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plans and find out
how Real Architect
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process.



Learn **AutoCAD[®]LT** **2000i for** **Architects** **James Padgett**



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Learn AutoCAD LT® 2000 for Architects

James Padgett

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Preface

Learn AutoCAD LT 2000 for Architects was written for beginner to intermediate users of AutoCAD LT. The book covers AutoCAD LT 98 through LT 2000i.

AutoCAD LT is a large and powerful program. It has all the tools you need to draw just about anything you can think of. Some of these tools are relevant to architectural drafting and some are not.

The goal of this book is to minimize the time it takes you to learn how to use AutoCAD LT for architectural drafting. We only show you how to use the commands and tools that are relevant to architectural work. If you get curious about some command that we have not covered, AutoCAD LT comes with many excellent sources of information regarding all of its commands. We urge you to use these resources such as the Help system, the printed manual, and the new Active Assistant in LT 2000i.

Because we are covering multiple versions of AutoCAD LT, some of the text prompts and graphics in the book may be a little different from what actually appears on your command line or screen. In most cases this is not a problem because the wording between versions is only slightly different. If, however, the differences between versions are significant, we have tried to show you these differences and explain how each version works.

AutoCAD LT is a great program. We hope this book will help you to get the most out of it.

Acknowledgments

I would like to thank my family for being so patient with me while I wrote this book. My wife, Melanie, son, Matthew, and daughter, Leianna, are very special people and helped me out more than they will ever know with their humor and love. I would also like to thank my friend John Lentz for his technical help. And finally I would like to say *mahalo* (thanks) to the folks at Wordware Publishing: Jim Hill, Wes Beckwith, Kellie Henderson, and especially Beth Kohler for her excellent work.

Introduction

Learn AutoCAD LT 2000 for Architects is a powerful learning system designed to teach architectural users how to get up and running as quickly as possible using AutoCAD LT 98, 2000, or 2000i.

This unique system is aimed specifically at teaching you how to use AutoCAD LT for architectural drafting. The system consists of several elements. These include this book; a number of different architectural templates containing borders, blocks, text, and dimension styles; a free copy of Real Architect LITE, a scaled-down version of an architectural front end for AutoCAD LT; and some hard copy materials, such as rough floor plans, elevations, and sections. These rough drawings, available on the companion CD and in the appendix, are similar to the types of materials you would expect to get from architects and contractors when starting a job.

Chapter 1 gives an overview of some of the basics of AutoCAD LT, including how to set up a drawing and other setup procedures. Chapters 2 through 5 focus on developing a set of architectural plans using plain AutoCAD LT. You will learn many tricks and shortcuts that really cut down on drawing time when creating a set of plans. We will cover creating a floor plan, sections, the four elevations, and building details.

The sixth chapter goes into using an architectural add-on package for AutoCAD LT called Real Architect LITE. This program, which is included on the companion CD, is a scaled-down version of the same product being used by thousands of architects, designers, and draftsmen around the country for producing their working drawings in AutoCAD LT.

Learn AutoCAD LT 2000 for Architects puts it all together by walking you through the development of a set of working drawings using all these elements. We have tried to replicate real-world experience as closely as possible. It is our feeling that this approach is the quickest way to learn how to use AutoCAD LT effectively for architectural drafting.

If you are a new user of AutoCAD LT, the experience you gain with this system will prepare you to take on real design projects with confidence. You will learn many shortcuts and methods that will get you up to speed quickly. If you are a seasoned user of AutoCAD, you will find the multitude of tips and tricks in this

book a surefire way to increase your productivity. So read on. We hope that you enjoy the book and find it helpful.

Why Use This Book?

Learn AutoCAD LT 2000 for Architects is more than just a book. It is a complete learning system that is designed to get the reader up and running as quickly as possible. The system includes this book; architectural templates; a free copy of the Real Architect LITE architectural drafting program; and additional hard copy materials that simulate what you would expect to receive from architects or contractors when working on a real job.

Whether you are making the switch from hand drafting to CAD or you are changing from one CAD program to AutoCAD LT, we all know that the time spent learning a new program is downtime. As design professionals, we get paid for output, pure and simple. The quicker you get up and drawing, the faster you begin to recover your investment.

So, instead of making you go through AutoCAD's entire set of commands, this book leads you through the ones that relate specifically to architectural drafting. In addition, there are many samples, blocks, fonts, and template drawings provided on the CD that will save you much time. Also, later on you will see how an add-on product like Real Architect LITE can cut out a tremendous amount of time by eliminating many of the repetitive tasks in architectural drafting.

What's Inside

Because our focus is to get up and running quickly, the book is broken down into chapters that lead you through the creation of a set of plans. Each chapter begins with an overview that explains what will be covered. The main body of each chapter is a step-by-step walk-through. A summary of each chapter follows.

Chapter 1

This chapter explains some of the basics of the AutoCAD LT program. You will learn different ways of starting a new drawing, setup procedures such as setting drawing units, how to create and use layers, and how to set text and dimension styles, snap spacing, osnap settings, and other variables. We will not spend a huge amount of time going over these. After all, most of these settings and drawing standards can be automated very easily. It is our feeling that you are

much better served by learning how to set up an automated system, rather than going into all the minute details about each setting.

If you're a seasoned user of AutoCAD LT and already have a good working knowledge of these setup procedures, you may want to skim through Chapter 1. If you are a new user, we recommend that you follow this chapter thoroughly.

Chapter 2

Chapter 2 leads you through the development of a simple floor plan. You will be working from a rough sketch of a floor plan, similar to one that would be provided to you by an architect or contractor. You will start out using one of the "template" files that we provide with this book. These template files contain a border, text styles, dimension styles, and symbols that will help you to get to work right away. You will draw all the walls, and add the windows, doors, notes, dimensions, and symbols to create a complete floor plan, based on the rough floor plan sketch. Finally, you will print the floor plan using the border sheet contained in the template file.

Chapter 3

Chapter 3 is focused on developing a cross section. First we go through creating a foundation plan and a roof plan for the floor plan you created in Chapter 2. These two elements, along with the floor plan, are essential when developing your cross section. Each template file provided with this book contains some predrawn roof lines with pitches of 1/12 through 12/12. These can be used when developing your cross section. Drawing cross sections helps to resolve actual construction issues and should be developed early in the design process.

Chapter 4

Chapter 4 discusses developing exterior elevations. The book provides you with some predrawn window and door blocks. It also has a number of predrawn roof lines, as in Chapter 3. These little features will help you to develop your elevations quickly. In the last part of Chapter 4, you will learn how to modify the template files to your own specifications. Once you have your own custom template built, we will go through the steps of plotting a sheet with multiple viewports of different scales.

Chapter 5

Chapter 5 focuses on developing drawing details. Details are generally specific to different areas of the country. We do not supply any predrawn details on the CD. We do, however, show you some examples in the book of different footings, walls, and framing details. Whenever you draw details for a job, you should save them in a directory for future use, as they are time consuming to re-create. We show you some methods for doing this.

Chapter 6

Chapter 6 discusses installing and using the Real Architect LITE program provided on the companion CD. Real Architect was created to reduce or eliminate many of the repetitive tasks associated with architectural drafting. Many routine tasks, such as placing a window or door in a floor plan, are cut down from many steps to just a couple of mouse clicks. This pared-down version of the full program contains only a small sample of what the full version can do, but it will give you a good idea of the operation and flow of the program.

Companion CD System Requirements

To use the files on the companion CD, you need the following software:

- Windows 95, 98, or NT 4.0
- AutoCAD LT 98, LT 2000, or LT 2000i

As for hardware, if your equipment runs AutoCAD LT, it can run Real Architect LITE.

How to Use This Book

Learn AutoCAD LT 2000 for Architects is a hands-on learning book. You need to use it in front of your computer. The chapters show you step by step how to create a set of plans using AutoCAD LT's tools, as well as Real Architect LITE's tools in the last chapter. You'll get the most out of the book by following these guidelines:

- Start at the beginning. Try the examples, if only to get the feel of the command sequence.
- Consider the implications of each command as it relates to your particular area and codes.
- Experiment. Try other commands to see how they work. Remember, you can always back up with the Undo command.

Some Words to the Wise

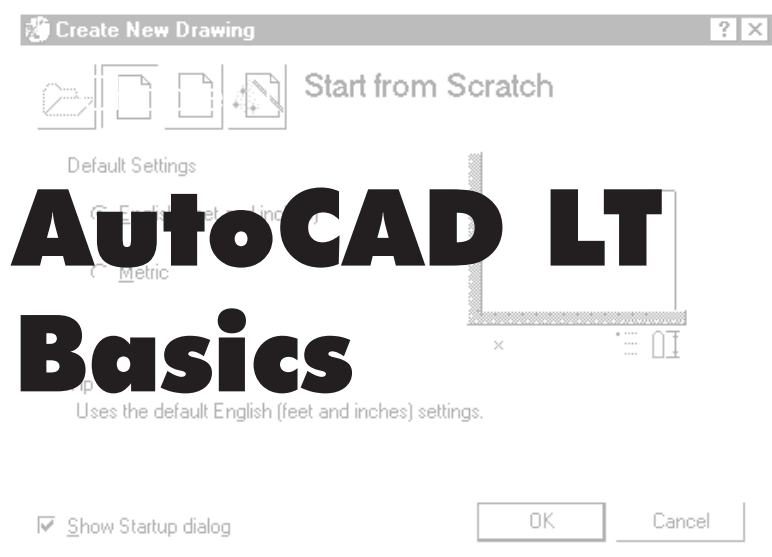
Don't worry about making mistakes in AutoCAD LT. You can always reverse your error by using the Undo command.

It is inevitable that you will goof once in a while and blow out a drawing. We may or may not learn something when this happens, but in any case, it does give us more practice, and in the end, that is what will make us more proficient CAD users.

There are a few things you can do to minimize these mistakes. One is to set the AutoSave timer to a reasonable interval. I like to use 10 minutes. The other is to back up drawings. If you do this conscientiously, you will lose at most only 10 minutes of drawing time if something goes wrong.

I have been using AutoCAD for over 12 years and still learn new things about the program on a regular basis. Because there are so many different ways of accomplishing any given task in AutoCAD, it is best to keep an open mind.

Chapter



Overview

The focus of this chapter is to get you up and running with AutoCAD LT as quickly as possible. We will be covering portions of the AutoCAD LT command set that are pertinent to architectural drafting. These are fundamentals that you will need to be familiar with in order to use AutoCAD LT effectively for architectural drafting.

Keep this in mind: AutoCAD LT is only a geometry engine. It is like a drawing board with all the drafting tools. It is not specific to any one discipline; rather, it can draw just about anything. It can be used for all types of drafting work, from mechanical to architectural. Our job is to show you the fastest, easiest way to use AutoCAD LT for architectural drafting.

Chapter 1 goes through some basic AutoCAD LT knowledge. You will learn the different ways of starting a new drawing. Then you will learn drawing setup procedures, such as setting drawing units, creating and using layers, setting text and dimension styles, and setting snap spacing, object snap (osnap) settings, and other variables.

If you're a seasoned user of AutoCAD LT and already have a good working knowledge of these setup procedures, you may want to skim through this chapter. If you are a new user, we recommend that you follow this chapter thoroughly.

In this chapter, you learn about:

- ♦ **The AutoCAD LT screen**
- ♦ **Starting drawings**
- ♦ **Basic drawing settings**
- ♦ **Using the setup wizards**
- ♦ **Drawing scale**
- ♦ **Selecting layers**

AutoCAD LT has a number of different methods for accessing commands in its menu system. This allows you to choose the combination that feels most comfortable to you. However, this redundancy can be confusing to the novice user, and does make it a little more difficult to explain the “how to” for executing any given command. For purposes of clarity, we will be using the actual command name in this book, but feel free to use whatever command access method you prefer.

Before we get started, you need to install some of the software provided on the CD that accompanies this book. The Ralite folder on the CD contains the template files and toolbars that go with Chapters 1 through 5. The Ra2000 folder contains the Real Architect LITE program that goes with Chapter 6.

The AutoCAD LT Screen

There are some terms frequently used in this book that refer to certain areas of the AutoCAD LT screen. These are labeled in the following figure. The example is of an AutoCAD LT 2000 screen, but the main features are the same in LT 2000i, as well as LT 98.

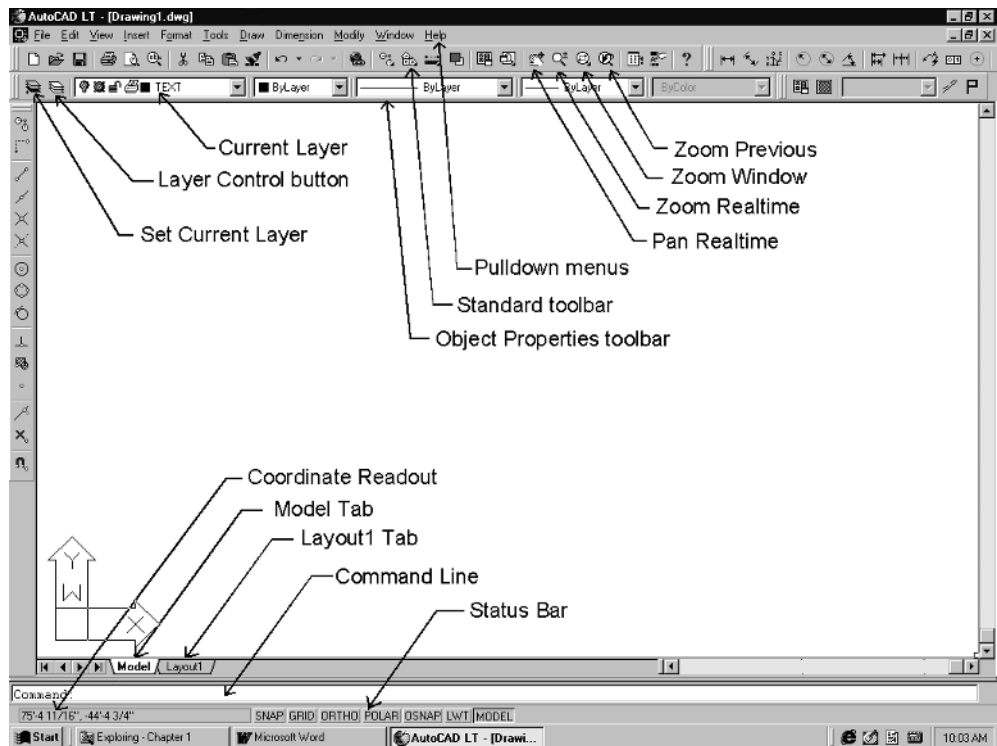


Figure 1-1

Here are some explanations for other terms that you will see frequently in this book.

- “Pick” or “click” both refer to pressing down with your finger on the mouse button indicated (either left or right).
- If a command is in progress, **Enter** refers to either pressing the Enter key on your keyboard or pressing the right mouse button.
- You are required to add the feet sign (') when typing in a distance in AutoCAD LT, but you do not need to add the inch sign ("). For example, for 20 feet, you would type 20' and hit the Enter key. For 20 feet and 6 inches, you would type 20'6 and hit the Enter key.

Installation Guide for Arch LT Templates and Toolbar

These tools and templates must be installed on the same drive as AutoCAD LT. Use Windows Explorer to find the drive AutoCAD LT is installed in on your machine.

1. Load the companion CD into your CD drive.
2. Pick **Start**, then **Run**. Type **E:\RALITE\SETUP**. If your CD drive is other than E, change it to the correct one, such as **F:\RALITE\SETUP**.
3. Follow the Install Wizard instructions. When you come to the Destination Directory screen, check the name of the Destination Directory. It should say **C:\ARCH-LT**. If you are installing on your C drive, you can proceed to the next screen.

If you are installing to a drive other than C, pick the Browse button, and then change the drive letter in the Path box to, for example, **D:\ARCH-LT**.

 **WARNING:** Change only the drive letter. The directory name must remain ARCH-LT. If you make a mistake, hit the Cancel button, then try again.

4. Once the path statement is right, hit the **OK** button. You will be asked if you want the install program to create this directory. Pick **Yes**, then **Next**.
5. When the installation is complete, go to the next section.

For AutoCAD LT 2000i Users Only

When you first start AutoCAD LT 2000i, a screen named AutoCAD LT Today will probably come up. In order to follow the first-time setup instructions in the next section, you will need to “minimize” this screen. This is done like any other Windows screen by just picking the underscore sign (_) in the upper right corner of the Today screen.

Also, the Active Assistance screen, shown in Figure 1-3, will pop up on your screen the first time you run 2000i. If you are new to AutoCAD LT, you will want to leave this up on your screen. It automatically shows you information on any command as soon as you select the command. Very nice for the novice user.

If you are a seasoned user, you might want to shut this down. It does take up screen space and you probably know how most commands work already.

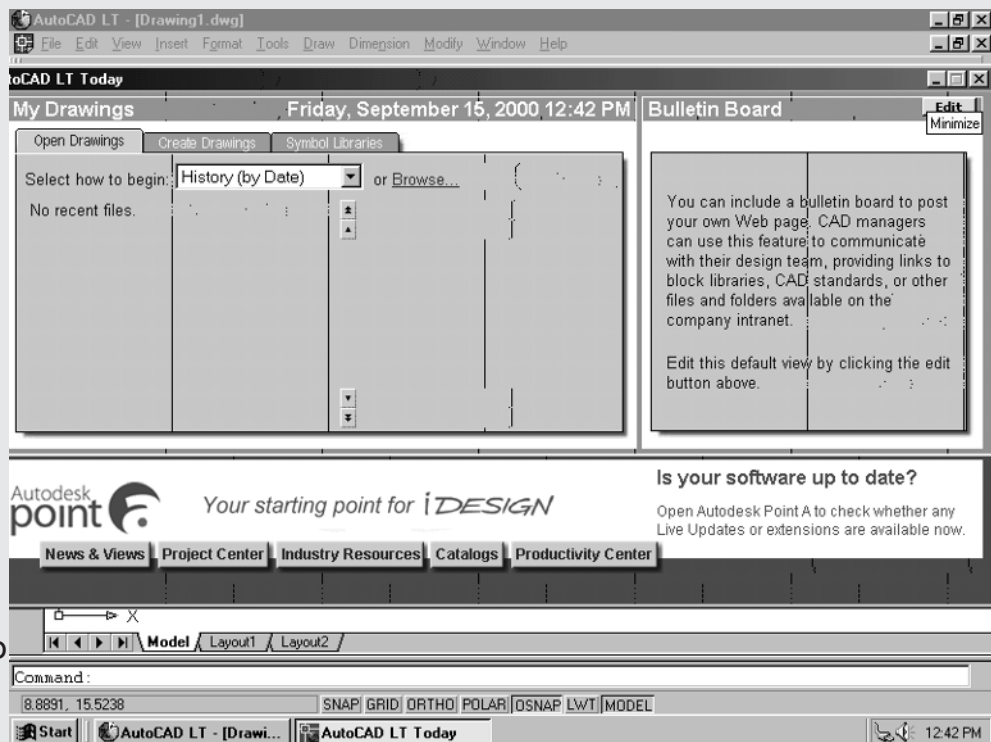


Figure 1-2
The AutoCAD
LT Today
screen in LT
2000i

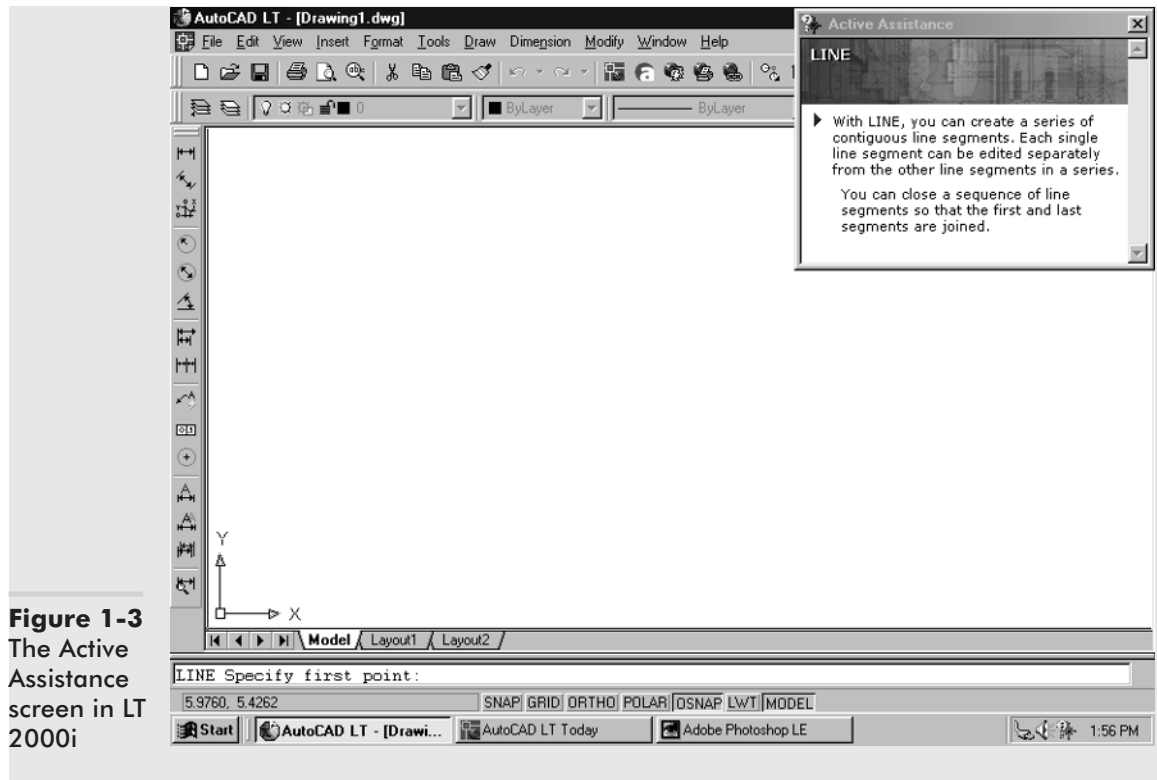


Figure 1-3
The Active
Assistance
screen in LT
2000i

First-Time Setup

To set up AutoCAD LT for the first time, follow these steps.

1. Start AutoCAD LT. Pick the **Cancel** button from the Startup or Start Up dialog box. If you are using AutoCAD LT 2000i, the AutoCAD LT Today screen may come up. This screen must be minimized in order for you to follow the rest of these steps. This is done, as with any other Windows screen, by picking the underscore sign () in the upper right corner of the screen.
2. Once you are in AutoCAD LT, you will need to select **Options** or **Preferences** from the Tools pull-down menu. Select the **Files** tab. Pick the + sign next to Support File Search Path, and pick the **Add** button.
3. Type **C:\ARCH-LT** in the newly created box. If you installed Real Architect LITE on a drive other than C, replace the C in the previous path statement with the appropriate drive letter, such as D:\ARCH-LT.

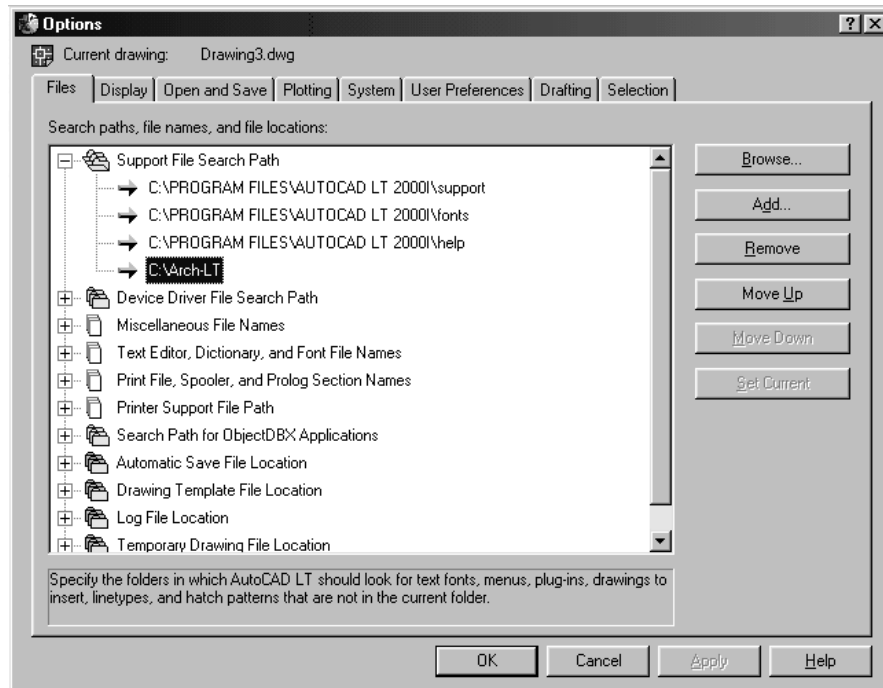


Figure 1-4

4. Next, pick the + sign next to Drawing Template File Location. Select the existing template drawing path, then pick the **Remove** button. In the empty box, type one of the following:

For AutoCAD LT 98, type **C:\ARCH-LT\TEMPLATE98**.

For AutoCAD LT 2000, type **C:\ARCH-LT\TEMPLATE2000**.

For AutoCAD LT 2000i, type **C:\ARCH-LT\TEMPLATE2000i**.

NOTE: If at any time you get a warning saying "Path does not exist...", hit the **No** button and try typing the path statement again.

Steps 5 through 8 depend on which version of AutoCAD LT you are using. Step 7 applies only to AutoCAD LT 2000i. Step 8 applies only to AutoCAD LT 2000 and LT 2000i.

5. In this step you change your crosshair size. This step applies to all versions of AutoCAD LT.

For LT 98, pick the **Work Space** tab. Change the number in the box labeled Graphics cursor size to **100**, as shown in Figure 1-5.

For LT 2000 and 2000i, pick the **Display** tab. Change the number in the box labeled Crosshair size, located in the lower right-hand corner of the dialog, to **100**, as shown in Figure 1-6.

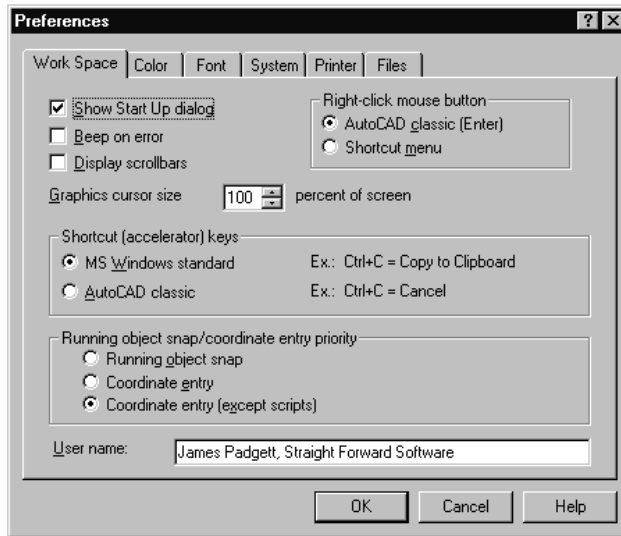


Figure 1-5
Changing cross-hair size in LT 98

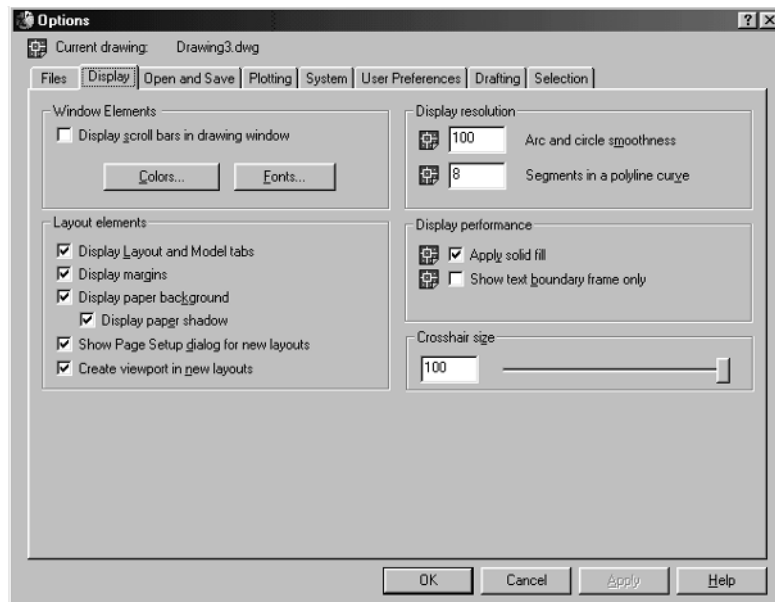


Figure 1-6
Changing cross-hair size in LT 2000/2000i

6. Here you set your automatic save time to a reasonably short interval. This applies to all versions of AutoCAD LT.

For LT 98, pick the **System** tab. Put a check mark in the Automatic save every box, then change the minutes to **10**. See Figure 1-7.

For LT 2000 and 2000i, pick the **Open and Save** tab. In the lower left corner, in the File Safety Precautions box, be sure to check the box labeled Automatic save. Change the time interval to **10**. See Figure 1-8.

Figure 1-7
Changing auto-
matic save time
in LT 98

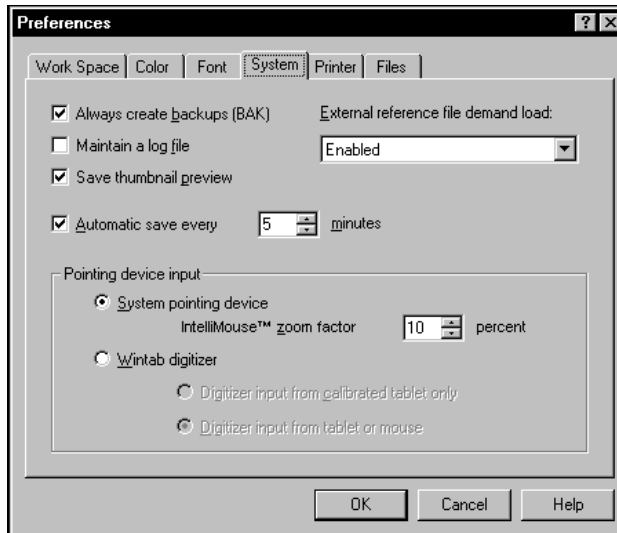
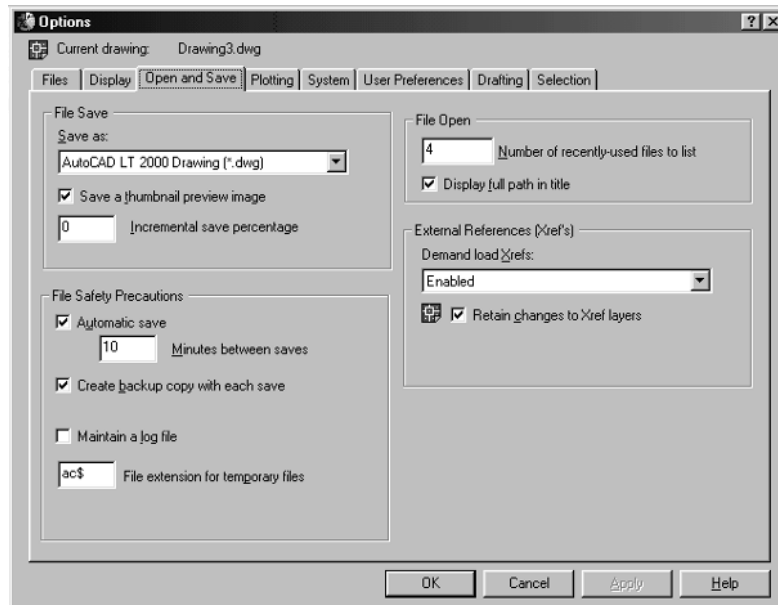


Figure 1-8
Changing auto-
matic save time
in LT 2000/
2000i



7. This step is for AutoCAD LT 2000i only. Pick the **System** tab. In the General Options section at the upper right is a text box labeled **Startup**. Pick the arrow key at the right end of the box, then pick **Show traditional startup dialog** from the pop-up list.

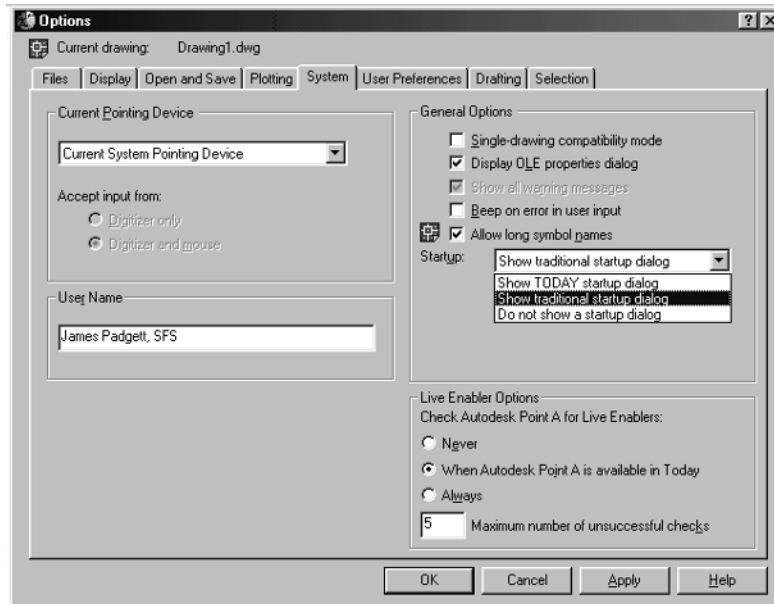


Figure 1-9

8. This step is for AutoCAD LT 2000 and LT 2000i only. Select the **User Preferences** tab. In the upper left corner is a section named Windows Standard Behavior. Pick the **Right-click Customization** button. A new dialog will pop up. In the area named Command Mode, pick **ENTER**. Then pick the **Apply & Close** button.

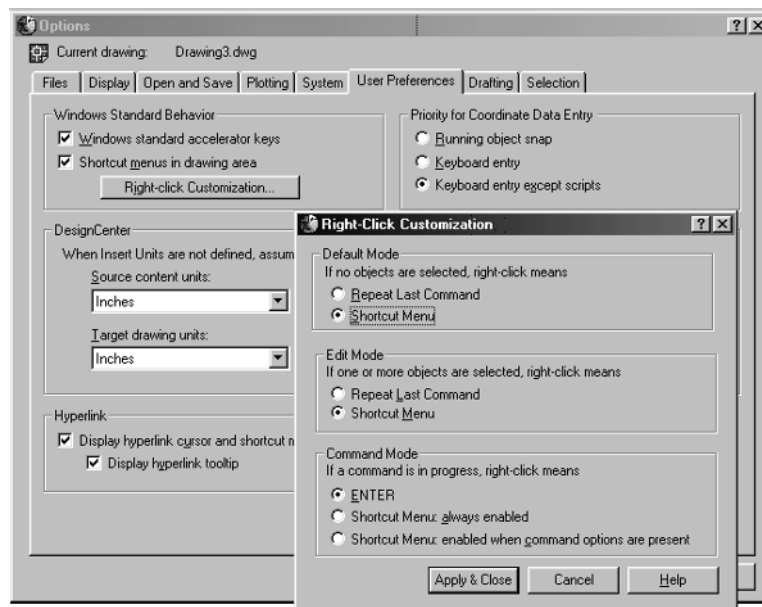


Figure 1-10

9. You should be back in the main dialog. Pick the **Apply** button. Then pick the **OK** button to exit the Options or Preferences dialog.



NOTE: You might get an alert stating that changes you made may not take effect until you restart the system. Press **OK**.

10. Type **MENULOAD** and hit **Enter**. The Menu Customization dialog will pop up. In the box labeled File name, type one of the following:
 For AutoCAD LT 98, type **ARCH98**.
 For AutoCAD LT 2000, type **ARCH2000**.
 For AutoCAD LT 2000i, type **ARCH2000i**.
11. Pick the **Load** button, then pick the **Close** button (x at the upper right corner) to exit. Shut down AutoCAD LT by picking **Exit** from the File pull-down menu. If you are prompted to save the drawing, pick **No**.

From now on, whenever you start AutoCAD LT, the Arch LT toolbar will load automatically.

Uninstalling

To uninstall the Arch LT toolbar and templates, go to the Control Panel and choose **Add/Remove Programs**. Pick **Arch LT** from the list. Then click **Yes** when asked if you are sure you want to remove this program.

AutoCAD LT Basics

AutoCAD LT is a powerful geometry engine. In my opinion, it is the best in the business. It is also the industry standard. Many drafting departments use a combination of full AutoCAD and AutoCAD LT. What you learn in AutoCAD LT is directly applicable to the full version of AutoCAD, so jumping from a machine running AutoCAD LT to a machine running full AutoCAD is no problem once you learn the fundamentals. The drawings you create with LT are native AutoCAD drawings. You will be able to work seamlessly with all other professionals who are using AutoCAD or AutoCAD LT, exchanging drawings without any conversion problems. It is an inexpensive way to get into the architectural drafting field.

This book will show you how to make AutoCAD LT work for you, as an architectural draftsman. The remainder of this chapter is devoted to the fundamentals of setting up and using AutoCAD LT for architectural drafting.

Many books have been written about AutoCAD LT, and they all try to go through the entire AutoCAD LT command set. You do need to know the fundamentals of using AutoCAD LT, but you don't need to learn the entire command set. Rather, you need to learn the commands and methods that relate to architectural drafting. So with that said, let us begin.

Starting a Drawing

Assuming AutoCAD LT is loaded in your machine, let's start by picking the AutoCAD LT icon on the desktop. Up comes the AutoCAD LT graphic screen with a Start Up or Create New Drawing dialog box in the center of it.



NOTE: AutoCAD changes the names of some dialog boxes from version to version. To simplify matters, we will refer to the Start Up dialog and the Create New Drawing dialog as simply the "Start Up dialog" from here on out.

This Start Up dialog box contains buttons with the different options available to you when opening up AutoCAD LT. The Start Up dialog boxes are pictured below.

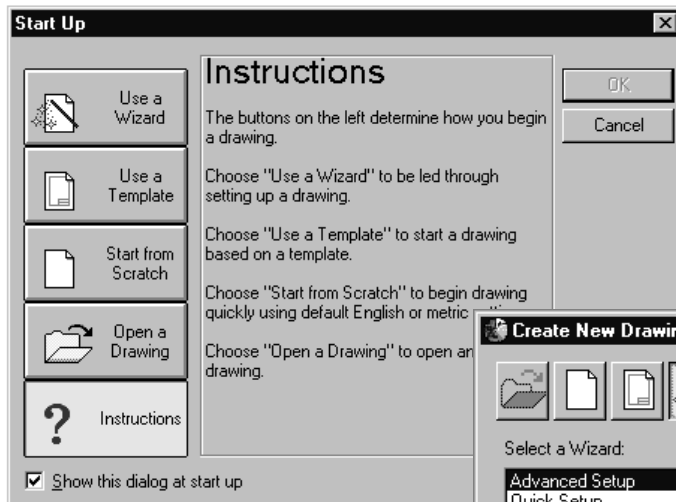


Figure 1-11
Start Up screen
in LT 98



Figure 1-12
Create New
Drawing
screen in LT
2000

Here is a short explanation of what the buttons in the Start Up dialog boxes do.

Use a Wizard lets you choose from among two wizards—quick setup and advanced. Each is easy to use. They both give you a multiple-choice type setup where you decide what type of units, angles, and screen size you wish to use. It then opens up a blank drawing with these parameters already set.

Use a Template gives you a list of predefined templates that you can use as the base for your drawing. Since we have provided a number of our own templates with this book, and many drawing variables are already set, we will be using these in our first exercise, a simple floor plan drawing.

Start from Scratch is just that. It does not use any predefined settings. You are basically on your own with this option, and you must go in and manually set any variable that you wish to use with the new drawing.

Open a Drawing presents a list of existing drawings. It has a Windows Explorer-type interface that allows you to search the system for a drawing to open.

Drawing Setup

Before we begin drawing, let us first examine some AutoCAD LT settings that are essential to architectural drafting. These include setting the type of units your drawing will be based on, the screen area size, text styles, dimension styles, layers, and various system settings. Most of these settings can be accessed from the Format pull-down menu, shown in Figure 1-13.

To run through the manual method of setting up a drawing for architectural work, we will use the Start from Scratch option from the Start Up dialog. Note that the screens in this section may vary slightly from yours depending on the version of LT you are using. We will then go through the various methods of setting up a new drawing for architectural drafting. It is important that you understand the methodology for setting up a drawing, although later in this chapter you will see that most of these steps can be automated.



Figure 1-13

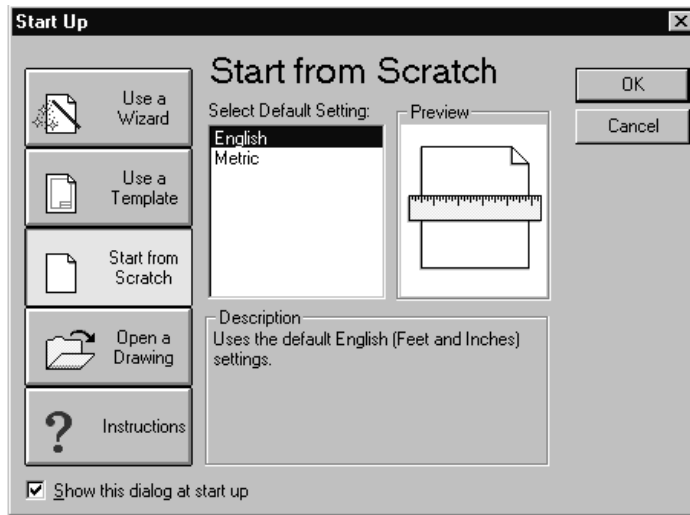


Figure 1-14
Start from
Scratch
screen in
LT 98

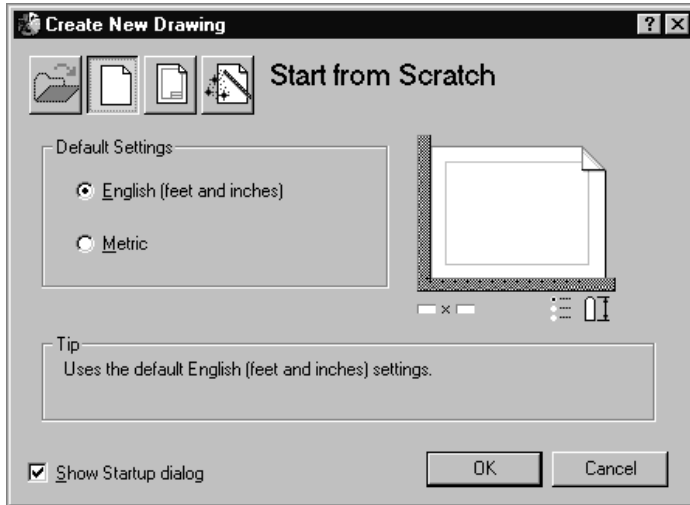


Figure 1-15
Start from
Scratch
screen in
LT 2000

1. First, select the **Start from Scratch** button on the Start Up or Create New Drawing dialog. There are two options available to you: English or Metric units. If you are using imperial units, select **English**. If you are using metric units, select **Metric**. Then press the **OK** button. The graphics screen will come up with a completely blank drawing, as shown in Figure 1-16. It is necessary to set up this new drawing so that you can begin using it for architectural work. The following sections will guide you through this process.

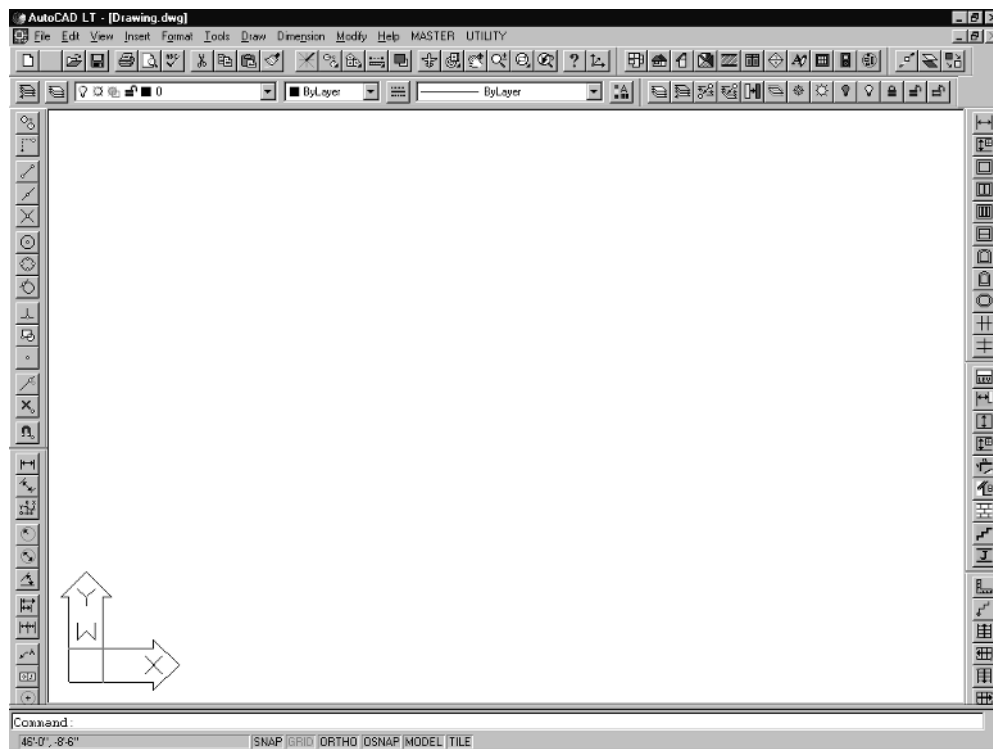


Figure 1-16

Setting Architectural Units

There are several ways to set the units for a drawing. They can be set through a dialog box interface or by typing them in.

1. To use the dialog box method, go to the Format pull-down menu and select **Units**. A dialog box, similar to those shown below, will pop up. Select the type of units and the precision you wish to use. Usually this would be Architectural for Length and 1/16 for Precision. When you are done, pick the **OK** button.

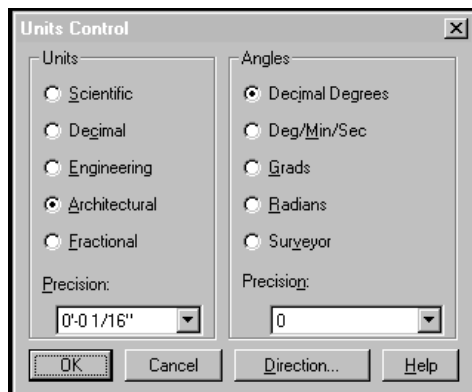


Figure 1-17
The Units Control dialog in LT 98

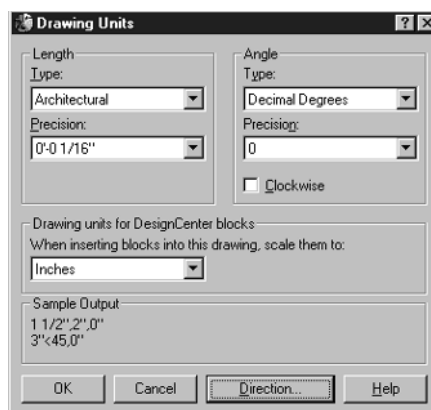


Figure 1-18
The Drawing Units dialog in LT 2000



NOTE: Many of these settings can be done semi-automatically by selecting the Use a Wizard button from the Create New Drawing dialog box or by creating a custom template file. For now, we are going to go through the basics manually so that you get an understanding of how they work.

Another method for setting architectural units is to enter them manually.

1. Type **LUNITS** and click **Enter**. The following prompt will come up on the command line at the bottom of your screen: *New value for LUNITS <2>*. Change this to architectural units by typing **4** and **Enter**.
2. To change the linear units precision, type **LUPREC** and **Enter**. The following prompt will come up on the command line at the bottom of your screen: *New value for LUPREC <2>*. To change to 1/16" precision, type **4** and **Enter**.

Setting the Drawing Area

There are a number of different ways to set the drawing screen area. One of the easiest is to use the following method.

1. Pick the **Drawing Limits** item from the Format pull-down. The first prompt is for *Lower left corner <0.0000,0.0000>*. Hit **Enter**.
2. When prompted for *Upper right corner <1'-0,0'-9">*, type in a value of **100',75'** and **Enter**. Finally, **Zoom|All**. (This command is located on the View pull-down menu. Pick Zoom and then pick All from the list that pops up.) The drawing area of your screen is now approximately 100' wide by 75' tall. This is large enough to lay out a fairly large building completely within the screen area. The screen area can be changed at any time, so if you are working on a bigger project that would span an area larger than 100' by 75', simply zoom out and pick **Drawing Limits** again. Hit **Enter** for the *Lower left corner <0.0000,0.0000>* prompt. For the *Upper right corner* prompt, you may use your mouse to pick the upper right corner, then **Zoom|All**.

Another method for setting the drawing limits is to use the Use a Wizard option from the Start Up dialog. There are two wizards available—Quick Setup and Advanced Setup. These wizards step you through a drawing setup. We will explore starting a drawing using the Quick Setup Wizard later in this chapter.

Text Styles

AutoCAD LT starts out using a default text style named Standard. This is a generic text style that you will probably want to change. The following steps show how to do this.

1. Select **Text Style** from the Format pull-down menu. The Text Style dialog box shown below will come up.

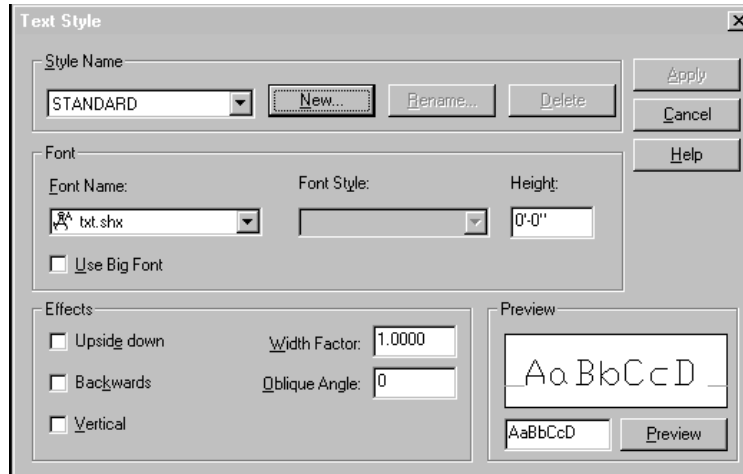


Figure 1-19

2. To set a new text style, select the **New** button. A subdialog will come up. In the Style Name box, type in a name for the new text style. You can name it anything you want, although it's a good idea for the name you use to somewhat resemble the actual font name. For example, if you wish to use the font Romans.shx, you could name the text style Romans. Once you have named the new style, pick the cascade button (the down arrow) in the Font Name box. Select the font you wish to use, then pick the **Apply** button. Your new text style will now be set and will be the current style until you change it again. Select the **Apply** button to save and then the **Close** button to exit the dialog.

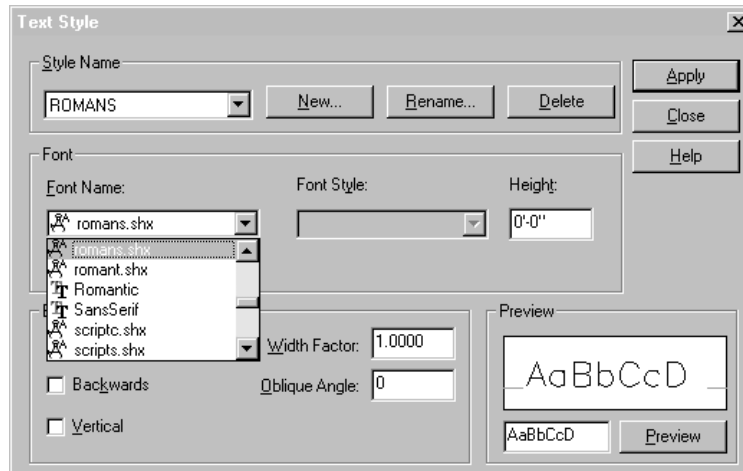


Figure 1-20

The text style can also be set by typing the commands.

1. Type **-style** and **Enter**. The following prompts will come up on the command line at the bottom of your screen. You press Enter to accept the default value given in brackets.

Text style name (or ?) <STANDARD>: Type in a name for your new text style, such as ROMANS, then press the **Enter** key.

Specify full font name or font filename <txt.shx>: Type in a font name including the extension, such as Romans.shx, then press the **Enter** key.

Height <0'-0">: **Enter**

Width factor <1.0000>: **Enter**

Obliquing angle <0>: **Enter**

Backwards? <N>: **Enter**

Upside-down? <N>: **Enter**

Vertical? <N>: **Enter**

ROMANS is now set as the current text style name.

You may assign different heights to text styles. This allows you to set up multiple text styles based on text height. These can be used when labeling items in your drawing that are going to be printed at different scales.

Text Styles and Paper Space

Although we won't be getting into paper space until Chapter 2, I will mention that text styles can be set so that they are specific to drawing scale. Because paper space allows you to set up multiple "graphic windows" within a single border, and each of these windows can have a different scale, it is important that the text in any given window be the right size compared to the rest of the text in the drawing.

For example, let's say you have created two text styles, each with a different text height. One is named ROM48 and its height is set to 5". The other is named ROM96 and its height is set to 10".

If you know that you will be printing your floor plan at $1/4" = 1'$ scale, you would make ROM48 the current text style when labeling it. This way the text height will be approximately $1/8"$ high when printed.

If you know that you will be printing your elevations at $1/8" = 1'$ scale, you would make ROM96 the current text style when labeling it. This way the text height will be approximately $1/8"$ high when printed.

For now, just be aware that you can create text styles that have the text height preset. These can save you time and help to standardize your drawings. The best way to use multiple text styles is to create a toolbar with buttons for each

of your text styles. This will allow you to press a single button when you want to change the current text style. The script for this would be:

```
^C^C_textstyle;name of text style;
```

Dimension Styles

The dimensioning tools in AutoCAD LT have been refined over a long period of time and are very good at this point. You can set up a number of different dimension styles based on different criteria such as viewport or drawing scale, units, type of tick or arrows, and many other variables. For now, we will only cover what it takes to set up an architectural dimension style based on a 1/4" = 1' floor plan.

AutoCAD LT starts out with a default dimension style named Standard. This is a generic style that can be changed and modified to your liking.

1. Select **Dimension Style** from the Format pull-down menu. A dialog box will come up that allows you to change dimension style settings. The LT 98 dialog box is shown in Figure 1-21. The LT 2000/2000i dialog box is shown in Figure 1-22.

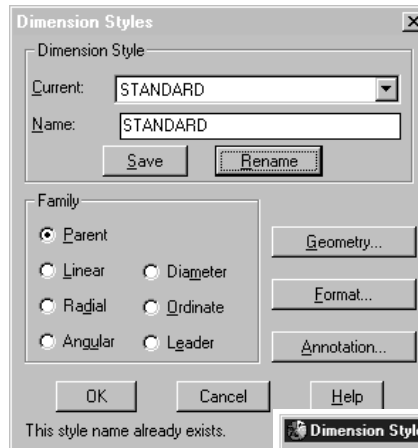


Figure 1-21
The Dimension
Styles dialog in
LT 98

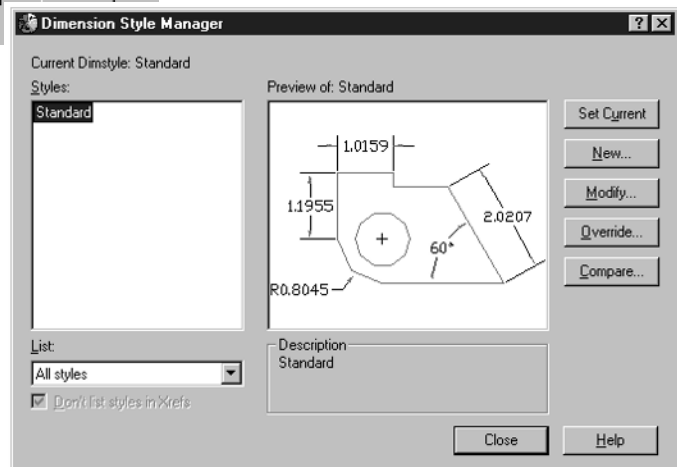


Figure 1-22
The Dimension
Style Manager
dialog in LT
2000/2000i

2. The first thing you need to do is create a new dimension style based on the Standard default style. Follow the corresponding instructions below for the version of AutoCAD LT you have.

For LT 98 Only

1. Type a new style name in the Name box, then pick the **Save** button. This creates an exact copy of the Standard dimension style under the new name. Now you are ready to go in and customize this new style.
2. Pick the **Geometry** button. Up comes a subdialog with a number of settings, as shown below. You only need to change a couple of these.

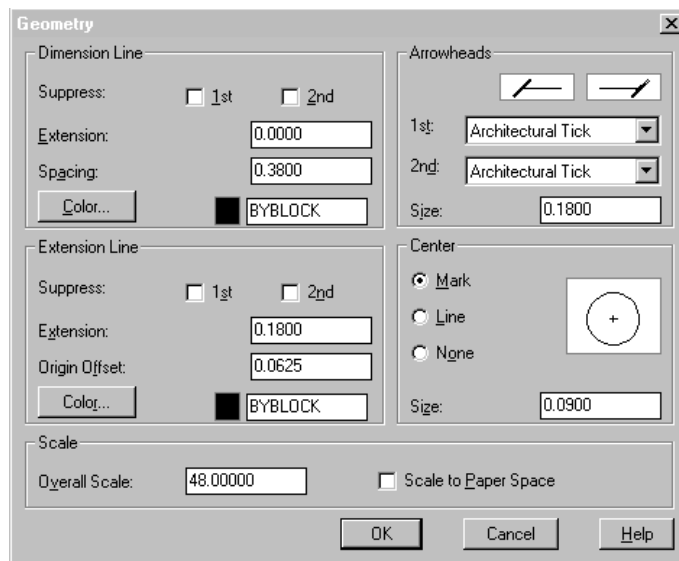


Figure 1-23

First, change the Arrowheads from Closed Filled to **Architectural Tick**. You do this by selecting the arrow button on the right side of the box labeled 1st.

Next, change the Overall Scale value to **27** and pick the **OK** button, which takes you back to the Dimension Styles dialog box.

3. Now pick the **Annotation** button. This brings up a new subdialog box. Change the Text Style from Standard to any other listed text style.

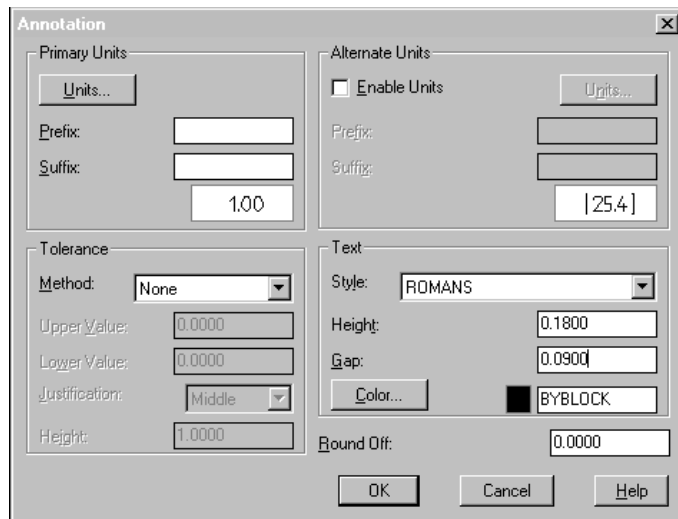


Figure 1-24



NOTE: The list of text styles is accessed by picking the arrow key to the right of the Style box. If Standard is the only style listed, it means that you have not yet created any. If this is the case, just leave Standard as the style.

- Next, pick the **Units** button in the Primary Units area. A list of the available primary unit styles will come up. Select **Architectural (stacked)**. The Precision should be 1/16", and Linear Scale should remain 1.0000. Press the **OK** button when done.

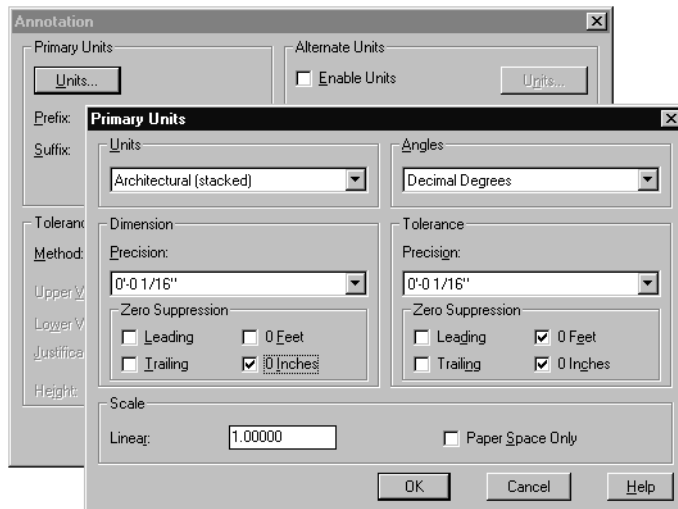


Figure 1-25

You will be taken back to the Annotation dialog box. Press the **OK** button again to return to the main dimension dialog. Make sure to press the **Save**

button before exiting the main dimension dialog. Your new dimension style is now set and is the current style.

For LT 2000 and LT 2000i Only

1. Select the **New** button. This will bring up the Create New Dimension Style dialog.

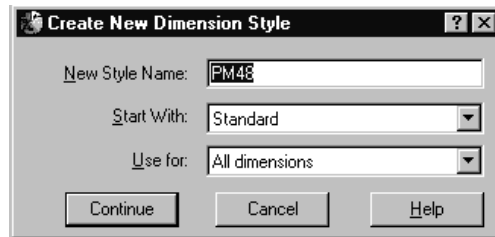


Figure 1-26

2. Type in the name for your new style in the New Style Name box, then pick the **Continue** button. The New Dimension Style dialog box will come up.

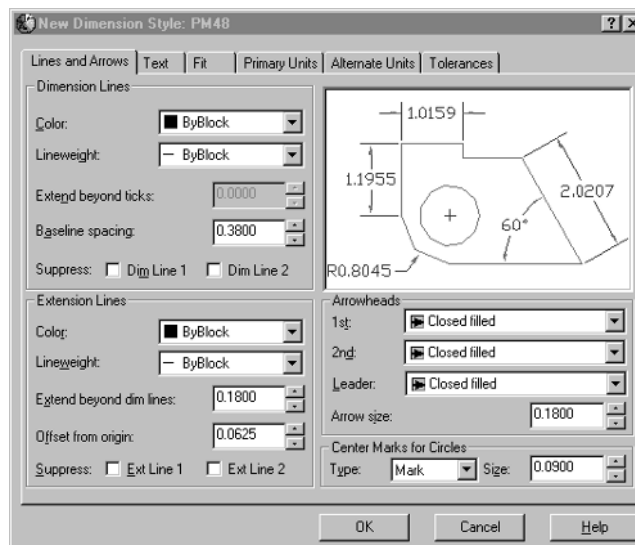


Figure 1-27

The Lines and Arrows tab will appear first. Change the arrowheads so that the boxes labeled 1st and 2nd read Architectural tick. This is done by picking the arrow buttons on the right side of these boxes. A menu with all the available sizes will come up. Scroll down and pick **Architectural tick**. You can leave the Leader item at Closed filled, or change it to some other arrowhead.

3. Next, pick the **Text** tab.

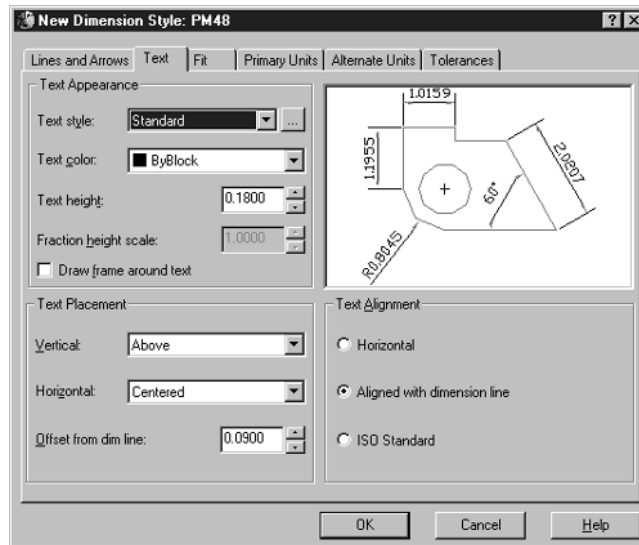


Figure 1-28

Again, use the little arrow buttons to change items. You may want to change the text style to something other than Standard. (You need to have defined another text style in order to do this.) Change the Text Alignment to **Aligned with dimension line**. You may also want to change the Vertical item in the Text Placement box from Centered to **Above**.

4. Pick the **Fit** tab next.

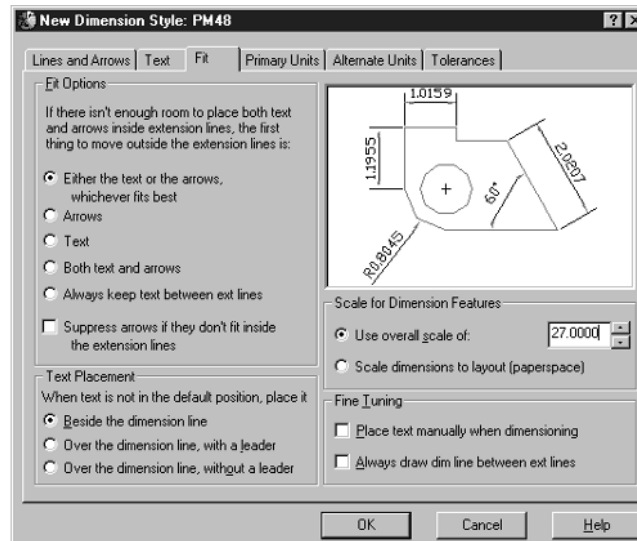


Figure 1-29

The only thing you need to change is the Use overall scale of item. Change it from 1.0000 to **27**.

- Next, pick the **Primary Units** tab. If you are using imperial units (inches/feet), this should be changed from Decimal to **Architectural**. If you are using metric units, you should leave it at Decimal (mm/cm).

The Precision should be at 1/16" for those using the Architectural option. For those using the Decimal option, it should be set to 0.00. The last change is only necessary for those using the Architectural option. Check the Feet option in the Zero Suppression box, and uncheck all the rest of the options.

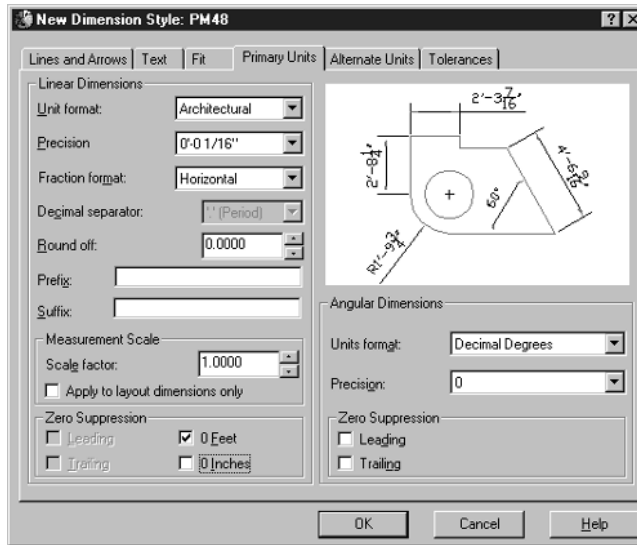


Figure 1-30

- Pick the **OK** button when you are done. The Dimension Style Manager dialog will come up with your new style listed. Pick on it, then press the **Set Current** button.

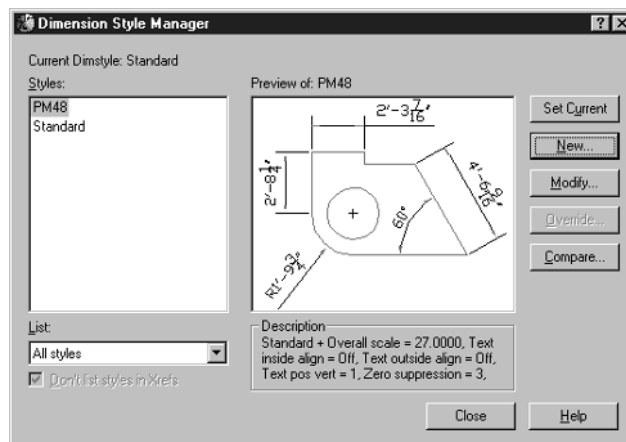


Figure 1-31

- Pick the **Close** button to exit the Dimension Style Manager. You will then be taken back to a blank AutoCAD LT screen.

Dimension Styles and Paper Space

Dimension styles can be set so that they are specific to drawing scale. Because paper space allows you to set up multiple “viewports” within a single border, and each of these viewports can have a different scale, it is important that the dimensions in any given viewport be the right size compared to the scale.

For example, say you are plotting a sheet that contains both a floor plan and a roof plan. The floor plan viewport is at 1/4" scale and the roof plan viewport is at 1/8" scale. If you use the same dimension style for both the floor plan and the roof plan, one of them will print out incorrectly. The dimension text and features, such as the arrowheads or ticks, will either be too large or too small in one of the printed viewports. The reason for this is that dimension and text styles grow larger or smaller depending on the print scale. We will be going into the paper space concept later in the book as you develop your drawings.

Basic Settings

There are a number of settings that you need to be aware of when starting a new drawing. These settings control different graphic screen modes, such as whether or not Ortho is on. They also control the way your cursor behaves. For example, by setting the “snap” space to 6", your cursor will move in 6-inch increments as you drag it across the screen.

The method with which you access these settings and variables differs between AutoCAD LT versions. The following sections describe the basic settings for LT 98 and LT 2000.

Basic Settings for LT 98

1. Go to the Tools pull-down menu and select **Drawing Aids**. The Drawing Aids dialog box will come up. This dialog is used to control many of the screen modes as well as the snap space settings.

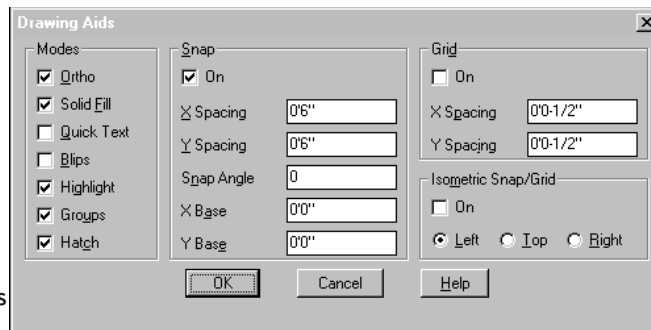


Figure 1-32
The Drawing Aids
dialog

A description of each setting in this dialog follows.

Modes

Ortho. Turns on Orthogonal mode and/or PolarSnap. With Ortho mode on, cursor input is restricted to either horizontal or vertical movements relative to the previous point. With PolarSnap, you can set a specified snap angle for the cursor movement, for example, 45 degrees.

Solid Fill. Displays solid filling for wide polylines, donuts, and 2D solids.

Quick Text. Displays text and attributes as simple rectangles.

Blips. Displays marker blips on the screen.

Highlight. Highlights selected objects.

Groups. Selects the whole group when you select an object that is a member of a group.

Hatch. Selects the boundary object when you select an associative hatch.

Snap

On. Restricts point selection to an invisible grid.

X Spacing. Specifies the snap spacing in the *X* direction.

Y Spacing. Specifies the snap spacing in the *Y* direction.

Snap Angle. Specifies the angle to rotate the snap grid.

X Base. Specifies the *X* basepoint for the snap grid.

Y Base. Specifies the *Y* basepoint for the snap grid.

Grid

On. Displays a grid of regularly spaced dots.

X Spacing. Specifies the grid spacing in the *X* direction.

Y Spacing. Specifies the grid spacing in the *Y* direction.

Isometric Snap/Grid

On. Changes the snap and grid orientation to isometric.

Left. Sets a simulated *XY* plane defined by the 150 degree and 90 degree axis pair.

Top. Sets a simulated *XZ* plane defined by the 30 degree and 50 degree axis pair.

Right. Sets a simulated *YZ* plane defined by the 30 degree and 90 degree axis pair.

2. Under Modes, check the Ortho box to turn Ortho on to begin with. Solid Fill, Highlight, Groups, and Hatch should also be checked.

Snap spacing can be set to any value you wish. A good starting value would be 6". This means that your cursor will move in increments of 6" when you are drawing lines, etc.

3. Next, set the coordinate readout, which is located in the lower left corner of your screen. Type **COORDS** and **Enter**. Type **2** for the value and **Enter**. This sets the coordinate readout so that it displays the distance and angle as you pull your cursor from point to point, such as 20'-6" 90d. Press **OK** when you are finished adjusting the settings.

Basic Settings for LT 2000

1. Go to the Tools pull-down menu and select **Drafting Settings**. The Drafting Settings dialog box will come up. This dialog is used to control many of the screen modes as well as the snap and grid settings, polar tracking, and object snap.

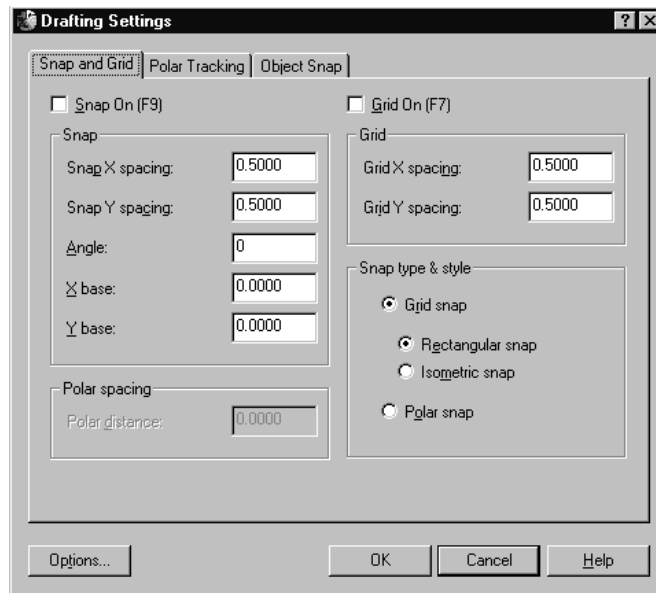


Figure 1-33
The Drafting
Settings dialog

A description of each setting in this dialog follows.

Snap and Grid Tab

Snap On. Restricts point selection to an invisible grid.

X Spacing. Specifies the snap spacing in the *X* direction.

Y Spacing. Specifies the snap spacing in the *Y* direction.

Snap Angle. Specifies the angle to rotate the snap grid.

X Base. Specifies the *X* basepoint for the snap grid.

Y Base. Specifies the *Y* basepoint for the snap grid.

Polar Spacing controls the polar snap increment distance.

Polar Distance. Sets the snap increment distance when Snap Type & Style is set to Polar Snap. If this value is 0, the polar snap distance assumes the value for Snap X Spacing. This value is also controlled by the POLARDIST system variable

NOTE: To use this option, Polar Tracking On must be selected on the Polar Tracking tab.



Grid

On. Displays a grid of regularly spaced dots.

X Spacing. Specifies the grid spacing in the *X* direction.

Y Spacing. Specifies the grid spacing in the *Y* direction.

NOTE: The limits of the dot grid are controlled by the Limits command.



Snap Type & Style controls settings for snap modes.

Grid Snap. Sets the snap type to Grid. The snap type is also controlled by the SNAPTYPE system variable.

Rectangular Snap. Sets the snap style to standard Rectangular snap mode. When the snap type is set to Grid snap and Snap mode is on, the cursor snaps to a rectangular snap grid. The snap style is also controlled by the SNAPSTYL system variable.

Isometric Snap. Sets the snap style to Isometric snap mode. When the snap type is set to Grid snap and Snap mode is on, the cursor snaps to an isometric snap grid. The snap style is also controlled by the SNAPSTYL system variable.

Polar Snap. Sets the snap type to Polar. To use this option, both Snap mode and Polar Tracking must be on. The cursor snaps along polar alignment angles set on the Polar Tracking tab relative to the starting polar tracking point. The snap type is also controlled by the SNAPTYPE system variable.

Polar Tracking Tab

This tab controls the polar tracking settings. Polar tracking draws lines along angles relative to a drawing command From or To point.

Polar Tracking On. Turns polar tracking on and off.

Polar Angle Settings. Sets the angles used with polar tracking.

Increment Angle. Sets the polar increment angle used to display polar tracking alignment paths. You can enter any angle, or select a common

angle of 90, 45, 30, 22.5, 18, 15, 10, or 5 degrees from the list. This setting is also controlled by the POLARANG system variable.

Additional Angles. Makes any additional angles in the list available for polar tracking. This setting is also controlled by the POLARADDANG system variable.

NOTE: Additional angles are absolute, not incremental.



New. Adds up to 10 additional polar tracking alignment angles.



WARNING: Before adding fractional angles, you must set the AUPREC system variable to the appropriate decimal precision to avoid undesired rounding. For example, if the value of AUPREC is 0 (the default value), all fractional angles you enter are rounded to the nearest whole number.

Delete. Deletes selected additional angles.

Polar Angle Measurement. Sets the basis by which polar tracking alignment angles are measured.

Absolute. Bases polar tracking angles on the current user coordinate system (UCS).

Relative to Last Segment. Bases polar tracking angles on the last object you created.

Object Snap Tab

In this tab, you set running object snap modes. With running object snap modes, also called Osnap, you can specify a snap point at an exact location on an object. The mode determines the location. Running object snap settings are stored with the drawing.

Object Snap On. Turns running object snaps on and off. The object snaps selected under Object Snap Modes are active while object snap is on. This setting is also controlled by the OSMODE system variable.

Object Snap Modes. Specifies the running object snap modes. Select one or more options.

Endpoint. Snaps to the closest endpoint of an arc, elliptical arc, line, polyline segment, spline, region, or ray.

Midpoint. Snaps to the midpoint of an arc, ellipse, elliptical arc, line, polyline segment, spline, region, or xline.

Center. Snaps to the center of an arc, circle, ellipse, or elliptical arc.

Node. Snaps to a point object.

Quadrant. Snaps to a quadrant point of an arc, circle, ellipse, or elliptical arc.

Intersection. Snaps to the intersection of an arc, circle, ellipse, elliptical arc, line, polyline, ray, spline, region, or xline. Extended Intersection snaps to the potential intersection of two objects that would intersect if the objects were extended along their natural paths. Extended Intersection is automatically on when you select the Intersection object snap mode.

Insertion. Snaps to the insertion point of an attribute, block, or text.

Perpendicular. Snaps to a point perpendicular to an arc, circle, ellipse, elliptical arc, line, polyline, ray, region, spline, or xline. Deferred Perpendicular snap mode is automatically on when the object you are drawing requires more than one perpendicular snap point to be completed. You can use a line, arc, circle, pline, ray, or xline as an object from which to draw a perpendicular line. Deferred Perpendicular can be used to draw perpendicular lines between such objects. When the aperture box passes over a Deferred Perpendicular snap point, an AutoSnap tooltip and marker are displayed.

Tangent. Snaps to the tangent of an arc, circle, ellipse, elliptical arc, or spline. The Deferred Tangent snap mode is automatically on when the object you are drawing requires more than one tangent snap point to be completed. For example, you can use Deferred Tangent to draw a line that is tangent to two arcs, polyline arcs, or circles. When the aperture box passes over a Deferred Tangent snap point, a marker and an AutoSnap tooltip are displayed.

When you use the From option in conjunction with the Tangent snap mode to draw objects other than lines from arcs or circles, the first point drawn is tangent to the arc or circle in relation to the last point selected in the drawing.

Nearest. Snaps to the nearest point on an arc, circle, ellipse, elliptical arc, line, point, polyline, spline, ray, or xline.

Apparent Intersection. Snaps to the apparent intersection of two objects (arc, circle, ellipse, elliptical arc, line, multiline, polyline, ray, or xline) that do not intersect in 3D space but may appear to intersect in the current view. Extended Apparent Intersection snaps to the imaginary intersection of two objects that would intersect if the objects were extended along their natural paths.



NOTE: You might get varying results if both Intersection and Apparent Intersection are turned on at the same time. Apparent Intersection and Extended Apparent Intersection work with edges of regions and curves but not with edges or corners of 3D solids created in AutoCAD.

Select All. Turns on all object snap modes.

Clear All. Turns off all object snap modes.

When more than one option is selected, AutoCAD LT applies the selected snap modes to return a point closest to the center of the aperture box. Press Tab to cycle through the options. Press OK when you are finished adjusting the settings.

Other Methods for Starting New Drawings

There are a couple of other methods for starting new drawings. Following are brief overviews of each of these.

Using the Quick Setup Wizard

Now that we have looked at the various drawing setup methods, let's start a new drawing using the Quick Setup Wizard.

1. To begin, select the **Use a Wizard** button. Then select **Quick Setup** and press **OK**.

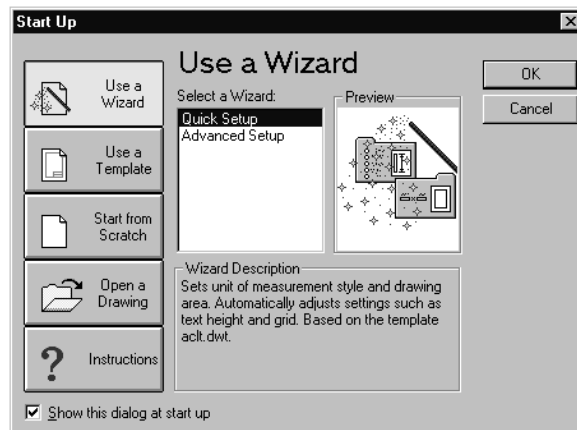


Figure 1-34

2. A new dialog box with unit options will pop up. Select the **Architectural** option and press the **Next** button.

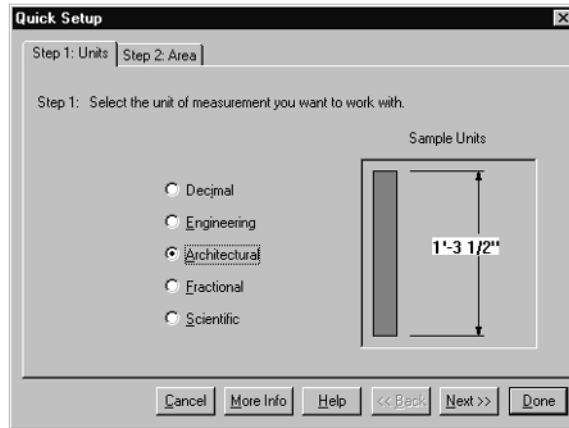


Figure 1-35

3. The last dialog box will pop up. This one determines the size of the initial drawing area of your graphics screen. Type **100'** for the Width and **75'** for the Length. Then pick the **Done** button.

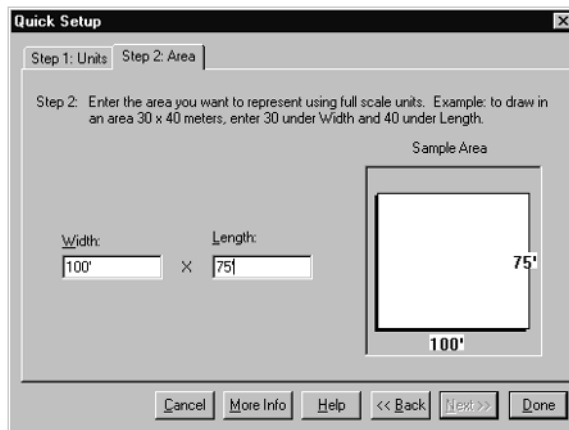


Figure 1-36

The dialog box will disappear and you will be in the AutoCAD LT drawing editor screen. We now have a basic drawing screen with architectural units set and a reasonably large drawing area to begin our drawing.

