

# Shared Data Menu:

## Communicating Design Intent Throughout Designs



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## Objective:

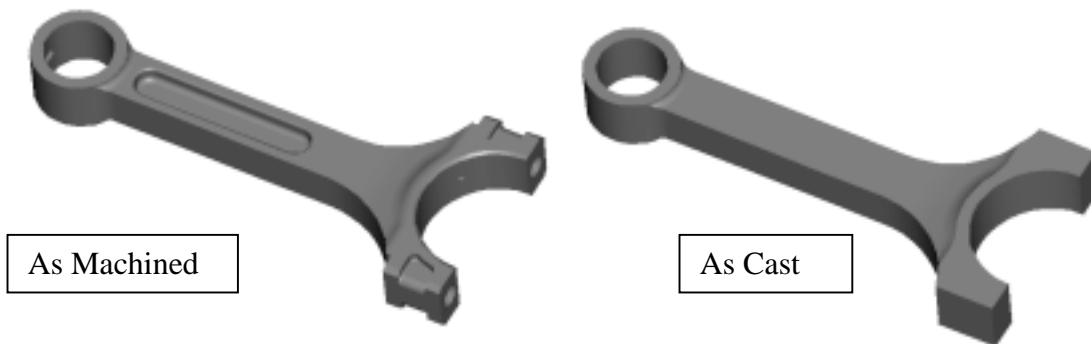
Describe the use of the new Shared Data menu for communicating geometry from one model to another. These options first debuted in Pro/ENGINEER 2000I and have been expanded in Pro/ENGINEER 2001. After reading this tutorial you will be able to:

- Describe how this functionality can be used to describe process variants
- Build simplified geometry for subsystem installation and routing
- Create associative simplified models to share with co-workers or sub contractors
- Explain how Shared Data features simplify Top Down Design

## Overview:

There are many times when a designer must share geometry from one model into one or more other models.

One example is the creation of process variants: “as machined” versus “as cast.”




You may also want to create a simplified version of an assembly for subsystem mounting or cable/pipe routing. Shared Data shrinkwrap features are useful in this instance.

Most new design work is created using a Top Down Design Process. A typical Top Down Design process consists of six fundamental steps:

1. Defining Design Intent
2. Defining Preliminary Product Structure
3. Introducing Skeleton Models
4. Communicating Design Intent Throughout Assembly Structure
5. Continued Population of the Assembly
6. Managing Part Interdependencies

Shared Data features are central to topics four and six.

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This document will explain the use of the following types of shared data features:

- Copy Geometry from other model
- Shrinkwrap from Other Model
- Inheritance features
- Cutout from other model
- Merge from other model
- Publish Geometry

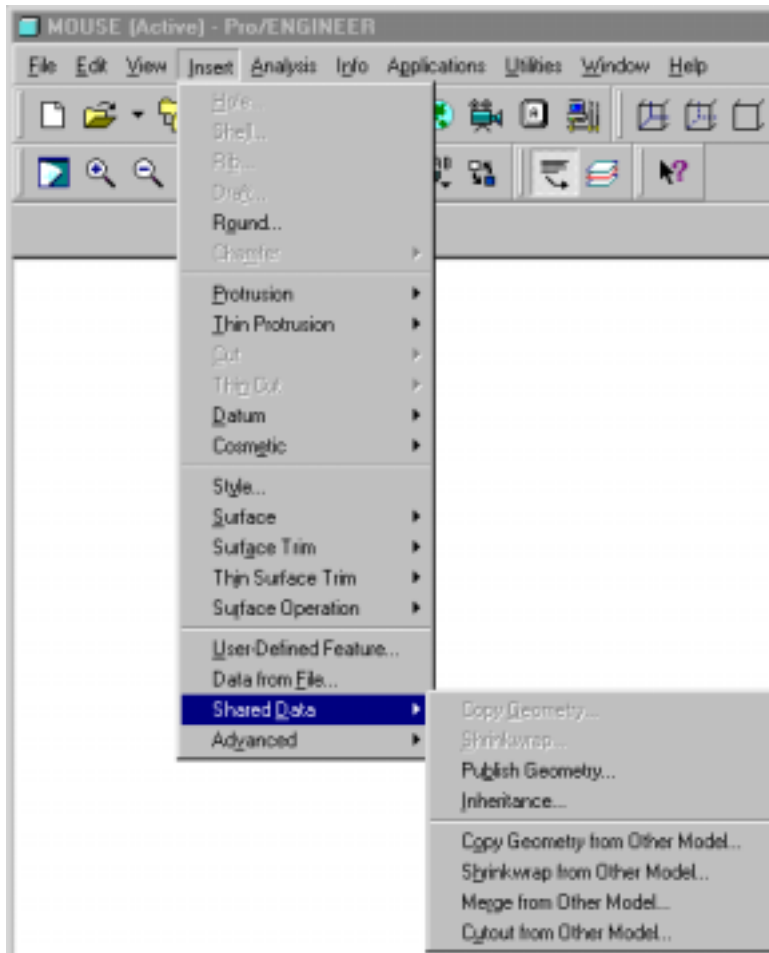
## **Metric:**

There are many benefits to using the new Shared Data features.

