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**Contractor/manufacturer is:**

Mentor Graphics Corporation

8005 S.W. Boeckman Road, Wilsonville, Oregon 97070-7777.

Telephone: 503.685.7000

Toll-Free Telephone: 800.592.2210

Website: [www.mentor.com](http://www.mentor.com)

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# Chapter 1

## Introduction to 3D PCB Viewer

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The 3D PCB Viewer application from Mentor Graphics Corporation provides you with a three-dimensional view of printed circuit board (PCB) designs and their components. PCB layouts can be flipped and rotated to give you views from the top, bottom, and sides in either two- or three-dimensions. The view can also be filtered so as to show or hide the components and traces that are located on the top or bottom of the board or on specific board layers. Planes can be filtered on any layer. Also, Board, Contours, Mounting Holes and Other Holes can be filtered.

The 3D PCB Viewer can also import and align mechanical models or three-dimensional cells so that you can see how the parts will fit together when assembled.

The 3D PCB Viewer is strictly a passive viewer so that it cannot be used to make any changes to the design itself. It simply provides you with greatly expanded viewing capabilities, including dynamic view updates that show changes to the state of the design in the active layout tool. Some possible uses for the 3D PCB Viewer include:

- Getting a three-dimensional view of DRC violations to better visualize layout problems.
- Loading data for auxiliary parts and translating them so as to see how assemblies will fit together.
- Hiding specific components (as opposed to hiding an entire layer) so that you can see what is underneath (jumpers, for example).

## Licensing

There are both licensed and unlicensed versions of the 3D PCB Viewer application. In the unlicensed version, the features that require a license are displayed dim to indicate that they are unavailable.

## Launching the 3D PCB Viewer

### Note



The 3D PCB Viewer uses OpenGL to display 3D graphics. X servers that do not support remote OpenGL displays cannot render graphics generated by the 3D PCB Viewer. For Exceed, only recent versions with a 3D display option can remotely display OpenGL graphics. Even in this case, performance can be slow because of the lack of hardware graphics acceleration. Therefore, Mentor Graphics recommends always running 3D PCB Viewer on the local display rather than remotely through an X server.

---

Select **View> 3D View...** with a PCB or a panel design open in Pads.

## Display Characteristics

The 3D PCB Viewer uses the following display conventions. By default, objects are displayed using symbolic colors instead of the real colors.

### 1. Board

- The outline of the PCB shows the shape of the board outline. The thickness is determined by the board's physical layer stackup.
- Mounting holes are displayed in the same color as the board.
- Contours in the board are displayed as voids within the board shape. Contours of type "internal" and "board" are modeled.

### 2. Components

- Components are modeled based on the placement outlines in the cell definition.
- RF components are treated as conductive shapes.
- When rendered symbolic, components are displayed using the same colors as are used in the design.
- When rendered real, components are displayed in charcoal grey to simulate the color of a typical IC package, and the colors used in the design.

### 3. Pins

- Pins are attached to the component that they are associated with.
- Pins are modeled as pad stacks.
- When rendered real, pins are copper colored.
- The default color for pads is copper.

### 4. Traces and Pads

- Traces and Pads are created for all PCB layers, and are displayed on their respective layers.
- Traces appear as flat (two-dimensional) ribbons placed at their layer height. If Thick Trace is selected, then traces are displayed using the actual characteristics that are contained in the layout database, making them appear three-dimensional. Likewise, if Thick Pad is selected, then pads are displayed using the actual characteristics that are contained in the layout database.
- When rendered symbolic, traces are displayed in their design layer color.
- When rendered real, the traces and pads are a copper color.

5. Planes and conductive shapes are displayed as two-dimensional objects. Conductive shapes have a thickness that toggles with traces while planes thickness is not displayed.
6. Placement obstructs are modeled as planar shapes placed at their height off the board.
7. Route Border
  - All Route Border edges are rendered as a bright outline in the same color as its sides.
  - In top or bottom views a route border appears as a thin line.
8. Route Obstruct
  - “*Trace*”, “*TraceVia*” and “*Via*” are types of Route Obstructs.
  - A Route Obstruct is displayed in red.
  - In top or bottom views a route obstruct appears as a thin line.
  - All Route Obstruct edges are rendered as a bright outline in the same color as its sides.



