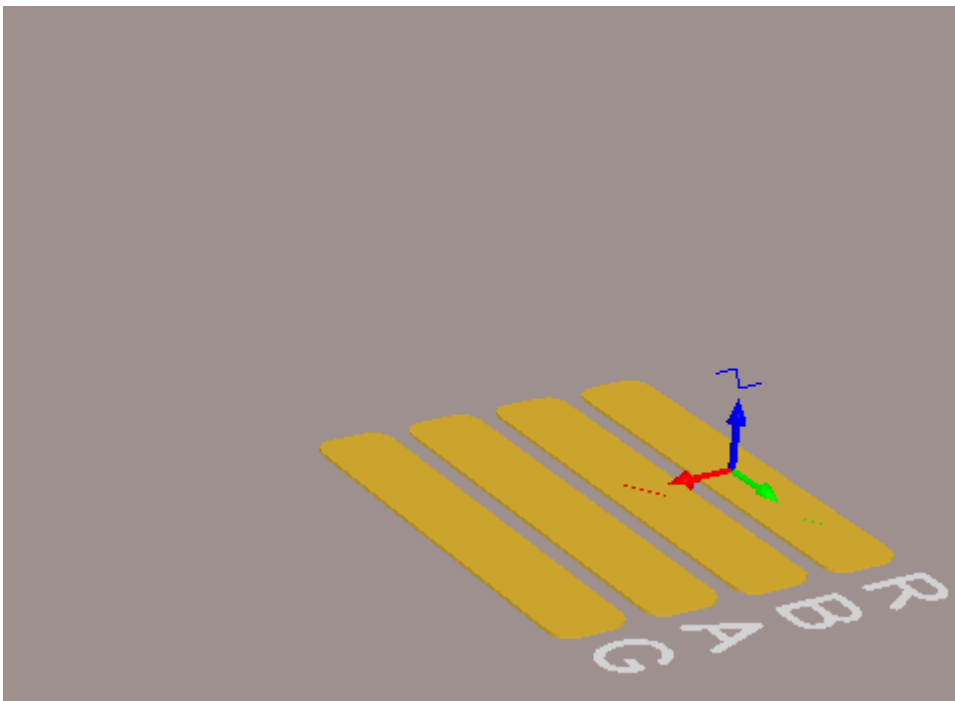


3D Body

Modified by Phil Loughhead on Dec 13, 2015

Parent page: [Objects](#)



A sphere, a cylinder and 4 extruded rectangles have been used to create the 3D body for an LED.

Summary

A 3D body is a primitive polygonal design object that is used to represent the 3 dimensional shape of the physical component that is mounted on the assembled PCB. Any number of 3D body objects can be used together to create complex shapes. The available 3D body shapes include extruded polygon, cylinder and sphere. They can be placed into a PCB library component footprint or a PCB document. Their overall shape is displayed when the editor is switched to 3D display mode (press the **3** shortcut). 3D body objects can be placed on any mechanical layer.

Placing 3D Body objects to define the components' shape allows the designer to get a real sense of the arrangement and organization of the components on the assembled board. As well as being able to see what the finished board will look like, real-time 3D clearance checking can be performed. Working in the PCB Editor's 3D mode is greatly enhanced by using a [3D mouse](#), this makes the process of moving and turning the component or board very easy, it is much like holding that component or board in your hand.

STEP models can also be used, by importing the model into a 3D Body object. STEP formats AP203 and AP214 are supported. In this situation the 3D Body object simply acts as a container for the STEP model, you cannot graphically modify the 3D Body object or the enclosed STEP model.

Availability

3D bodies are available for placement in both the PCB editor and the PCB Library editor.

PCB Editor

Use the following method to place a 3D body in the PCB editor:

- Click **Home** | **Place** |  **3D Body** .

PCB Library Editor

Use the following method to place a 3D body in the PCB Library editor:

- Click **Home** | **Place** |  **3D Body** .