- When used to communicate surface shapes in Top Down Design these features are **50% smaller** than surface copies made at the assembly level.
- Geometry can be communicated between models without creating and managing an assembly
- Pro/INTRALINK manages all dependencies created using the Shared Data Menu
- Shrinkwrap features retrieve **>70% faster** than the models that they represent

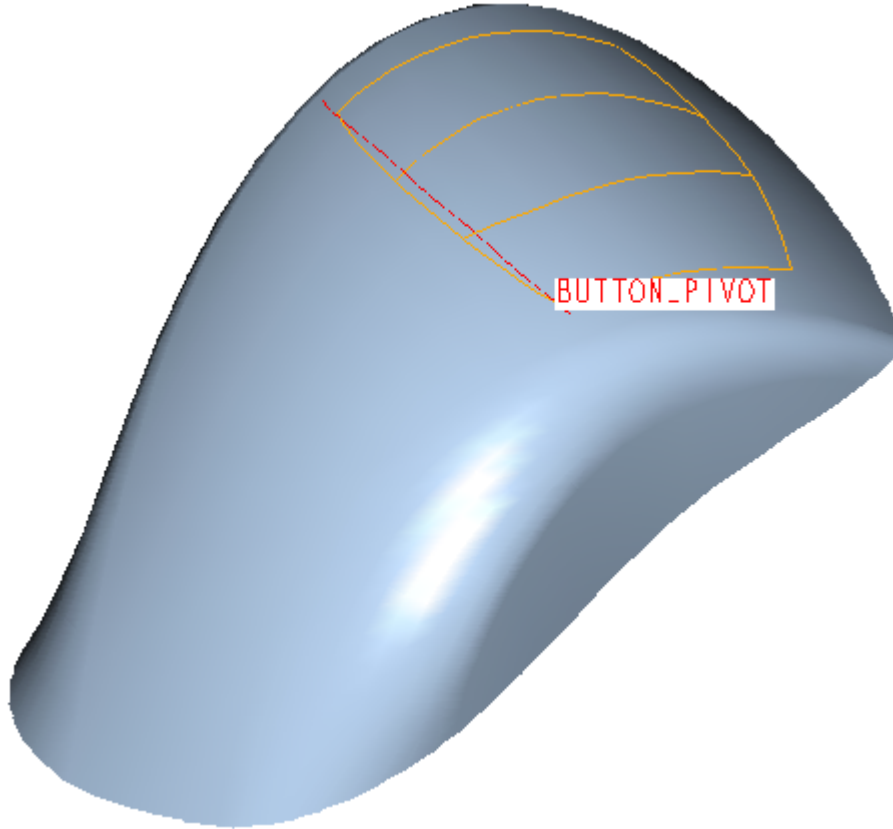
## Tutorial:

We will look at each type of shared data feature separately. All are accessed the same way. With a part or assembly open select #Insert;# Shared Data.



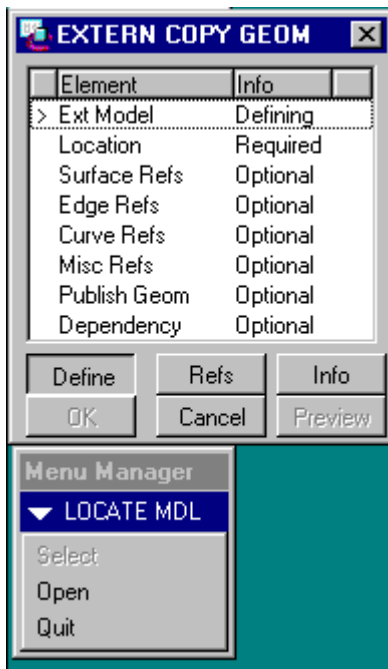
Note: You may also select #Feature;#Create;#Data Sharing.

**Copy Geometry from Other Model:** In this example we will copy the required references from a skeleton model into a part model to ensure that a mouse button corresponds to the proper shape and size defined in the master model. The master model is shown below:



To design the part for the left mouse button I need the master surface definition, the Pivot axis, and the curves denoting the perimeter of the button. We will use Copy Geometry from Different Model to get started.

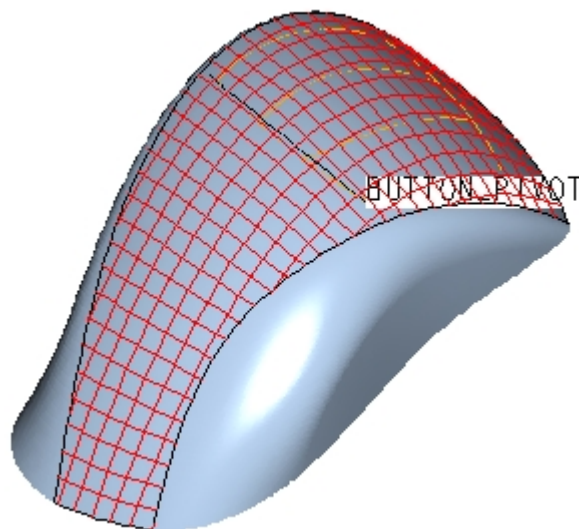
- Create a new part with three datum planes and a coordinate system for the left mouse button.
- Select #Insert;#Shared Data;# Copy Geometry from Different Model. You will see the following elements of the feature, most of them are optional.



**Ext Model:** Retrieve a model that you need references from. I'll call this model the source model. Select Open or pick a model that is visible.

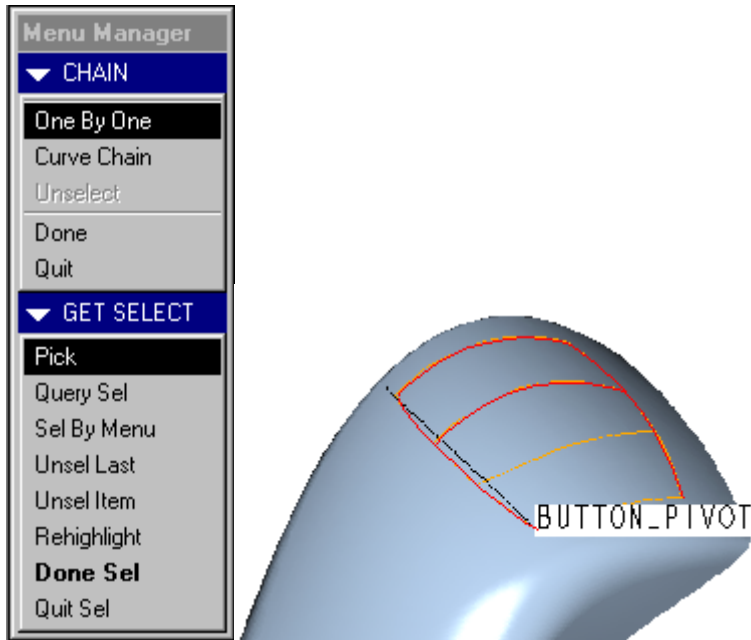
**Location:** Locate the source model relative to your target model. You have two options: Use the default location or align coordinate systems. In this case I have chosen the default location.

