

# **AUTOCAD<sup>®</sup> 2006 AND AUTOCAD LT<sup>®</sup> 2006**

***NO EXPERIENCE REQUIRED<sup>®</sup>***

**David Frey**



**San Francisco • London**



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*In memory of my parents,*

*Dorotha and Hugh.*

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# INTRODUCTION

**T**his book was born of the need for a simple yet engaging tutorial that would help beginners step into the world of AutoCAD or AutoCAD LT without feeling intimidated. That tutorial has evolved over the years into a full introduction to the way in which architects and civil and structural engineers use AutoCAD to increase their efficiency and ability to produce state-of-the-art computerized production drawings and designs.


Because AutoCAD and AutoCAD LT are so similar, it makes sense to cover the basics of both programs. For most of the book, the word *AutoCAD* stands for both AutoCAD and AutoCAD LT.

 When you come to a section of a chapter that applies to AutoCAD only, an icon (shown here) is displayed in the margin to alert you. Then, at the end of that section, extra information for AutoCAD LT users is provided to give you a workaround or otherwise keep you in step with the tutorial.

The Appendix, which is an introduction to drawing in 3D, applies only to AutoCAD, because AutoCAD LT does not have the 3D commands and features. LT users, be assured: other than the 3D features, LT is much the same program as AutoCAD, with minor differences. You'll be prompted when those differences come along.

This book is directed toward AutoCAD and AutoCAD LT novices—users who know how to use a computer and do basic file-managing tasks, such as creating new folders and saving and moving files, but who know nothing or little about AutoCAD or LT, as we'll be calling AutoCAD LT throughout the book. If you are new to the construction and design professions, this book will be an excellent companion as you're learning AutoCAD. If you're already practicing in those fields, you'll immediately be able to apply the skills you'll pick up from this book to real-world projects. The exercises have been successfully used to train architects, engineers, and contractors, as well as college and high-school students, in the basics of AutoCAD.

For those of you in other trades and professions, the project that runs through the book—drawing a small cabin—has been kept simple so that it does not require any special training in architecture or construction. Also, most chapters have additional information and exercises specifically designed for non-AEC users. So anyone wanting to learn AutoCAD will find this book helpful.

 **A note like this will provide you with information on AutoCAD LT, as well as other helpful information.**

## What Will You Learn from This Book?

Learning AutoCAD, like learning any complex computer program, requires a significant commitment of time and attention and, to some extent, a tolerance for repetition. You must understand new concepts to operate the program and to appreciate its potential as a drafting and design tool. But to become proficient at AutoCAD, you must also use the commands enough times to gain an intuitive sense of how they work and how parts of a drawing are constructed.

At the end of most chapters, you will find one or more additional exercises and a checklist of the tools you have learned (or should have learned!). The steps in the tutorial have a degree of repetition built into them that allows you to work through new commands several times and build up confidence before you move on to the next chapter.

Progressing through the book, the chapters fall into four general areas of study:

- ▶ Chapters 1 through 3 familiarize you with the organization of the screen, go over a few of the basic commands, and equip you with the tools necessary to set up a new drawing.
- ▶ Chapters 4 and 5 develop drawing strategies that will help you use commands efficiently.
- ▶ Chapters 6 through 11 work with AutoCAD's major features.
- ▶ Chapters 12 through 14 and the appendix examine intermediate and advanced AutoCAD features.

In the process of exploring these elements, you will follow the steps involved in laying out the floor plan of a small, three-room cabin. You will then learn how to generate elevations from the floor plan and, eventually, how to set up a title block and print your drawing. Along the way, you will also learn how to do the following:

- ▶ Use the basic drawing and modify commands in a strategic manner
- ▶ Set up layers
- ▶ Put color into your drawing
- ▶ Define and insert blocks
- ▶ Generate elevation views
- ▶ Place hatch patterns and fills on building components
- ▶ Use text in your drawing
- ▶ Dimension the floor plan

Chapters in the last part of the book touch on more advanced features of AutoCAD, including:

- ▶ Drawing a site plan
- ▶ Using external references
- ▶ Setting up a drawing for printing with layouts
- ▶ Making a print of your drawing
- ▶ Working in three dimensions, for AutoCAD users

All these features are taught using the cabin as a continuing project. As a result, you will build up a set of drawings that document your progress through the project and that you can use later as reference material if you find that you need to refresh yourself with material in a specific skill.

