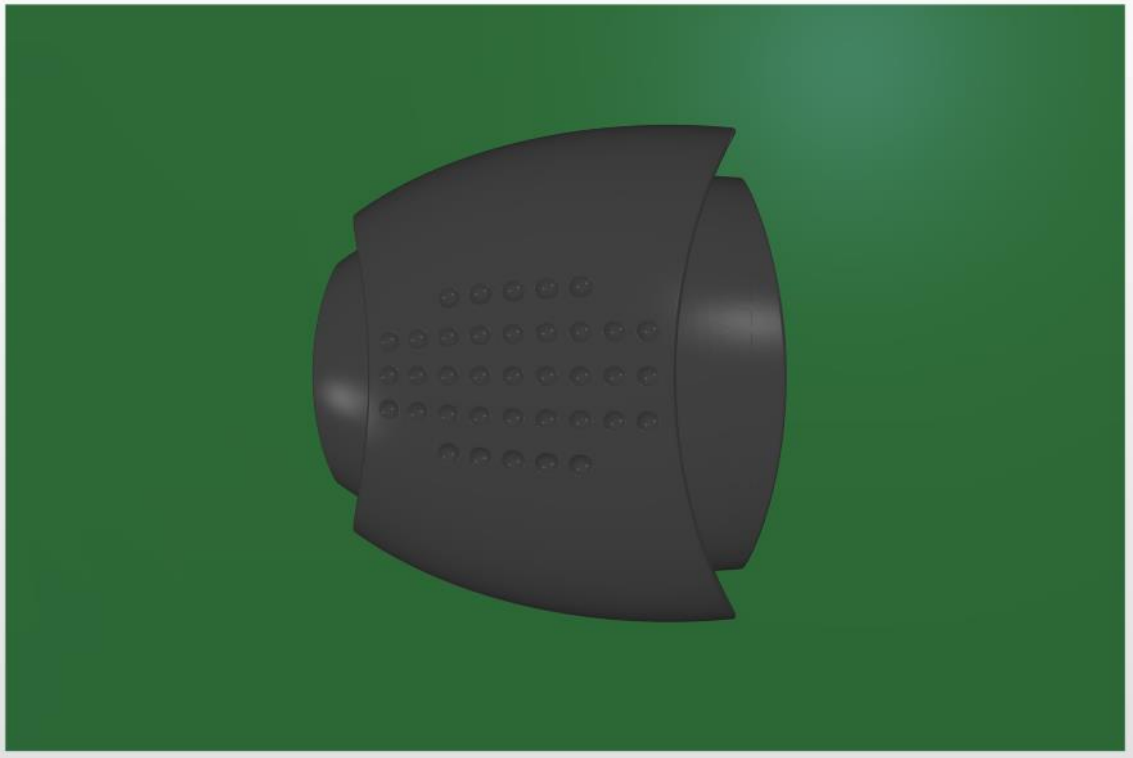


Figure 2. 3D View of Placed STEP Assembly

20. Open the *PCB* panel from the **Panels** button.
21. From the drop-down list at the top the panel, select **3D Models**, as shown in Figure 3.