Placement

The placement process for a 3D body is the same in both the PCB Library editor and the PCB editor. After launching the command the *3D Body* dialog will open. Placement is made by performing the following sequence of actions:

1. In the *3D Body* dialog select the **3D Model Type** from the available shapes: **Extruded**, **Cylinder** or **Sphere**.
2. Each 3D body can be named, this helps identify each element when multiple 3D bodies are placed to create a complex shape. Enter a suitable name in the **Identifier** field.
3. Each shape must have a defined size before it can be placed. If the chosen shape is **Extruded** then define the **Height**, if it is **Cylinder** define the **Radius** and **Height**, if it is **Sphere** define the **Radius**.
4. Set the **3D Color** and the **3D Color Opacity** as required. Note that these can be edited later if needed.
5. Click **OK** to close the dialog and return to the workspace.
6. If the shape is Cylinder or Sphere, the cursor will be moving in the workspace with a rectangular shape attached. Click to place the 3D body.
7. If the Shape is Extruded the cursor will present, ready to define the the polygonal base shape of the extruded 3D body. Click to define the first vertex.
8. Move the cursor ready to place the second vertex. The default behavior is to place 2 edges with each click (as shown in the first 5 images in the set below), with a user-defined corner shape between them. Refer to the Placement Modes topic below for more details on changing corner modes and the number of edges that will be placed with each click.
9. Continue to move the mouse and click to place further vertices.
10. After placing the final vertex, right-click or press **Esc** to close and complete placement of the 3D body. There is no need to manually close the 3D body as the software will automatically complete the shape by connecting the start point to the final point placed.



11. The 3D Body dialog will re-appear, ready to configure the next 3D Body for placement. Configure the dialog settings and continue placing 3D bodies, or click **Cancel** to exit placement mode.

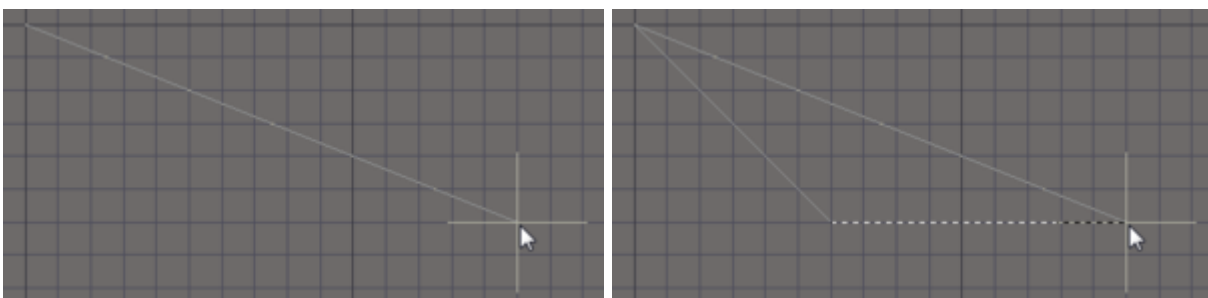
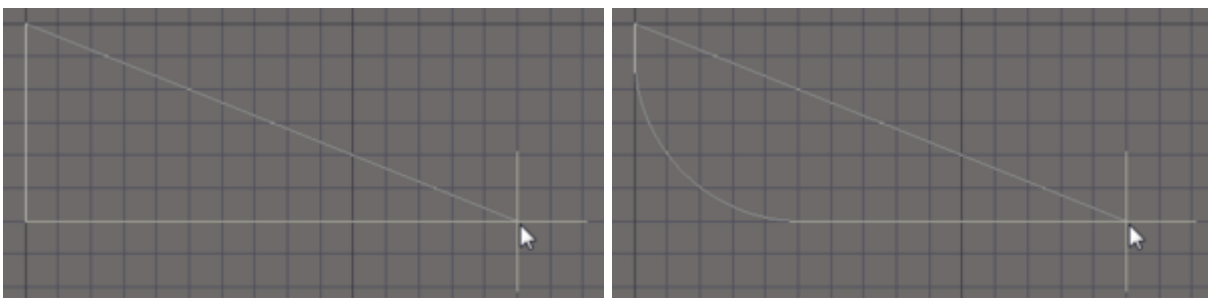
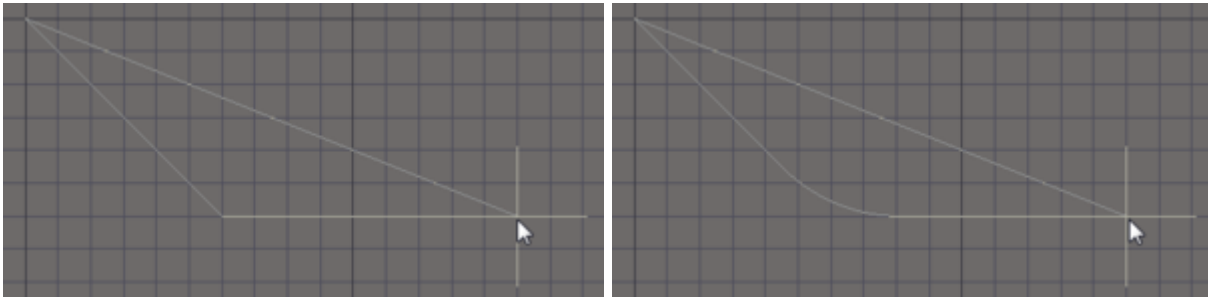


3D body objects can be placed with the display in 2D mode or 3D mode. When a 3D body is placed in 3D mode, object movement is restricted to the X, Y plane, that is the cursor cannot be moved in the Z direction. Generally it is easier to perform initial placement in 2D mode, where objects can more easily be aligned.