Using the Advanced Setup Wizard

Now let's start a new drawing using the Advanced Setup option.

1. Select the **Use a Wizard** button. Then select **Advanced Setup** and press **OK**.
2. A new dialog box with unit options will pop up. Select the **Architectural** option. **1/16"** is fine for the precision. Press the **Next** button.

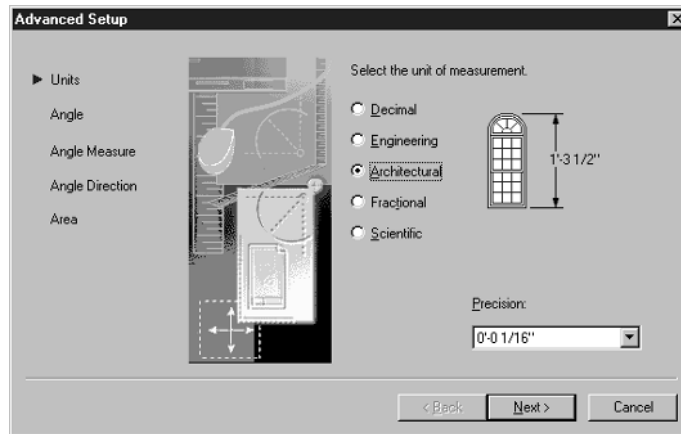


Figure 1-37

3. The following three dialog boxes are for the type of angular units you wish to use and the direction and orientation. You may want to change the Angle to Degrees, Minutes, Seconds, and the precision to 0d00'00". But this is not necessary and can be done later by using the Units command under the Format pull-down menu.

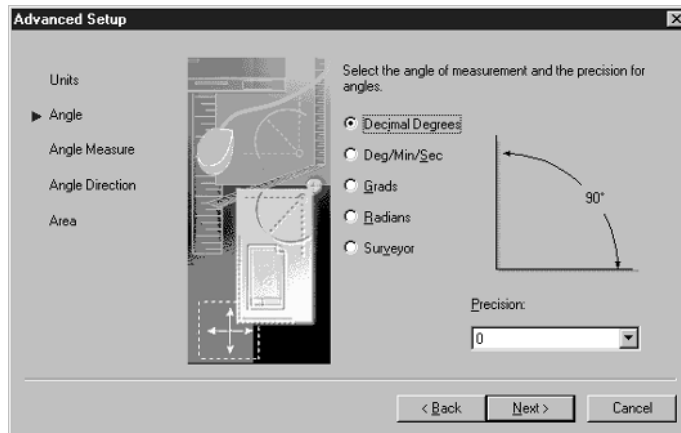


Figure 1-38

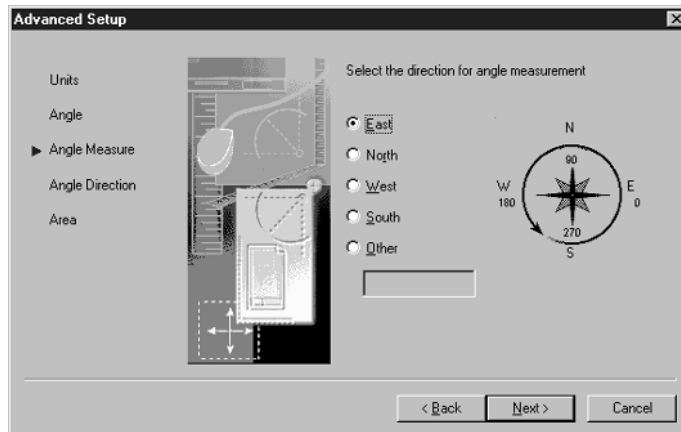


Figure 1-39

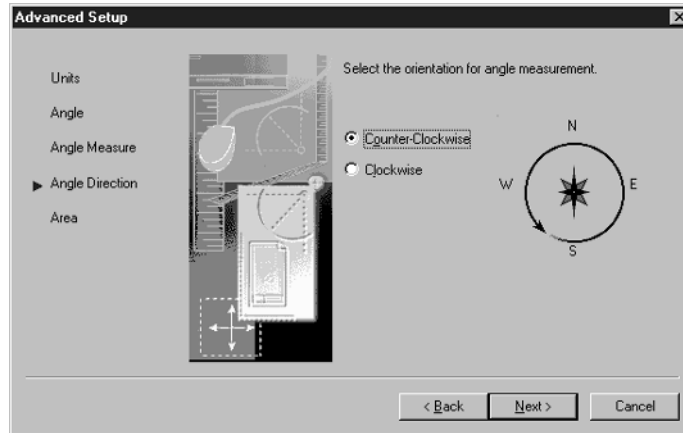


Figure 1-40

4. The last dialog box will pop up. This one determines the size of the initial drawing area of your graphics screen. Type **100'** for the Width and **75'** for the Length. Pick the **Finish** button.

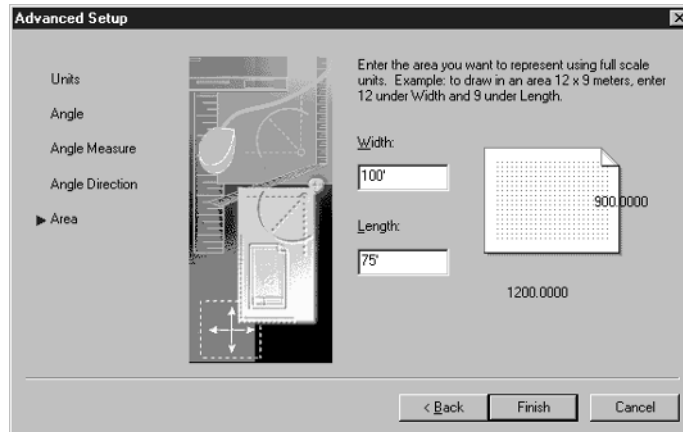


Figure 1-41

The dialog box will disappear and you will be in the AutoCAD LT drawing editor screen. We now have a basic drawing screen with architectural units set and a reasonably large drawing area to begin our drawing.

I personally prefer the Quick Setup Wizard to the Advanced Setup Wizard. They are basically the same, but in the Advanced Setup you have to spend extra time answering some prompts for angles and direction that may be unnecessary, depending on what you are drawing.

Drawing Scale Conversion Table

People often get confused when it comes to figuring out what sizes to use for text and dimensions in their drawings. Everything you draw in AutoCAD LT

should be drawn at full scale, yet you know you will be printing some of the elements at different scales.

For example, floor plans are usually printed at $1/4" = 1'$ scale and elevations are usually printed at $1/8" = 1'$ scale. If you use the same text height for labeling both the floor plan and the elevations, the text height will not be uniform when you print them. The text height looks uniform on your screen, but you need to remember that the elevations are going to be printed at half the scale of the floor plan. If you use a text height of 6" for labeling both the elevations and floor plan, the printed floor plan will come out looking fine because 6" high text will be approximately $1/8"$ high when printed at $1/4" = 1'$. Unfortunately, the elevation text will look tiny because 6" high text will be approximately $1/16"$ high when printed at $1/8" = 1'$.

The drawing scale conversion table below shows you the approximate sizes you should use on the different elements of your plan. Using this table you would know that the floor plan text height should be around 6" high because it will be printed at $1/4" = 1'$. You will also know that the text height for the elevations should be around 12" high, because you will probably print them at $1/8" = 1'$. (I prefer 5" high text for $1/4" = 1'$ and 10" high text for $1/8" = 1'$.)

The Overall Scale column numbers pertain to dimension sizes, since these too change depending on the print scale. We get into this more in Chapter 2 as you develop your floor plan.

Table 1-1 shows some standard architectural scale ratios and equivalent text sizes in model space.

Table 1-1: Drawing scale conversions

Scale	Scale Factor	To plot text size at	Set drawing text size to	Overall Scale
1/8" = 1'-0"	96	1/8"	12"	54
3/16" = 1'-0"	64	1/8"	8"	40
1/4" = 1'-0"	48	1/8"	6"	27
3/8" = 1'-0"	32	1/8"	4"	20
1/2" = 1'-0"	24	1/8"	3"	14
3/4" = 1'-0"	16	1/8"	2"	10
1" = 1'-0"	12	1/8"	1.5"	7
1 1/2" = 1'-0"	8	1/8"	1.0"	4

Layers

Setting up a simple layer system will make your drawings easier to edit and much more manageable. How you set up your layer system is a matter of personal preference. I suggest starting with a simple system that includes layers for the different drawing elements. This can be expanded if necessary as you become more familiar with the way layering works and its benefits to you.

What are Layers?

Layers are the equivalent of the overlays used in paper-based drafting. They are the primary organizational tool in AutoCAD LT, and you use them to enforce linetype, color, and other standards to elements as you draw them.

You can reduce the visual complexity of a drawing and improve display performance by controlling the number of objects that are displayed or concealed. For example, you can use layers to control the visibility of similar objects, such as windows or dimensions, by turning these layers on or off. Also, you can lock a layer to prevent objects on that layer from being selected and modified.

Why Use Layers?

By creating layers, you can associate similar types of objects by assigning them to the same layer. For example, you can put all wall lines on a layer named WALL. You can do the same for windows, doors, text, dimensions, and title blocks. You can then control:

- Whether objects on a layer are visible by turning the layer on or off.
- Whether objects are plotted, again by turning them on or off.
- What color is assigned to all objects on a layer.
- What linetype is assigned to all objects on a layer.

Selecting a Layer to Draw On

As you draw, AutoCAD LT places newly created objects on the current layer. The current layer may be the default layer (0) or a layer you create and name yourself, such as WALL or WINDOW. You switch from one layer to another by making a different layer current, and any subsequent objects you create are associated with the new current layer and use its color and linetype.

There is a button on the Object Properties toolbar that will allow you to set the current layer by selecting an object on the screen. This comes in handy when you want to, for example, add a window in an existing floor plan. To set the current layer, you would select the Make object's layer current button and then select, for example, a window. If the window you selected is on the layer named WINDOW, this will become the current layer.

NOTE: You cannot make a layer current if it is frozen.



Figure 1-42
The Object Properties toolbar

Controlling the Visibility of Objects on a Layer

You can make drawing layers invisible either by turning them off or by freezing them. Turning off or freezing layers is useful if you need an unobstructed view when working in detail on a particular layer or set of layers or if you don't want to plot details such as reference lines. Whether you choose to freeze layers or turn them off depends on how you work and on the size of your drawing.

System Variables

System variables are settings that control how certain commands work. They can turn on or turn off modes such as Snap, Grid, or Ortho; set default scales for hatch patterns; and store information about the current drawing and about AutoCAD LT configuration. Sometimes you use a system variable in order to change a setting. At other times you use a system variable to display the current status.

For example, the GRIDMODE system variable turns the dot grid display on and off when you change the value. In this case, the GRIDMODE system variable is functionally equivalent to the Grid command.

Some system variables can be toggled with the F keys on your keyboards. There are four that we consider the most important. They are as follows:

F2—Toggles between text/graphics screens. When this button is pressed you are switched back and forth between the graphic and the text screens of AutoCAD LT.

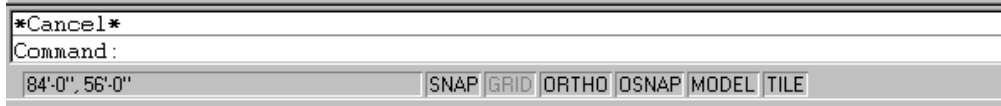
F3—Turns your Osnaps on/off without losing your settings. This is one of the most frequently used keys, as there are many times you do not want the object snaps active when drawing.

F8—Turns Ortho mode on/off. Look at the command line at the bottom left of your screen. Each time you press F8, it will tell you whether Ortho is on or off. When Ortho is on, cursor movement is constrained to the horizontal or vertical directions when drawing lines and other commands. With Ortho off, you can draw lines in any direction.

F9—Turns Snap mode on/off.

These settings can also be controlled from the status bar at the bottom of your screen. The setting is grayed out when not active. You can simply double-pick on any of the settings to turn them on or off.

Figure 1-43
Status bar
showing dif-
ferent modes



Command Aliases and Hot Keys

Many command functions in AutoCAD LT can be called by typing in one- or two-letter strings. For example, typing **L** and then pressing **Enter** should call up the Line command. These are known as command aliases. An alias is not the same as a keyboard shortcut, which is a combination of keystrokes, such as Ctrl+S for Save.

AutoCAD LT uses the command alias section of the *acut.pgp* file to define command aliases. You can use any Windows text editor, such as NotePad, to change existing aliases or to add new ones. Before editing *acut.pgp*, first create a backup so that you can restore it later, if necessary.

Below is a partial listing of standard command aliases that are preset in the *acut.pgp* file. This listing contains some of the most common commands used in architectural drafting:

CO = COPY	PT = POINT
E = ERASE	RO = ROTATE
EX = EXTEND	S = STRETCH
F = FILLET	SC = SCALE
L = LINE	TR = TRIM
M = MOVE	Z = ZOOM
O = OFFSET	X = EXPLODE
U = UNDO	DT = DTEXT
PL = POLYLINE	

Shortcut keys (sometimes called accelerator keys) are another way to quickly invoke commands you perform frequently. For example, pressing Ctrl+O opens a file and pressing Ctrl+S saves a file, just as choosing Open and Save from the File menu do. Shortcut keys can be associated with both menu items and toolbar buttons. You can create new shortcut keys or modify existing shortcut keys.

Shortcut keys are interpreted using AutoCAD classic standards (pre-Windows) or Microsoft Windows standards. AutoCAD LT uses internal shortcut key

assignments when AutoCAD Classic is selected through Preferences and the menu file *aclt.mnu* is unloaded in the Menu Customization dialog box.

Table 1-2 lists the default actions for both types of settings. You can change this setting through the Work Space tab of the Preferences dialog box.

Table 1-2: AutoCAD LT shortcut keys

Shortcut Key(s)	AutoCAD LT Internal Shortcuts used by AutoCAD Classic	AutoCAD LT/MS Windows Standard
CTRL+A	Toggles group selection on/off	Select All objects in drawing
CTRL+B	Toggles Snap	Toggles Snap
CTRL+C	Cancels current command	Copies objects to Clipboard
CTRL+D	Toggles coordinate display	Toggles coordinate display
CTRL+E	Cycles through isometric planes	Cycles through isometric planes
CTRL+F	Toggles running object snaps	Toggles running object snaps
CTRL+G	Toggles Grid	Toggles Grid
CTRL+H	No action	Toggles PICKSTYLE on/off
CTRL+J	Executes last command	Executes last command
CTRL+L	No action	Toggles Ortho mode
CTRL+M	Repeats last command	No action

This is only an abbreviated listing of the shortcut keys available in AutoCAD LT. If you would like to see the rest of them, you will find them in the manual.

Helpful Hints

Before starting to draw the floor plan, there are a few important bits of information that will help you in the future.

- Anything you draw in AutoCAD is always drawn at 1 to 1 scale. For example, a 30-foot long wall is drawn 30' long. Even if you plan to print this out at 1/4" scale, you will still draw everything to full length.
- Use direct distance entry when drawing lines, copying objects, moving objects, etc. Turn Ortho on first (F8). For example, when using the Move command, after you have selected the objects to move you will be prompted for a base point. Pick a point anywhere on the screen. When asked for the second point of displacement, pull the cursor in the direction you want the object copied and type in the distance, then click Enter. The object will be copied the exact distance in the direction you pulled.
- Always set up your automatic save time interval to 10 minutes or less. This way, you never lose more than 10 minutes of work in the event of a power failure or other accident. To do this, select Preferences or Options from the Tools pull-down menu. For LT 98, pick the System tab, select Automatic

save every, and enter the interval in minutes. For LT 2000, pick the Open and Save tab, select Automatic save, and enter the interval in minutes.

- Remember that the Undo command can reverse any action. If you accidentally erase something, you can type U and pick Enter as many times as necessary to back the drawing up until the erased object is restored.
- Here are some keystrokes that you will find yourself using on a constant basis:
 - F3 turns Osnaps on/off.
 - F8 turns Ortho mode on/off.
 - F9 turns Snap mode on/off.

Summary

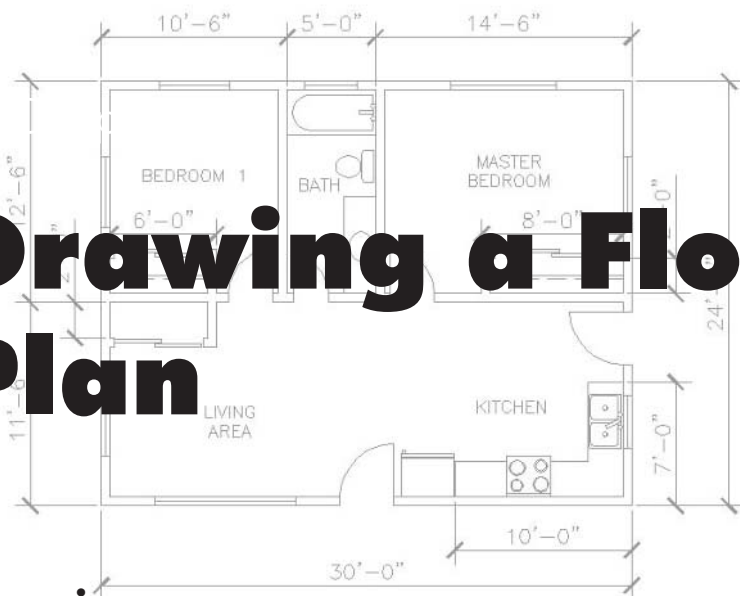
AutoCAD LT is a great drawing tool. It is a fairly large program because it contains nearly every tool you will ever need for 2D drawing. You will find yourself using certain tools on a regular basis. Others, you may never use. Some of the geometry commands you will find yourself using constantly for architectural work are Line, PLine, Rectangle, Circle, Arc, and DLine. You will probably use commands such as Ellipse, Spline, and 3dPolyline much less frequently.

The same goes for editing commands. Here is a short list that you will use constantly: Copy, Move, Trim, Fillet, Extend, Erase, Offset, and Mirror. Then there is the invaluable Undo to get you out of the deep stuff when you erase half your drawing by mistake.

In Chapter 1, you installed the templates and toolbar that will be used in the chapters that follow. We have covered some of the basics for setting up AutoCAD LT for architectural drafting and explained the use of variables, text and dimension styles, and concepts such as setting up your object snaps and setting layers to define different elements in your drawings. We feel that this approach will help you become more aware of how to structure your drawing environment so that you draw faster and more accurately. So, with that said, let's move on to Chapter 2 and begin drawing a floor plan.

Drawing a Floor Plan

Overview



This chapter focuses on the development of a simple floor plan. You will be working from a rough sketch, similar to one that would be provided to you by an architect or contractor. You will start out using one of the template files that we provide with this book, and you will draw all the walls, and add the windows, doors, notes, dimensions, and symbols to create a complete floor plan. Finally, you will print the floor plan using the border sheet that is contained in the template file.

Let's take a look at what graphic entities make up an architectural floor plan. We have walls that are drawn with lines, windows that are usually made up of lines, doors that are a combination of lines and arcs, various predrawn symbols, such as fixtures and appliances that can be "inserted" into the floor plan, plus dimensions, text, and labels. There are a number of methods that can be used to draw and edit these different entities. In this chapter, we will only be covering the ones we consider essential to architectural drafting.

Starting a Drawing

We will be using the Use a Template option to begin this exercise. The template we will use is named 11x8.5-horizontal-title.dwt. It should be located in a Template folder that was created when you installed Ralite in Chapter 1.

In this chapter, you learn about:

- ◆ **Starting a drawing from a template**
- ◆ **Drawing interior and exterior walls**
- ◆ **Adding windows and doors**
- ◆ **Adding symbols and dimensions**
- ◆ **Paper space and model space**

1. Start AutoCAD LT from the icon on your desktop. The Start Up or Create New Drawing dialog box should pop up. If neither comes up, go to the File pull-down menu and pick **New**; the appropriate dialog should pop up.
2. Pick the item named **Use a Template**.

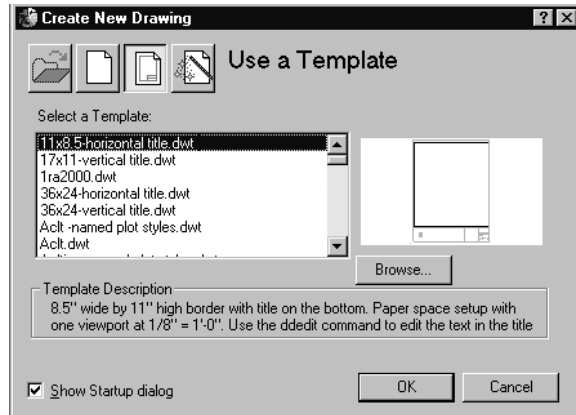


Figure 2-1

3. Select the **11x8.5-horizontal title.dwt** file and press **OK**. The border will pop up, as shown below.

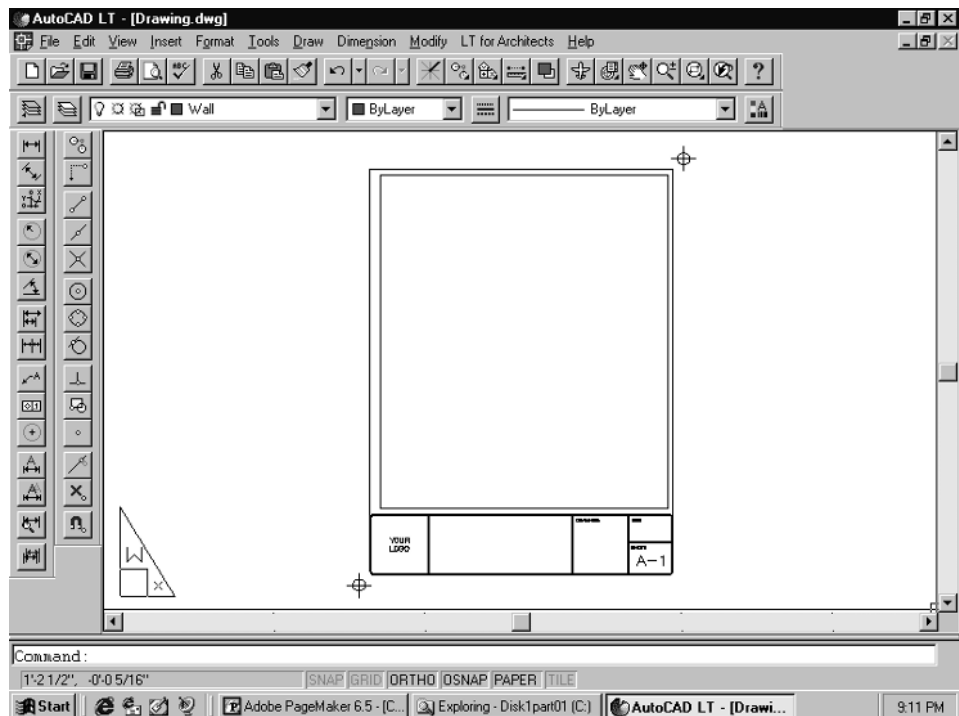


Figure 2-2



NOTE: Notice the triangular icon in the lower left-hand corner of the screen in Figure 2-2. This indicates that this drawing is in paper space. The first thing you want to do is to change from paper space to model space. If you are using LT 98, go down to the status bar at the bottom of your screen and double-click on the TILE button. This will flip you into the regular model space.

If you are using LT 2000/2000i, pick the Model tab in the lower left of your screen. The border will disappear and you will see a number of different blocks and symbols in the lower left-hand corner of the screen, as shown below.

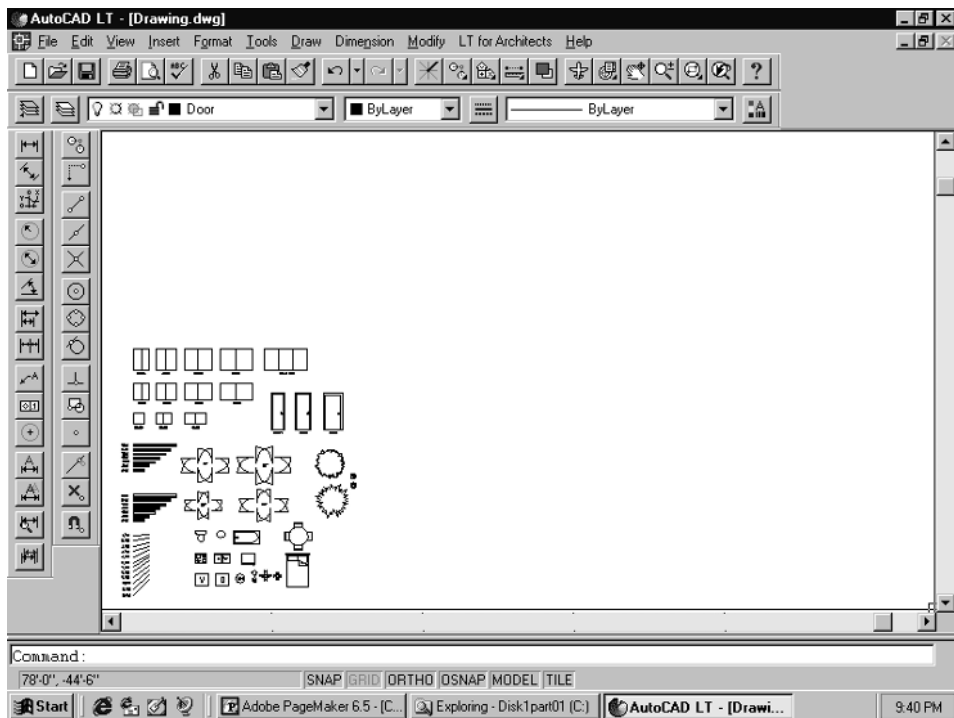


Figure 2-3

Drawing the Exterior Walls

Now that you are in regular model space, you can start drawing your floor plan. The floor plan is of a 30'x24' guest house. It has two bedrooms, one bath, a kitchen/dining area, and a living area. See Sheet #1 (Floor Plan) in the appendix.

The layer WALL should already be the current layer. If it isn't, pick the Layers button on the Object Properties toolbar. (It is the second button from the left.)



Figure 2-4

This will bring up the Layer Control dialog box. To make WALL the current layer, scroll down the list of layers and select WALL. Pick the Current button and then pick the OK button to exit.

If you need to create the WALL layer, pick the New button in the Layer Control dialog box. Type WALL in the newly created box named “(Layer 1),” then pick the Current button and the OK button to exit.



NOTE: Make it a habit to look down often at the command line at the bottom of the screen. This is where the program “prompts” you for input or action. If you don’t look down to see what the program is prompting you to do, you will definitely run into problems.

1. To begin drawing the wall lines, go to the Draw pull-down menu and pick **Double Line**. The command line will prompt *Specify start point or Break/Caps/Dragline/Offset/Snap/Undo/Width*. Type **W** (for Width) and hit the **Enter** key.

The command line *Specify width of dline <6">* will appear. If it does say <6">, just hit the **Enter** key. If it doesn’t say <6">, type **6** and hit the **Enter** key.

Next, type **D** (for Dragline) and hit the **Enter** key.

At the command line *Enter offset from center or dragline position option [Left/Center/Right] <0">*, type **L** (for Left) and hit the **Enter** key.

With these parameters set, you are ready to start drawing the floor plan. The command line should say *Specify start point or [Break/Caps/Dragline/Offset/Snap/Undo/Width]*.

2. For the start point of your first wall, pick a point in the lower right-hand quarter of your screen and press the left mouse button. Then pull your mouse left, type **30'**, and hit the **Enter** key. The first wall will be drawn as shown in Figure 2-5. Do not forget to add the feet sign (') when typing in the 30'.

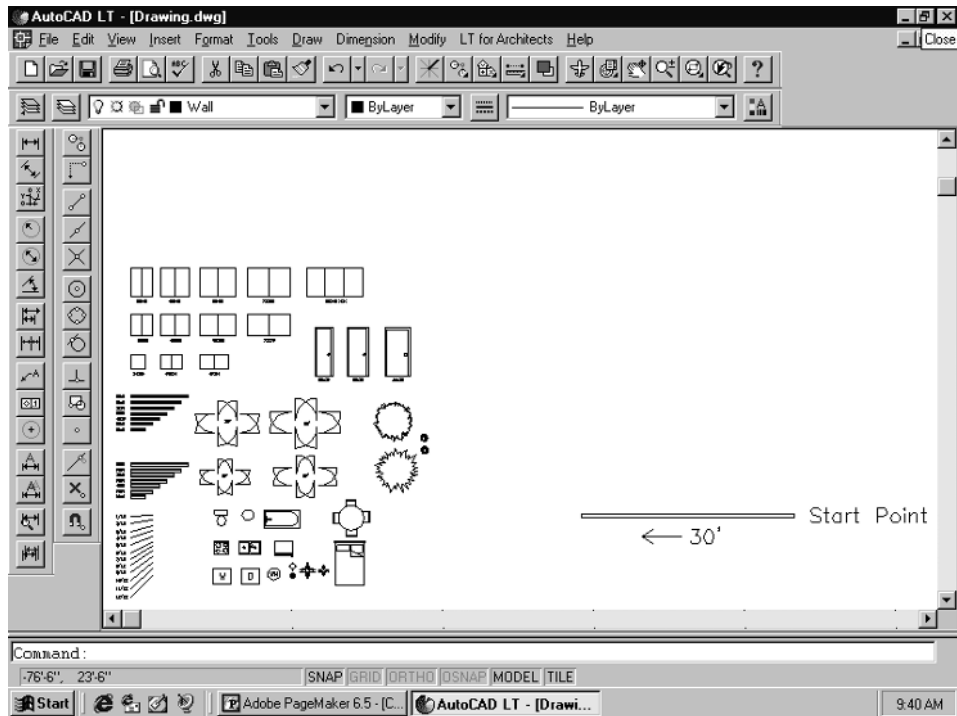


Figure 2-5



NOTE: If you make a mistake while drawing a wall segment, type **U** and hit the Enter key. This is the Undo command and will back you up a step. You may then redraw the wall. You can type **U** and hit Enter repeatedly to back up further.



NOTE: From this point forward we will refer to the phrase “hit the Enter key” with just the bold word **Enter**.

3. With the first segment of wall drawn the Double Line command should still be active, so pull your cursor up, type **24'**, and **Enter**. Your second wall segment will be drawn. Pull right, type **30'**, and **Enter** for the third wall segment. Type **CL** and **Enter** to close back to the start point. You now should have a 30'x24' rectangular exterior footprint of a simple floor plan, similar to the illustration in Figure 2-6.

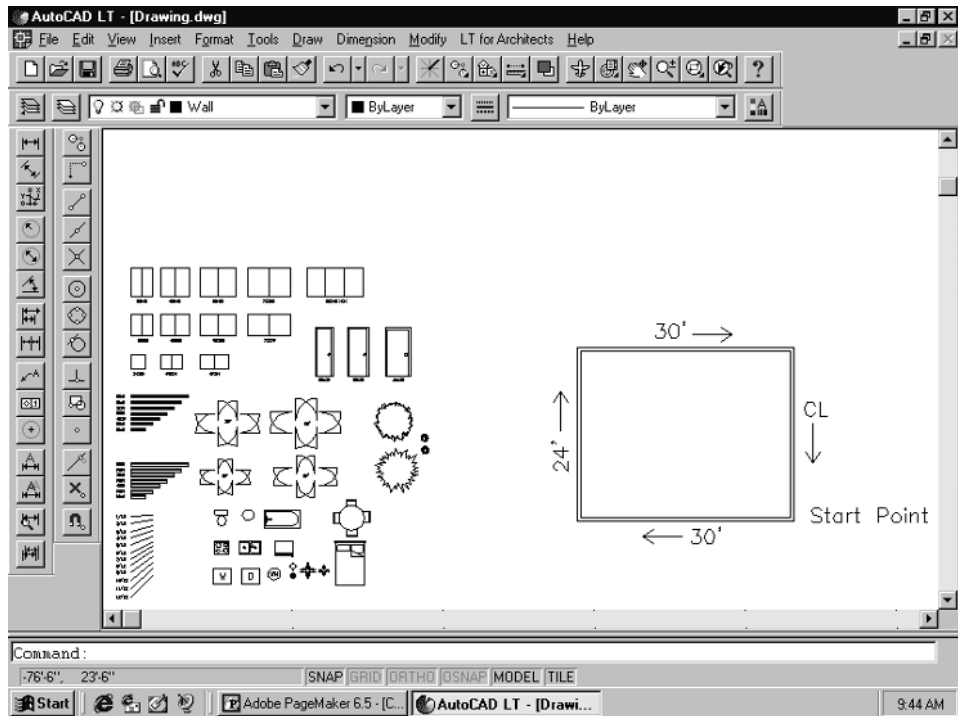


Figure 2-6

Just for your information, an alternate method of drawing these walls would be to use the Double Line command and set it up just as we did in the previous exercise with the width, etc. You would then pick a start point with the left mouse button, drag your mouse to the left 30', and pick with your left button.

How would you know when you have pulled exactly 30'? AutoCAD LT has the coordinate readout in the lower left corner of the screen on the status bar (the bar containing SNAP, GRID, POLAR, ORTHO, etc.). It has been set up so that it will show you the exact distance and angle you are pulling from point to point. It can be a useful way to draw without having to type in any distance.



NOTE: Time to save your drawing. Go to the File pull-down menu and pick the Save command. If this is the first time the drawing has been saved, the Save Drawing As dialog box will come up. Look at the File Name box. There will probably already be a name like "Drawing 1" in the box. Type in your own name for the drawing and then pick the Save button. If the drawing has been saved before, no dialog will come up and the drawing will simply save itself.

4. Zoom in closer to the floor plan you have just finished by selecting the **Zoom** command from the View pull-down menu. Pick the item named **Window** from the list that pops up. Pick point #1 at the *Specify first corner*

prompt. Then, select point #2 at the *Specify opposite corner* prompt. See Figure 2-7. The drawing will zoom in as in Figure 2-8.

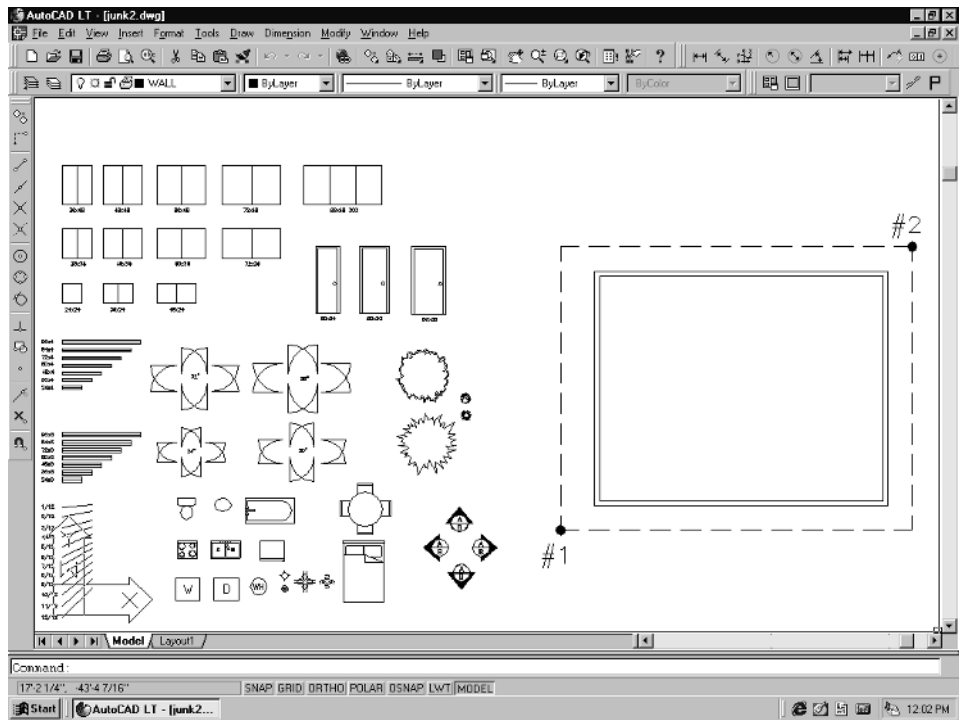


Figure 2-7

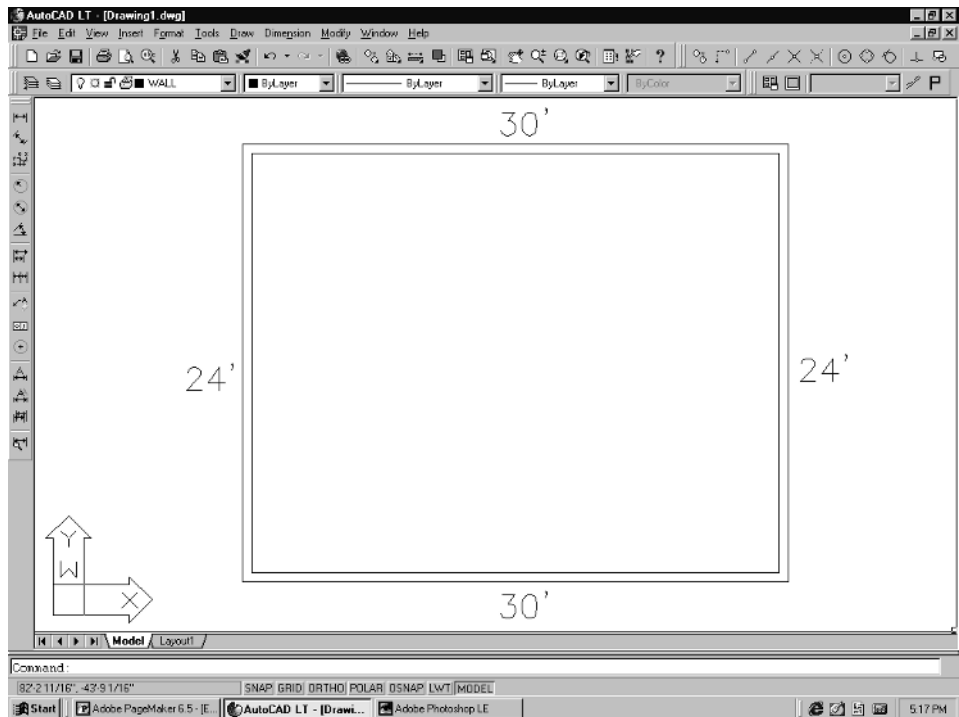


Figure 2-8

Drawing the Interior Walls

To continue our floor plan, we will add some interior walls. First, make sure SNAP and ORTHO are on and OSNAP is off. To do this, look at the status bar at the bottom of your screen. In LT 2000/2000i, they are on when the button is depressed and off if they are not. In LT 98, they are on if the button is black and off if they are gray.



Figure 2-9

1. Assuming you have the basic exterior walls drawn as in Figure 2-8, pick **Double Line** from the Draw pull-down menu.

The command line will prompt *Specify start point or [Break/Caps/Drag-line/Offset/Snap/Undo/Width]*. Type **O** (for Offset) and **Enter**.

The command line will prompt *Specify base point to offset from*. Pick the upper left wall corner as shown in Figure 2-10. Your crosshairs should snap right to the corner as shown. If they don't, you can hold down the Shift key and press your right mouse button down at the same time. This will bring up a menu. Select **Endpoint**, then pick the wall corner.

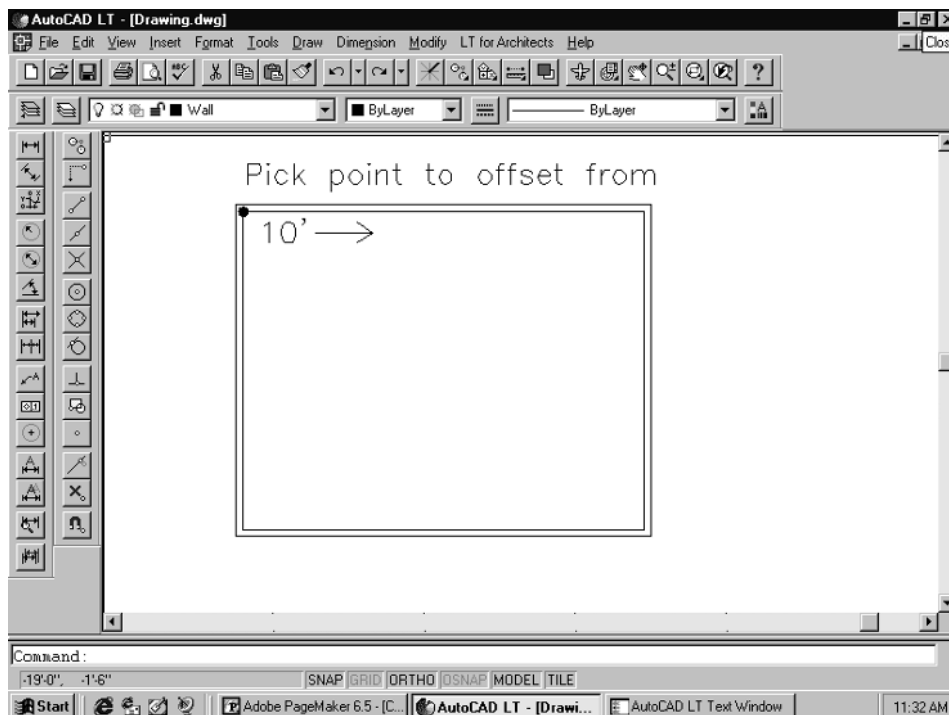


Figure 2-10

NOTE: You could also pick Snap to Endpoint from the Object Snap toolbar.



The command line will prompt *Specify point to indicate offset direction*. Pull the cursor toward the right as shown in Figure 2-10 and pick with your left mouse button. You will see the prompt *Specify distance to offset <5'-0">*. Type in the distance (**10'**) and **Enter**. This will place the starting point for your interior wall exactly 10' from the wall corner.

2. To draw the actual wall segments, continue with these steps.

The command line *Specify next point or [Arc/Break/Caps/CLOSE/Dragline/Snap/Undo/Width]* will appear. Pull the cursor in the down direction, type **12'** and **Enter**. This will draw the first segment of the interior wall.

At the *Specify next point or [Arc/Break/Caps/CLOSE/Dragline/Snap/Undo/Width]* prompt, pull your cursor left, type **10'** and **Enter**. This should draw the second interior wall segment, and automatically join it to the existing left side exterior wall, as shown in the following figure.

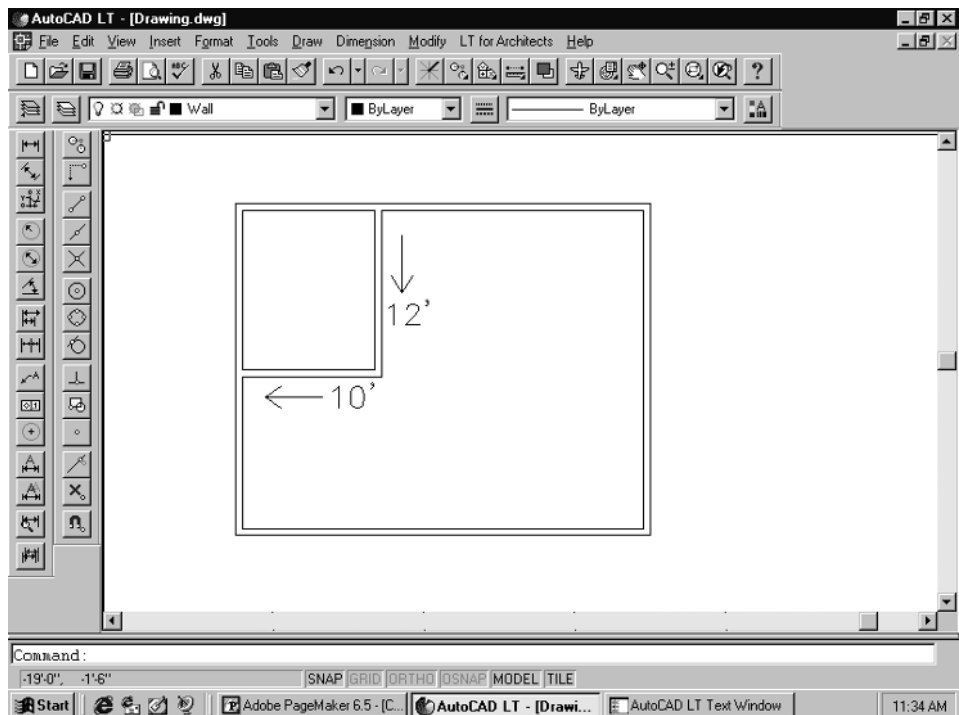


Figure 2-11

3. To add the next interior wall, type **DLINE** and **Enter**. At the *Specify next point or [Arc/Break/Caps/CLOSE/Dragline/Snap/Undo/Width]* prompt, type **O** (for Offset) and **Enter**. When you see the *Specify base point to offset from* prompt, pick the wall corner indicated in Figure 2-12.

The command line *Specify point to indicate offset direction* will appear. Pull the cursor in the direction of the arrow as shown in the figure and pick with your left mouse button.

At the command line prompt *Specify distance of offset <10'-0">* type in the distance **5'6** (no inch sign required) and **Enter**. This will place the starting point for your interior wall exactly 5'-6" from the wall corner.

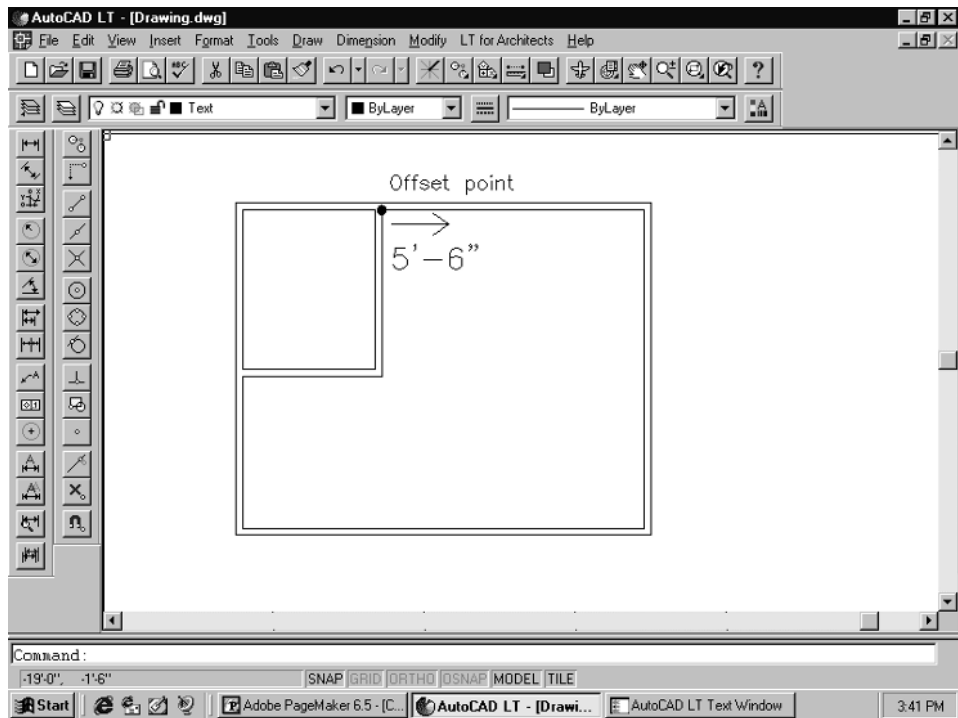


Figure 2-12

4. To continue with these new interior walls, first make sure the Double Line command is still active. If it is not, type **DLINE** and **Enter**. At the *Specify next point or [Arc/Break/CAs/CLose/Dragline/Snap/Undo/Width]* prompt, pull the cursor down and type **12'** and **Enter**. This will draw the first segment of the interior wall. The command line *Specify next point or [Arc/Break/CAs/CLose/Dragline/Snap/Undo/Width]* will appear. Pull your cursor left, type **5'6**, and **Enter**. This should draw the second interior wall segment, and automatically join it to the existing left side interior wall corner, as shown in Figure 2-13.

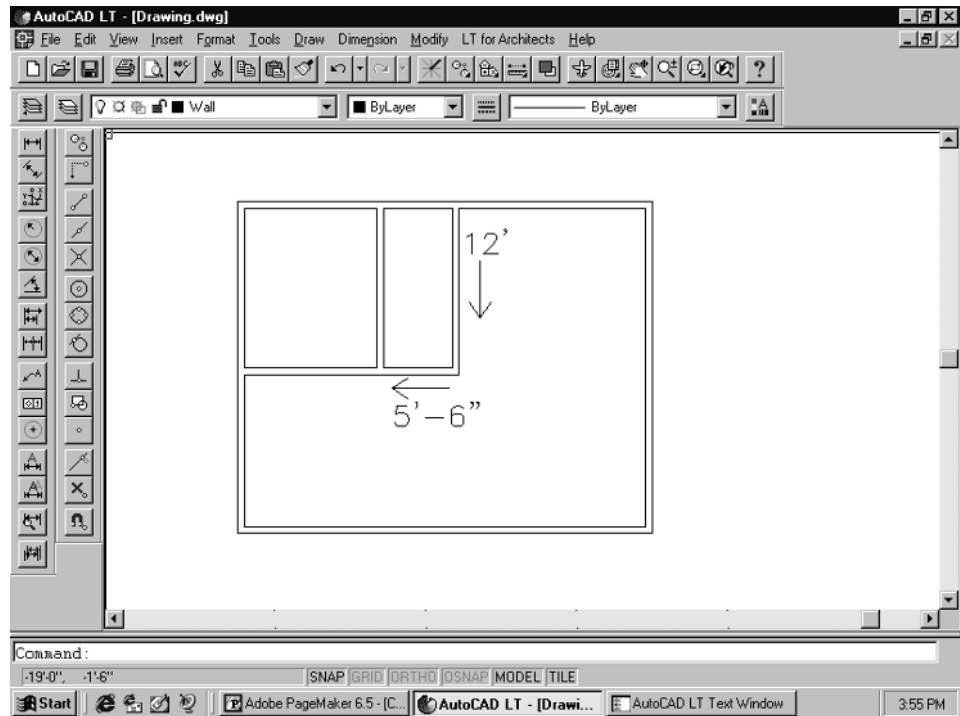


Figure 2-13

5. To finish these interior walls, select the **Extend** command from the Modify pull-down menu, or type **Extend** and hit **Enter**. At the command line prompt *Select boundary edges: Select objects*, pick the inside wall line with your left mouse button, as shown in Figure 2-14. Then hit **Enter**. This is the line that you want the other wall lines to extend to.

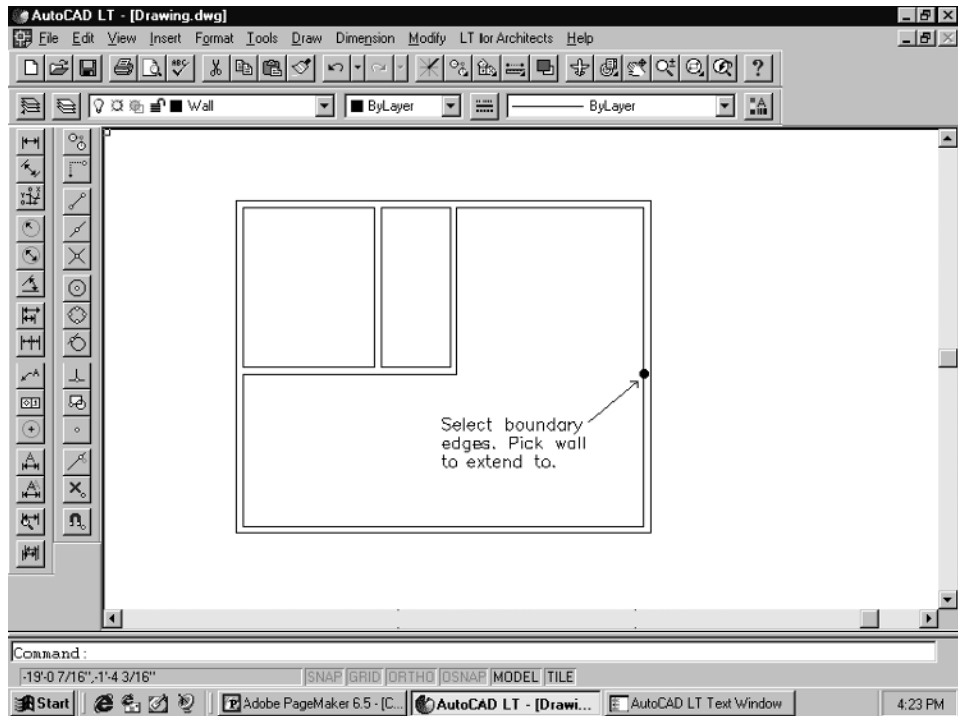


Figure 2-14

At the command line prompt *Select object to extend*, pick the two wall lines as shown below. These are the lines you want to extend over to the existing wall line.

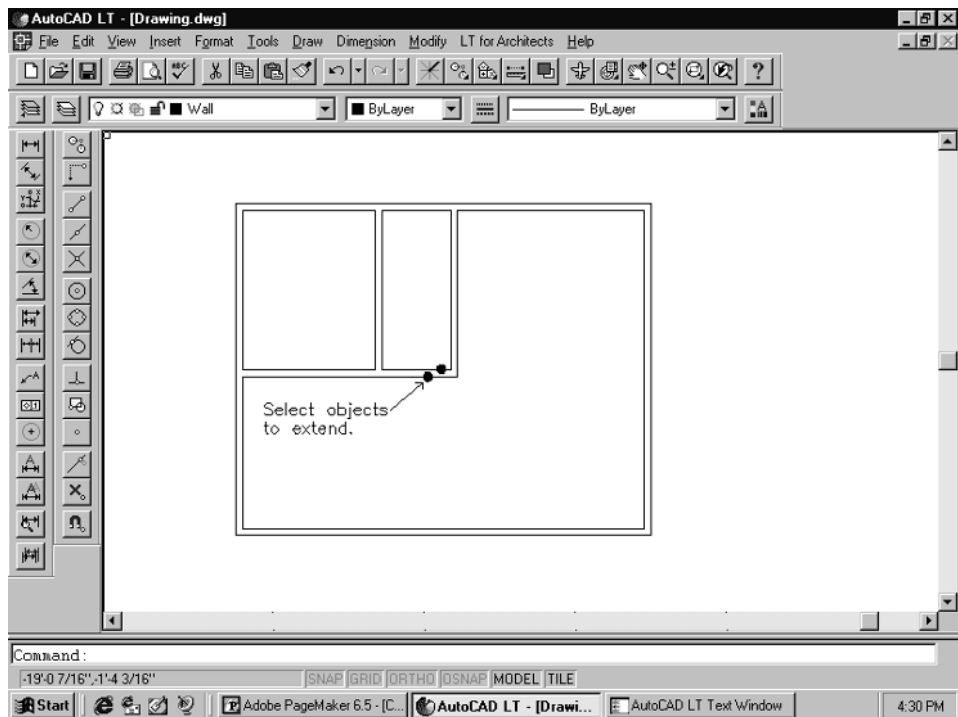


Figure 2-15

These two lines will automatically extend to the wall line you previously selected. See Figure 2-16. Hit the **Esc** key to quit this command.

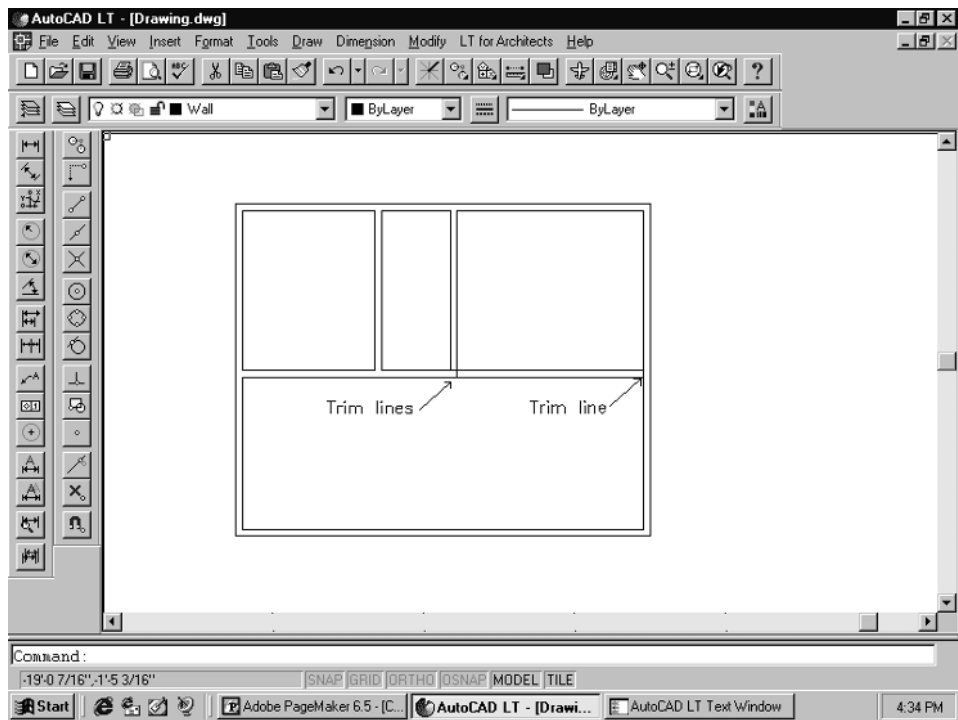


Figure 2-16

6. You will have to do some minor cleanup to trim out the lines that cross over each other. You first need to zoom in closer to the intersections of the walls so that you can get a good look at the lines that overlap. (Pick **Zoom** from the View pull-down menu, and pick **Window** from the submenu that pops up. Then “window” the area you want to zoom in to.)

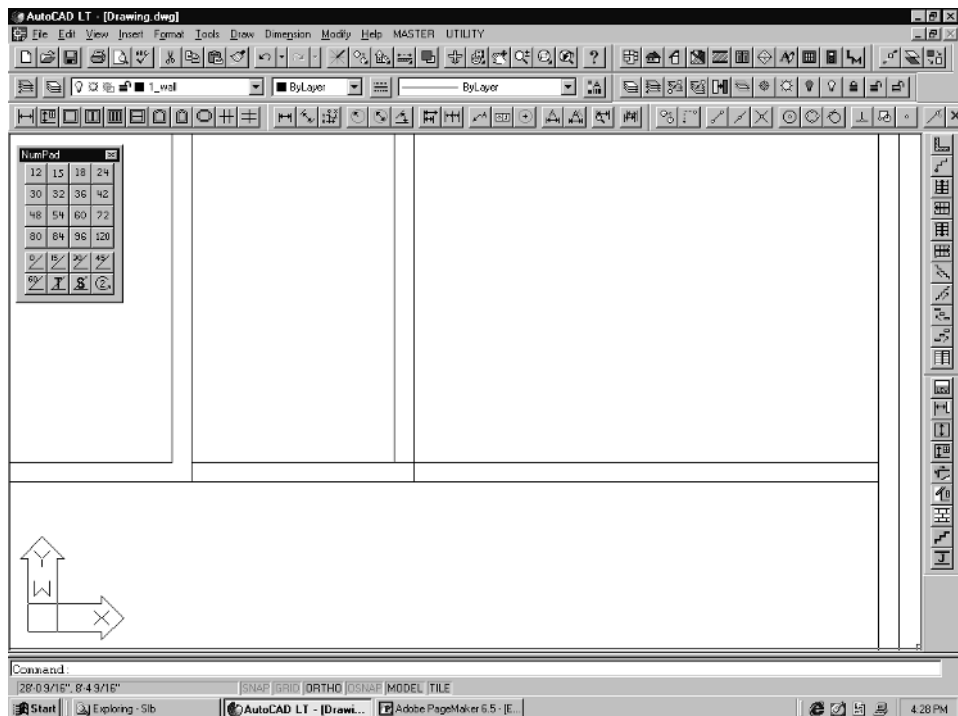


Figure 2-17

Pick **Trim** from the Modify pull-down menu and then hit **Enter** at the *Select Objects* prompt. Next, at the *Select object to trim or [Project/Edge/Undo]* prompt, pick each line you want trimmed. Type **U** and **Enter** to undo any mistakes. Hit the **Esc** key when done.



NOTE: If you are having difficulty picking right on the lines, hit the F9 key to turn off Snap.

This completes the basic portion of our wall layout. Next, you will add the windows and doors. Check out Sheet #1 (Floor Plan) in the appendix. This gives you the window and door sizes, as well as their locations in the walls. For this exercise, all windows for the Master Bedroom, Bedroom 1, and Bath are centered in the walls. The doors for these rooms are offset 4" from the wall corners.

Adding Windows

For the exercises in this book, we will use the window blocks that are provided with our template drawings. We are using these in order to demonstrate to you the time that can be saved by creating your own library of parts and symbols. Also, we have provided a couple of simple script files for placing these window and door symbols. They save some time when inserting the windows, but are

mainly for demonstration purposes so that you can see how commands can be strung together to form macros.

1. To begin, zoom out so that you can see the floor plan and the group of symbols. Pick **Zoom** from the View pull-down, and select **Extents** from the list that pops up. Your drawing should look like the one below.

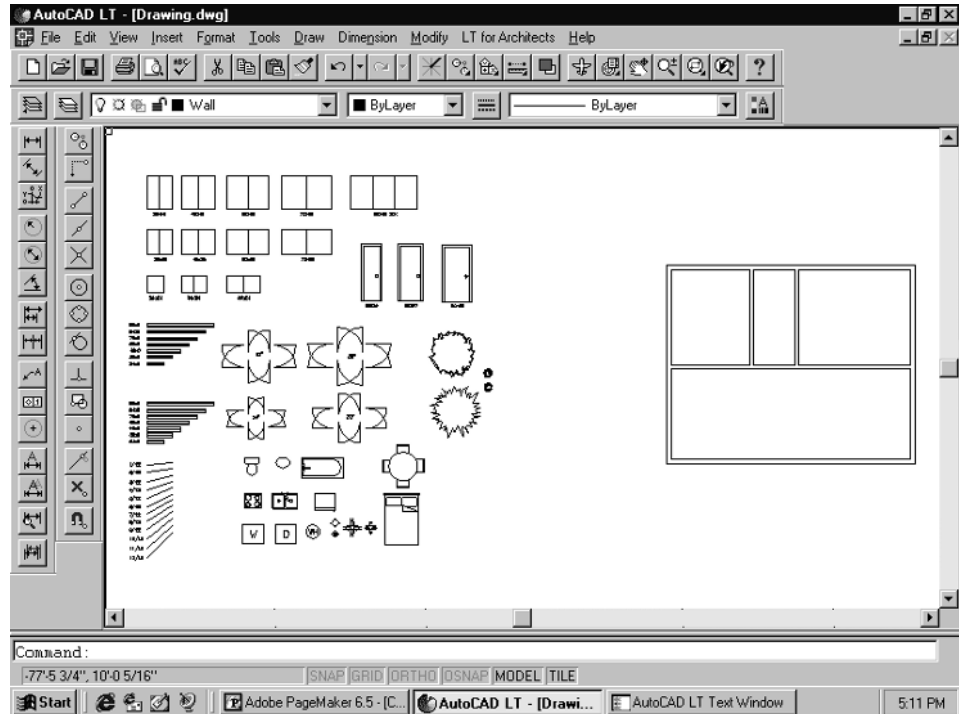


Figure 2-18



NOTE: There are two toolbars that you should always have visible on your screen—the Standard toolbar, which has some of the zoom and pan buttons on it, and the Object Properties toolbar. I also suggest that you keep the Dimension and the Object Snap toolbars visible at all times for architectural drafting.

Now, use the **Zoom|Window** command to zoom in to the area around the plan window symbols in the lower left of the screen.

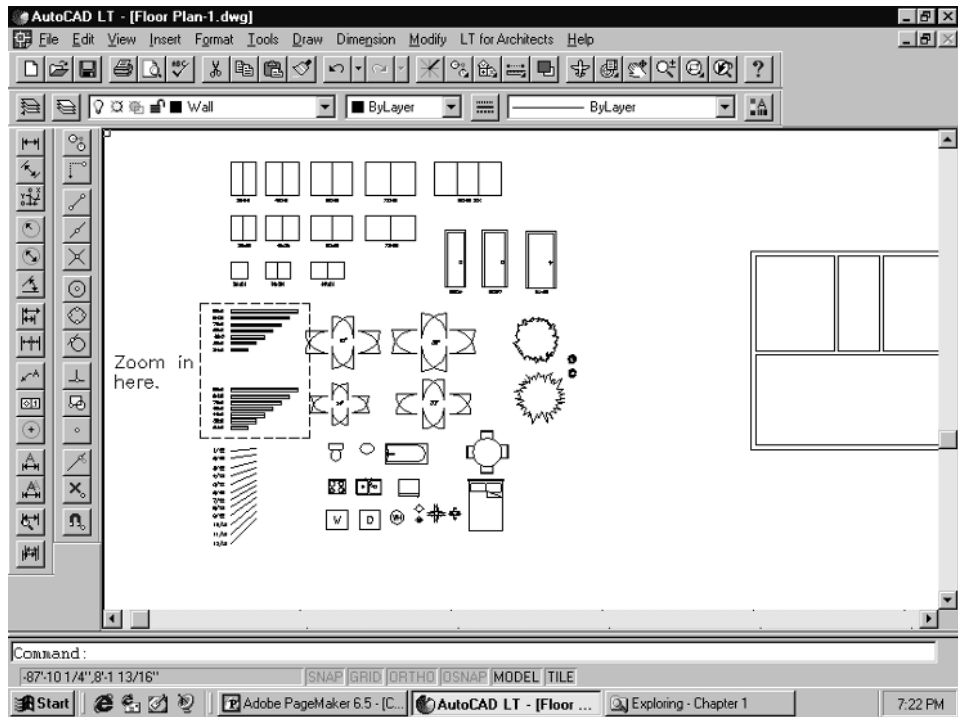


Figure 2-19

Once you get in close, you will see that there are two different sets of plan windows. One is for 6"-thick walls, and the other is for 4"-thick walls. Since our wall thickness in this exercise is 6", you will want to copy the whole set of 6"-wide windows and move them closer to the floor plan.

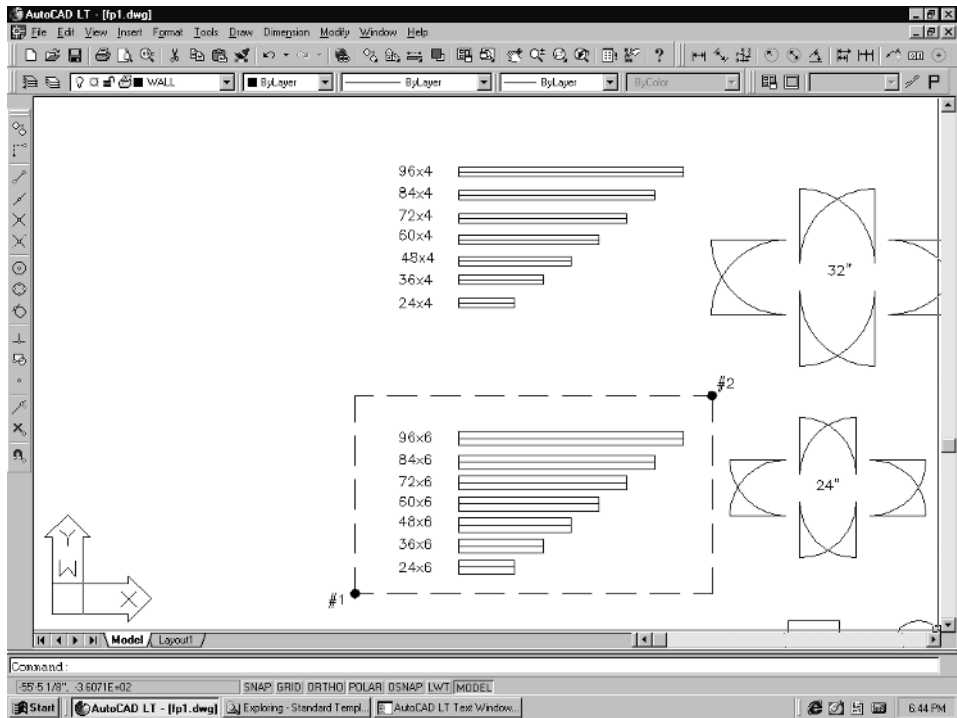


Figure 2-20

2. To copy the windows, select the **Copy** command, which is located on the Modify pull-down menu. You will first be prompted to *Select objects*. You want to “window” around all of the 6" windows, so first pick point #1 with your left mouse button, then pull and pick point #2 (as shown in the above figure). Then hit **Enter**.

The next prompt will be *Base point*. Pick a point anywhere near the center of the group of windows. The last prompt will be *Second point of displacement*. Use the **Pan Realtime** command to move over to the floor plan. Then place the group of windows anywhere near the floor plan by picking with your left mouse button.

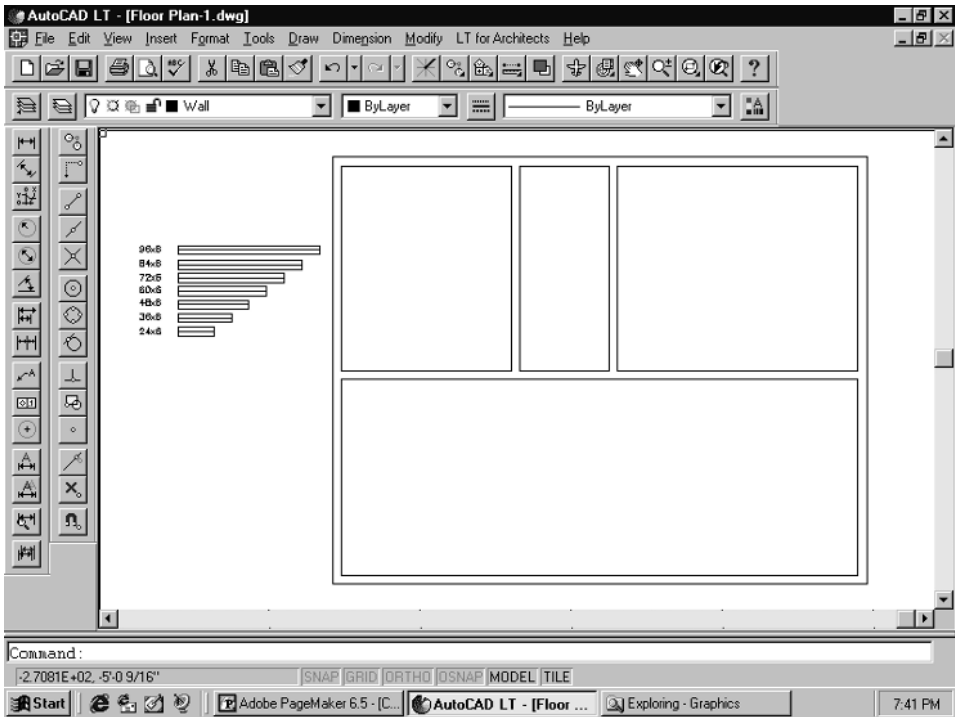


Figure 2-21

NOTE: Make sure you have your object snaps set with Endpoint, Midpoint, and Perpendicular checked. You can verify this by hitting the F3 key. If the Osnap Settings dialog box does not pop up, it means you already have some osnaps set.

You can find out which ones are set by selecting Object Snap Settings from the Tools pull-down menu, or by picking on the Object Snap Settings button on the Object Snap toolbar, pictured below. Either way, the Osnap Settings dialog will come up, showing you which ones are already set.



Figure 2-23

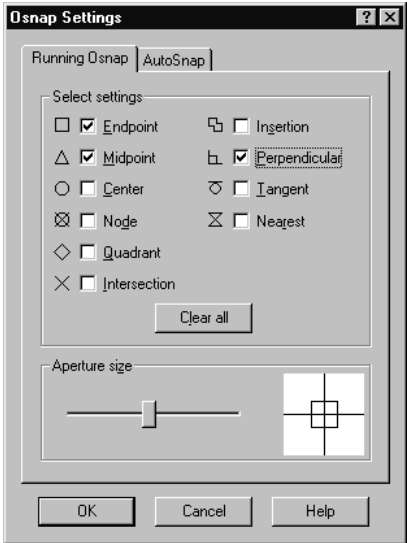


Figure 2-22

3. The first task when adding windows to a floor plan is to cut the openings in the walls. Take a look at Sheet #1 (Floor Plan). It gives you the size of each window, as well as the placement for each. In this case, all windows in the

Master Bedroom, Bath, and Bedroom 1 are centered in the walls. You will first need to draw a construction line from the midpoint of each interior wall line outward so that it crosses the exterior wall line. Pick the **Line** command from the Draw pull-down menu. The first prompt is *LINE From point*. Pull your cursor over the interior wall line of Bedroom 1. As you get close to the center of the interior wall line, a little triangular “glyph” will light up. This tells you that this is the midpoint of that wall line. Pick with your left button. Then at the second prompt, *To point*, pull up and pick. Your first construction line will be drawn. Hit **Enter** once to quit the Line command, or hit the **Esc** key.

Hit **Enter** again to start the Line command again. Now go to the interior wall line of the Bath and find the midpoint. When the midpoint “glyph” lights up, pick with your left button. Pull up and pick with the left button. Hit **Enter** to stop the Line command. Hit **Enter** again to start it back up and continue with the rest of the lines as shown below.

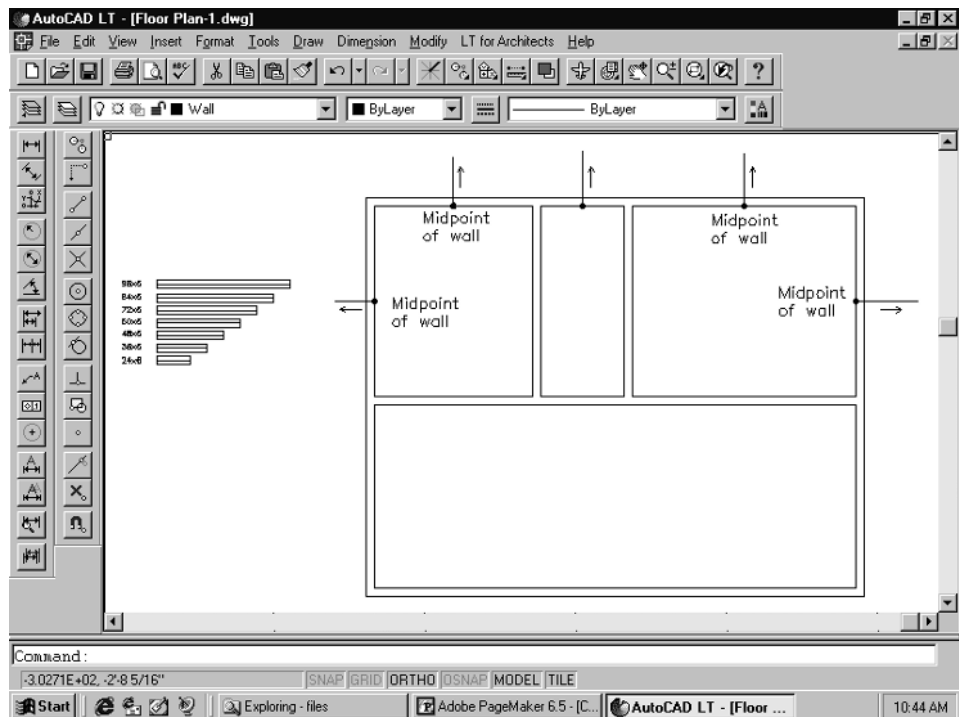


Figure 2-24

4. The reason you draw these lines is simply to establish the center of each window. Once you have all the center lines drawn, you will need to offset them to both sides to create the window openings in the walls.

To do this, use the Offset command located on the Modify pull-down menu. The first prompt will be *Offset distance or Through <Through>*. The offset distance of each is based on half the width of the window. For example, for a

48"-wide window, you would offset the center line 24" to each side. So for the first window in Bedroom 1, you would type **24** and **Enter**.

The next prompt is *Select object to offset*. Select the center construction line by picking on it with the left mouse button. You are then prompted *Side to offset?*. Pick to the left of the construction line with your left mouse button, as in Figure 2-25.

The command then prompts again *Select object to offset*. Pick the center line again with the left button. Then at the *Side to offset?* prompt, pick to the right side of the construction line, as in Figure 2-26.

Figure 2-25

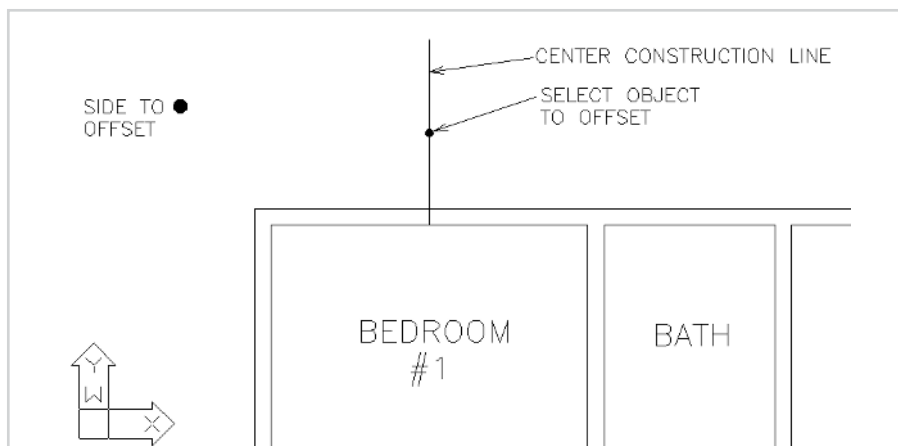
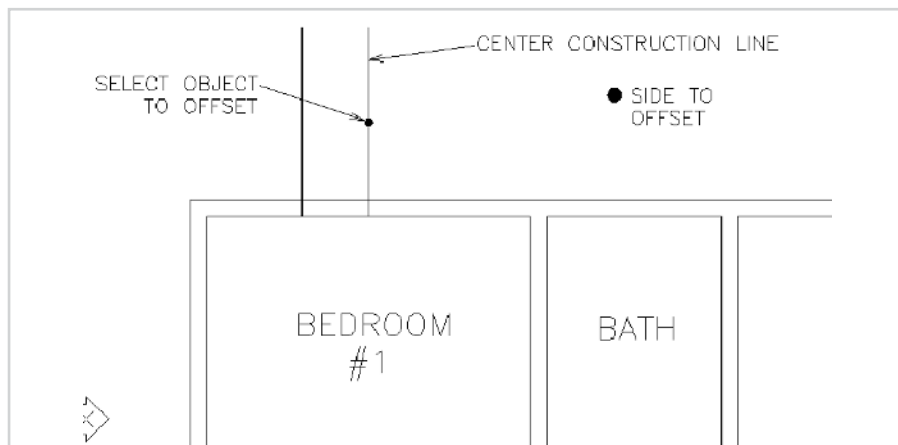


Figure 2-26



The right-hand offset line will be drawn. Do this for all of the windows, based on the sizes shown in Sheet #1. You should end up with your drawing looking like the one shown on the next page.

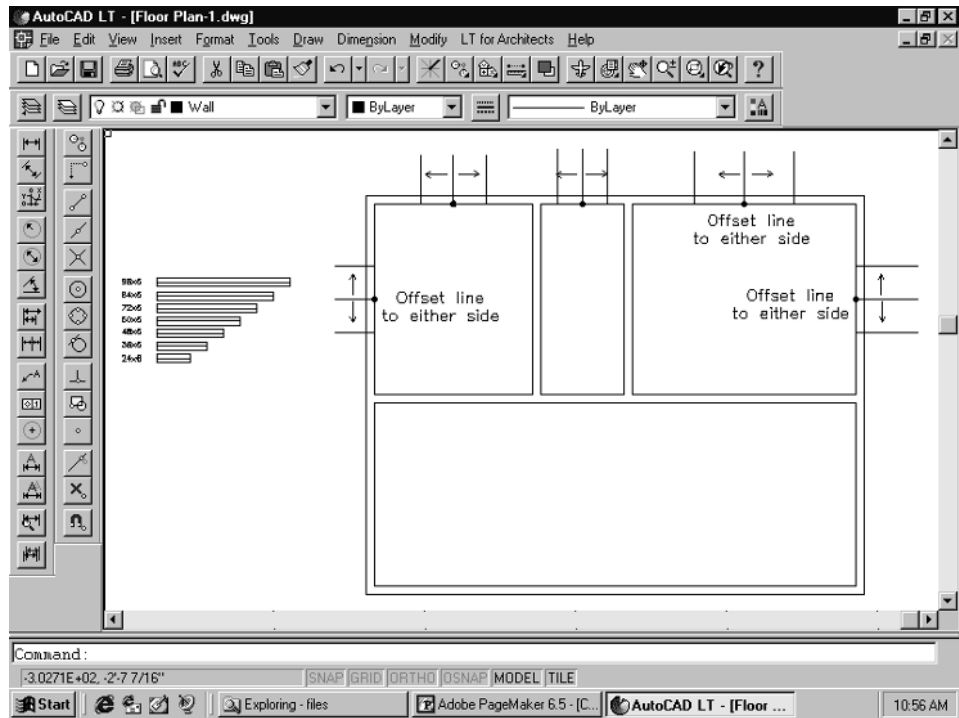


Figure 2-27



NOTE: As long as the offset distance remains the same, you can continue picking the object to offset, and then picking the side to offset. But if you need to change the offset distance you must hit the Esc key and then Enter to restart the command again. You will then be prompted for the new offset distance.

5. Next, you need to trim out the wall openings and the window jamb tails. Before you do this, erase the center construction lines you drew back in Figure 2-24. Use the Erase command from the Modify pull-down menu to do this. Next, select **Trim** from the Modify pull-down. The *Select objects* prompt will appear. Hit **Enter**. This will select all objects in the drawing as cutting edges. It is much easier than individually selecting each line you want as a cutting edge. If necessary, zoom in closer to each area you want to trim by using the Zoom|Window command. Then, pick each of the wall lines between the window jamb lines and the ends of the jamb lines. They will trim out as you pick them. Figure 2-28 shows you where to pick.

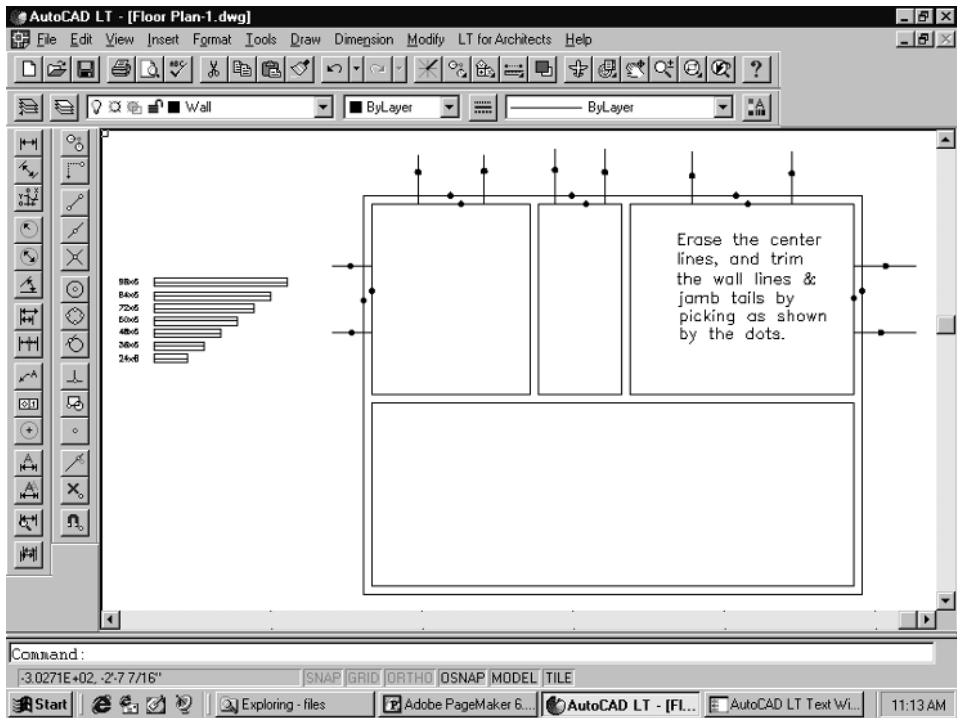


Figure 2-28

When you are done, your drawing should look like the one below.