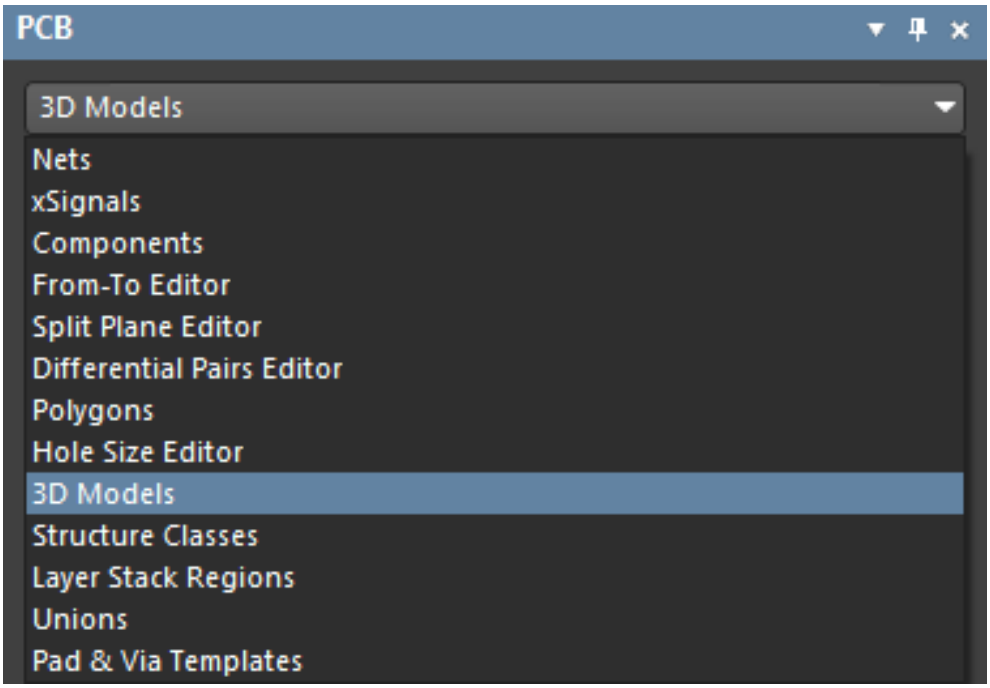


Figure 3. 3D Models from the PCB panel

22. In the *PCB* panel, you can see the *Free Models* section. Select *Free Models.* You'll then see the `DT01` assembly in the *Model* section, as shown in Figure 4.
23. Click on the arrow to the left of `DT01` to expand all of the models included in this assembly. It has three parts:
    a) `Case - bottom half-2`
    b) `Case - top half-2`
    c) `PCB Assembly-2`

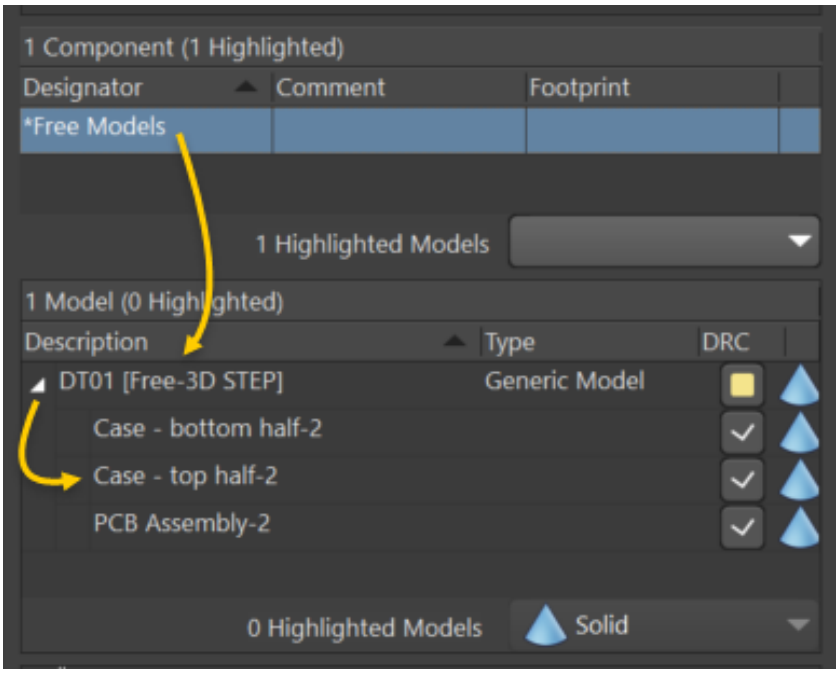


Figure 4. DT01 models from the PCB panel

24. To create the board shape, you need to select one of the faces of the `PCB Assembly-2` model. Start with hiding the `Case - bottom half-2` and `Case - top half-2` by clicking on the blue cones until a red `X` appears, as shown in Figure 5.