**Surface Refs:** Allows the selection of surfaces and quilts. The typical surface collection menus are available.

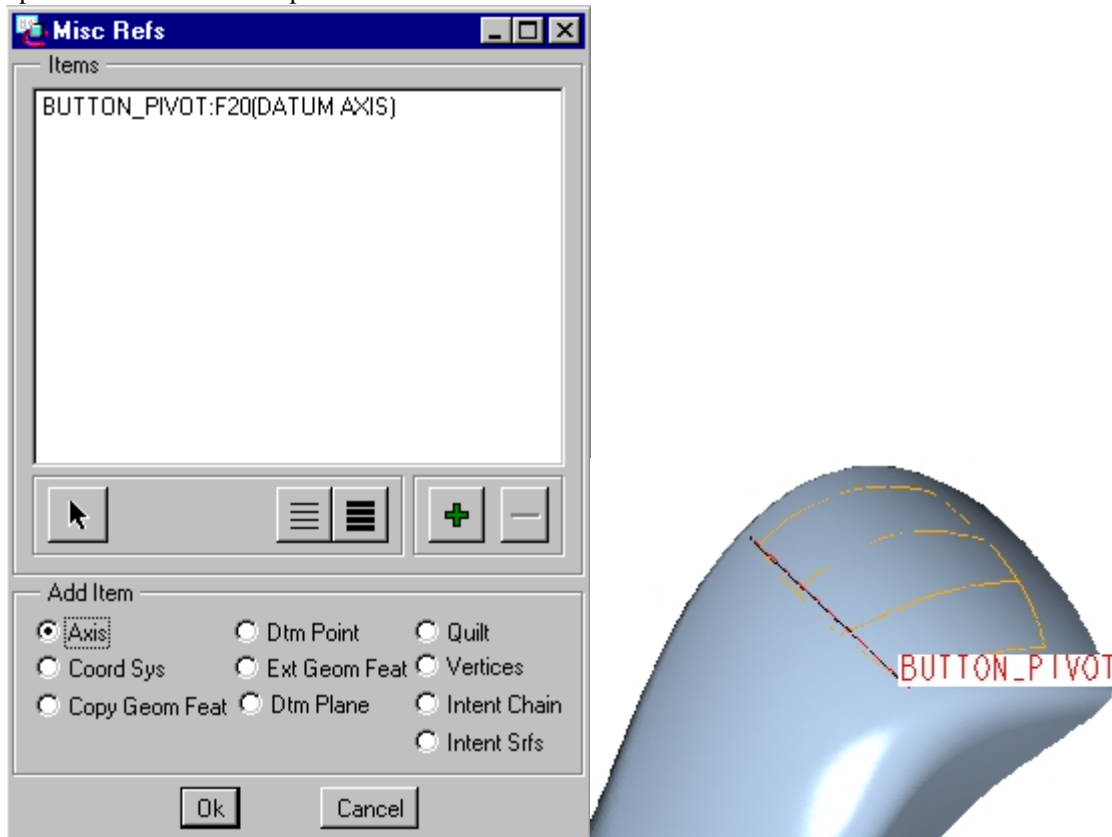


I have used the Indiv Surfs option and selected the top surface of the mouse.

**Curve Refs:** Will allow the selection of curve features. I have used the option to select the bounding curves of the mouse button.

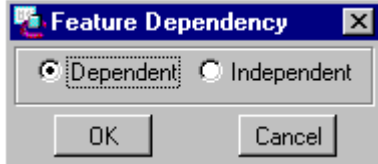


**Misc Refs:** Allows the selection of Datum features' intent chains and other references. I have used the option to select the button pivot axis.