Placement Modes

While placing an extruded 3D body there are 5 available corner modes, 4 of which also have corner direction sub-modes. During placement:

- Press **Shift+Spacebar** to cycle through the 5 available corner modes: 45 degree, 45 degree with arc, 90 degree, 90 degree with arc, and Any Angle.
- Press **Spacebar** to toggle between the two corner direction sub-modes.
- When in either of the arc corner modes, hold the  or  keys to shrink or grow the arc. Hold the **Shift** key as you press to accelerate arc resizing.
- Press the **1** shortcut key to toggle between placing 2 edges per click, or one edge per click. In this second mode the dashed edge is referred to as the look-ahead segment (as shown in the last image in the set below).
- Press the **Backspace** key to remove the last vertex.



Press Shift+Spacebar to cycle through the 5 available corner modes, press the 1 shortcut to toggle placement between 2 edges or 1 edge.

Graphical Editing

This method of editing allows you to select any placed polygonal-shaped object directly in the workspace and change its size and/or shape, graphically. All polygonal objects, including polygons, regions and 3D body objects, share the same graphical editing techniques.

The basic approach to editing a polygonal-shaped object is:

- Click once to select the object - editing handles (vertices) will appear at each corner, as well as a handle at the center of each straight or curved edge. For a polygon, you must first switch to the layer that the object is placed on to be able to select it.
- Click and hold on a handle to move it: if it is a center handle (displayed as hollow) you will be breaking the edge, if it is an corner (end) handle (displayed as solid), you will be moving the vertex.
- To move an edge of the polygonal object, click and hold anywhere along the edge then slide it to the required location.
- To remove a handle, click and hold on it, then press **Delete** on the keyboard.