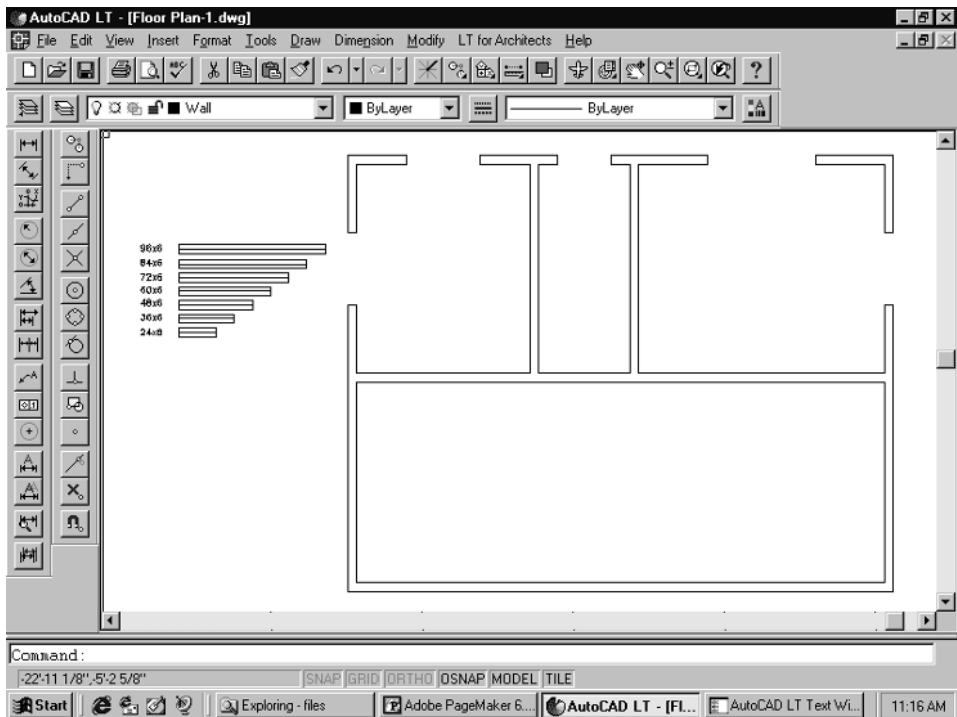


Figure 2-29

- To begin applying the windows, zoom in to the drawing so that you can see the window sizes. Use the **Zoom | Window** command to do this.

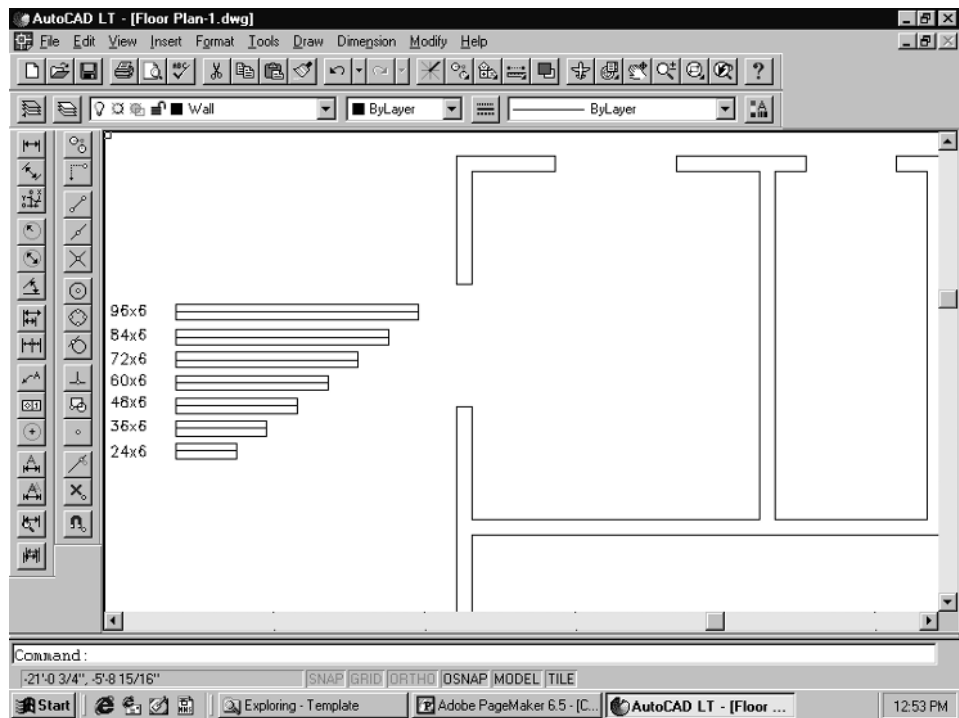


Figure 2-30

The Arch LT Toolbar, pictured below, contains commands for inserting windows and doors, as well as some commands that aid in elevation creation. We will use the toolbar to help place windows in this project.



Figure 2-31

We have created several commands for this book that aid you in doing certain repetitive tasks. One of them is for inserting our plan window symbols. Instead of drawing a bunch of lines to represent a window, we are going to use our window symbols combined with the Copy Rotate Window command. This makes inserting a plan window easy and fast. Later, you can also create your own plan windows and use them in place of ours.

To begin inserting plan windows, select the **Copy Rotate Window** button from the Arch LT Toolbar. This command allows you to select a window and then place it in one of the openings you have previously cut out of the wall lines. It has a final function that lets you rotate the window so that it aligns with the wall. Make sure that Ortho is on when using this command (F8).

The command also turns your object snaps on and off by itself whenever needed.

Here is the command sequence for placing windows using the Copy Rotate Windows command:

First, pick the command button, which is the leftmost button. Next, pick the window you wish to use, and select the endpoint of the window glass pane. You then drag the window over to the opening and select the midpoint of the window jamb as the insertion point.

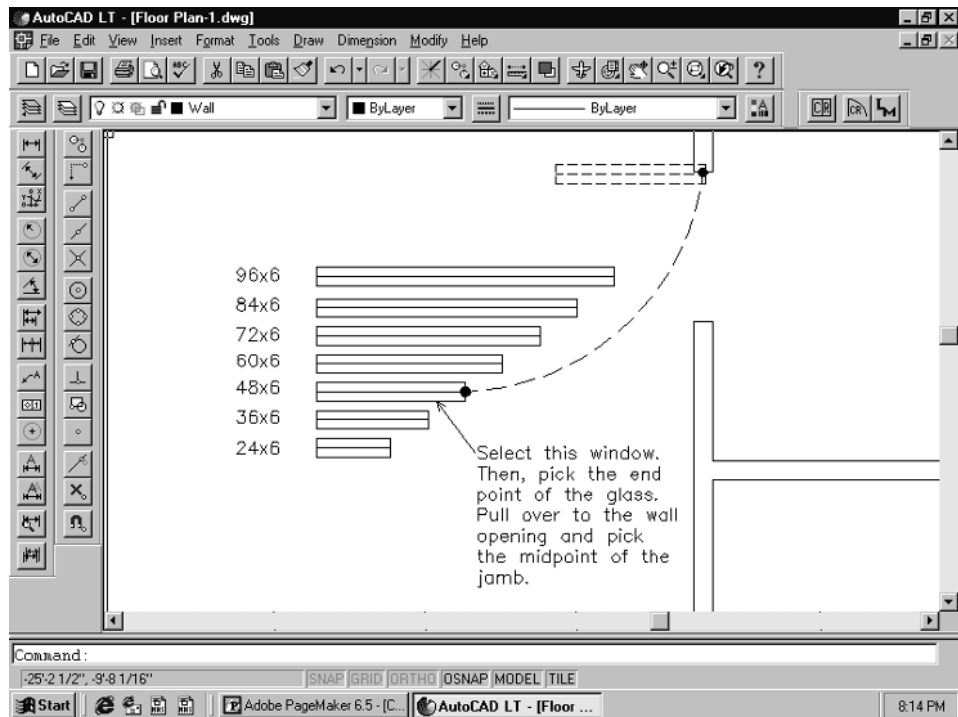


Figure 2-32

The last prompt is for the rotation of the window. Pull your cursor along the wall, then pick your left mouse button when it is lined up correctly. See Figure 2-33. The window is drawn and the command is then ready to place another window, following the same procedure. When done, hit the **Esc** key to exit the command.

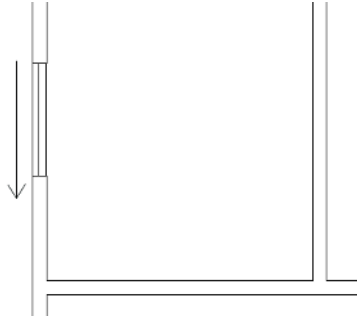


Figure 2-33

Continue placing the rest of the plan windows for Bedroom 1, Bath, and Master Bedroom. Your drawing should resemble Figure 2-34 when you are finished.

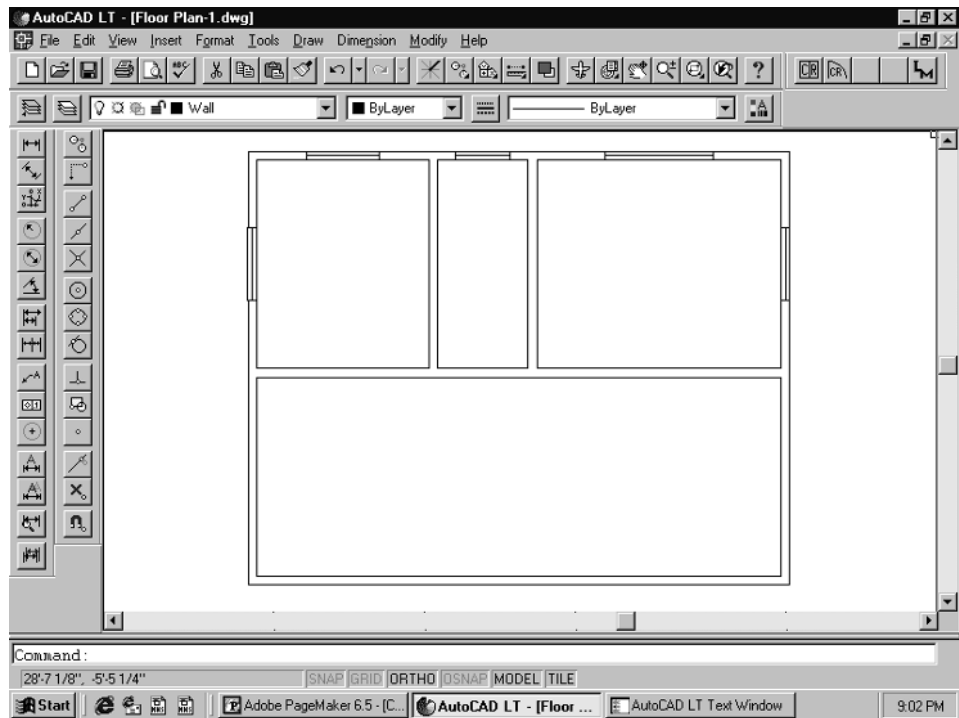


Figure 2-34



NOTE: If you listed the properties of any of the plan windows that you just inserted, you would find that they are all on the layer **WINDOW**. This is because we created them on this layer. Also, these windows are not “blocks” but rather “groups.” The advantage of creating each window as a group is that it can be moved, copied, etc., as if it were a single entity, but each line in the window retains its ability to be a cutting edge when using the Trim command, so each window can be trimmed if needed. This can really be handy in elevation windows when the fascia line comes down below the top of the window and you need to trim the window.

Adding Doors

The method for adding the plan doors is basically the same as for the plan windows. You need to draw some construction lines, offset them the width of each door, then trim out the wall and jamb lines, thus forming the door openings in the walls.

1. First, you need to draw your construction line. This needs to be drawn from the inside wall corner, then pulled out across the outer wall line. Pick the **Line** command from the Draw pull-down menu. Pick the inner wall corner with your left button, then pull the cursor down, and pick again, as shown below. Hit the **Esc** key to quit the Line command.

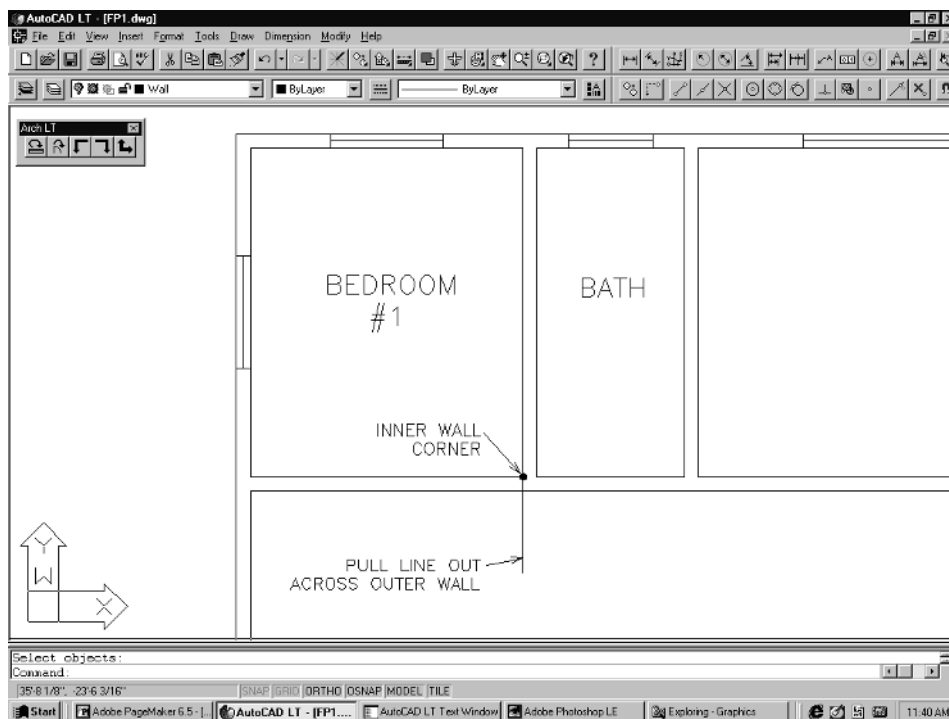


Figure 2-35

2. Next, offset this new line 4" to the left. This creates the first door jamb line. To do this, pick the **Offset** command from the Modify pull-down menu. The *Offset distance or Through <Through>* prompt will appear. Type **4** and **Enter**. At the *Select object to offset* prompt, pick the construction line with your left mouse button. Finally, at the *Side to offset?* prompt, pick to the left side, as shown in Figure 2-36. The line will automatically be drawn. Hit the **Esc** key or **Enter** key to quit the Offset command.

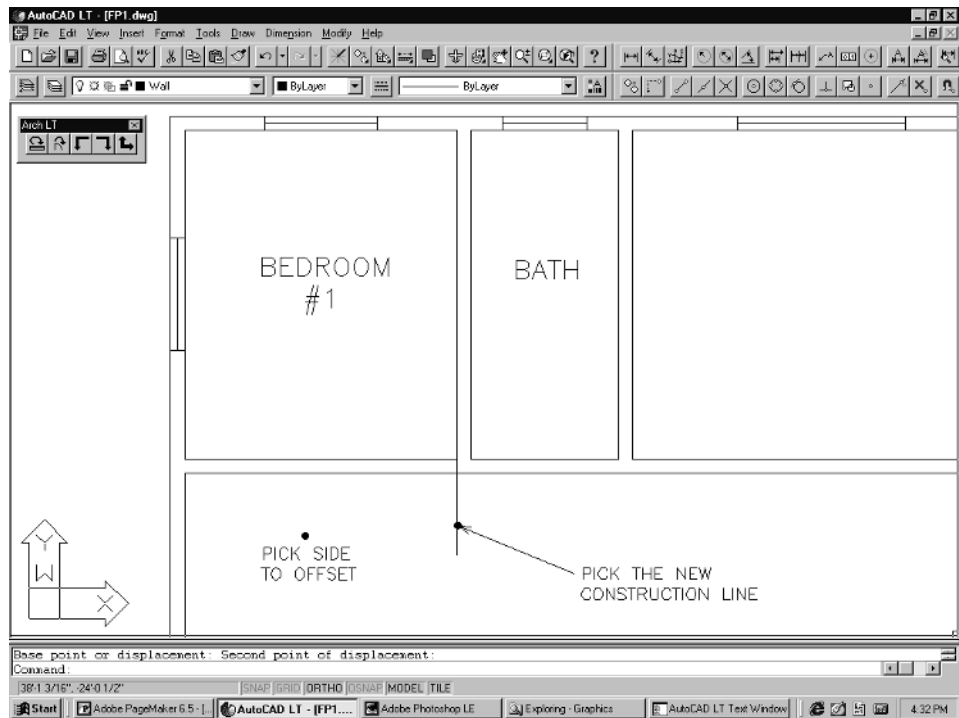


Figure 2-36

- For this exercise, we are inserting the door for Bedroom 1. Take a look at Sheet #1 (Floor Plan). This door is supposed to be 2'-6" wide. The first door opening line has already been created. To create the other side of the door opening, let's try something a little different.

Just to show you that there are many ways to accomplish the same task with AutoCAD LT, we will use the Copy command instead of the Offset command to create the other door opening line. If the Offset command is still active, hit the **Esc** key to quit it. Pick the **Copy** command from the Modify pull-down menu.

At the *Select objects* prompt, pick the new construction line, then **Enter**. When *<Base point or displacement>/Multiple* appears on the command line, pick a point with your left mouse button as shown in Figure 2-37. Your cursor will automatically attach itself to the base point you just picked.

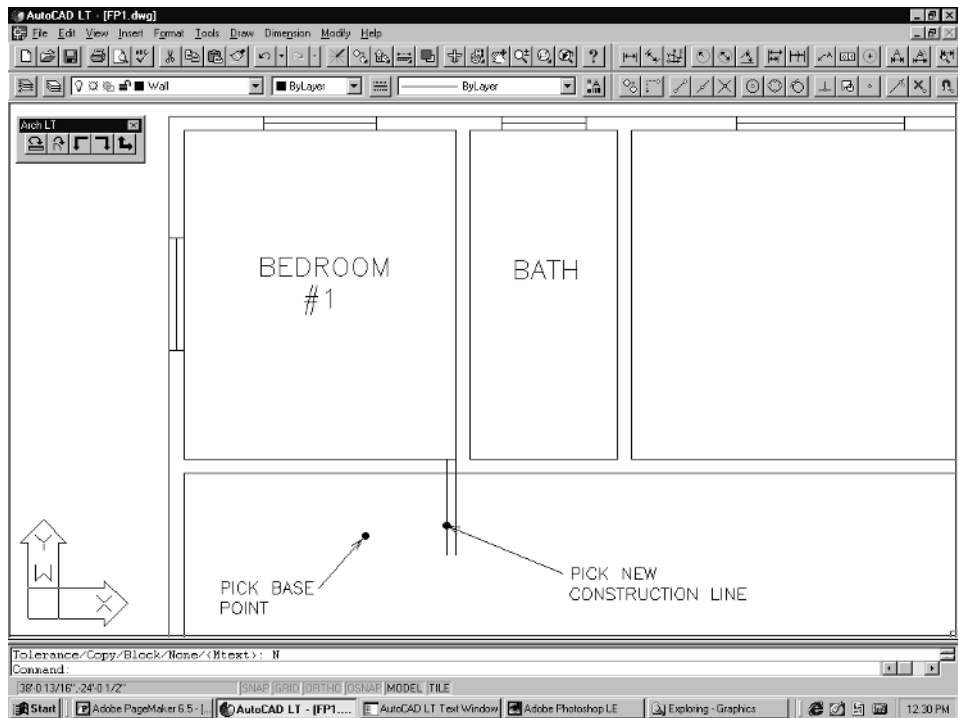


Figure 2-37

At the *Second point of displacement* prompt, pull your cursor to the left, type **30**, and hit **Enter**. The new door opening line will be drawn.

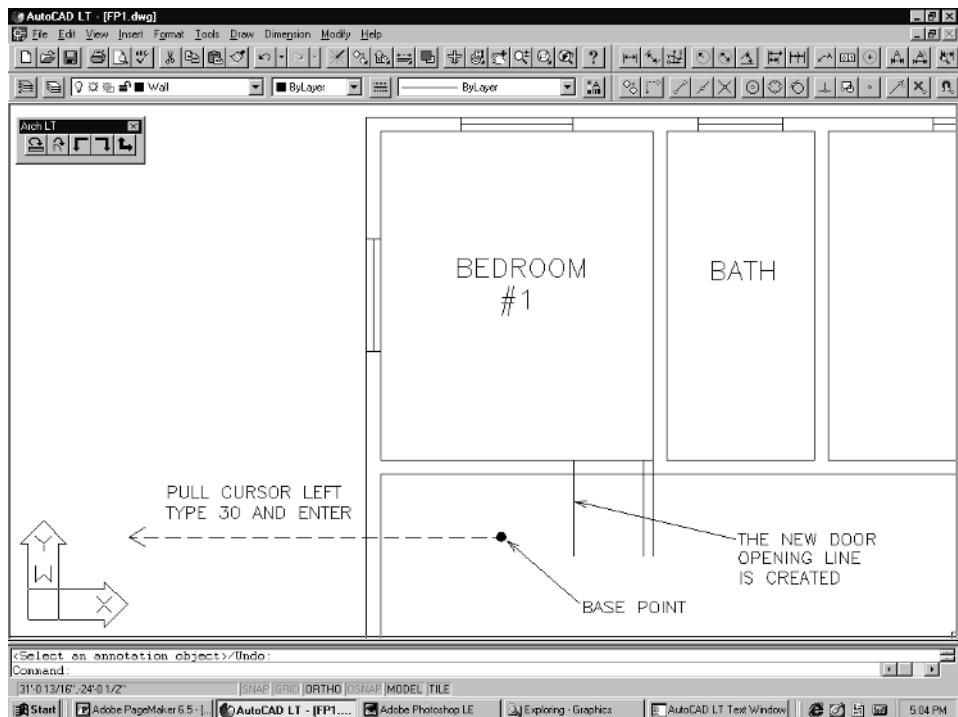
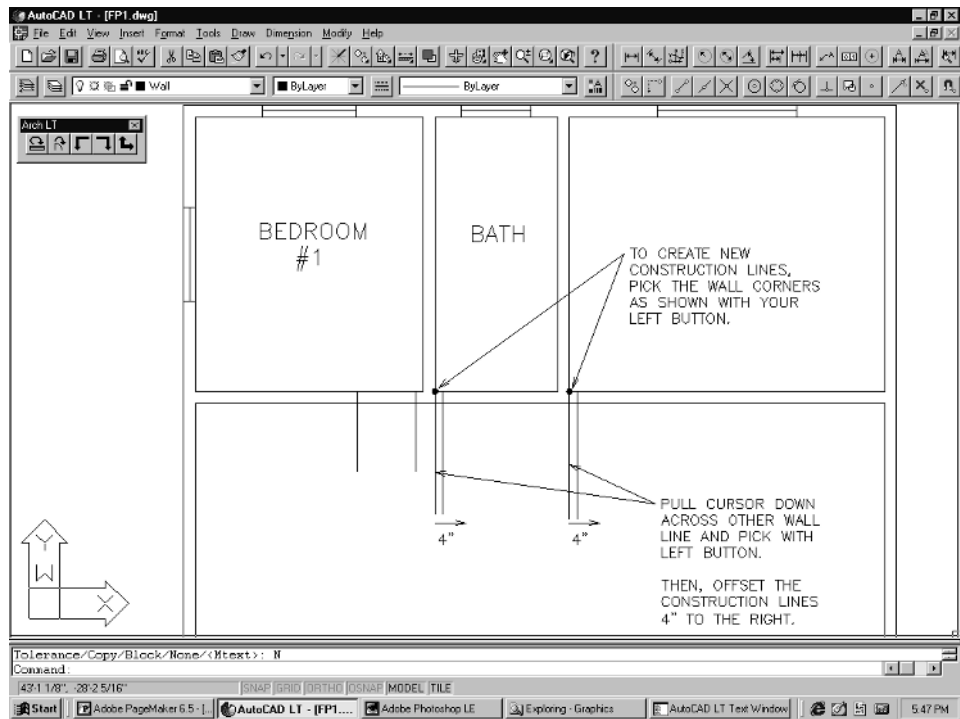


Figure 2-38

- Hit the **Esc** key to exit the Copy command. Pick the **Erase** command from the Modify pull-down menu and erase the first construction line you drew.
4. You now need to create the door opening lines for the Bath and the Master Bedroom, so go ahead and draw the construction line for each of them. Offset each of these 4" to create the first door opening lines (jamb lines), as shown in Figure 2-39.



Then offset each of the new jamb lines the width of each door. In this plan, the bath has a 24"-wide door, and the Master Bedroom has a 30"-wide door.

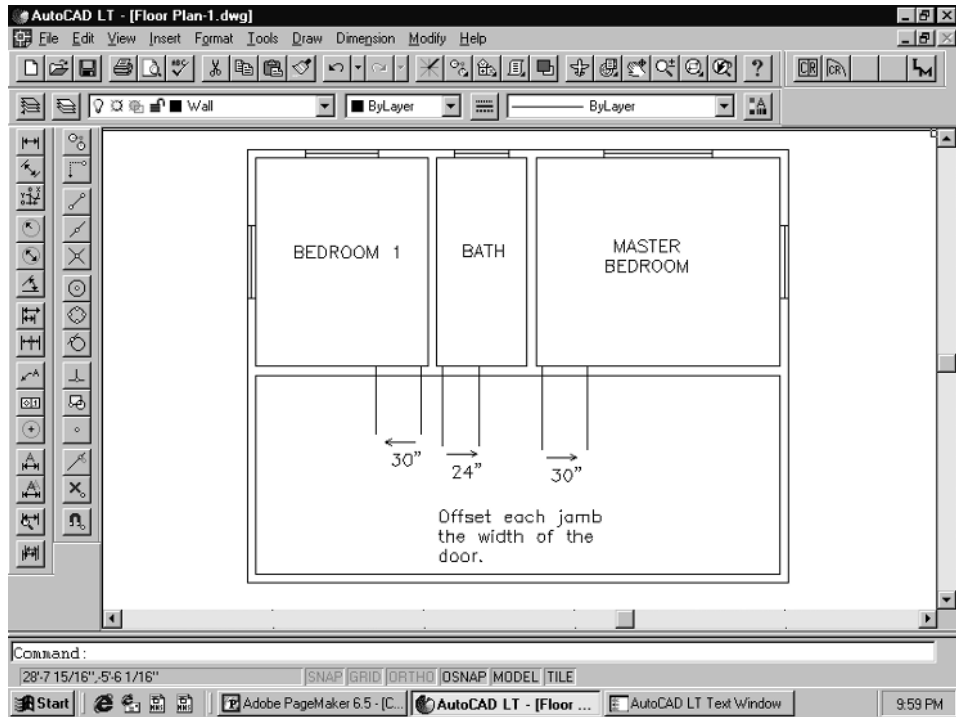


Figure 2-40

5. Next, you need to trim out the wall openings and the door jamb ends. Select **Trim** from the Modify pull-down menu. At the command line prompt *Select objects*, hit **Enter** or right-pick on your mouse. This will select all objects in the drawing as cutting edges. Pick each of the wall lines between the door jamb lines, just as we did when trimming out the window openings. They will trim out as you pick them. Continue by picking the long tails of the door jamb lines and they will trim out also.

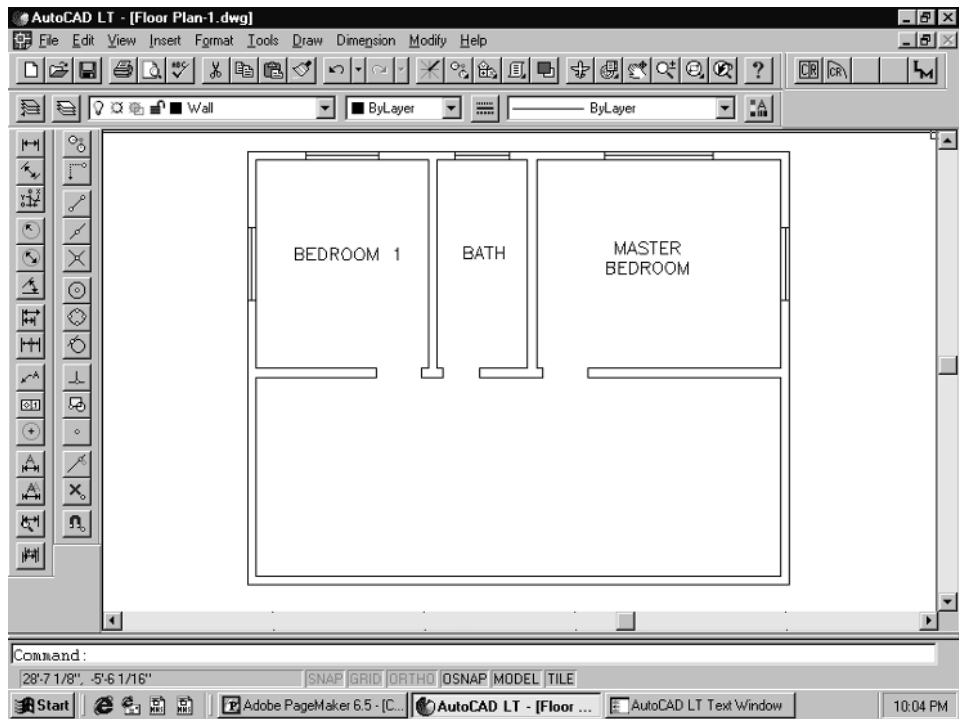


Figure 2-41

6. Next, copy some of the door symbols that you need from the side and drag them closer to the floor plan, as we did with the windows. The main objective is to get the door blocks over near where you will be inserting them into the floor plan.

First, use the **Zoom|Extents** command from the View pull-down menu to zoom the drawing out so you can see all the symbols and the floor plan. Use the **Copy** command to pick some of the doors you will be using (24" and 30") and then hit **Enter**. Pick a base point with your left button anywhere near the doors, then drag the doors over to the floor plan.

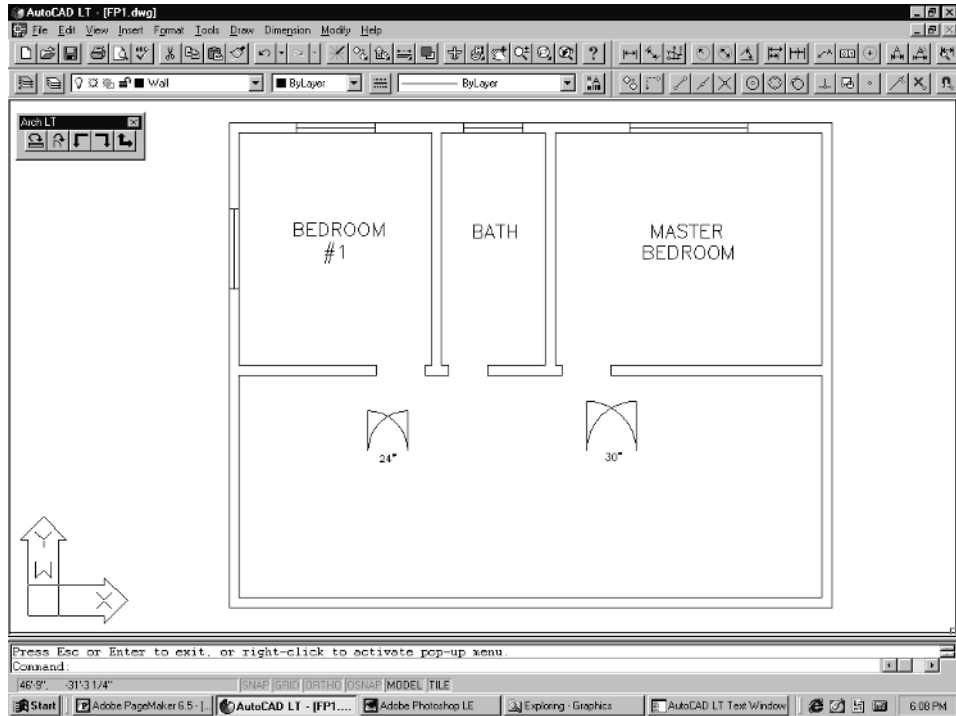


Figure 2-42

7. Pick the **Copy Rotate Door** button (second from the left) from the Arch LT toolbar. The first prompt is *Select objects*. Pick the door you want. Then, at the *<Base point or displacement>/Multiple: _endp of* prompt, pick the hinge point of the door. The Endpoint Osnap is automatically turned on, so just slide your cursor over the hinge point until the glyph lights up. Then pick with your left button. The command line prompt *Second point of displacement: _endp of* will appear. Drag the door to the opening and pick on the door jamb corner. Finally, when the prompt *<Rotation angle>/Reference* appears, pull your cursor along the wall to line the door up correctly, then pick with your left button.

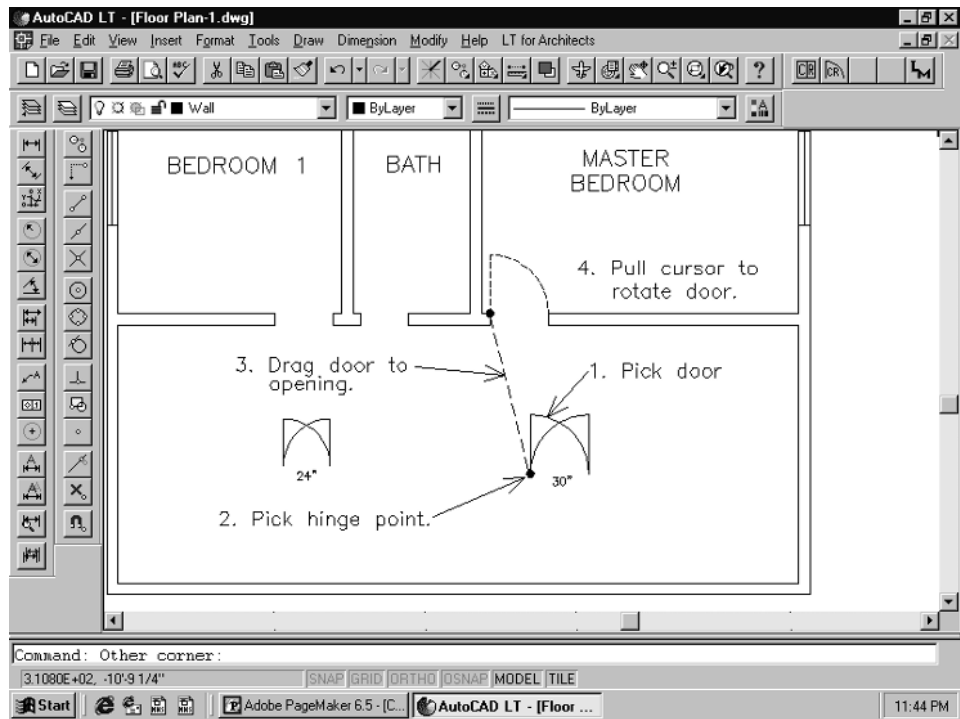


Figure 2-43

As soon as you finish placing a door, the command then reactivates and is ready to place the next door. Follow the same steps to finish placing the doors in Bath and Bedroom 1. Your drawing should resemble Figure 2-44. Hit **Esc** when done.

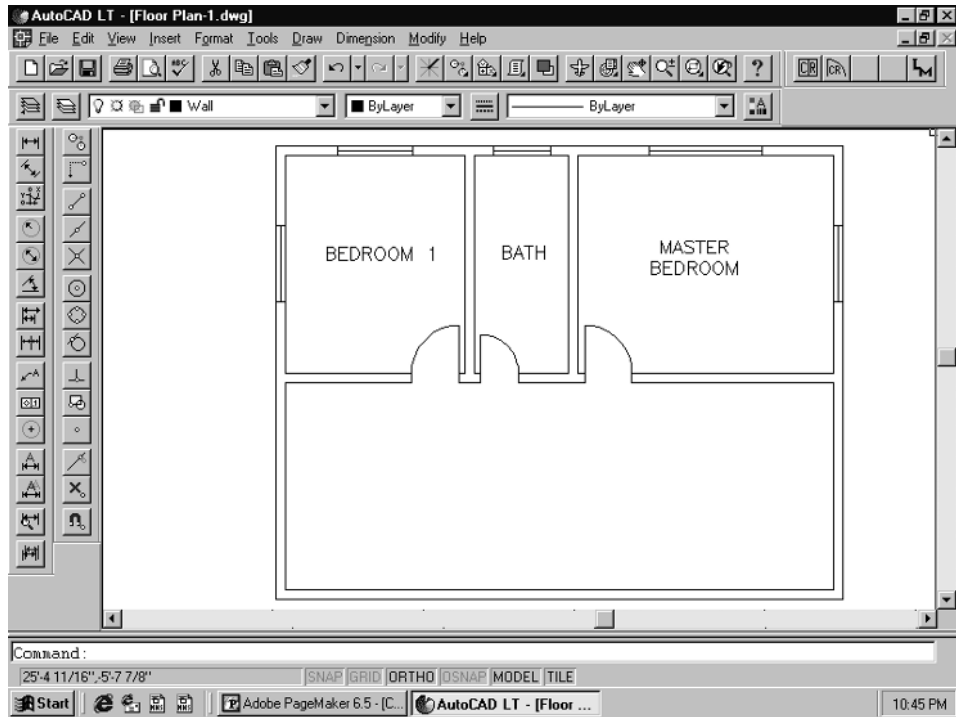


Figure 2-44



NOTE: The plan doors that you just inserted are all on the layer DOOR. This is because we created them on this layer. Also, these doors are made up of a single polyline. You can make your own door symbols, if you prefer. You can make them more elaborate and of different styles.

Using the Standard Copy Command for Inserting Doors

You may wish to use the standard Copy command, rather than our Copy Rotate Door toolbar command, to insert the doors. Follow these steps to accomplish this task.

1. Pick the **Copy** command from the Modify pull-down menu. The prompt *Select objects* will appear. Pick the door you wish to use, then hit **Enter**. At the *<Base point or displacement>/Multiple* prompt, pick the hinge point of the door, as shown in Figure 2-45.

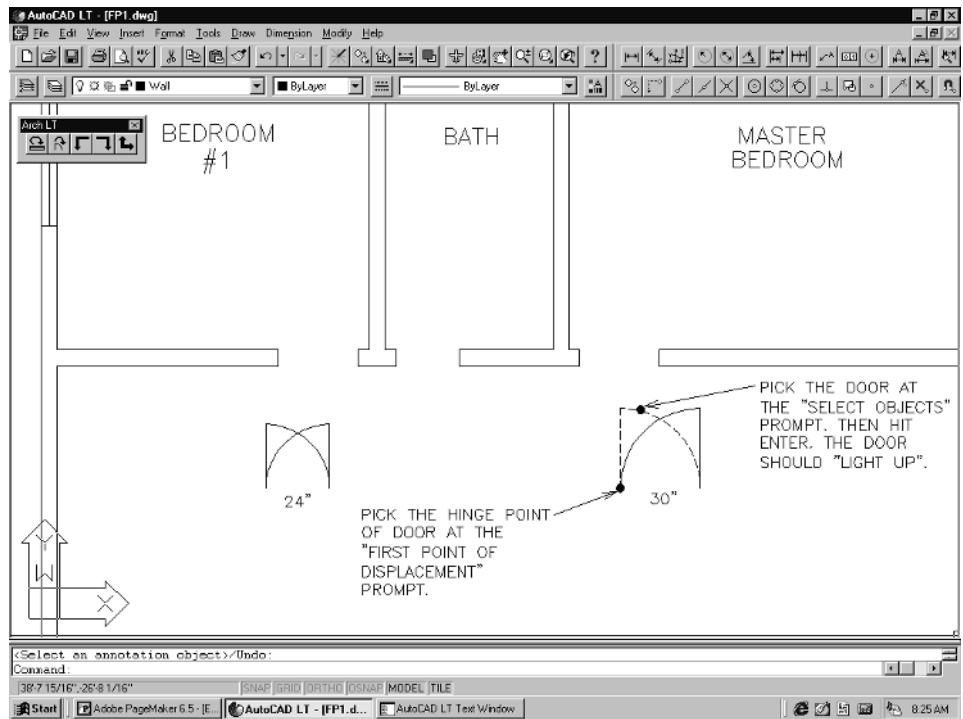


Figure 2-45

2. At the *Second point of displacement* prompt, pull the door up and pick on the door jamb corner as shown below. Hit the **Enter** key if you wish to continue placing doors with the Copy command.

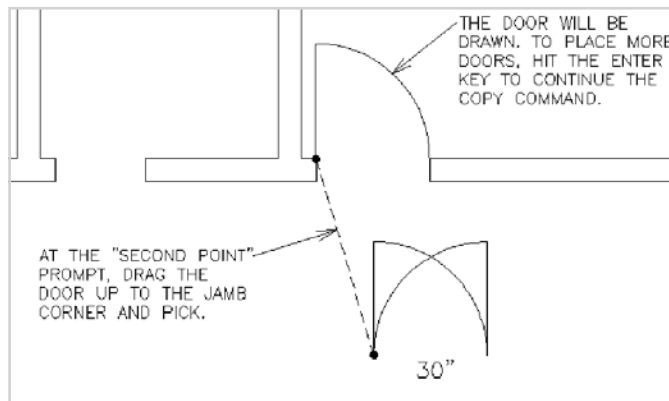


Figure 2-46

Adding Closets

Our next task will be to add the closets to the floor plan. There is a closet in each bedroom and a storage area in the Living Area. Take a look at the rough floor plan drawing on Sheet #1 (see the appendix).

NOTE: Throughout the rest of this book, the term “pick” means to press down on your left mouse button, unless otherwise noted.



1. The Master Bedroom closet is 8' long and has an interior dimension of 24". We will use the “offset” method to build the closet walls. Pick the **Offset** command from the Modify pull-down menu.

At the *Offset distance or Through <Through>* prompt, type **8'** and **Enter**. When prompted to *Select object to offset*, pick the wall line as shown below.

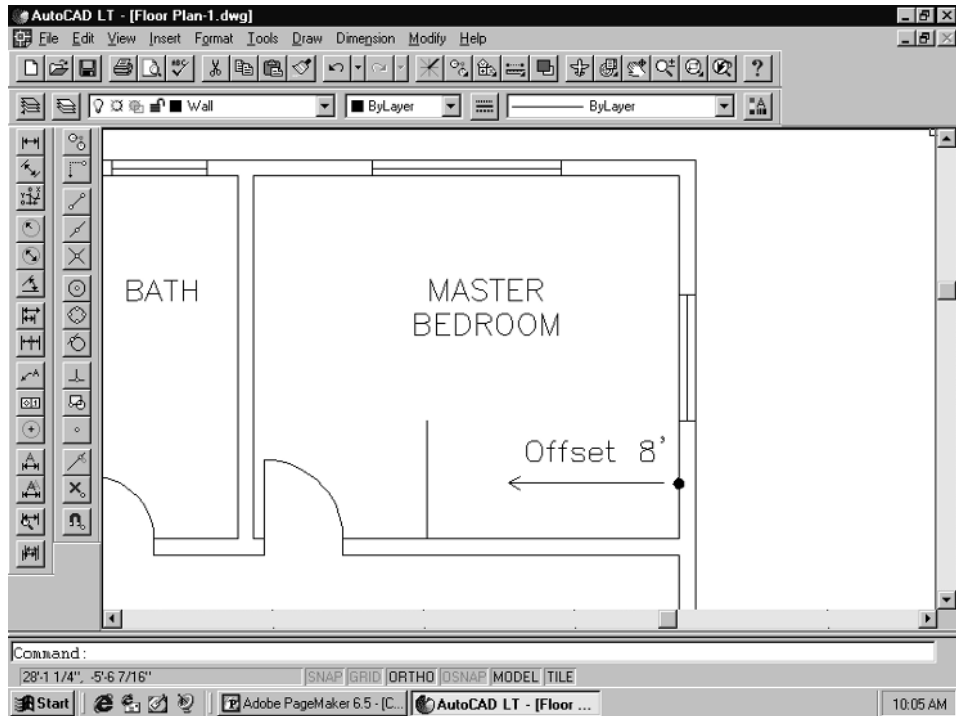


Figure 2-47

As soon as you select the wall line the prompt will say *Side to offset?*. Pick a point to the left of the wall and the line will be drawn. As soon as you have offset the first closet wall line, hit **Enter** twice to recall the Offset command. Change the *Offset distance* to **6"** and offset the new line to the right, thus creating the first closet wall.

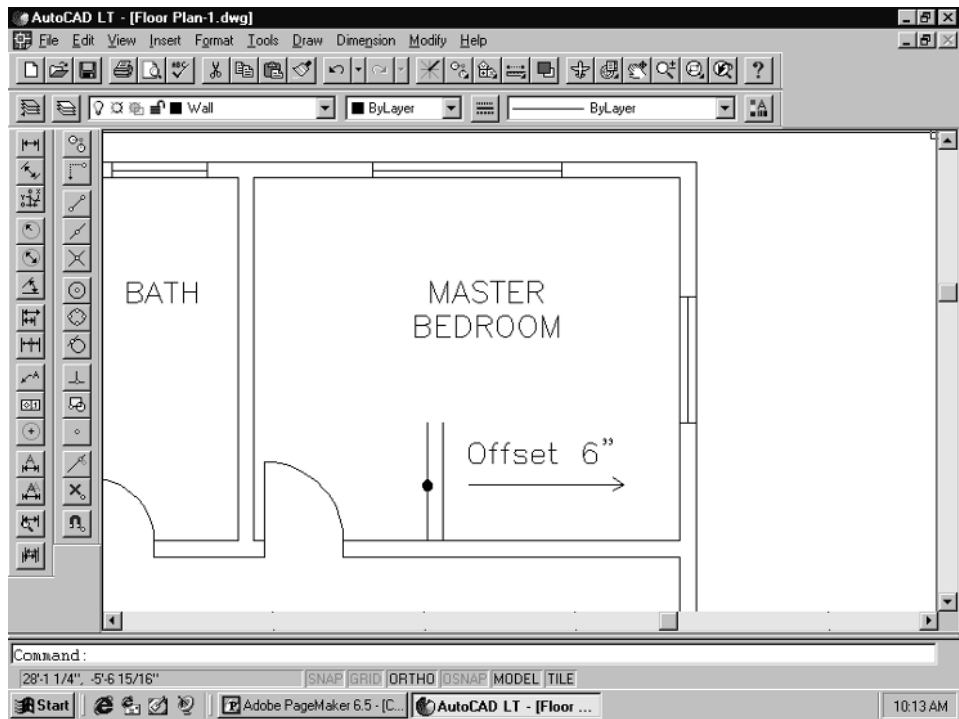


Figure 2-48

Hit **Enter** twice and change the offset distance to **24"** at the prompt. Offset the back wall line to create the front line of the closet.

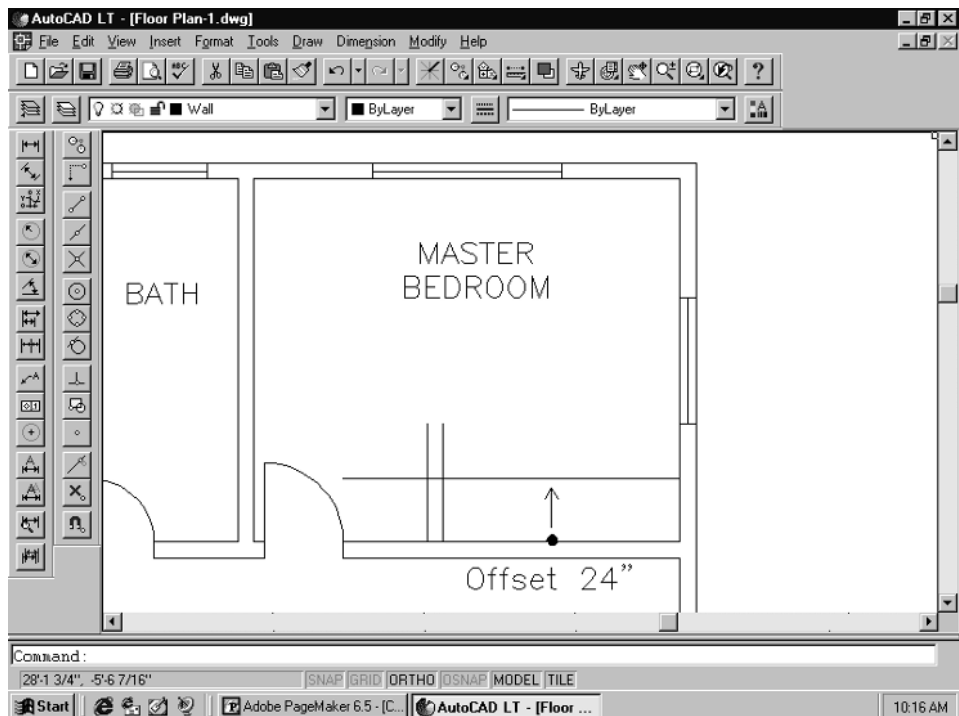


Figure 2-49

Hit **Enter** twice and change the offset distance to **6"** at the prompt. Offset the new closet wall line up 6" to create the front wall line of the closet.

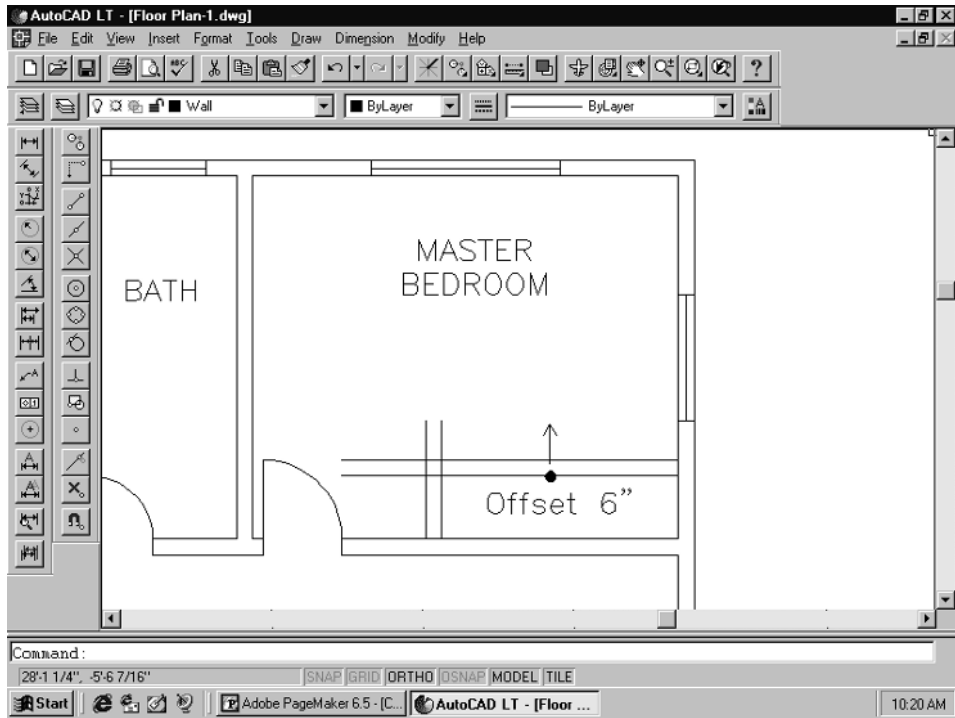


Figure 2-50

Hit the **Esc** key to exit the Offset command.

2. You will now need to do a quick cleanup of the closet wall lines. The fastest way is to use the Trim command. Pick **Trim** from the Modify pull-down menu. When the *Select cutting edges: (Projmode = UCS, Edgemode = No extend)* Select object prompt appears, hit **Enter**. This selects all lines as cutting edges. At the <Select object to trim>/Project/Edge/Undo prompt, pick the lines to trim out, as shown in Figure 2-51.

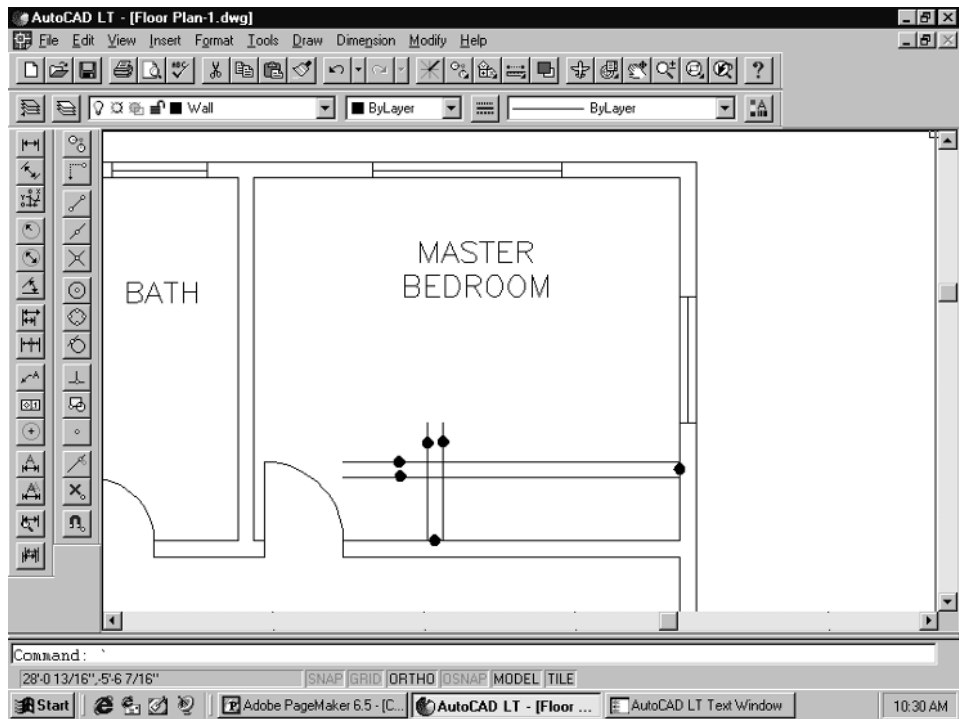


Figure 2-51

The closet will end up looking like Figure 2-52. Notice that the inside corner of the closet wall still needs to be trimmed. A good command for taking care of corner trims like this is the Fillet command, located on the Modify pull-down menu. When you select the command, you will be prompted *Polyline/Radius/Trim/ <Select first object>*. Select one of the inner closet lines as shown in Figure 2-52. At the *Select second object* prompt, select the other inner closet line.

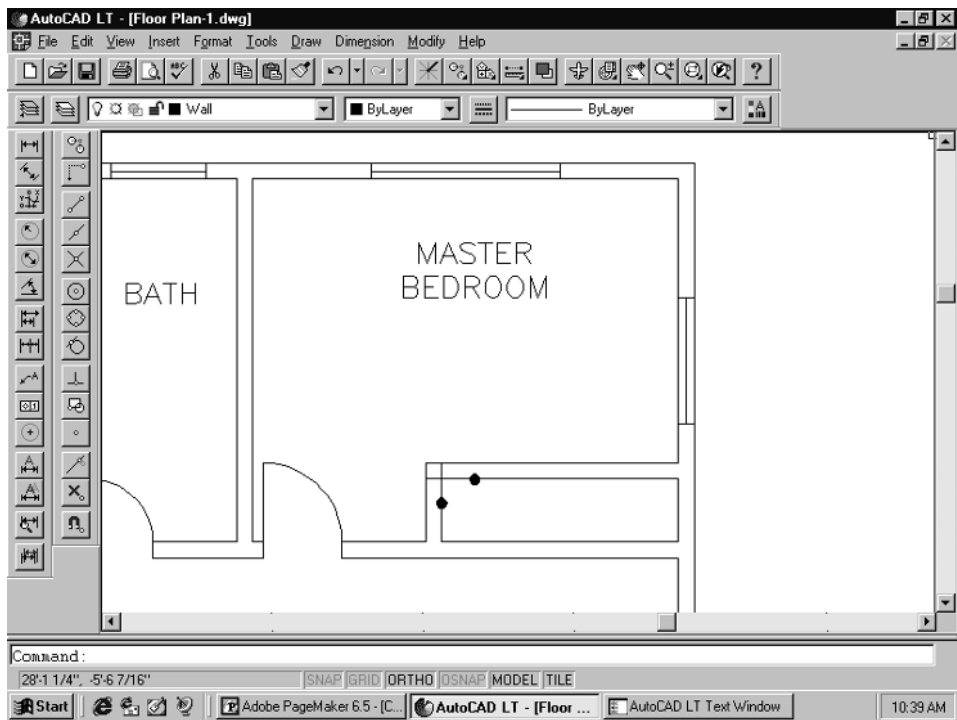


Figure 2-52

The finished closet walls are shown in the following figure.

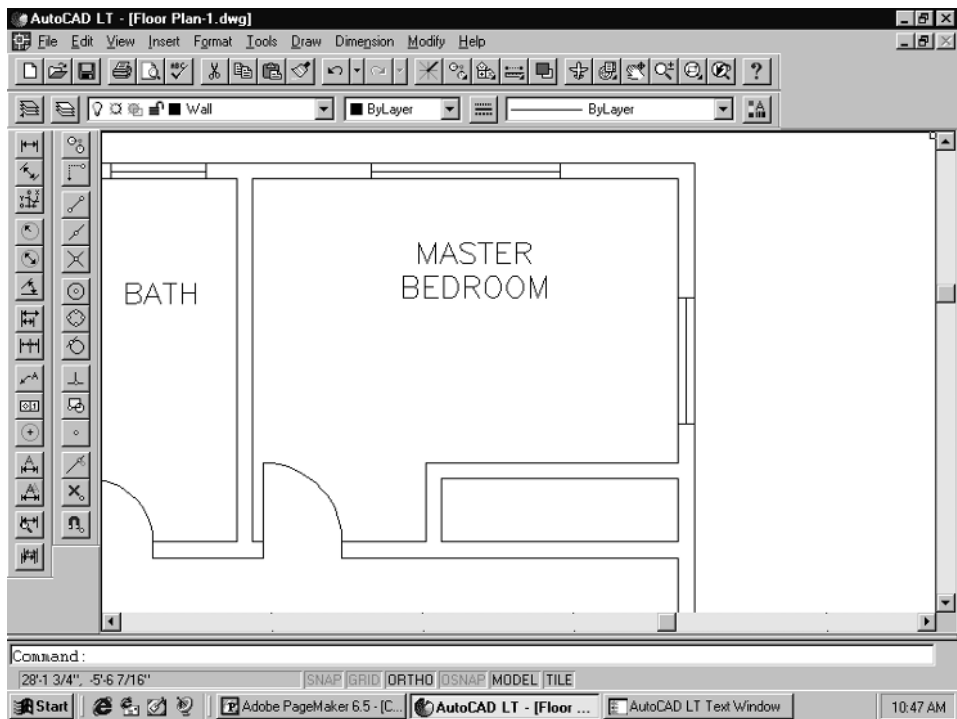


Figure 2-53

3. The next task is to cut the opening for the closet door. Take a look at Sheet #1. This is supposed to be a 7' bypass door. You need to draw a line from the center of the inside closet wall across the outer closet wall line. See Figure 2-54.

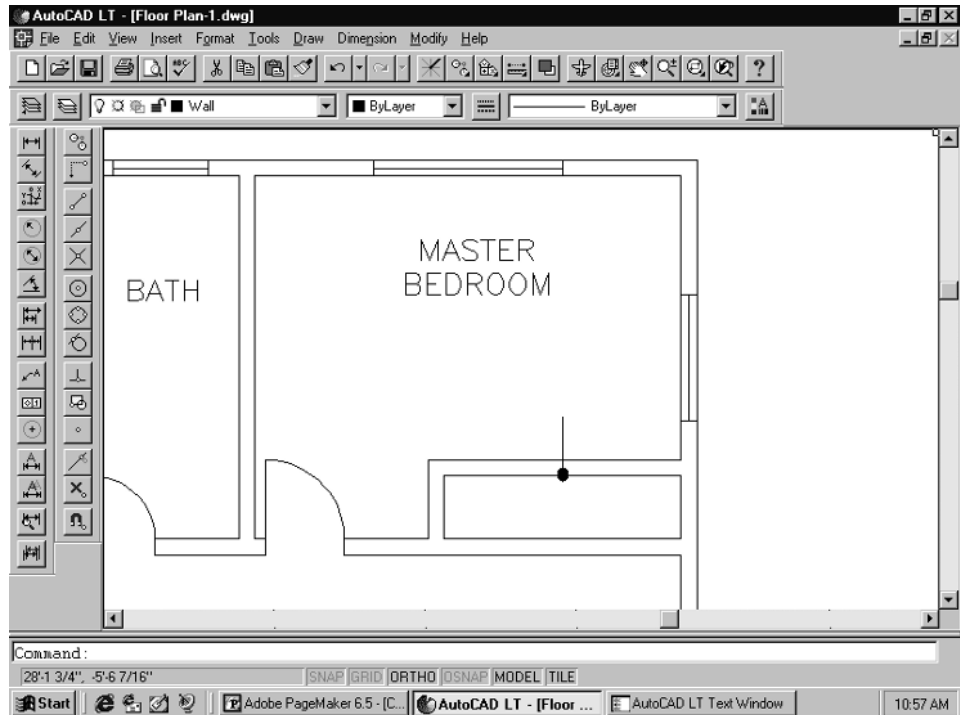


Figure 2-54

Next, use the Offset command to offset the center line 3'-6" to either side, thus creating the door opening lines (jamb lines).

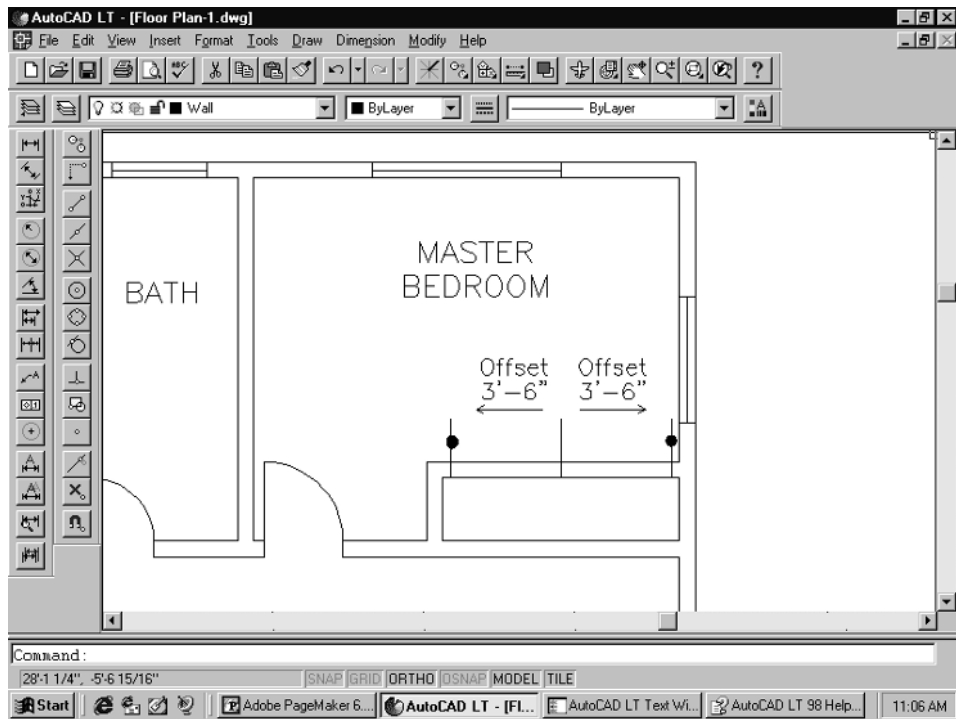


Figure 2-55

Erase the center construction line, then use the Trim command to trim out the closet wall and door jamb lines to create the door opening. Follow the same technique as you did when cutting out the window openings. The closet should resemble Figure 2-56.

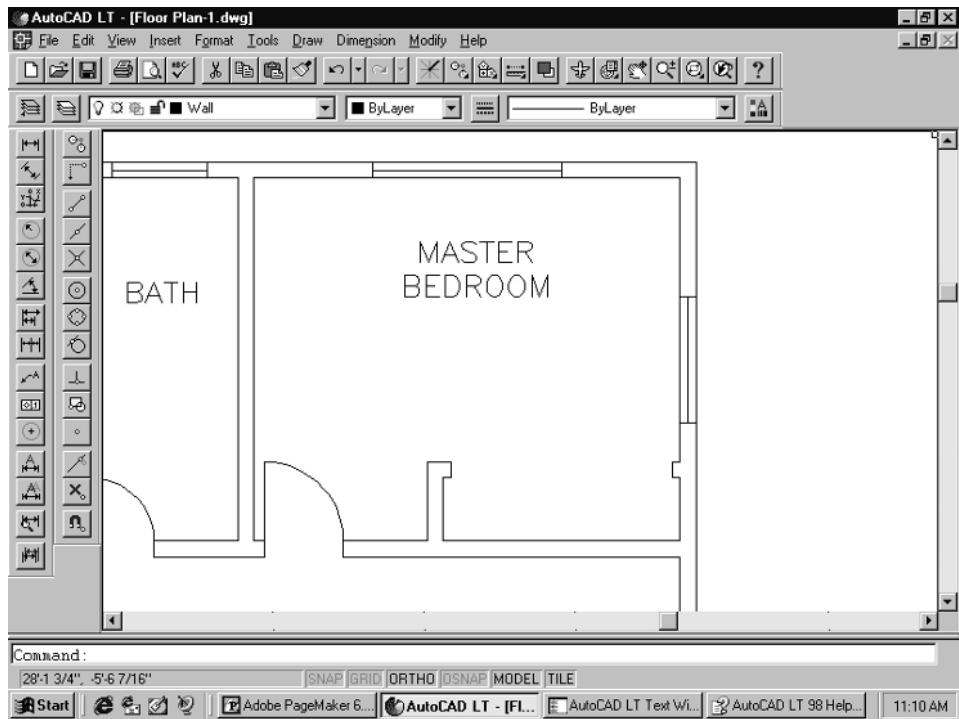


Figure 2-56

4. Follow the same procedure for drawing the other closets. See Sheet #1 for the dimensions. The finished closets should look like Figure 2-57.

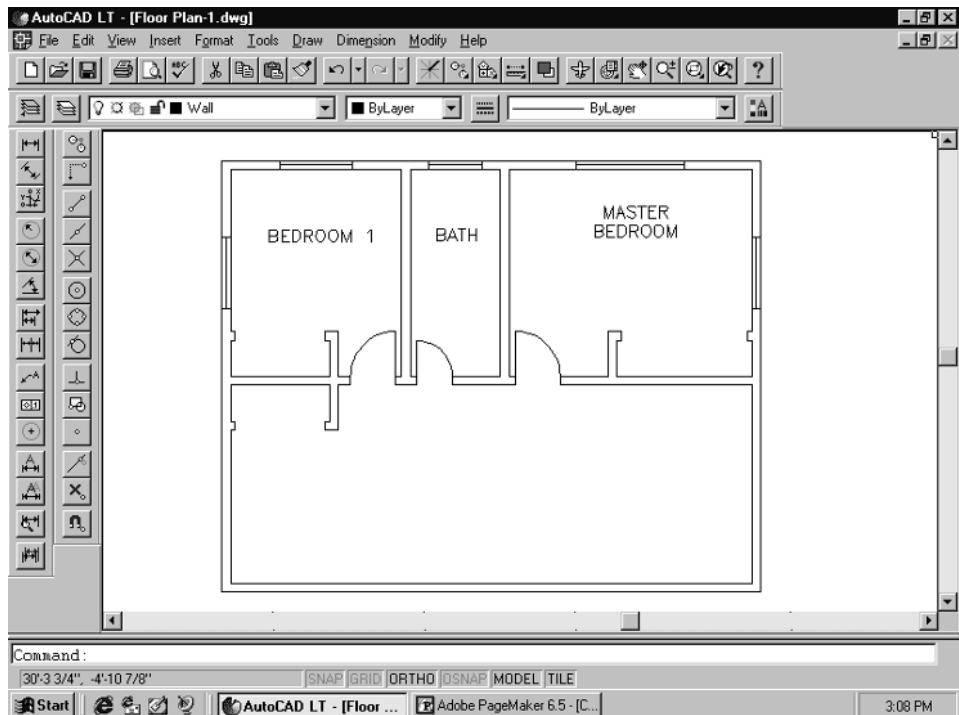


Figure 2-57

Sheet #1 specifies that all the closets are equipped with bypass type sliding doors. We did not provide these, so you need to make them yourself. Here is a little lesson on creating your own symbols. You will find yourself doing this many times in the future, so we will start with something very simple, like these doors.

There are two ways to create symbols, or blocks. One way is to draw whatever it is you want and then go through the “block” building routine. The other way is to make a “group” out of whatever it is you are making. Both methods will take a number of AutoCAD LT entities, such as lines, circles, text, etc., and tie them together, as if they were one entity. This group or block can then be dropped into a drawing any time, without having to worry about individual parts. They all stick together and can be moved, copied, and erased as a single unit.

There are differences between the two, however. First, a block cannot be edited unless you explode it into its individual components, in which case it no longer acts as a single unit. On the other hand, individual components of groups can be trimmed, stretched, extended, and offset without exploding the group.

Another difference is that groups do not show up when you use the Content Explorer or Design Center. Blocks do show up and can be inserted into your drawing by dragging and dropping from the Content Explorer or Design Center.

So which should you use to make the bypass doors? It’s up to you, but since there are two different sizes of bypass doors in this drawing, it makes sense to draw one of them, and then make it a group. Then, you have the option of being able to stretch the door panels to create the other size, as needed.

1. To create the first door panel, zoom in close to the Bedroom 1 closet. Change the current layer to **DOOR**. Next, type **Snap** and **Enter**, and type **1** for Snap Spacing and **Enter**. This sets the snap space to 1" increments.
2. Next, pick the **Rectangle** command from the Draw pull-down menu. Pick the corner points as shown in Figure 2-58 (#1 and #2). These do not have to be exact, as this is only meant to represent a door. The opening must be dimensionally correct, but the door panels themselves are only for representational purposes. The door label or tag will indicate the size on the finished plan.

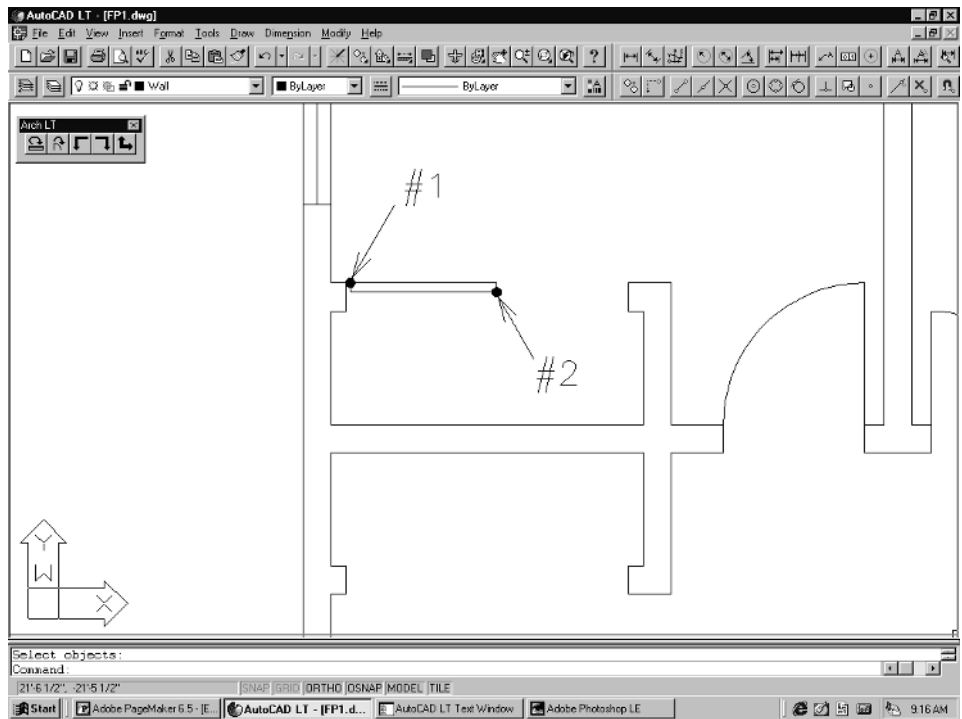


Figure 2-58

3. When the first panel is drawn, use the Copy command to create the other door panel. First, turn Ortho off (F8). Pick **Copy** from the Modify pull-down menu. At the *Select objects* prompt, pick the first panel and **Enter**. At the *Base point* prompt, pick a point near the first door panel. For the *Second point of displacement* prompt, pull the copied door panel into position as indicated in Figure 2-58 and pick with the left button. Hit the **Esc** key to exit the Copy command.

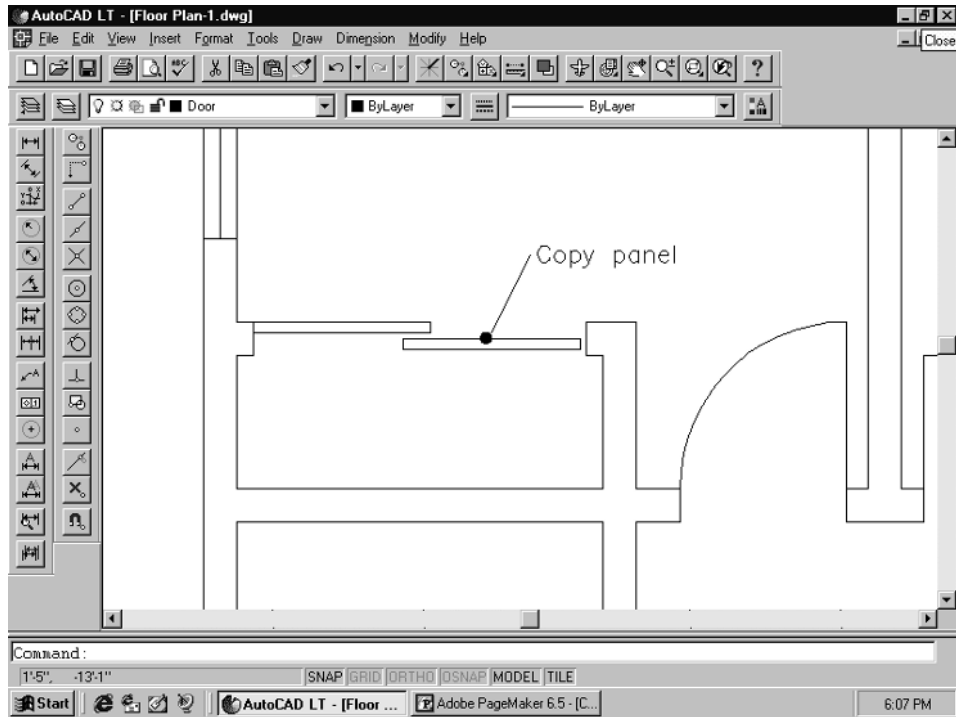


Figure 2-59

4. Next, pick the **Group** command from the Tools pull-down menu. At the *Select objects* command, pick both of the door panels and then hit **Enter**. This will create a “group” of the two panels. You can then move or copy them as a single entity.

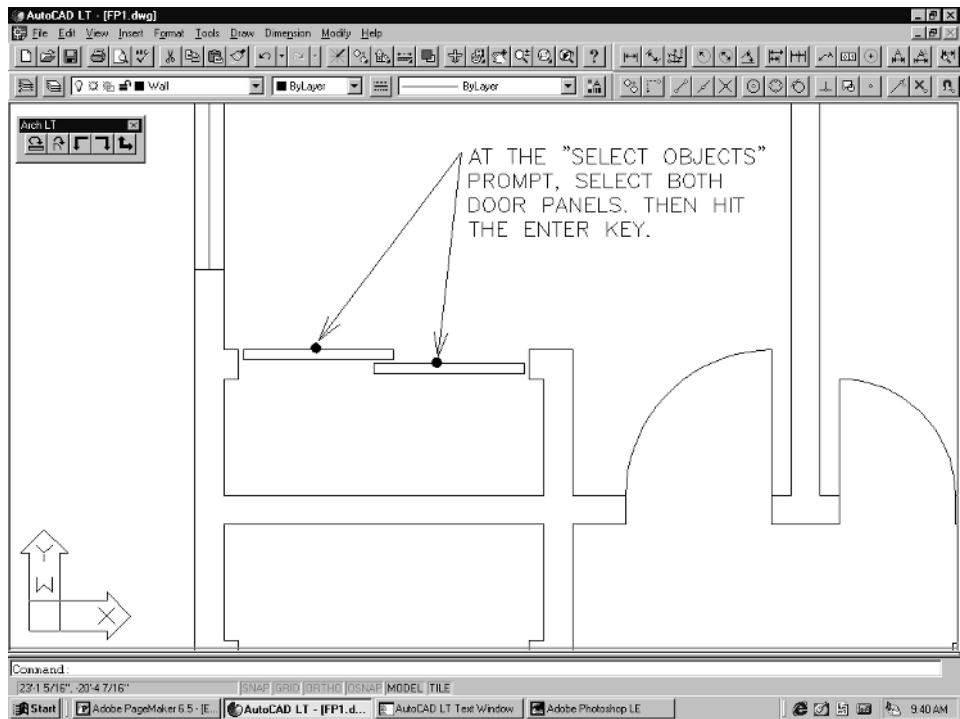


Figure 2-60

5. Copy the bypass doors from Bedroom 1 to the closet in the Living Area. They are both the same size. See Sheet #1 (Floor Plan).

First, pick the **Copy** command from the Modify pull-down menu. At the *Select objects* prompt, pick the bypass door and hit **Enter**. At the next prompt, *<Base point or displacement>/Multiple*, pick #1. Use your Endpoint Osnap to pick right on the corner, as shown in Figure 2-61. Then pick #2, again using your Endpoint Osnap, when prompted for the second point of displacement.

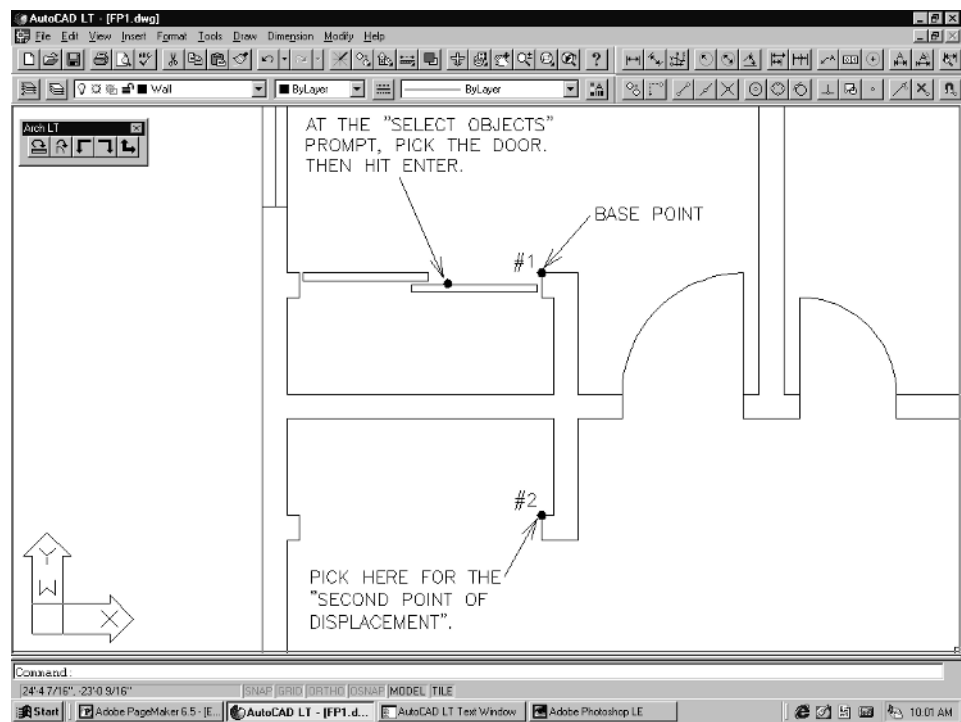


Figure 2-61

The door will be copied as soon as you have picked the second point.

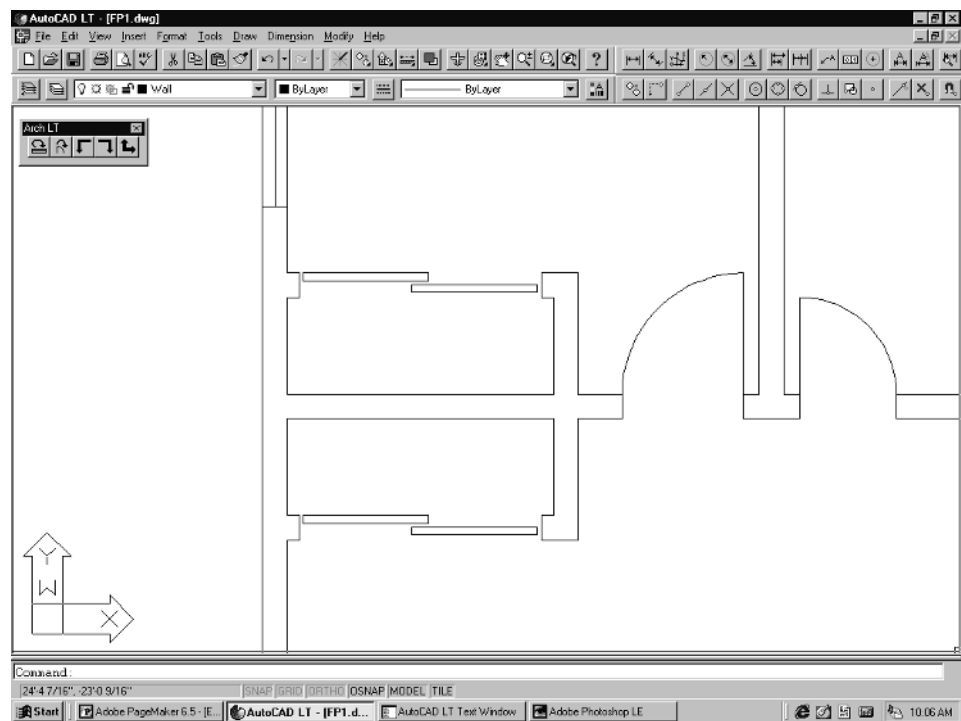


Figure 2-62

6. Next, copy the bypass doors from Bedroom 1 to the closet in the Master Bedroom. Use the Copy command to do this. You have probably learned enough by now to do this on your own. (If you run into trouble with Copy, take a look at AutoCAD LT Help. It is an excellent tool whenever you need assistance.)