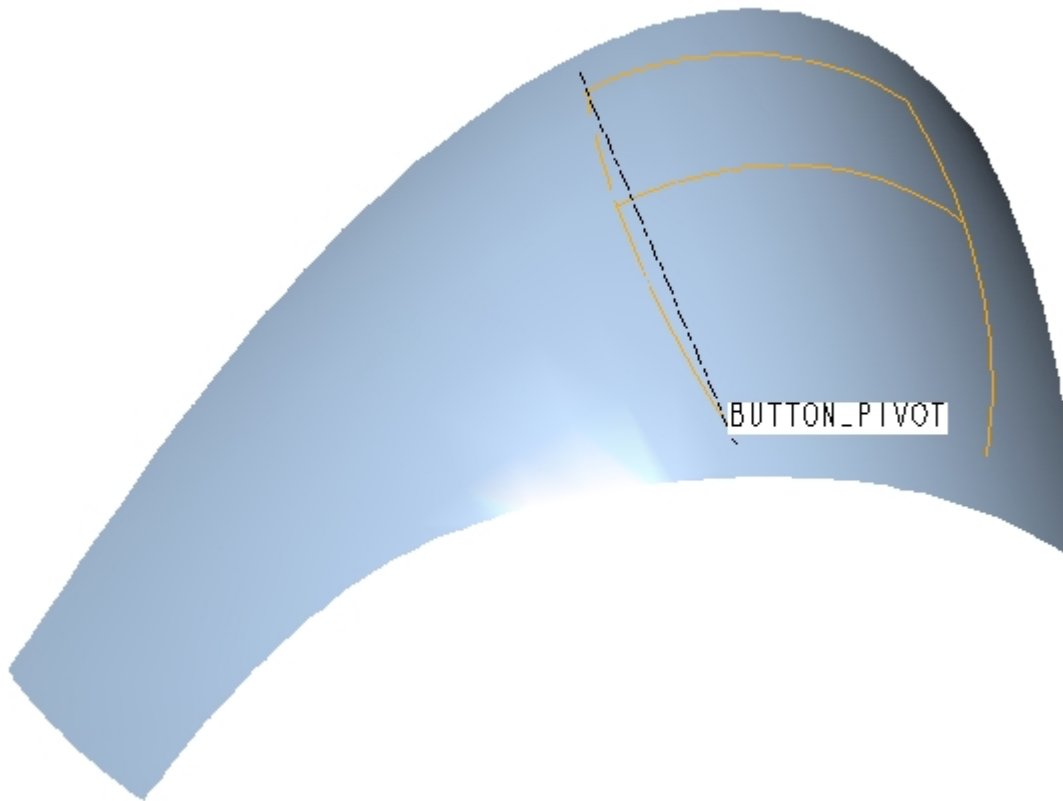


**Publish Geom:** Allows the selection of references that have been pre-bundled in the source model. Rather than picking features and references individually, you reference a Publish Geometry feature in the source model. Publish geometry features are chosen from a list of available features. An example of creating a Publish geometry feature in a source model appears in this document.

**Dependency:** One of the most interesting things about Data Sharing features is that you can choose whether or not the features update automatically; You can determine associativity. I have selected dependent. My reference geometry will automatically update if the source geometry is available in session. You can toggle between dependent and independent at will.

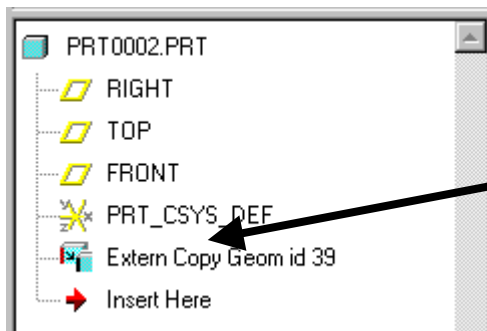


The resulting feature is shown below. I now have all the references needed to build the left mouse button without requiring a merge of the entire master model, or unnecessary assembly references. I can also choose when my model updates to external changes.



The Model tree shows one feature for the six references that were added.

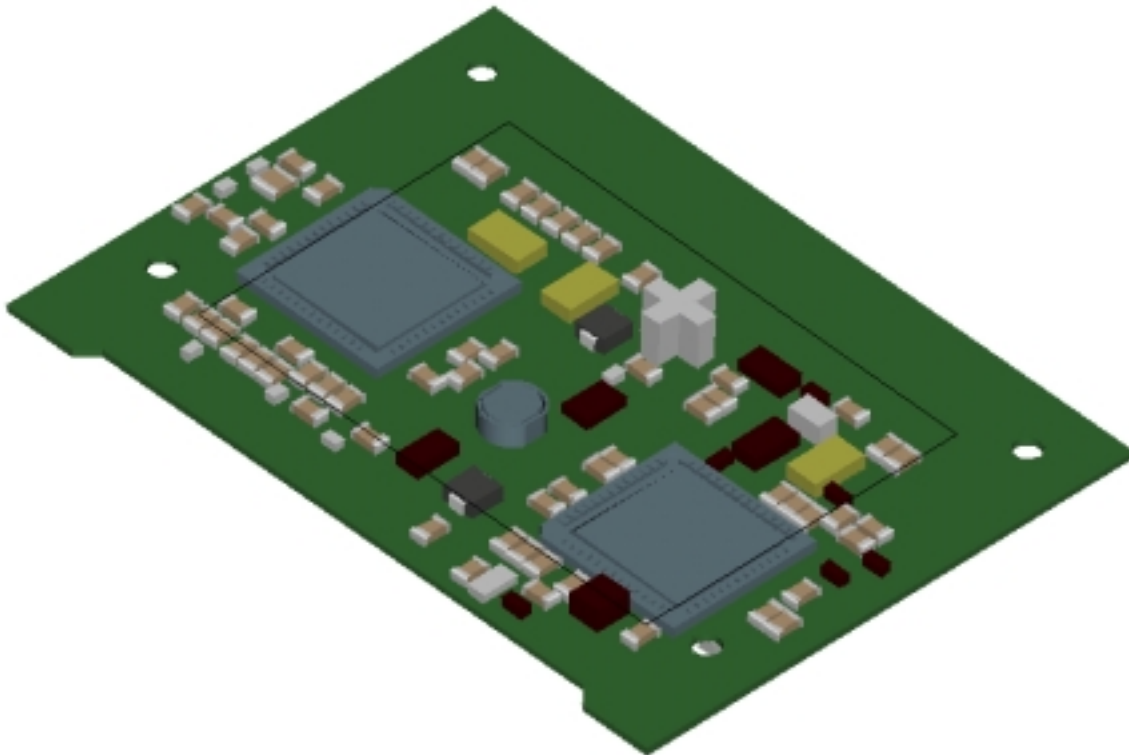




Note the icon used for external copy geom features. The Feature name can be changed

**Shrinkwrap from Other Model:** In this example we will create a simplified version of a Printed Circuit Board. This will allow us to place a single part file in assemblies to represent the Circuit Board Assembly. Only this file would need to be checked out of Intralink instead of all the components on the circuit board. Other uses of this function would be to create simplified versions of assemblies to route cables or pipes. You could also share information with other project workers or other companies in a manner that would allow associative updates.

