

# iCopy for Inventor<sup>®</sup> Release Notes



## Introduction

Many designs require the creation of subassemblies which contain similar geometry, only the size or position in the main assembly is slightly different. The manual creation and positioning of these subassemblies is time consuming. The iCopy command automates the process of copying and positioning similar components in the main assembly. iCopy combines skeletal modeling and adaptivity to allow the subassembly to change shape to fit its position in the model. This workflow is beneficial for curtain wall panels, rungs on a ladder, frames, or any subassembly where the size varies based on the position in the main assembly.

There are four steps to the iCopy process:

- 1 Create the target assembly, including the target layout part containing geometry/patterns for placing/adapting copied assemblies.

- 2 Create an adaptive skeleton assembly, including the template layout part containing sketch geometry, and parts derived from the skeleton template layout/shape.
- 3 Use the iCopy Author command in the adaptive assembly to enable it as an iCopy template. This results in an iCopy template containing the iCopy definition.
- 4 Use the iCopy command to create one or more iCopy results. Each iCopy result contains the iCopy definition, so any iCopy result can be used as an iCopy template.

### TARGET ASSEMBLY



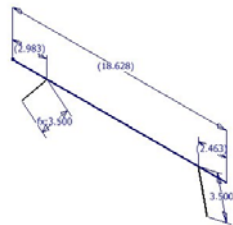
The target assembly is the destination for the iCopy results. This assembly contains the target layout part. The target layout part contains the geometric representation that determines the shape for each assembly copy built by the iCopy command.

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**NOTE** When working with skeleton modeling, it is common to use a parameter layout part. This part only contains parameters that are used to drive the size of the skeleton. The parameter layout part is derived into each component of the skeleton model and the target assembly.

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### ADAPTIVE SKELETON ASSEMBLY



The adaptive skeleton assembly is the file that is used with the iCopy Author to create the iCopy template. This file is created using skeleton modeling techniques. Creating the adaptive assembly requires:

- Set the iCopy template layout part to adaptive. This geometry is adapted using constraints placed during the iCopy command, so that each iCopy result can have a unique shape.

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**NOTE** Fully constrained sketch geometry can cause problems with adaptivity. For best results, do not fully constrain sketch geometry.

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- Create and test the template layout part. The template layout part is derived into each component in the assembly and controls the component.
- Derive parts from the template layout part. The shape/sketch geometry is derived from the layout into other part documents. The derived geometry forms the basis for solid geometry and additional detail in the child parts.
- Insert parts into the adaptive assembly. The template layout part and child parts are reassembled in a new assembly.

The skeleton assembly should be constrained in a particular way for best results with adaptivity.

- Constrain the iCopy template layout part origin to the iCopy template assembly origin. Use a flush constraint to constrain each of the origin planes (XY/XY, YZ/YZ, and XZ/XZ).

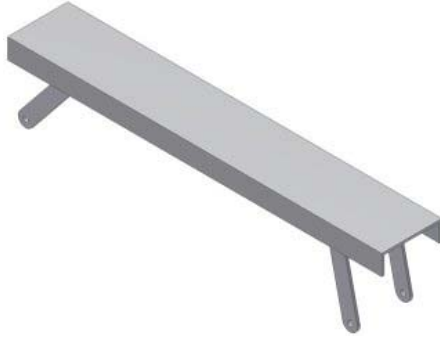
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**NOTE** If the layout part is the first component placed in the assembly, it will be aligned to the origin of the assembly and grounded automatically. Although it is redundant, constraining the origin planes is still required.

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- Constrain the origin of each part derived from the layout part to the iCopy template layout part origin. Use a flush constraint to constrain each of the origin planes (XY/XY, YZ/YZ, and XZ/XZ).
- Any part that does not derive its position from the layout can/should be constrained to other parts in the template assembly, including the layout, other derived parts, and other non-derived parts.

### ICOPY AUTHOR



The iCopy Author command creates an iCopy template from an adaptive skeleton assembly. When authoring the iCopy template, you select the points to use to position and size the component geometry and select the parameters you want to control.

The iCopy Author command prepares the following required data in the skeleton layout part (within the adaptive skeletal assembly) for use by the iCopy command:

- Sketch geometry points (the endpoints of lines, arcs, and circle center points, but not sketch points)
- (Optional) Parameters used to vary the iCopy results

### ICOPY PLACEMENT



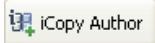
The iCopy command creates one or multiple copies of the iCopy template and adds each copy to the target assembly. Each assembly (iCopy result) can vary slightly from other iCopy results in the pattern depending on the adaptivity that was used in the iCopy template. During the iCopy command, parts can be set to copy or reuse depending on the definition and purpose.