At the end of the book is a glossary of terms that are used in the book and are related to AutoCAD and building design, followed by an index.

## **Files on the Website**

If you are already somewhat familiar with AutoCAD and reading only some of the chapters, you can pull accompanying files from this book's page on Sybex's website at [www.sybex.com](http://www.sybex.com). Use the Catalog or Search tool to find this book's web page, and then click the Downloads button.

Also on Sybex's website, in addition to the .dwg files that accompany the book, you can download a bonus chapter, "Making the Internet Work with AutoCAD" and two bonus appendixes, "An Introduction to Attributes" and "An Introduction to Dynamic Blocks." These introduce you to tools for working online with AutoCAD, demonstrate how to define attributes and construct a title block using attributes, and show how dynamic blocks work and how they are set up.

## **Hints for Success**

Because this book is essentially a step-by-step tutorial, it has a side effect in common with any tutorial of this type. After you finish a chapter and see that you have progressed further through the cabin project, you may have no idea how you got there and are sure you couldn't do it again without the help of the step-by-step instructions.

This feeling is a natural result of this kind of learning tool, and you can do a couple of things to get past it. You can do the chapter over again. This may seem tedious, but it has a great advantage. You gain speed in drawing. You'll accomplish the same task

in half the time it took you the first time. If you do a chapter a third time, you'll halve your time again. Each time you repeat a chapter, you can skip more and more of the explicit instructions, and eventually you'll be able to execute the commands and finish the chapter by just looking at the figures and glancing at the text. In many ways, this is just like learning a musical instrument. You must go slow at first, but over time and through practice, your pace picks up.

Another suggestion for honing your skills is to follow the course of the book, but apply the steps to a different project. You might draw your own living space or design a new one. If you have a real-life design project that isn't too complex, that's even better. Your chances for success in learning AutoCAD or any computer program are greatly increased when you are highly motivated, and a real project of an appropriate size can be the perfect motivator.

## **Ready, Set...**

When I started learning AutoCAD about 18 years ago, I was at first surprised how long I could sit at a workstation and be unaware of time passing. Then, shortly afterward, I experienced a level of frustration that I never thought I was capable of feeling. When I finally “got over the hump” and began feeling that I could successfully draw with this program after all, I told myself that I would someday figure out a way to help others get over the hump. That was the primary motivating force for writing this book. I hope it works for you and that you too get some enjoyment while learning AutoCAD. As the title says, there is “No experience required,” only an interest in the subject and a willingness to learn!

# CHAPTER 1



## Getting to Know AutoCAD

- ▶ **Opening a new drawing**
- ▶ **Getting familiar with the AutoCAD and AutoCAD LT Graphics windows**
- ▶ **Modifying the display**
- ▶ **Displaying and arranging toolbars**

**Y**our introduction to AutoCAD and AutoCAD LT begins with a tour of the features of the screens used by the two programs. In this chapter, you will also learn how to use some tools that help you control the screen's appearance and how to find and start commands. For the material covered in this chapter, the two applications are almost identical in appearance. Therefore, as we tour AutoCAD, I'll point out any differences between AutoCAD and AutoCAD LT. In general, LT is a 2D program, so it doesn't have the 3D features that come with AutoCAD, such as solids modeling and rendering. The other differences are minor. As mentioned in this book's Introduction, when I say "AutoCAD," I mean both AutoCAD and AutoCAD LT. I'll also refer to AutoCAD LT as "LT" throughout this chapter and the rest of the book. Starting up AutoCAD is the first task at hand.