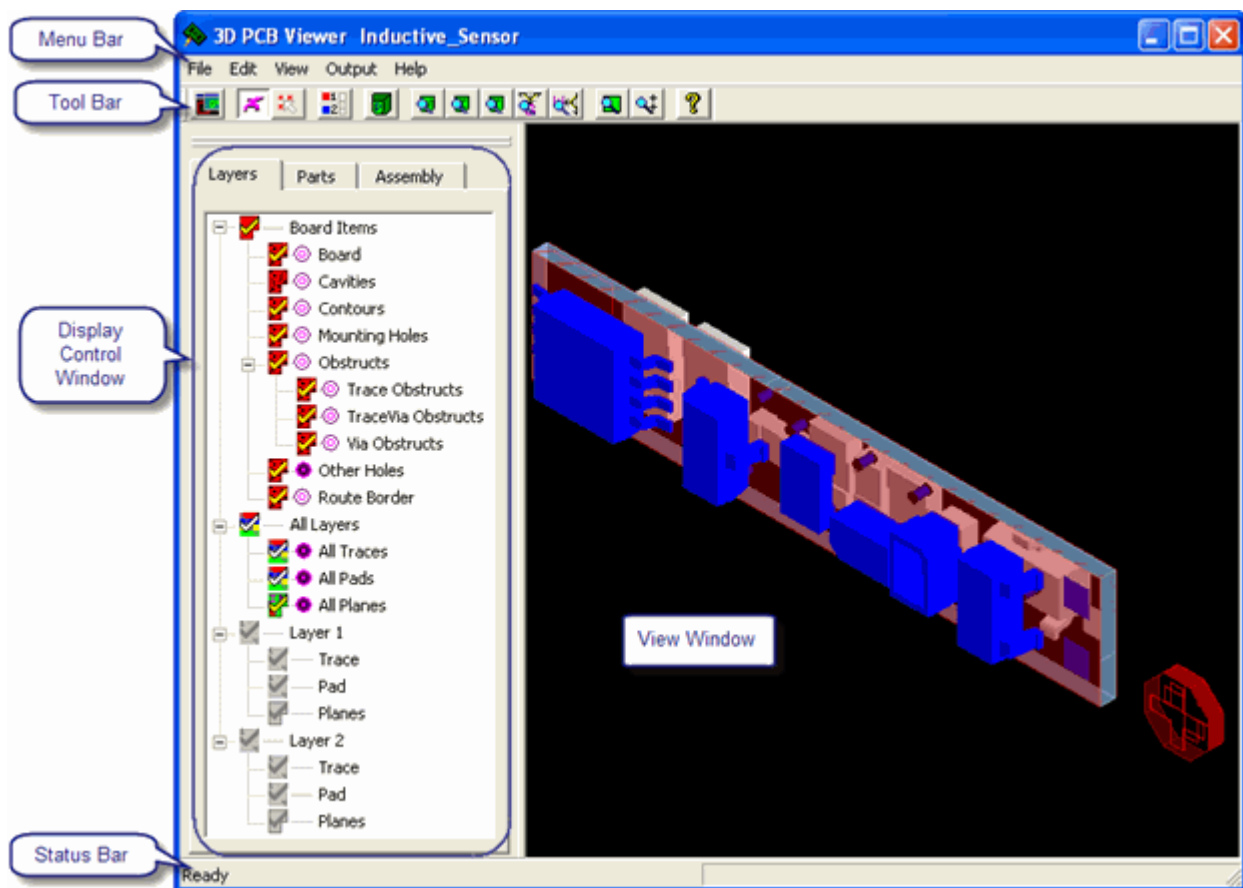
# Chapter 2

## 3D PCB Viewer Quick Reference

### 3D PCB Viewer Window Layout


Figure 2-1 illustrates the layout of the 3D PCB Viewer window. The controls available in the window are described in Table 2-1.