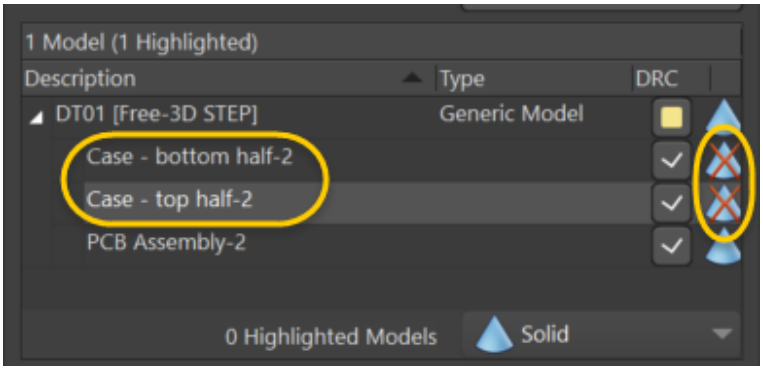


Figure 5. PCB panel with3D Models

25. To define the new board shape, go to the **Design menu and select Board Shape » Define Board Shape from 3D body**.
26. With the cross on your cursor, left-click on the white model.
27. After the first left-click, you'll be prompted to select the face that you want to create the outline from. Left-click on the white face again.
28. If successful, you'll be prompted with a *Board Outline Creation Successful* dialog.

29. Accept the default values for the *Board Outline Creation Successful* dialog by clicking on the **Close** button, as shown in Figure 6.

