

1 Introduction to Autodesk Inventor[®]

The following section will give an overview of the Autodesk Inventor user interface and program basics in order to navigate the program as well as the part modeling environment.

1.1 File Types

The basic file references that exist in a typical Autodesk Inventor 3D design are represented in the following illustration.



W Assembly files: **.iam* files reference part files and are referenced by drawing files.

Part files: **.ipt* files are referenced by assembly files and drawing files.

Drawing files: **.dwg* files reference assembly files and part files.

Inventor Drawing files: *.idw files are interchangeable with *.dwg files in Inventor and reference assembly and part files.

Note: For the purposes of this section you will only be dealing with Part files.

1.2 User Interface

Autodesk Inventor uses a standard structure common in all Microsoft Windows applications. All environments share a common layout for tabs on a single toolbar across the top of the application window called the ribbon. The structure is context-sensitive based on the environment and mode you are using.

Below is the Model Tab used in the part modeling environment.

PRO Mode	el Inspe	ct Tools	Mana	ige 🕺	View	Enviro	nments
Create 2D Sketch	Extrude F	Revolve	Loft Sweep Rib	Second Contraction	oil nboss erive	Hole	Fillet
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The following image illustrates the major areas of the Autodesk Inventor user interface.







Project 1 – Clevis Mount Part



Browser

The browser displays the Origin folder at the top of the list which contains the default X, Y, and Z planes, axes, and center point. There are two main versions of the browser depending on which operation you are preforming.

- The Model Browser displays all features you use to create the part.
- The Assembly Browser displays all the parts you use in the assembly.

Model Browser

Assembly Browser



Marking Menu and Overflow Menu

The Marking Menu is accessed by right-clicking anywhere in the graphics windows. The commands available change depending on the environment and command context. These commands indicate the next steps possible for the current process. The Marking Menu is offered as an alternative to selecting tools from the ribbon.



Although only eight items are available in the Marking Menu, there are many more options located below the Marking Menu in the Overflow Menu. These options are typically either specific to the operation being performed or new operations than can be started directly without exiting the current command first.

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1.3 Viewing Tools

View manipulation is a key 2D drawing and 3D modeling skill. You are often required to view different areas of a design, and changing your view can help you visualize solutions for the current task. Many of the view manipulation tools are common to all environments.

Navigation Bar

Different view manipulation tools are available on the Navigation bar





Zoom Options





Orbit Options





Function Key Shortcut Keys

KEY	NAME	FUNCTION
F2	Pan	Pans the graphics window.
F3	Zoom	Zooms in or out in the graphics window.
F4	Rotate	Rotates objects in the graphics window.
F5	Previous View	Returns to the previous view.
F6	Isometric View	Display the isometric view of the model.

Mouse Viewing Tools

MOUSE FUNCTION	NAME
Click and Drag Mouse Wheel Button	Pan
Roll Mouse Wheel	Zoom
Shift + Click and Drag Mouse Wheel Button	Free Orbit
Double-Click Mouse Wheel Button	Zoom All





2 Project 1 - Clevis Mount Part

2.1 Instructions

The first project will introduce you to the Autodesk Inventor 2012 user interface and basic sketching and modeling commands. The main purpose of this project is to highlight component creation process and the interface of Autodesk Inventor.



- **1:** Create a new part using the *Standard (mm).ipt* template.
 - On the **Quick Access** toolbar, click **New**.



- In the **New File** dialog box, click the **Metric** tab.
- Select Standard (mm).ipt.



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Project File: Quick Launch	Default.ipj	▼ Proje	cts
		OK Car	ncel

- Click OK.
- 2: Create a basic shape.
 - Start the Line tool.



Select a start point near the origin.
 You will contain the sketch to the origin later.

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Drag the cursor to the right, making certain the horizontal constraint glyph appears near the cursor. In the direct input field enter **150 mm** for the line length. Press TAB to lock in the value. Press ENTER to accept this line segment.



A dimensional contain of 150 is added to the line segment.

With the Line tool still active, drag the cursor up, making certain the perpendicular constraint glyph appears near the cursor. In the direct input field enter **15 mm** for the line length. Press TAB to lock in the value.

Press ENTER to accept this line segment.



A dimensional contain of 15 is added to the line segment.

 Drag the cursor back to the left, perpendicular to the last line segment, approximately 40 mm. Left-Click to accept line segment.





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 Drag the cursor up, perpendicular to the last line segment, approximately 50 mm. Left-Click to accept the line segment.



With the Line tool still active create an inline arc segment. Click-Hold the start point and Drag the endpoint of the line segment up and to the left to define the direction of tangency for the arc. Release the left mouse button when the endpoint of the arc is directly to the left of the start point.





Project 1 – Clevis Mount Part

Complete the sketch as shown



- 3: Investigate sketch.
 - Press the F9 key to display the geometric contains that where automatically applied while sketching the line segments.



- Click and drag the line segment, notice how they move.
- Press F9 to hide the geometric contain icons
- 4: Add geometric constraints to the sketch.
 - Add a Vertical geometric constraint.
 Sketch Tab | Constrain Panel | Vertical Constraint







 Click the center point of the arc line segment, and then click the mid-point of the bottom line segment to place the Vertical constraint

Note: As you move the cursor along a line segment, the cursor will snap to the mid-point and will indicate the mid-point with a green circle.