## Starting Up AutoCAD

If you installed AutoCAD or LT using the default settings for the location of the program files, start AutoCAD by choosing Start > All Programs > Autodesk > AutoCAD 2006 > AutoCAD 2006. For LT, choose Start > All Programs > Autodesk > AutoCAD LT 2006 > AutoCAD LT 2006. If you customized your installation, find and click the AutoCAD 2006 or the AutoCAD LT 2006 icon to start the program.

## The Startup Dialog Box

If AutoCAD or LT opens with the Startup dialog box sitting in front of the AutoCAD Graphics window, your screen will look like Figure 1.1. If the Startup dialog box doesn't open, read on a little—you'll see how to display it and then how to suppress it.

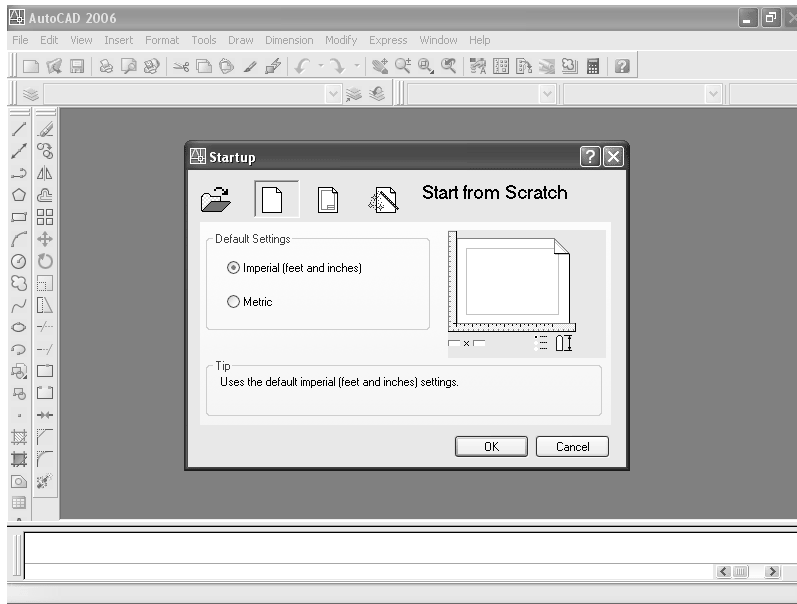
The Startup dialog box has four buttons in the upper-left corner. The first two buttons let you set up a new drawing and choose an existing drawing to revise or update. The second two buttons use templates and wizards to initiate advanced setup routines. The contents of the middle portion of the dialog box depend on which of the four buttons you choose. By beginning a new drawing, you can get past this dialog box to the AutoCAD Graphics window.



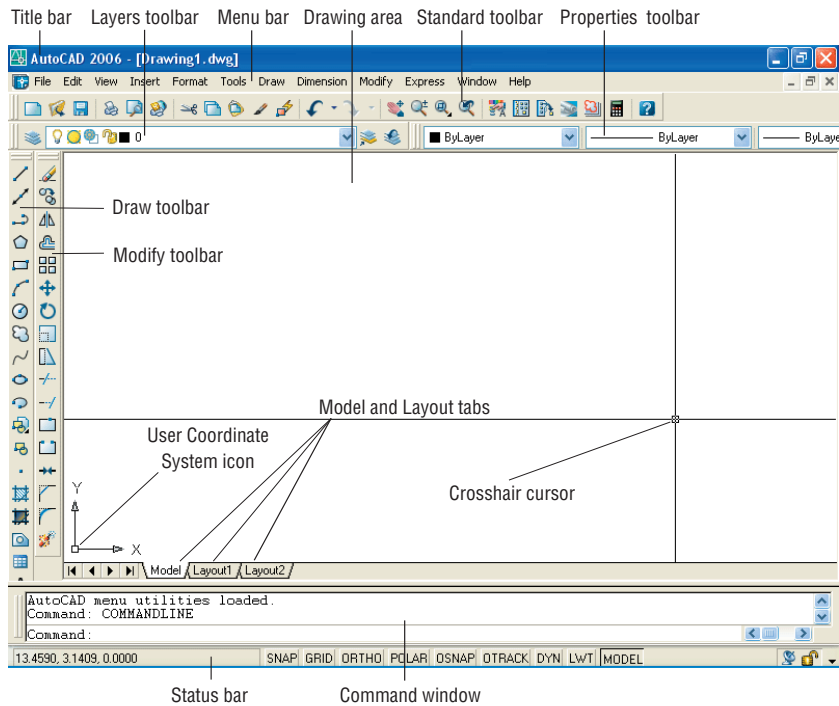
1. Click the Start From Scratch button, the second button from the left.
2. In the Default Settings section, click the Imperial (Feet And Inches) radio button.
3. Click OK to close the Startup dialog box. Your monitor displays the AutoCAD or LT Graphics window, sometimes called the Graphical User Interface, or GUI (see Figure 1.2).