To place a single iCopy result requires work points to position/size the iCopy result. To place multiple iCopy results requires:

- Path for work plane pattern
- Work plane that is patterned; used as frame of reference / intersection for patterning the work points
- Offset / number of copies / flip direction for work plane pattern
- Rail (geometry) to guide the patterning of each work point (input)

### Author iCopy template

The iCopy Author command is used to prepare an adaptive skeletal assembly for use by the iCopy command.



- 1  On the ribbon, click Manage tab > Author panel > iCopy Author or in the Classic Interface, click iCopy Author on the Assembly panel.
- 2 On the Layout tab, select the adaptive skeleton part (template layout part) that contains the sketch and parameters to drive the iCopy.
- 3 Select the Geometry tab.
- 4 For each control point:
  - Click **Click to add**.
  - Select the sketch end point/center point.
  - In the Label field, enter a name for the point.

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**NOTE** If you select the wrong point, highlight the Point and Label fields then press <Delete>.






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- 5 Select the Parameter tab.

- 6 Select the parameter in the left browser and click  to add it to the browser on the right.
  - You can remove parameters by selecting the parameter in the browser on the right and clicking .
  - Parameters that have been renamed are automatically added.
- 7 Click OK to complete the iCopy template.








### Place a single iCopy result

The iCopy command places copies of the iCopy template into the target assembly. The iCopy results are positioned and sized based on the selected work points.

- 1  On the ribbon, click Assemble tab > Component panel > iCopy or in the Classic Interface, click iCopy Author on the Assembly panel.
- 2 Click  to select the iCopy template assembly.
- 3 For each point:
  - Click in the Work Point / Value field.
  - Select the work point.
- 4 Modify the parameters as necessary.
- 5 Click Next.
- 6 If there are components in the iCopy template that can be reused, the Copy / Reuse iCopy Components dialog box displays. Set the individual components to  (copy),  (reuse), or  (exclude).
- 7 Click OK to create and place the iCopy result or click Apply to place the iCopy result and return to step 3.

### Place multiple iCopy results

The iCopy command places copies of the iCopy template into the target assembly. The iCopy results are positioned and sized based on the selected work points.

- 1  On the ribbon, click Assemble tab > Component panel > iCopy or in the Classic Interface, click iCopy Author on the Assembly panel.
- 2 Click  to select the iCopy definition assembly. Click Next.
- 3 Click  (lower right of dialog box) to display the Multiple Copies options.
- 4 For each point:
  - Click the Work Point / Value field.
  - Select the work point.
  - The rail is automatically selected for you. Click the Rail field to specify a different rail.
- 5 Modify the parameters as necessary.
- 6 Select the path for the work plane pattern. This pattern drives the placement of the iCopy results.
- 7 Select the work plane to drive the placement of the iCopy results.
- 8 Enter the number of results to create.
- 9 Enter the distance between results.
- 10 If necessary, click the  (Flip) button to change the direction of the pattern.
- 11 Click Next.
- 12 If there are components in the iCopy template that can be reused, the Copy / Reuse iCopy Components dialog box displays. Set the individual components to  (copy),  (reuse), or  (exclude).

- 13 Click OK to create and place multiple iCopy results.

### **Constrain components in the iCopy template**

iCopy uses a combination of adaptivity and skeleton modeling to control the size and position of components. This combination requires constraining the components using the following method.

- 1 Place the layout part
- 2 If it is the first part in the assembly, no further constraining is needed. Otherwise, constrain the XY plane of the layout part to the XY plane of the assembly.
- 3 Repeat for the YZ planes and the XZ planes.
- 4 Create and place the derived components.
- 5 Constrain the XY plane of each derived component to the XY plane of the layout part.
- 6 Repeat for the YZ planes and the XZ planes.
- 7 Create and place any parts that are not derived from the layout part.
- 8 Constrain these parts to other parts in the assembly.

### **Test the assembly before authoring**

When creating an iCopy definition, Autodesk recommends to test the definition at different stages in the process. The following is a general workflow.

- 1 Create and place the iCopy template layout part in the iCopy assembly template.
- 2 Use iCopy Author to create the iCopy definition.
- 3 Use the iCopy command to place the iCopy occurrences in the target assembly verify functionality.
- 4 Close the target assembly without saving.
- 5 Create any parts that are derived from the iCopy template layout part.
- 6 Place and constrain the derived parts in the iCopy assembly template.
- 7 Use iCopy Author to recreate the iCopy definition.
- 8 Use the iCopy command to place iCopy occurrences in the target assembly.

- 9 Close the target assembly without saving.
- 10 Create any components that are not derived from the iCopy template layout part.
- 11 Use iCopy Author to recreate the iCopy definition.
- 12 Use the iCopy command to place iCopy occurrences in the target assembly.

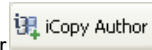
## QUICK REFERENCE

### iCopy Author

The iCopy Author prepares an adaptive skeletal model for use by the iCopy command. In the Layout tab, select the adaptive part that contains the skeletal sketch.