Add a Collinear geometric Constraint.
 Sketch Tab | Constrain Panel | Collinear Constraint

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Click the two horizontal line segments shown to make them in line with each other.



Add a Coincident geometric Constraint.
 Sketch Tab | Constrain Panel | Coincident Constraint



 First Click the Mid-Point of the bottom line segment and then click the projected Origin Center Point.

The sketch will now be centered to the part Origin. By centering the sketch the part Origin planes can be used for features applied later.



5: Add dimensional constraints to the sketch.

Add a linear Dimensional constraint. Sketch Tab | Constrain Panel | Dimension



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 Click bottom line segment and the arc segment center point. Enter 65 mm. Click OK



- Add radial Dimensional constraint.
 Sketch Tab | Constrain Panel | Dimension
- Click the arc segment.
 Enter 30 mm. Click OK



• Notice the line colors have changed to indicate that the sketch is fully constrained.

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 Right-Click the Graphics Windows. Click Finish 2D Sketch from the Marking Menu to exit the sketch.



- 6: Reorient the Graphic Window using the Viewing Tools so the sketch looks like the image below.
 - You can use the View Cube or Orbit Tool (F4) as optional Viewing Tools



- **7:** Extrude the Base Feature.
 - Start the Extrude Tool







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Because there is only one closed loop exists in the sketch, the sketch profile is automatically selected

Select the Symmetric direction from the Mini-Toolbar



 Drag the direct manipulation arrow, or enter 75 mm into the Mini-Toolbar for the extrusion length. Click OK



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8: Change Part Color

• On the Quick Access Toolbar pick Metal-Steel (Polished) from the part color drop down list.



- 9: Create Secondary Feature
 - Right Click Graphics Windows, Click New Sketch on the Marking Menu



In the Brower expand the Origin folder. Click the YZ Plane to start the new sketch on this plane.





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Project reference part edges into the sketch at the point where the sketch cuts through the part.
 Sketch Tab | Draw Panel | Project Cut Edges



Click F7 (Slice Graphics) to show sketch.

Draw a Two Point Recta Sketch Tab Draw Pai	angle n <mark>el Recta</mark>	ingle		
Line Circle Arc	Rectangle	က် Spline က ာ Ellipse Point	Fillet • Polygon A Text •	Project Cut Edges
Draw 🔻				

Pick top reference edge for the rectangle starting point. End 35 mm and 65 mm in the direct entry fields as shown. Click ENTER to except.



Place a Horizontal Constraint
 Sketch Tab | Constrain Panel | Horizontal Constraint

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Between the mid-point of the rectangle to the projected Origin point as shown.





The sketch will now be fully constrained.

Exit the Sketch.

10: Extrude cut through the part

- Start the Extrude Tool, set the following options:
 - Select the Symmetric direction
 - Select the **Cut** option from the Mini-Toolbar





- Select the Through All option from the Mini-Toolbar



Click OK

11: Create a Hole Feature

Start the Hole Tool



In the Hole Dialog Box change the Placement option to Concentric.
 Plane: Pick Front Face
 Concentric Reference: Pick Top Arc



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 Set the following options in the Hole Dialog Box: Termination: Through All Hole Diameter: 35 mm

Hole		
Placement O Concentric Plane Solids Concentric Reference	• U • V • V	
Drill Point	4	Termination
	¶ ⊙ ℃එ	OK Cancel Apply

Click OK



12: Create Slot

Click the right hand top surface and select Create Sketch from the Mini-Toolbar



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Sketch a slot as shown

Make sure that the **Tangent** glyph shows next to the cursor when you finish the second arc segment.



2

 Place a Horizontal Constraint between the mid-point of the slot and mid-point of the side reference edge.





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Place a Linear Dimensional Constraint for the overall length of the slot.
 Pick the first arc segment, and the mid-point of the second arc segment.
 Make sure the Dimension To Arc Edge glyph is shown next to the cursor Enter 45 mm for the slot overall length



Place a Dimensional Constraint from the right reference edge to the center of the slot.
 Enter 20 mm





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Place a Dimensional Constraint for the slot width.
 Enter 18 mm



Exit the sketch

13: Extrude to cut out the slot

Start the Extrude Tool, pick inside the slot profile







- Set the following options on the Mini-Toolbar:
 - Cut option
 - Through All option
 Click OK



14: Turn on the XZ Origin Plane Visibility

In the browser Right-Click the XZ Plane, Select Visibility to turn it on



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15: Mirror Feature





Select the slot feature.





Select the visiable XY Origin plane



Click OK

16: View Part

Click Home View on the View Cube
 Notice that the default Home View setting displays the part lying on its back side.





Using the View Cube or other View Tools, rotate the part until it is in the position shown.



Right-Click the View Cube, Set the current view as Home
 Set Current View as Home | Fixed Distance



- Click-Hold the View Cube and Drag the cursor to rotate the part to another position.
- Click Home View on the View Cube once more, notice that the part returns to the up right position.



17: Save Part

• On the **Quick Access** toolbar, click **Save**.



- In the Save As dialog box, enter file name ClevisMount.ipt
- Click Save