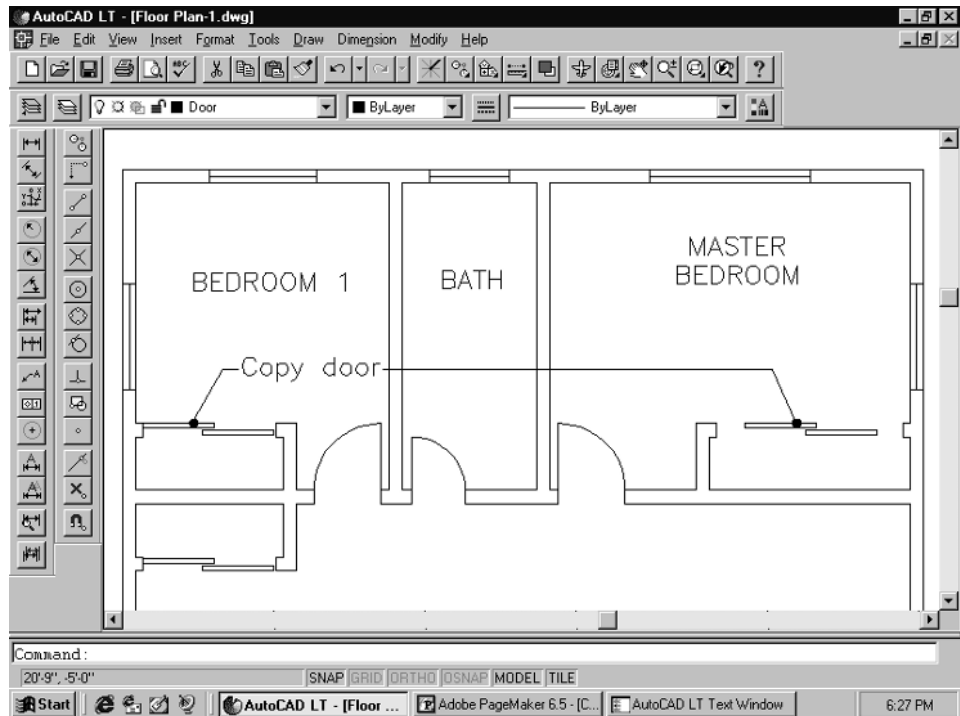


Figure 2-63

7. Because the copied door is only 5' long, the Master Bedroom door will need to be stretched 12" in each direction to create a 7'-long door. (Make sure Ortho is on for this exercise; F8.) Select **Stretch** from the Modify pull-down menu. Window the left end of the door with a "crossing window." Be sure to pick the points in the order shown in Figure 2-64, then hit **Enter**. At the *Base point* prompt, pick a point with your left button anywhere. At the *Second point* prompt, pull to the left, type **12"**, and **Enter**. This will stretch the left door panel 12" to the left.

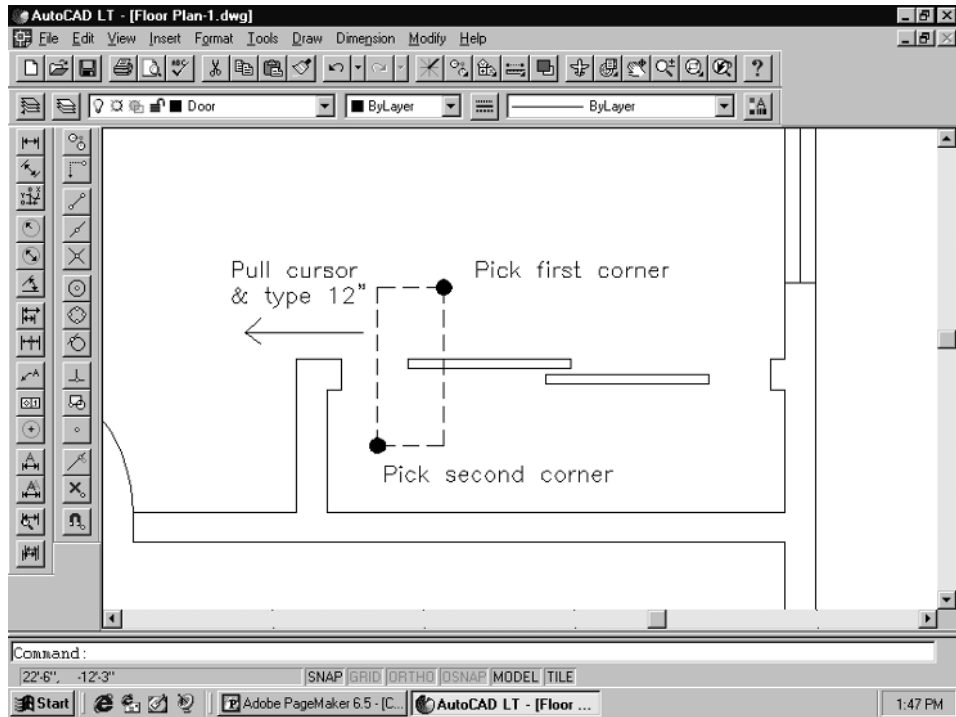


Figure 2-64

Follow the same procedure to stretch the other end of the door: Select **Stretch** from the Modify pull-down menu. Window the right end of the door with a “crossing window.” Then pull your cursor to the right, type **12**", and **Enter**. This will stretch that side of the door.

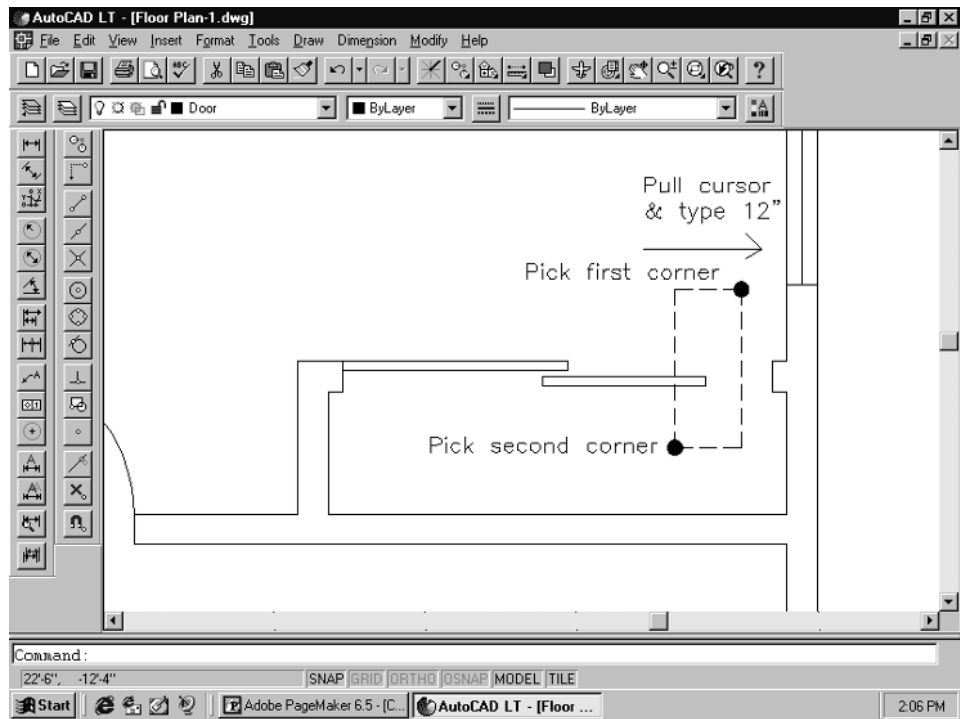
**Figure 2-65**

Figure 2-66 shows the completed 7'-long bypass door. If you try to move or copy this modified door, you will see that it still retains its grouping and acts as a single entity.

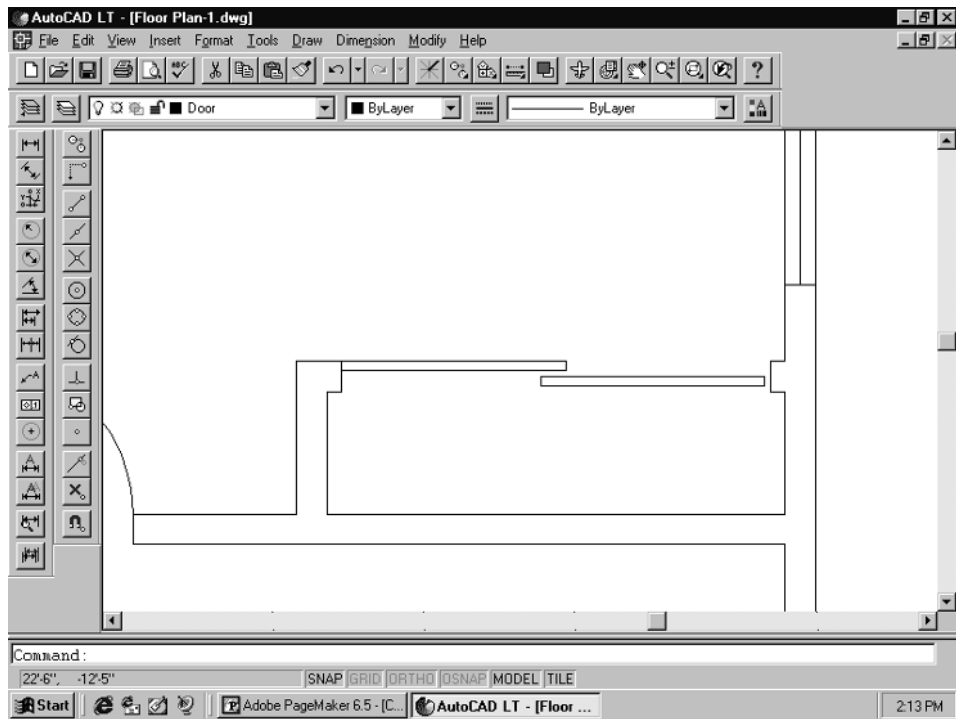


Figure 2-66

This exercise was designed to show you a little of the versatility of AutoCAD LT. You can make and manipulate just about any object you need, as long as you know the right commands to get the job done. If you are not sure of how to use a command, look it up in the manual or use the AutoCAD LT Help feature. Once you enter Help, pick the Index tab and then type the command name in the Keyword box. This will take you right where you want to go. Double-click on an item from the list that shows up below the keyword, or pick the Display button at the bottom of the help box.

AutoCAD LT is like a toolbox full of all kinds of tools. Like carpentry or mechanics, certain tools are designed to do certain jobs. You need to take the time to learn which ones are necessary for your everyday work. When you come to a situation that requires a new tool, you need to find out how the tool operates. Read up on it in the manual, or ask a friend who is familiar with it. Be willing to experiment. It is important to keep learning.

You will hear much hype about programs that do everything for you. You just press a button and whamo!, there's your completed drawing. Well, it may be a drawing, but whether it's a drawing you can use is another story. The quality can vary tremendously. I have seen some pretty good ones, and some pretty bad ones. I have never seen one that does 100% of the job automatically.

As drafting professionals know, you can't get away with working drawings that are only 90% correct. They may be okay for preliminary work, but for final plans, they just won't cut it. Any architect or engineer who stamps a drawing that isn't correct and complete is taking on a tremendous liability risk.

I use AutoCAD LT because it has all the tools I need to create a 100% complete drawing. It may take a little more time, but I know I can get my drawings 100% correct with it. I never get in situations where I can't fix or modify something. This is very important because sometimes we are talking about projects that cost millions of dollars. Being able to edit objects at any time is of the utmost importance. Automation is nice, but it has its limitations. You cannot be limited in architectural drafting. Does a pencil ever say "Sorry, I can't draw that line because the drafting board won't let me do it"?

Adding Symbols

Okay, enough preaching. Let's get back to work. Our next task will be to draw the kitchen counters and add the range, refrigerator, and sink.

1. To create the counters, we will simply offset the wall lines out 24" for the counter width.

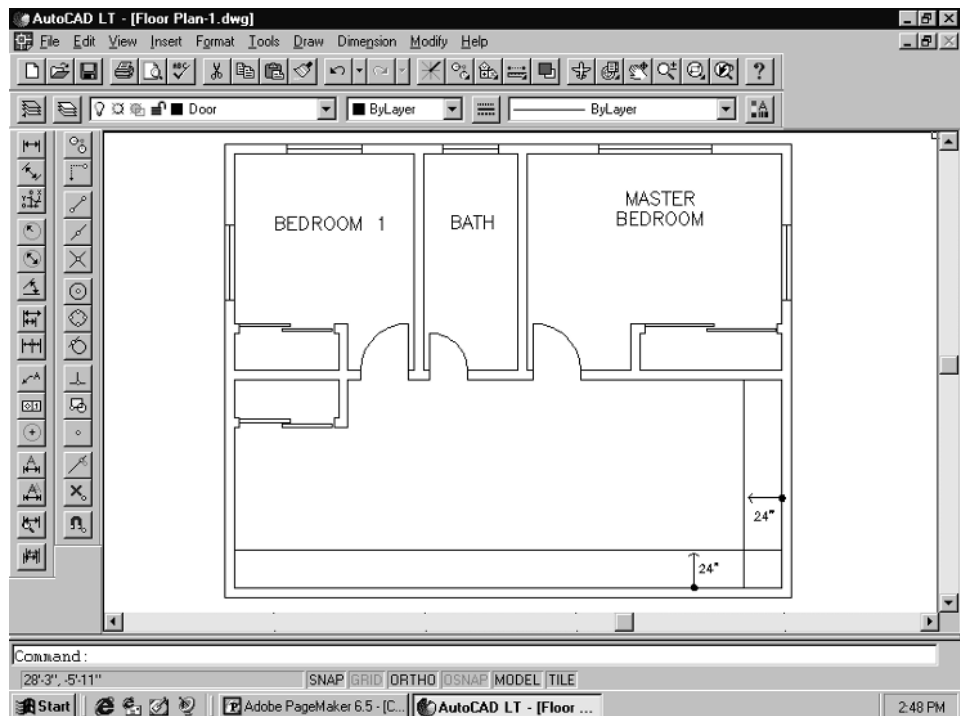


Figure 2-67

2. Next, offset the wall lines again for the counter ends, following the dimensions in Sheet #1.

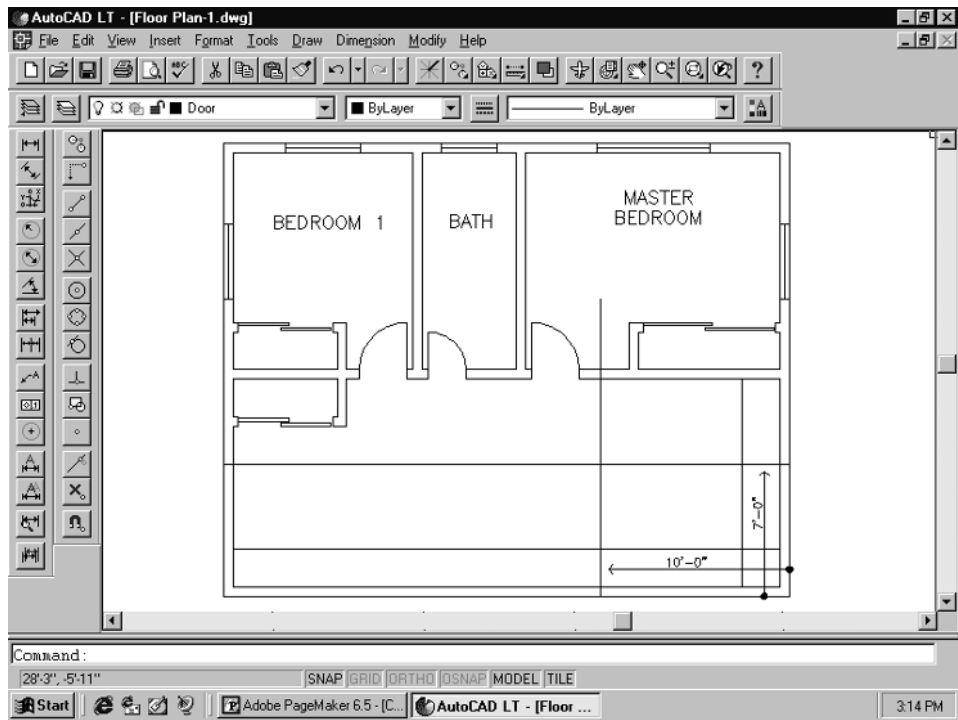


Figure 2-68

3. Now, use the Fillet command to clean up the counter top. Select **Fillet** from the Modify pull-down menu, or type **Fillet** and **Enter**. Pick the lines as shown in Figure 2-69.

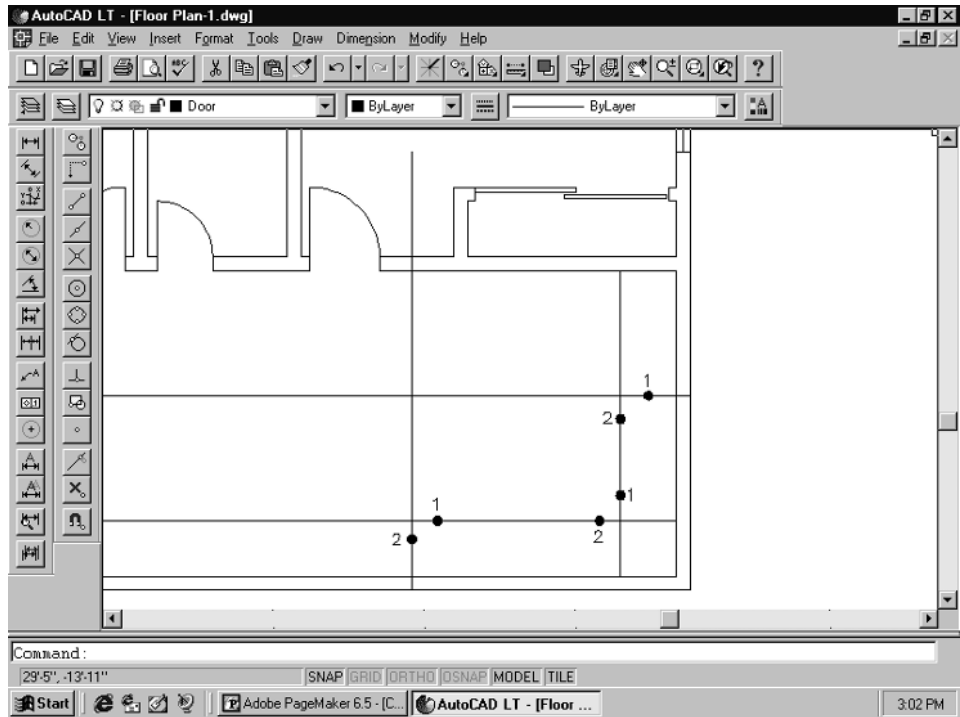


Figure 2-69

4. This will square off all of the counter corners. The last thing to do is to trim out the little counter ends that cross through the wall lines.

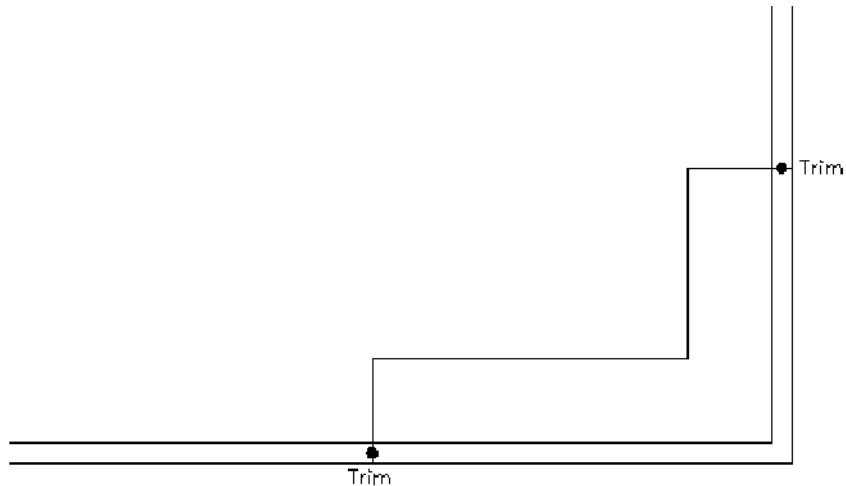


Figure 2-70



NOTE: This “trim” step could have been avoided by offsetting the counter lines, rather than the wall lines, since the counter lines do not cross the walls. These are some of the little time savers that are always good to keep in mind. Remember, you may come up with a better way to do any of the tasks demonstrated in this book. Don’t be afraid to experiment. You can always use the Undo command to back up if you make a mistake.

Before adding the appliances and bath fixtures, let’s add the remaining doors and windows in the Kitchen and Living Area. Refer to Sheet #1 for the sizes. The 4'x4' window on the left-hand wall of the Living Area is centered in the wall that runs from the closet to the front wall. The 8'x4' window is centered between the wall corner and the front door opening. The front door opening begins 6" from the end of the refrigerator. The kitchen door is 6" off of the Master Bedroom wall.

1. First, offset the left-hand side of the kitchen counter **36"**. This will be the space for the refrigerator. Next, offset that line **6"** to the left to represent the first jamb for the front door. Then offset it **36"**. This will represent the other door jamb. See Figure 2-71.

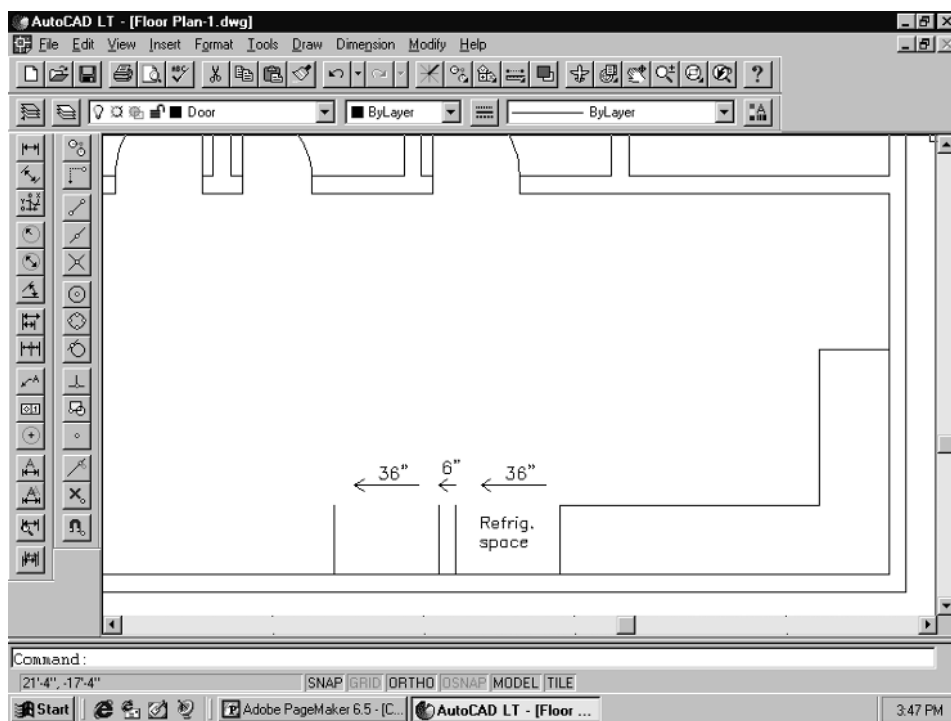


Figure 2-71

Now, extend the door jamb lines out to the outer wall line.

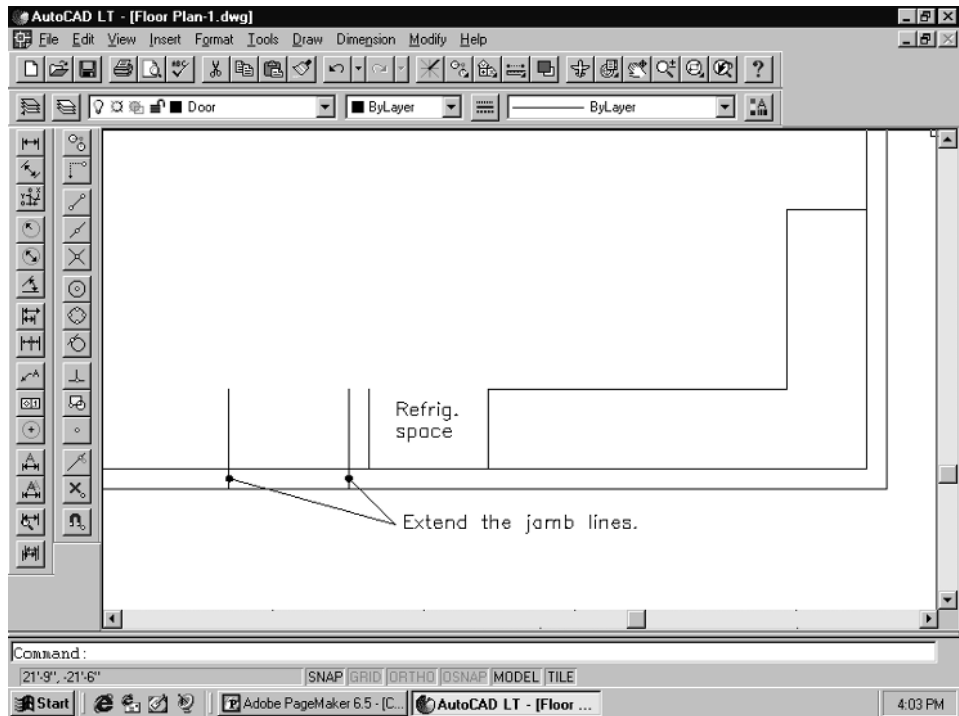


Figure 2-72

Then use the Trim command to trim out the front door opening. Remember, pick the **Trim** command and then **Enter** twice to make everything a cutting edge. Then pick all the lines you want trimmed. Your drawing should resemble Figure 2-73.

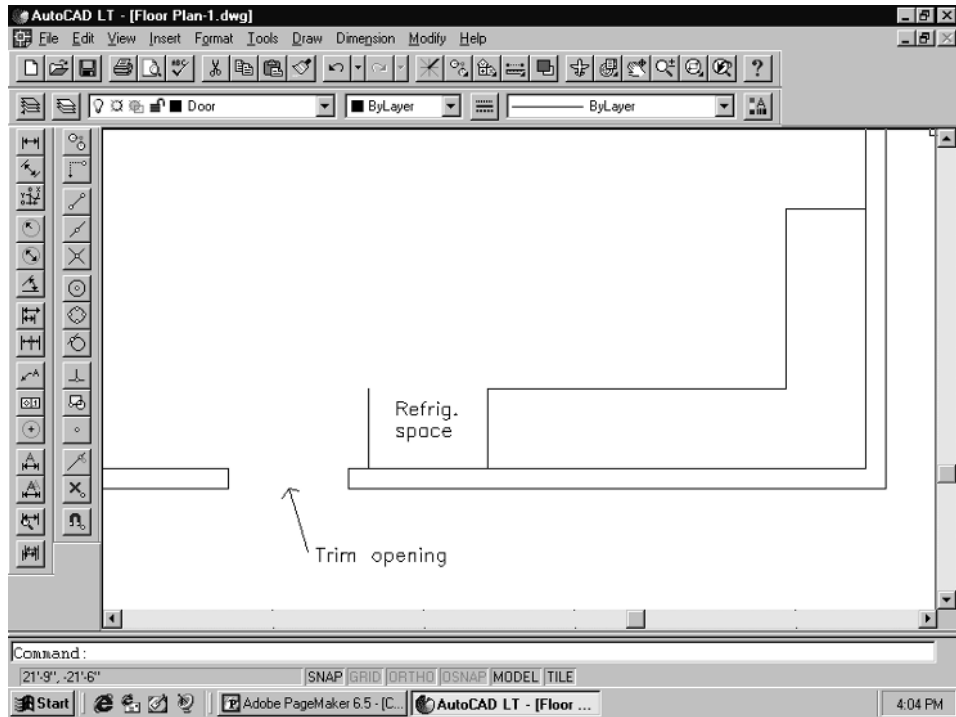
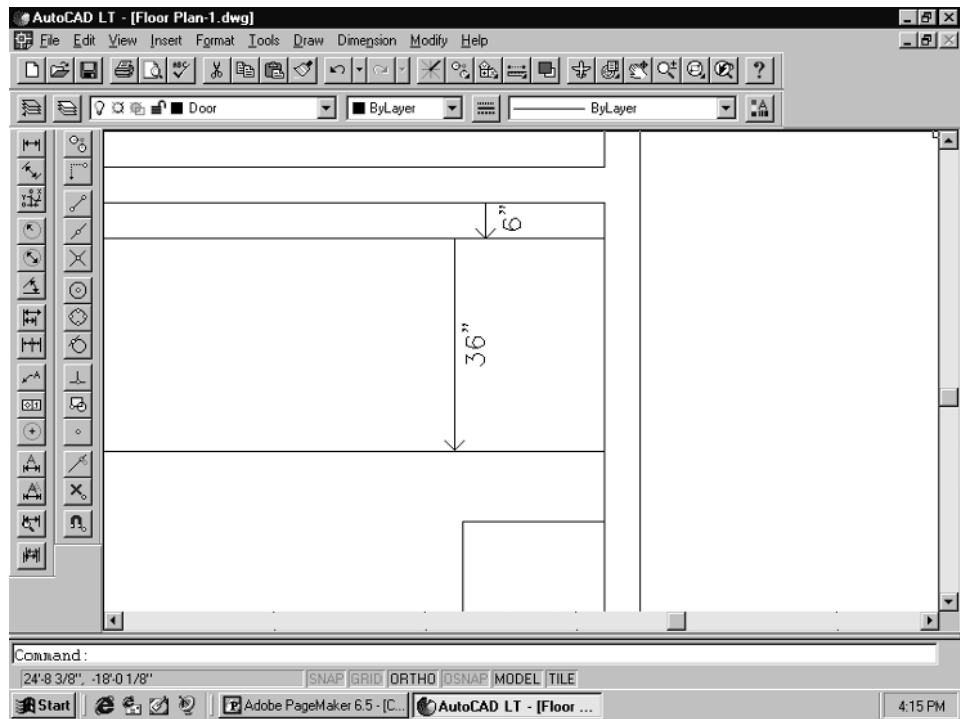


Figure 2-73

2. Next, cut the door opening in the right-hand wall of the kitchen. This is also a 36" door. First offset the Master Bedroom wall line 6" to create the first jamb, then offset again 36" to create the other jamb.

**Figure 2-74**

Extend the two door jamb lines to the outer wall line, and then trim out the door opening as you did with the front door. Your drawing should be similar to Figure 2-75.

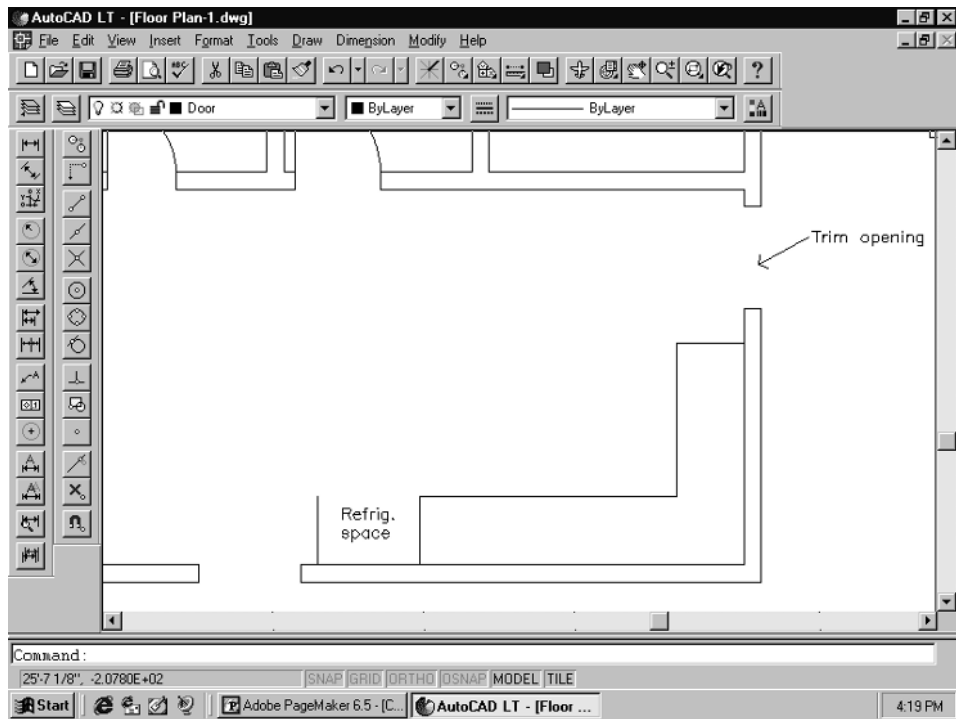


Figure 2-75

3. To cut the window openings in the Kitchen and Living Area, you need to draw a center line for each opening first. Draw the lines as shown in the following figure, then offset them half the width of the window, on either side, to create the jambs. Notice that we used the midpoint of the counter rather than the wall midpoint as the center line for the window over the sink. This way the sink and counter can be placed right on center.

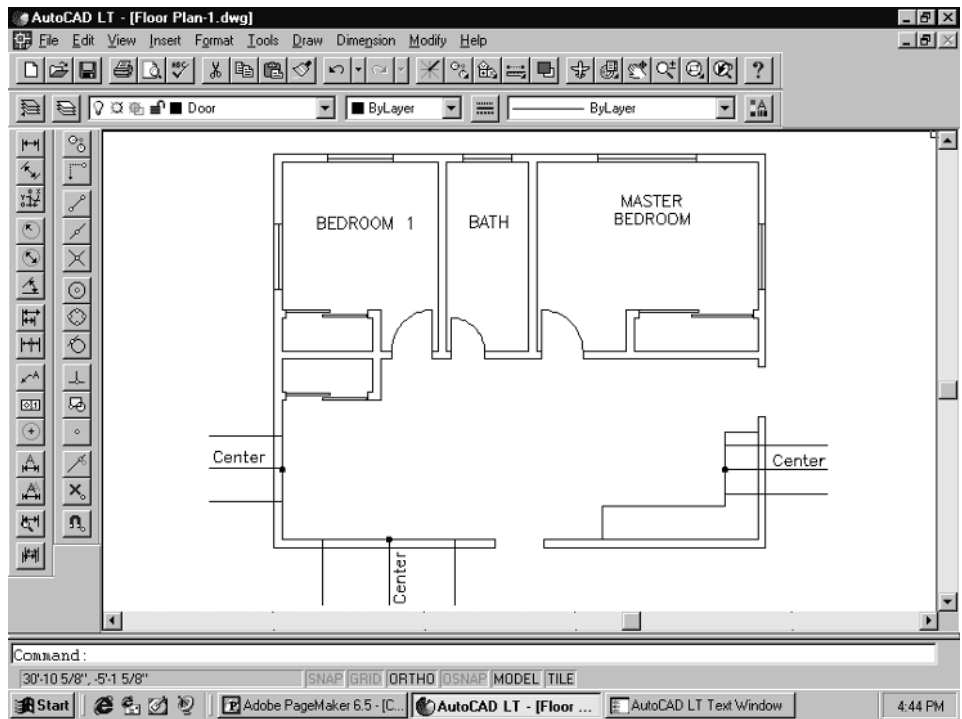


Figure 2-76

To finish the window openings, first erase the center lines, then trim out the wall lines and jamb tails. Use the Trim command and remember to immediately hit **Enter** twice to make all lines cutting edges. Then, pick each of the lines you want trimmed out.

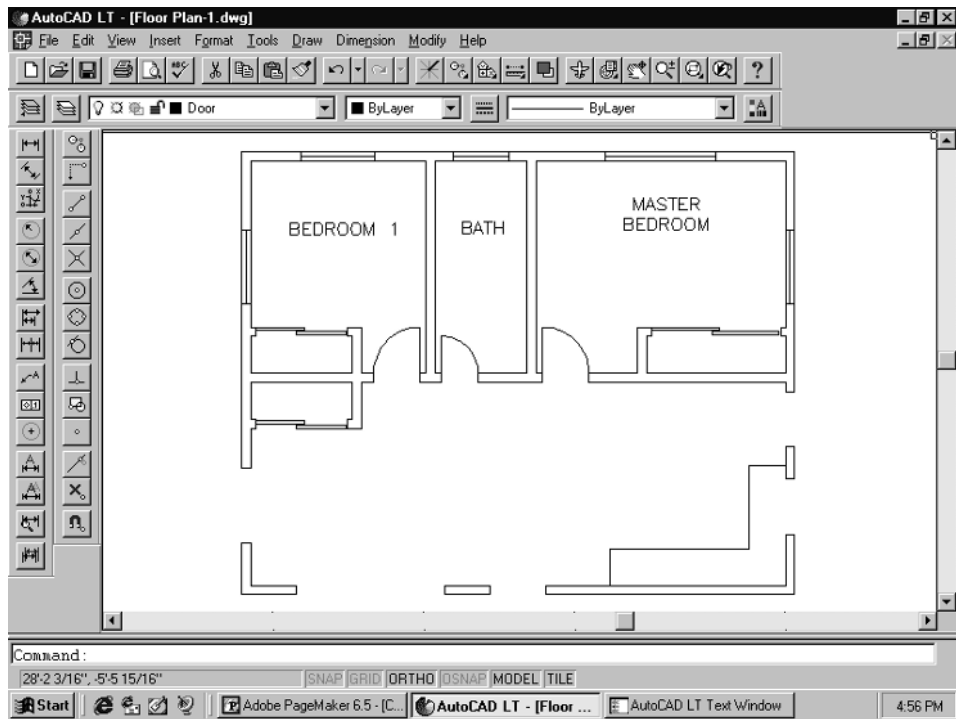


Figure 2-77

Next, place the windows in the openings as we did before.

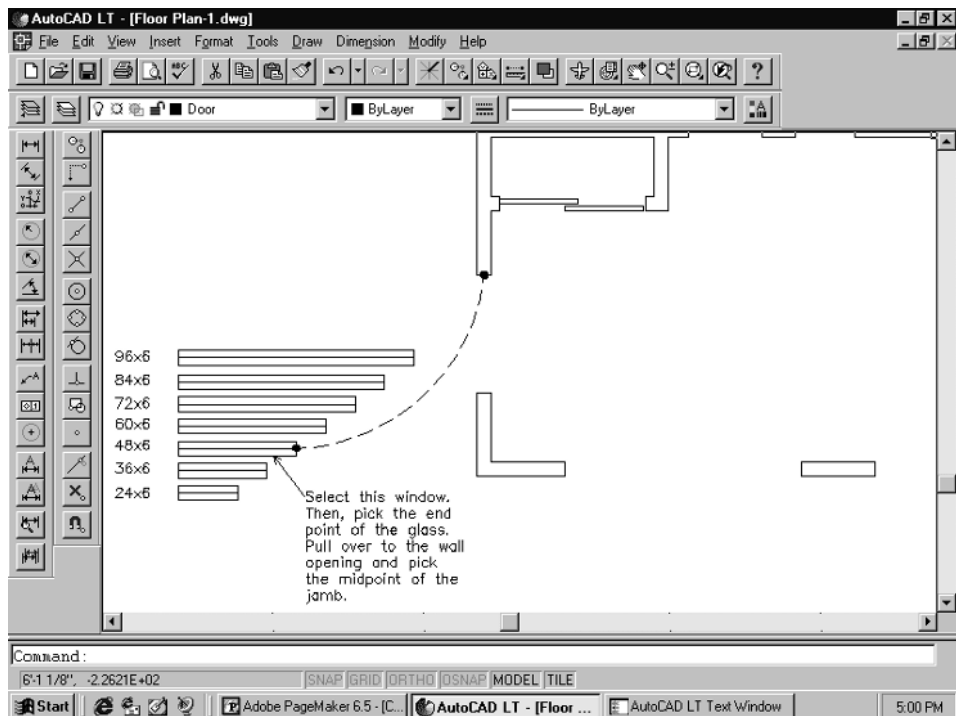


Figure 2-78

Do the same for the 8' window in the front wall and the 3' Kitchen window. Remember to use the Copy Rotate Window command from the Arch LT toolbar when placing these windows.

4. Next, place the doors in the Living Area and the Kitchen. You will need to zoom out so that you can see all of the blocks that were provided with the drawing. Type **Zoom** and **Enter**. Then, type **E** and **Enter**. This will take you out to the farthest extents of the drawing. You should now be able to see your floor plan and all of the blocks together.

Zoom in to the area of the plan doors. What you want to do is get the 36" doors closer to the floor plan so that you can easily insert them. So zoom in as in Figure 2-79 and pick **Copy** from the Modify pull-down menu. At the *Select objects* prompt, window around the 36" doors, then hit **Enter**. At the *<Base point or displacement>/Multiple* prompt, pick a point in the center of the doors. When the *Second point of displacement* prompt appears, hit the **Zoom Previous** button and then place the doors in the center of the Living Area.

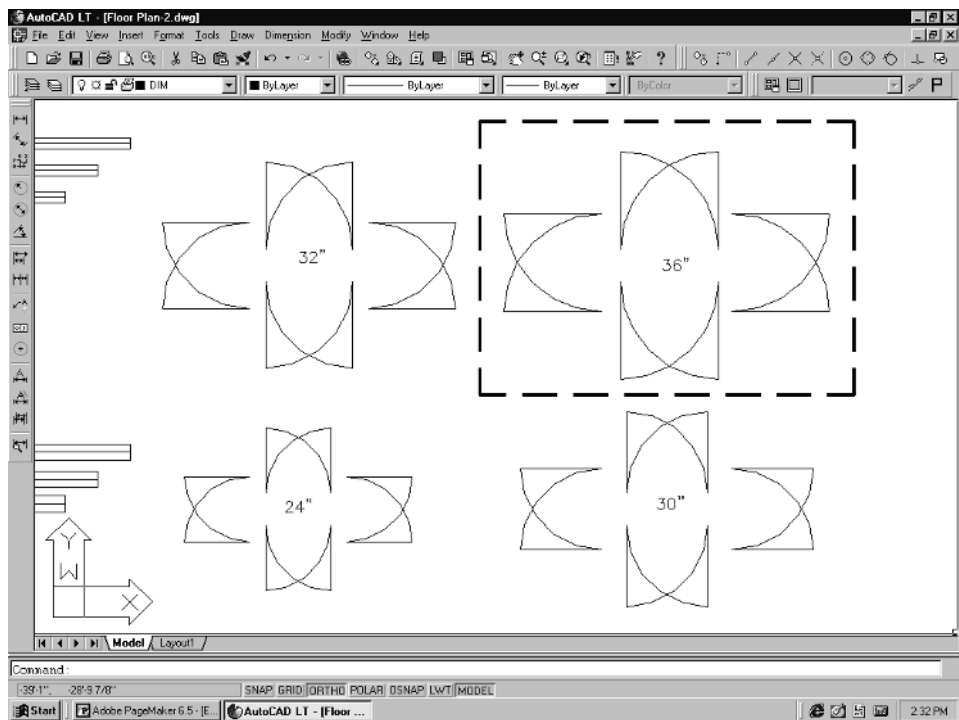


Figure 2-79

To insert the doors, follow the same steps as you did when you placed the Bedroom and Bath doors. Use the Copy Rotate Door command from the Arch LT toolbar. See Figure 2-80.

NOTE: You can also use the standard Copy command when placing doors.

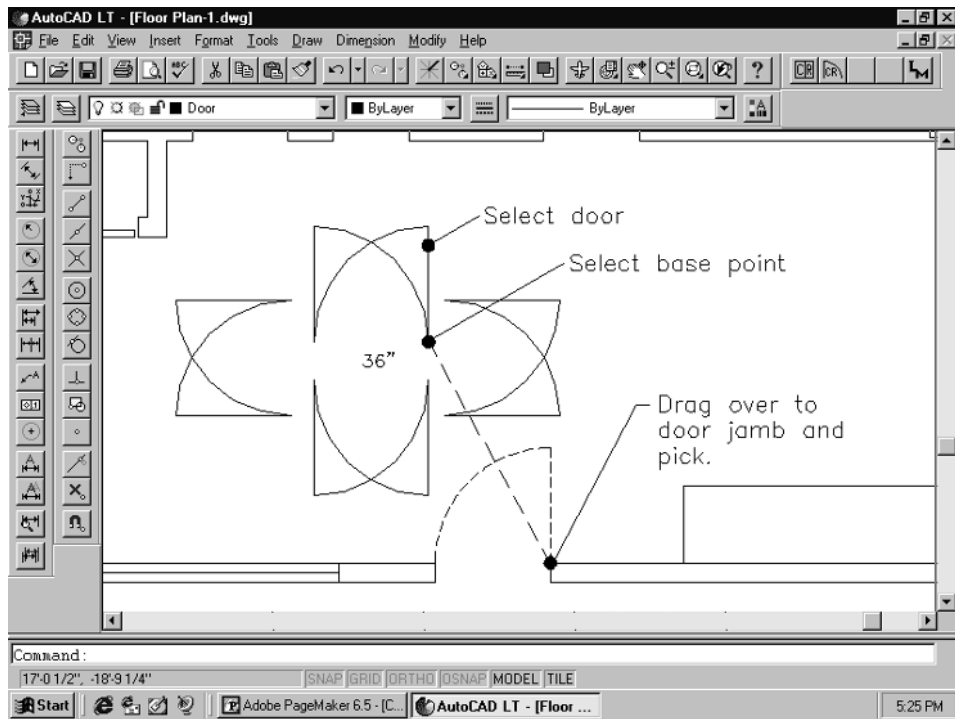


Figure 2-80

5. Erase the extra doors that are sitting in the Living Area, and any other stray blocks you may have laying about. Pick **Zoom** from the View pull-down, and pick **Extents** from the list that pops up. The drawing will zoom out so that you can see the floor plan and all the symbols.
6. Hit the **Enter** key to recall the Zoom command. Check your command line. It should say *All/Center/Extents/Previous/Scale(X/XP)/Window/<Realtime>*. Type **W** (for Window) and **Enter**. Now draw a window around the floor plan. Pick point #1 at the *First corner* prompt, and pick point #2 for the *Other corner* prompt.

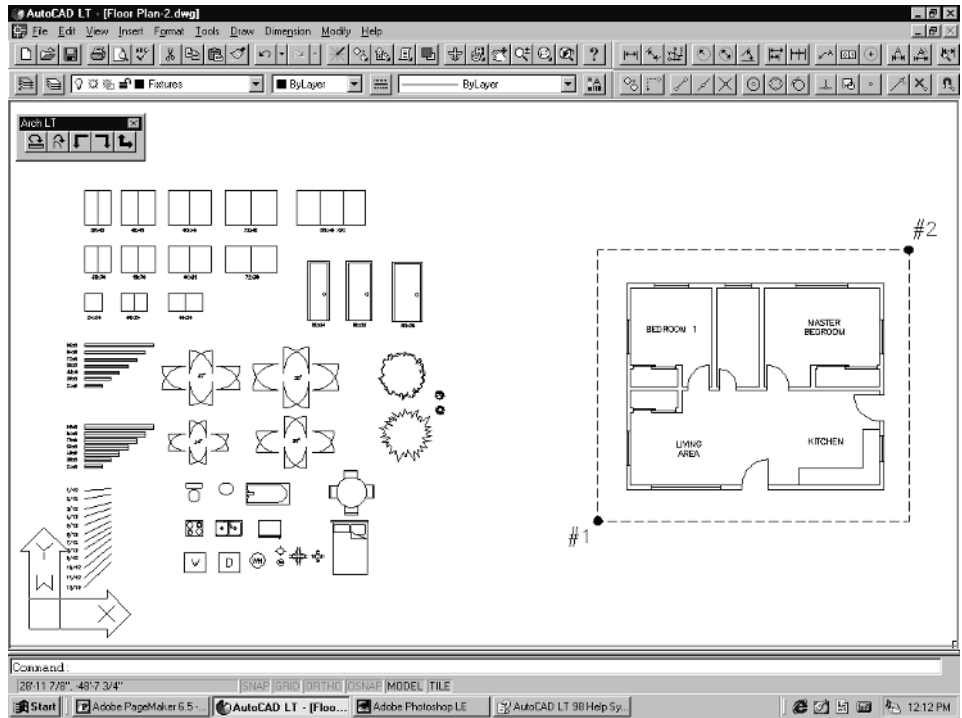


Figure 2-81

This should zoom you back in to the floor plan, as shown below.

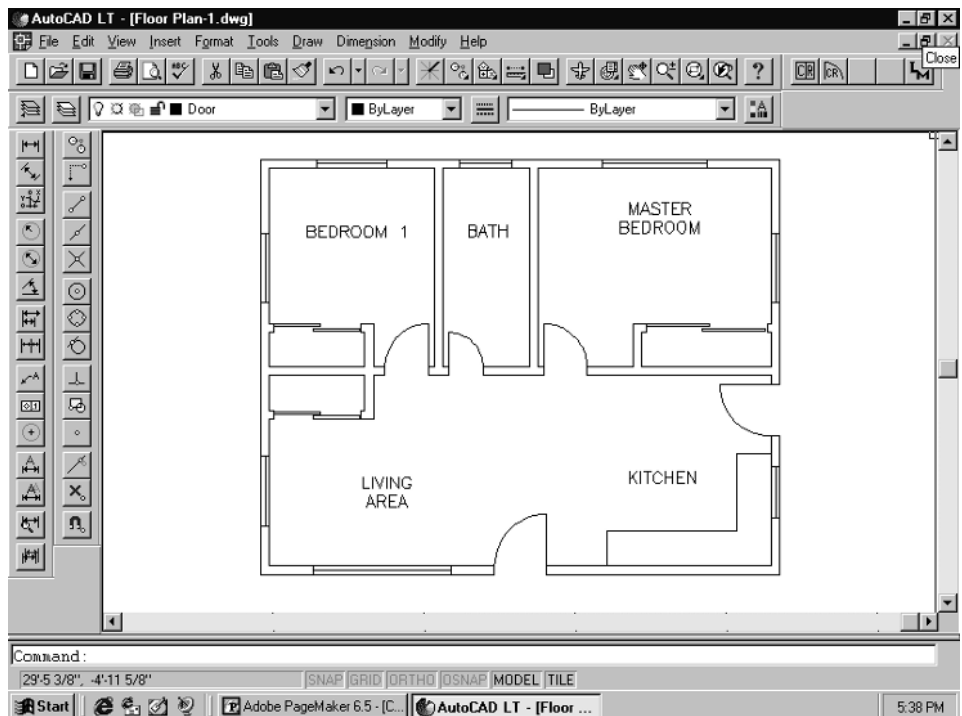


Figure 2-82

Now you can begin to add some of the details, fixtures, and notations to the floor plan. There are a number of different fixture and appliance symbols supplied with each of the template files included with this book. These symbols can simply be copied to the floor plan and then dropped in wherever you need them. It's a pretty efficient way to go, especially when you have a set of symbols that you use on a regular basis.

This is why it is a good idea to set up your own template files that contain a collection of your own blocks and symbols. You can then simply copy them over to your drawing whenever needed. Then you can erase them all when you no longer need them.

You can also save symbols, details, or even entire sections out to individual drawing files. These can then be “inserted” into any drawing, as if it were a block. This is also a good way to go because you can save these as they are drawn. The downside is the tendency to save it someplace, and then forget where it was or what you named it. You then waste all kinds of time searching around your hard drives looking for them.

AutoCAD LT includes the Content Explorer or AutoCAD Design Center, depending on your version. A brief overview of what these two utilities do follows.

For LT 98, go to the Insert pull-down menu, and select Content Explorer. (It may take a moment or two to compile itself, so be patient.) The Content Explorer will be displayed as in Figure 2-83.

For LT 2000, go to the Tools pull-down menu and select AutoCAD Design Center. The Design Center will be displayed as in Figure 2-84.

Figure 2-83
The Content
Explorer in
LT 98

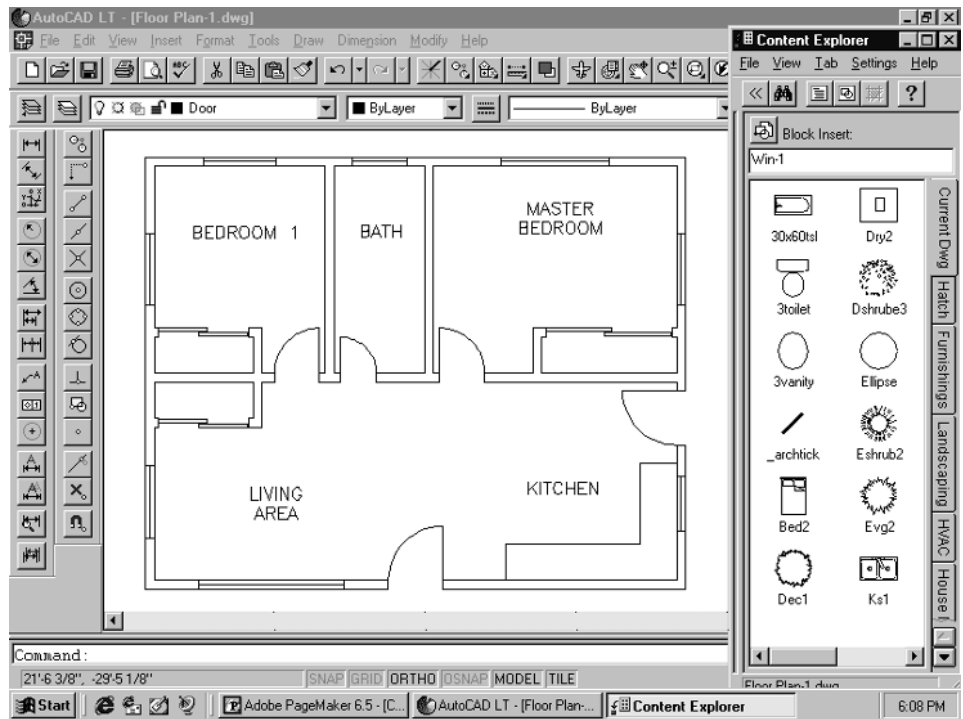
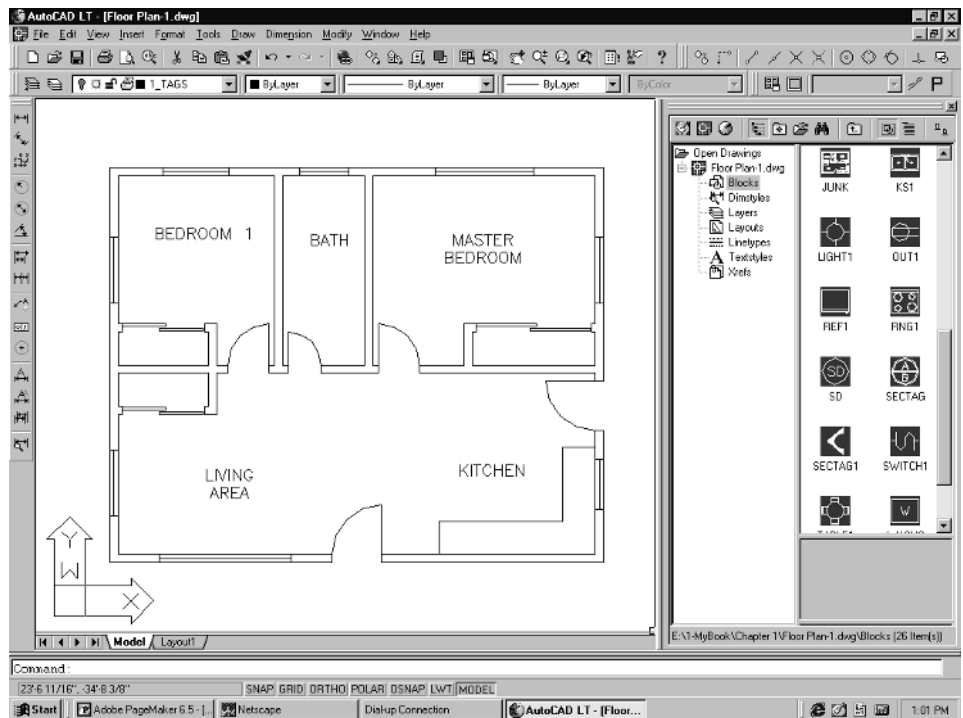


Figure 2-84
The Design
Center in LT
2000



Once you have called up either one of these, you can pan your drawing over if it is hidden behind the Content Explorer or Design Center window. A simplified explanation of what these utilities do is that they create pictures, or “slides,” of every block that is in the current drawing. You can then simply drag and drop these blocks back into your active drawing by selecting the insertion point. Or you can drag them into the drawing in the same manner and then specify the insertion point, X and Y scale, and rotation angle.

The first method works great and is easy to use. It works the same with both Content Explorer and Design Center. You simply pick the block you want to insert with your left mouse button, drag it to where you want to place it, then drop it on the insertion point by letting go of the mouse button. The only drawback is that it does not give you an option to rotate the block as you are placing it. With some blocks this is fine. For example, a round object’s orientation is not relevant, so not being able to rotate it as you place it doesn’t matter.

On the other hand, if you are inserting an object like a kitchen sink, the orientation definitely does matter. So the second method is a better way to go in this situation. Instead of dragging and dropping, you double-pick on the block in the case of Content Explorer (LT 98). You will then be prompted for the insertion point, X and Y scale, and rotation angle.

If you are using Design Center (LT 2000), you pick on the block with your right mouse button and drag it over to the active drawing. A little menu will pop up, as in Figure 2-85. Pick Insert Block. The Insert dialog box, shown in Figure 2-86, will pop up.

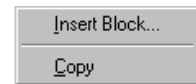


Figure 2-85

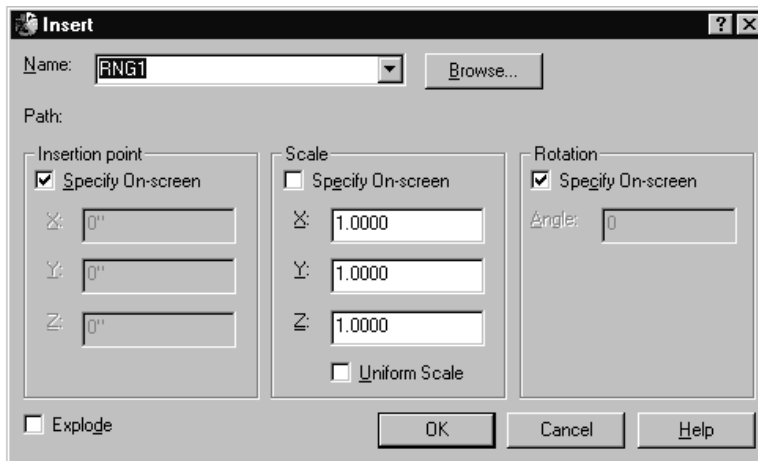


Figure 2-86

If both the Insertion Point and Rotation boxes are checked, as in Figure 2-86, you will only be prompted for the insertion point and the rotation angle when you insert the block. This is a good way to set up the Insert dialog box. That way you won’t be prompted for the X and Y scale every time you place a block.



NOTE: Normally Design Center does not minimize itself when you select a block. This means that it is always visible on your screen until you close it. You can undock it and resize it, but it basically either stays up on your screen, or you close it and open again as needed. Speaking from personal preference only, I prefer the old Content Explorer because it sort of took care of itself. You weren't made to go through the extra step of closing it down every time you wanted to get back your full screen space.

For this exercise, we will be using LT 98 to place the kitchen symbols in the following example.

1. If the Content Explorer has disappeared, look down on the status bar at the bottom of your screen. You will see an item named Content Explorer. Select it and the Explorer will pop back up.

Double-pick on the kitchen sink image. The Content Explorer will disappear again. You will be prompted for the insertion point. Zoom in to the area in the kitchen where the sink is supposed to be inserted. Pick the point as shown below.

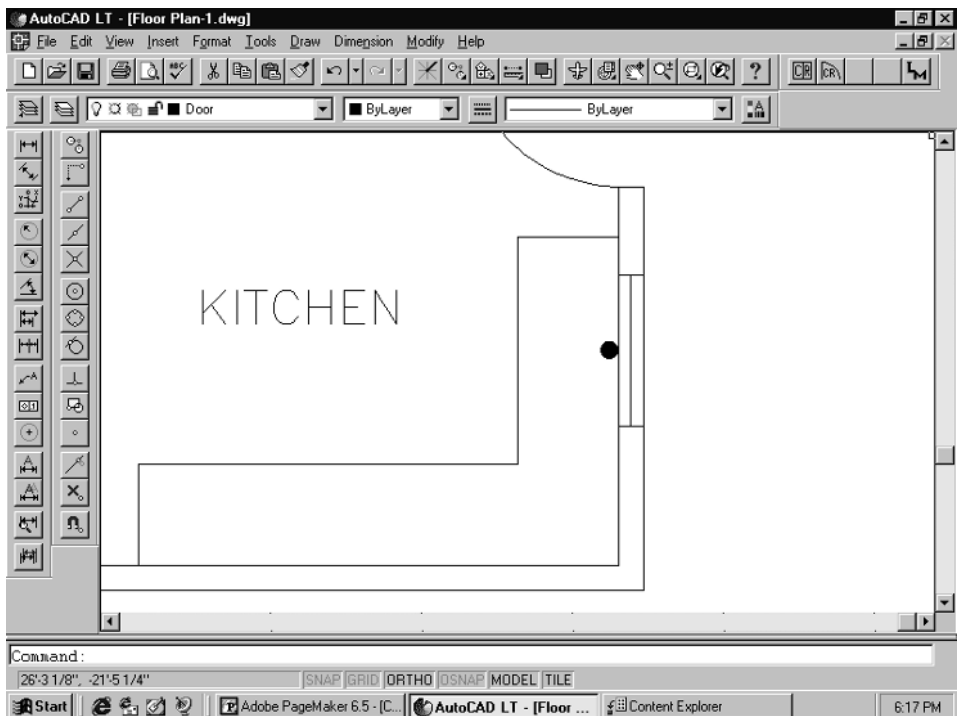


Figure 2-87

You will then be prompted for the X scale. Hit **Enter**. Do the same for the Y scale prompt. The last prompt is for the rotation angle. Make sure Ortho is on (F8), then pull your cursor until you see the sink line up correctly; pick

the left mouse button. If the sink is not quite lined up correctly, as shown below, just use the standard AutoCAD LT Move command to adjust it.

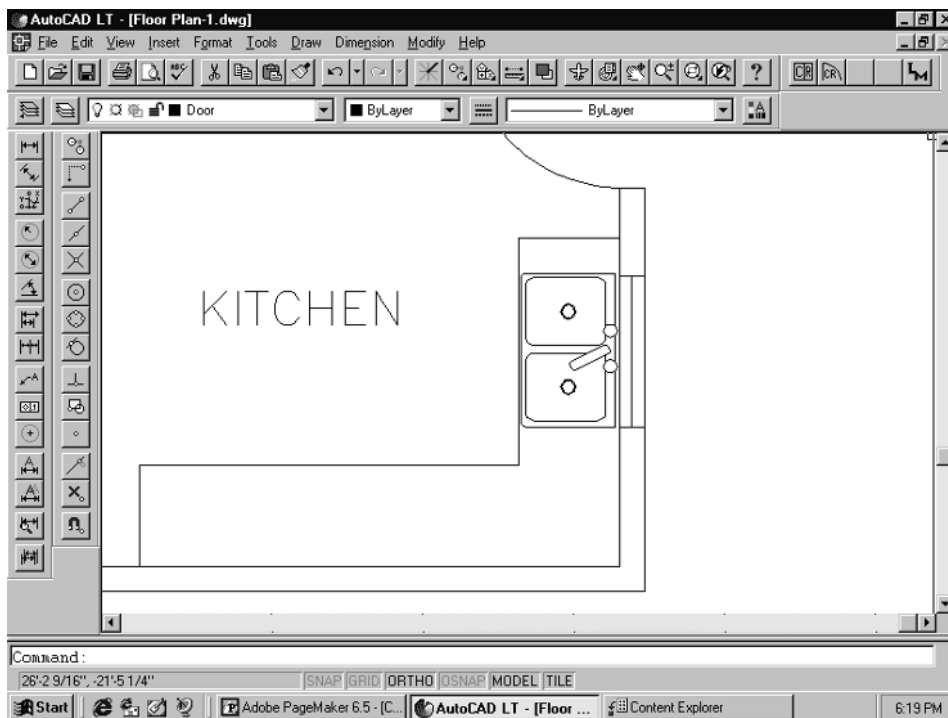


Figure 2-88

2. Next, place the range and refrigerator. Again, pick the Content Explorer button from the status bar. When it pops back up, look for the range symbol. If it is not visible, use the scroll bar at the bottom of the Content Explorer window to see more blocks. Double-pick on the range symbol. You will be prompted for the insertion point. Zoom in to the kitchen area, and pick a point as shown in Figure 2-89.

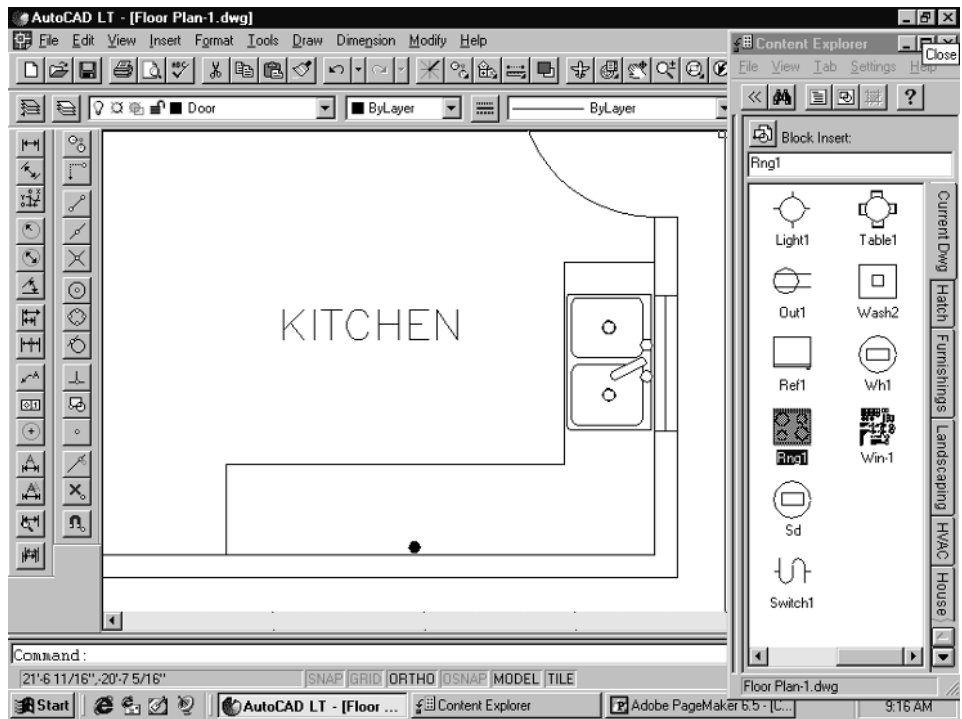


Figure 2-89

You will then be prompted for the X scale. Hit **Enter**. Do the same for the Y scale prompt. The last prompt is for rotation angle. Make sure Ortho is on, pull your cursor until you see the range line up correctly with the counter, then pick the left mouse button. Use the regular Move command to adjust the range if necessary.

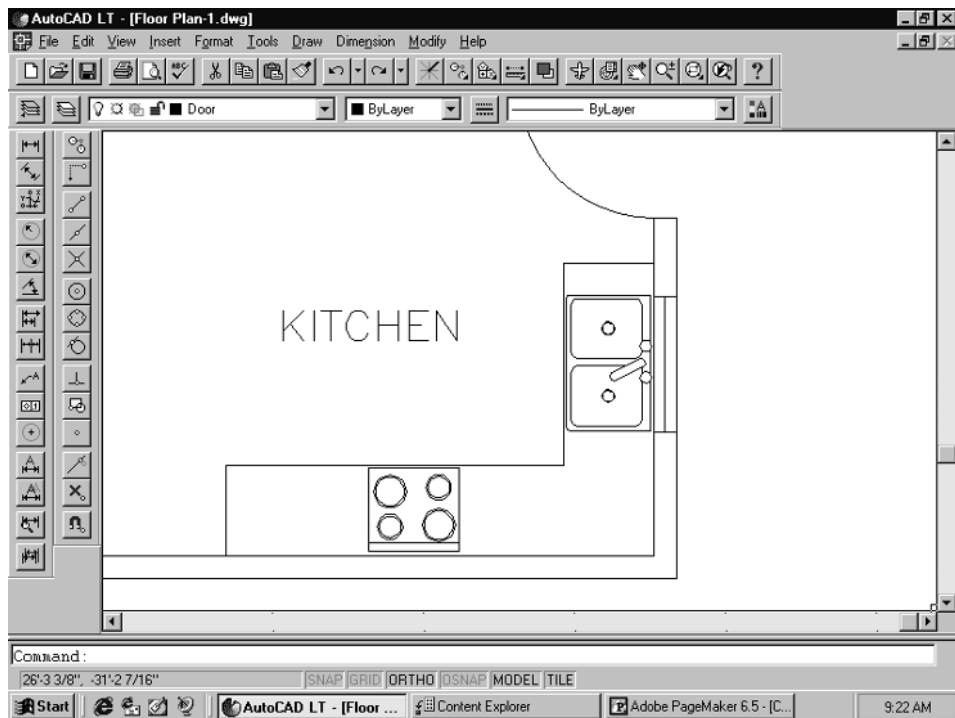


Figure 2-90

3. Call up the Content Explorer again and double-pick on the refrigerator symbol. At the insertion point prompt, pick a point as shown below.

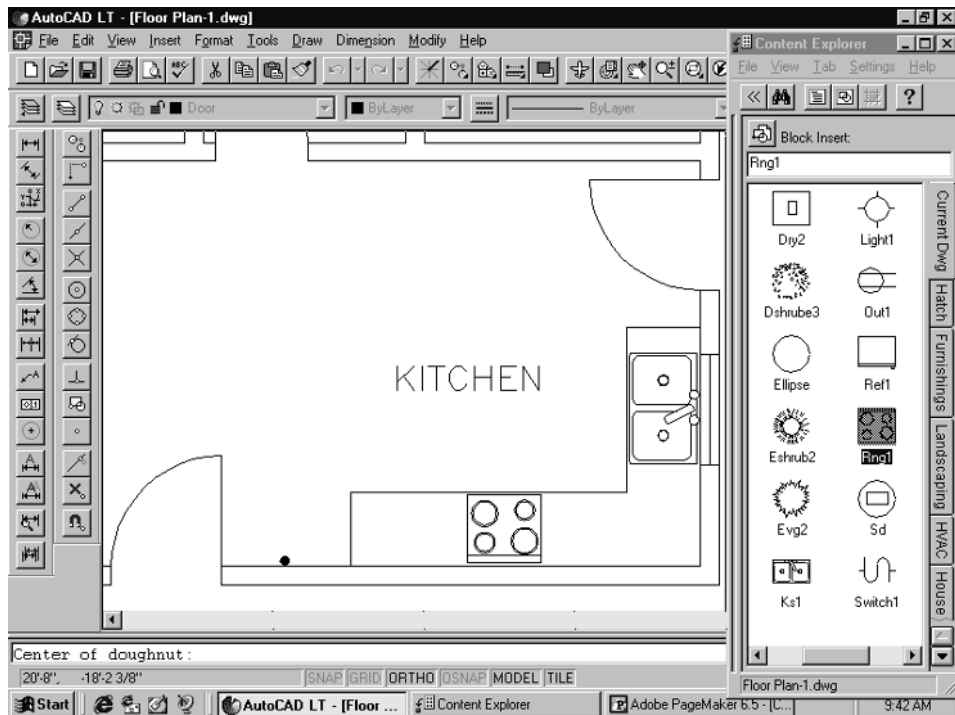


Figure 2-91

You will then be prompted for the X scale and Y scale. Hit **Enter** at each of these prompts. The last prompt is for the rotation angle. Make sure Ortho is on, pull your cursor until you see that the refrigerator lines up correctly, and pick the left mouse button. Your drawing should resemble Figure 2-92. Use the Move command to adjust the refrigerator if necessary.

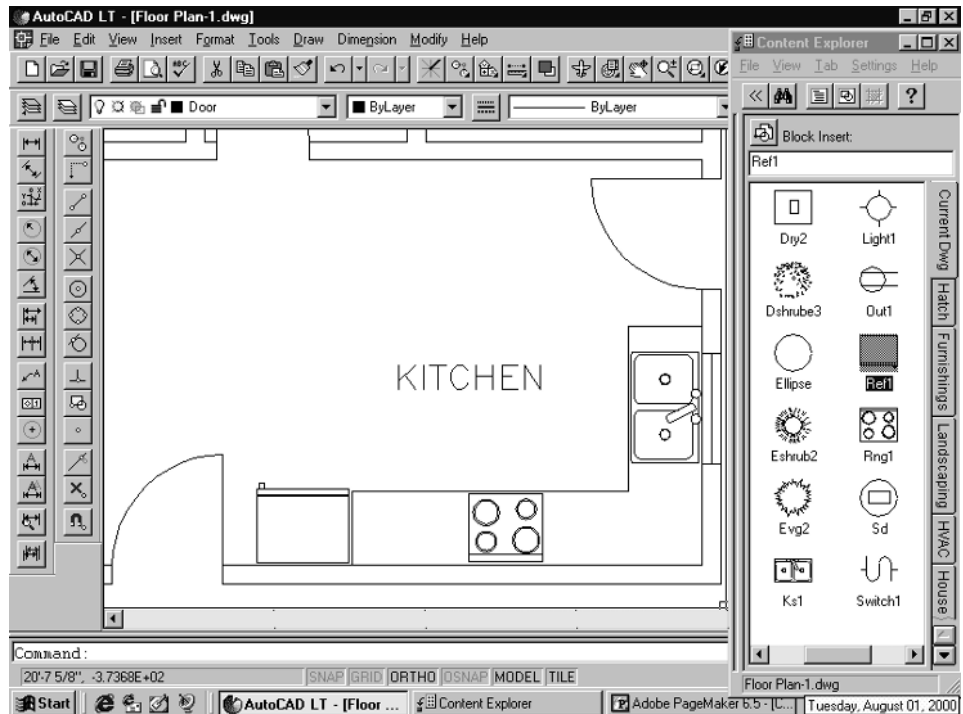


Figure 2-92



NOTE: If you prefer, you can have the Content Explorer always visible on the screen. There is a setting on the View pull-down menu of the Explorer called Always on Top. Pick this, and the Explorer will remain in position, rather than disappearing when you are working on the drawing.

There is one more thing I would like to mention about blocks. You can change the size of blocks once they are inserted by scaling them, using the standard Scale command. Here is a quick run-through.

1. Pick **Scale** from the Modify pull-down menu. The *Select objects* prompt will appear. Select the refrigerator, then **Enter**. At the *Base point* prompt, pick the midpoint of the back line of the refrigerator, then **Enter**. See Figure 2-93.

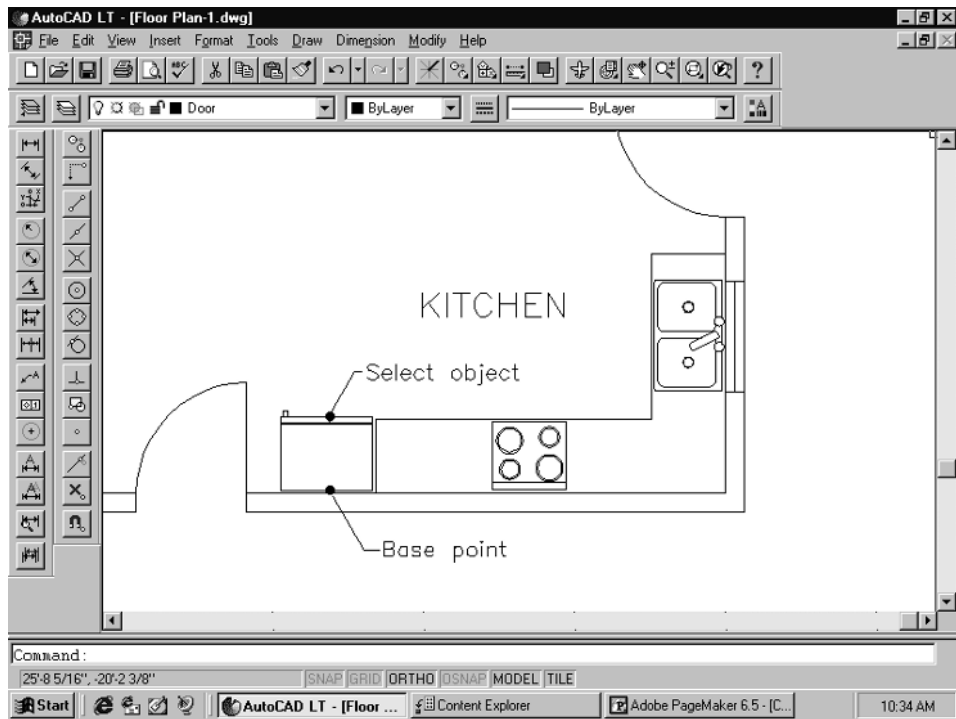


Figure 2-93

2. At the *<Scale factor>/Reference* prompt, type **R**, then **Enter**. Then, at the *Reference length <1>* prompt, pick one end of the back line of the refrigerator, then pick the other end of the back line, as shown in Figure 2-94.

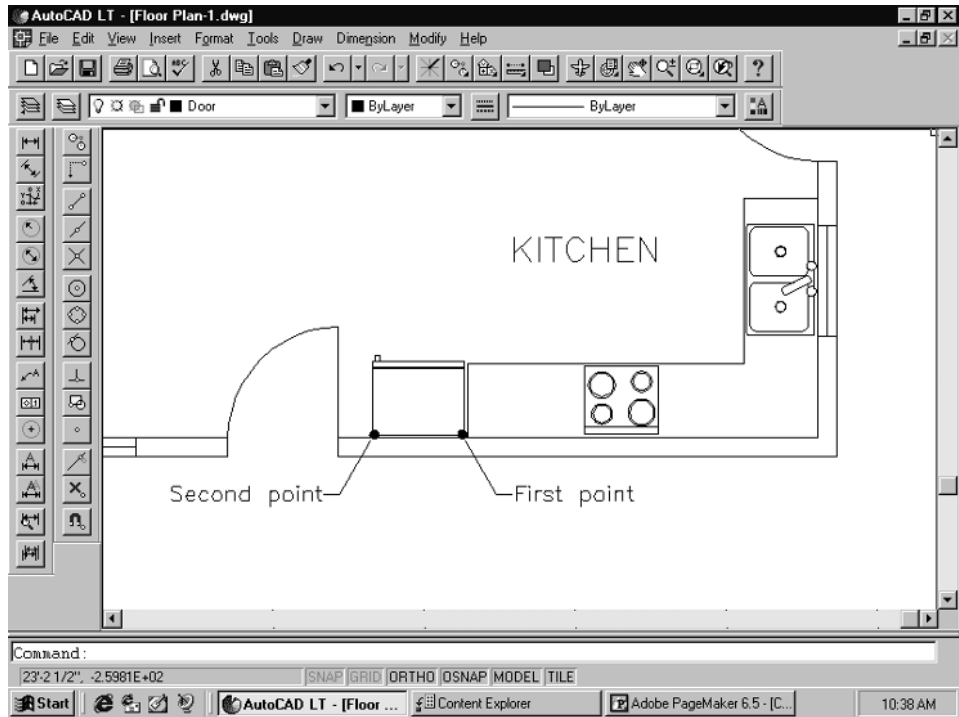


Figure 2-94

3. Type **36**, then **Enter** at the *New length* prompt.

The refrigerator will scale up so that the width is now exactly 36". This method of scaling is known as "reference scaling."

Figure 2-95 shows the refrigerator scaled up to be 36" wide.

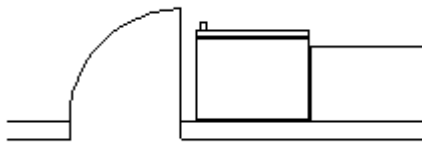


Figure 2-95

You can also scale the range in the same manner.

1. At the *Select objects* prompt, select the range, then **Enter**. At the *Base point* prompt, pick the midpoint of the back line of the range, then **Enter**.
2. Type **R** and **Enter** at the *<Scale factor>/Reference* prompt. At the *Reference length <1>* prompt, pick one end of the back line of the range, then pick the other end of the back line.
3. Type **30**, then **Enter** at the *New length* prompt. The range will scale up so that the width is now exactly 30".

4. You can trim out the counter line by drawing two lines from the rear of the range across the counter line.

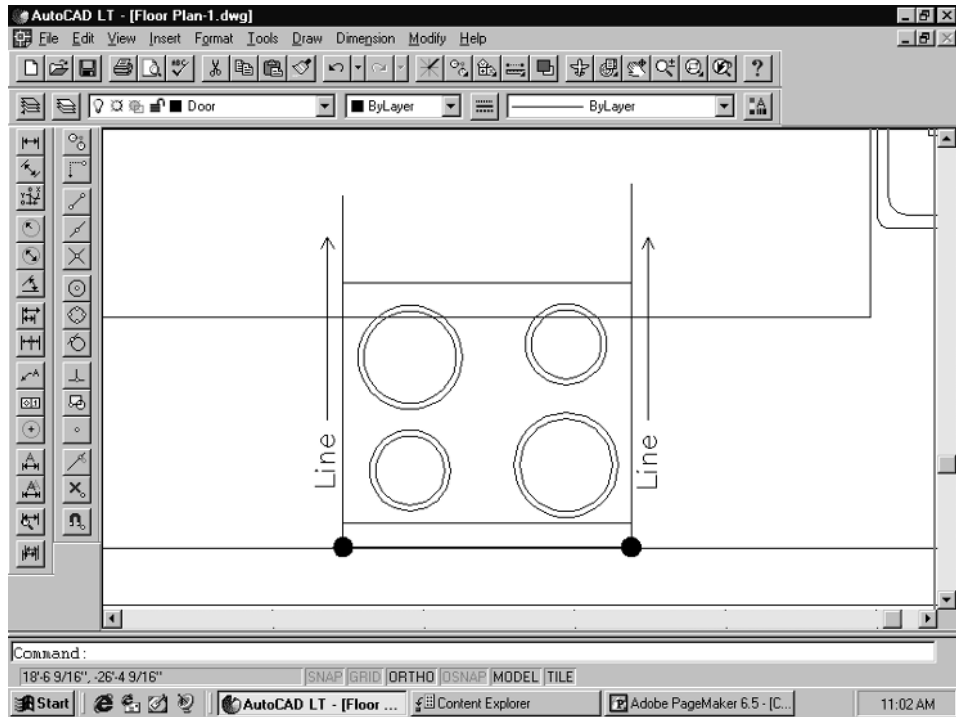


Figure 2-96

Then pick **Trim** and **Enter** twice. Select the ends of the lines you just created and the counter line that runs across the range.

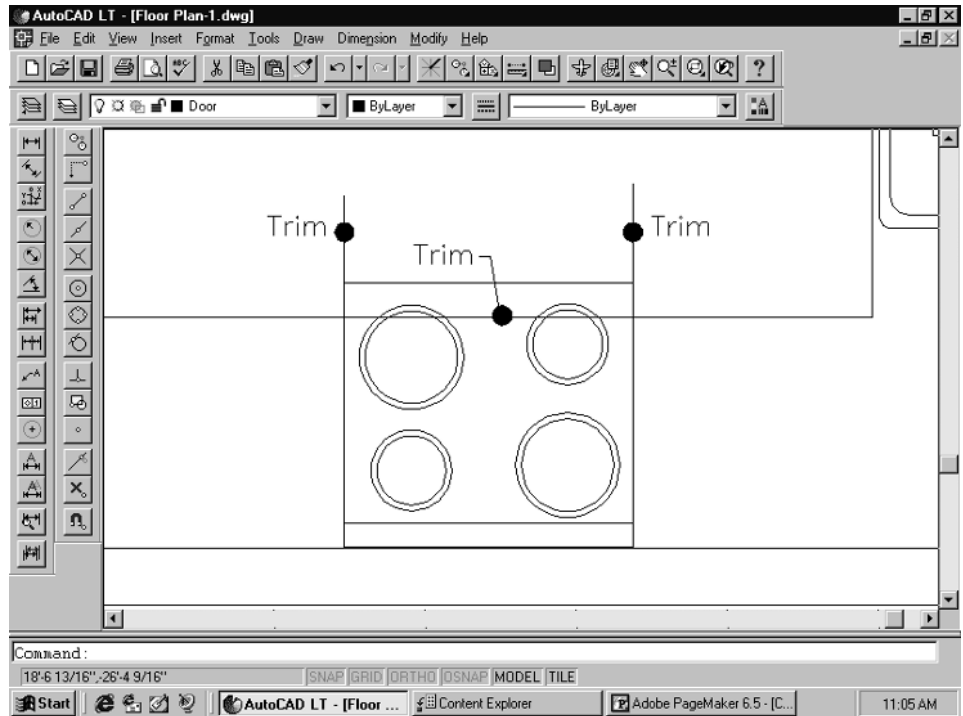


Figure 2-97

Your drawing should resemble the following.