▶ Dialog boxes with various combinations of buttons and text boxes are used extensively in AutoCAD and LT. You will learn their many functions as you progress through the book.

▶ Radio buttons are round and come in a list or a group. You can activate only one radio button at a time.



**FIGURE 1.1:** The Startup dialog box



**FIGURE 1.2:** The AutoCAD Graphics window



**NOTE** If the **New Features Workshop** window appears when you start up AutoCAD, click the second or third radio button in the window, and then click **OK** to remove it. You can always access it on the **Help** menu.

The toolbars on your screen may not be in exactly the same places as they are shown in Figure 1.2. I recommend that you set your screen to look like the one here, as it will make following through the book that much easier. Later in this chapter, you will see how to move the toolbars, display new ones and place them, and delete them.

Another feature called *palettes* might be visible on the far-right side of your screen when you start AutoCAD. Palettes can display as a rectangular area or as a vertical title bar. If they appear, choose **Tools > Tool Palettes Window** to temporarily close the palettes. We'll take a look at them in Chapters 7 and 9.

---

## CONTROLLING THE WAY AUTOCAD STARTS UP

You can set AutoCAD and LT to display or hide the Startup dialog box when you start AutoCAD.

1. From the menu bar, choose **Tools > Options** to open the Options dialog box.
2. Click the **System** tab to bring it forward.
3. In the **General Options** section, open the **Startup** drop-down list.
  - ▶ If you want AutoCAD to display the Startup dialog box, click **Show Startup Dialog Box**.
  - ▶ If you want AutoCAD to start up with a blank drawing, click **Do Not Show A Startup Dialog**.
4. Click **Apply**, and then click **OK**.

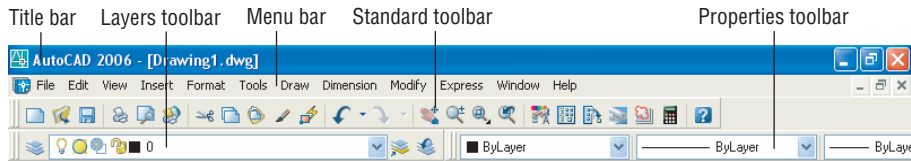
The next time you start up AutoCAD, your preference will be used.

---



# Introduction to the AutoCAD Graphics Window

At the top of the Graphics window sit the title bar, the menu bar, and three toolbars.



The title bar is analogous to the title bar in any Windows program. It contains the program name (AutoCAD or AutoCAD LT) and the title of the current drawing with its *path*. Below the title bar is the menu bar, where you will see the drop-down menus. Among the drop-down menus, the first two on the left and the last one on the right are Windows menus (meaning that they appear on most Windows applications). These Windows menus also contain a few commands specific to AutoCAD. The rest of the menus are AutoCAD menus.