This is the original board:



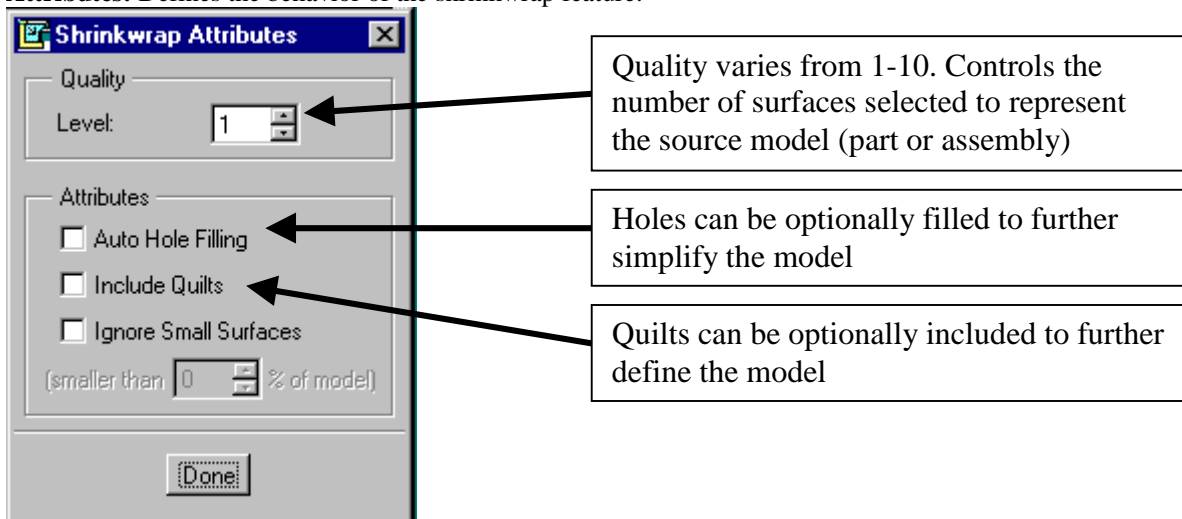
- Create a new blank part
- Select #Insert;#Data Sharing;#Shrinkwrap from Other Model
- The following dialog shows the elements for the feature



**Ext Model:** Retrieve a model that you need references from. I'll call this model the source model. Select Open or pick a model that is visible. I chose the board assembly pictured above.

**Location:** Locate the source model relative to your target model. You have two options: Use the default location or align coordinate systems. In this case I have chosen the default location.

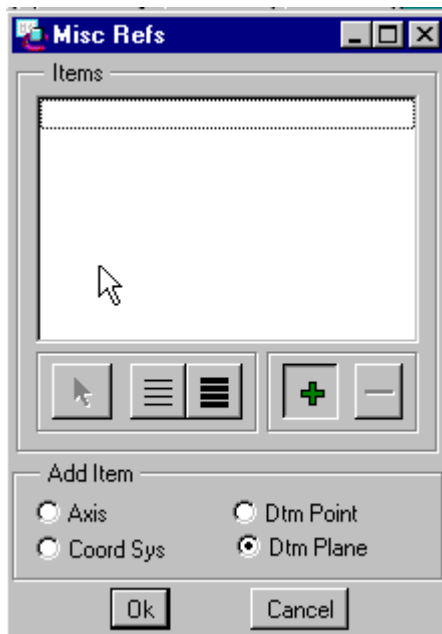
**Attributes:** Defines the behavior of the shrinkwrap feature.



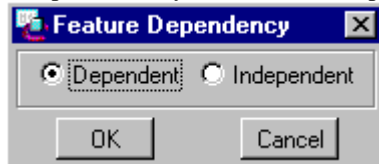
I chose a quality of 5. The higher the quality the longer the feature takes to regenerate.

**Additional Surfs:** Allows you to manually select surface to be included in the shrinkwrap feature. Use this when your chosen quality setting does not automatically select a surface that you want included.

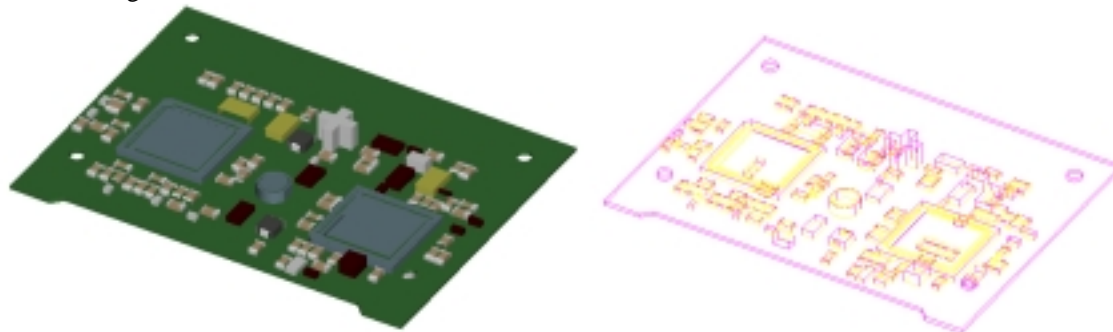
**Include Datums:** Datum features are not included in shrinkwrap features. Remember that we are trying to create a simplified model. There are occasions when you would like to include datums, particularly as future assembly references. Use this option to select the desired datums.



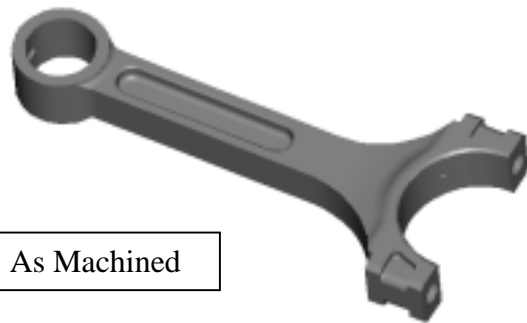
**Dependency:** One of the most interesting things about Data Sharing features is that you can choose whether or not the features update automatically; You can determine associativity. I have selected independent. My model will not update until I toggle dependency back on.