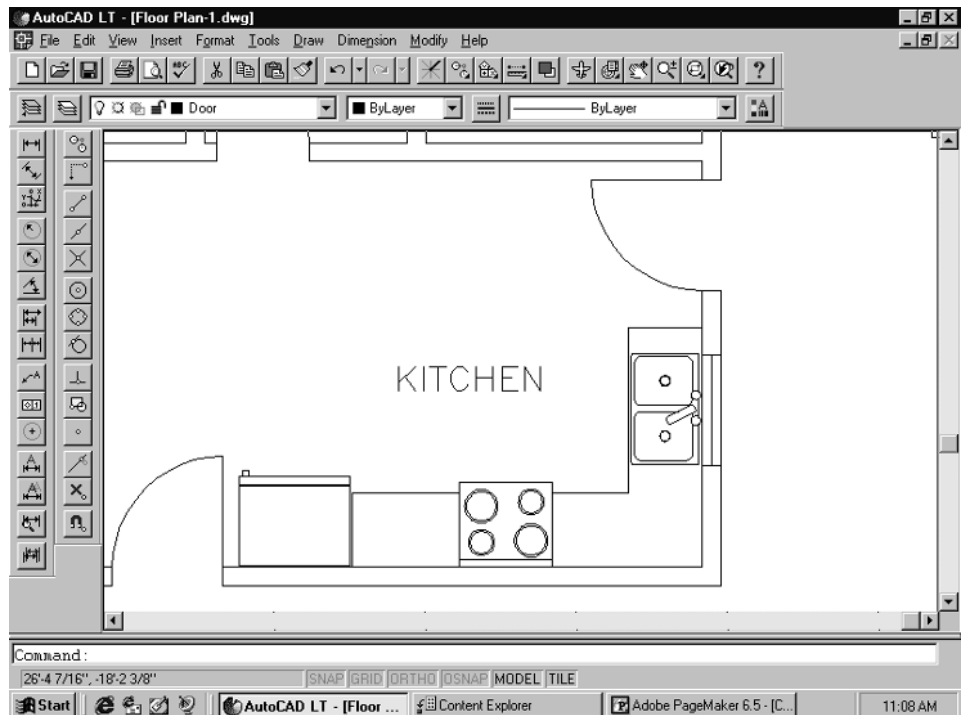


Figure 2-98

There is another method of scaling, which is to go through the first two prompts above, but then instead of typing R for Reference at the third prompt, you simply type in a scale factor. For example, if you want to scale the refrigerator up, you could type in 1.2 and Enter. This will enlarge the refrigerator slightly. The rule for scale factor is that any number above 1 scales the object up, and any number below 1 scales the object down.

The difference between the two methods of scaling an object is that reference scaling scales the object precisely. Scale factor scaling, on the other hand, either grows or shrinks the object, depending on the scale factor you type in.

Now you can place the bath counter and fixtures.

1. The counter can be drawn in the same manner as the kitchen counters. Simply offset the right side wall line **21"**. Then offset the wall line at the door **5'-6"**. Use the Fillet command to clean up the counter lines. See Figure 2-99.

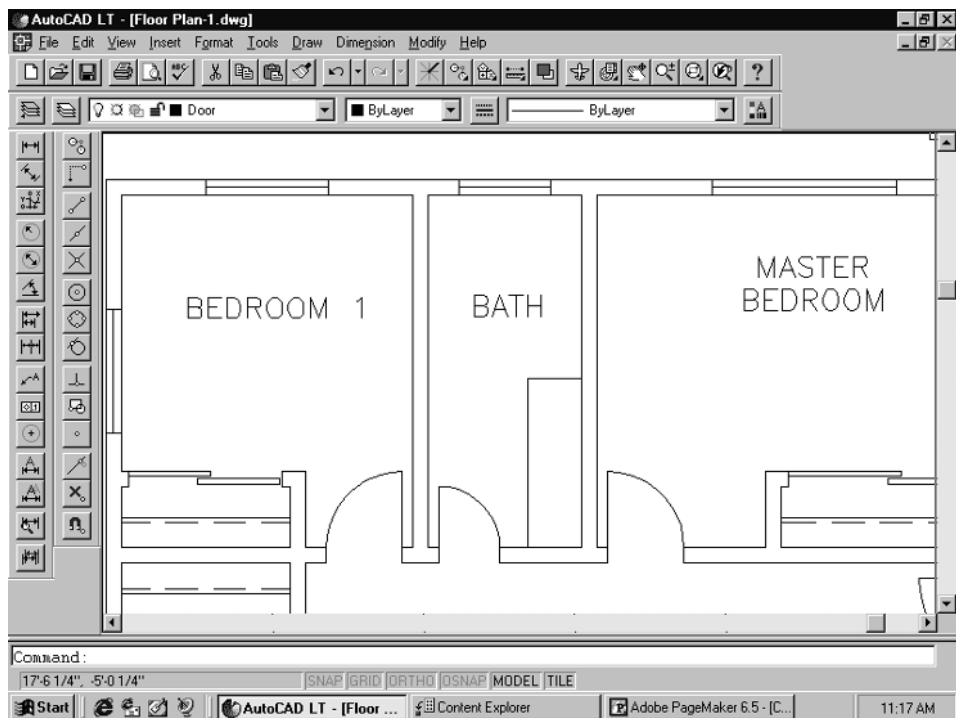
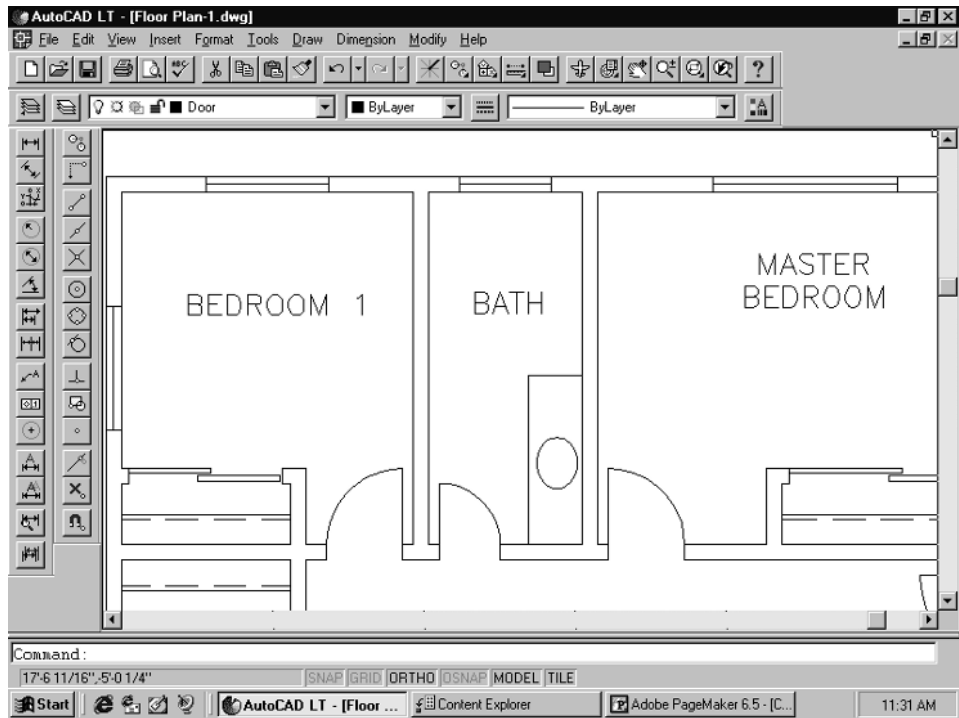


Figure 2-99

2. Next, using Content Explorer, find the vanity symbol (3vanity). Double-pick on it, and pick an insertion point. Hit **Enter** for the X and the Y scale. Then pull your cursor to line it up and pick.

**Figure 2-100**

3. Add the water closet and the tub/shower using the same method. If you make a mistake, either use Undo or just erase the symbol and insert it again. Figure 2-101 shows the finished Bath.

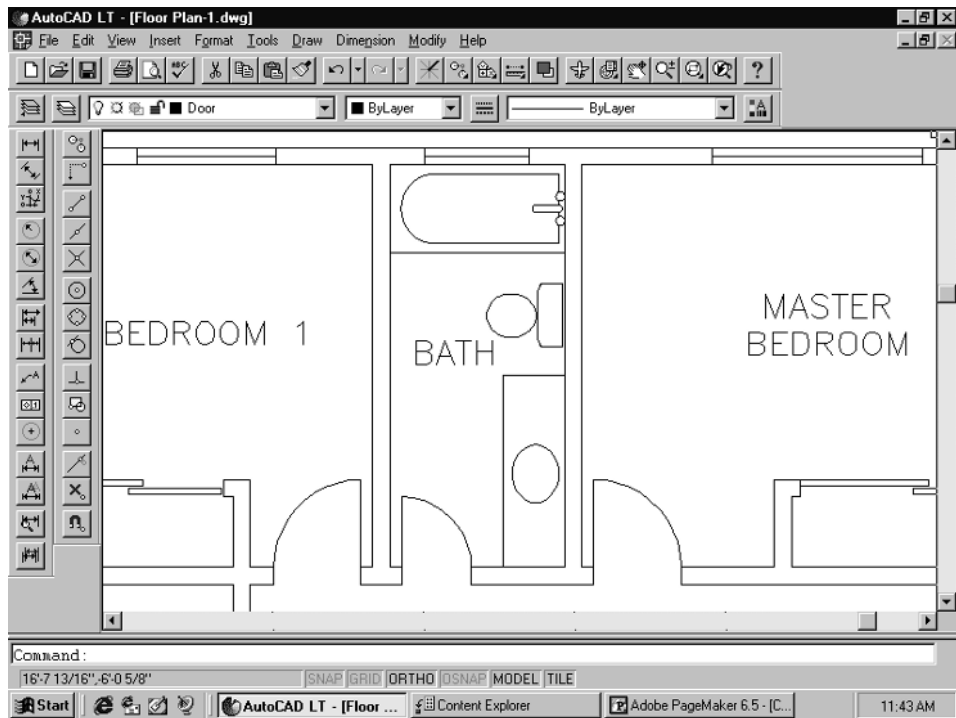


Figure 2-101



NOTE: Remember to turn Ortho on when placing blocks. The F8 key turns Ortho on/off. You can tell when it's on when the word ORTHO on the status bar at the bottom of your screen is black, not gray.

Take a look at Sheet #1 again. The closets in the bedrooms show a shelf with a clothes rod.

1. To create these, simply offset the back wall of each closet **12"** to represent the shelf. Then offset each shelf line back **2"** to represent the clothes rod.

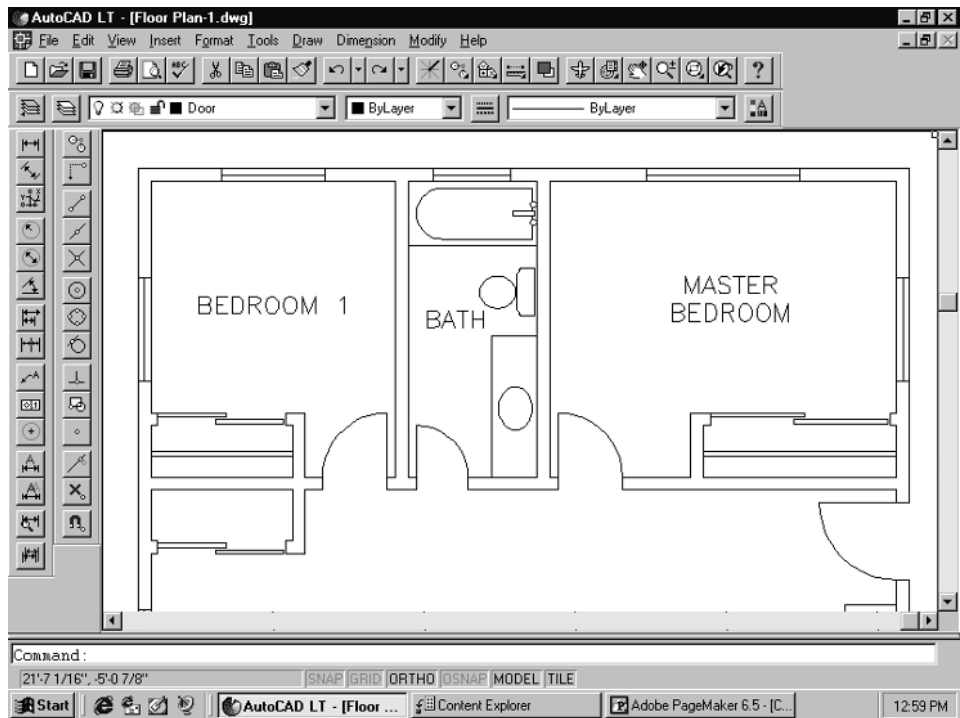


Figure 2-102

2. The last step is to change the rod from a continuous line to a dashed line. To do this, you need to change the Linetype property of these lines. (There are different ways of modifying these settings, depending on the version of AutoCAD LT you are using. For this particular job, though, the methods between versions are the same.) First, select the clothes rods with your cursor. The “grips” should be visible on the items you select. Also, the lines should “highlight,” becoming sort of “dotted.” Next, select the Linetype Control box on the Object Properties toolbar, shown in Figure 2-103. Pick **HIDDEN** and then hit **Esc** twice to clear the grips.

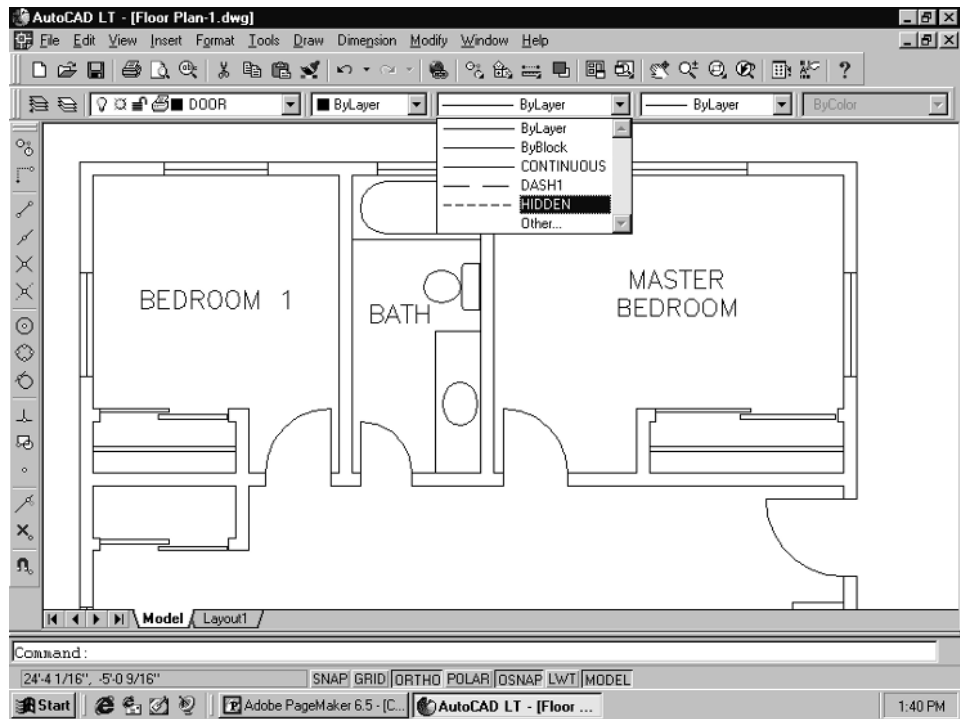


Figure 2-103

The finished result should end up looking like the figure below.

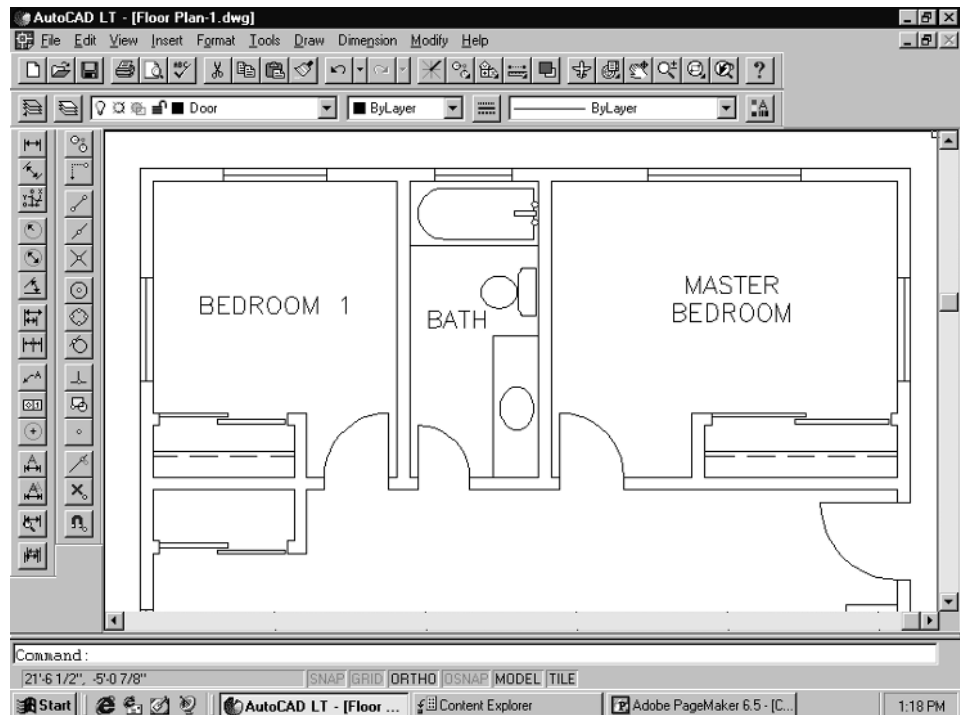


Figure 2-104

This pretty much takes care of the drawing of our simple floor plan. To finish, you need to add the dimensions and annotations. Before doing so, let's take a look at the floor plan in our border. Zoom out so that you can see the whole floor plan.

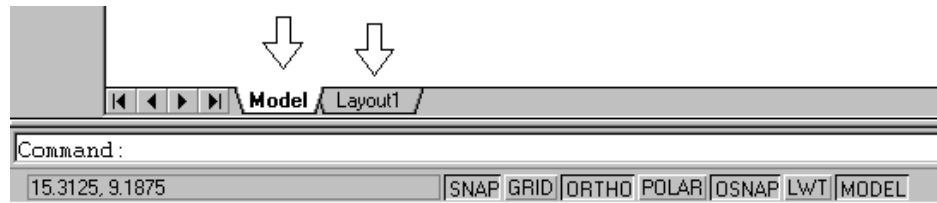
Before you began drawing this floor plan, we opened AutoCAD LT using our template drawing. The first screen you saw when the drawing opened was an 8.5"x11" border in paper space. We then had you pick on the TILE button on the status bar, changing the screen to regular model space. The border disappeared and a blank drawing with our symbols came up. From there, you began drawing the floor plan.

Now, let's flip back to paper space so that you can start to get a feel for what it's all about. If you are in AutoCAD LT 98, double-click on the TILE button on the status bar, shown in Figure 2-105. If you are in AutoCAD LT 2000, pick the Layout1 tab, shown in Figure 2-106.

Figure 2-105
The TILE button
in LT 98



Figure 2-106
The Layout1 tab
in LT 2000



The 8.5"x11" border will pop up. There is a "viewport," or window, within this border, scaled at $1/8" = 1'-0"$. Your floor plan should be inside of this viewport, as in Figure 2-107. Our reason for scaling the viewport at $1/8"$ is that your floor plan would never fit within a small border like this if it was scaled larger than $1/8"$.

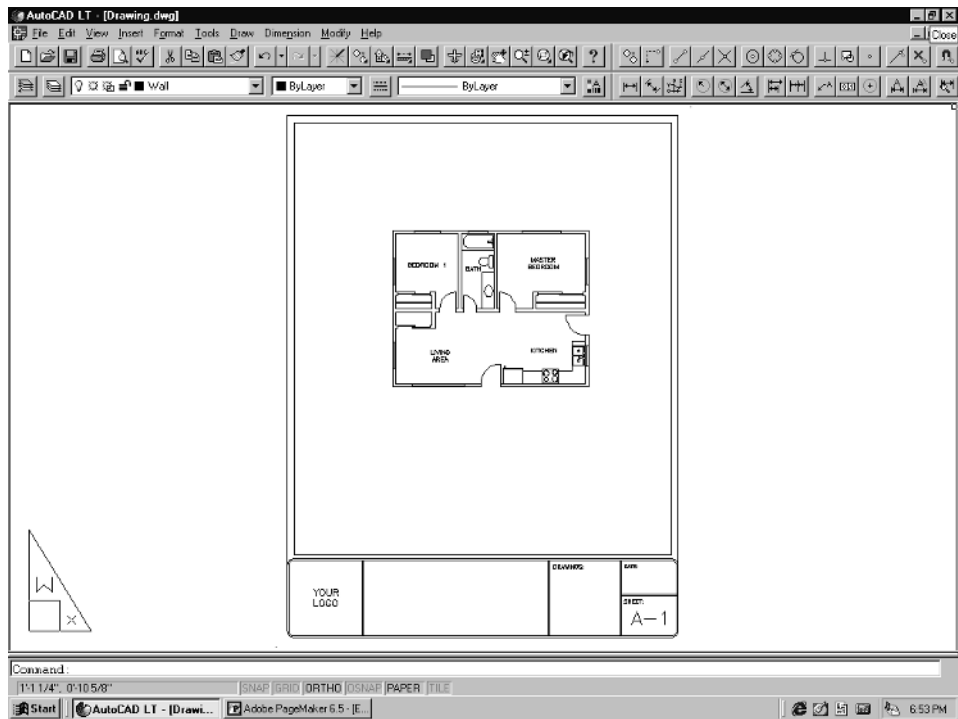


Figure 2-107

Paper Space and Model Space

The triangular icon in the lower left-hand corner of the screen indicates that you are in paper space. The border itself was drawn in paper space. You can modify the border lines and text if you wish. For example, the sheet number can be changed by using the DdEdit command. This is true for any of the text or linework in the border.

Now, what do you do if your drawing is not centered in the border, as in Figure 2-108?

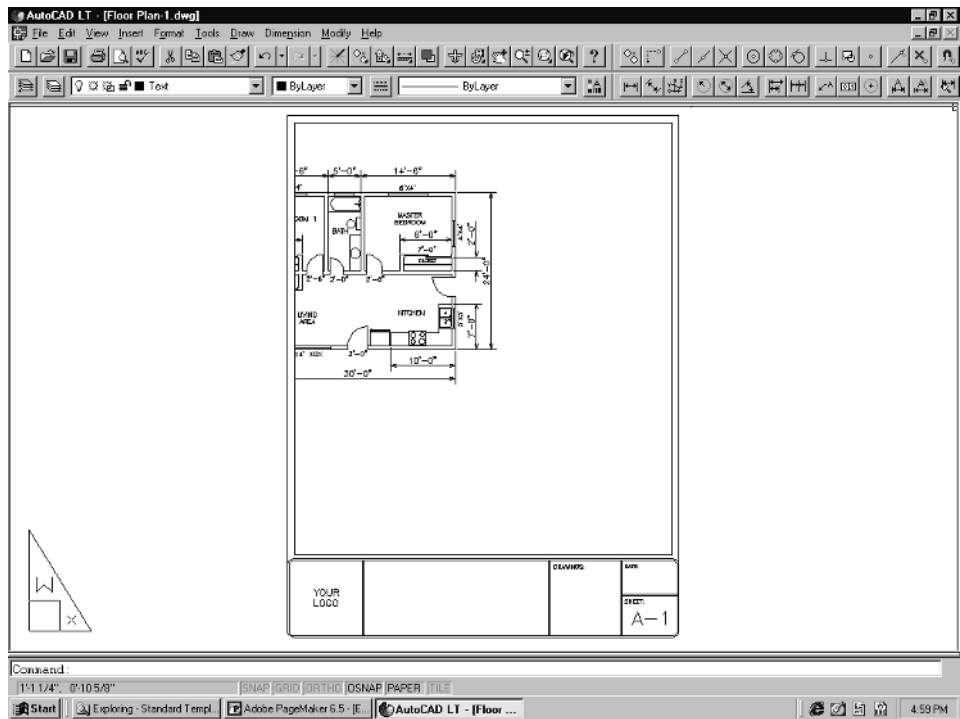


Figure 2-108

How do you move it? Try using the regular Pan command while still in paper space. The only thing that moves is the entire border. The floor plan moves around with the border, but it doesn't move within it; it just stays in the same position relative to the border.

You need to move the floor plan's position within the border.

1. To do this, pick the button named **PAPER** down on the status bar. This will change to **MODEL**. Move your cursor around. Notice that it moves only within the viewport inside of the border.

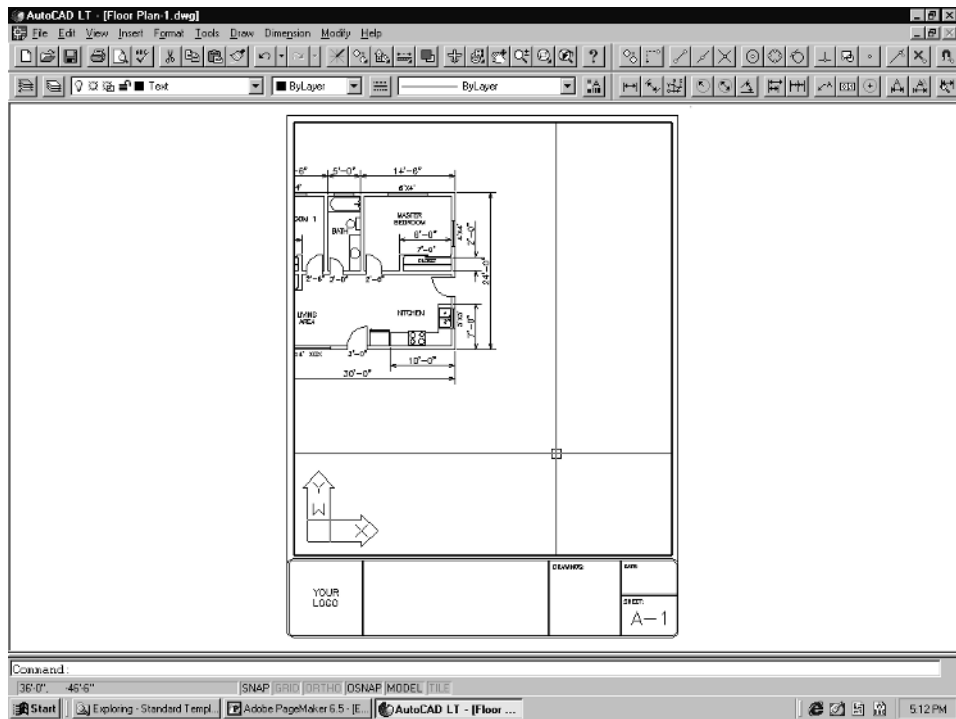


Figure 2-109

Notice the arrow icon in the viewport's lower left-hand corner. This shows you that you are now in "floating model space." Notice the difference between Figures 2-108 and 2-109.



WARNING: Do not zoom while in floating model space mode. It will change the scale of the viewport. You may pan the floor plan around to center it within the border without affecting the viewport scale, but do not zoom.



NOTE: If you do happen to zoom while in floating model space you can easily rescale the viewport. This particular viewport should be scaled $1/8" = 1'$.

- For LT 98, type **Zoom** and **Enter**, then type **1/96xp** and **Enter**. For LT 2000/2000i, you can do the same, or you can use the Viewports toolbar, which has a list of scales that you can pick from. Select **1/8" = 1'**.
- Center your floor plan within the border by panning it with the Pan Realtime button, then double-pick on the **MODEL** button so that it changes back to PAPER in both LT 98 and LT 2000. This puts you back in paper space.
- Now, double-pick on the **TILE** button if you are using LT 98, or pick the **Model** tab if you are using LT 2000. The drawing will revert back to regular

model space and the border will disappear, as in Figure 2-110. Notice the model space icon in the lower left corner of the screen. This indicates that you are in regular model space now and can continue adding elements such as walls, dimensions, and symbols to the floor plan.

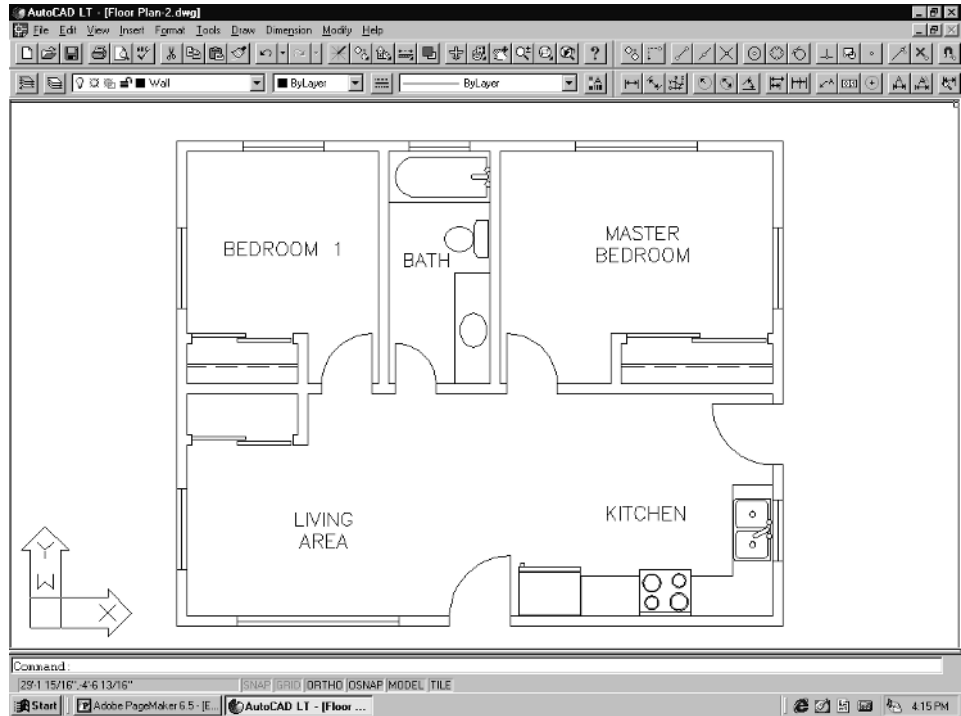


Figure 2-110

Adding Dimensions

Zoom out a little, as shown in the following figure, so that you have some clear space around the floor plan. You will need the space for your dimensions.

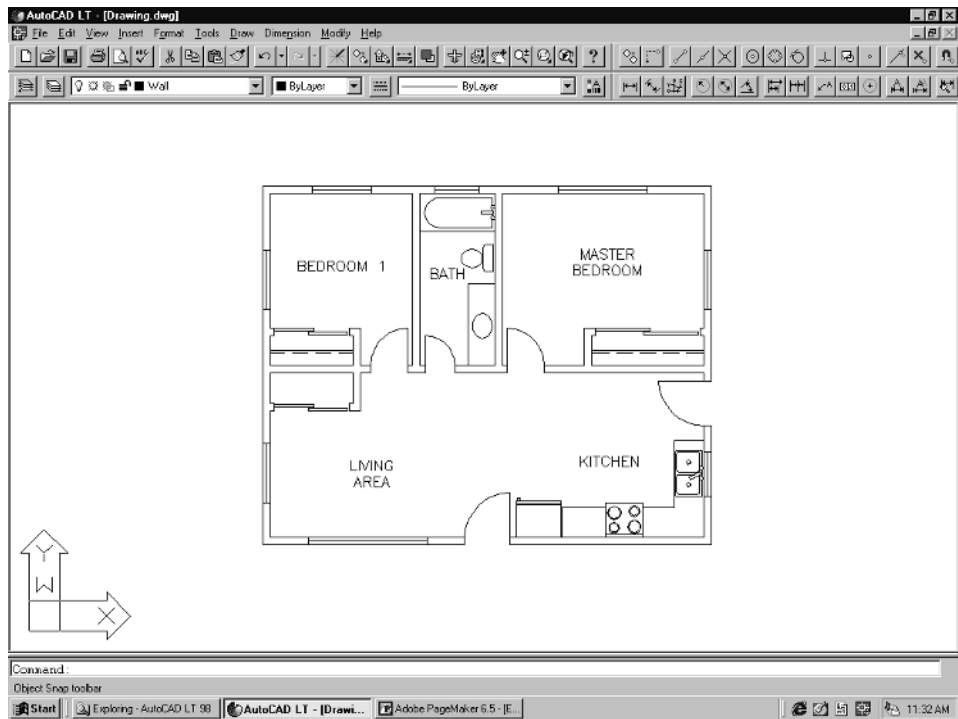


Figure 2-111

We have already set up a number of dimension styles for the templates that are provided with this book. The template this plan was drawn in has a dimension style named RA96 already set for you. This is the right dimension style for a drawing that is scaled at 1/8".

Also, we have set the text style to TEXT96. This is also the appropriate size for your callouts and notes in an 1/8" drawing. You would scale the text up larger for room names and such.

1. Before you begin adding the dimensions, you may want to set your osnaps as follows. Type **osnap** and **Enter**. Put a check in the Endpoint and Mid-point boxes and then hit **OK**.
2. Set the current layer to **DIM** and select **Linear** from the Dimension pull-down menu or your dimension toolbar. Look at Sheet #1 (Floor Plan) to see what the dimensions should be.
3. First, you will dimension the back wall. At the *First extension line origin or press ENTER to select* prompt, pick the left rear corner of the house. Pick the inside wall line of the Bath at the *Second extension line origin* prompt. When the *Dimension line location (Mtext/Text/Angle/Horizontal/Vertical/Rotated)* prompt appears, pull the cursor up and notice the dimension line drags as you pull. When you are satisfied with the placement of the

dimension line, pick your left mouse button. The first dimension line will be drawn.

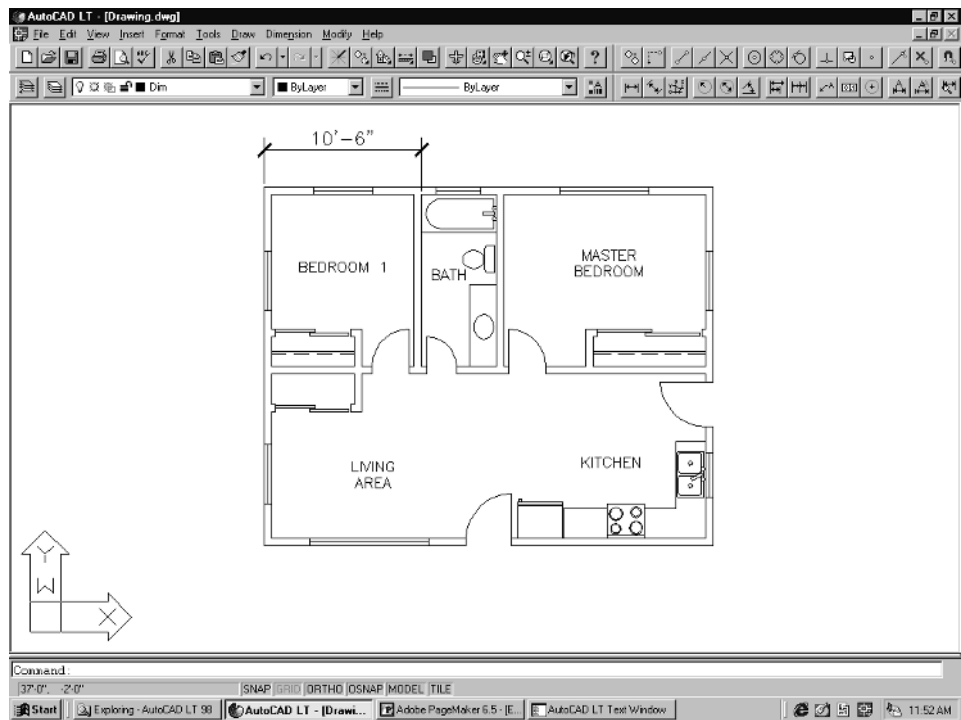


Figure 2-112

4. To continue along the wall, showing the dimensions for the Bath and the Master Bedroom, pick **Continue** from the Dimension pull-down menu or the Dimension toolbar. At the *Specify a second extension line origin or (Undo/<Select>)* prompt, pick the opposite inner wall of the Bath. The dimension will be drawn and automatically line up with the first one.

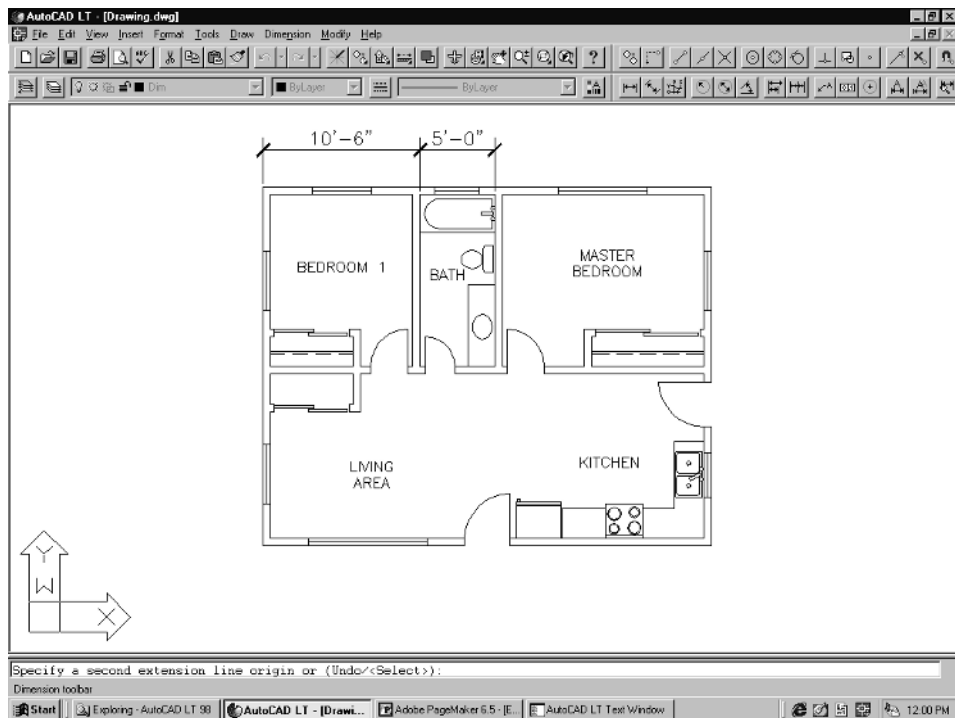


Figure 2-113

5. You will be prompted again for the next extension line origin. Select the upper right corner of the Master Bedroom to finish this first run.



NOTE: Once you start using the Continue function, you must hit the Esc key in order to exit. It will just keep looping until you do. Also, if you wish to dimension another wall, you must pick the Linear command again from the Dimension pull-down menu before you start.

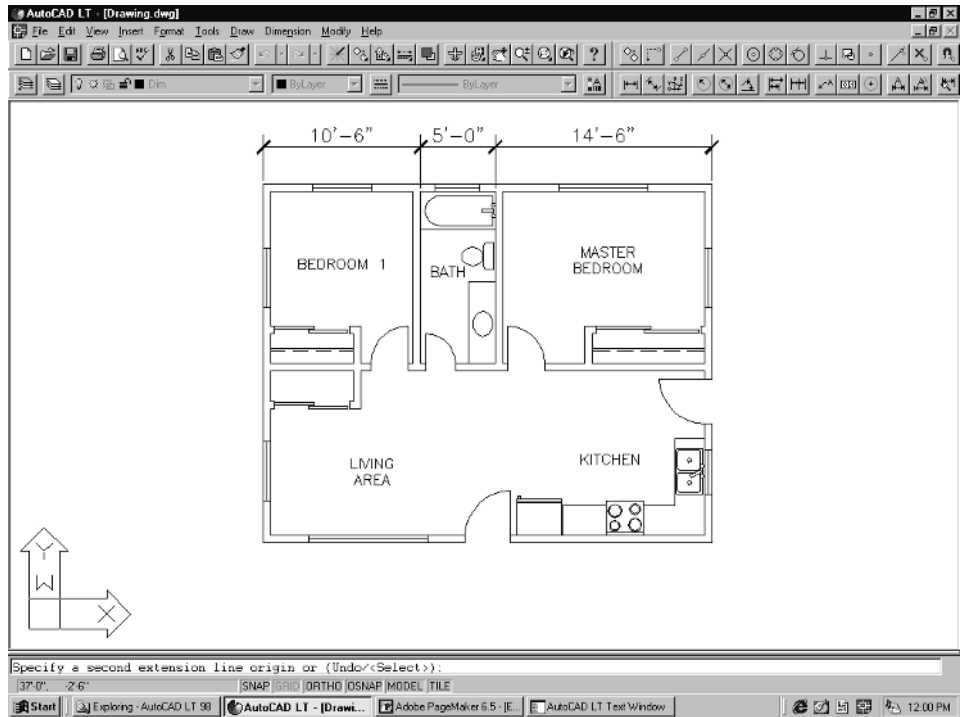


Figure 2-114

6. Now that you have the idea, go ahead and finish dimensioning the drawing. Pick **Linear** from the Dimension pull-down menu or toolbar, and go for it. The finished dimensions should be similar to those shown in Figure 2-115.

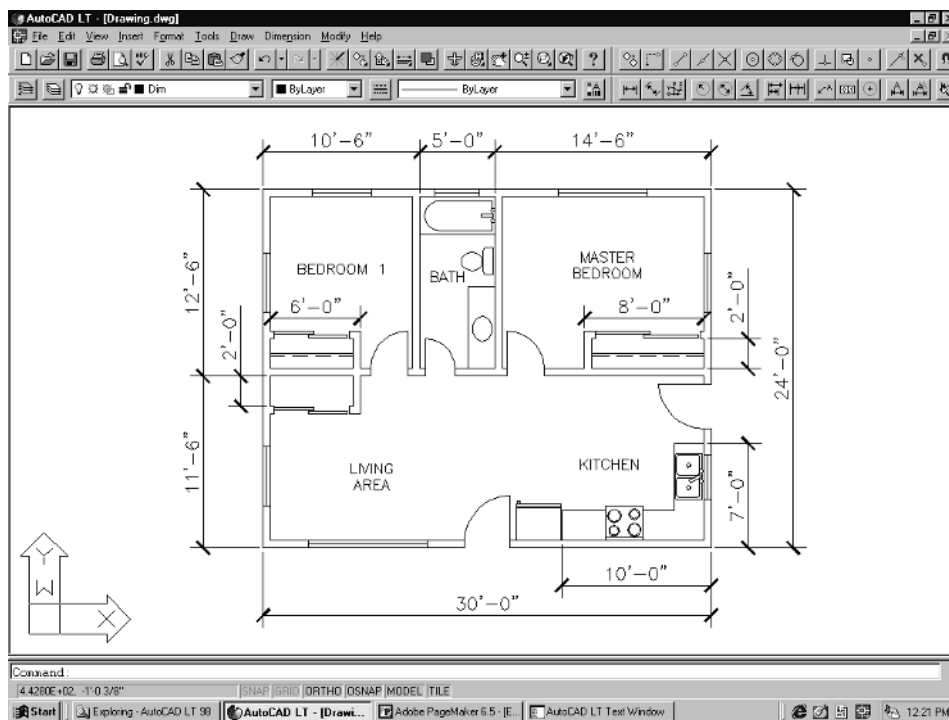


Figure 2-115

Here are a couple of things to keep in mind about dimensions: You can stretch them if you need to. You can edit the text using the Properties command under Modify. You can globally change any of the features associated with a dimension style.

1. For example, say you wanted to change the RA96 dimension style so that it used arrows rather than architectural ticks. You would just go up to the Dimension pull-down menu and select **Styles**. The Dimension Styles dialog, shown in Figure 2-116, appears. The current style for this drawing should be RA96.

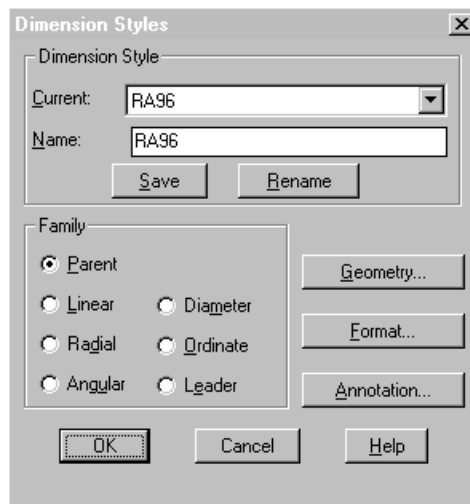


Figure 2-116

- Pick the **Geometry** button. The Geometry dialog, shown below, has a little box in the upper right-hand corner that shows what kind of arrowheads are being used.

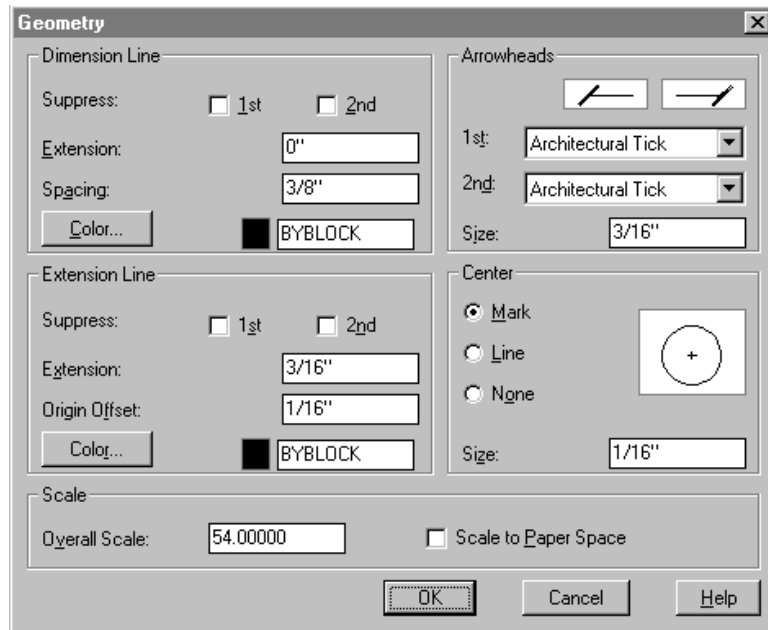


Figure 2-117

- Pick the little arrow to the right of the box labeled 1st. A cascading menu of available arrows will come up. Select **Open 30**, then pick the **OK** button. You will be taken back to the Dimension Styles dialog. Pick the **Save** button. Then pick the **OK** button to exit. Your dimension ticks should all change to arrows.
- You can do the same thing with the Overall Scale factor. Pick the **Geometry** button, then look in the lower left-hand side of the Geometry dialog. The overall scale for RA96 is set at 54.0000. If you would like to reduce the size of your dimensions a bit, try changing this to 48.0000. Then hit **OK** to exit the Geometry box. Remember to hit the **Save** button before exiting the Dimension Styles box. If you have done this correctly, your dimension text, arrows, etc., should be slightly smaller.

The last thing we need to do to finish this simple floor plan is to add any notes or notations that describe conditions that the contractor or builder needs to be aware of. These include door tags, window tags, and general hardware callouts. Some floor plans call for more detail than others. This will usually be made clear to you when you talk to the builder or architect before starting a job.

For this exercise, we will use simple text tags for the windows and doors. Check Sheet #1 for the sizes. Change the current layer to TEXT before you begin. Then, input the labels using the regular DText command. See Figure 2-118 to see the door and window tags we added, as well as some other labels.

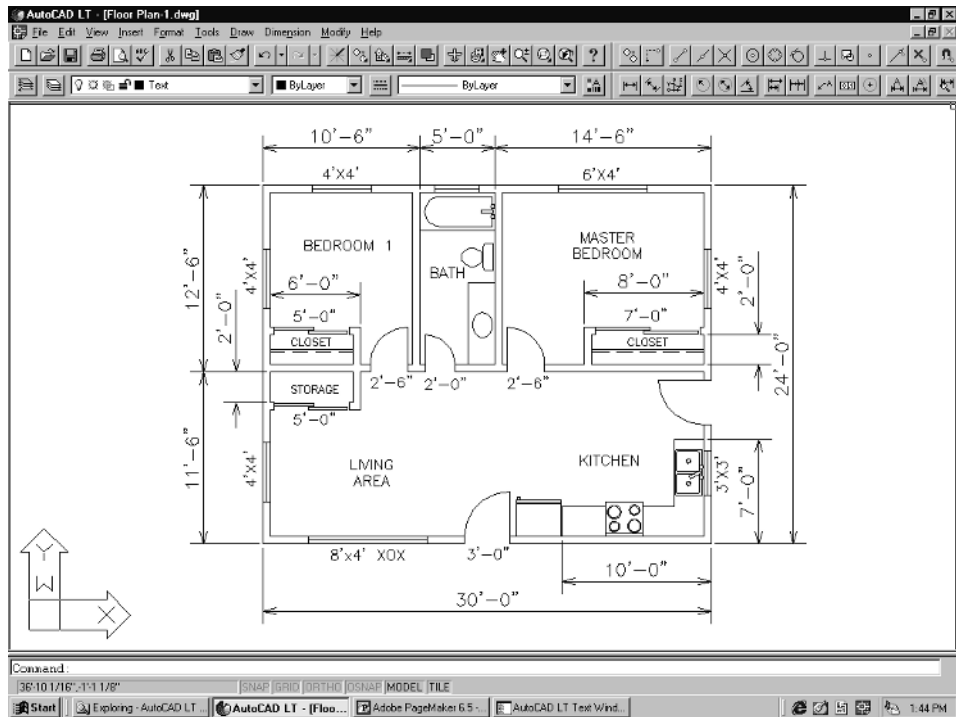


Figure 2-118

Printing the Plan

It's time to go back to paper space and print our drawing. We used an 8.5"x11" border so that you can use your regular system printer for this plot.

1. The first thing you need to do is double-pick on the **TILE** button if you're using LT 98 or pick the **Layout1** tab if you're using LT 2000. The border, with the floor plan in it, will come back up. Notice again the triangular icon in the lower left of your screen. This triangular icon lets you know that you are now back in paper space. See Figures 2-119 (LT 98) and 2-120 (LT 2000). Remember, you can move the floor plan around inside of the viewport but must change to floating model space before doing so. You do this by picking on the **PAPER** button on the status bar. This toggles back and forth between paper space and floating model space.

NOTE: You must make sure to use Pan, not Zoom, when you are in this mode. Otherwise you will lose the viewport scale and must reset it.



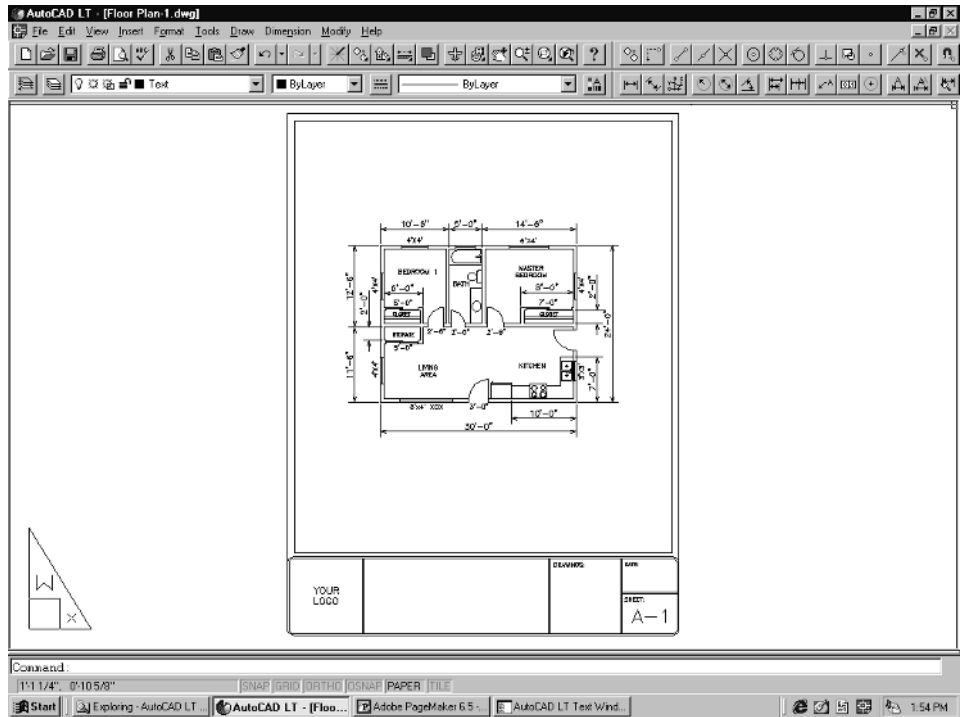


Figure 2-119
Paper space in
LT 98

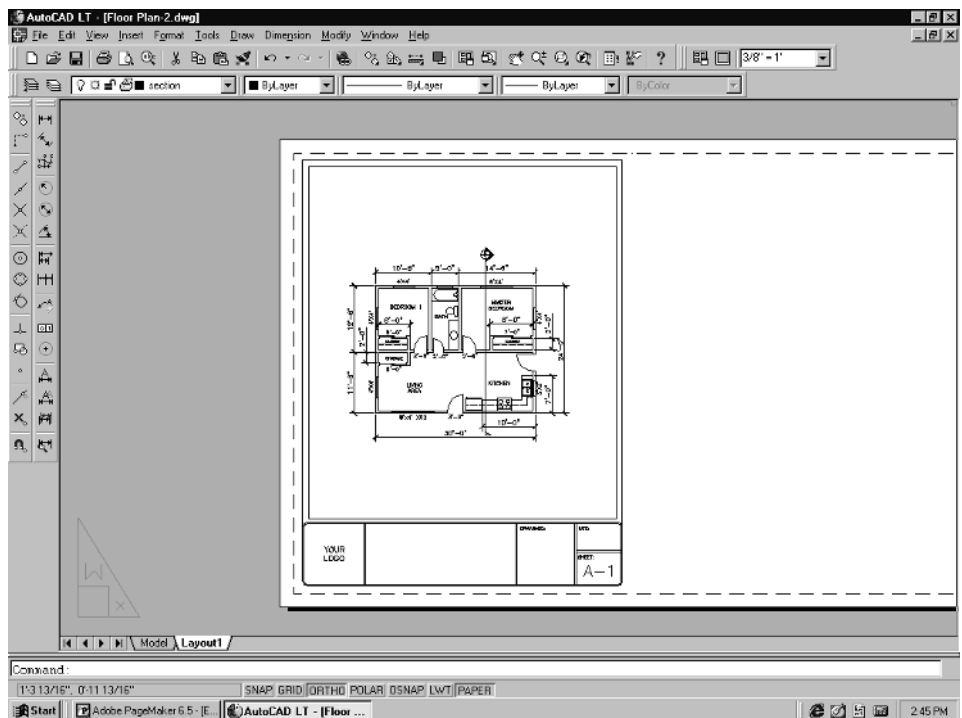


Figure 2-120
Paper space in
LT 2000

If you have adjusted the drawing in the border, remember, before proceeding with the plot, to go back to paper space by picking on the MODEL button on the status bar so that it changes back to PAPER.

2. Plotting methods will depend on which version of AutoCAD LT you are using. If you are using LT 97 or LT 98, select **Print** from the File pull-down menu. For AutoCAD LT 2000 or LT 2000i, pick **Plot** from the File pull-down menu. The Print/Plot Configuration or Plot dialog will come up. See Figures 2-121 and 2-122. For this exercise, your Device and Default Selection or Plotter Configuration should be set to System Printer.

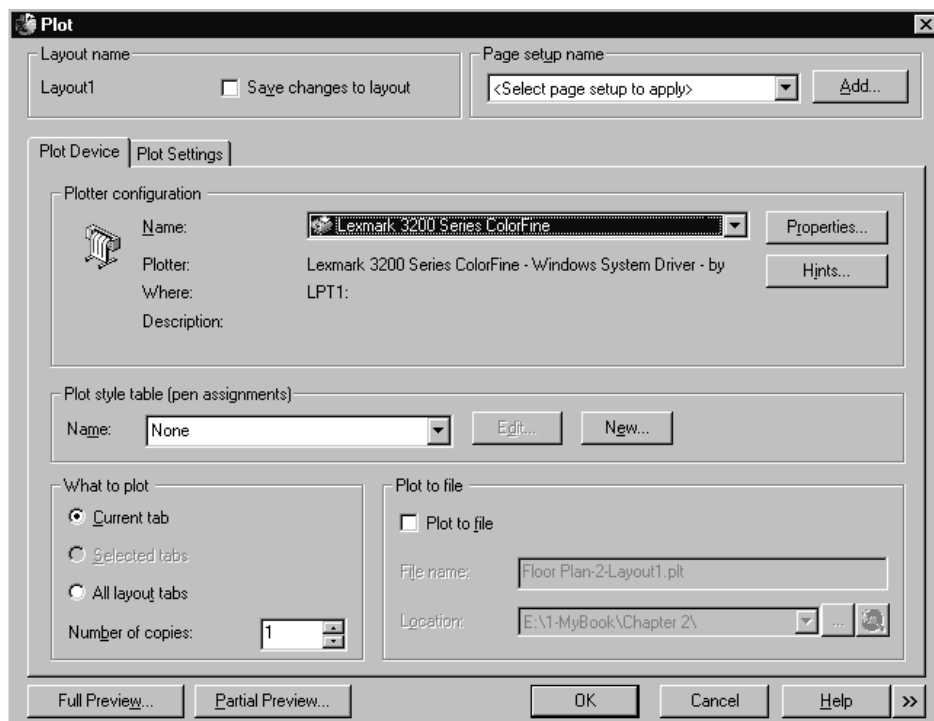
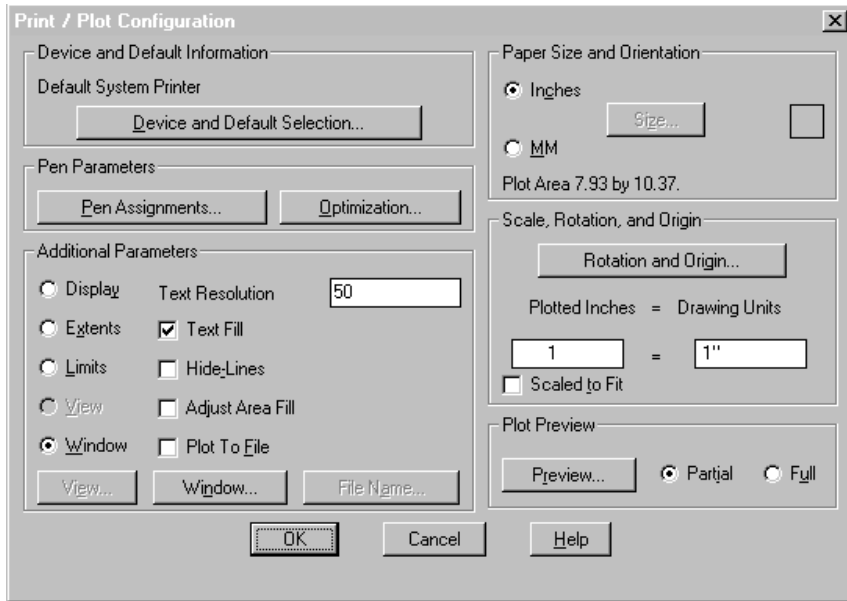


Figure 2-121
The Plot dialog
in LT 2000

Figure 2-122
The Print/Plot
Configuration
dialog in LT 98



3. Make sure the Plot Scale or Plotted Inches = Drawing Units is 1 = 1. For AutoCAD LT 2000, this is found under the Plot Settings tab (see Figure 2-126). Next, pick the **Window** button in the lower left of the dialog. In LT 98, a Window Selection dialog will pop up, as shown below. Select the **Pick** button.

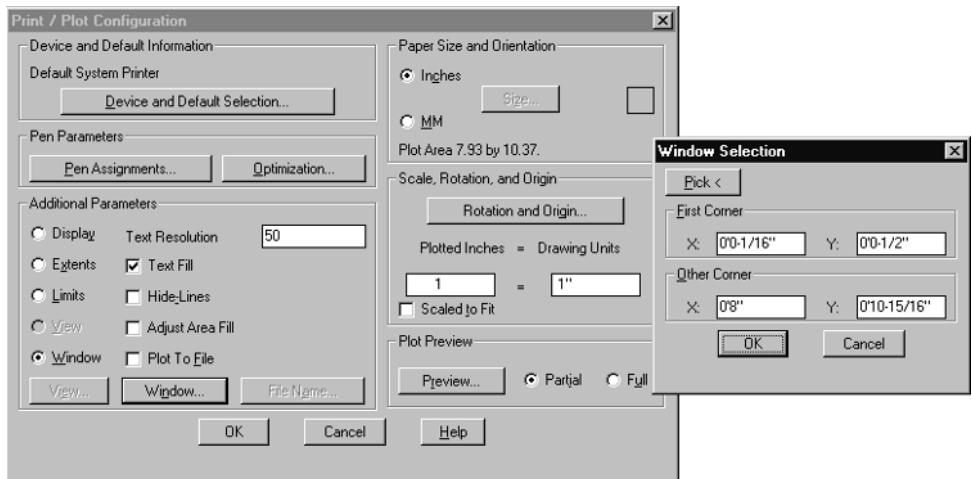


Figure 2-123

LT 2000 does not have a Window Selection dialog, but both versions will prompt you to select the first corner, then the other corner. See Figure 2-124. You are basically being asked to draw a window around what you want plotted or printed. Our template borders have points in the lower left and upper right corners, a little to the outside of the border. These are

actual points and can be used as the corner points when doing a “window” plot, as we have done here. See points #1 and #2 in the following figure.

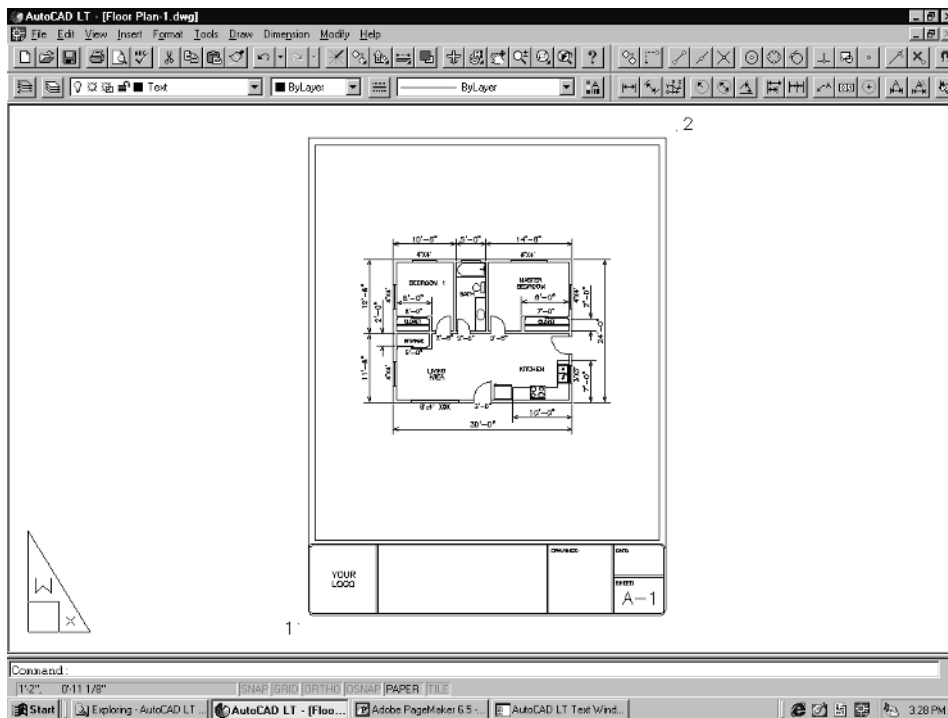


Figure 2-124

4. As soon as you pick the second corner, the Window Selection box pops up again in LT 98, as shown in Figure 2-125. Pick **OK** to exit back to the Print/Plot Configuration dialog.

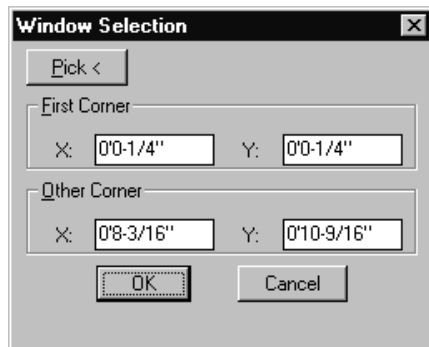


Figure 2-125
The Window
Selection dialog
in LT 98

In LT 2000/2000i, the Plot dialog pops back up as shown in Figure 2-126.

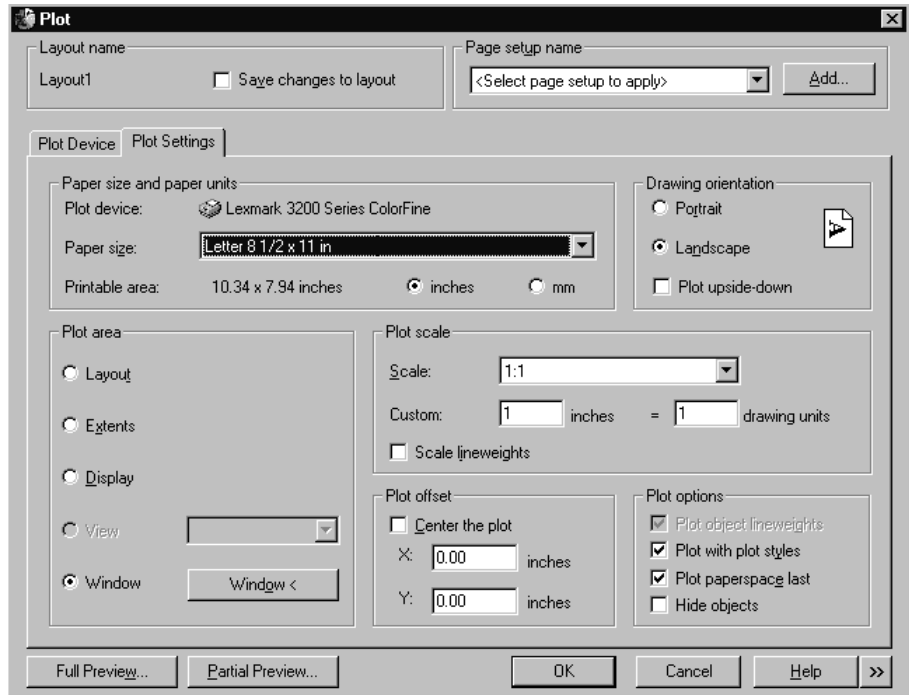


Figure 2-126

5. Before going ahead and printing, it is a good idea to preview the plot first. To do this in LT 98, select the **Full** circle in the Plot Preview section in the lower right-hand side of the Print/Plot Configuration dialog box. Then pick the **Preview** button. This will show you exactly what your plot will look like on the sheet you have chosen.

In LT 2000, pick the **Full Preview** button in the lower left-hand corner of the Plot dialog box.

Whichever version of AutoCAD LT you are using, if the preview looks good, pick **Exit** and then hit the **OK** button to plot. If the preview doesn't look right, pick the **Exit** button, then pick the **Window** button again and re-window the plot area. Then take another preview.

Your finished print should end up looking exactly like it did when you did a full preview. An example of what the finished plot should look like is shown on the next page.

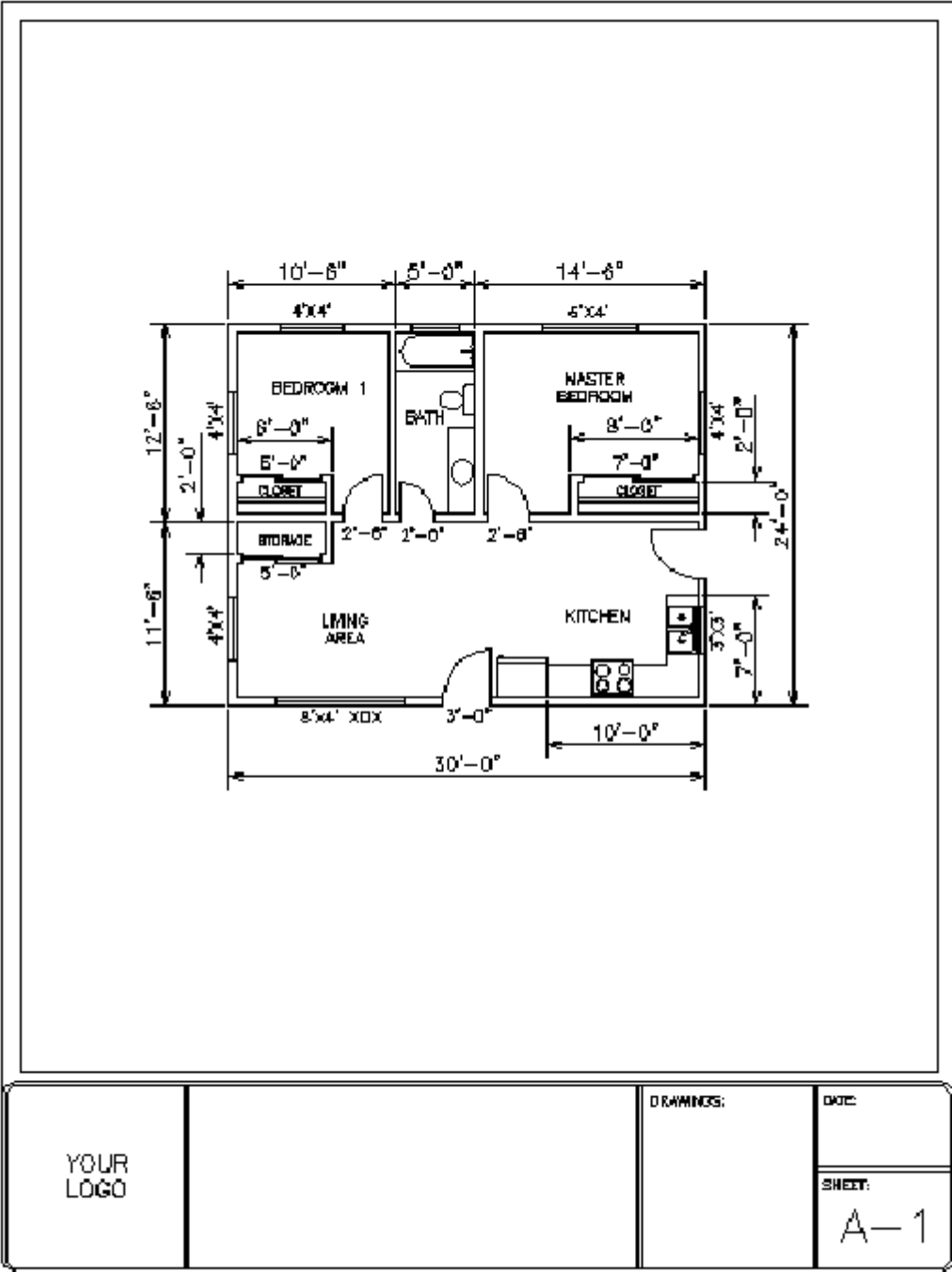


Figure 2-127



NOTE: Save your drawing, if you haven't already. Name it whatever you wish. Remember, earlier in this chapter we talked about the importance of saving your drawing often. This can save you from disasters such as power failures and other unforeseen calamities.

Make sure you have set your automatic save time to a reasonably short interval, like 10 minutes. Waiting while the drawing saves itself every 10 minutes or so is a small price to pay for the security it gives you.

Also, back up your drawings to either a floppy, Zip disk, or CD. Hard drives do go out on a regular basis and no one can afford the loss of data this causes.

Creating Your Own Templates

Creating your own template files is one of the best ways to improve your drawing speed. It also will help to standardize your drawings. This is a quick overview on creating your own custom template drawing, based on the templates provided with this book.

The basic things that you want a template file to contain are your own text styles, dimension styles, layer names, and any blocks that you use on a regular basis. You also want your border sheet to have at least one viewport created on the layer DefPoints. The scale of the viewport doesn't really matter, as you can change this at any time. Also, the number of viewports doesn't matter, as you can add viewports by simply copying the original one as many times as needed.

Here is a quick way to set up your own template. Let's say you want a 24"x36" template. You want to use your own company logo, and you want to get rid of our blocks and insert your own set of blocks. You also want to have five viewports in this border, one at 1/4" and the other four at 1/8". Here's how you do it.

1. Pick **Open** from the File pull-down menu. The Select File dialog box will come up. Look for the box named Files of type and change it from "Drawing (*.dwg)" to **Drawing Template File (*.dwt)**.

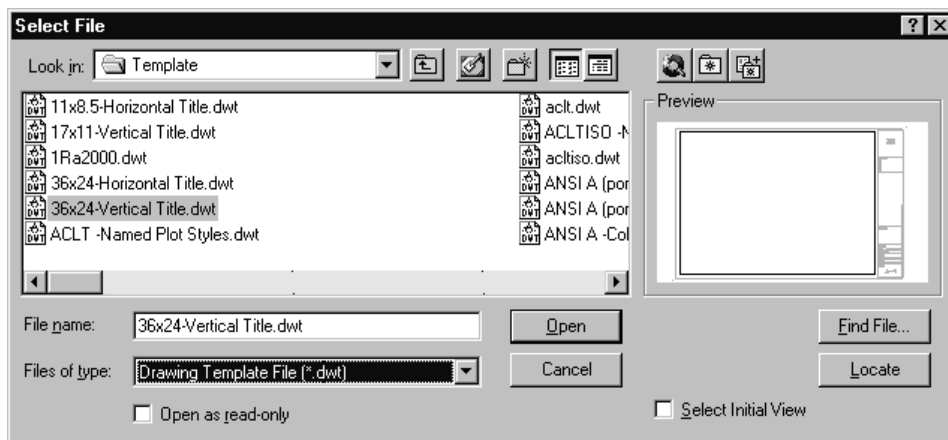


Figure 2-128

2. Open up the file named 36x24-Vertical-Title.dwt. Notice the triangular icon in the lower left-hand corner of the graphic screen. This indicates that the drawing is in paper space.

We created the border lines and text in paper space so you can edit them right in paper space. The layer name for the lines around the border are named, aptly enough, BORDER. The color designated for the BORDER layer is cyan. Pick the **Layers** button on the Object Properties toolbar and change the color for the BORDER layer to red.

3. Erase the words YOUR LOGO and type in your company name or draw a logo here. You may want to move some of the horizontal lines around in the title bar and add some text.

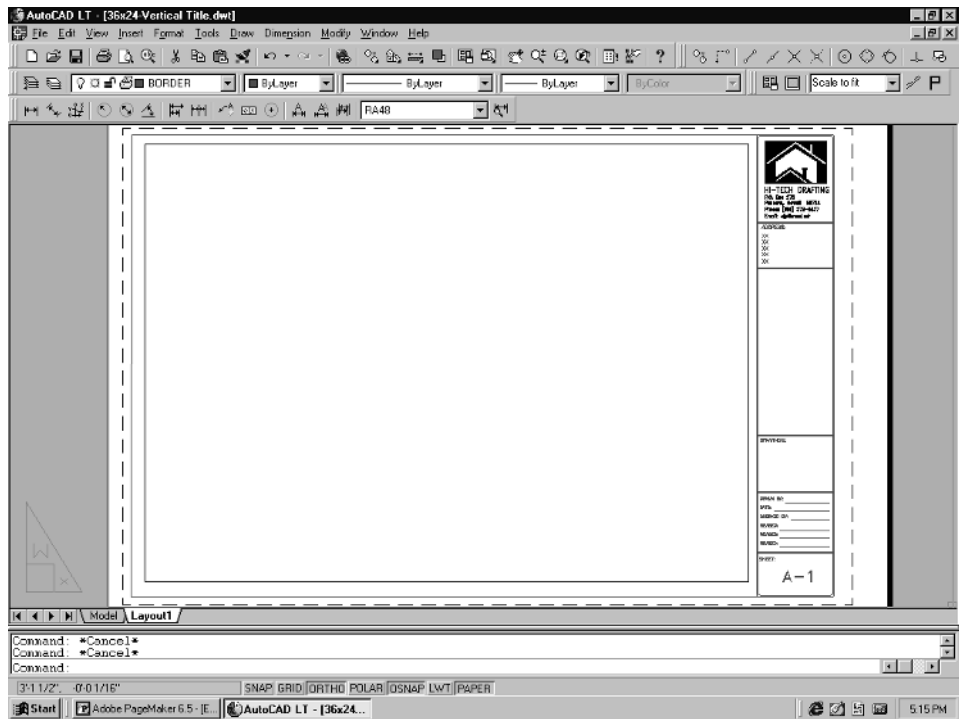


Figure 2-129

4. Pick on the viewport, which is the inside rectangle within the border. Pick on one of the “grips” and drag it inward so as to reduce the size of the viewport. Pick another of the grips and pull it in again so that you end up with a fairly small viewport, as shown in Figure 2-130.

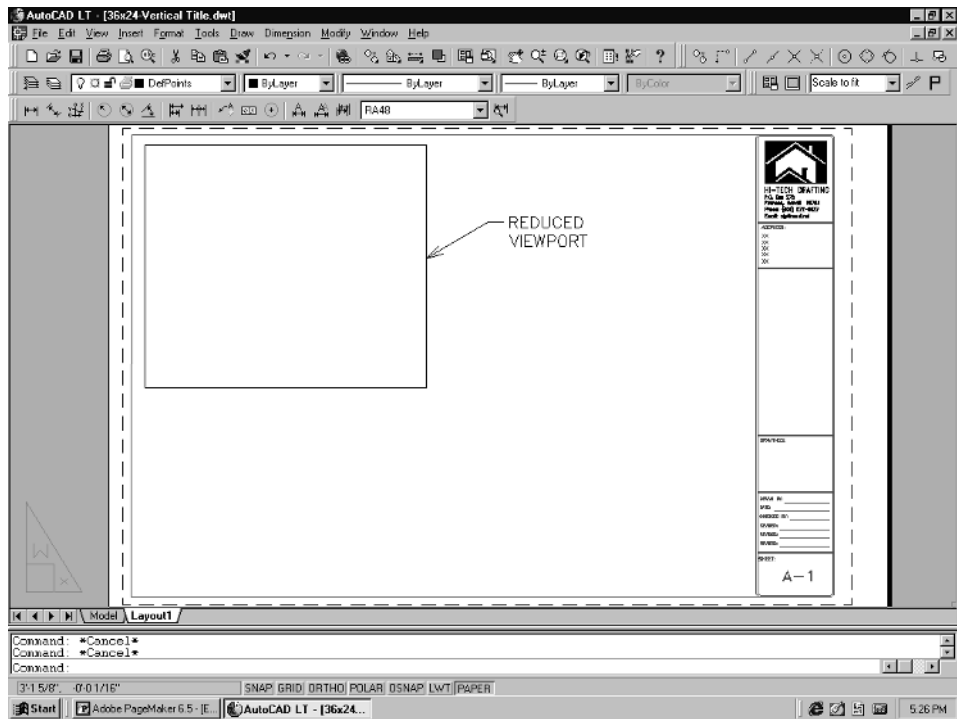


Figure 2-130

This viewport can then be copied and stretched or reduced as you wish. It is not necessary to do this, but is only to show you what can be done with templates. You could go further and individually scale each one of these viewports.

5. At this point you should save the template to a new name. Go to the File pull-down menu and select **Save As**. The Save Drawing As dialog box will come up. Change the Save as type box from “AutoCAD LT 2000 (*.dwg)” to **Drawing Template File (*.dwt)**.

In the File name box, type in a name for the new template (try to name it something that is fairly descriptive so you can remember it). A Template Description dialog box will pop up. Type in a description for this new template.

6. You now need to consider what types of text and dimension styles you want to be standard in your template. You may not care for our text or dimension styles. You can purge these from the template by typing **Purge** and **Enter**. The Purge dialog box will come up. It allows you to either selectively purge (get rid of) text styles, dimension styles, layers, blocks, etc., or delete all of them at once.

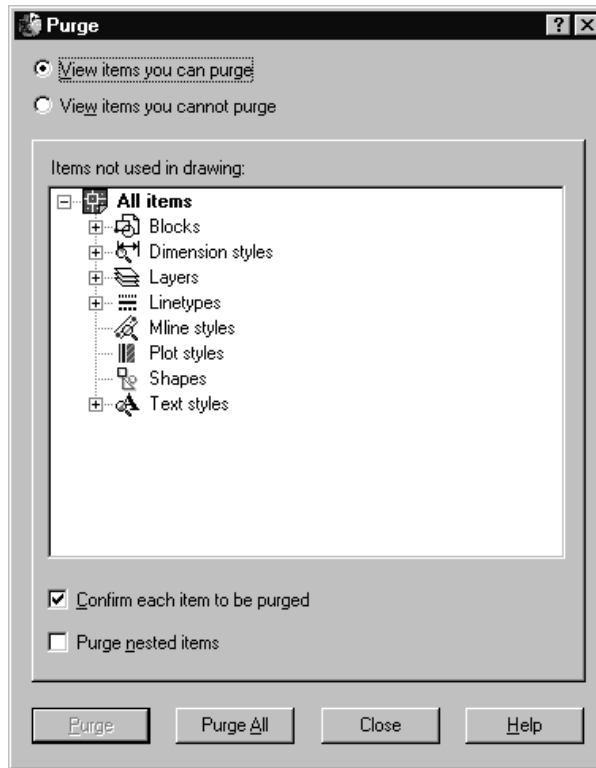


Figure 2-131

7. Pick the + sign next to Dimension styles. A list of all the unused dimension styles that are presently defined in this template file will pop up. These are the dimension styles that we built into our templates. If you want to get rid of our styles, just highlight them and pick the **Purge All** button. You can also selectively pick the ones you want to get rid of and then pick the **Purge** button. Do this for all styles that you want to purge.
8. The last thing you will want to do is get rid of any blocks that you don't want in your template drawing. Go into real model space by picking **TILE** for LT 98 or **Model** for LT 2000. Erase all the blocks you don't want. Type **Purge** again and pick the + sign next to Blocks. Pick the **Purge All** button to get rid of all the blocks, or select the ones you want to get rid of and pick the **Purge** button.

At this point you can insert any blocks or text and dimension styles that you want to use as standards from now on and then save the template as a .dwt file.

NOTE: See the end of Chapter 4 for an explanation on how to set up and plot multiple viewports within a drawing started using your own custom template file.



Summary

This ends Chapter 2. You should have a fairly good understanding of the basics of drawing a floor plan with AutoCAD LT. There is much that we did not cover, but that is the nature of AutoCAD LT. It is a big program and if you use it regularly, you will learn new things about it all the time.

I encourage you to pick up the AutoCAD LT manual when you have some spare time. There are so many different ways of doing any one task in AutoCAD LT, you may find an easier, better way to do some of them. You will definitely learn some new commands.

Also, whenever you run up against something that is new to you and you are unsure of how to proceed, use the AutoCAD LT Help system. You will find it to be an invaluable tool.

So on to Chapter 3 where we will be creating a foundation plan, a roof plan, and then a section of the floor plan you just finished.

Developing Sections



Overview

In Chapter 2, we developed a simple floor plan. There are a couple of things that we must add before beginning to develop the sections. We need a foundation plan and a roof plan.

The foundation and roof plans can be drawn quickly, based on our simple floor plan. So, our first task is to decide on the type of foundation this house will rest on. Is it going to be on a “post and pier” foundation, or is it going to be on a concrete slab? For this exercise, we will use a slab foundation. The roof plan will be based on using 2x4 engineered trusses. Using these two plans we will then create the sections.

Drawing a Slab Foundation

A slab foundation is usually used for small buildings with no basement. Notations for rebars, ties, wire mesh, and footing depths are generally called out. Use the floor plan drawing from the previous chapter to begin.