Figure 2-1. 3D PCB Viewer Window












## Command Summary



**Table 2-1. 3D PCB Viewer Commands**

Menu Command	Function	Icon
<b>File Menu</b>		
File> Auxiliary File Import	Opens the “ <i>Auxiliary File Import</i> ” dialog box from which you can import additional files. For example, you can import additional mechanical information that was created with other software applications. Refer to <a href="#">Importing Data from Auxiliary Files</a> for more information.	
File> 3D Cell Import	Opens the “ <i>3D Cell Import</i> ” dialog box from which you can import three-dimensional models to get a more accurate rendering of the components used in the design. Refer to <a href="#">Importing Three-Dimensional Cells</a> for more information.	
File> Batch Import 3D Cells	Opens a standard directory file browse dialog from which you can import all the three-dimensional models in the selected directory.	
File> Print Setup	Invokes the “ <i>Page Setup</i> ” dialog box through which you can set the Paper, Orientation and Margin options before printing.	
File> Print Preview	Allows you to view the shape of the printed page before printing.	
File> Print	Invokes the Print dialog box through which you can print the current active file in the text editor.	
File> Exit	Exits the 3D PCB Viewer tool.	
<b>Edit Menu</b>		
Edit> Copy	Copies the current view image to the windows clipboard.	
<b>View Menu</b>		
View> Display Control	Opens the Display Control window so that you can choose which elements in the design to display. Refer to <a href="#">Controlling the Display</a> for more information.	
View> Toolbar	Displays or hides the Toolbar icons.	

**Table 2-1. 3D PCB Viewer Commands (cont.)**

Menu Command	Function	Icon
View> Status Bar	Displays or hides the Status Bar at the bottom of the window. The Status Bar displays Help about whatever GUI element that the cursor is hovering over along with the current state of the 3D PCB Viewer software.	
View> Always On Top	Displays the 3D PCB Viewer window on top of any other open Microsoft Windows.	
View> Fly Around	<p>When selected, the design continues the rotate, pan, or zoom actions set in motion by the cursor even after the mouse button has been released. Movement continues as long as the cursor remains in the View window or until a mouse button is pressed.</p> <p>When <b>Fly Around</b> is not selected, the design image rotates, pans, and zooms only while a mouse button is being held down and the cursor is being moved.</p>	
View> Look at Mirror	Displays a mirror image of the current view.	
View> Look at Isometric	Displays the isometric view of the PCB.	
View> Look at Top	Displays the top view of the PCB.	
View> Look at Bottom	Displays the bottom view of the PCB.	
View> Look at North	Displays the design from the North (top) edge.	
View> Look at South	Displays the design from the South (bottom) edge.	
View> Look at East	Displays the design from the East (right) edge.	
View> Look at West	Displays the design from the West (left) edge.	
View> Fit to Board	Fits the view of the PCB Board in the current viewpoint.	
View> Fit All	Fits the view to all non-hidden PCB parts and auxiliary files from the current viewpoint.	

**Table 2-1. 3D PCB Viewer Commands (cont.)**

<b>Menu Command</b>	<b>Function</b>	<b>Icon</b>
View> View Orthographic	Displays an orthographic view, which lacks the distance distortion seen in a perspective view. This view is useful for visually checking the fit between parts because it renders distances accurately.	 <p><b>Note:</b> icon acts as a toggle switch.</p>
View> View Perspective	Displays a perspective view. This view is useful for visualizing how the design will appear in the “real world.”	
View> Thick Trace	When selected, traces are displayed with their actual size and thickness. When not selected, traces are displayed as flat ribbons without thickness.	
View> Thick Pad	When selected, pads are displayed with their actual size and thickness. When not selected, pads are displayed as flat features without thickness.	
View> Render Symbolic	When selected, displays the PCB using the color palette from Expedition PCB.	
View> Render Real	When selected, displays the PCB using typical fabrication colors: <ul style="list-style-type: none"> <li>• green for the board</li> <li>• silver for plated holes</li> <li>• charcoal grey for components</li> <li>• copper for conductors</li> </ul>	
<b>Output Menu</b>		
Output> Design Status	Generates and displays an ASCII formatted file that lists design details such as the size of the board, the number of layers, number of placed parts, and so on. The Design Status report is placed in the project’s <code>..\PCB\3D\LogFiles</code> directory.	
<b>Help Menu</b>		
Help> Open 3D PCB Viewer Help	Launches a browser window containing the <i>3D PCB Viewer User’s Guide</i> (that is, this manual).	
Help> Help and Manuals	Launches a window containing the 3D PCB Viewer tool’s InfoHub, which contains links to online documentation.	

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