



**Autodesk Inventor Tutorials**

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# **Derived Parts Part Two – Scaling & Copying**

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In this part of the tutorial on derived parts we will deal with Inventor's ability to scale and copy parts.

In a design it is often necessary to produce several parts that are similar in basic shape but have minor differences in features. Using derived parts of a base part (.ipt) file will allow the user to make quick copies of the part of interest while still allowing a parametric link to the base features.

This example begins with a simple linkage that has three extrusions (one join and two cuts), a work plane, a work axis and a set of fillets. (see Figure 1)

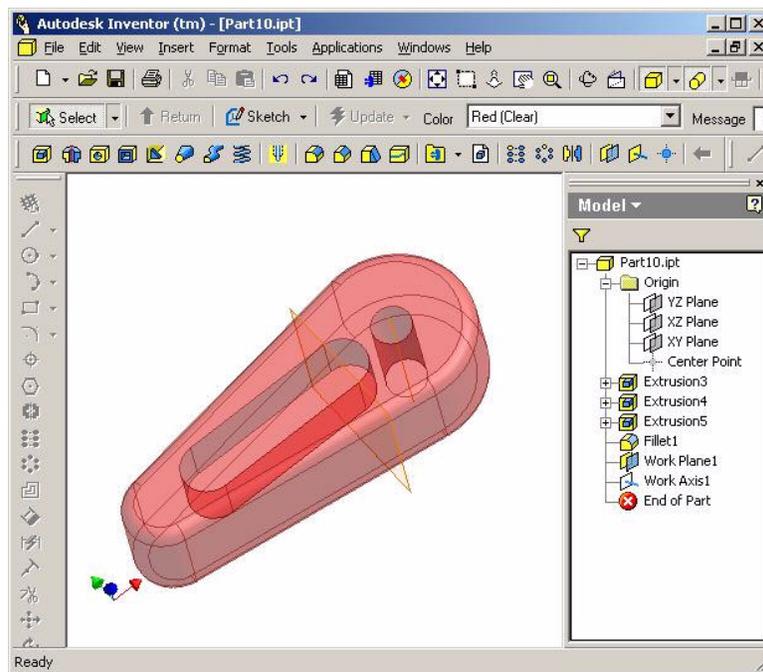
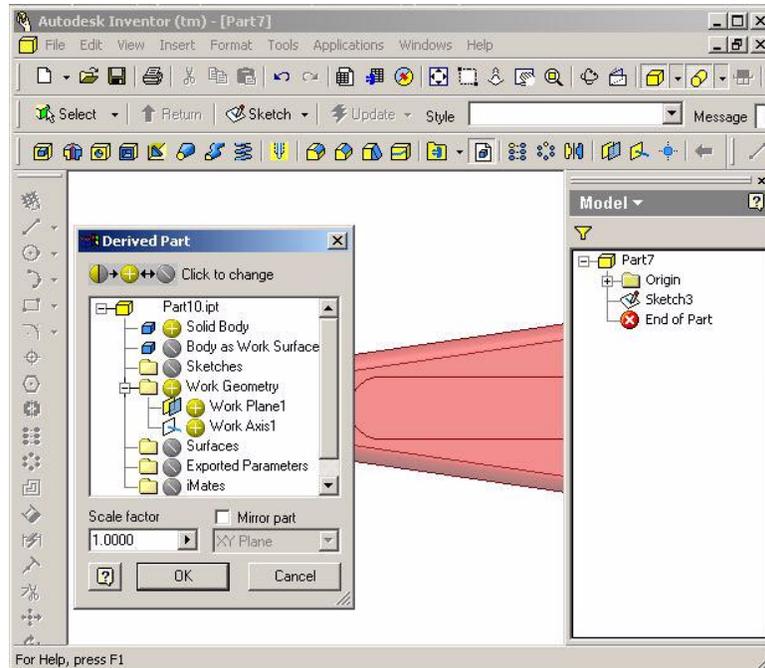