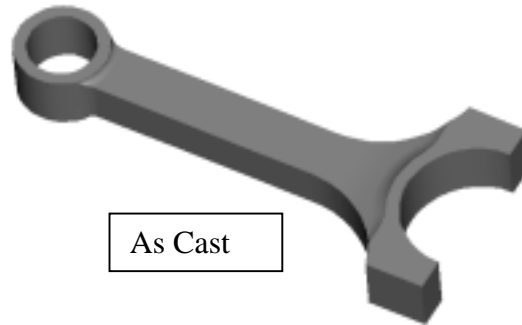
The resulting feature is shown below shaded and in wireframe.



**Inheritance feature:** In this example we will derive an “as-cast” design model from an “as-designed” or “as-machined model.” We need to be able to toggle features on and off as well as modify feature dimensions



As Machined

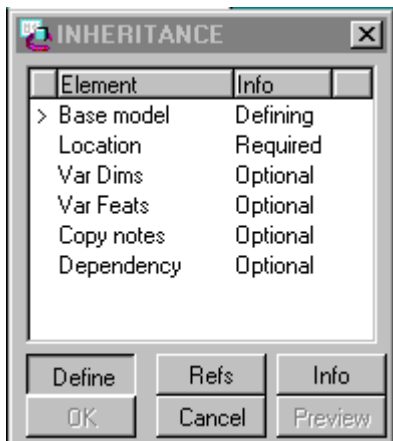


As Cast

In the past users might have used merge model techniques or family tables for this type of task. This method is not only more straightforward and useful; it also reduces data management concerns since the person creating the manufacturing variant does not change the original model. Also, some of the change required would not be possible in a merge model scenario.

This feature could also be used to copy in an entire skeleton or master model if desired.

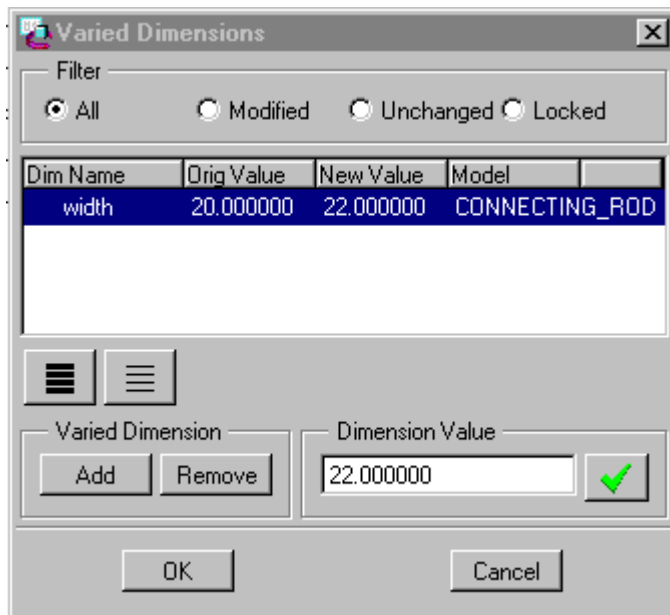
- Create a new model. This will be the manufacturing variant or the “as-cast” model. The model uses a start part and has three datums and a coordinate system. Note: the units used must agree with the model that you are referencing.
- Select #Insert;#Shared Data;#Inheritance
- The following options are available



**Base Model:** Retrieve a reference model. Select Open or pick a model that is visible. I chose the final version of the connecting rod pictured above. By default this entire model will show as a single feature in the target model.

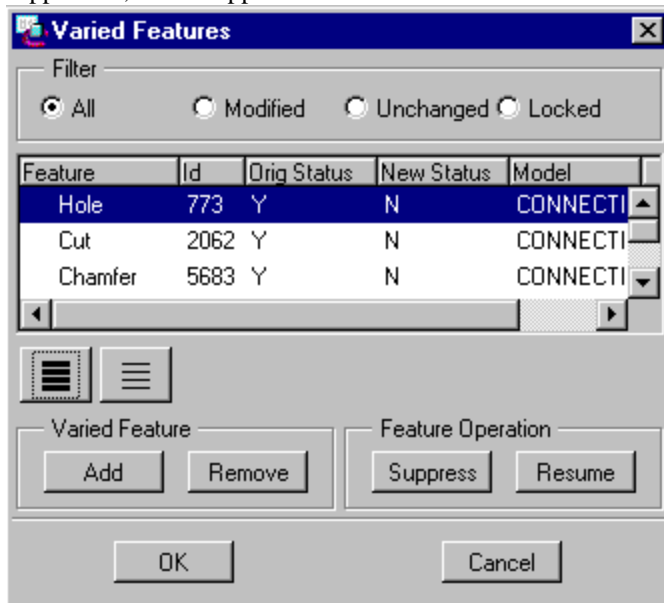
**Location:** Locate the source model relative to your target model. You have two options: Use the default location or align coordinate systems. In this case I have chosen the default location.

**Var Dims:** feature dimensions can be modified in the current model. Select “Add”; select the feature to be modified then the dimension to be changed.



Selecting features and using the right mouse button to modify them can also modify dimensions. You will be prompted to add the dimension to the var dim table.

**Var Feats:** Features may be suppressed in the current model. Select “Add;” select the features to be suppressed; select suppress.

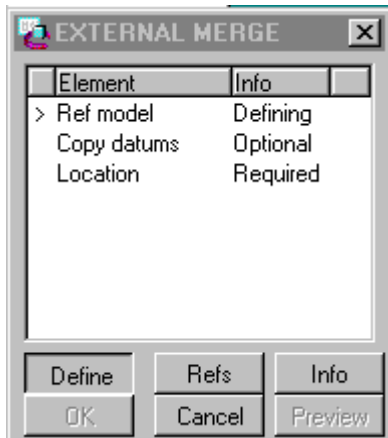


Features can also be suppressed by expanding the feature list in the model tree, selecting features and using the right mouse button to suppress.