1. First, open the drawing that you saved. To do this, select **Open** from the File pull-down menu. Select the **Open a Drawing** button from the Start Up dialog box. Find the drawing that you started in Chapter 2 and select it. Then pick the **OK** button to open the drawing.

In this chapter, you learn about:

- ◆ **Drawing a foundation plan**
- ◆ **Drawing a roof plan**
- ◆ **Rotating drawings**
- ◆ **Creating a section**

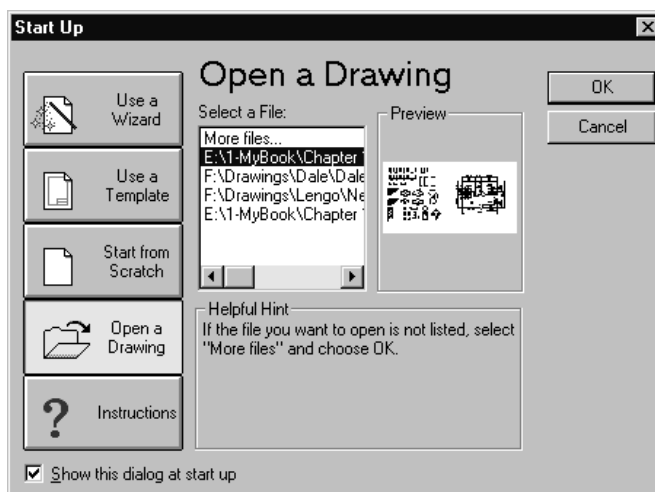


Figure 3-1
The Start Up
dialog in LT 98

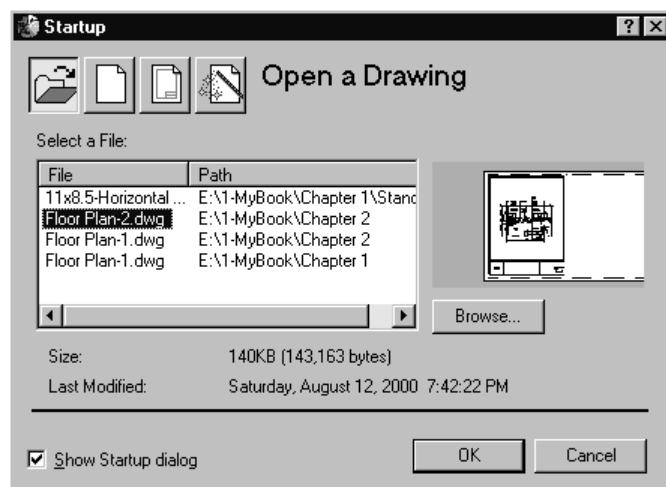


Figure 3-2
The Startup
dialog in
LT 2000

2. If your drawing is in paper space, the first thing you need to do is to change from paper space to model space. To do this, go down to the bottom status bar and double-click on the **TILE** button for LT 98, or select the **Model** tab for LT 2000. This will flip you into the regular model drawing screen. The border will disappear, since it was drawn in paper space. Now you will see a number of the blocks we provided in the lower left-hand corner of the screen, and your floor plan as shown in Figure 3-3.

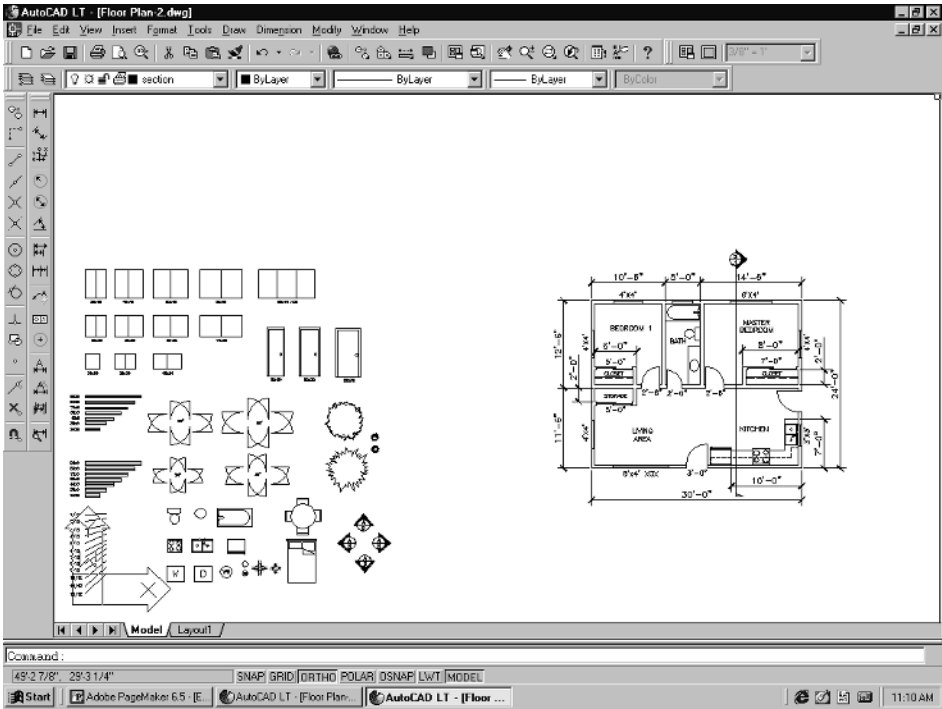


Figure 3-3

3. Now, you need to create a layer for the foundation plan elements. Pick **Layer** from the Format pull-down menu. The Layer Properties Manager dialog, shown in Figure 3-4, will come up.

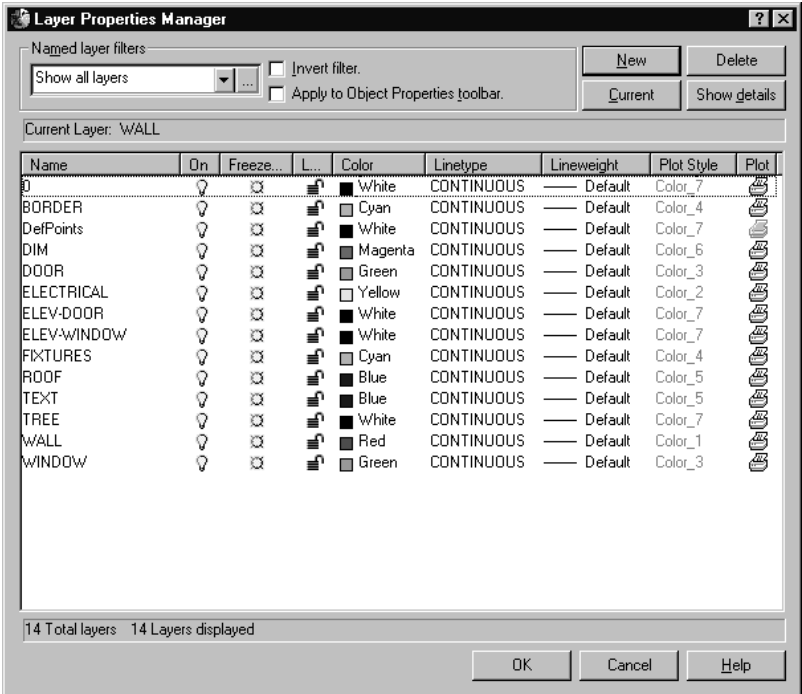


Figure 3-4

- Pick the **New** button. Then, type **Foundation-1** in the Layer Name box. Finally, pick the **Current** button and then **OK**. The current layer will now be set to Foundation-1 and you can begin drawing the foundation plan.



NOTE: You may want to change the color or linetype of the layer. We suggest you have your Object Properties toolbar docked at the top of your screen at all times. This way you can change object properties quickly, as well as call up the Layer Properties Manager dialog any time.

- Now, with our current layer set to Foundation-1, select the **Line** command and draw a rectangle 30'x24' to the side or above the floor plan. See Sheet #2 in the appendix and Figure 3-5.

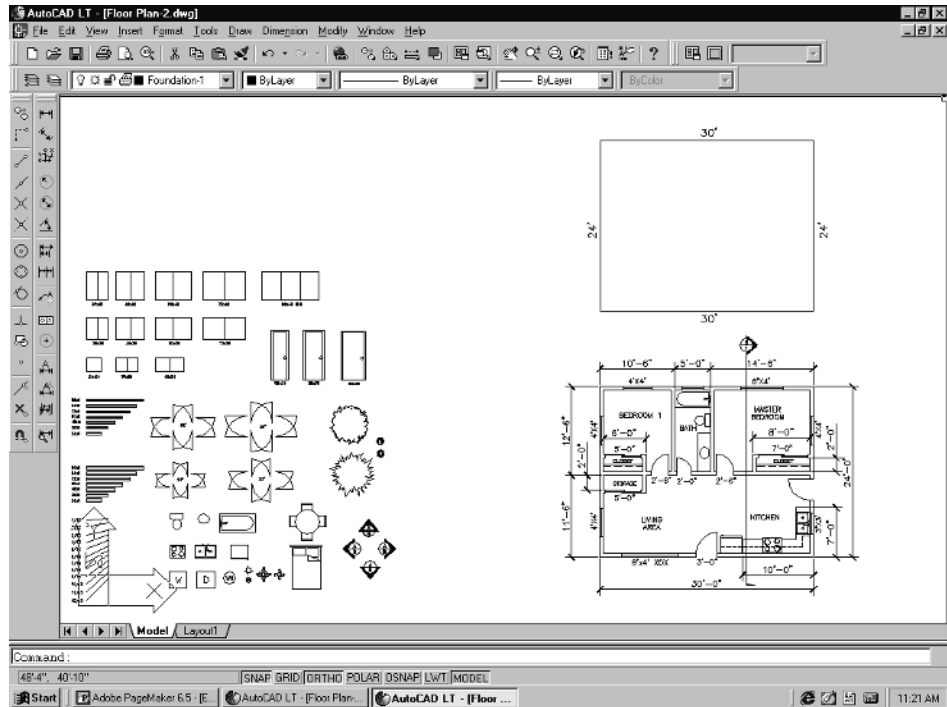


Figure 3-5

6. Zoom in closer to the rectangle you just created, and offset all four lines 12" to the inside. Use the Fillet or Trim command to clean up the inside lines. These represent the inside lines of the continuous perimeter footings. Select each of the inside lines so that the “grips” come on in each of them. Then change the linetype to **HIDDEN** by using the Linetype control on the Object Properties toolbar.

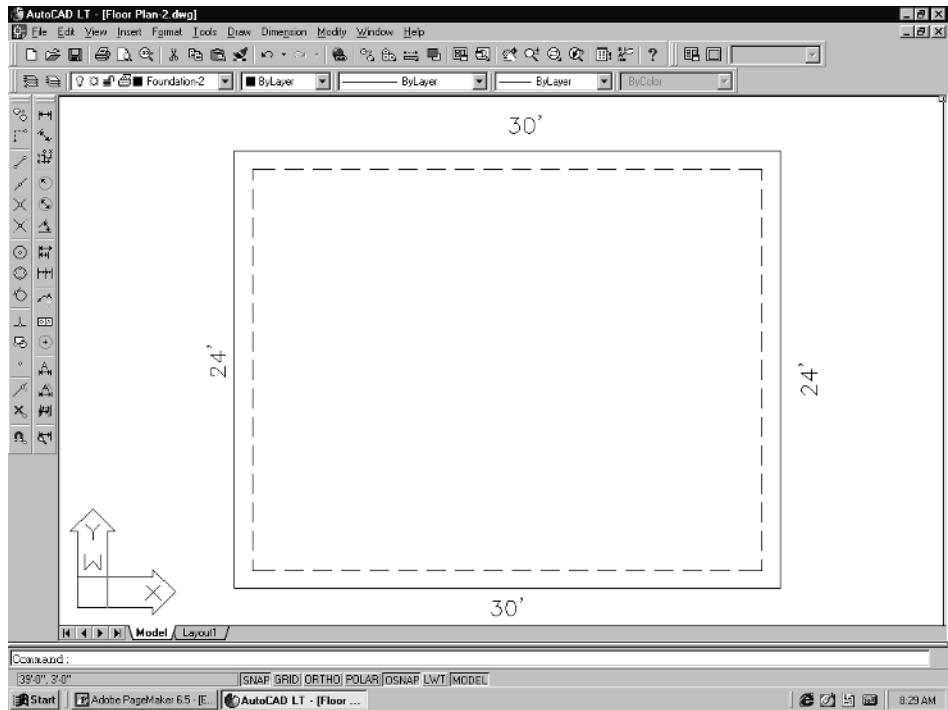


Figure 3-6

7. Next, we will dimension the foundation. Change the current layer to **DIM**, then select **Linear** from the Dimension pull-down menu. The dimension style should be set on RA96 already. Zoom out a little so that you are able to fit your dimensions on the screen. Now, dimension one width and one length, as in Figure 3-7.

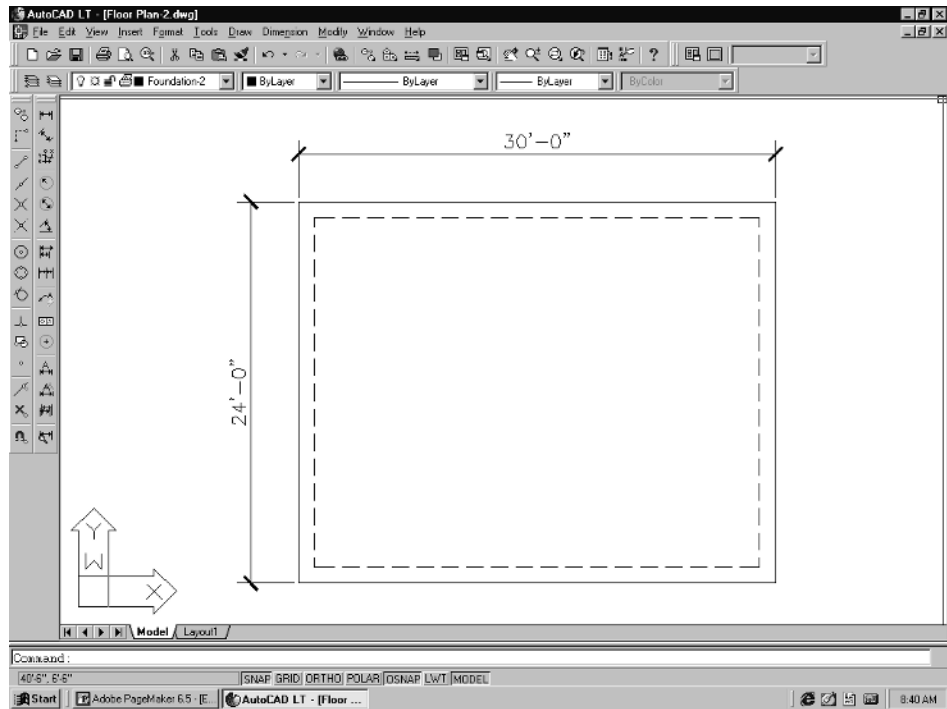


Figure 3-7

8. Next, you need to label the slab and footings. Change the current layer to **TEXT**. The text style should already be set to TEXT96. We will use the MText command for labeling. Type **MT** and **Enter**. You are prompted *First corner* and then *Other corner*. You are basically creating a box for your text to go in. See Figure 3-8.

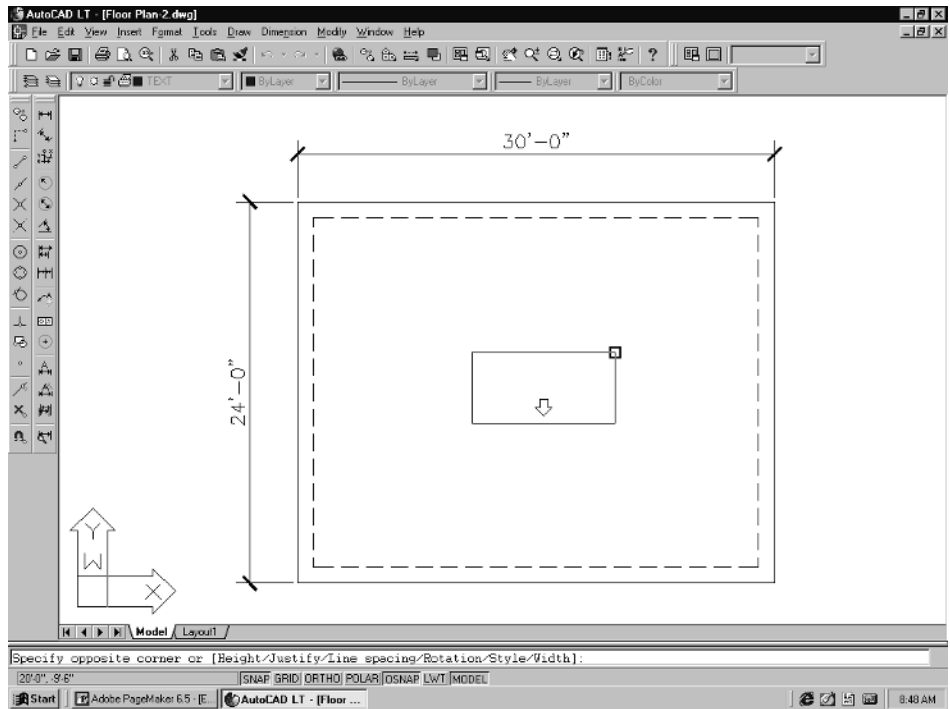


Figure 3-8

9. The Multiline Text Editor dialog, shown in Figure 3-9, will pop up. Type in your label text, then pick **OK** to exit. The difference between using MText and DText is that both will let you type multiple lines of text, but DText lines are not connected. They are each separate entities. MText lines are one entity and can be moved, copied, etc., as one.

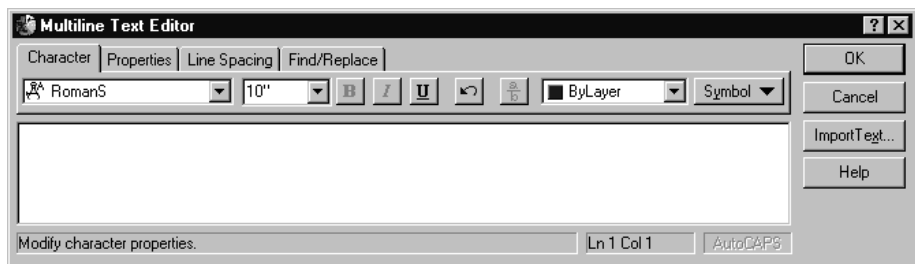


Figure 3-9

10. Type the following in the Multiline Text Editor box: **4" CONC. SLAB W/6"X6"/ 10#X10# WWM**. This means that this is a 4" thick slab with 6"x6" wire mesh for strength.

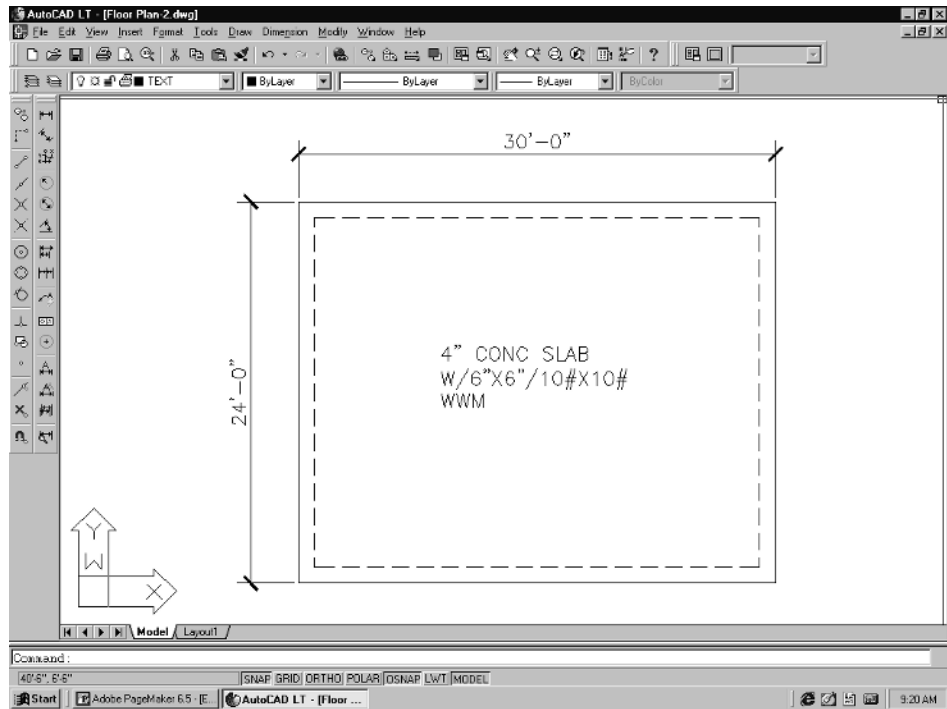


Figure 3-10

11. The text box created by the MText command can be stretched so that the text fits better. To do this, pick on the text and then pick one of the “grips” and pull with your cursor. See Figure 3-11.

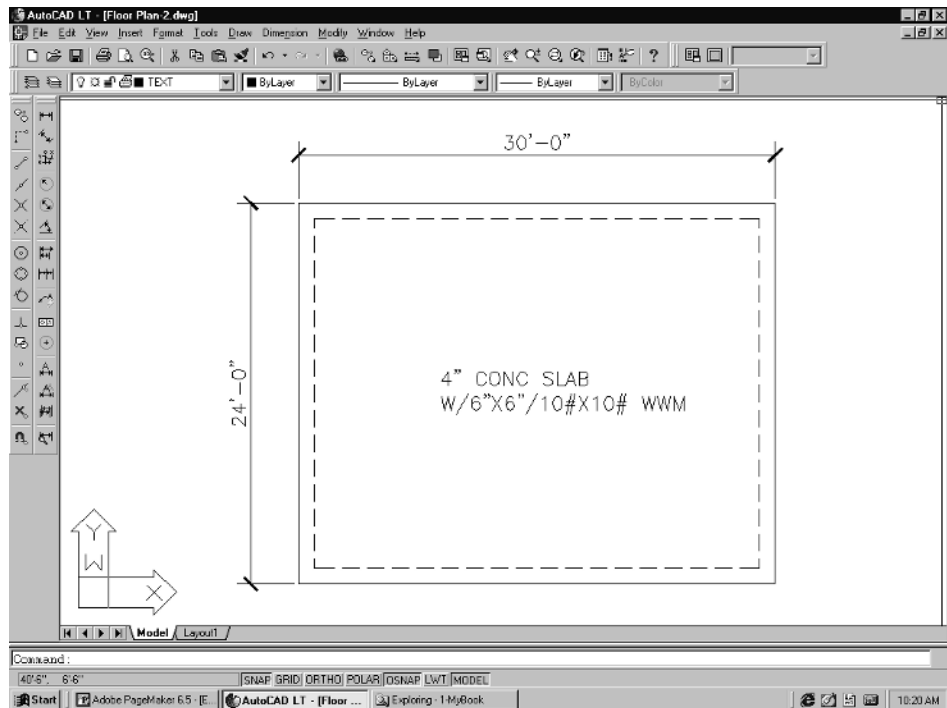


Figure 3-11

These little tasks that we are going through may seem mundane, but they are essentials when it comes to speeding up your drawing times.

12. Next, using MText again, label the perimeter footings as in Figure 3-12.

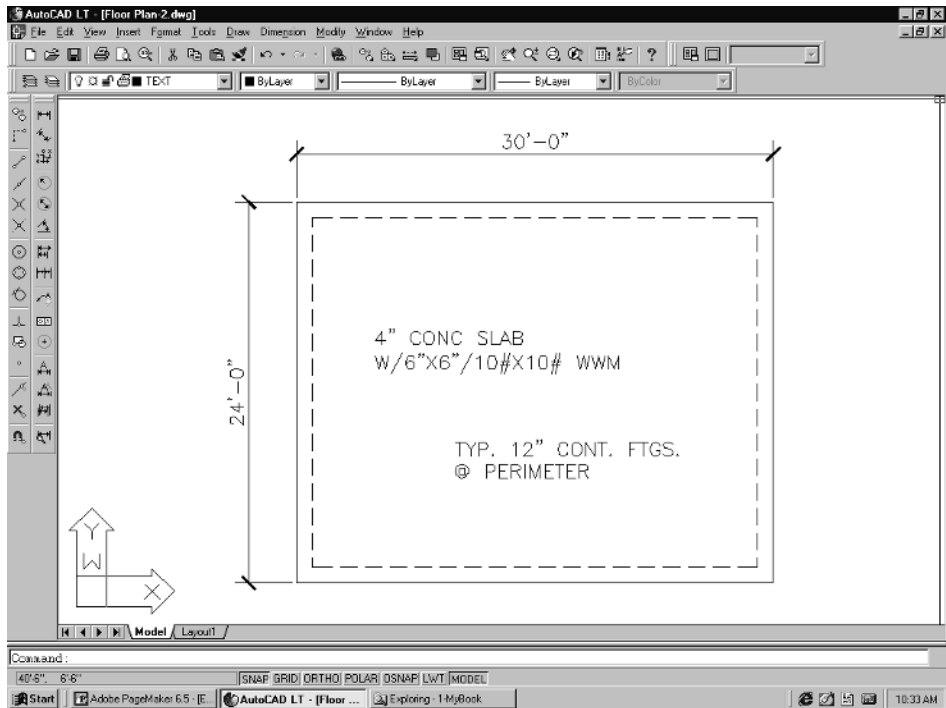


Figure 3-12

You will need to draw leaders from the labels to the objects or features they are describing.

13. In LT 98, you need to create a dimension style named LEADER. Then pick the **Geometry** button, and change the arrowheads to one of the arrow types (Open 30). Pick the **OK** button, then pick the **Save** button. Before starting to draw your leaders, change your dimension style to LEADER. You can also use the Property Painter to change any subsequent leader you draw to match the correct leader, by picking the first leader and then picking any new ones that you add after that.

LT 2000 has a much better setup for leaders that is quick and really makes drawing leaders easier. To set up your leaders, pick **Leader** from the Dimension pull-down menu. The command line prompt will say *Specify first leader point, or [Settings]<Settings>*. Type **S** and **Enter**. The Leader Settings dialog box will pop up.

Pick the **Annotation** tab and select **NONE**.

14. Pick the **Leader Line & Arrow** tab. Change the Arrowhead to **Open 30**. Change the Leader Line from Straight to Spline if you like curved leaders.

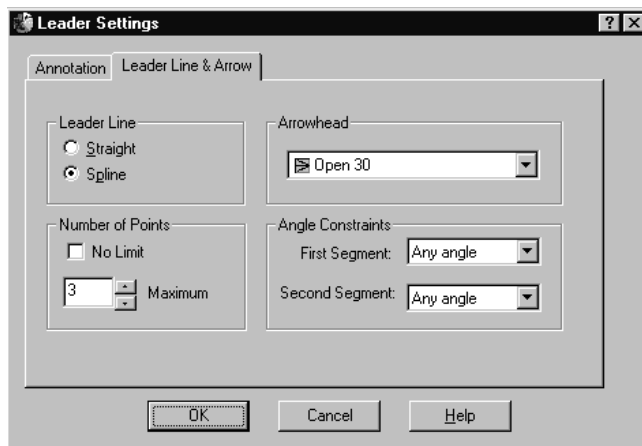


Figure 3-13

15. Pick **OK** when done. The prompt will go back to *Specify first leader point, or [Settings]<Settings>*. You have three picks. The first pick is where you want the arrowhead to start. The second pick would be where you want the bend in the leader to be. And the last pick should be the end of the leader line, at the label. See Figure 3-14.

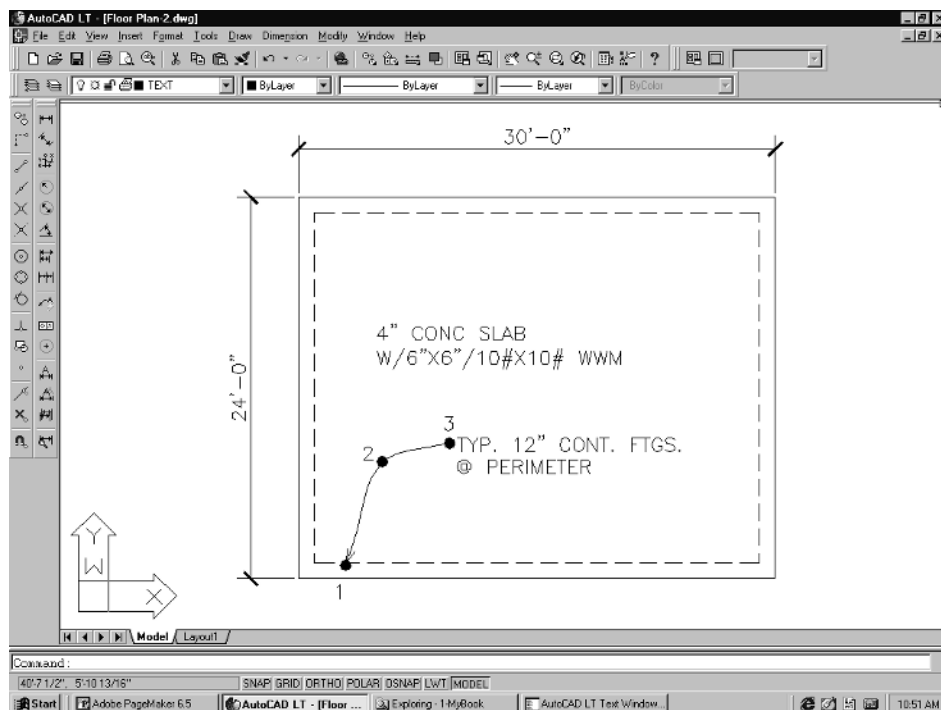


Figure 3-14



NOTE: You can change the number of picks to any number. I personally find three to be enough, but experiment and try more to see if it suits you.

16. Finish adding the rest of the leaders to the foundation plan using the same method. Your drawing should resemble Figure 3-15.

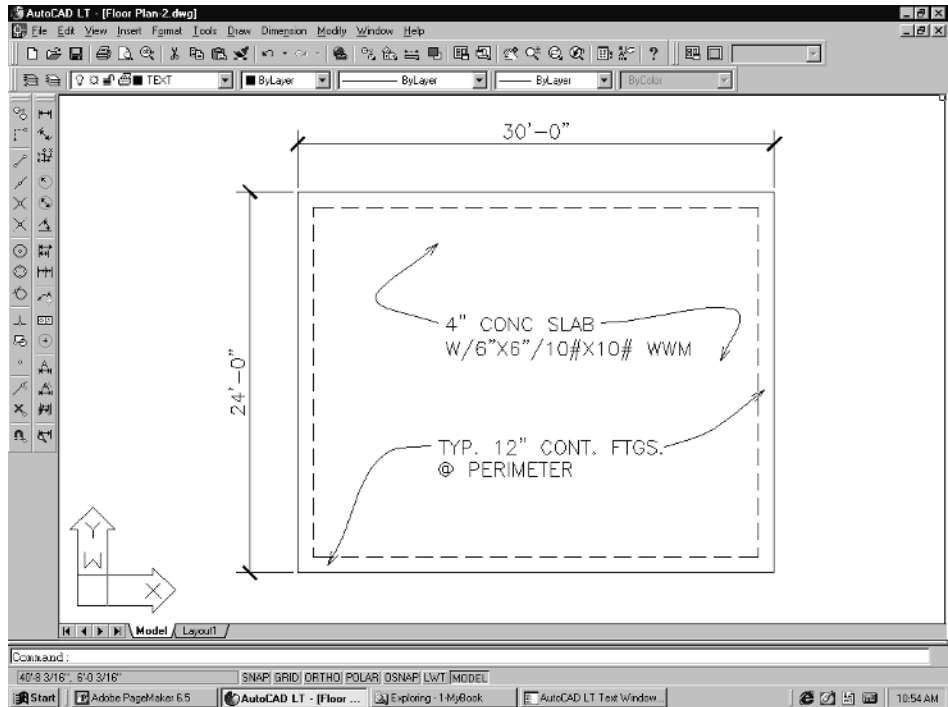


Figure 3-15

Drawing the Roof Plan

Next, you will draw the roof plan. This is a simple trussed gable roof. The pitch will be 5/12. The eave overhang will be 36" and the barge ends will be 24". The fascia and barge will be 2x6 with a 1x4 trim board.

Take a look at Sheet #3 in the appendix. This shows you roughly what the roof should be like. Let's begin by making a new layer named WALL_OUTLINE and making it our current layer.

1. **Zoom|Out** so that you can see the foundation plan and all the blocks in this drawing.

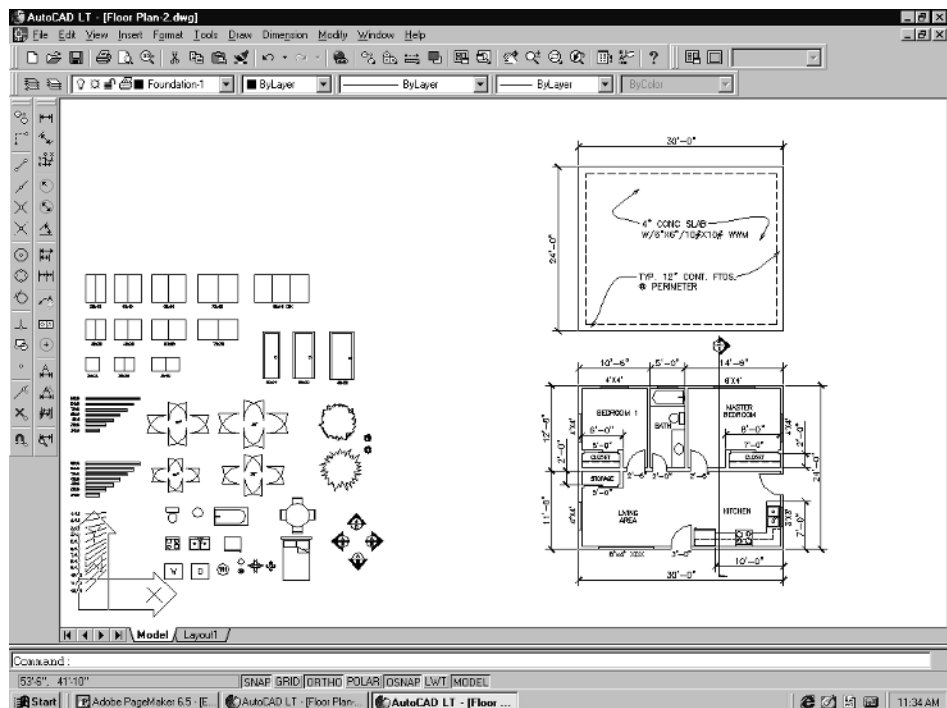


Figure 3-16

2. Copy the exterior lines of the foundation plan over to the right, away from the foundation plan. Change their layer property from Foundation-1 to **WALL_OUTLINE**. Then offset these lines **36"** out on the long sides, and **24"** out on the gable end or rake wall sides as shown in Figure 3-17.

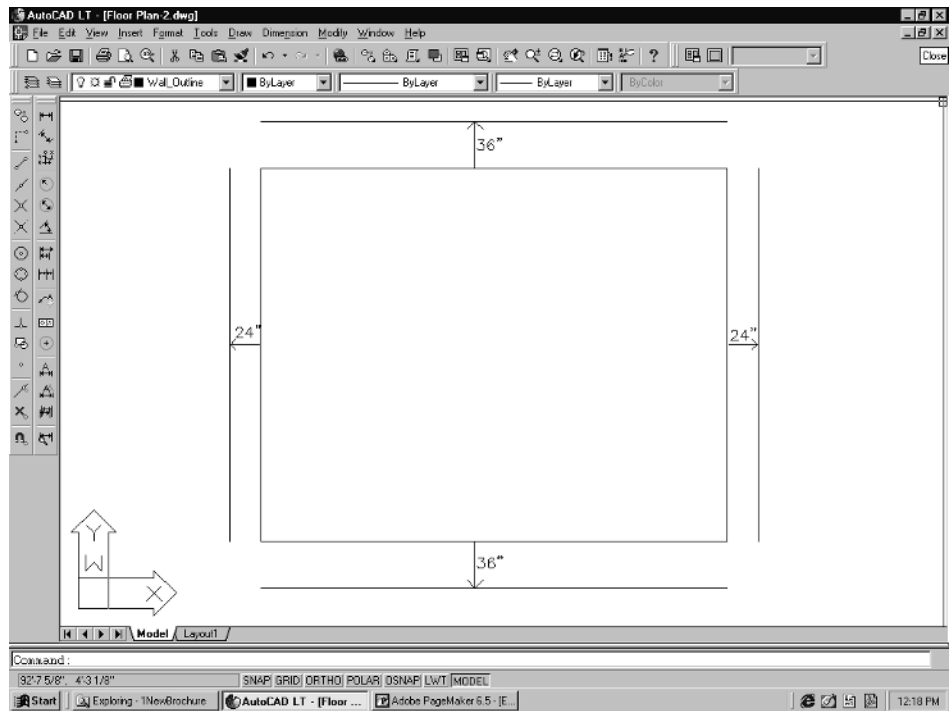


Figure 3-17

3. Use the Fillet command to square the roof lines up. Draw a ridge line from midpoint to midpoint of each gable end. Then change these lines to the ROOF layer by selecting each, and picking the layer **ROOF** from the pop-down list.

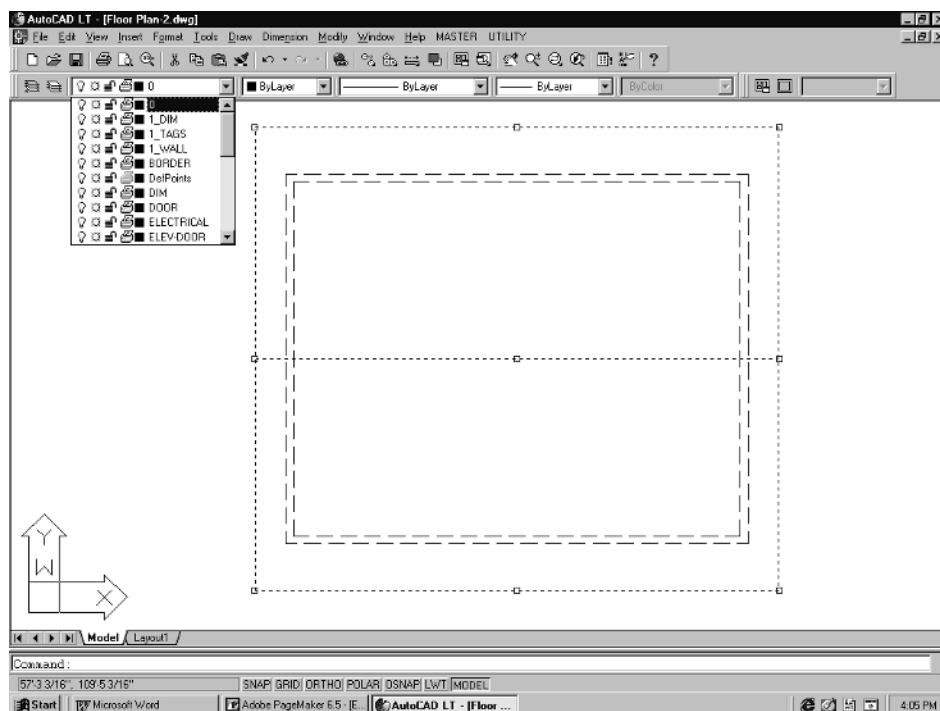


Figure 3-18

- Next, pick on the wall lines below the roof. Change these to the HIDDEN linetype by selecting the Linetype control on the Object Properties toolbar.

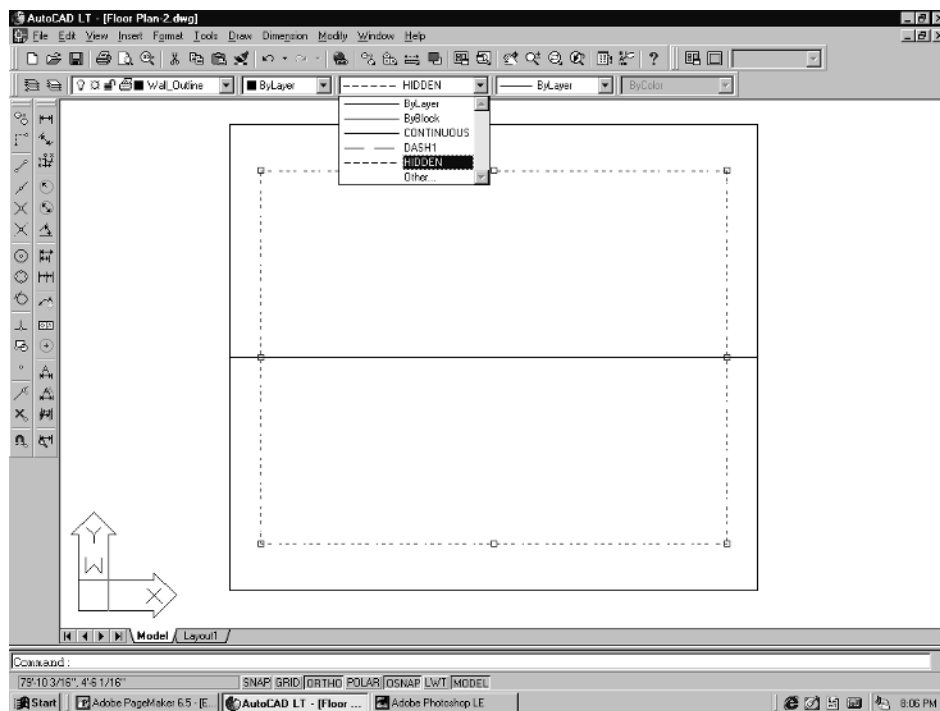


Figure 3-19

5. Type **PEDIT** and **Enter**, or pick **Object** from the Modify pull-down menu. Select **Polyline** from the cascading menu that comes down. At the *Select polyline* prompt, pick one of the dashed wall lines (#1).
The command line should read *Object selected is not a polyline. Do you want to turn it into one? <Y>*. Press **Enter** for Yes.
6. The command line will then prompt *Enter an option [Close/Join/Width/Edit vertex/Fit/Spline/Decurve/Ltype gen/Undo]*. Type **J** (for Join). When prompted to *Select objects*, pick all of the dashed wall lines (#1), (#2), (#3), and (#4) as shown below. Then hit **Enter** twice to exit.

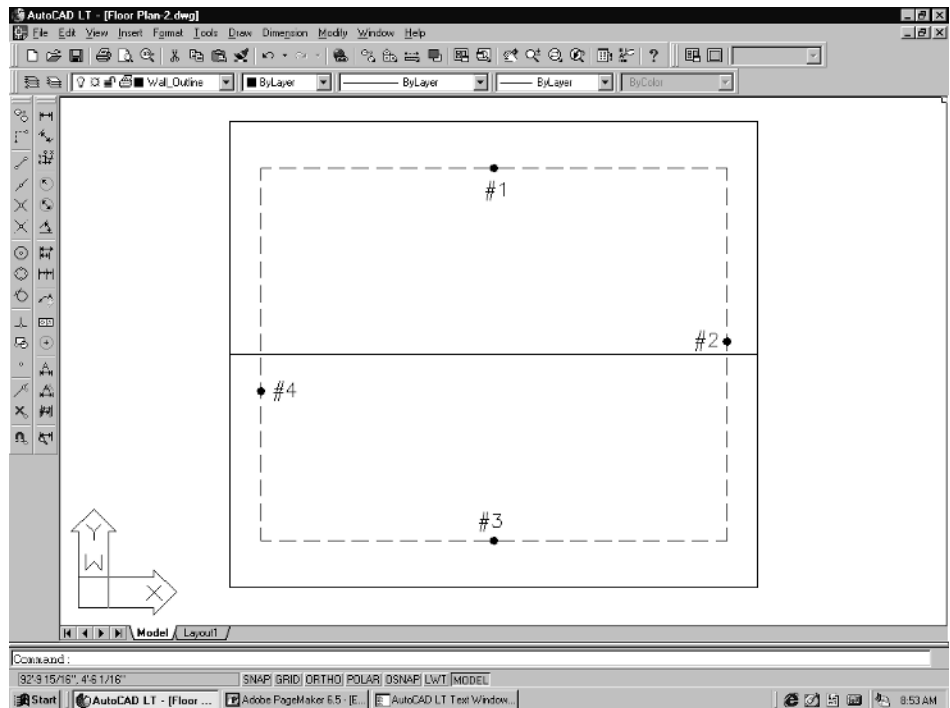


Figure 3-20

7. The wall lines that you just joined have now become a single polyline and can be manipulated as a single entity. Our purpose here was to show the wall lines below the roof plan, so select the **Offset** command from the Modify pull-down menu. The command line will read *Specify offset distance or [Through] <Through>*. Type **6** and **Enter**.
8. When prompted to *Select object to offset or <exit>*, pick the dashed wall line. You will be prompted to *Specify point on side to offset*. Pick anywhere inside of the plan. The dashed wall lines will offset. Hit **Enter** to exit.

This is to be a simple engineered truss roof. The eave line overhang is 36". The gable end overhang distance is 24". The truss spacing is 24" O.C. The fastest

way to draw your roof truss is to use the Offset command. Your offset distance is 24".

1. At the *Specify offset distance or [Through] <Through>* prompt, type **24** and **Enter**.
2. When prompted to *Select object to offset or <exit>*, pick the left side gable end.
3. At the *Specify point on side to offset* prompt, pick anywhere to the right of the line you just selected.
4. The *Select object* prompt will come up again. Pick the new line and pick to the right of it when prompted *Side to offset*. Keep offsetting the lines until you have all your rafters drawn, as in Figure 3-21.

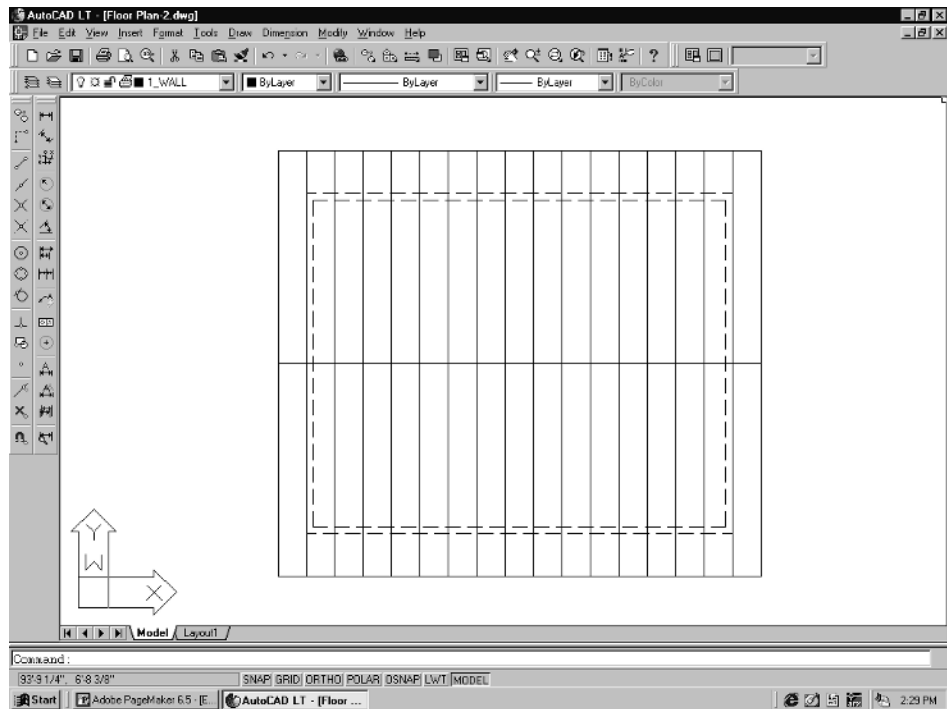


Figure 3-21

Next, add the look-outs. Look-outs are 2x4s at 48" on center. They are laid flat and run perpendicular to the trusses, from the second to the last truss out to the fascia. Keep in mind that this is a very simple layout and is only intended to show you AutoCAD LT drawing techniques, rather than show you how to build.

Building practices vary throughout the country and the world, so this may go against what you are normally used to. Don't worry about it, as these are only examples. In any case, Figure 3-22 shows what the completed roof plan should look like. Callouts for materials and dimensions have also been added.

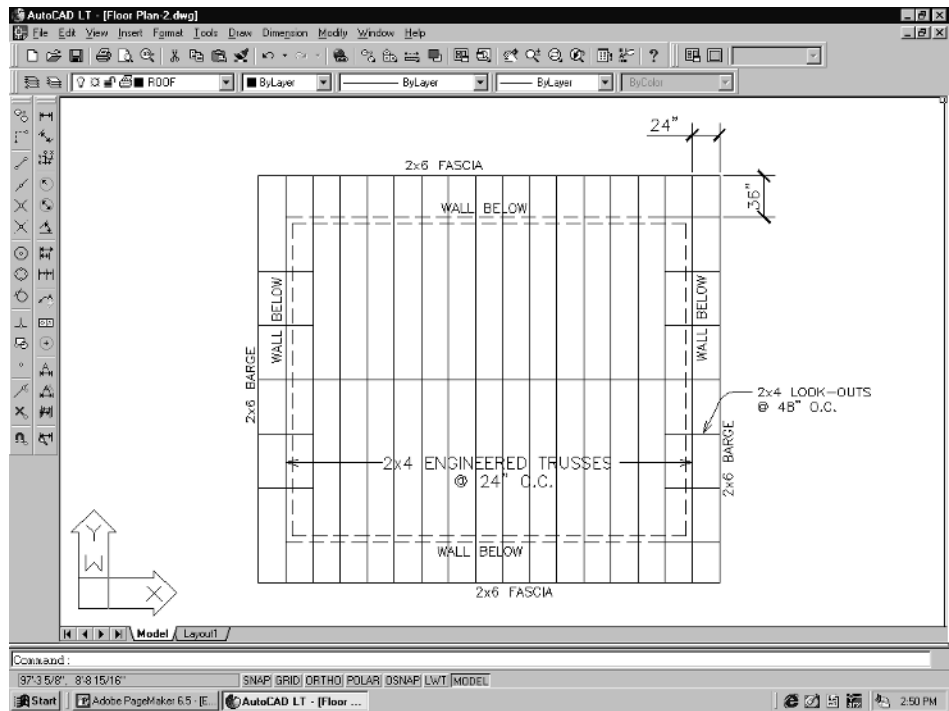


Figure 3-22

Creating a Section

Now that you have the floor plan, foundation plan, and roof plan, you can go ahead and build a section. The important features to show are the slab and footings, wall materials and hardware, rafters or trusses, and dimensions.

The first thing you need to do is figure out where you want to cut the section. Ideally, this should be through a part of the building that will show the important structural elements that might not be so clear in any of the other drawings. This building is so simple that a single section is all that is necessary. Most projects you work on will need a number of sections drawn, especially in multistory construction and commercial projects.

We have added section symbols to all of our base templates. We have placed one of these on the floor plan in Figure 3-23. We then drew a line across the house to represent the “cut” line of the section. The placement of this section was chosen so that we can show the builder the maximum amount of information with just one section. Notice that the section line crosses the kitchen counter and cabinets. This gives the builder information on their location.

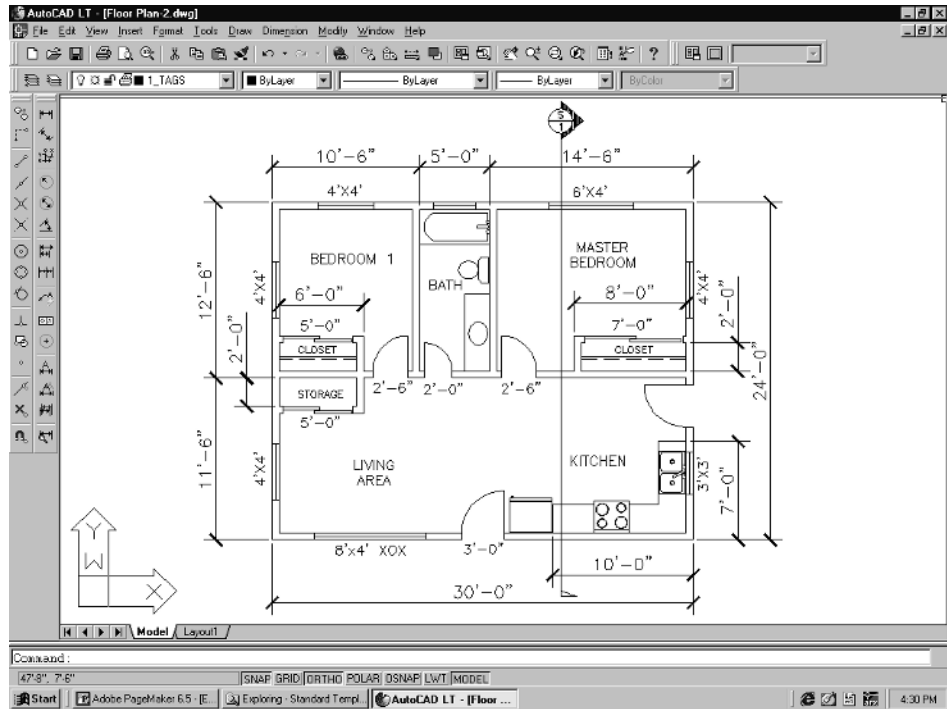


Figure 3-23

Rotating the Floor Plan

To draw the section we have chosen, it is a good idea to rotate the floor plan so that you are working on the section in a horizontal orientation. You would not need to do this if the section cut line was running horizontally, but because the cut line is running vertically, you will need to rotate the floor plan. There are a couple of ways to do this. Follow either Option A or Option B. Either way works fine.

Option A:

Before you begin, turn off any layers that are not necessary like DIM and TEXT. Next, type **ucsfollow** and **Enter**. At the prompt *Enter new value for UCSFOLLOW <1>*, type **1** and **Enter**. Type **UCS** and **Enter**. Type **N** (for New) and **Enter**. Type **OB** (for Object) and **Enter**. When the command line prompts you to *Select object to align UCS*, pick the section line, as shown in Figure 3-24.

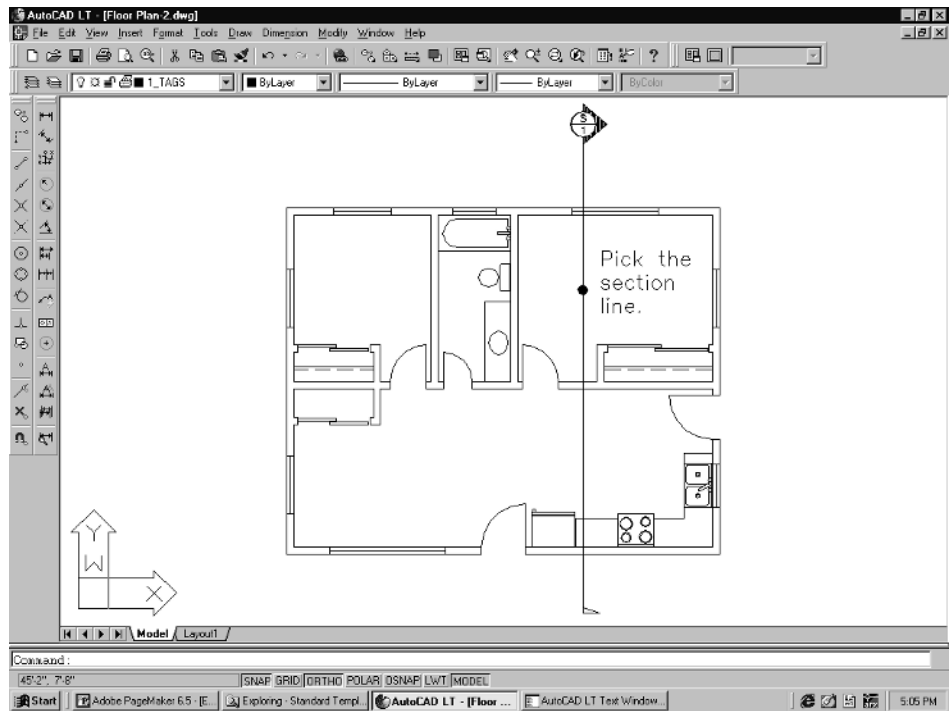


Figure 3-24

Option B:

Or, you can use one of the buttons on the Arch LT toolbar that we provided on the companion CD. Pick the **Shift to Left Elevation** button. This will rotate the floor plan automatically so that the left side is in the horizontal orientation.

The floor plan will rotate as in Figure 3-25. Zoom in some so you can see that the section line you selected is now in a horizontal orientation. This means you can now start pulling lines up off of the floor plan.

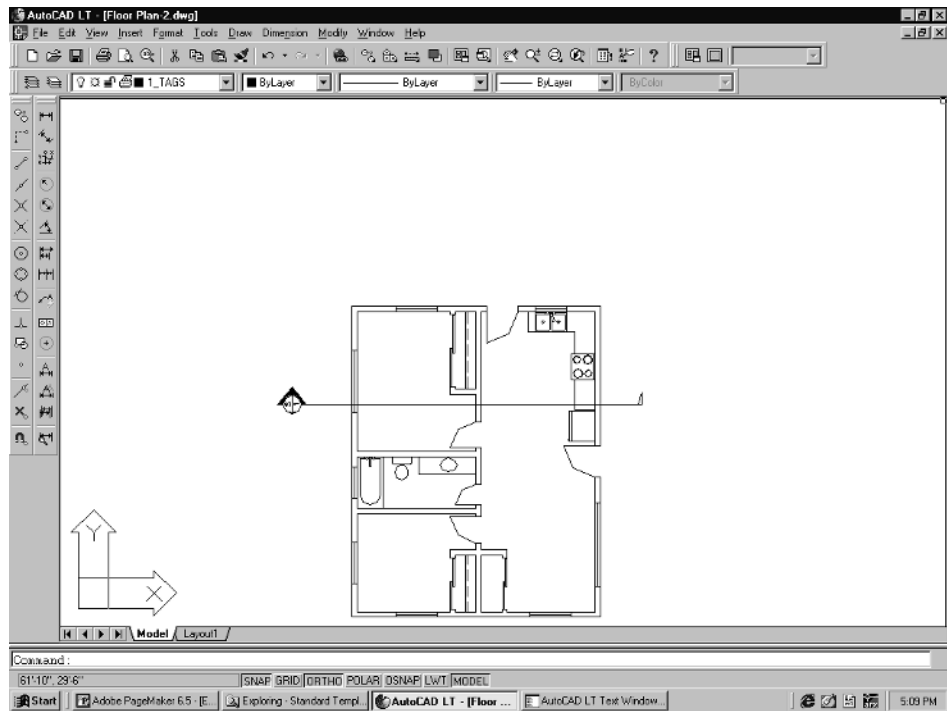


Figure 3-25

To continue:

1. Make a layer named **SECTION** and make it current. Type **OSNAP** and enter. The Drafting Settings dialog will come up.
2. Select the **Object Snap** tab. Pick **Endpoint** and **Perpendicular**, then pick **OK**. For LT 2000, just right-click on the **OSNAP** button on the status bar and pick **Settings**. Then, set **Endpoint** and **Perpendicular**.
3. Now, you can begin to pull lines off of the floor plan. Using the Line command, pick the exterior and interior wall corners and pull up. Then draw a horizontal line to represent the floor line.

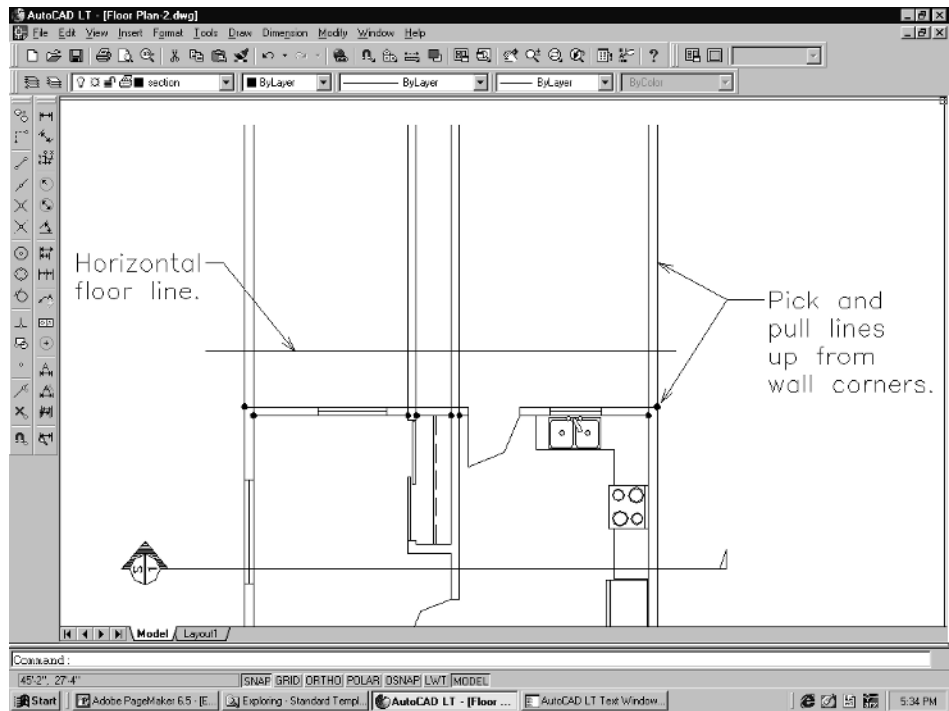


Figure 3-26

4. Trim the wall lines using the floor line as the cutting edge. Then offset the floor line 8' up to create the ceiling line and trim the wall lines that run above it.

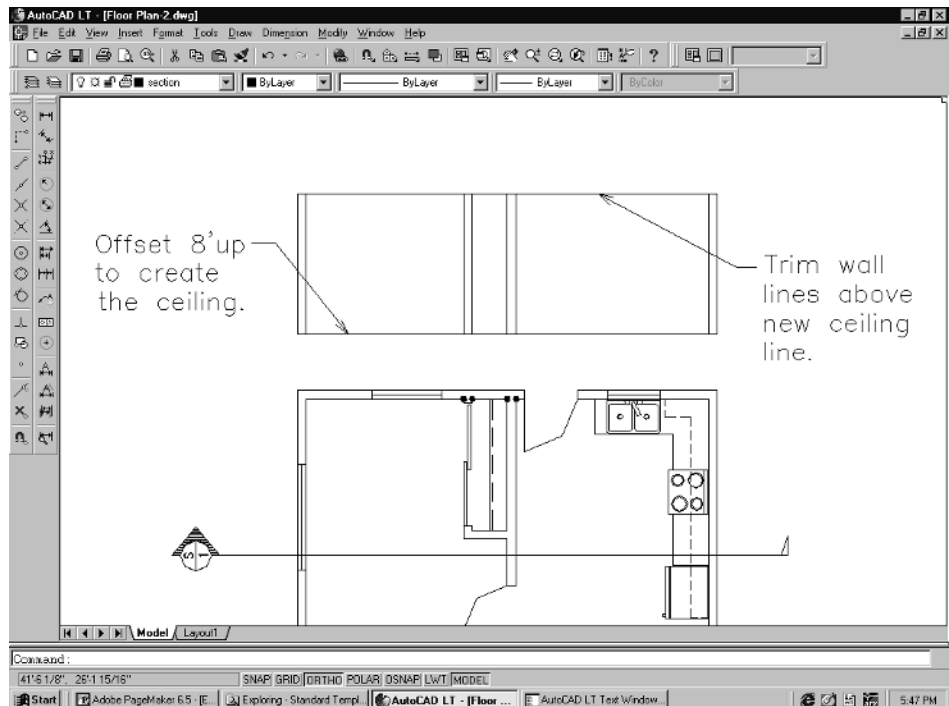


Figure 3-27

- Next, pick the cabinet and counter corners and pull lines up into the section wall.

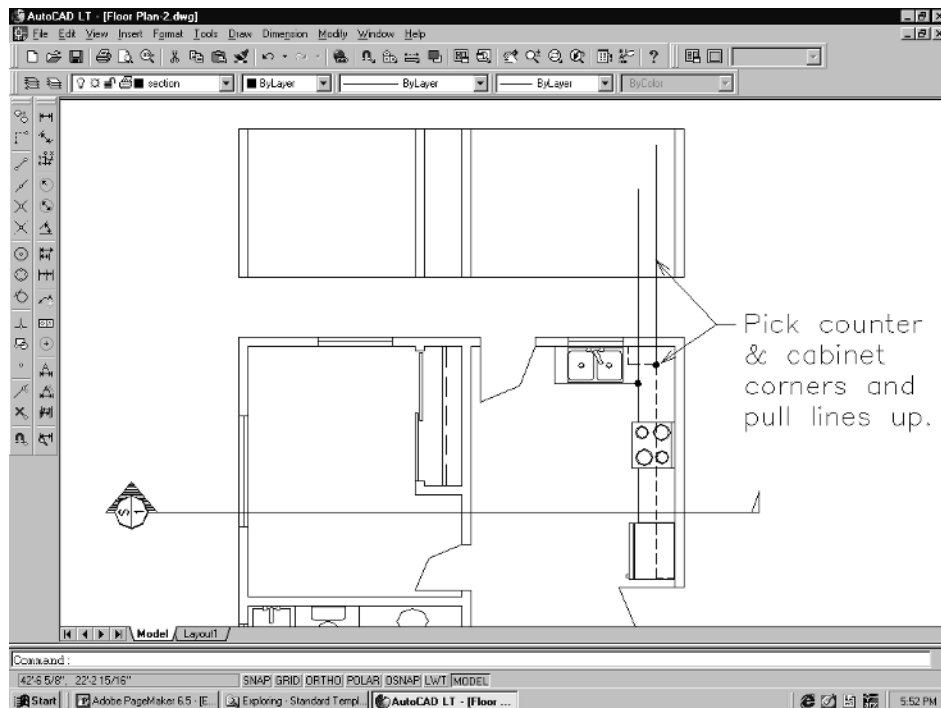


Figure 3-28

- Offset the floor line **36"** up to represent the counter top. Then offset the floor line **7'** up. This will represent the top of the wall cabinets. Lastly, offset that line **30"** down to represent the bottom of the wall cabinet. You now have the rough outline of the cabinets and counters.

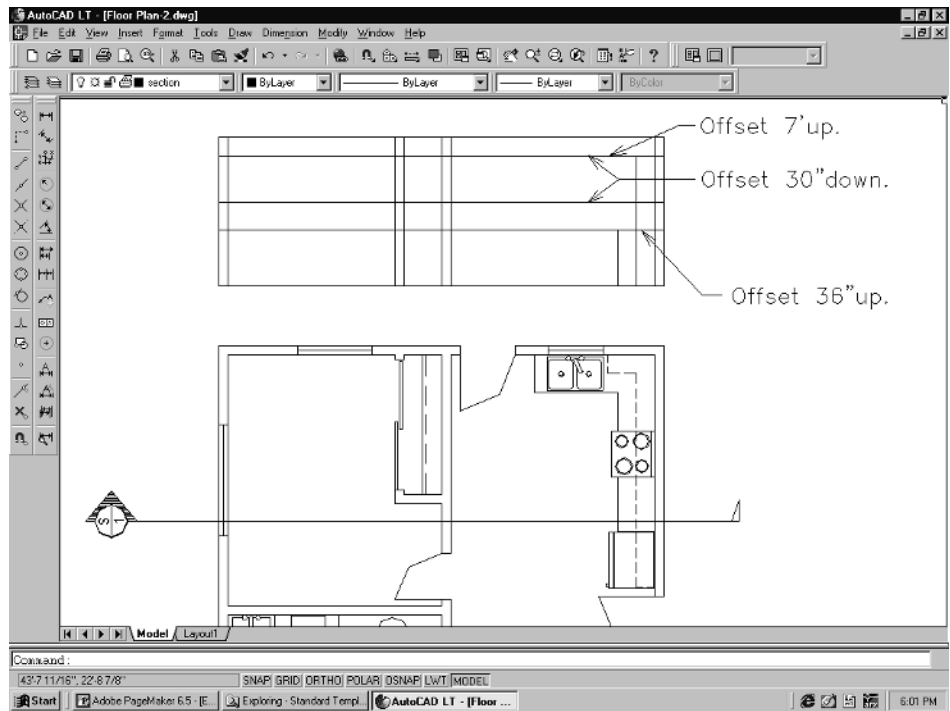


Figure 3-29

7. Use the Trim and Fillet commands to clean up the counter and cabinet lines. Your drawing should resemble Figure 3-30.

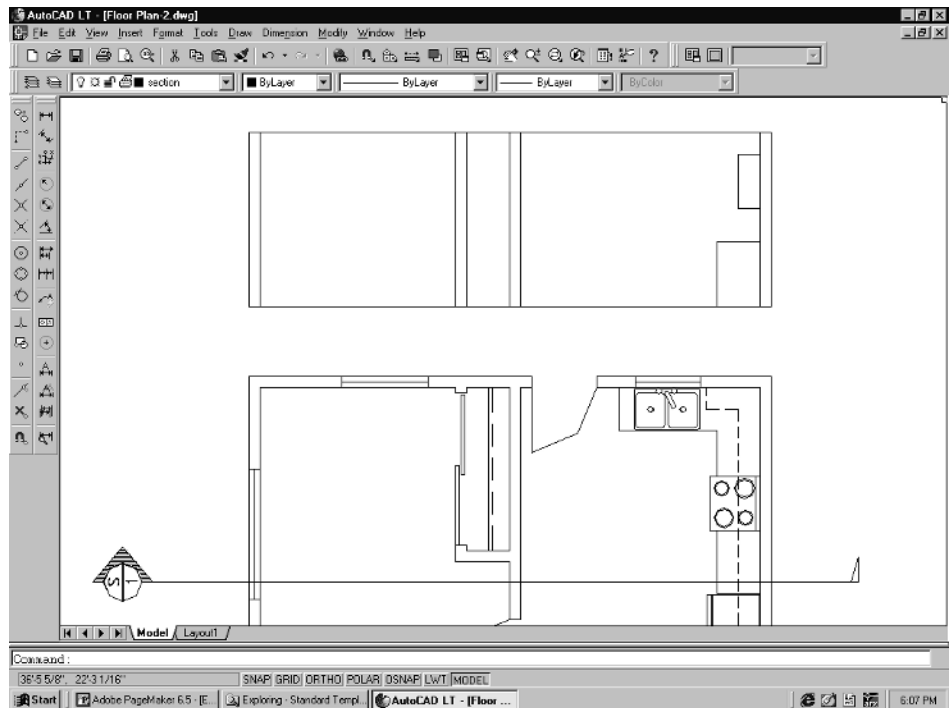


Figure 3-30

At this point we have all the lines that we needed to “pull” from the floor plan. We will need to change the drawing back to the normal UCS orientation. Then, we will need to rotate the section walls 90 degrees.

1. First, type **UCS** and **Enter**. Then, **Enter** once more to automatically change the drawing back to plan view as in Figure 3-31.

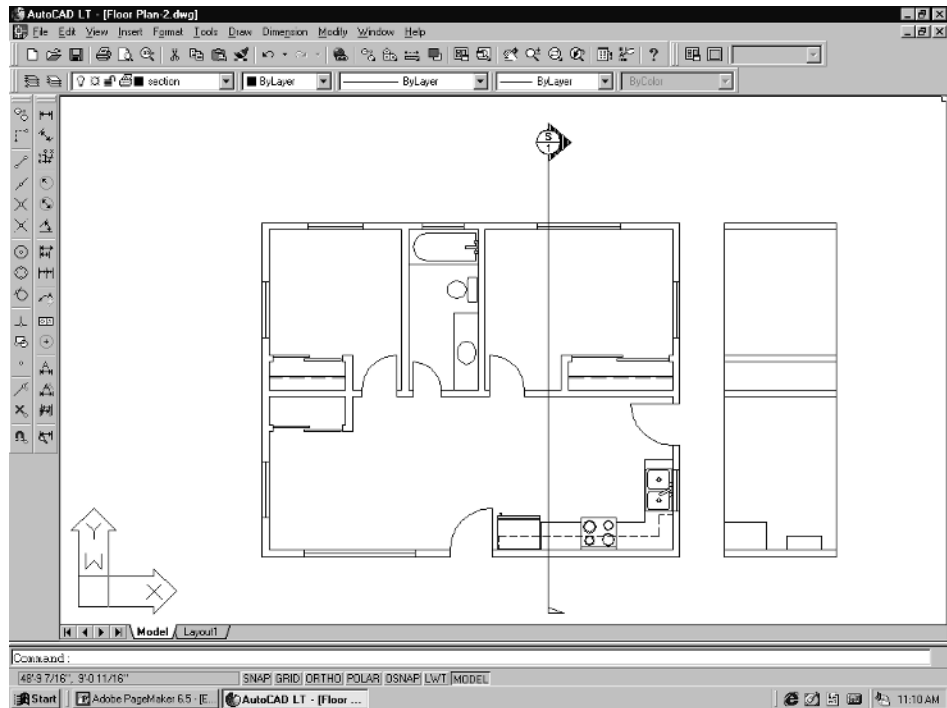


Figure 3-31

Plan view is like being in an airplane and looking straight down on a house. It is also the original orientation of your drawing when you start AutoCAD LT. How do you know you are truly back in plan view? Look at the UCS icon in the lower left corner of the above figure. When you see this icon with the Y and W pointing up and the X pointing to the right, you know you are in plan view. This means you are looking straight down on the drawing. Let's proceed with the section.

2. Now that we are back in plan view, we need to rotate the section walls and floor/ceiling lines, so that they are horizontal. To do this, pick **Rotate** from the Modify pull-down menu. When the command line prompts you to *Select objects*, pick corner 1 as shown in Figure 3-32. When asked to *Specify opposite corner*, pick corner 2.

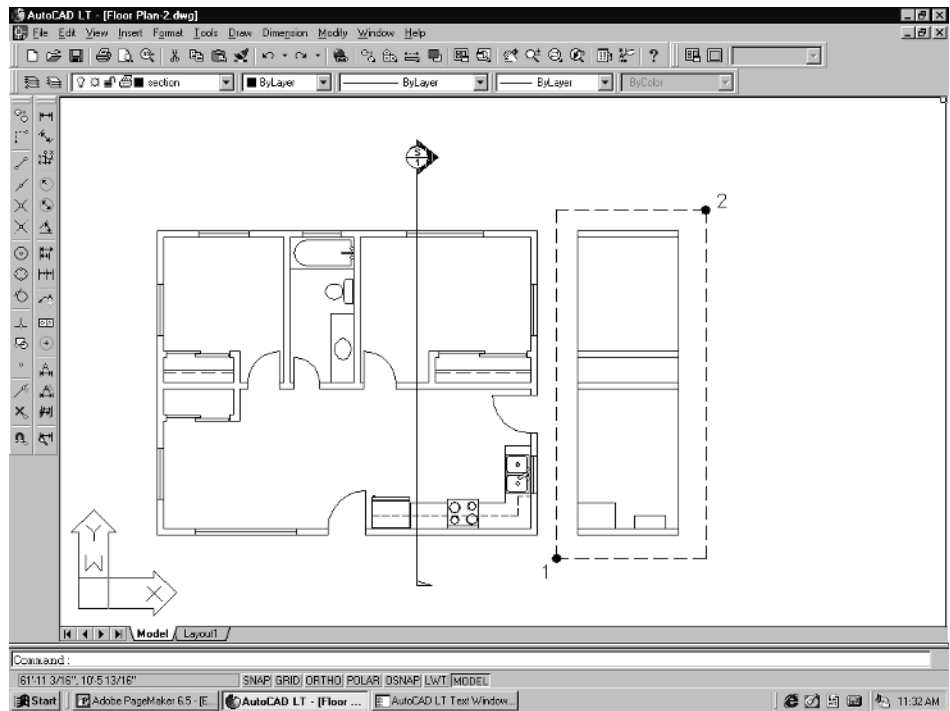


Figure 3-32

3. At the *Specify base point* prompt, pick wall corner 3 as shown in Figure 3-33. Then at the *Specify rotation angle or [Reference]* prompt, pull your cursor up.

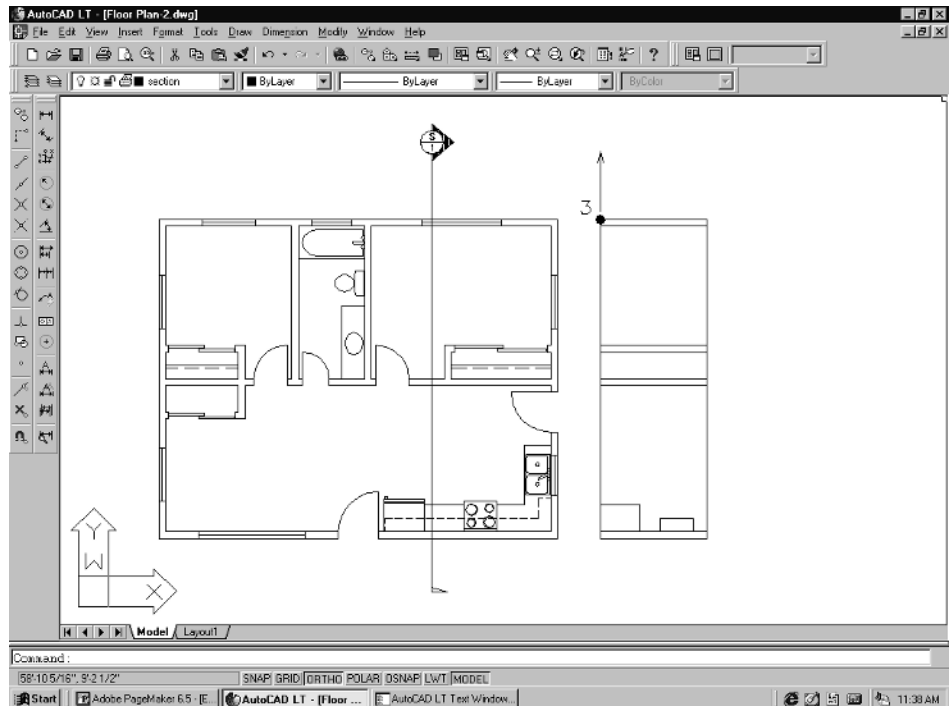


Figure 3-33

The section walls should rotate to the correct horizontal position as shown in Figure 3-34.

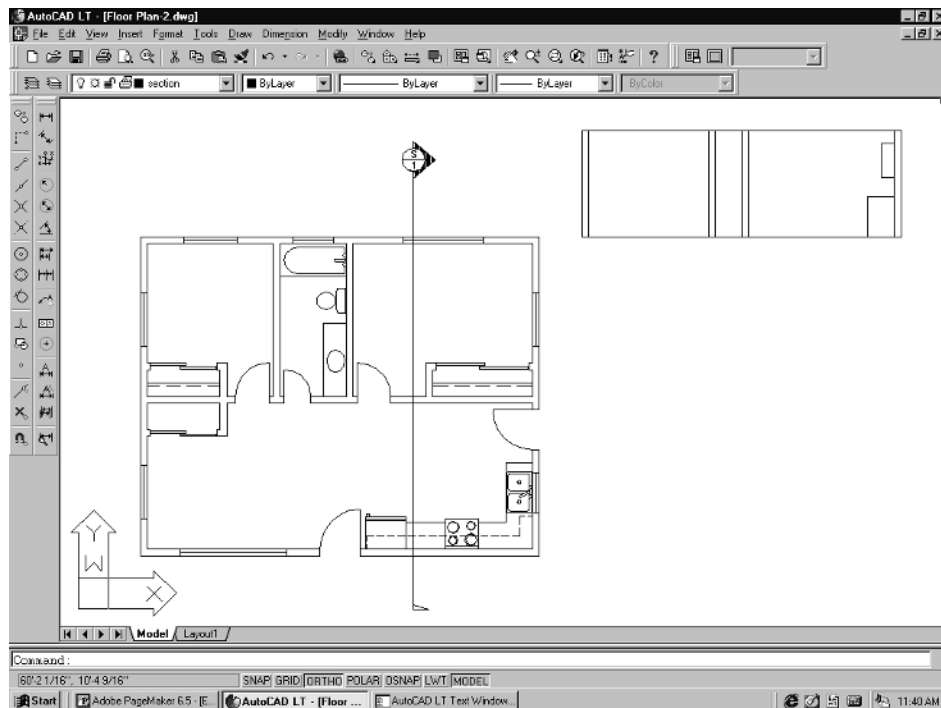


Figure 3-34



NOTE: It is always a good idea to check the UCS icon orientation. It is located in the lower left corner of the drawing screen. If the UCS icon has only the Y pointing up and the X pointing to the right, you are not in Plan view. It is okay to draw in this orientation, but unexpected results can occur when the UCS icon is not in the standard orientation with YW pointing up and X pointing right. Much of this is explained in the AutoCAD LT manual and Help files. But remember, it is always a good idea to pay attention to the UCS icon orientation.

Printing the Foundation Plan

To print the foundation plan, you need to move the floor plan that is showing in the viewport out and then move the foundation plan in. Easy enough.

1. First, pick on the **PAPER** button on the status bar at the bottom of the screen. It will change to **MODEL**. Pick the **Pan** button and pan the drawing down so that you can see the foundation plan, as in Figure 3-35. Do not zoom while in floating model space or you will have to rescale the viewport. This is not that difficult to do, but for now, just use the Pan command to move the drawing around in the viewport.

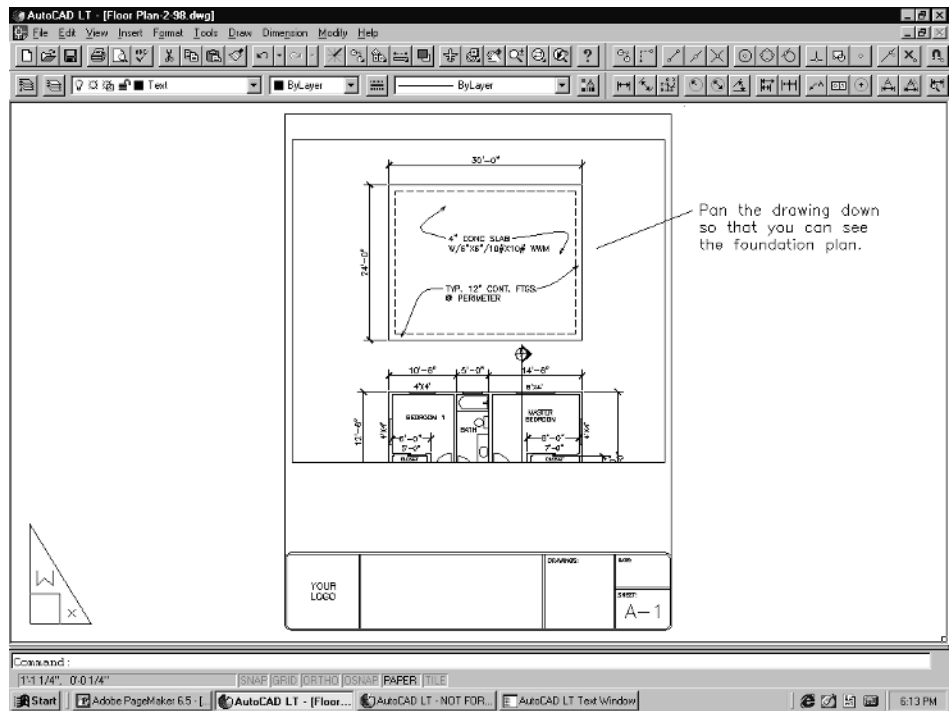


Figure 3-35

Once you have used Pan to move the foundation plan onto the view, center it in the viewport and then hit the **MODEL** button on the status bar. This will take you back to paper space.

2. Once you are back in paper space, you can use the grips method to stretch the viewport to fit the foundation plan and hide the floor plan, or anything else that might be showing that you don't want in your plot.