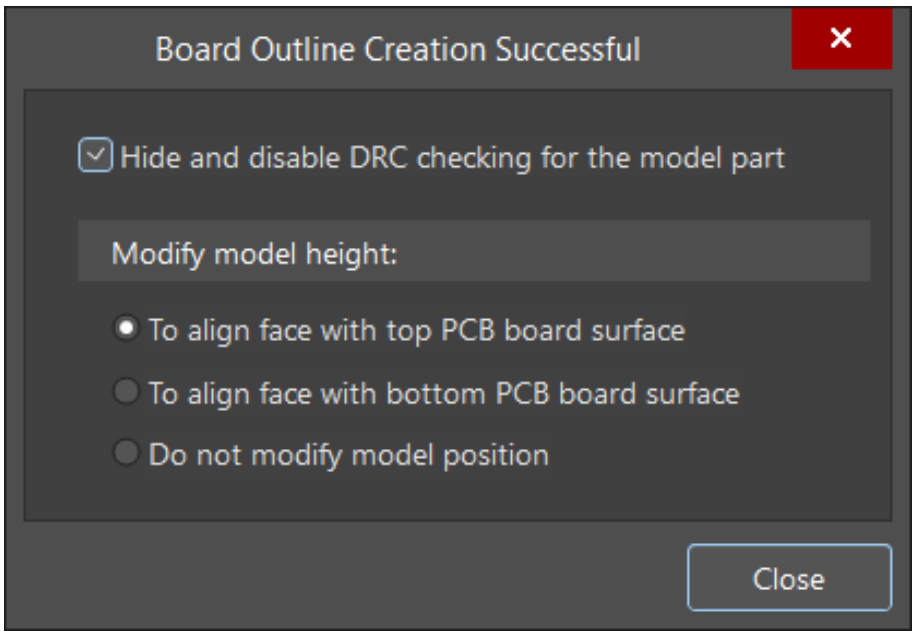


Figure 6. Board outline successful dialog

30. The board shape is now defined as shown in Figure 7.

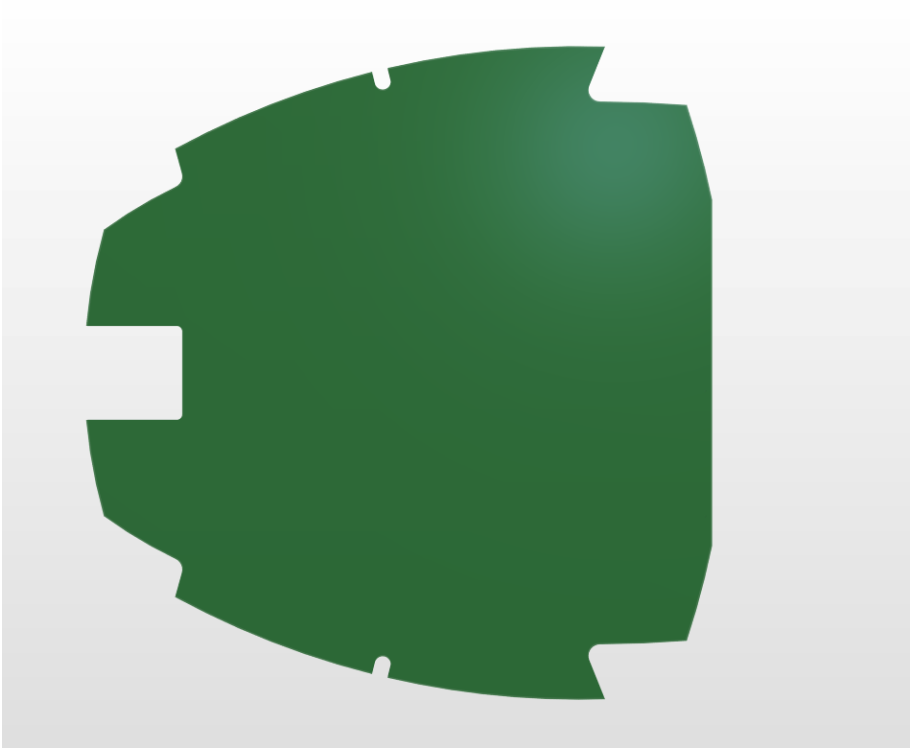


Figure 7. Resulting Board Shape in 3D Mode

31. Return to the 2-dimension view by pressing the **2** key. You'll notice your new PCB board outline. It's not necessary to keep the 3D enclosure in your design, however, it is recommended to keep the enclosure for 3D clearance checking.
32. To hide the 3D body in 2D, you can hide the mechanical layer it resides on, by using the *View Configuration* panel, in the *Layers & Colors* tab.

33. Back in 3D, you can enable the visibility of the `Case - bottom half-2` and `Case - top half-2` by clicking on the blue cones in the *PCB* panel to change their opacity. The result should look similar to Figure 8.

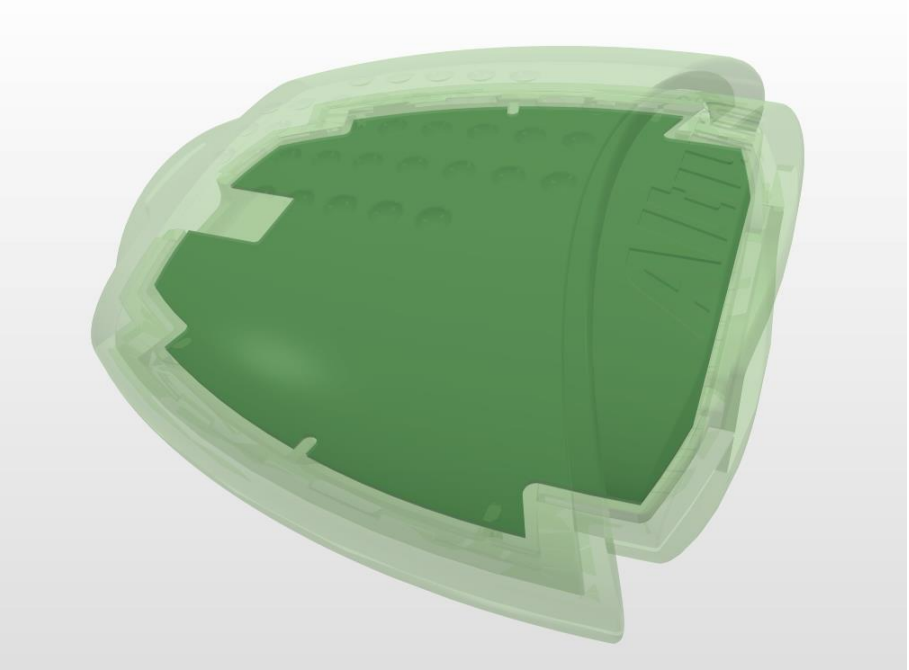


Figure 8. Final assembly in 3D mode with the enclosure opacity set to 25%

34. Save all documents using **File » Save All**.
35. Save the modifications to the server:
    a) In the *Projects* panel, next to the Project name you find the command **Save to Server** Save to Server.
    b) Select **Save to Server**.
    c) In the dialog *Save [Project Name]:*
        i) Add the comment `Defining the Board Shape from a 3D Model - [Add Your Name] - Finished`.
        ii) Select **OK**.
36. When ready, close the project and any open documents, **Window » Close All**.

Congratulations on completing the Module!

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Altium Designer Advanced Training with Altium 365

Thank you for choosing **Altium Designer**