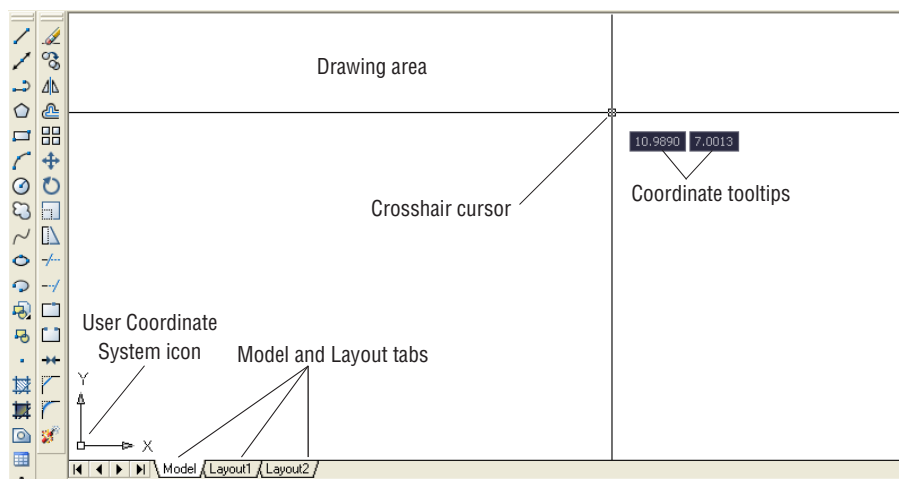
Below these menus is the *Standard toolbar*, which contains 24 command buttons (LT has only 22). Several of these buttons will be familiar to Windows users; the rest are AutoCAD commands. Just below the Standard toolbar are the *Layers toolbar* and the *Properties toolbar*, which together contain three command buttons and five drop-down lists.

The blank middle section of the screen is called the *drawing area*. Notice the movable *crosshair cursor*. The crosshairs on your cursor may not extend completely across the screen. I recommend that you set them to look like they do in the figures in this book, and I will show you how to do this when we make a few changes later in this chapter. Your screen may or may not display the coordinate tool tips next to the intersection of the crosshairs.

Notice the little box at the intersection of the two crosshair lines. This is one of several forms of the AutoCAD and LT cursor. When you move the cursor off the drawing area, it changes to the standard Windows pointing arrow. As you begin using commands, it will take on other forms, depending on which step of a command you are in.

The icon with a double arrow in the lower-left corner of the drawing area is the *User Coordinate System icon*. It indicates the positive direction for the X and Y coordinates. You won't need it for most of the chapters in this book, so you'll learn how to make it invisible in Chapter 3.

The title bar and menu bar at the top of the LT screen are identical to those of AutoCAD except that AutoCAD LT appears in the title bar rather than AutoCAD.



At the bottom of the drawing area are three tabs: a Model tab and two Layout tabs. You use these tabs to switch between viewing modes. (I'll discuss viewing modes in Chapter 13.) Our example shows no toolbars floating in the drawing area, but two toolbars are docked at the left of the drawing area. Your screen may or may not have the toolbars, or they may be in a different position. If the toolbars are within the drawing area, they will have a colored title bar. For specifics, see the section “The Toolbars” later in this chapter.

Below the drawing area is the *Command window*.



The Command window in LT is identical to the one in AutoCAD.

The Command window is where you tell the program what to do and where the program tells you what's going on. It's an important area, and you will need to learn how it works in detail. Three lines of text should be visible. If your screen displays fewer than three lines, you will need to make another line or two visible. You'll learn how to do this later in this chapter in the section “The Command Window.”

Below the Command window is the *status bar*.



LT does not display the Otrack button on the status bar.