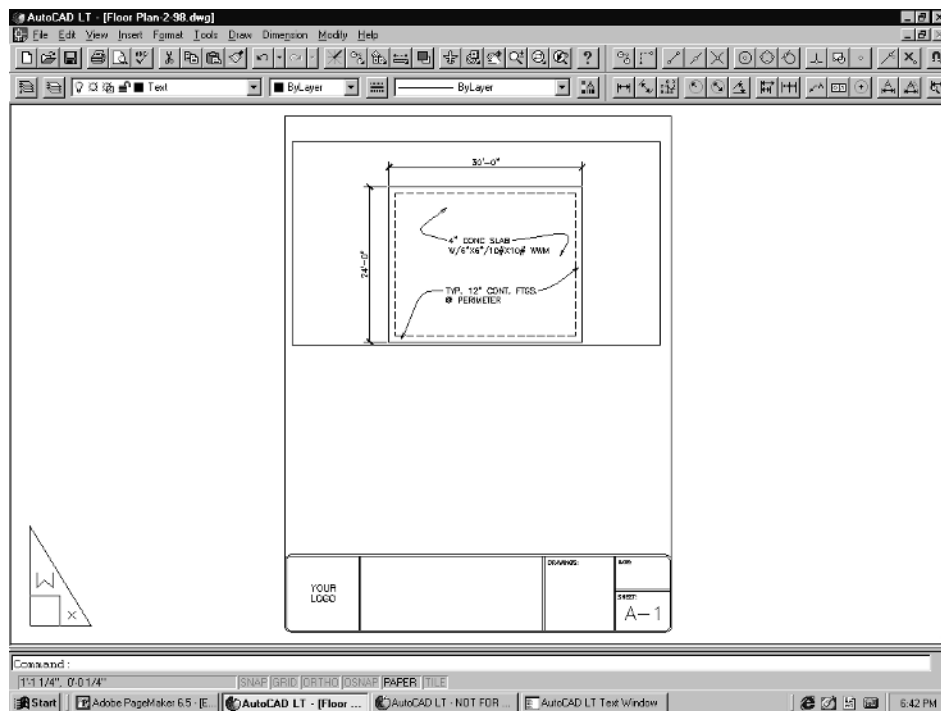


Figure 3-36

When you are ready, you can go ahead and print the foundation plan. Remember to use a plot scale of 1 to 1.

Developing the Roof

Now we're going to draw the roof section.

1. First, **Zoom|Extents** so that you can see the floor plan, the partial section, and our symbols. Then, **Zoom|In** to the symbols. Pick **Copy** from the Modify pull-down menu. When prompted to *Select objects*, window around all of the roof lines, as shown in Figure 3-37, then **Enter**.

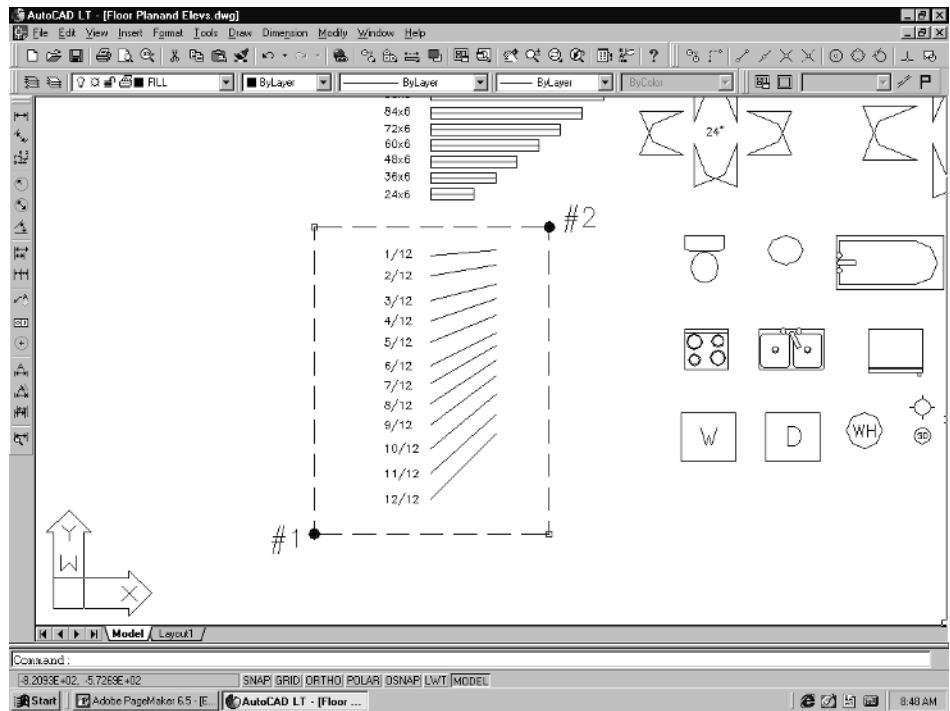


Figure 3-37

2. For the *First point of displacement* prompt, pick right in the center of the roof lines. For the *Second point* prompt, hit the **Zoom Previous** button on the Standard toolbar, then drag the roof lines over closer to the partial section and pick a point. See Figure 3-38. This way they are accessible when you need them.

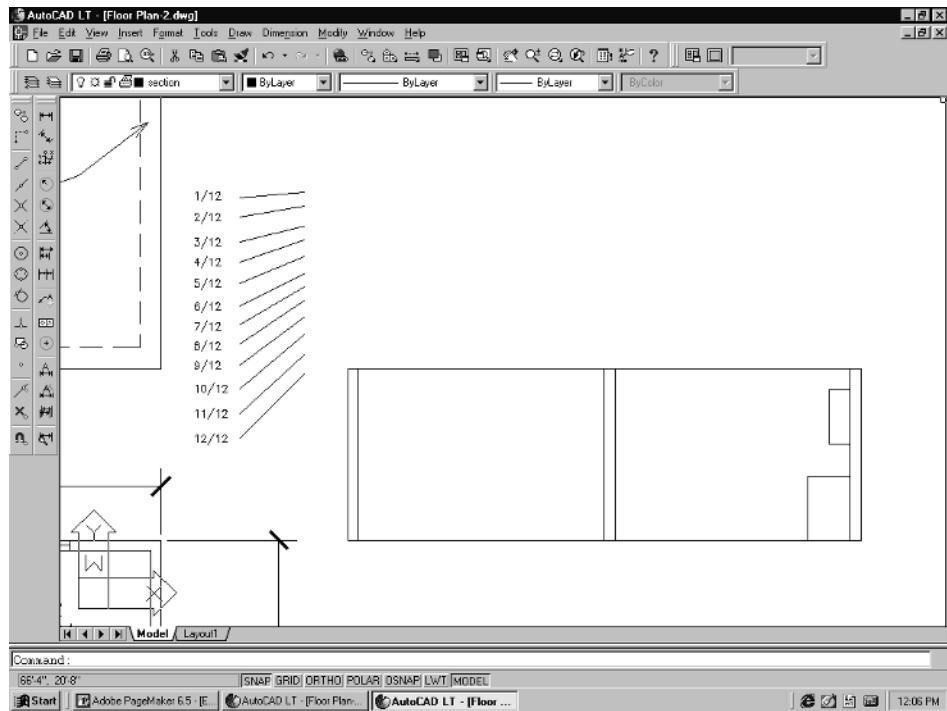


Figure 3-38

3. Now you can really begin to develop the section. Earlier in this chapter we mentioned that the roof was to have a 5/12 pitch. So the first thing to do is to copy the 5/12 roof line. Copy it using the lower endpoint as the first point of displacement. Pull it over and pick the top left corner of the section wall for the second point.

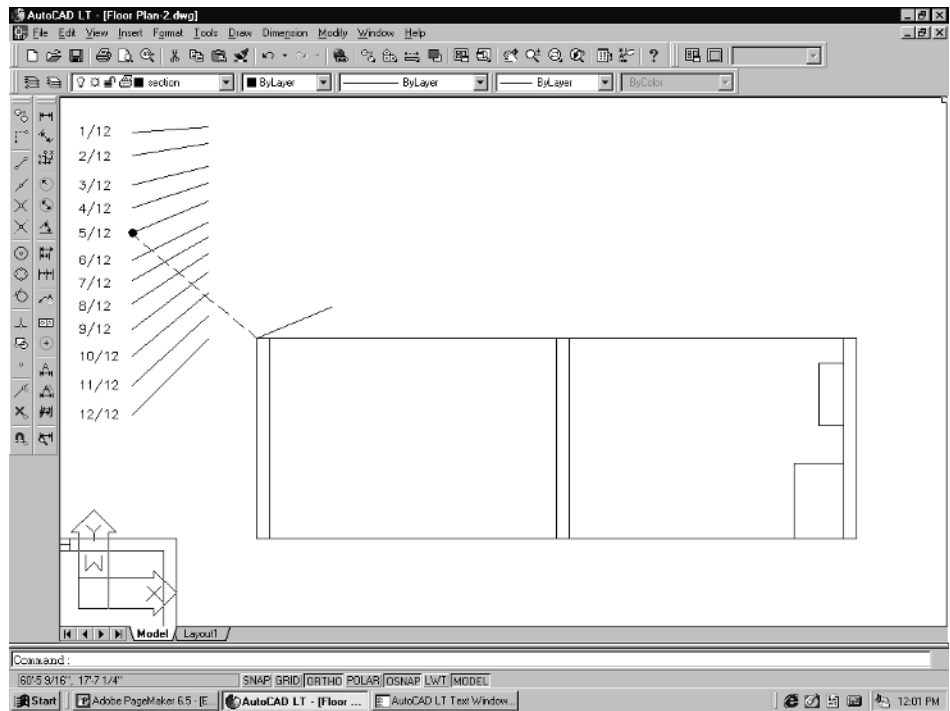


Figure 3-39

4. Next, pick the **Mirror** command from the Modify pull-down menu. When prompted to *Select objects*, pick the roof line that you just attached to the upper left-hand wall corner and hit **Enter**. At the *Specify first point of mirror line* prompt, pick the midpoint of the ceiling line as in Figure 3-40. Use your Osnap to do this. When the *Specify second point of mirror line* prompt appears, pull your cursor up and pick. The roof line should be mirrored over to the right wall corner now. Make sure Ortho is on when you do the last function.

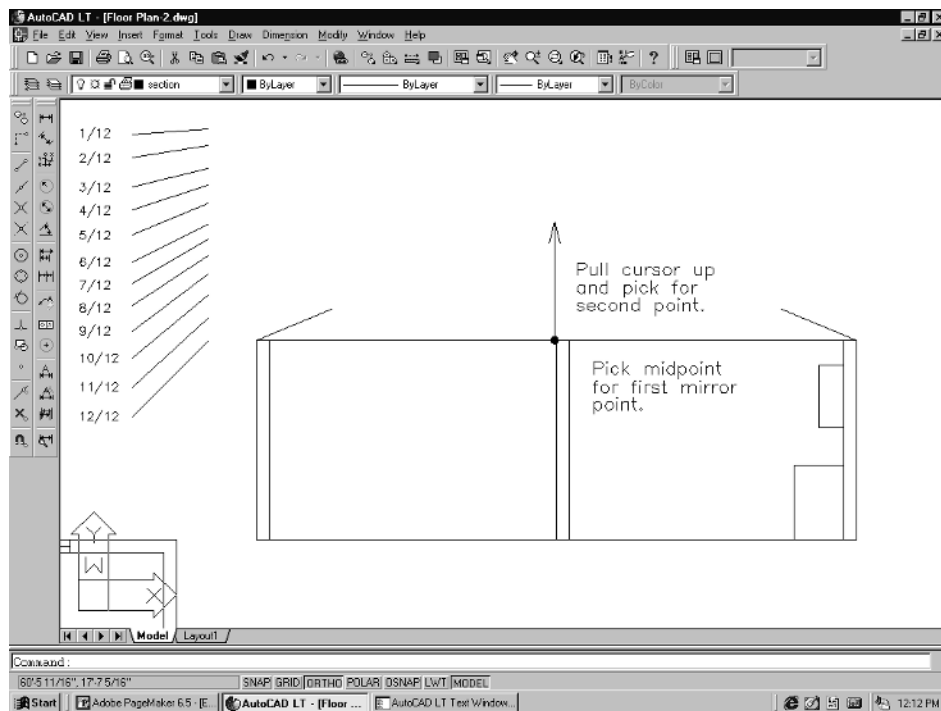


Figure 3-40

5. Next, you need to add the plates to the walls. In this exercise, we are using double 2x6 top plates and a single 2x6 sole plate. To do this, first offset the ceiling line down **1-1/2"**, then offset it down another **1-1/2"**. That makes the lines for the double top plates.

Offset the floor line up **1 1/2"** to make the line for the single sole plate. See Figure 3-41.

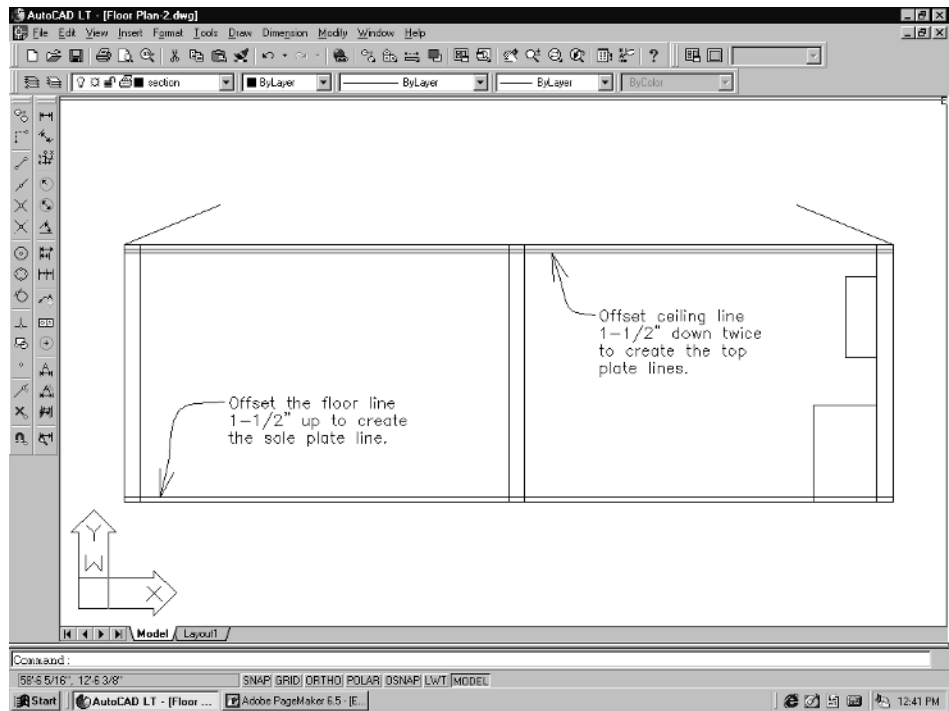


Figure 3-41

- Next, you need to trim out the lines that you just offset. The easiest way is to pick **Trim** from the Modify pull-down menu and hit **Enter** twice at the *Select objects* prompt. This will make all lines cutting edges. Then just start picking the lines to get rid of. Figure 3-42 shows each line that needs to be trimmed.

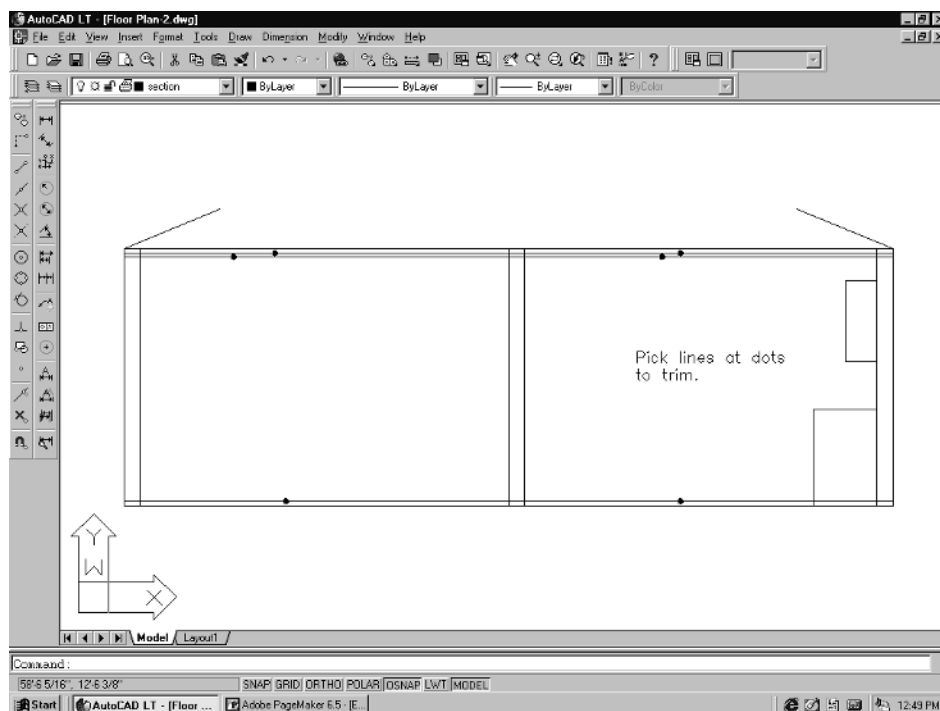


Figure 3-42

The drawing should now look like Figure 3-43. If you missed any lines or made a mistake and trimmed the wrong one, just type **U** and **Enter**. Keep hitting **Enter** until the mistake has been cleared up, then retrim the lines.

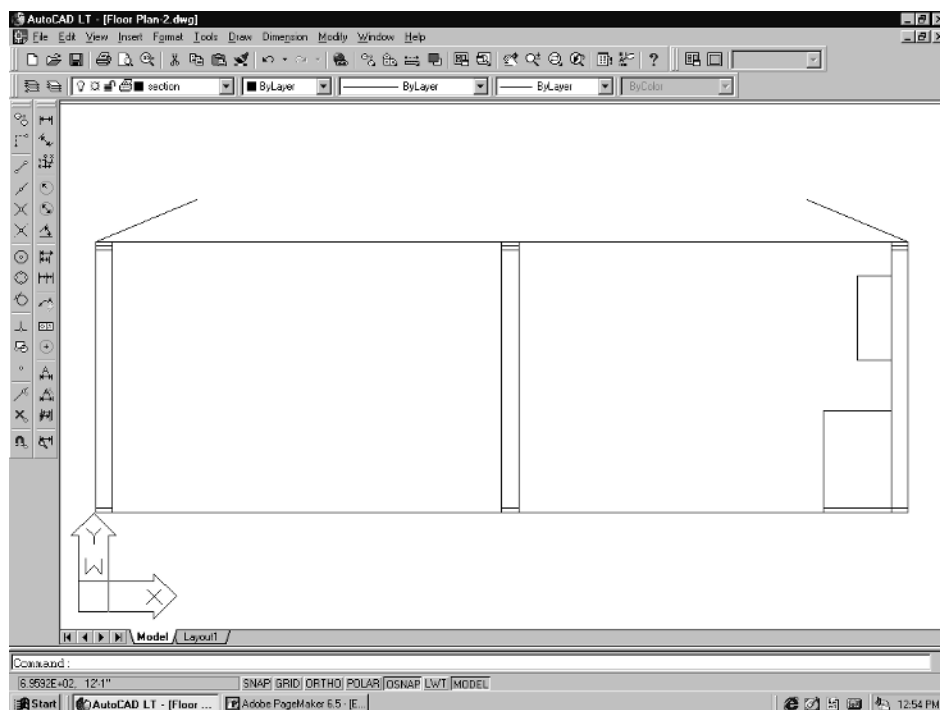


Figure 3-43

7. To show that these are crosscut plates, you need to draw X's in each of the plates. Since all the walls are 6" wide, we can simply draw one and then "multiple copy" it to all the rest of the plates. **Zoom | In** closer to the upper left-hand wall corner. Go down to the bottom of your screen on the status bar and place your cursor over the OSNAP item. Pick your right mouse button. A little dialog will pop up. Pick **Settings**. Make sure that **Endpoint** is one of the options that is checked, then hit **OK** to exit.
8. Pick the **Line** command from the Draw pull-down menu, or type **L** and **Enter**. Draw an X in the top plate, as in Figure 3-44. Your cursor should automatically "grab" the endpoints of each line as you drag over them.

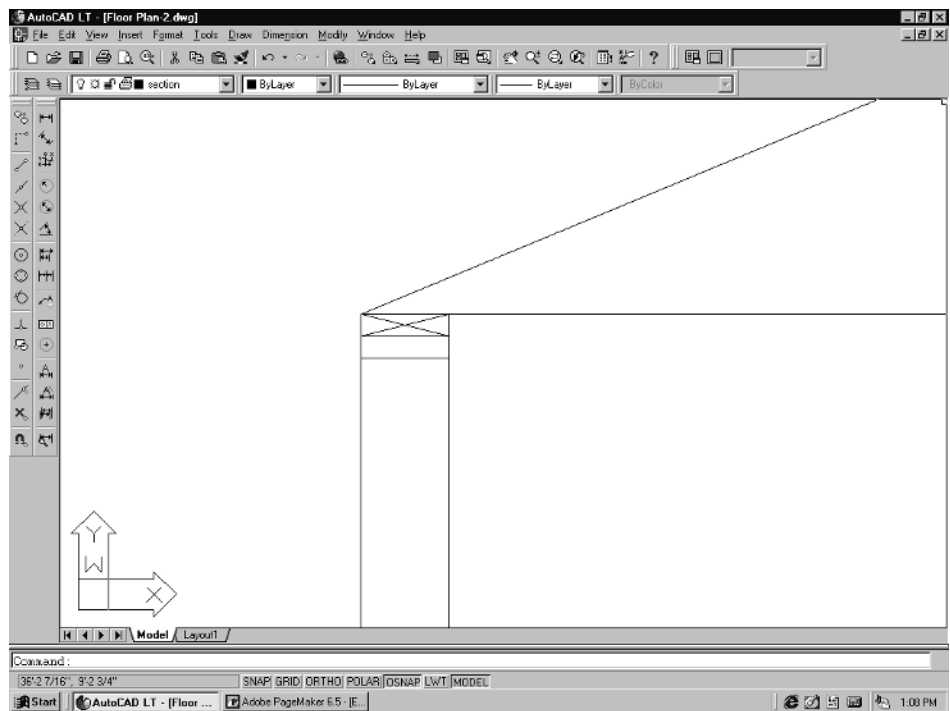


Figure 3-44

9. Next, pick **Copy** and pick the two X lines, then hit **Enter**. Type **M** (for Multiple) and **Enter**. Pick one of the endpoints of the X line as the first base point, as shown in Figure 3-45. Now start picking insertion points for each of the other plates where you want these Xs copied. See Figure 3-46.

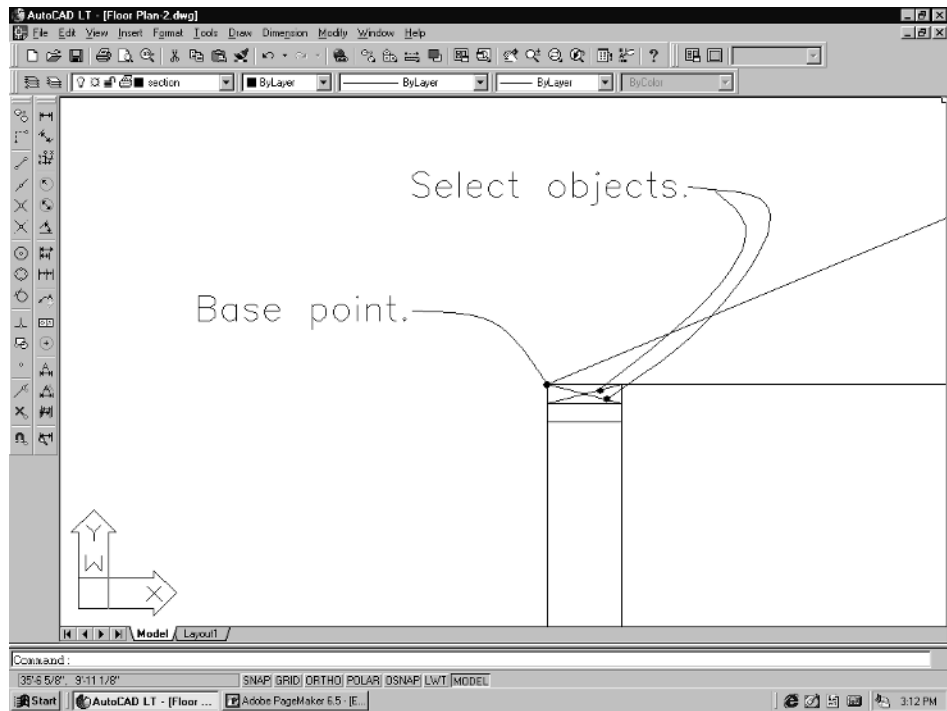


Figure 3-45

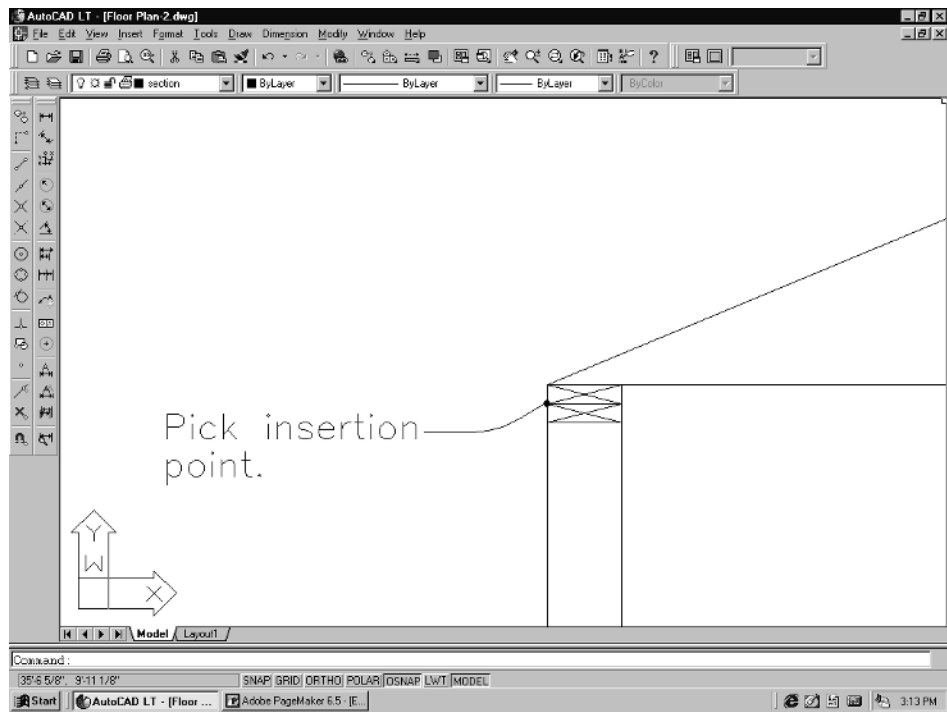


Figure 3-46

The finished result should look like Figure 3-47.

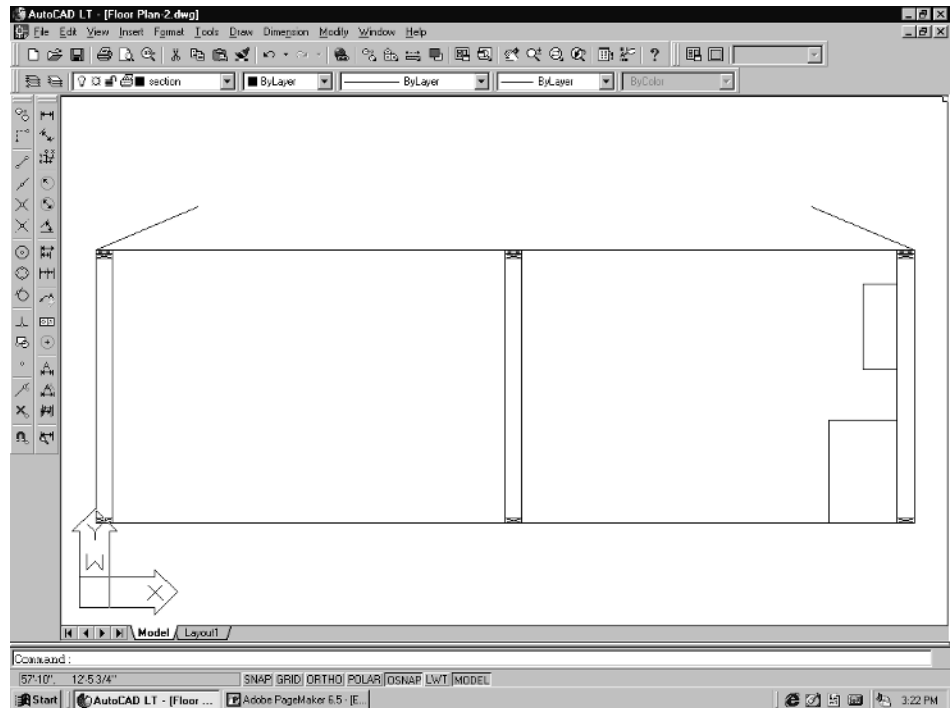


Figure 3-47

Next, we will draw the roof trusses. For this project, we are using 2x4 engineered trusses, so unless you happen to have a drawing of one already made, you are going to have to draw one manually.

1. You already have the roof lines with the correct 5/12 pitch attached to the section corners. So to start, offset the ceiling line and the two roof lines 4" up as in Figure 3-48. This gives us the basic building blocks to construct the truss.

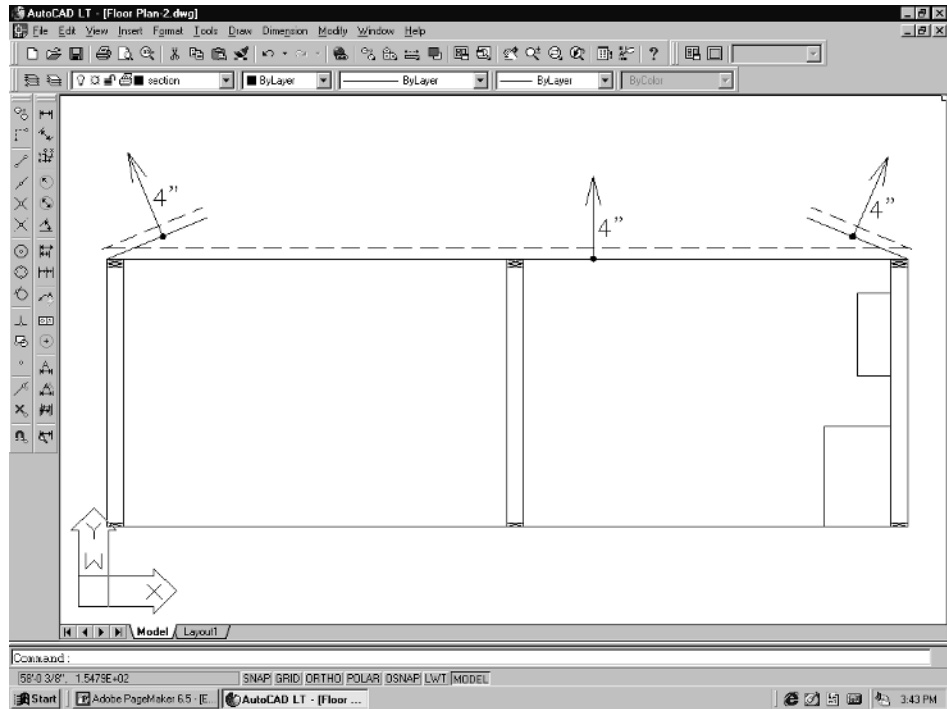


Figure 3-48

NOTE: The lines are dashed for clarity only. They would actually be solid lines in the drawing.



2. Next, offset the left and the right exterior wall lines **36"** to the outside. This will be used to form the eave overhang for the truss. Also, select the **Fillet** command from the Modify pull-down menu to join the roof lines together. Your drawing should resemble Figure 3-49.

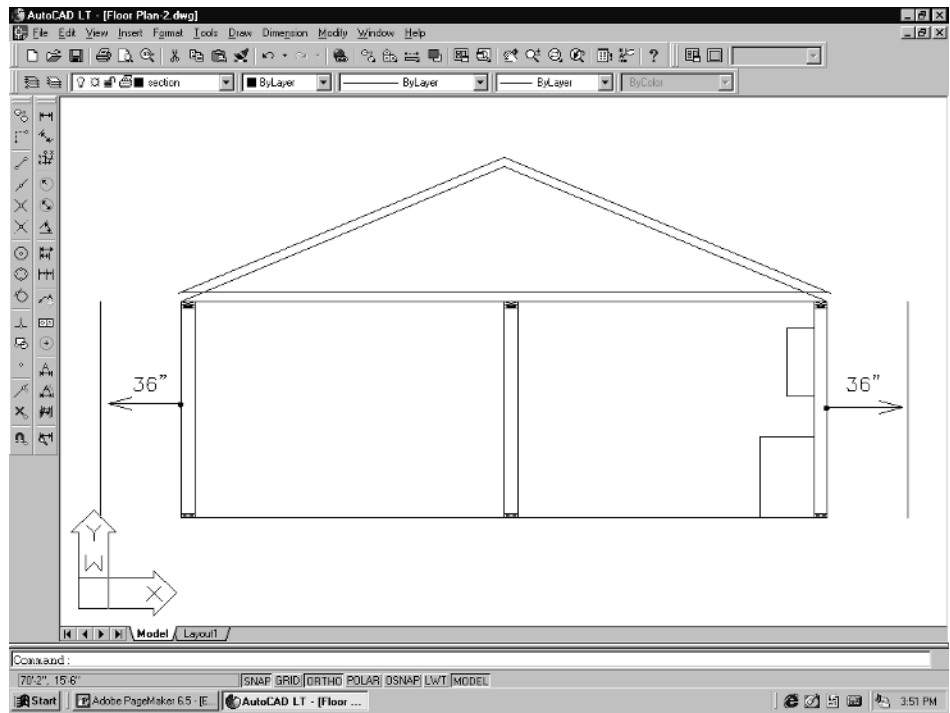


Figure 3-49

3. Extend the rafter tails down to the offset lines.

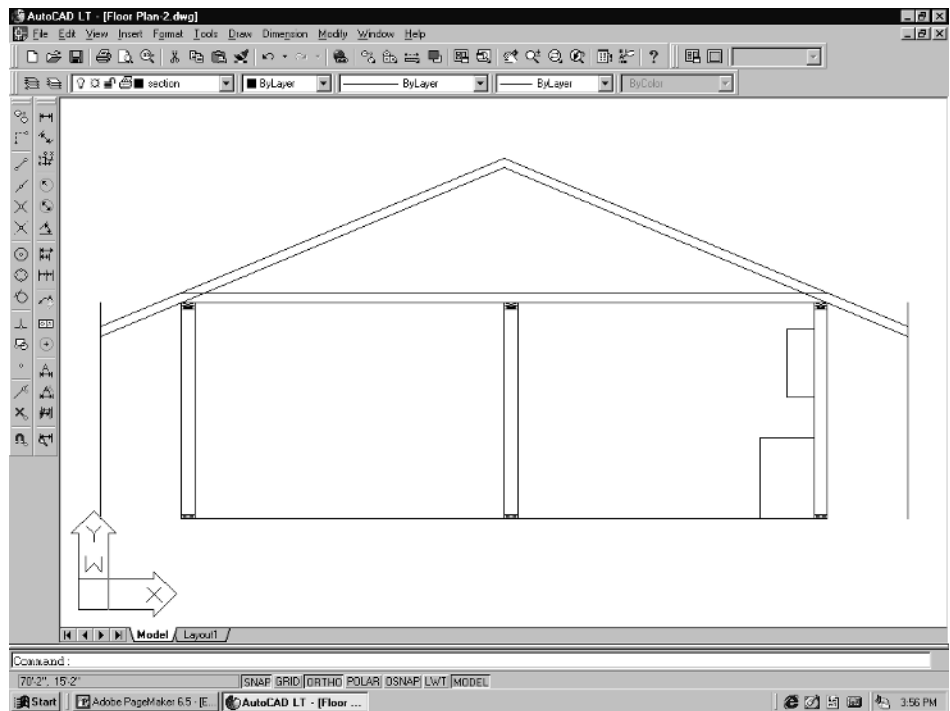


Figure 3-50

4. Then, **Zoom|In** on either side so that we can build the fascia and trim.

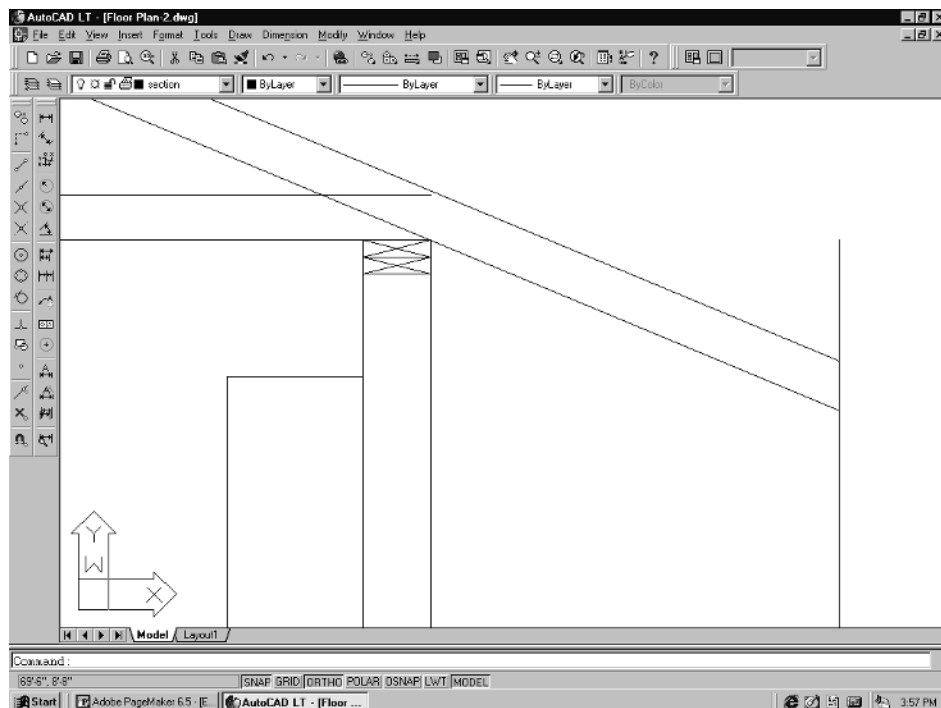


Figure 3-51

The fascias are 2x6 with a 1x4 trim. We will be using 5/8" CDX plywood with clips for the sheathing.

5. To begin, offset the fascia line in **1-1/2"**. Trim off the upper fascia lines, using the upper rafter as the cutting edge.

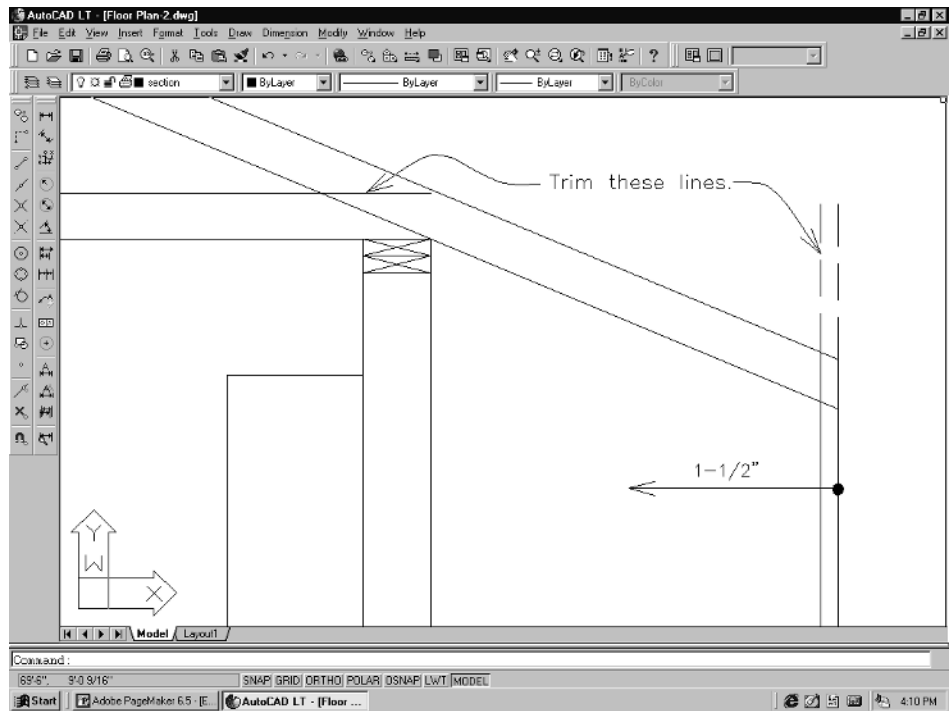


Figure 3-52

6. Draw a line from the inside fascia line and pull out to the right. Next, offset the new line down 6" to form the fascia.

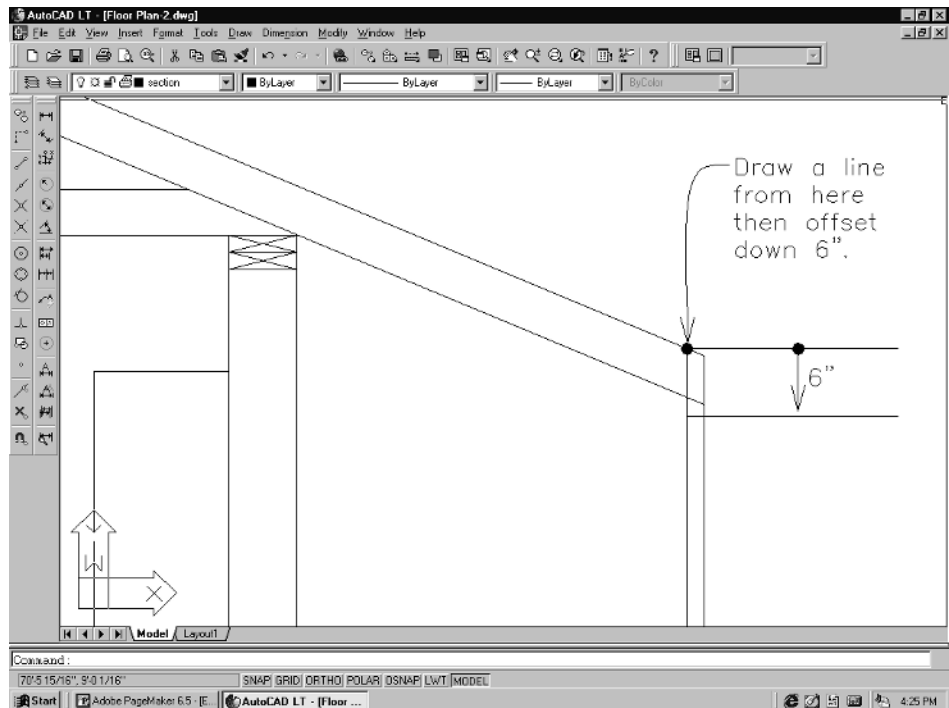


Figure 3-53

7. Offset the top rafter line $5/8$ " up to represent the roof sheathing. Also, offset the outside fascia line $3/4$ " to start building the 1x4 trim.

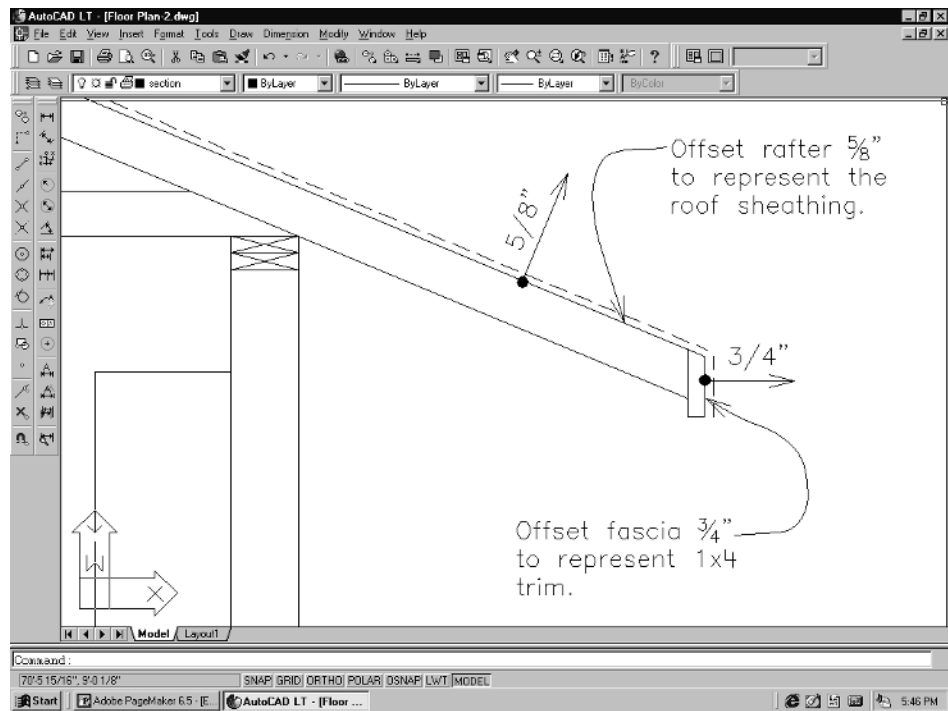


Figure 3-54

8. Fillet the lines as shown in Figure 3-55. Then draw a line to the right, from the intersection of the roof sheathing and the new trim line. Offset this line 4" down for the trim.



NOTE: This example is a square cut fascia. Plumb cut fascias are constructed using basically the same commands and methods.

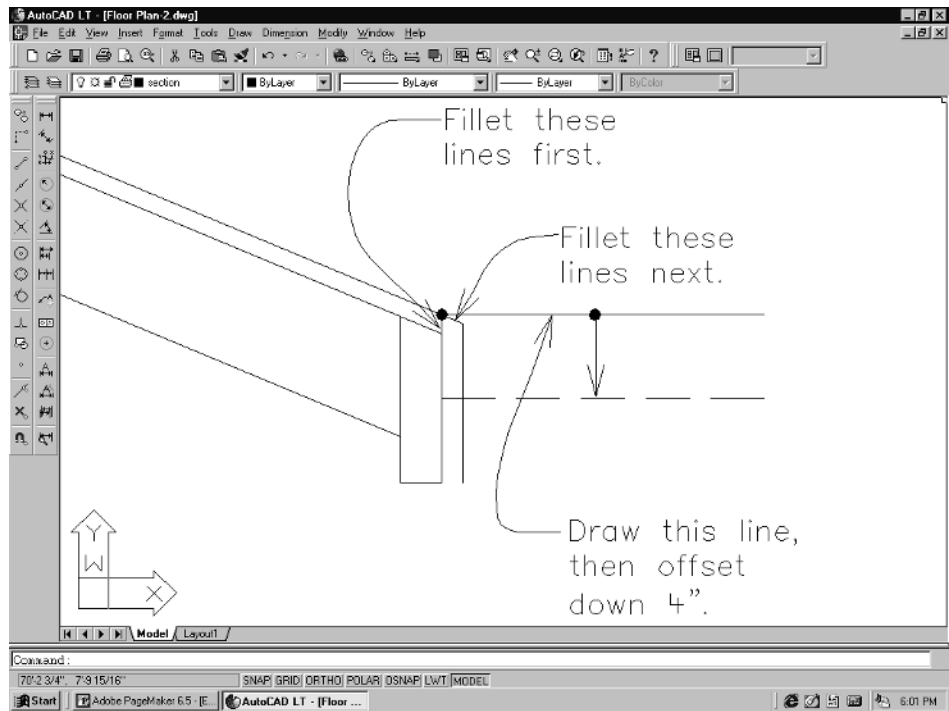


Figure 3-55

9. Use the Fillet command to finish the 1x4 trim, then add the X lines to denote that these are crosscut members. Also, draw a line from the outside corner of the top plate to the top rafter line. Use the Endpoint for the first point of the line, and then Perpendicular Osnap to the rafter end. This line will be used to create the frieze board between trusses.

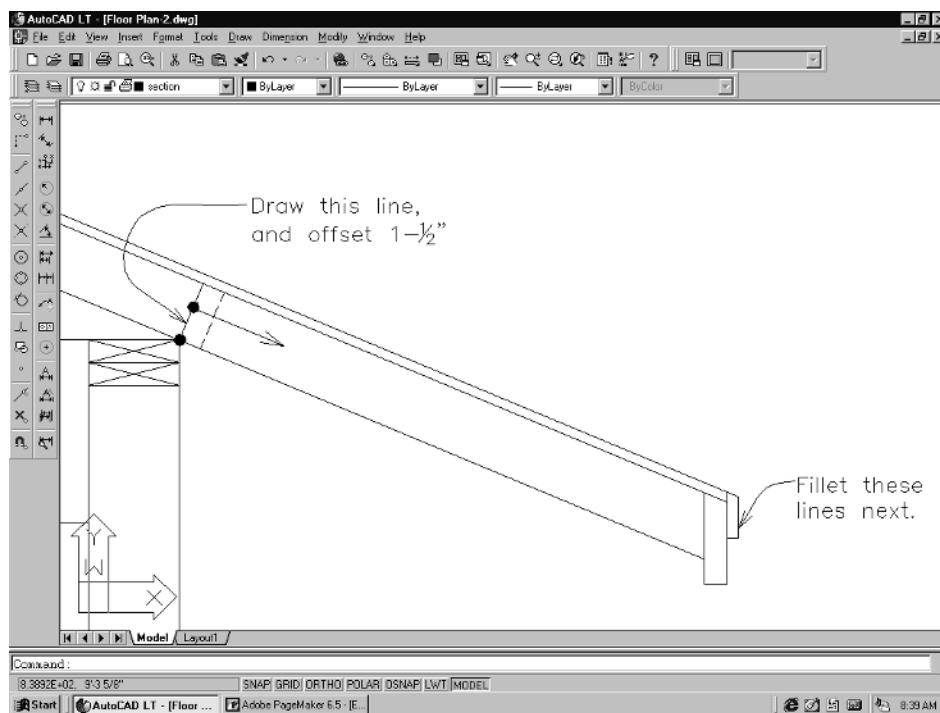


Figure 3-56

The frieze board is a block that seals the space between the top plate and the roof sheathing between each truss. Each one usually contains a couple of screened vents for ventilation of the attic space. You can label these later.

10. Draw X lines in the fascia and the 1x4 trim board using the standard Line command. To denote that the frieze board is a block, rather than a full-length board, draw only one diagonal line across it, instead of an X as you did with the fascia and trim board.

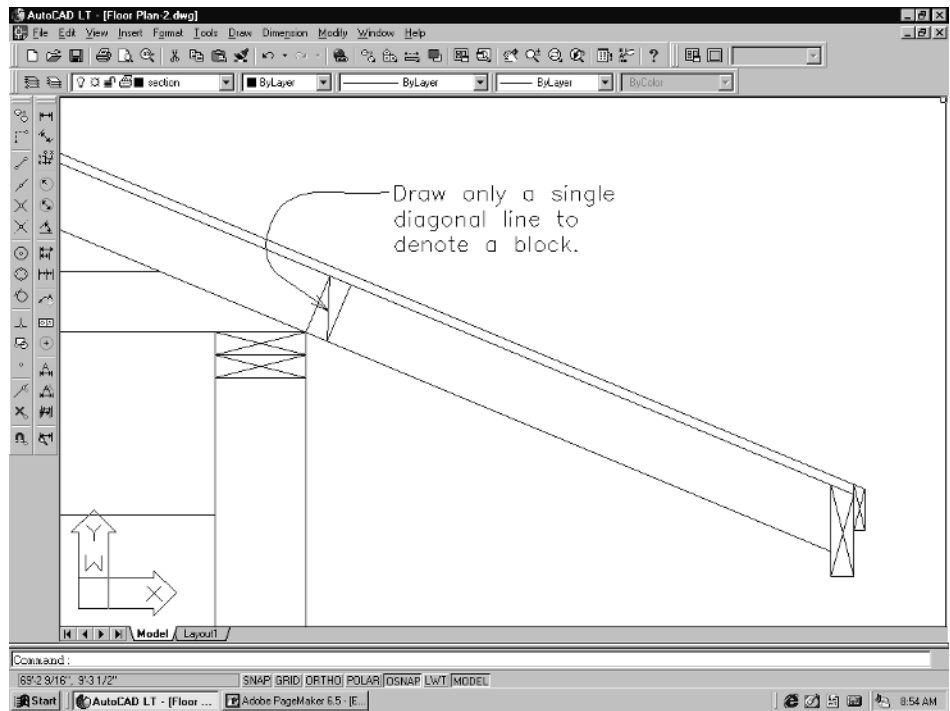


Figure 3-57

11. Next, offset the outer wall line $\frac{5}{8}$ " to represent the $\frac{5}{8}$ " T1-11 siding. Then, draw a line to the right from the top plate corner. Offset this line down 4". This will be the top and bottom line for a 1x4 continuous trim that runs around the bottom of the rafters.

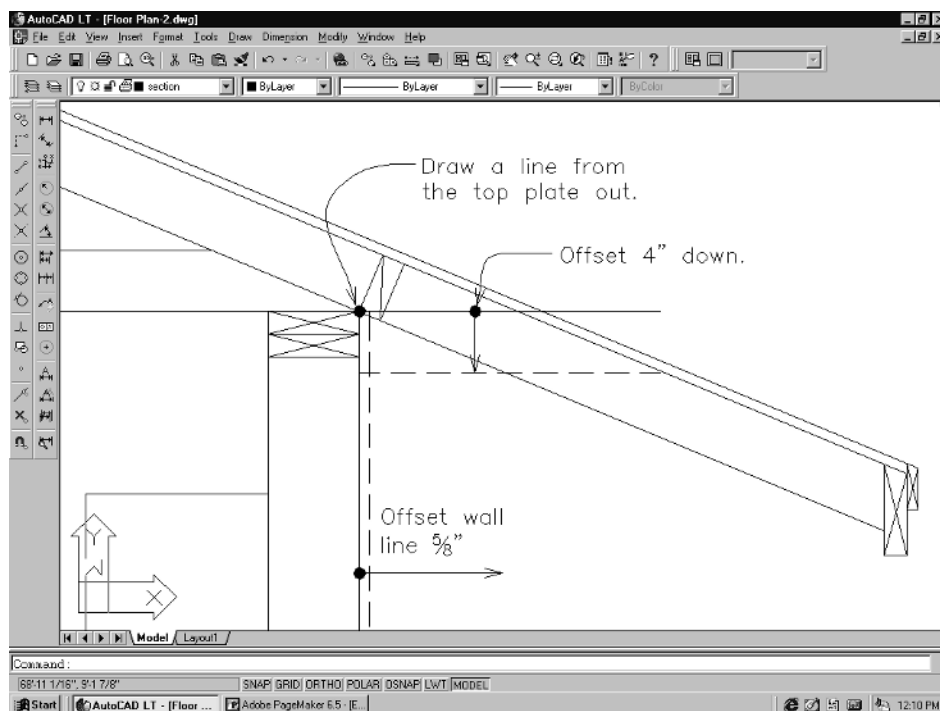


Figure 3-58

12. You need to offset the wall line one more time to form the front piece of the 1x4 trim as in Figure 3-59. Then, use the Trim and Fillet commands to clean up the lines.

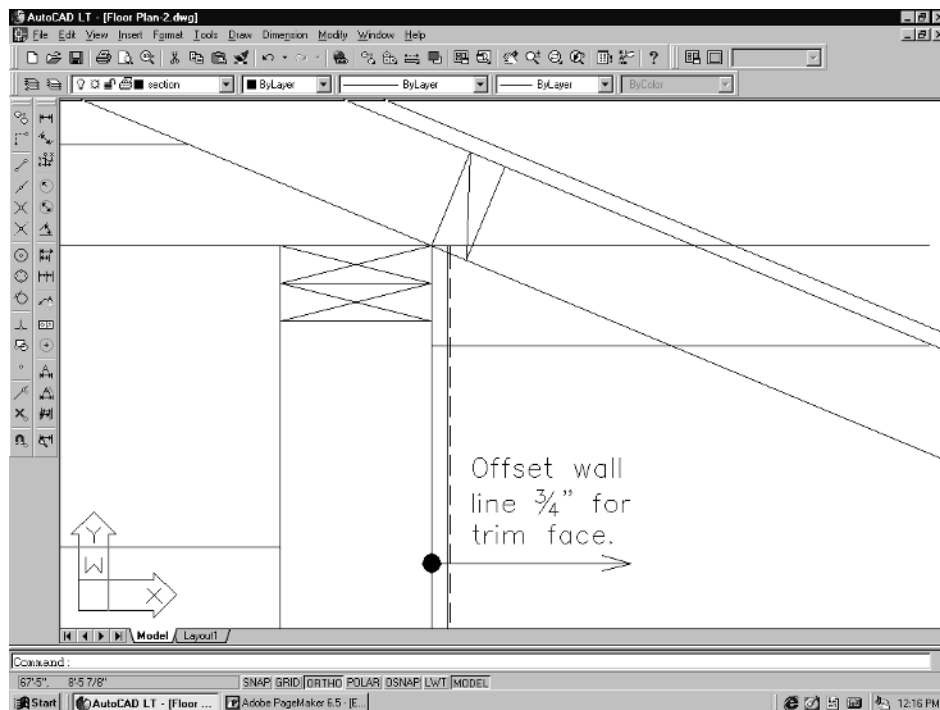


Figure 3-59

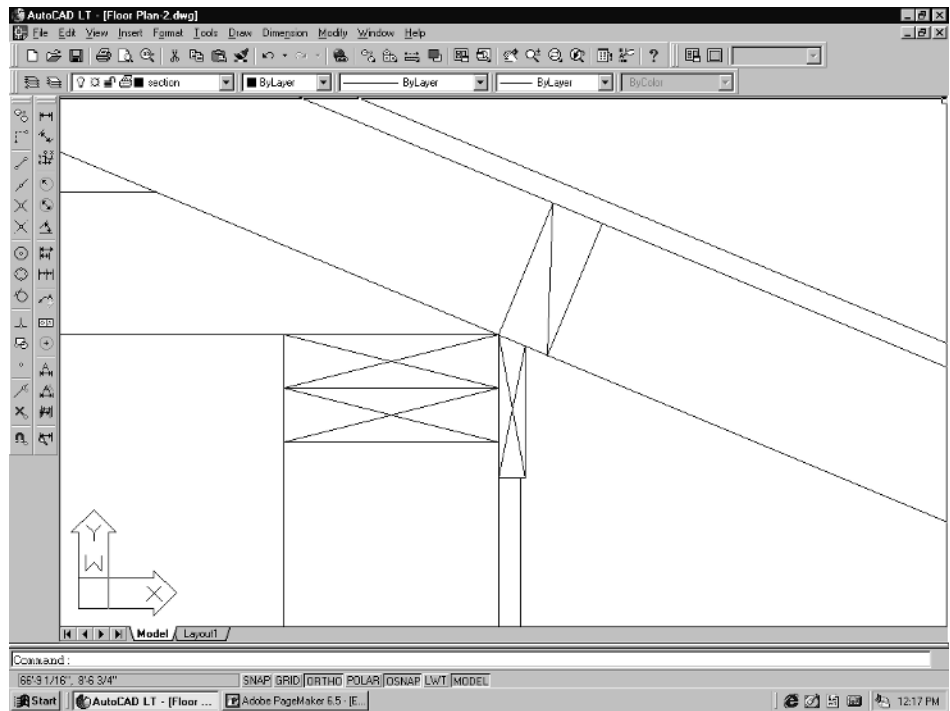


Figure 3-60

13. Next, pick the **Mirror** command from the Modify pull-down menu. When prompted to *Select objects*, window around the fascia and trim, pick the roof sheathing line and the wall siding line, and then window the 1x4 trim and frieze board, as shown in Figure 3-61. Once you have selected all of these, hit **Enter**.
14. At the *Specify first point of mirror line* prompt, pick the intersection of the roof rafters at the ridge. This is the exact center of the roof. When the *Specify second point of mirror line* prompt appears, pull the cursor down and pick, as in Figure 3-62. Hit **Enter** at the *Delete source objects? [Yes/No] <N>* prompt because you want the source objects to remain where they are. If you typed Y, the source, or original, objects that you mirrored would be erased. Occasionally you do want to erase the source objects, but not in this case.

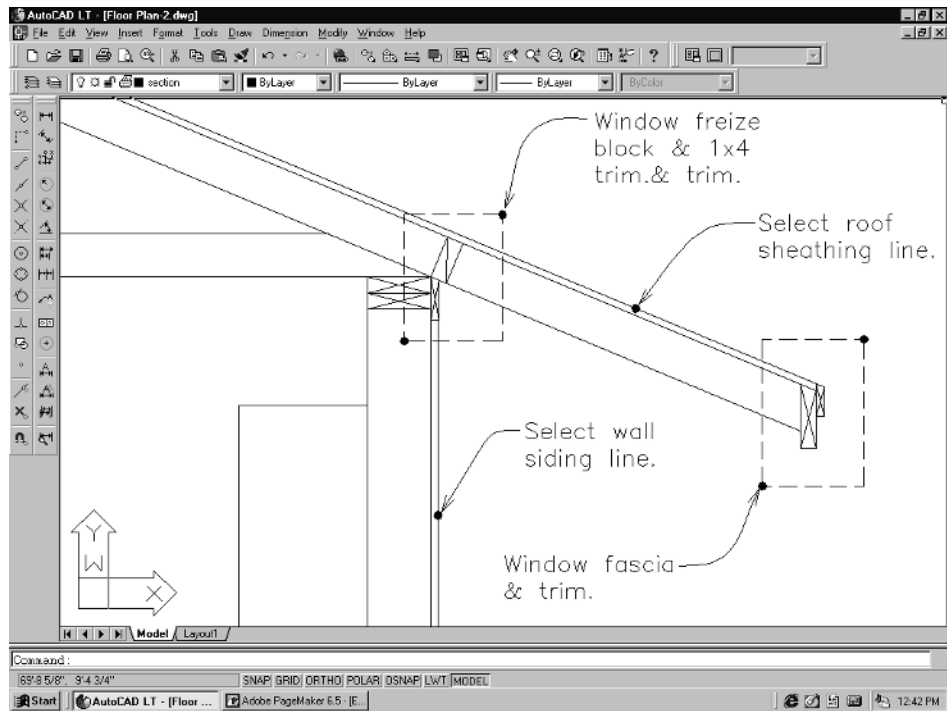


Figure 3-61

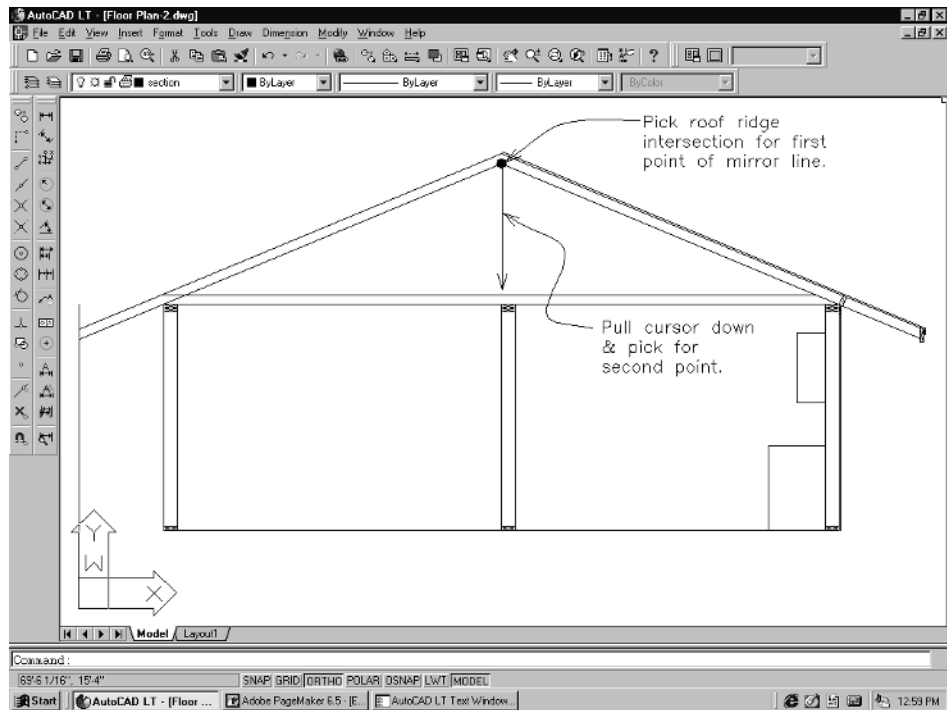


Figure 3-62

All the objects you mirrored will be drawn on the left side of the house. See Figure 3-63. This is a great time saver when doing details, sections, and elevations. All you need to have is a line that you can get a midpoint from.

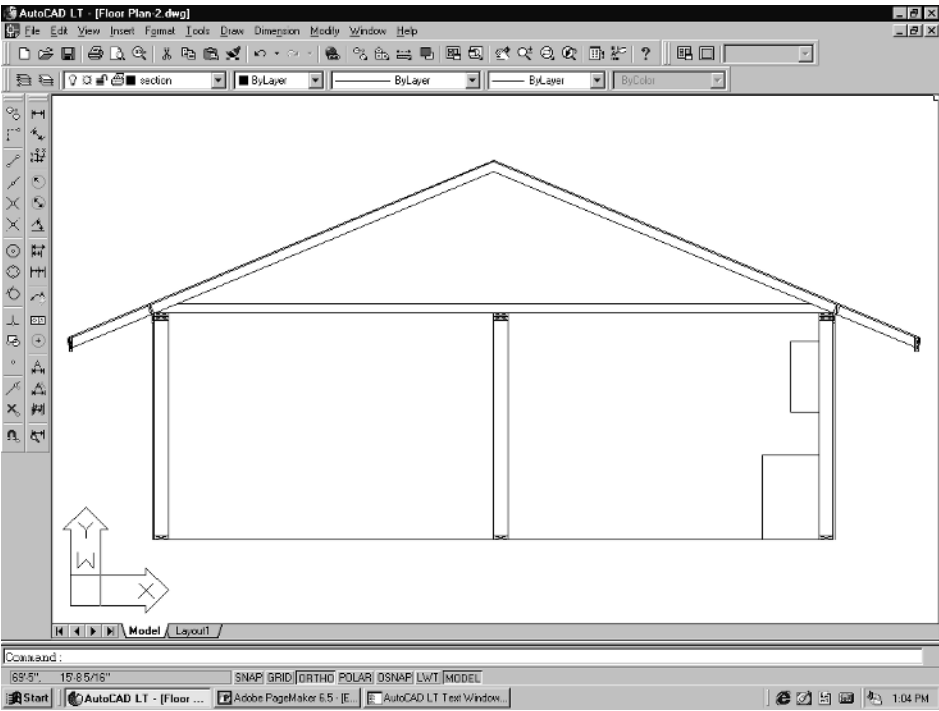


Figure 3-63

There are, of course, different types of trusses, and many times these will be drawn by the truss manufacturer. For this exercise we will use a standard W-type truss. The standard layout for this type of truss is shown in Figure 3-64. We know the total span is 24', so the 1/4 spans would be 6' each and the 1/3 span would be 8'.

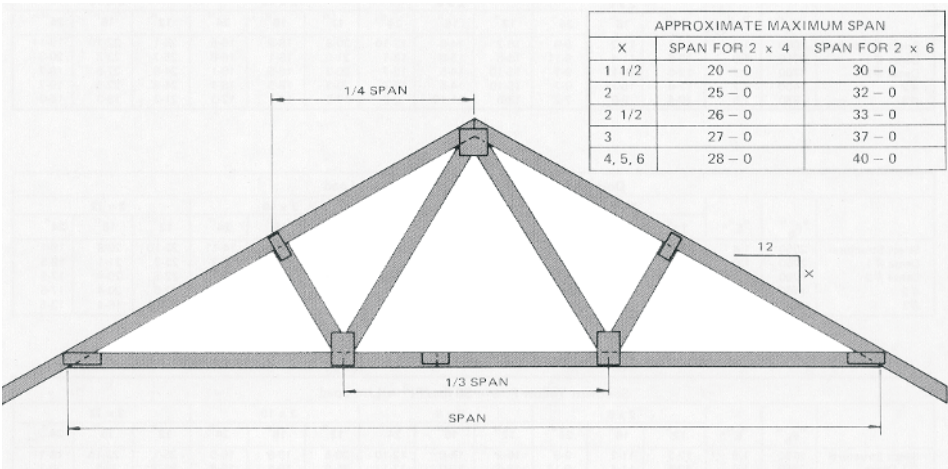


Figure 3-64

1. To actually draw the truss webbing, draw a line at the intersection of the roof ridge. Then, offset it 6' to the left and 6' to the right. The intersections of these lines and the top roof line will be the center points for the tops of the 2x4 webbing. See Figure 3-65.

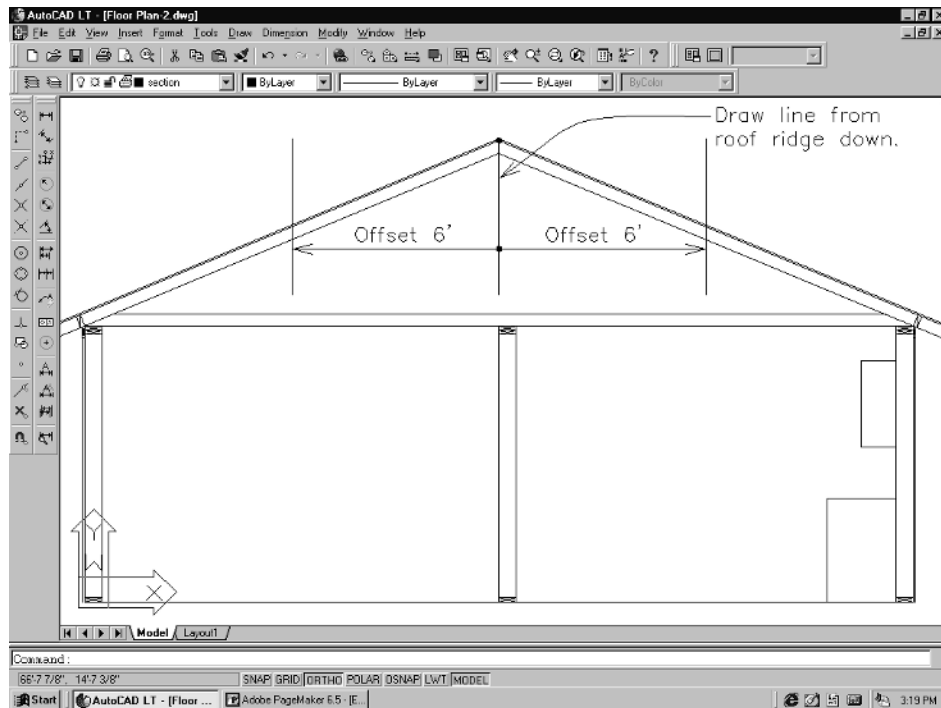


Figure 3-65

Then offset the same center line 4' to each side and extend these lines down to the top line of the truss chord. The intersections of these lines will give you the center points for the bottom of the 2x4 webbing. See Figure 3-66.

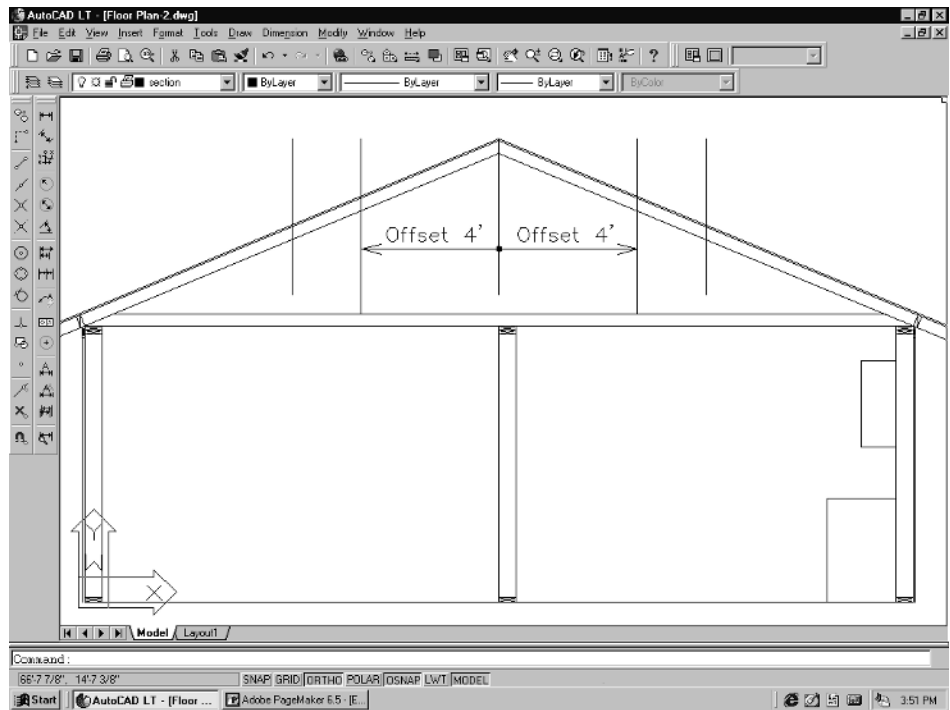


Figure 3-66

2. Next, you can draw the basic webbing now that you have all the points defined. Before starting to draw the lines, pick on the **OSNAP** button on the status bar at the bottom of the screen with your right mouse button. Pick the **Settings** item. Pick the **Clear All** button first, check the **Intersection** box, and pick **OK**.

Type **L** and **Enter**, or select the **Line** command from the Draw pull-down menu. Draw the web lines as shown in Figure 3-67. Hit **Enter** when done.

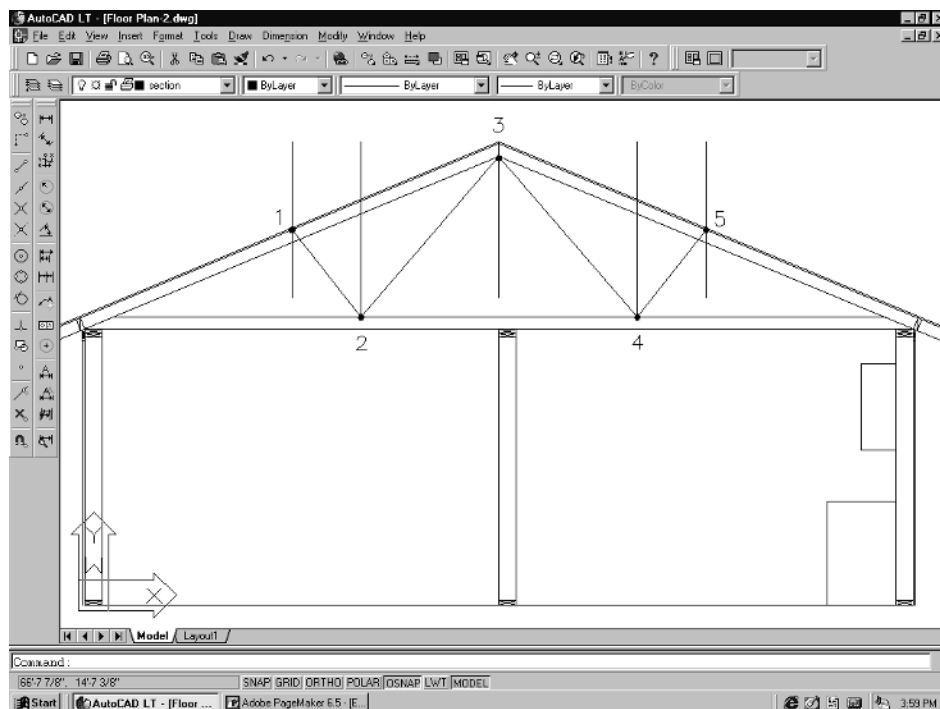


Figure 3-67

3. Next, erase the vertical construction lines, then offset each of the webbing lines half the distance of their width. Since we are using 2x4 members in this exercise, the offset distance would be 2" to either side.

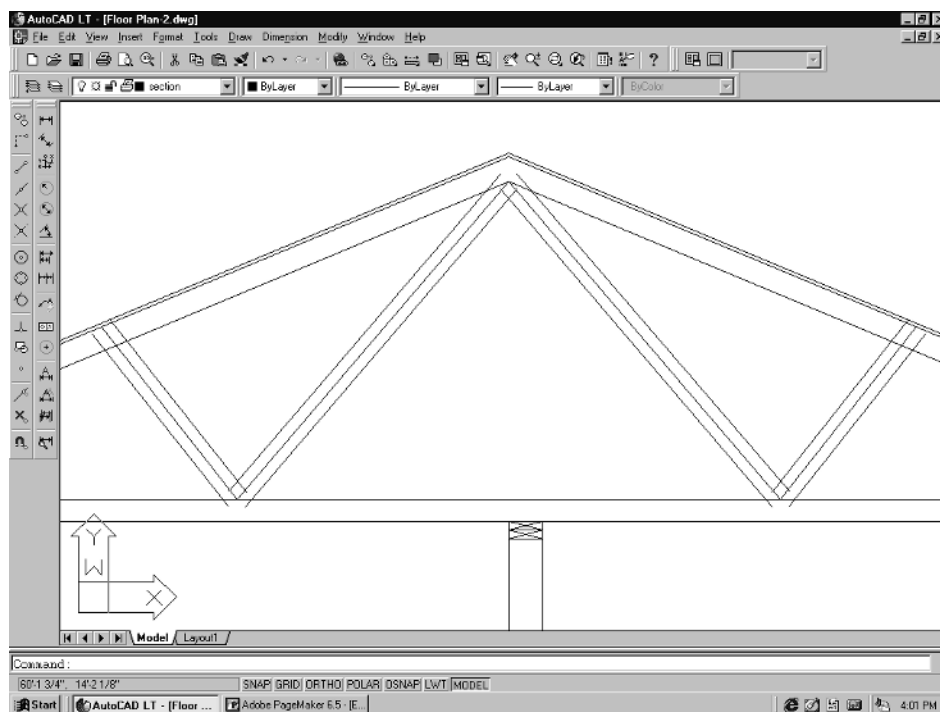


Figure 3-68

4. Erase the center lines of the webbing. Then use the Trim and Fillet commands to clean up the webbing. You should end up with something close to Figure 3-69.

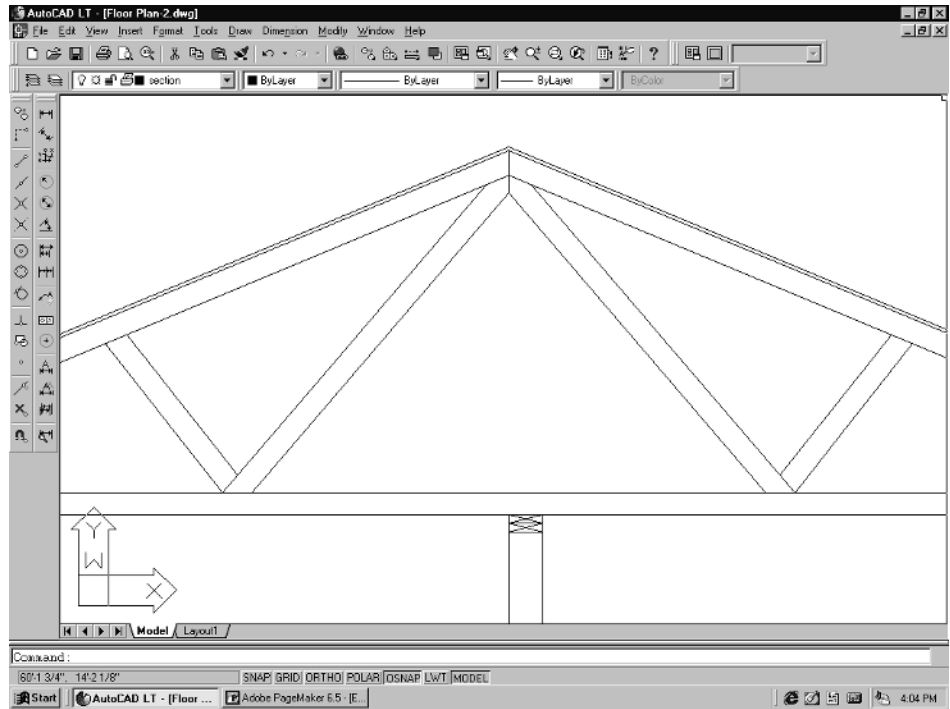


Figure 3-69

Hardware for the trusses, such as plates, etc., can be shown, but are usually not necessary. The truss manufacturer usually provides a detailed drawing. The amount of information needed on a set of plans depends on who you are drawing for, the building code requirements in your area, and how complex the structure is.

For example, if the structure you are working on is being built on a steep, sloping lot, you need to pay close attention to the foundation plan and details. If you are working on a large, multistory structure, close attention needs to be paid to spans and sizes of materials. Most of the time, architects or engineers will have already worked these problems out; however, it is something to keep in mind as you are laying out your sections.

Finishing the Foundation

The final drawing task on this cross section is to draw the foundation. You have a floor line already drawn. You need to add the perimeter footings and slab. You would also want to show any other features that are important to the structural integrity of the building.

This simple cottage has very little that needs to be shown. However, not showing some things leaves the plan ambiguous, which is not a good idea. You want to cover as much as possible when it comes to structural integrity. Most contractors know their stuff, but you can never be 100% sure about how their subs work. If you have it shown in the plans, you are covered should anything happen.

1. **Zoom|Out** so that you can see the entire cross section as in Figure 3-70. Offset the floor line 4" down.

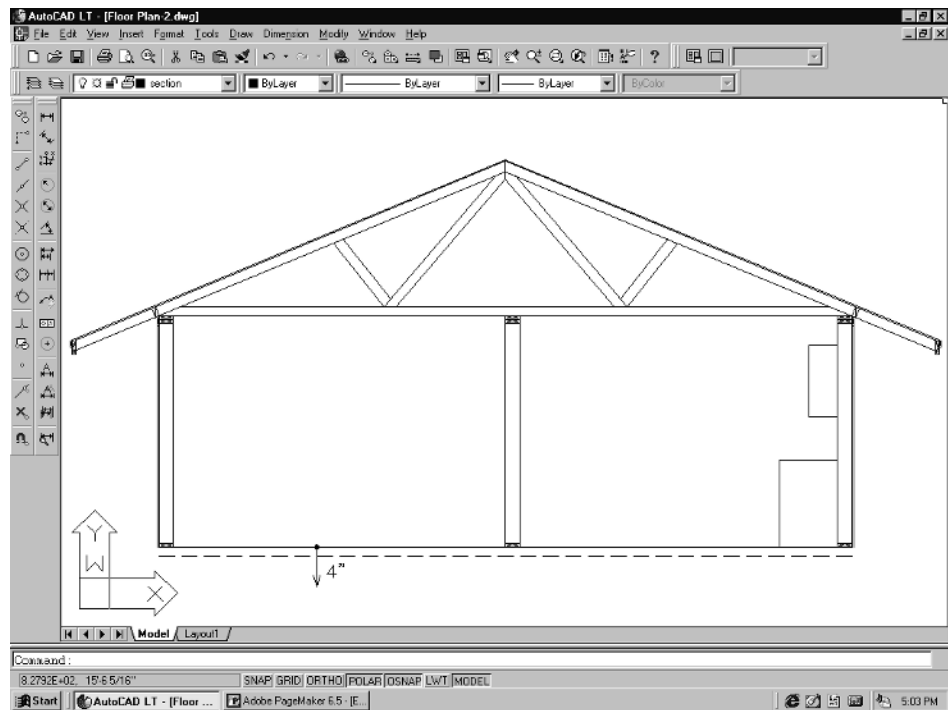


Figure 3-70

2. Next, **Zoom|In** to the lower left corner of the section. Draw a line down from the outside corner of the sole plate. Offset this line 12" right. Then offset the floor line down 12".