**Copy notes:** Copy 3-D notes if desired

**Dependency:** One of the most interesting things about Data Sharing features is that you can choose whether or not the features update automatically; You can determine associativity.

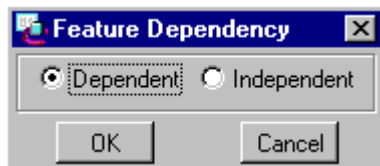
**Cutout and Merge from Other Model:** Cutout and merge models can now be created without an assembly. The menus are similar and shown below.



**Base Model:** Retrieve a reference model.

**Location:** Locate the source model relative to your target model. You have two options: Use the default location or align coordinate systems.

**Dependency:** One of the most interesting things about Data Sharing features is that you can choose whether or not the features update automatically; You can determine associativity.

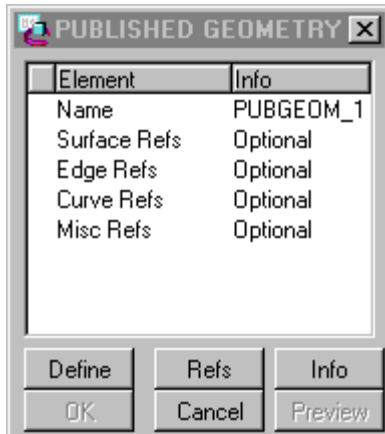


**Publish Geometry:** In the copy geometry example shown above (collecting references for the left mouse button), the user selected multiple references from a source model. It may make sense for the originator of the source model to pre-select these references for you. The references (surfs, curves, datums, etc) can be collected in a Publish geometry providing the following benefits:

- Sometimes the source model may be very complex and hand picking the references may be difficult.
- Some items that are needed may be on layers and not visible and you may not be familiar with the model.
- The originator of the source model would be in a better position to select the necessary references for you. He/she would also know which references will stay in their model.
- This is particularly useful when the references will be used in many models. You can select them once in the publish geometry and reference the Publish Geometry feature in many models.

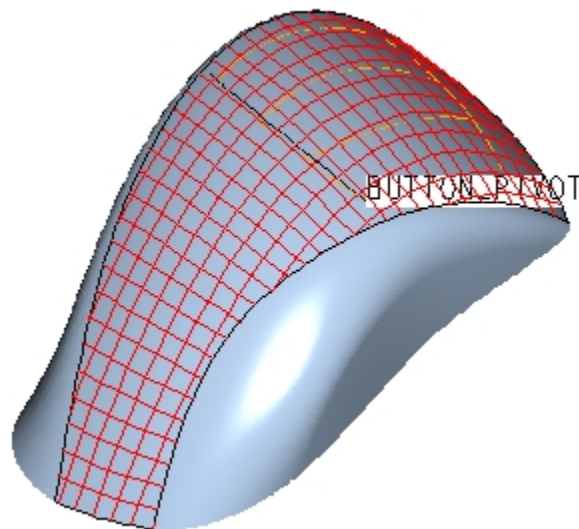
The Publish Geometry functionality is described below. This example will build a Publish Geometry feature in the Master Model of the Mouse used above. This feature will pre-select features need to create the mouse buttons.

Select #Insert;#Shared Data;#Publish Geometry. The following options are presented.



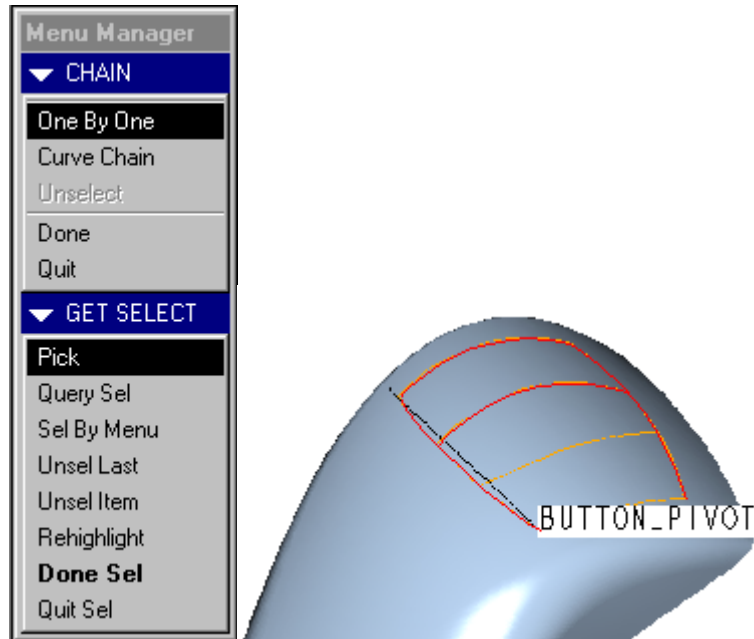
**Name:** Name the feature. This name will appear in lists when other models reference the feature