**Access:**

Ribbon: Manage tab > Author panel > iCopy Author



Classic Interface: Author panel > iCopy Author

- [Layout tab](#) on page 9
- [Parameter tab](#) on page 10
- [Geometry tab](#) on page 10

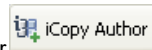
## QUICK REFERENCE

### iCopy Author - Layout tab

The iCopy Author prepares an adaptive skeletal model for use by the iCopy command. In the Layout tab, select the adaptive part that contains the skeletal sketch.

**Access:**

Ribbon: Manage tab > Author panel > iCopy Author



Classic Interface: Author panel > iCopy Author



**Layout part**

Select the adaptive part that is used to position and size the iCopy.

## QUICK REFERENCE

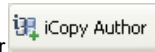
iCopy Author - Geometry tab

The iCopy Author prepares an adaptive skeletal model for use by the iCopy command. In the Geometry tab, select the points that control the position and size of the model.

**Ac-**

**cess:**

Ribbon: Manage tab > Author panel > iCopy Author



Classic Interface: Author panel > iCopy Author

**Point**

Click to select a sketch point.

**Label**

Enter a descriptive name for the point.

## QUICK REFERENCE

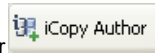
iCopy Author - Parameter tab

The iCopy Author prepares an adaptive skeletal model for use by the iCopy command. In the Parameters tab, select the parameters that are used to define the iCopy.

**Ac-**

**cess:**

Ribbon: Manage tab > Author panel > iCopy Author



Classic Interface: Author panel > iCopy Author



Adds the selected parameter to the iCopy definition.



Removes the selected parameter from the iCopy definition.

## QUICK REFERENCE

### iCopy

The iCopy command creates one or multiple copies of the iCopy template and adds each copy to the target assembly. Use the iCopy dialog box to select the iCopy definition to place.

**Access:**

Ribbon: Assemble tab > Component panel > iCopy



Classic Interface: Author panel > iCopy



Select the iCopy template to place.

**Select a source assembly file**

**Next**

Displays the Constrain iCopy dialog box.

## QUICK REFERENCE

### Constrain iCopy

The iCopy command creates one or multiple copies of the iCopy template and adds each copy to the target assembly. Use the Constrain iCopy dialog box to position the iCopy, define the pattern if necessary, and modify parameters. This dialog box also contains an image to clarify what the pattern options control.






**Access:**

Ribbon: Assemble tab > Component panel > iCopy



## ICOPY ADD-IN FOR INVENTOR HELP

Classic Interface: Author panel > iCopy

<b>Name</b>	Name of the point or parameter. This value comes from the Label value in the iCopy definition.
<b>Work Point / Value</b>	Activate the field to select a work point or modify a parameter value.
<b>Rail</b>	Available when inserting multiple copies. Activate the field to select a path for the work point. Work points are created at the intersection of the rail and the selected work plane.
 <b>Multiple</b>  <b>Single</b> copy / copy	Select to toggle the dialog box between multiple copy mode and single copy mode.
 <b>Path</b>	Select sketch geometry to define the path for the iCopy pattern.
 <b>Work Plane</b>	Select a work plane. The work plane is used to calculate the positions of the iCopies.
 <b>Flip</b>	Select to flip the direction of the pattern.
<b>Instance Number</b>	Enter the number of iCopy occurrences to insert.
<b>Offset</b>	Enter the distance between the iCopies. The spacing is calculated between work planes along the path.
<b>Back</b>	Returns to the iCopy dialog box where you can change the iCopy template.
<b>Next</b>	Displays the Copy / Reuse iCopy Components dialog box.

### QUICK REFERENCE

Copy / Reuse iCopy Components

## ICOPY ADD-IN FOR INVENTOR HELP

The iCopy command creates one or multiple copies of the iCopy template and adds each copy to the target assembly. Use the Copy / Reuse iCopy Components dialog box to set the components to copy, reuse, or exclude. This dialog box is only displayed if there are components in the iCopy template that can be reused.

**Access:**

Ribbon: Assemble tab > Component panel > iCopy



Classic Interface: Author panel > iCopy

**Status commands** Provides the following command buttons to change the status on multiple selected components at the same time.



**Copy**

Creates a copy of the component. Each copied component is saved in a new file, which is not associative to the source file.



**Reuse**

Creates an instance of the component.



**Exclude**

Excludes the component from the copy operation.

**Back**

Returns to the Constrain iCopy dialog box.

**Apply**

Creates the iCopy results as designated then starts the command over at the Constrain iCopy stage.

**OK**

Creates the iCopy results as designated then exits the command.

**Cancel**

Exits the iCopy command without creating iCopy results.

**Reuse Standard Content and Factory Parts**

Restricts library components and iParts from being copied. Instances of library parts and iParts are created instead.