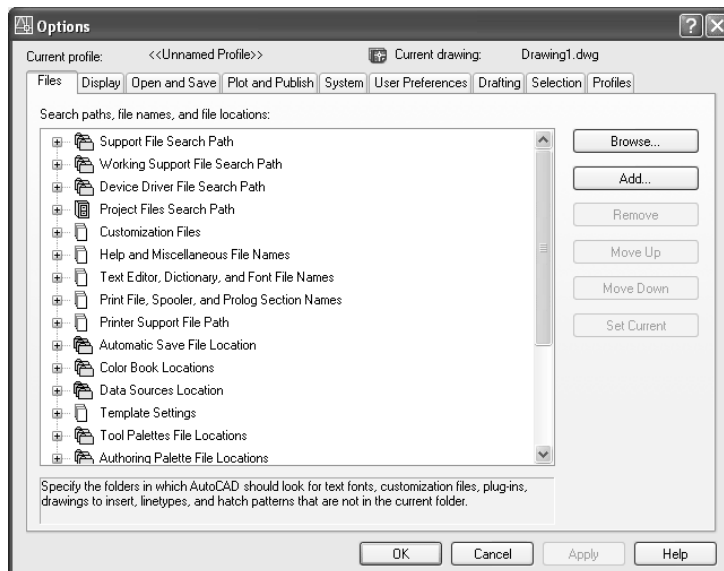
On the left end of the status bar, you'll see a coordinate readout window. In the middle are nine readout buttons (LT has only eight) that indicate various drawing modes. It is important to learn about the coordinate system and most of these drawing aids (Snap, Grid, Ortho, and Osnap) early as you learn to draw in AutoCAD or LT. They will help you create neat and accurate drawings. Polar and Otrack are advanced drawing tools and will be introduced in Chapter 5. Dyn is an

OFF/ON toggle that activates or suppresses the dynamic display of information next to the crosshair cursor when it's in the drawing area. For now, keep it in the OFF, or unpushed, mode. Lwt stands for Lineweight and will be discussed in Chapter 14 in the section on plotting. The Model button is an advanced aid that will be covered in Chapter 13. At the far right of the status bar are small icons that indicate the presence of various features for a drawing session. The Satellite Dish button activates AutoCAD's Communication Center and is discussed in a bonus chapter available on Sybex's website ([www.sybex.com](http://www.sybex.com)). The Padlock icon controls which types of toolbars and windows are locked in their current positions on the screen. Leave it in the unlocked mode for now.

This has been a quick introduction to the various parts of the Graphics window. I didn't mention a couple of items that might be visible on your screen. You might have scroll bars below and to the right of the drawing area, and you might have a menu on the right side of the drawing area. Both features can be useful, but they can also be a hindrance and can take up precious space in the drawing area. They won't be of any use while working your way through this book, so I suggest that you remove them for now.

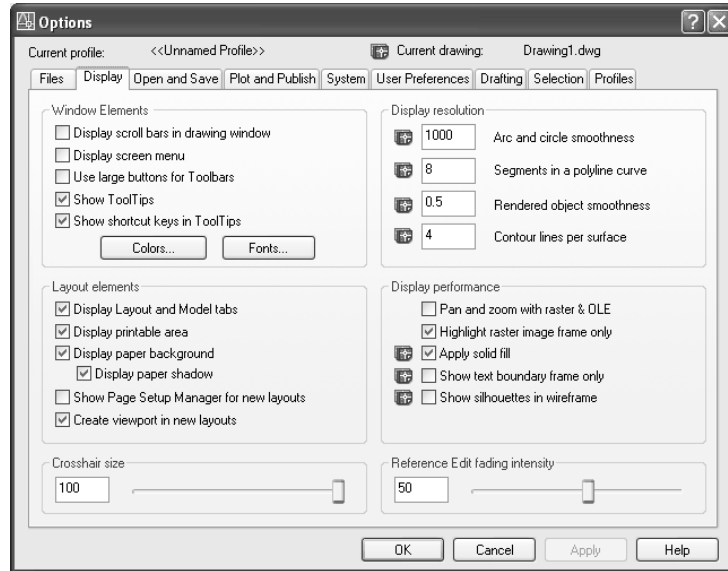
To temporarily remove these features, follow these steps:

1. Choose Tools > Options to open the Options dialog box (shown in Figure 1.3). It has nine tabs (LT has only eight) across the top that act like tabs on file folders.