**Surface Refs:** Allows the selection of surfaces and quilts. The typical surface collection menus are available.

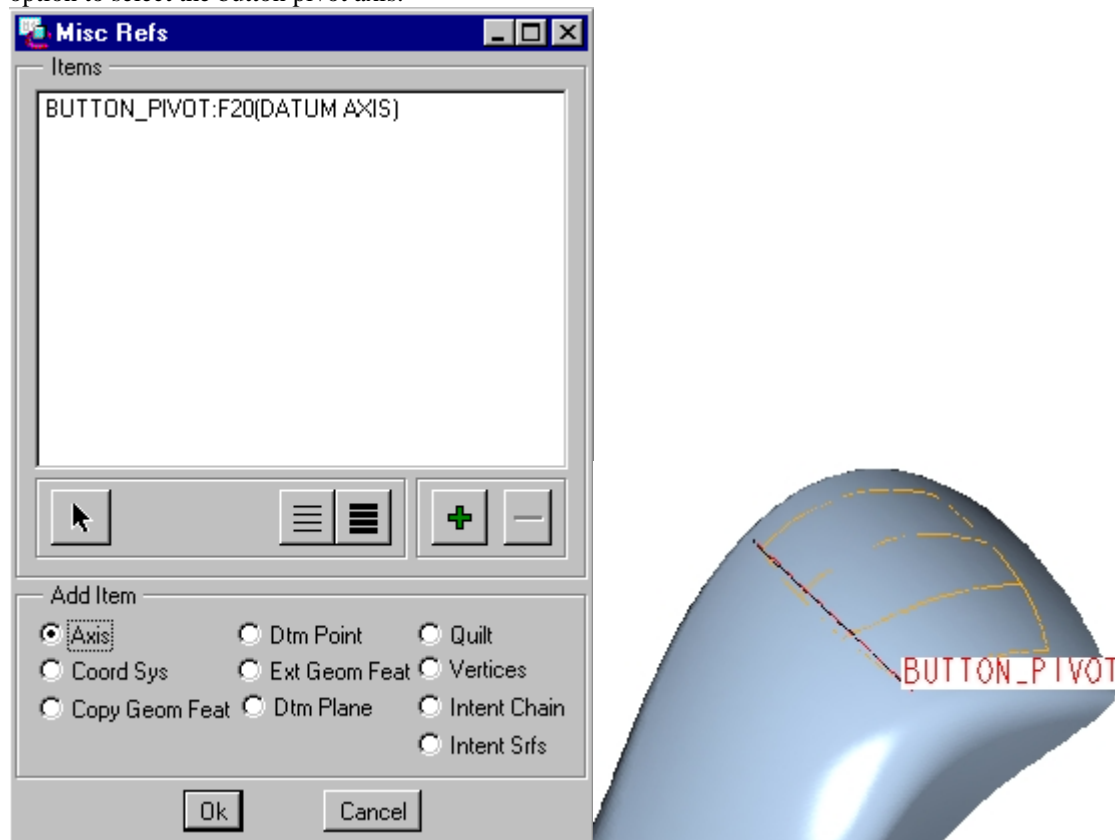


I have used the Indiv Surfs option and selected the top surface of the mouse.

**Curve Refs:** Will allow the selection of curve features. I have used the option to select the bounding curves of the mouse button.

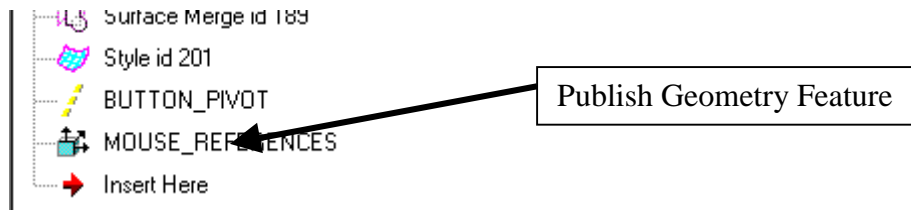


**Misc Refs:** Allows the selection of Datum features' intent chains and other references. I have used the option to select the button pivot axis.



The icon used in the model tree of the originating model is shown below.





## Key Vocabulary for Shared Data Features:

**Copy Geometry Feature:** A Pro/ENGINEER feature allowing geometry from one model to be replicated in one or many other models

**Cutout:** Remove the volume of one model from another. Like creating a mold cavity

**Inheritance Feature:** A Pro/ENGINEER feature allowing one part model to appear as a single feature in another part model. Useful for creating/documenting manufacturing process variants.

**Merge:** Combine two part models into one.

**Publish Geometry Feature:** A Pro/ENGINEER feature allowing a user to collect references in a source model to make it easier for other users to reference the geometry.

**Shrinkwrap:** A lightweight version of a part or assembly. Used in this document as an associative surface shrinkwrap.

**Skeleton Model:** A Top Down Design tool used to communicate shape and interfaces throughout a model

**Source model:** The model from which references are needed.

**Top Down Design:** A method of designing a product by specifying top level design criteria and passing those criteria down from the top level of the product's structure to all of the affected sub systems.

Title: Shared Data Menu: Communicating Design Intent Throughout Designs	
Date: 2/21/02	

## Tutorial Evaluation:

Title:	<input type="checkbox"/> Engineer <input type="checkbox"/> Designer <input type="checkbox"/> Draftsmen <input type="checkbox"/> Mfg. Engr. <input type="checkbox"/> Tech. Pubs. <input type="checkbox"/> Analyst					
PTC Products Used:	<input type="checkbox"/> Foundation <input type="checkbox"/> Advanced Assembly Extension <input type="checkbox"/> Advanced Surface Extension <input type="checkbox"/> Behavioral Modeling <input type="checkbox"/> Intralink <input type="checkbox"/> Modelcheck <input type="checkbox"/> All					
Time using Pro/E:	<input type="checkbox"/> 0-6 months <input type="checkbox"/> 6-12 months <input type="checkbox"/> 1-2 years <input type="checkbox"/> 2-5 years <input type="checkbox"/> 5+ years					
1 – Strongly <u>Disagree</u> 3 – Agree 5 – Strongly Agree						
1. This tutorial content met my expectations:	.....	1	2	3	4	5
2. The exercise was easy to understand:	.....	1	2	3	4	5
3. This tutorial will help me on current projects:	.....	1	2	3	4	5
4. These techniques make Pro/E a more effective tool:	.....	1	2	3	4	5
5. These techniques will increase my speed using Pro/E:	.....	1	2	3	4	5
What concepts/techniques learned from this tutorial will you apply on the job?						
1)						
2)						
3)						
What would you like to see as a future tutorial at your company?						
1)						
2)						
3)						
What can be done to improve these tutorials for your company?						
1)						
2)						
3)						

Additional Comments: