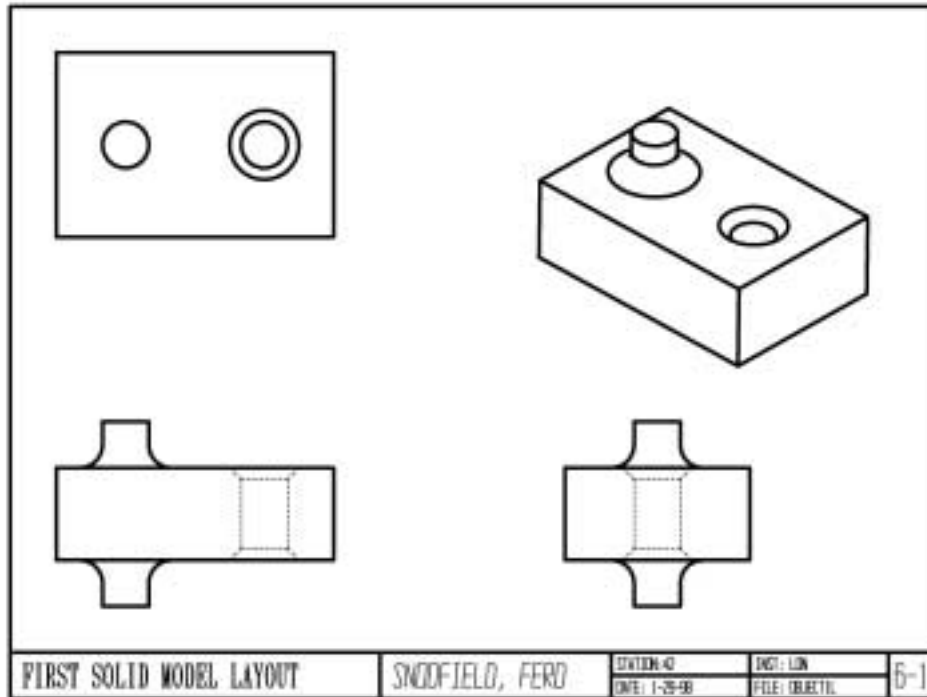

CHAPTER 6

Basic Solid Modeling



Project Goals

When you have completed this project you will be able to:

1. Use the fundamental **Solids** functions and features
2. Create solid models from primitive shapes
3. Combine solids using the boolean **Union** function
4. Create holes and cavities using the boolean **Difference** function.
5. Modify solids with the **Fillet** and **Chamfer** functions.

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Introduction

This chapter introduces some of the basic techniques for creating 3D geometry using CADKEY Solids. You will see how models can be built from primitive shapes, and how these shapes can be combined and modified to create complex objects. Before starting to work in 3D, it is a good idea to create a 3D blank seed drawing. This drawing will save a great deal of time when you are starting on a new model.

If you are just starting with CADKEY and are not familiar with the user interface, you should complete the exercises in **Chapter 1** of this book before proceeding.

Creating a 3D Blank (seed) Drawing

When CADKEY is started a number of things are pre-set. These are called the *default* settings. These settings will remain in place until they are changed. Whenever you start a new design, it is very handy to have things adjusted just the way you prefer. By creating a blank part file (also known as a seed drawing) that contains some basic 3D construction settings, you will save a lot of time when creating the objects demonstrated in this project.

•• **NOTE:** You will have to click on << or >> to change the **SETTINGS WINDOW** pages while completing the next several steps.

1. __ Start the Cadkey software. Select **File, Close All**.
2. __ **Open** your **Blank2D** file created in **Chapter 1**.



Creating a 3D Blank (seed) Drawing

3. From the **MENU BAR**, select **Viewport, Layout** and select the **four** viewport option (as shown in Figure 6-1).

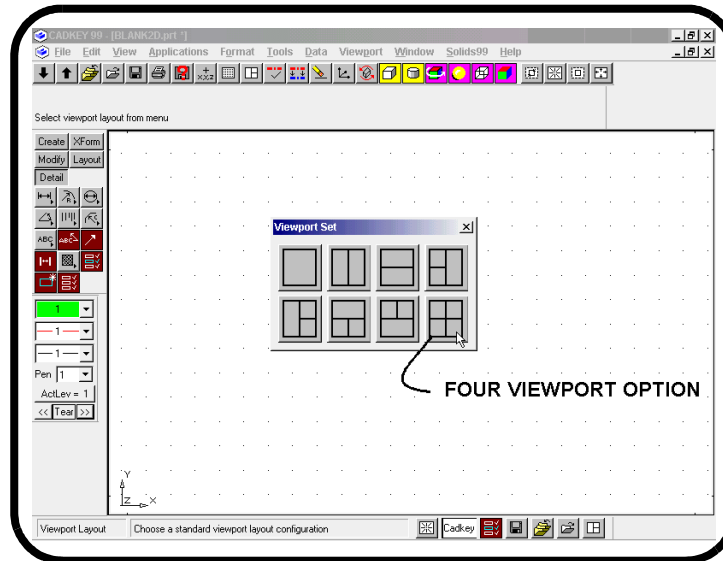


Figure 6-1, Selecting the four viewport option.

4. Watch the prompt and click in the **lower left** viewport as the **primary** view.

Some of the settings in the following steps may already have the desired options, however it is a good idea to check them.

5. Set **Grid** to **Prim** in the **SETTINGS WINDOW**.
6. Set **View/World Coordinates** to **WLD Coords** in the **SETTINGS WINDOW**.
7. Set construction to **3D Const** in the **SETTINGS WINDOW**.
8. Toggle **Snap** to **ON** in the **SETTINGS WINDOW**.
9. From the **MENU BAR**, select **View, Cursor Tracking**, and then select the **World** button.



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Your display should look similar to Figure 6-2.

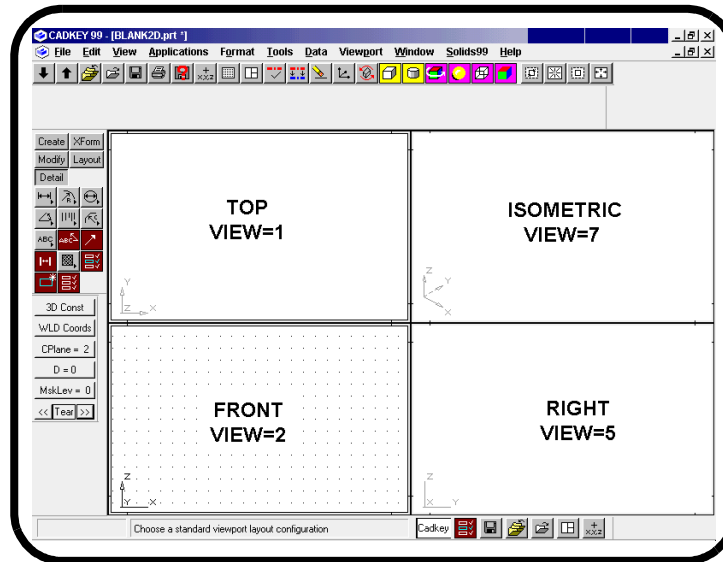



Figure 6-2, The four viewport display.


10. Move the cursor around the display and observe the cursor tracking in the different viewports. Also watch the **View=** indicator in the **SETTINGS WINDOW** while you move the cursor into the different viewports.

The CADKEY identification number for the *top* viewport is **View =1**, *front* = **2**, *right side* = **5**, and *isometric* = **7**.

Since CADKEY PART files include information about drawing levels, you can include level information in your blank seed file.

11. From the **MENU BAR**, select **View, Levels, List**. Edit the **Descriptor** for the levels as follows: Number **1 - Geometry**; Number **2 - Dimensions**; Number **3; Title Block**. 
12. Turn on the **Display** of levels 1, 2 and 3. Make level **1 Active**, then select **OK**.

You can also include your other preferred default settings in your blank seed drawing.

13. From the **APPLICATION MENU**, select **Detail, Set the current default attributes**. 

Creating Solids from Primitive Shapes

14. Set the **Notes** and **Dimension Char Height** to **0.125**, and set the **Anchor** points as desired.
15. Set the **Leader/Witness Arrow Style** to **Filled Arw**, and set the **Tolerance** to **None**.

Now the new blank seed drawing can be saved.

16. From the **MENU BAR**, select **File, Save As** and save the file with the name  **BLANK3D**.

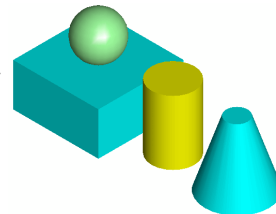


As you become more experienced with using CADKEY, you should keep the concept of creating blank seed drawings in mind. By creating your own collection of seed drawings, you can increase your drawing productivity.



If you are forgetful, and frequently find yourself starting a new project with a blank seed file, and then saving new designs with that file name, you may want to use a **Windows Explorer** option to make your seed drawing files *read only*.

Creating Solids from Primitive Shapes

A typical method for creating solid objects is to start with a library of basic shapes and then modify and/or combine those shapes into more complex models. There are a large variety of primitive shapes, and an even larger variety of options for creating them available in **Solids**. This variety of options can be a little overwhelming to a new user. In this exercise, you will be introduced to the 3D geometry interface by creating a simple block and then adding a post and a hole. Later chapters will cover most of the options and techniques available for creating and modifying solid geometry. And, as you gain experience working with 3D construction, you will quickly see the advantages of creating a 3D database.



Creating Blocks

1. If your **BLANK3D** file is on the display skip to the next step. Otherwise, **Open**  your **BLANK3D** file.
2. From the **Menu Bar**, select **File, Save As** and enter **OBJECT1** as the file name. Enter *First solid model* as the part description. 

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3. From the **Menu Bar**, select **Applications, Solids, Create**.

The **Solids, Create APPLICATION MENU** is shown in Figure 6-3.

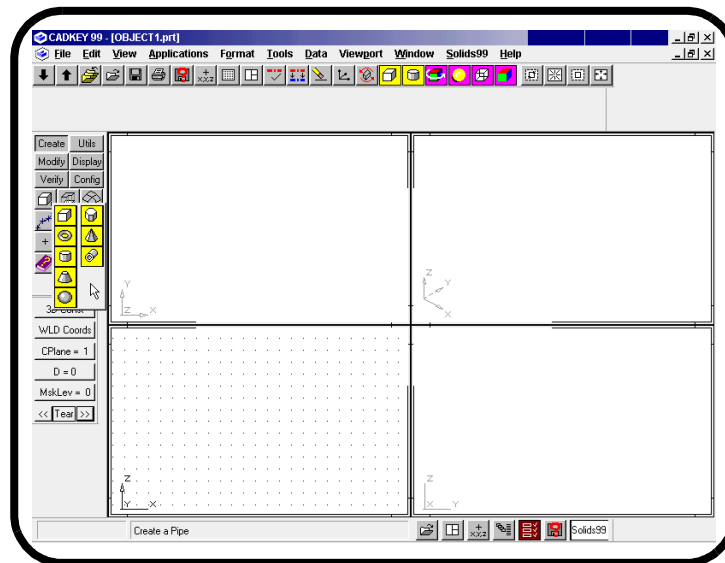


Figure 6-3, The Solid primitives options.

The basic shapes that are available are *block, prism, cone, pyramid, cylinder, pipe, sphere* and *torus*.

•• **NOTE:** Watch the **STATUS LINE** to see a description of each tool as you move the cursor over it.

4. Select **Create, Create Primitive solids, Create a Block**.