**FIGURE 1.3** : The Options dialog box

- Click the Display tab, which is shown in Figure 1.4. Focus on the rectangular area titled Window Elements. If scroll bars are visible on the lower and right edges of the drawing area, the Display Scroll Bars In Drawing Window check box will be checked.



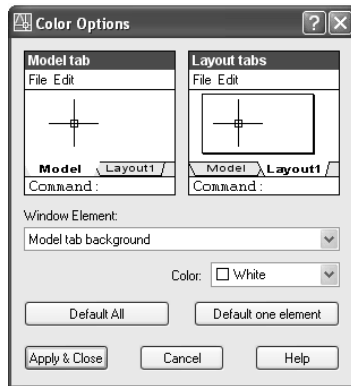
**FIGURE 1.4** The Options dialog box open at the Display tab

LT doesn't have the Screen menu, so the option to turn it off is not on LT's Display tab.

- Click the check box to turn off the scroll bars. Also be sure the check box for Display Screen Menu is unchecked. Don't click the OK button yet.

Another display setting that you might want to change at this point controls the color of the cursor and the drawing area background. The illustrations in this book show a white background and black crosshair cursor, but you might prefer to reverse the colors. To do so, follow these steps:

- In the Window Elements area of the Display tab, click the Colors button to open the Color Options dialog box (see Figure 1.5). In the middle of the dialog box, in the Window Element drop-down list box, Model Tab Background should be visible. If it's not, open the drop-down list and select it.



**FIGURE 1.5:** The Color Options dialog box

2. Move to the Color drop-down list, which is below the Window Element drop-down list. If your drawing area background is currently white, a square followed by the word *White* is displayed. Open the Color drop-down list. Scroll to Black (or the background color you want) and select it. The drawing area will now be that color, and the cursor color will change to white, as shown in the Model Tab preview window in the upper-left corner of the dialog box.
3. Click the Apply & Close button to close the Color Options dialog box.
4. Don't close the Options dialog box yet.
5. If you want the lines of your crosshair cursor to extend completely across the screen, go to the lower-left corner of the Display tab (lower-right for LT) and move the slider to change the Crosshair Size setting to 100.
6. Click OK to close the Options dialog box.

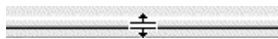
Your screen and crosshair cursor will take on their newly assigned colors, and the crosshair lines should extend across the drawing area.



**TIP** If you choose a color other than black as the drawing area background color, the color of the crosshair cursor remains the same as it was (black). To change the crosshair color, in the Color Options dialog box, open the Window Element drop-down list, and select Model Tab Pointer. Then select a color from the Color drop-down list.

## The Command Window

Just below the drawing area is the Command window. This window is actually separate from the drawing area and behaves like a Windows window—that is, you can drag it to a different place on the screen and resize it, although I don't recommend that you do this at first. If you currently have fewer than three lines of text in the window, you will need to increase the window's vertical size. To do so, move the cursor to the horizontal boundary between the drawing area and the Command window until it changes to an up-and-down arrow broken by two parallel horizontal lines.



Hold down the left mouse button and drag the cursor up by approximately the amount that one or two lines of text would take up, and then release the mouse. You should see more lines of text, but you might have to try this a couple of times to display exactly three lines. When you close the program, the new settings will be saved, and the next time you start up AutoCAD, the Command window will display three lines.

The Command window is where you give information to AutoCAD and where AutoCAD prompts you for the next step in executing a command. It is a good practice to get into the habit of keeping an eye on the Command window as you work on your drawing. Most errors occur when you are not taking a look at it frequently. If the Dyn button on the status bar is activated, some of the information in the Command window is displayed in the drawing area next to the cursor. We'll look at this feature when we start drawing.

Before you begin to draw, take a close look at the menus, toolbars, and keyboard controls.



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**NOTE** In many cases, you can start AutoCAD commands in a number of ways: from drop-down menus, from the toolbars, from the keyboard, and from menus that appear when you right-click the mouse. When you get used to drawing with AutoCAD, you will learn some shortcuts that start commands quickly, and you will find the way that is most comfortable for you.