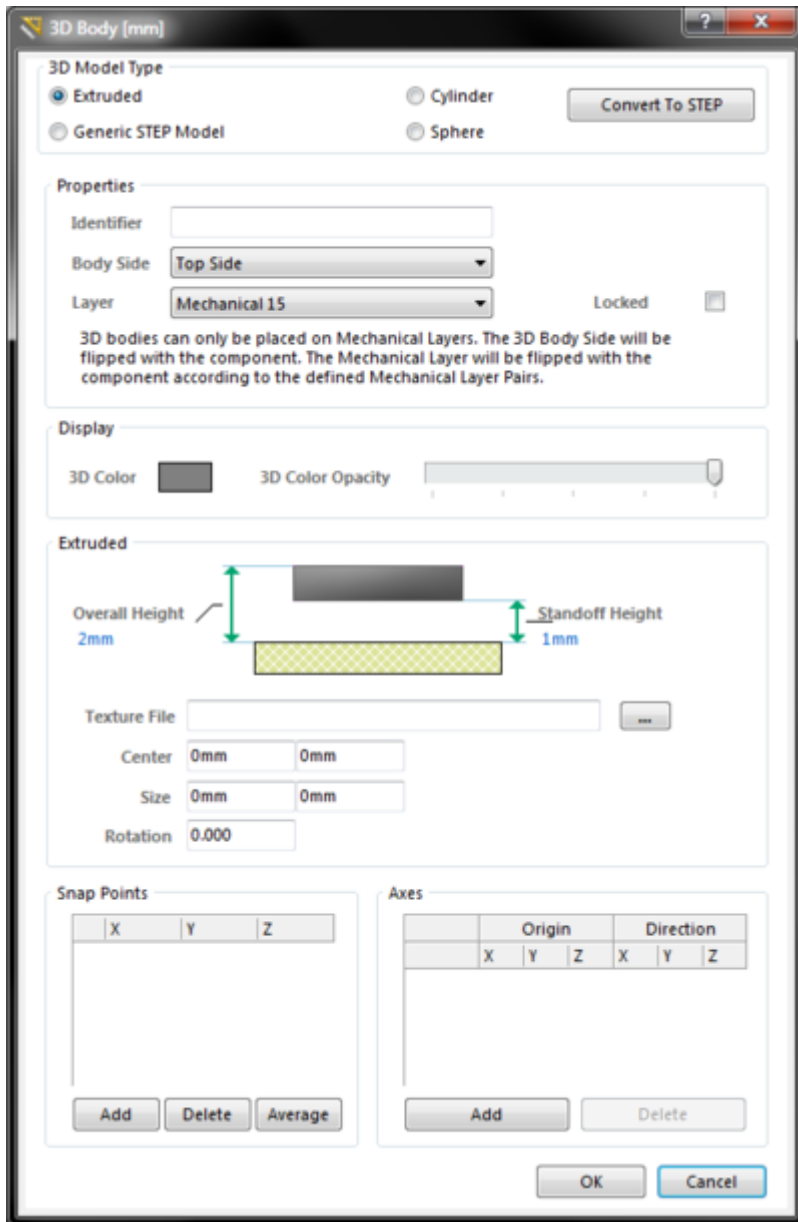
Non-Graphical Editing

The following methods of non-graphical editing are available:

Editing via an Associated Properties Dialog

Dialog page: [3D Body](#)

This method of editing uses the [3D Body dialog](#) to modify the properties of a 3D body object.



The 3D Body dialog.

The 3D Body dialog can be accessed prior to entering placement mode, from the **PCB Editor - Defaults** page of the *Preferences* dialog. This allows the default properties for the 3D body object to be changed, which will be applied when placing subsequent 3D bodies.

During placement, the dialog can be accessed by pressing the **Tab** key.

After placement, the dialog can be accessed in one of the following ways:

- Double-clicking on the placed 3D body object.
- Placing the cursor over the 3D body object, right-clicking and choosing **Properties** from the context menu.

Editing via the Inspector Panel

Panel pages: [PCB Inspector](#), [PCBLIB Inspector](#)

An *Inspector* panel enables the designer to interrogate and edit the properties of one or more design objects in the active document. Used in conjunction with appropriate filtering, the panel can be used

to make changes to multiple objects of the same kind, from one convenient location. The *Inspector* panel is ideal for editing 3D body objects as the changes can be seen in the workspace without needing to close a dialog. For example, if you are aligned two body objects with the display in 3D mode, you can watch as you change the **Model Z** setting for one of the objects (there is a brief pause after changing a 3D Body setting in the *Inspector* panel).

Other 3D Body Editing Features

Including a Texture

Extruded objects can also include an image overlaid on the upper most surface. When a **Texture File** is added it is automatically stretched to fit to cover the entire upper surface of the 3D body, as shown in the image below. This can be adjusted by altering the **Center** location, **Size** and **Rotation** settings in the *3D Body* dialog. Note that the texture file is embedded in the Library or Board file.

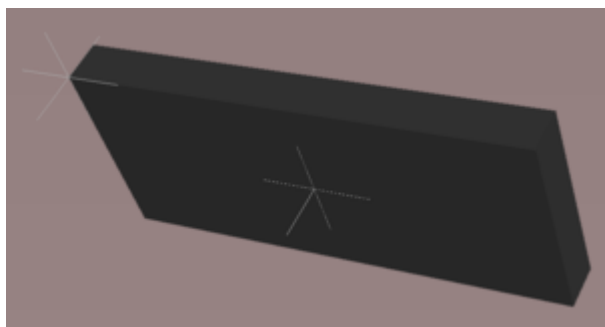
Supported Texture File formats include: *.bmp;*.dds;*.dib;*.hdr;*.jpg;*.pfm;*.png;*.ppm;*.tga



A texture or logo can be added to an extruded 3D Body object.

Snap Points and Axes

Snap points and lines of Axis can be added to a 3D body. Snap points define points at which the 3D body can be held. When the cursor is moved close to a snap point and a click and hold is performed, the cursor will jump to and hold the 3D body at the snap point. The image below shows a 3D body with 2 snap points defined. Axes can be added to provide a visual aid for positioning and orienting a 3D body.



Add Snap Points to a 3D Body to hold the object during positioning.

If attempting to graphically modify an object that has its **Locked** property enabled, a dialog will appear asking for confirmation to proceed with the edit. Double click on the locked object directly and disable the **Locked** property to graphically edit the object.

Maintaining Component Clearances

Add Component Clearance design rules to check for collisions between components that include 3D body objects in the X, Y and Z planes. This allows the designer to fit one component over another component. Multiple rules can be defined to handle different clearance requirements. Note that the Design Rule Check does not test for 3D body objects passing through the board.

Source URL: [http://documentation.circuitmaker.com/display/CMAK/PCB_Obj-3DBody\(\(3D+Body\)\)_CM](http://documentation.circuitmaker.com/display/CMAK/PCB_Obj-3DBody((3D+Body))_CM)