Figure 1 – Base Part

Start a new part file and exit sketch mode, then click on the **Derived Component** button in the **Features** toolbar. Again you will be asked to select a part or assembly file. Choose the red linkage part file. The next dialogue that appears will be the **Derived Part** box. The function and look of the **Derived Part** dialogue is similar to that of the **Derived Assembly** box. (see Figure 2)

Just as in the Derived Assembly dialogue, clicking on the icons next to the features and work geometry names cycles through options

- Yellow Plus: Includes the selected feature or geometry in the derived part
- Grey Slash: Excludes the feature or geometry from the derived part



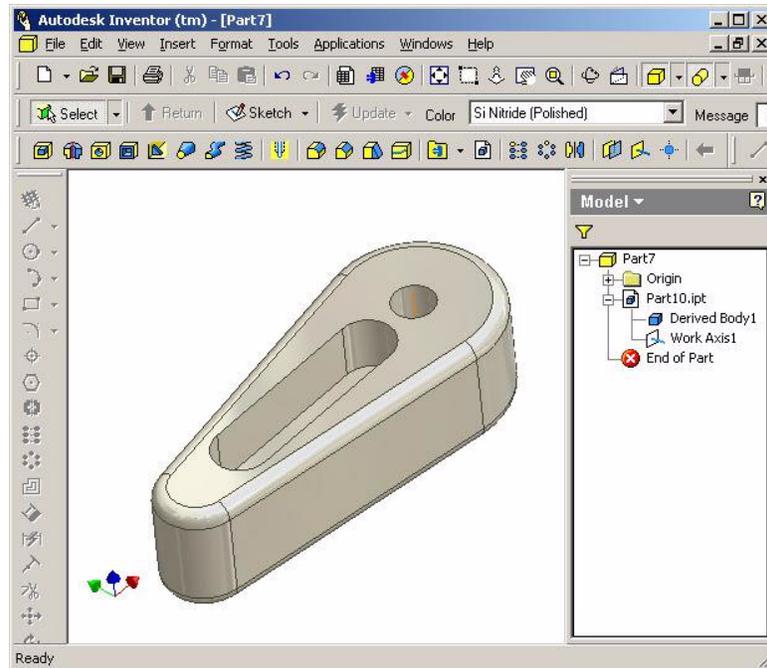
**Figure 2 – Derived Part Dialogue Box**

In the Derived Part dialogue have control over base features, work geometry (axes, planes and points), surfaces, parameters, sketches and iMates. If the model does not have one or more of these items then the item will be excluded (gray slash) by default. Furthermore the first two selections “*Solid Body*” and “*Body as Work Surface*” are mutually exclusive. Only one of these can be exported into the derived part

In the lower portion of the dialogue the user has the option of scaling or mirroring the part. Scaling the part can be useful in the event that a part was drawn in the incorrect units or if the user imports a SAT or IGES file that is not in the correct scale. Mirroring the part can be useful when making “right” and “left” hand versions of a part when else changes on the parts.

In this example the work axis will be included but the work plane will be omitted and the base features will be exported as a solid body. (see Figure 3).

As with derived assemblies additional features may be added to the derived part. When working with derived part it is important to remember that while additional features can be added to the derived part, features cannot be removed from the part. When designing the base part the user should exclude any features that will not exist on all of the derived part. For example if one version of our part did not have the slot, it would have been better to leave it out of the base part and add it to one of our derived parts. (A workaround to this would be to make a new join extrusion in place of the slot, filling in the slot.)



**Figure 3 – Derived Part**

Just as in derived assemblies, derived parts are parametrically link to the base model. Changes to the base model will be reflected in the derived part.

A further extension of derived parts can be used to make scaled and/or mirrored assemblies. To achieve this several steps are required:

1. Create the base assembly
2. Start a new part file
3. Create a derived assembly from the base assembly
4. Save the derived assembly and start a new part file
5. Create a derived part from the derived assembly that was created in step 3.
6. Mirror or scale the assembly as desired

It is hoped that in future releases of Inventor that the ability to mirror and/or assemblies will be built into the derived assembly menu.

In the next part of this article we will discuss how derived parts can be use in the creation and design of molds and dies.