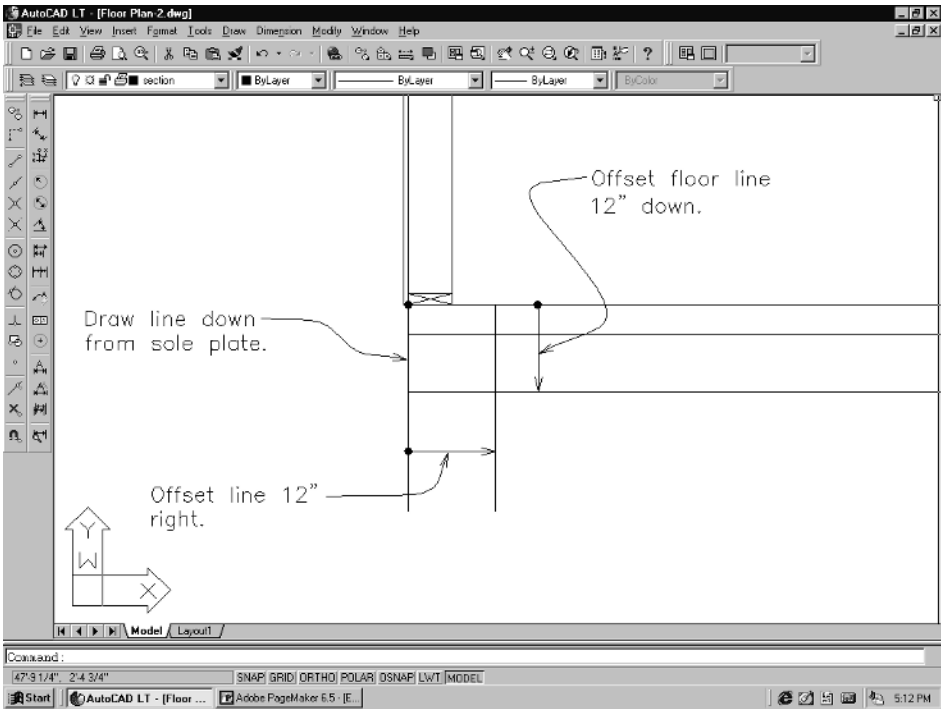


Figure 3-71

3. Fillet and trim the footing and slab lines as shown in Figure 3-72.

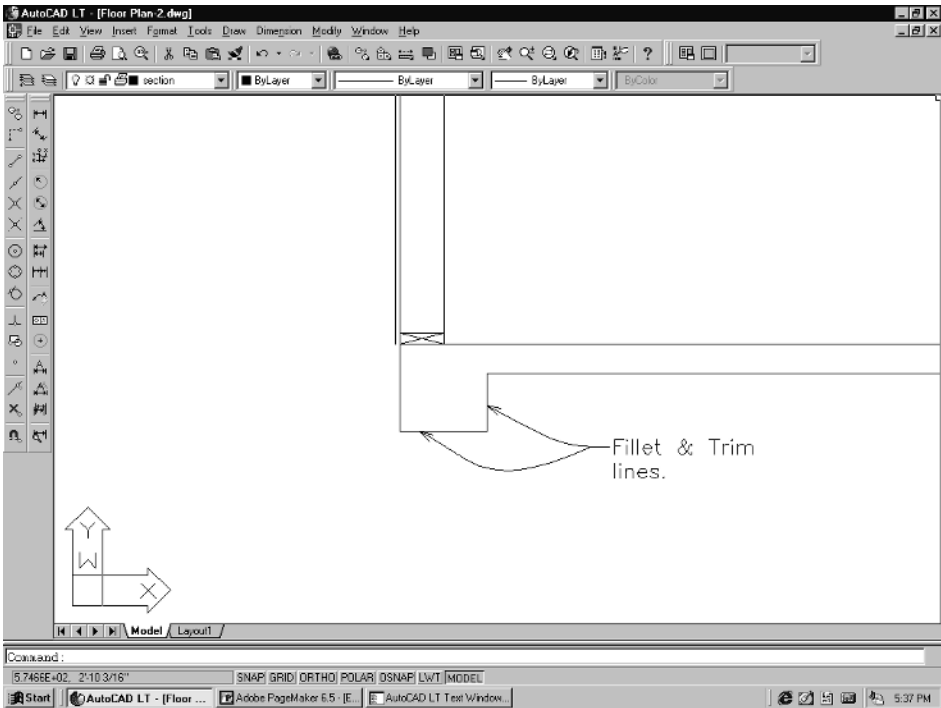


Figure 3-72

4. Next, add a 45 degree line as shown in Figure 3-73. Pick **Construction Line** from the Draw pull-down menu.

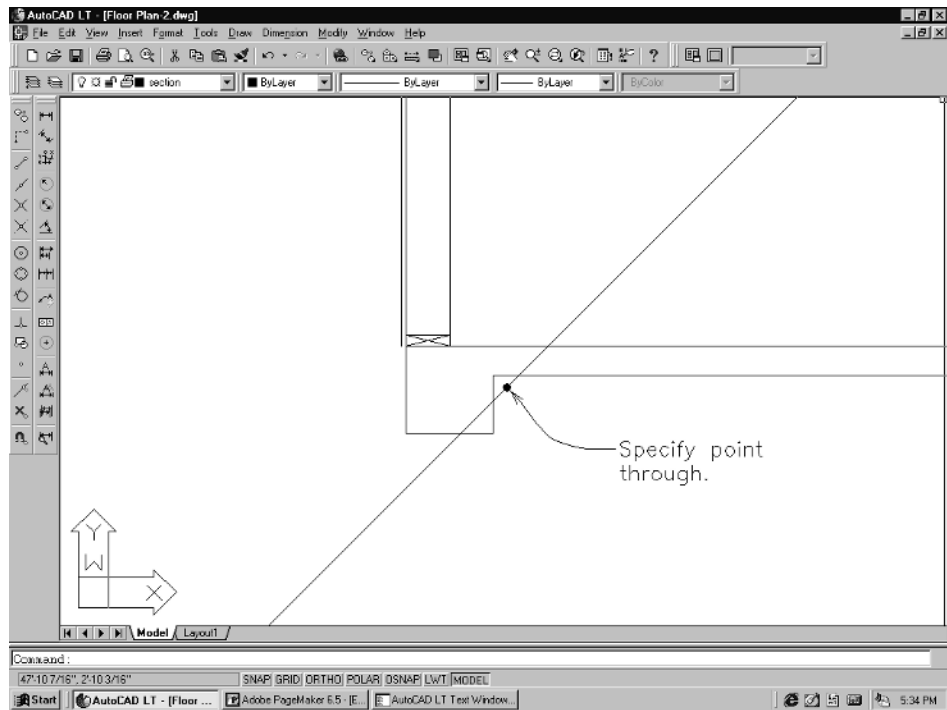


Figure 3-73

5. At the command line prompt *_xline Specify a point or [Hor/Ver/Ang/Bisect/Offset]*, type **A** and **Enter**. At the *Enter angle of xline (0) or [Reference]* prompt, type **45** and **Enter**. Finally, at the *Specify through point* prompt, type **45** and **Enter**.
6. After filleting the 45 degree line with the footing and slab lines, you can add the rebar to the continuous footings. Refer to Sheet #4 for what the contractor has called for. The callout is for two #4 continuous rebar with cross ties at 32" O.C. Use the Donut command to draw the rebar. This can be found on the Draw pull-down menu.
7. At the command line prompt *Specify inside diameter of donut <0'-0">*, type **0** and **Enter**. When prompted to *Specify outside diameter of donut <0'-1">*, type **1** and **Enter**. If this looks too small after you have placed the first one, type **U** to back up, then change the outside diameter to a larger size. At the *Specify center of donut or <exit>* prompt, pick the points for the two rebar as shown in Figure 3-74.

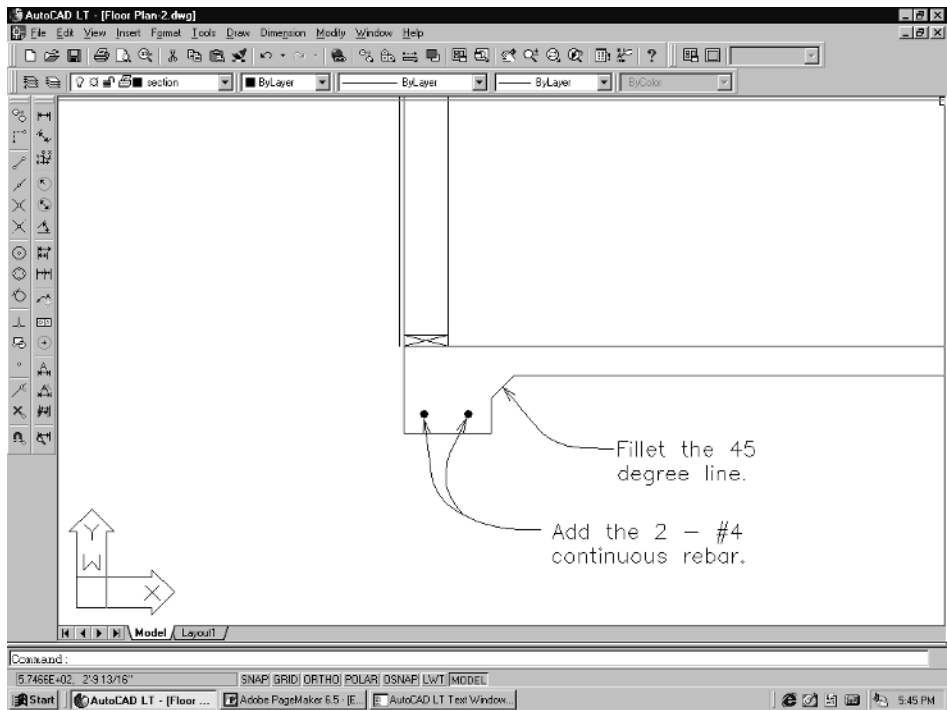


Figure 3-74

8. Next, add the cross tie using the Polyline command located on the Draw pull-down menu. Draw it so that it is as long as the distance between the two #4s. See Figure 3-75. You can change the width of the tie by going to the Modify pull-down menu and selecting **Object**, then picking **Polyline**.

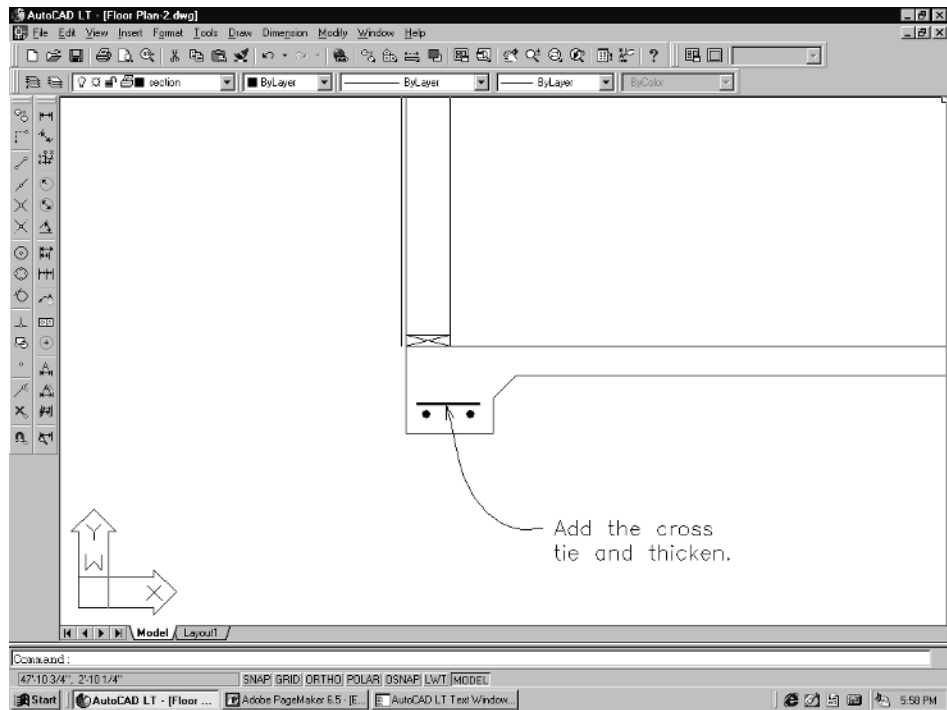


Figure 3-75

9. At the command line prompt *Select polyline*, pick the cross tie. When prompted *Enter an option [Close/Join/Width/Edit vertex/Fit/Spline/Decurve/Ltype gen/Undo]*, type **W** (for Width) and **Enter**. At the *Specify new width for all segments* prompt, type **.25** and **Enter**.
10. Draw an anchor bolt using a polyline as shown in Figure 3-76. Change the thickness the same way as you did with the cross tie. The bolt does not have to be precise, as this footing will be one of the details you will draw in a later chapter. Details are usually drawn at a much larger scale, so you can save time here by approximating the look but not spending a whole lot of time making sure it is exactly 8" long, etc.

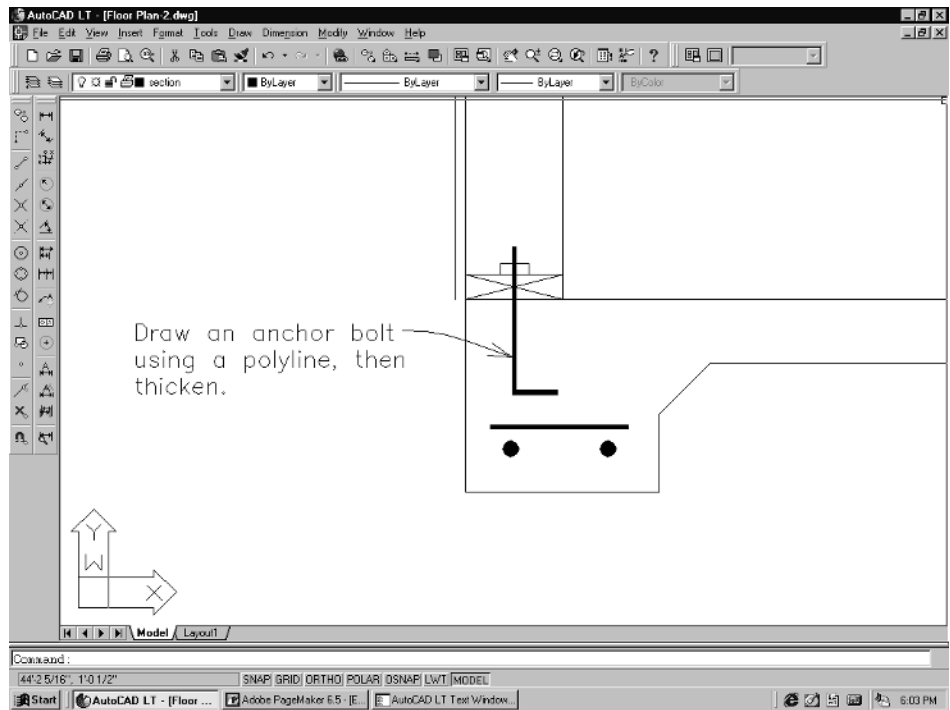


Figure 3-76

11. Next, you will mirror this footing over to the right-hand side of the section. **Zoom|Out** so you can see the entire section. Pick the **Mirror** command. When prompted to *Select objects*, window the footing including the 45 degree line, the rebar, and the anchor bolt. At the *Specify first point of mirror line* prompt, pick the midpoint of the top floor line. When asked to *Specify second point of mirror line*, pull the cursor down and pick. See Figure 3-77.

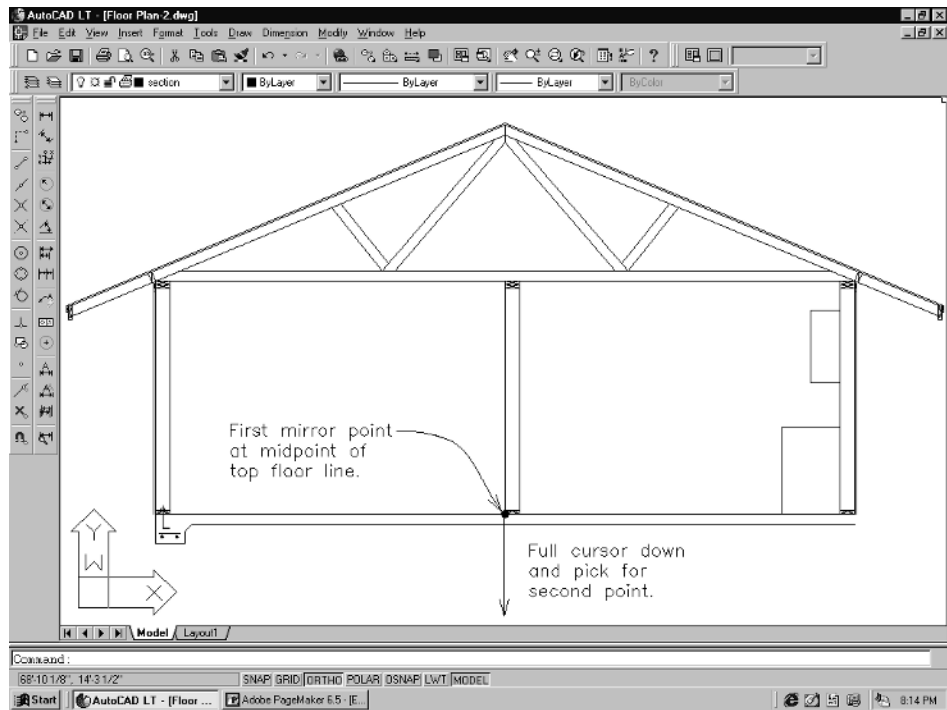


Figure 3-77

12. Hit **Enter** at the *Delete source objects?* [Yes/No] <N> prompt. The left-hand footing will be mirrored over to the right-hand side as shown below.

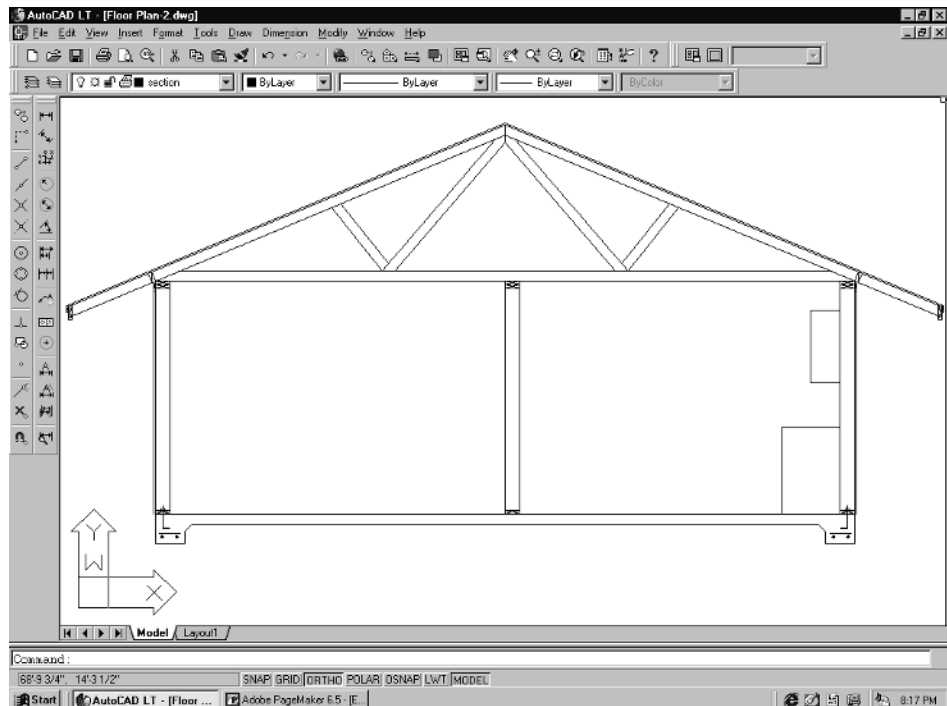


Figure 3-78

The final touches before adding the labels to this section would be to draw the interior drywall, add some clips as required by local codes, clean up some of the roof lines at the ridge, add the wire mesh in the slab, and extend the exterior siding below the sole plate.

1. First offset the interior wall lines and ceiling line $1/2"$ for the gyp board. Trim and fillet where necessary.

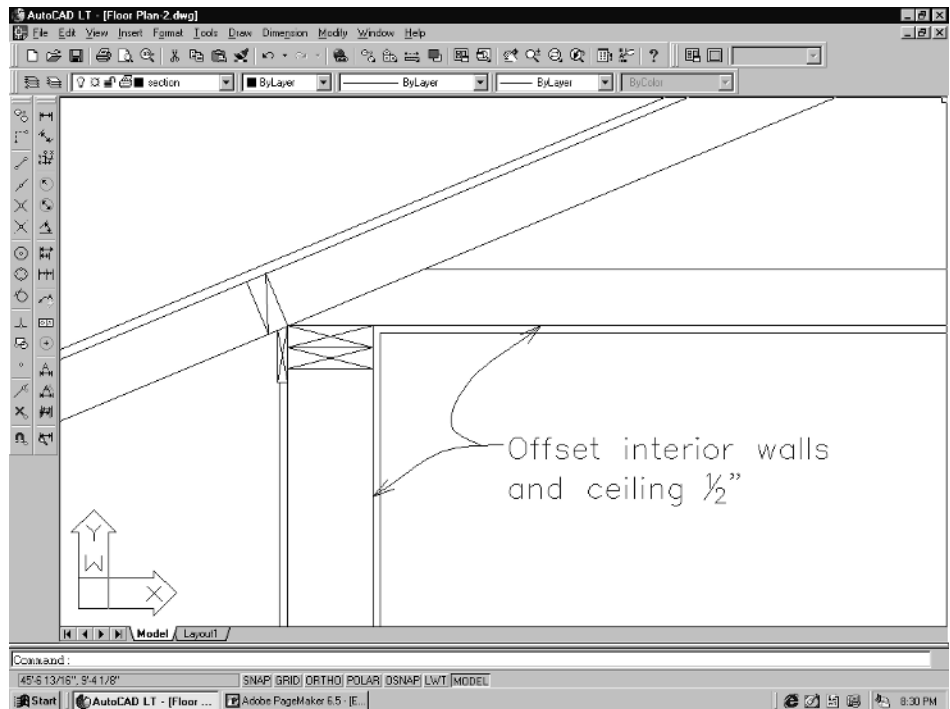


Figure 3-79

2. Next, add clips where necessary, extend siding past the sole plate, add wire mesh to the slab, and clean the roof lines at the ridge. Your drawing should resemble Figure 3-80.

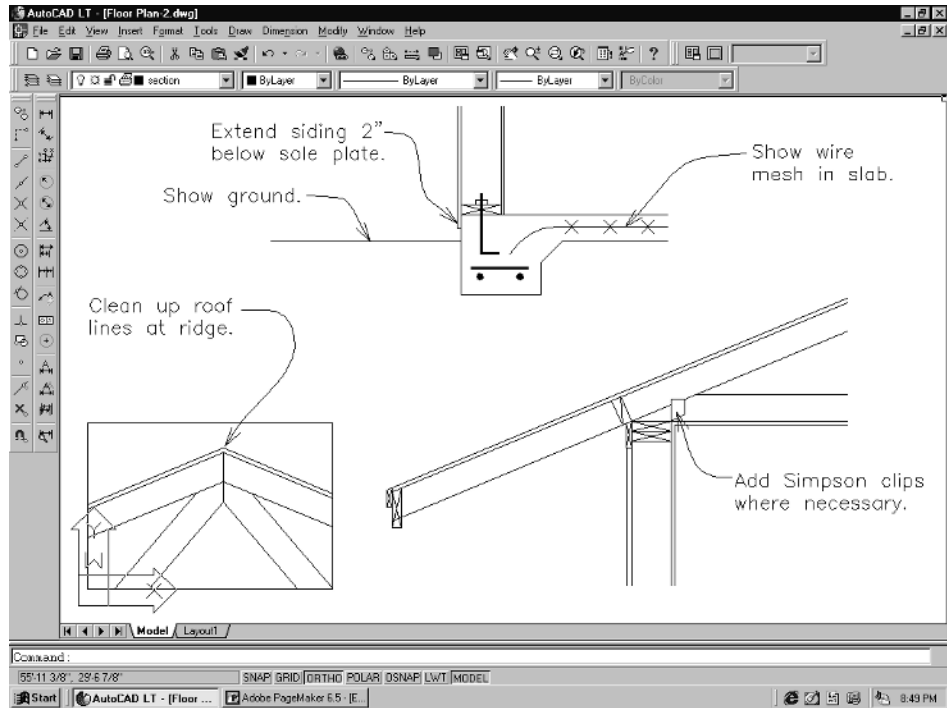


Figure 3-80

That about takes care of the drawing part of this section.

Before we add the text to this section, let's go through an exercise in moving some of the different elements around inside of the paper space viewport. Remember, the viewport is inside of the border and is scaled to $1/8" = 1'-0"$. You have a number of drawings in model space, including the floor plan, foundation plan, roof plan, and section. Each of these drawings can be “panned” into position within the viewport, which is inside of the border. This allows you to use this single border to print all of these drawings.

Alternatively, you could add more viewports within the border and then pan the different drawings into these. So, for example, if you had a larger sheet, you could have one $1/4"$ scale viewport for the floor plan, another one for the roof plan at $1/8"$ scale, and a couple of smaller ones for details at $1" = 1'-0"$.

The magic of paper space is that it allows you to mix and match a number of drawings, at different scales, on a single sheet. Yet you never have to change the scale of any of your drawings. You create everything at 1 to 1. Everything you draw is drawn at true scale, but can be plotted out at any scale you wish.

Figure 3-81 shows what elements we should have at this point in our drawing. Notice we are in “true” model space, as the Model tab is selected. Also, the icon in the lower left of the screen tells us we are in plan UCS.

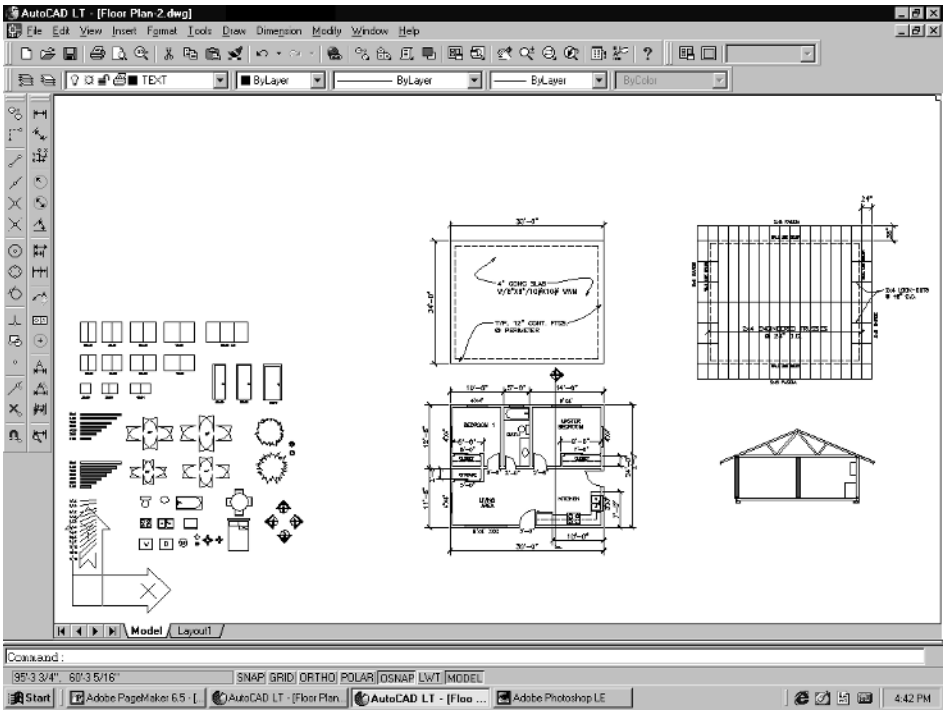


Figure 3-81

Figure 3-82 shows the LT 98 version of the drawing in “true” model space. The TILE button is black rather than gray, as is the MODEL button. Also, the icon in the lower left of the screen tells us we are in plan UCS.

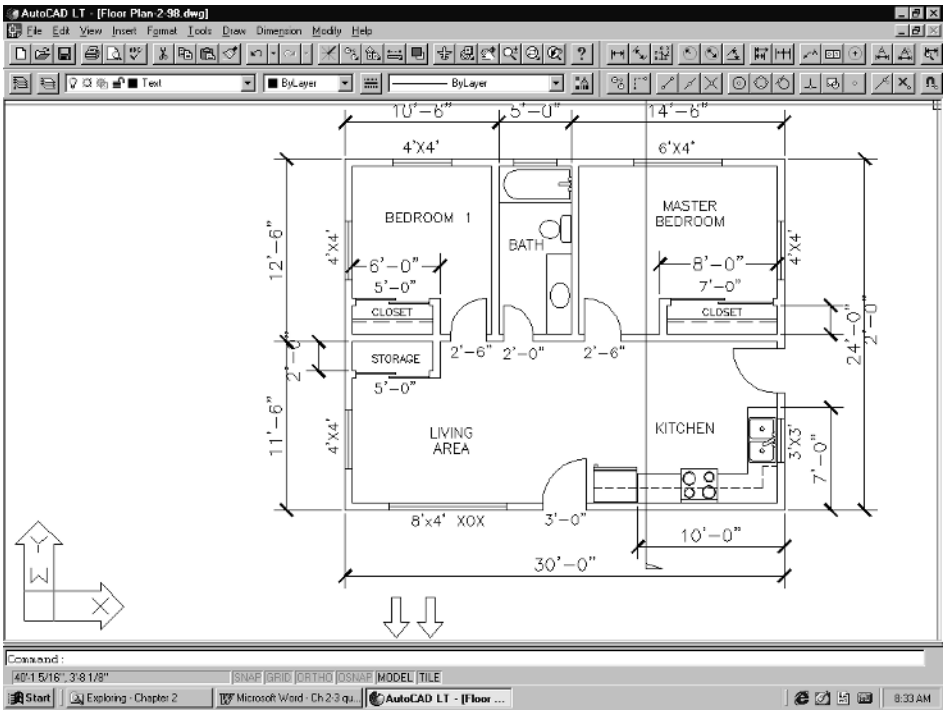


Figure 3-82

Go back into paper space. The method for doing this depends on the version of AutoCAD LT you are using. In LT 98, pick on the TILE button on the status bar. It should turn gray and the PAPER button should turn black. The border should come up. Also, the triangular icon should be visible in the lower left of the screen.

In LT 2000, pick the Layout1 tab. The border should come up and the triangular icon should be visible in the lower left of the screen.

Since you printed your floor plan back in Chapter 1, you have added a couple of new elements to this drawing, such as the foundation plan, roof plan, and section. When you switch back to paper space, your viewport within the border will probably look similar to Figure 3-83. In other words, you may have more showing in the viewport than you want.

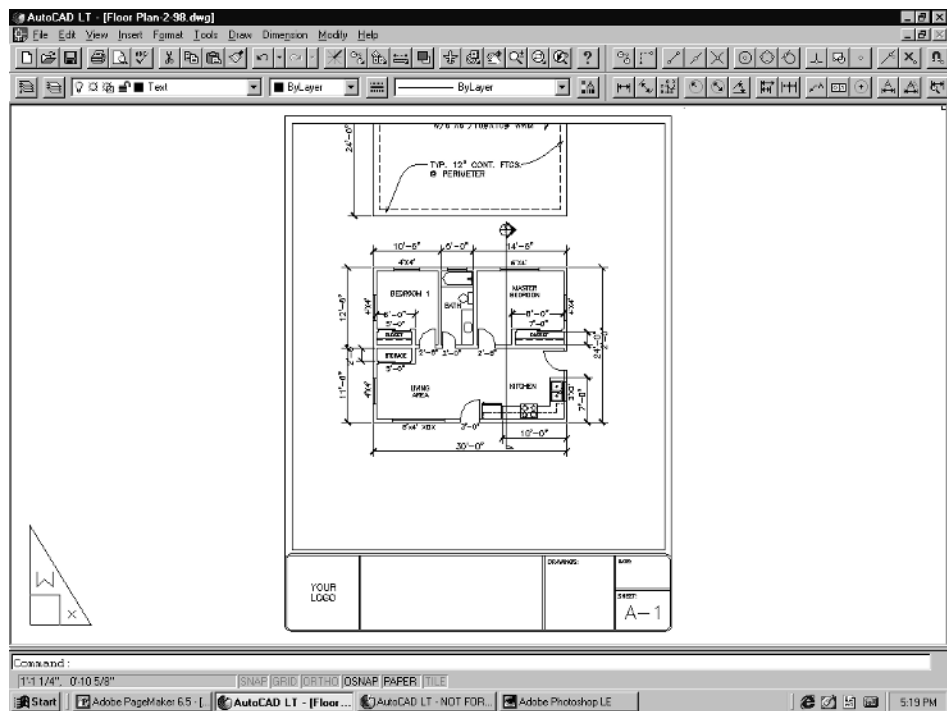


Figure 3-83

So what do you do to clean this up? Very simple. Just for the sake of this exercise, we will again print the floor plan. So you want to get rid of the foundation plan lines that are going to print if you leave it the way it is.

1. Pick on the inside line of the border. It is on a layer named DefPoints. This is the viewport. The grips light up in each of the corners of the viewport.

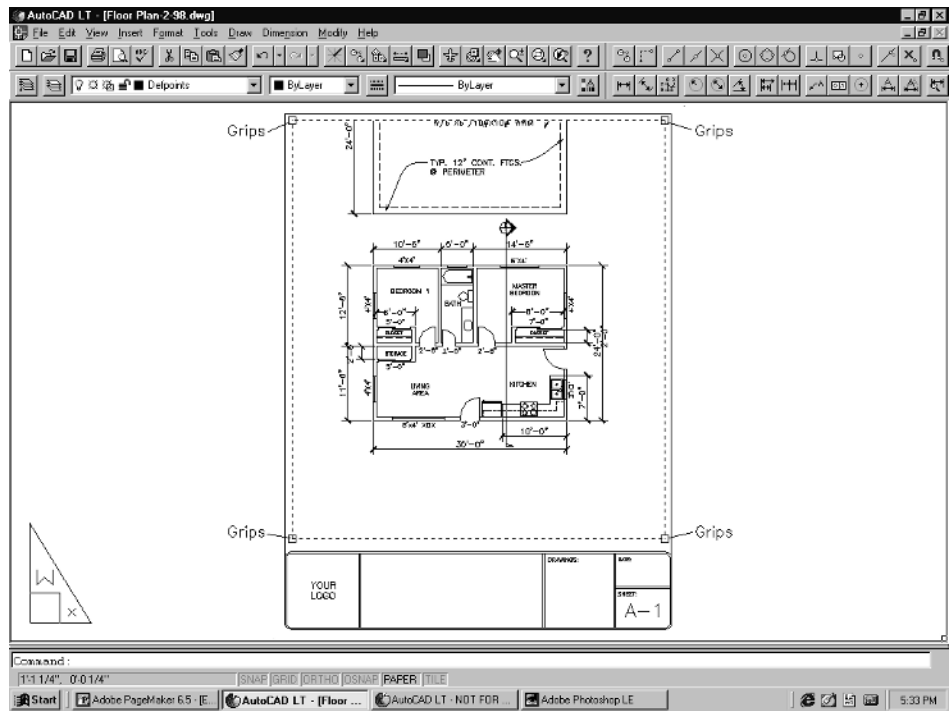


Figure 3-84

2. Make sure that ORTHO is on, or black. Make sure that OSNAP is off, or gray. Pick on the grip in the upper right-hand corner. It should change color. Pull it down so that it lines up with the bottom of the foundation plan and pick.

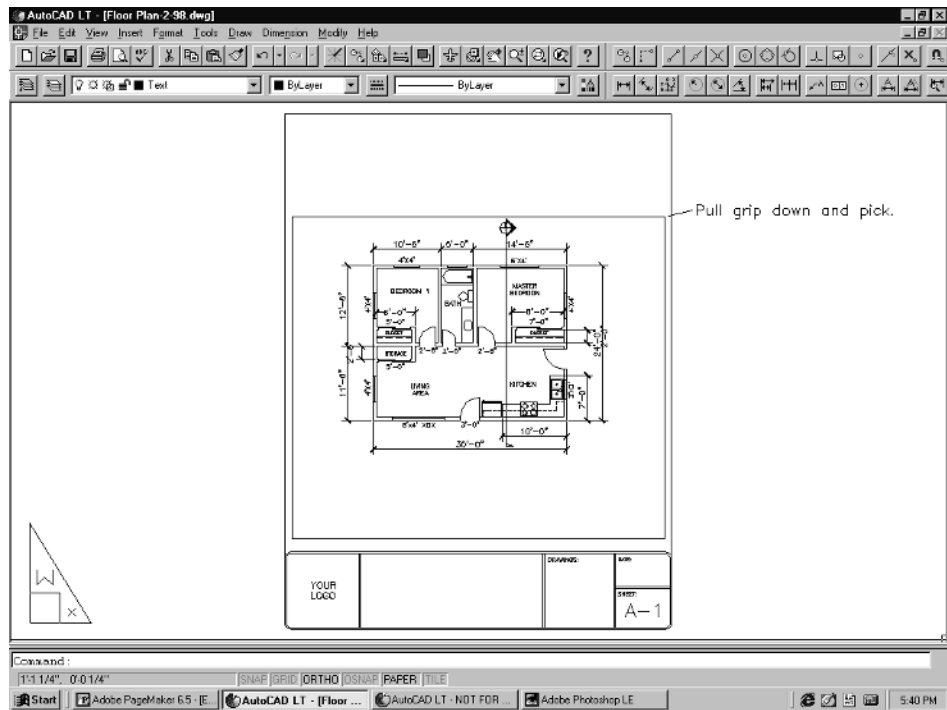


Figure 3-85

As you see, the viewport is resizable. This allows you to shape it vertically and horizontally to fit only what you want to show on the printout. You could pick the viewport again and grab one of the bottom corner grips and pull up. This would make the viewport fit the floor plan even more snugly.

This is not really necessary, but it demonstrates one of the unique aspects of paper space. There are many more, but we will go into that later.

Printing the Roof Plan

Next, go back to floating model space by picking the PAPER button on the status bar, changing it to say MODEL. Use the Pan command to move to the roof plan so that it is centered in the viewport, as in Figure 3-86. Switch back to paper space by picking the MODEL button on the status bar. The roof plan may not fit correctly, so stretch the viewport to make it fit. Remember that you want to show the entire roof plan, including the dimensions. See Figure 3-87.

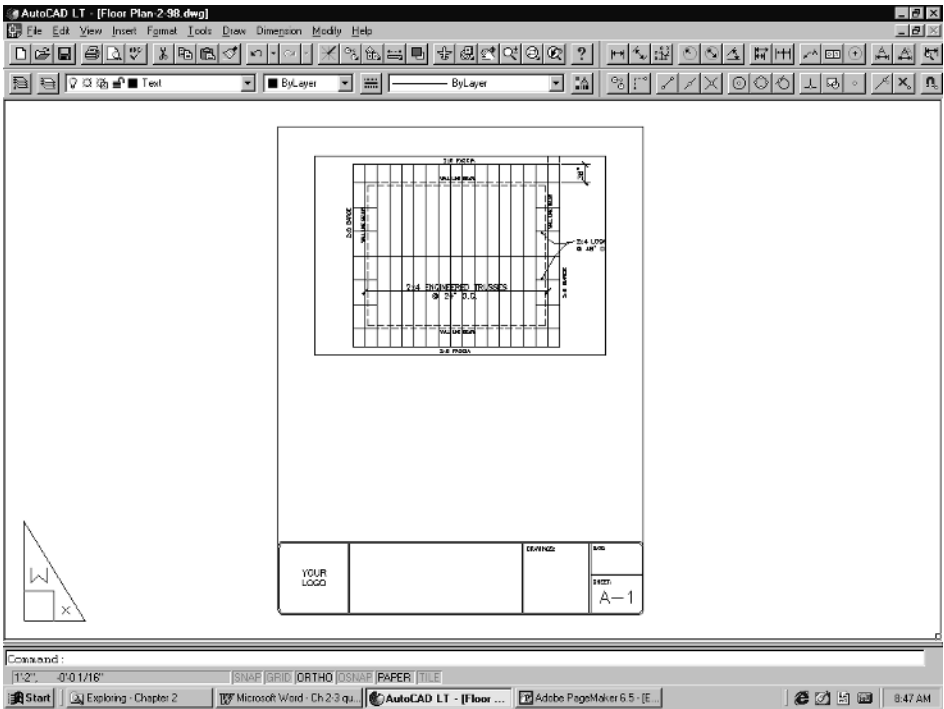


Figure 3-86

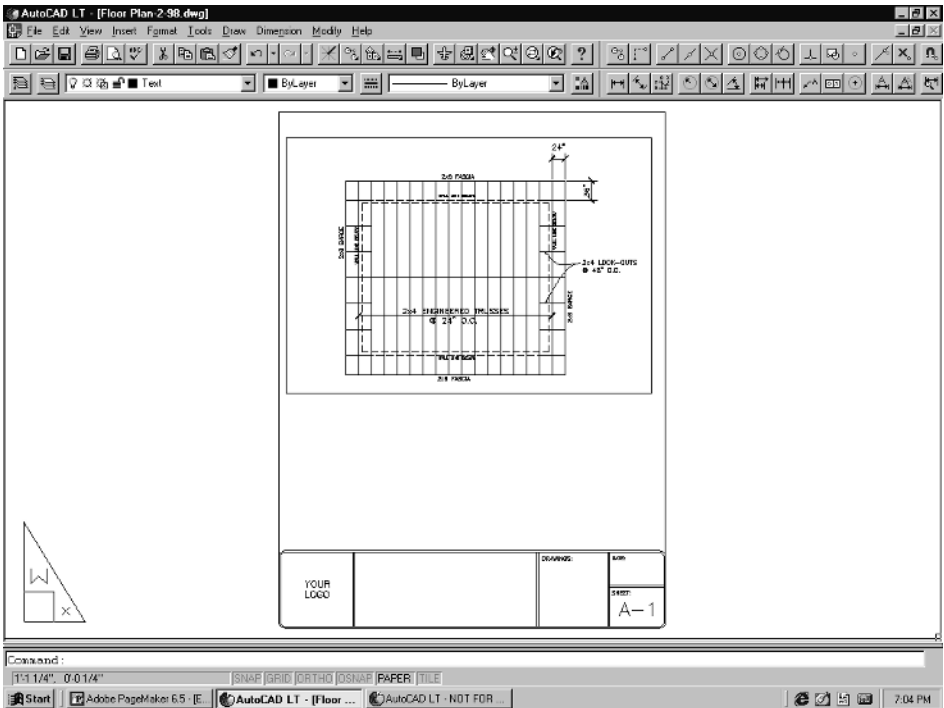


Figure 3-87

When you are ready, you can go ahead and print the roof plan. Remember to use a plot scale of 1 to 1.

Adding Text to the Section

There is much more to using paper space effectively, and we will go into that later. For now, we will be adding the text and labels to the section that you just finished. Sheet #4 shows what materials and specifications the contractor is calling for, so use it as your guide. There are a couple of things to consider before you begin dimensioning and adding text labels to a section.

First, you need to consider the scale the section will be plotted at. Some like to use a scale of 1/4", others 3/8". Choosing a scale is important because it determines which dimension and text style to use. Remember that most times you will be plotting on much larger sheets. Most architectural plots are done on 24"x36" (D sized) sheets. This means you have much more room on each sheet, and therefore the scale for each of the different elements can be larger than what we are forced to use here.

For example, floor plans are almost always drawn at 1/4" scale. Foundation and roof plans vary from 1/8" to 1/4" scale. This will depend on the amount of information that needs to be shown for either.

We started this book using the 11"x8.5" template. The scale of the viewport was set at 1/8" = 1'-0". The reason we chose this small template is that almost everyone has a "system printer" and can print out the finished drawings.

Let us begin by going back to floating model space by picking the PAPER button on the status bar and changing it to read MODEL. Pan the drawing so that the section is in the viewports.

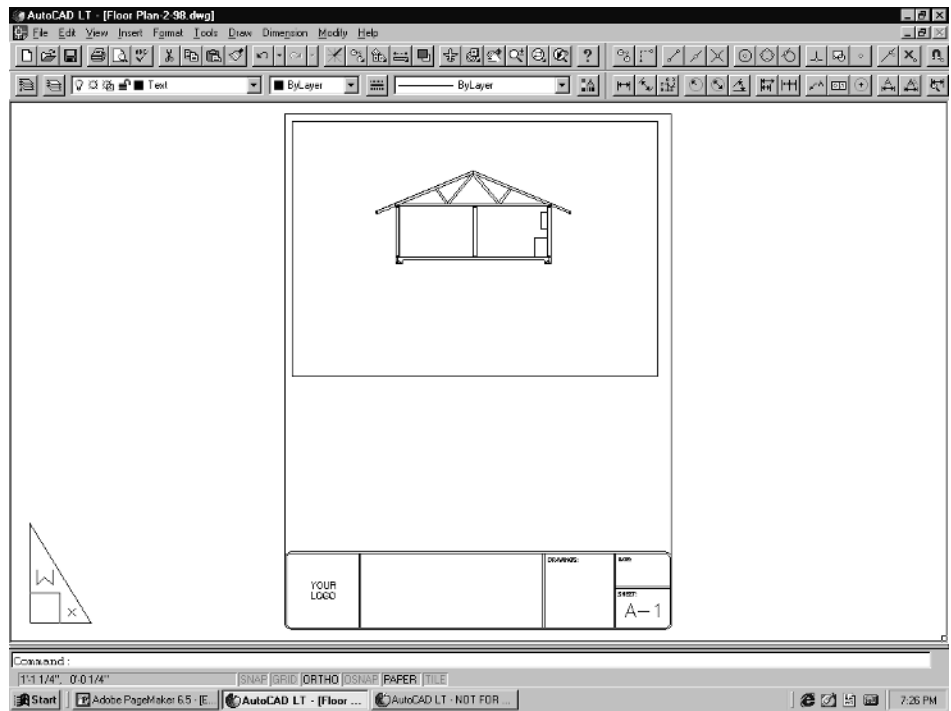


Figure 3-88

At 1/8" scale, you really have a hard time seeing any of the details you built into the section. However, you can label some of the main components and then create details of parts that need more labels than can be shown on the main section.



NOTE: Here is a trick that will help you to always know the limits of your viewports in relation to the element. Set your layer to DefPoints. Make sure you are in floating model space. Draw a rectangle within the viewport, making it almost as big as the viewport, as in Figure 3-89.

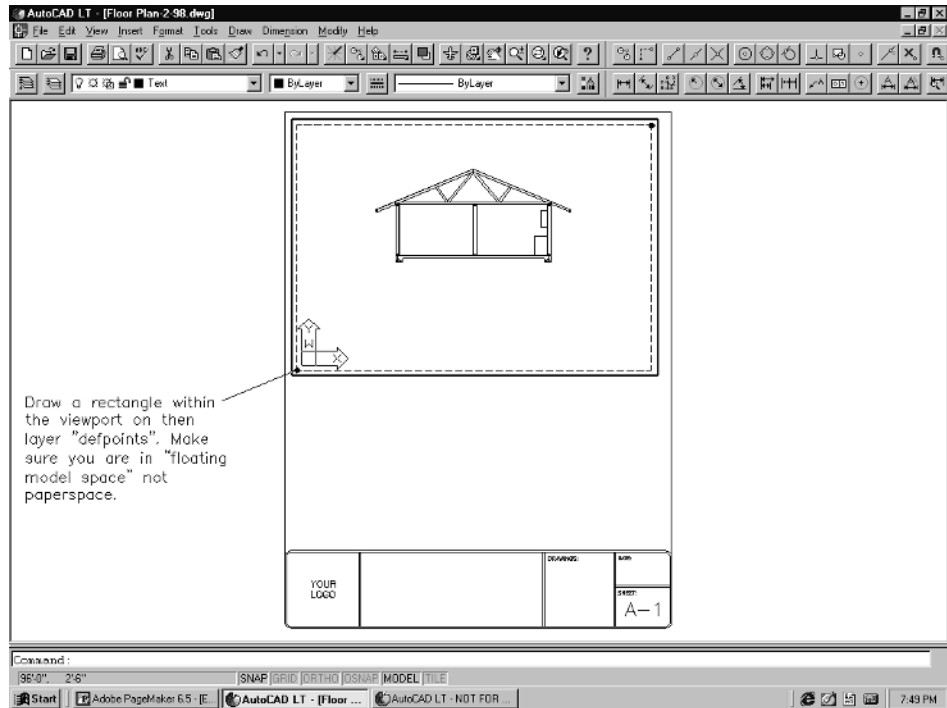


Figure 3-89

What does this do for you? It allows you to switch back to real model space, by picking the Model tab in LT 2000 or picking TILE in LT 98. You will see this rectangle around the drawing and know that you can draw anything within this rectangle and it will fit inside its corresponding viewport.

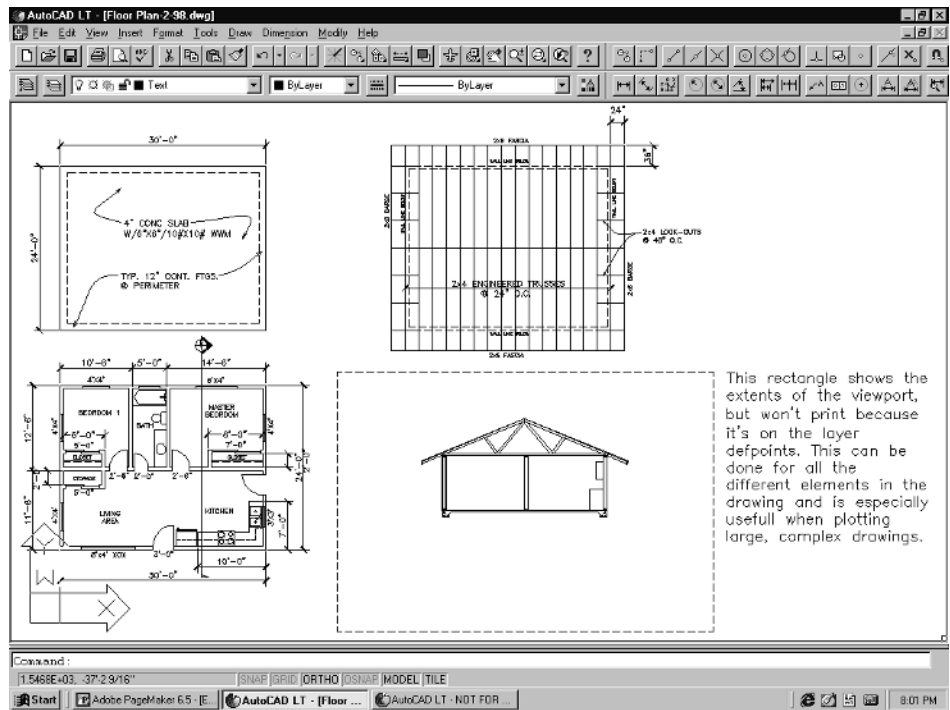


Figure 3-90

Since the scale of the viewport in this template is $1/8" = 1'-0"$, you will be using the text style named TEXT96 and the dimension style named RA96.

These should already be set. If they are not, follow these steps to set them as the current styles.

1. For text style, pick **Text Style** from the Format pull-down menu. Pick the little arrow in the Style Name box and select **TEXT96**. Hit the **x** in the upper right corner to close and exit.
2. To set the dimension style, pick **Style** under the Dimension pull-down menu. Pick **RA96** in the Styles box and then pick the **Set Current** button. Pick **Close (x)** to exit.
3. Zoom in to the section so that you can see it and its rectangular border. Change the current layer to **TEXT**. Draw rectangles or circles around any area that you feel you will need a detail of. In this exercise, we will draw details of the perimeter footings and the truss/wall connection area, as shown below. These are called out as Detail 1 and 2. Normally on detail tags, the sheet number that the detail is drawn on will be in the top portion of the tag. The detail number in the bottom portion.

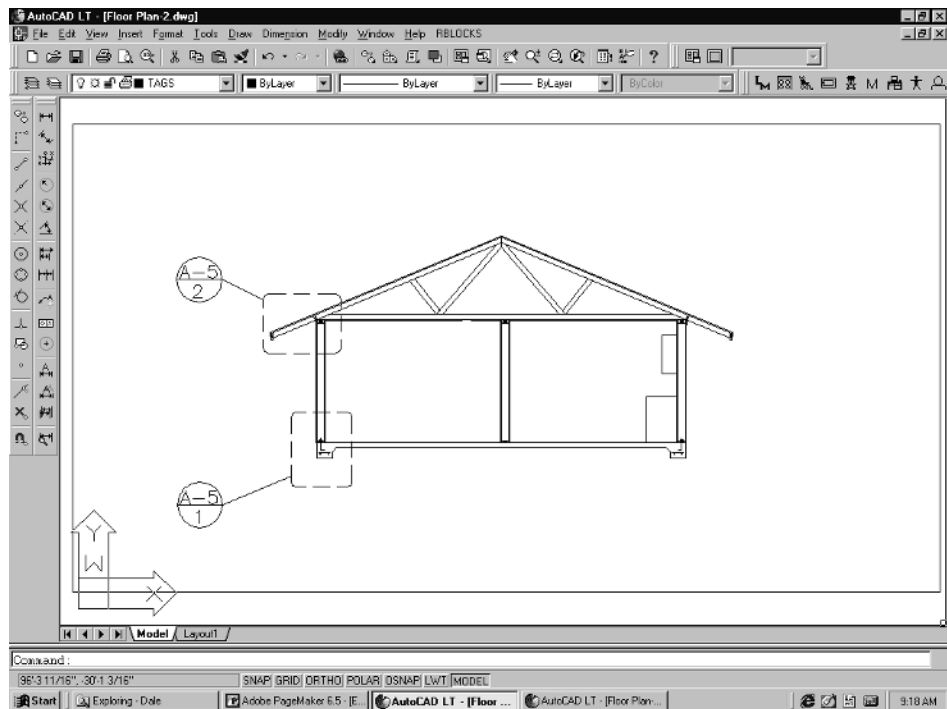


Figure 3-91

Because of space limitations on such a small sheet, you can only label some of the main features of the section. Details 1 and 2 will be blown up to much larger scale later, and you can then label the features that cannot fit here.

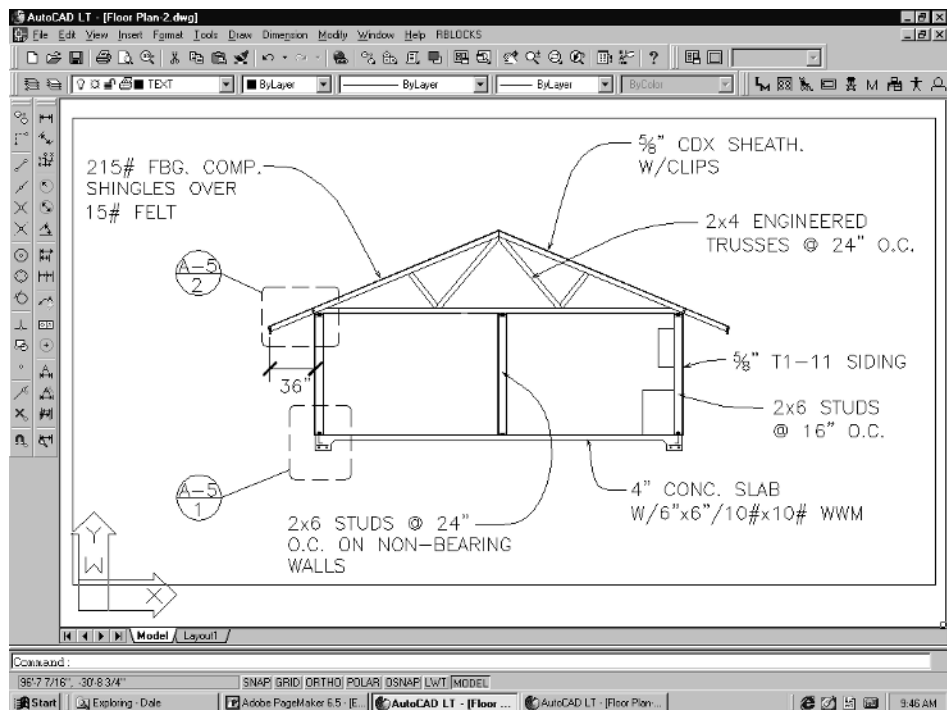


Figure 3-92

Once you have added the text and detail bubbles to the section, flip back to paper space.

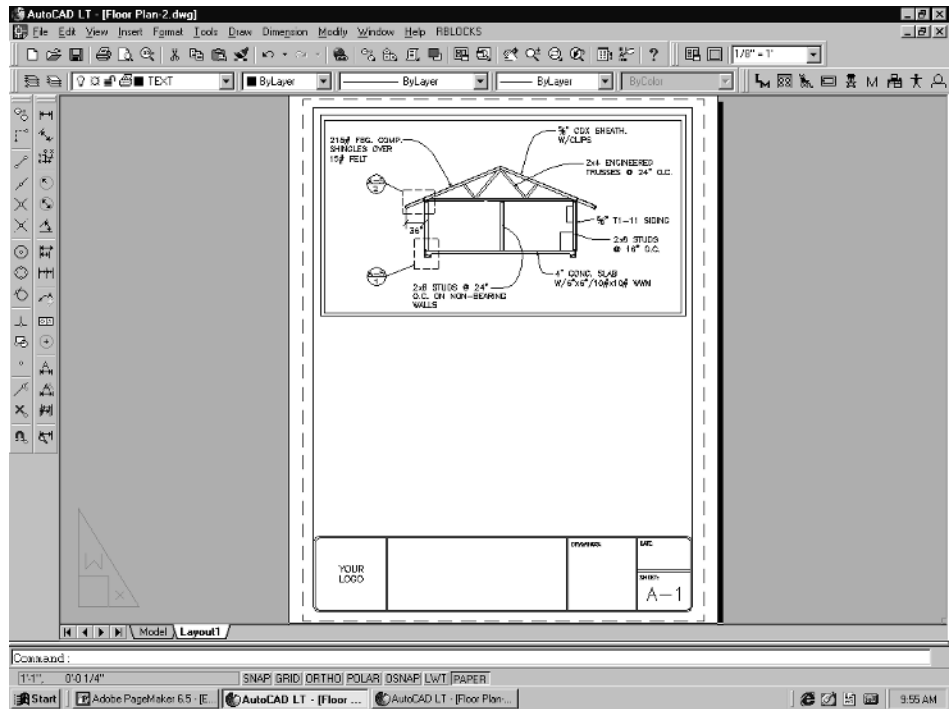


Figure 3-93

This time we are going to label the drawing and specify the scale.

1. Create a layer named **PSText**. Pick **Text Style** from the Format pull-down menu and pick the little arrow in the Style Name box. Pick the style named **Romans** and then pick the **Close (x)** button. Type **DT** and **Enter**, or select **Text** from the Draw pull-down menu and then pick **Single Line Text**.
2. When prompted to *Specify start point of text or [Justify/Style]*, pick a point for the label, centered below the section. At the *Specify height <5">* prompt, type **.25** and **Enter**. When prompted to *Specify rotation angle of text <0>*, hit **Enter** if the default is 0, or type **0** and **Enter** if it isn't. At the *Enter text* prompt, type **SECTION 1** and **Enter** two times to exit.
3. Center the label under the section by using the AutoCAD LT standard Move command. Then, draw a line under the label, making sure ORTHO is on when you do so.

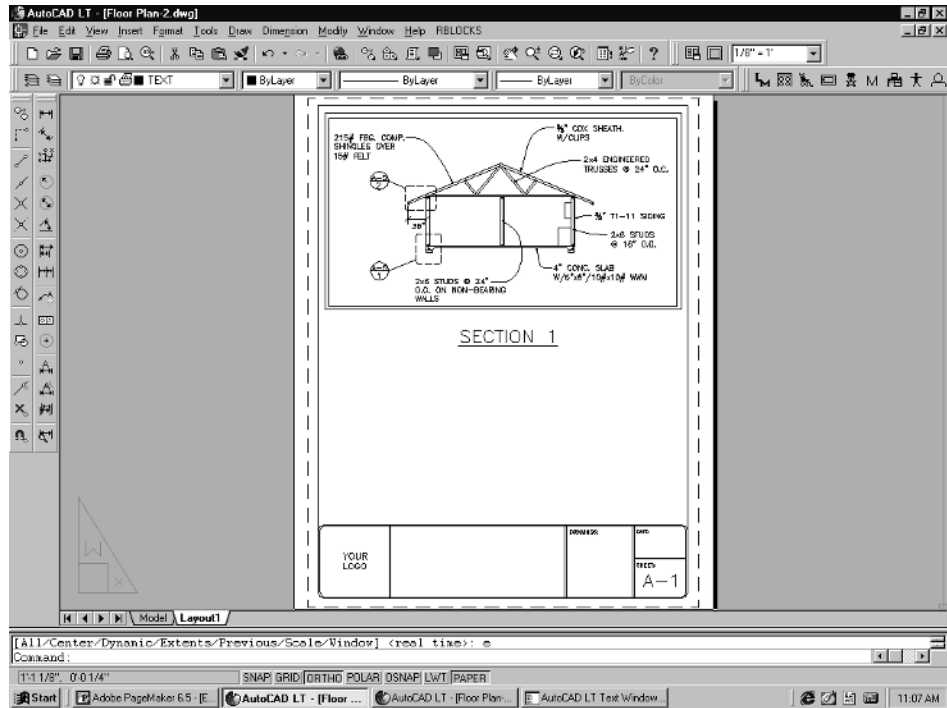


Figure 3-94

4. Use the same text commands to place the scale of the drawing right below the label. Type **DT** and enter, or select **Text** from the Draw pull-down menu and then pick **Single Line Text**.
5. When prompted to *Specify start point of text or [Justify/Style]*, pick a point for the scale label, centered below the main label. At the *Specify height <5">* prompt, type **.15** and **Enter**. When prompted to *Specify rotation angle of text <0>*, hit **Enter** if the default is 0, or type **0** and **Enter** if it isn't. At the command line prompt *Enter text*, type **Scale:1/8" = 1'-0"** and **Enter** two times to exit.

Center the scale label under the title label with the Move command. You can also stretch the line under the title label for a more uniform look.

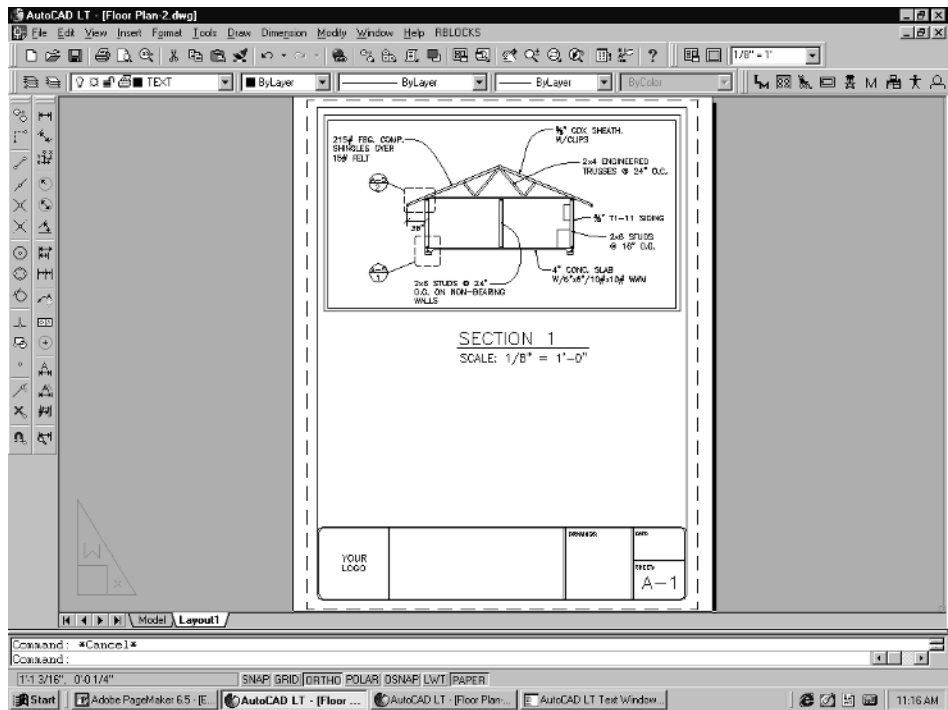


Figure 3-95

Modifying Text in the Border

You can modify the text in any of our borders by using the following methods.

For LT 2000, select the text first, then right-click the mouse. Pick the Text Edit option in the dialog that appears.

For LT 98, type DDEDIT and Enter, or pick Object from the Modify pull-down menu. Pick the item Text, then select the text you want to change.

Either way, you end up with the Edit Text box, which allows you to change whatever is already written. You can use this method for MText also, but you will get a slightly different edit box. Both regular “single line text” and “multi-line text” have their advantages and disadvantages. You must experiment with them to find which you like best in certain situations.



Figure 3-96

Figure 3-97 shows the completed section drawing with the border modified and the label and scale applied.

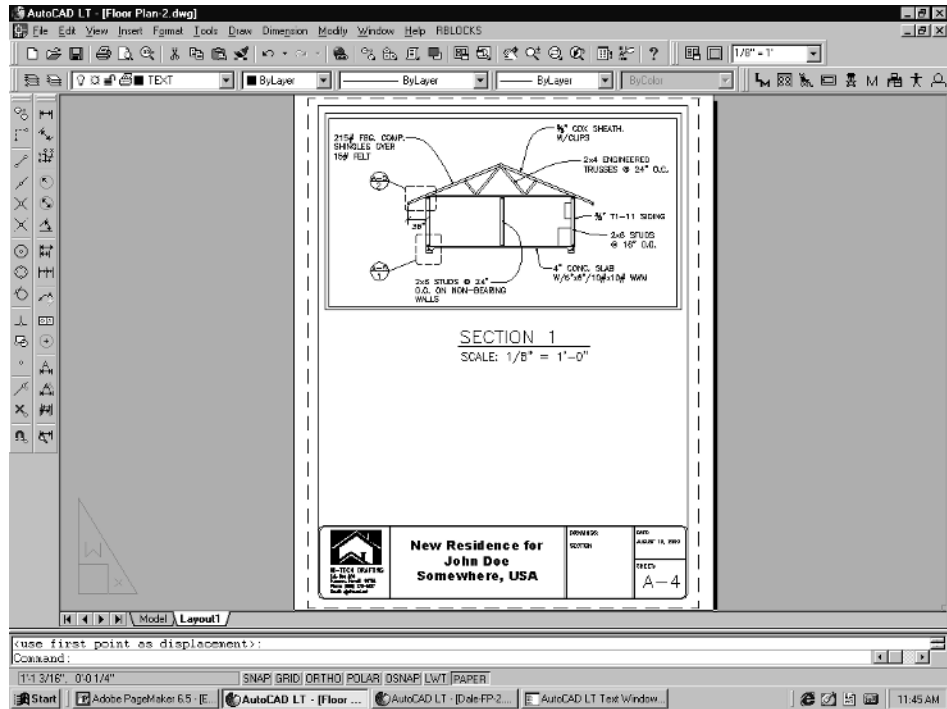


Figure 3-97

The sheet in Figure 3-97, as small as it is, still has room for at least a detail or possibly a roof or foundation plan within the border. You can easily do this by drawing a new viewport below the existing section viewport.

To create a new viewport, make DefPoints the current layer, then go to the View pull-down menu and pick Viewports. Select the 1Viewport item and then draw the new viewport below the existing one, just like you were drawing a rectangle. Next, change into floating model space by picking PAPER on the status bar at the bottom of your drawing screen. This will change to read MODEL. Pick inside of the new viewport and pan the roof or foundation plan into position inside of the new viewport. Finally, scale the viewport to $1/8" = 1'$. There is a difference in how this is done.

For LT 98, type ZOOM and Enter. Then type $1/96xp$ and Enter. For LT 2000/2000i, select the scale factor from the Viewports toolbar.

Remember that viewports can be moved and resized while you are in paper space. Also, you can move, change, and rescale any text that was created in paper space.

Just to show you that it can be done, take a look at Figure 3-98. Now, imagine you are working on a 24"x36" sheet. You can have any number of viewports on a single page, and each of these can have a different scale.

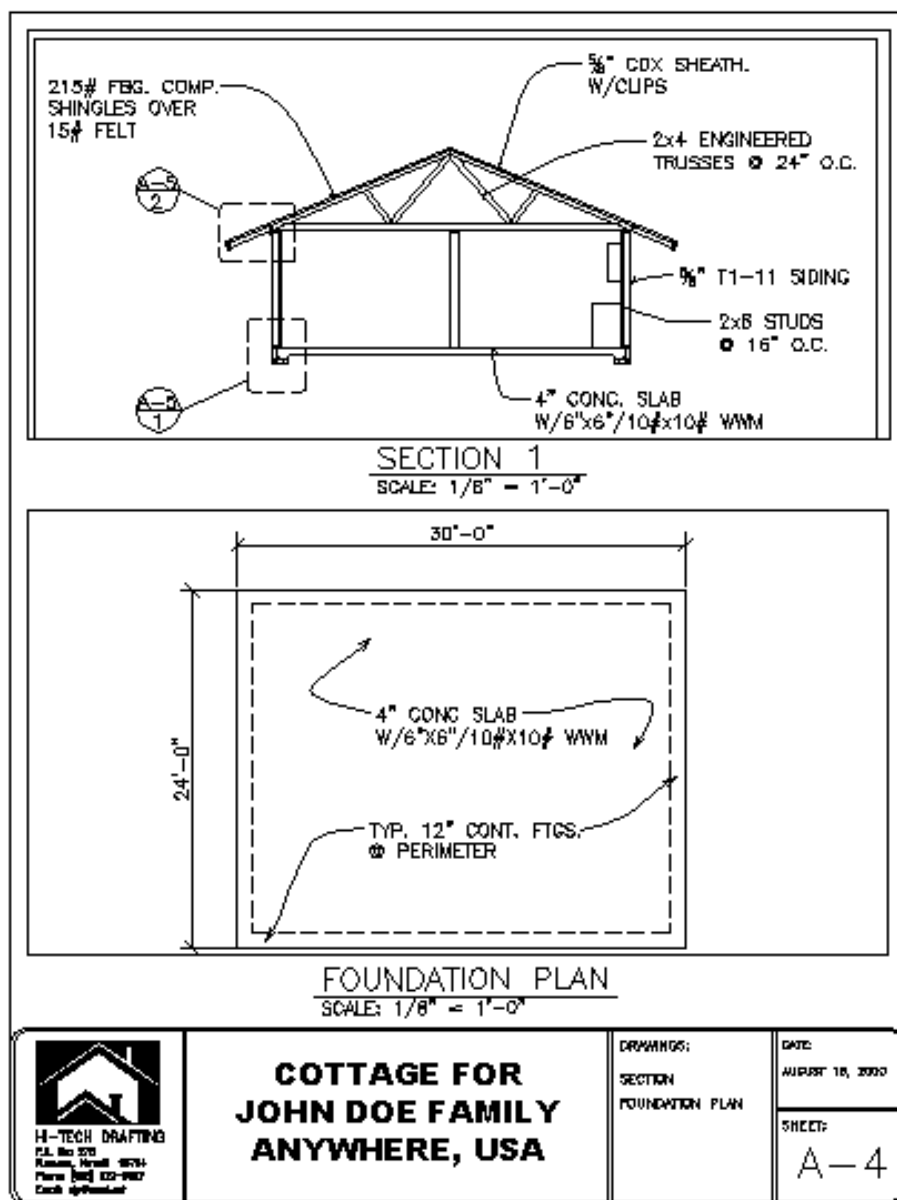


Figure 3-98

NOTE: The viewport frames won't print if they were created on the layer DefPoints. If you created your viewports on any other layer, they will print.

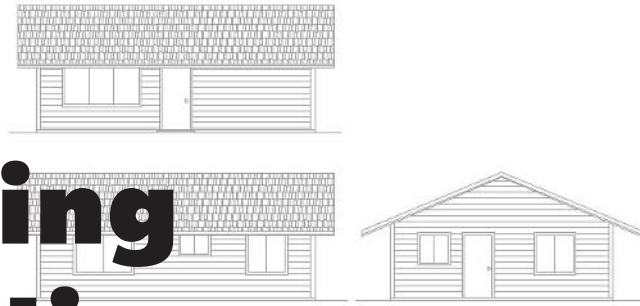


Summary

In Chapter 3, you have drawn a simple foundation plan and a roof plan. You then developed a single section. The section shows the vertical relationship of the structural materials called out in the floor, foundation, and roof plans. In more complex buildings, you will need to show more than one section to fully explain the different structural variations that the builder needs to be made aware of.

We now have all of the information we need to begin creating our elevations. So let's move on to Chapter 4.

Drawing Elevations



Overview

The traditional method of drawing elevations is to “pull” lines off of the floor plan—front, back, left, and right. These lines are then used to construct the elevation walls, window and door locations, and roof lines.

There are a couple of ways of going about this. One is to pull your lines out to the four sides, just as you would with the old drafting board and straight edge. The other is to “rotate” the floor plan so that the side elevation is in a horizontal orientation, and then pull your lines out. We have provided a couple of buttons that automatically rotate the floor plan when you want to draw the left or right side elevations. These are on the Arch LT toolbar, which you loaded at the beginning of Chapter 1. There is also a button that returns the floor plan back to the “plan” orientation once you are done pulling your lines.

We have also provided you with a number of different elevation symbols and blocks to demonstrate to you that, even though elevations are time consuming to construct, you can cut out a large part of the work by developing a library of your own symbols and blocks.

Traditional Method

For this chapter, we will be using the traditional method of drawing elevations using AutoCAD LT. Consider the floor plan

In this chapter, you learn about:

- ◆ **Drawing and plotting front, back, left, and right elevations**
- ◆ **Hatching elevations**
- ◆ **Plotting using a custom template file**

in Figure 4-1. Using the traditional method of creating elevations, you would pull lines off the wall corners, window and door openings, and roof corners and ridges. These lines would be pulled up, down, left, and right. A floor line is drawn and then you begin to offset lines for the top plate of the walls, window and door tops, and ridge heights.

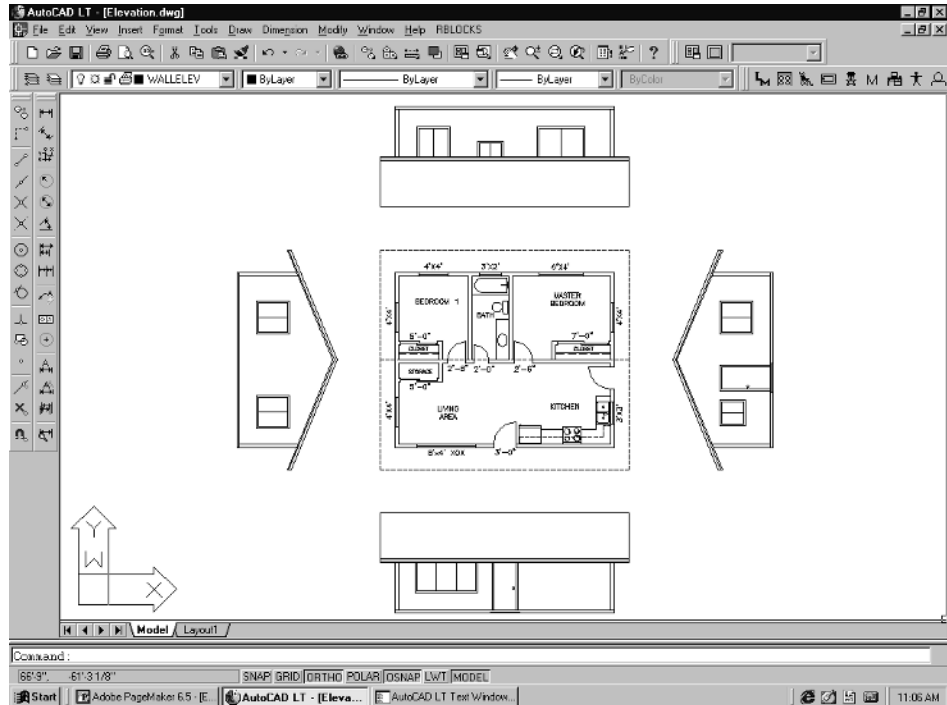


Figure 4-1

To begin, open up the same drawing we have been working on by selecting Open from the File pull-down menu and selecting the drawing. If the drawing is still in paper space (the border is showing), you will need to change back to true model space.

Remember, to change back to model space in LT 98, pick the TILE button so that it turns black. In LT 2000, pick the Model tab. Your drawing should be similar to Figure 4-2.

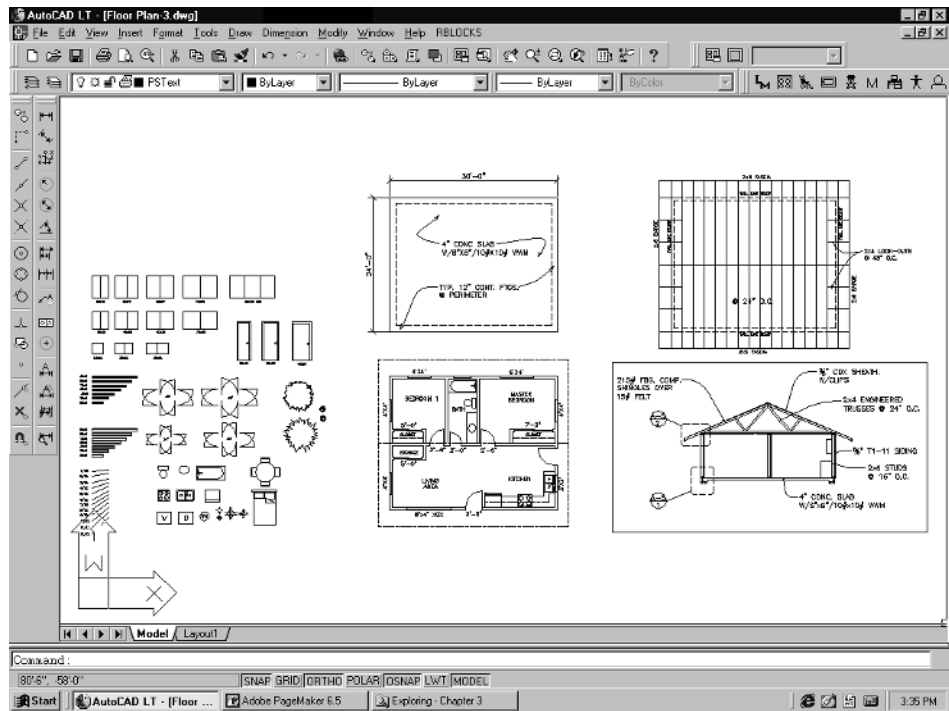


Figure 4-2

You are going to need to create quite a bit of space around the floor plan so that you will have room for the elevations. First, make sure all of your layers are on and thawed. With this checked, **Zoom|Out** so that you have some room around all the existing elements in the drawing. We will start by separating the floor, foundation, and roof plans and the section away from the set of symbols and blocks that came with the drawing.

1. Make sure both **SNAP** and **ORTHO** are on. They will show up as black on the status bar when they are on.
2. Type **M** and **Enter**, or select **Move** from the Modify pull-down menu. At the command line prompt *Select objects*, draw a window around all of the elements in the drawing by picking points 1 and 2, as shown in Figure 4-3. Then press **Enter**.

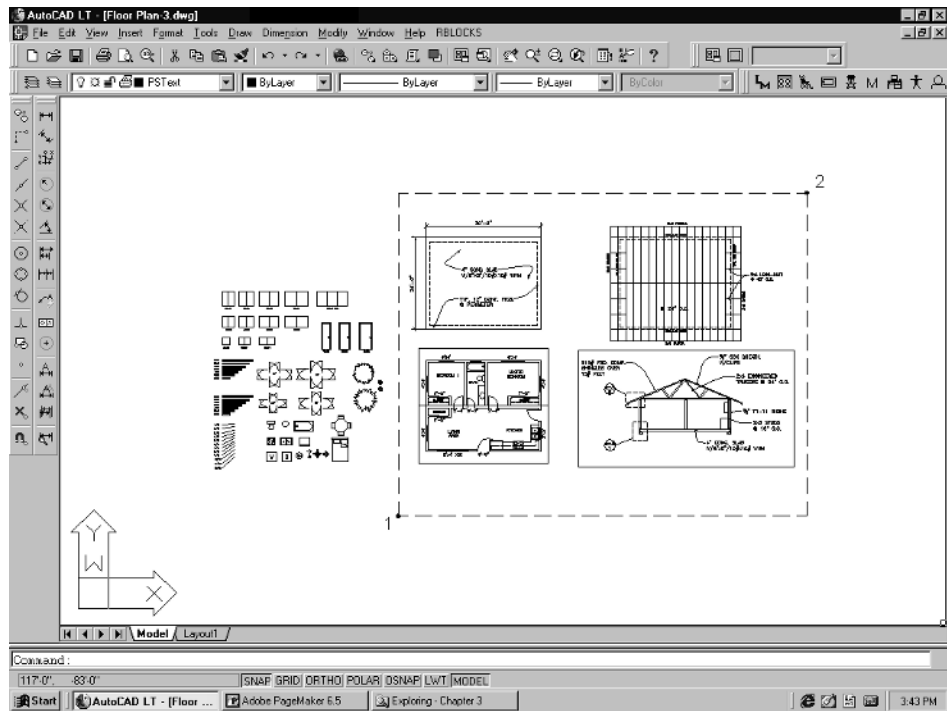


Figure 4-3

- When prompted to *Specify base point or displacement*, pick a point, such as point A in Figure 4-4. At the *Specify second point of displacement* prompt, pull the cursor right and pick point B.

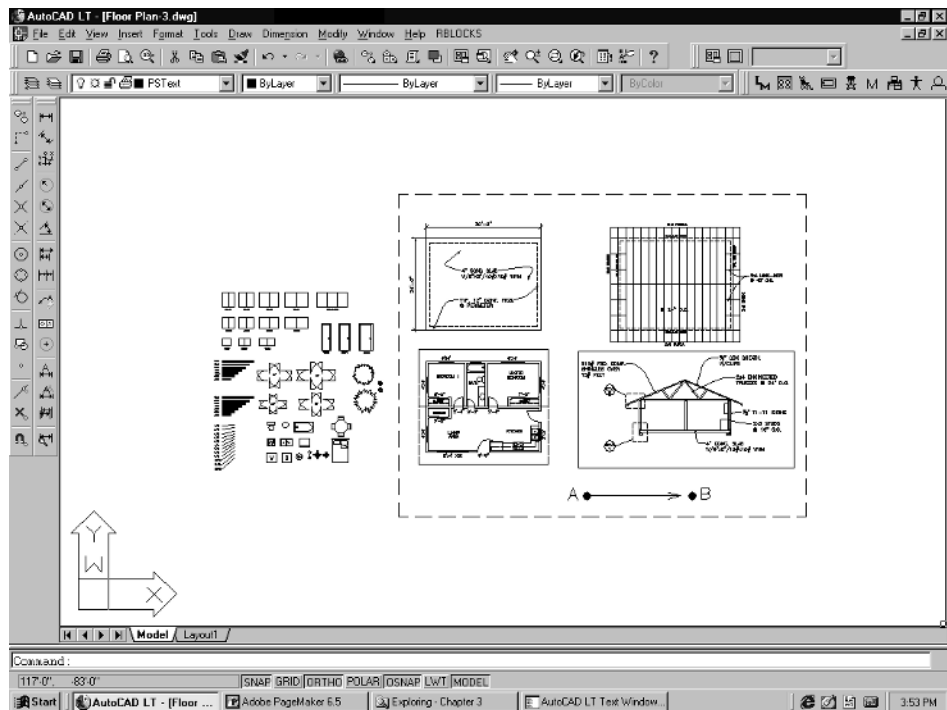


Figure 4-4

4. As soon as you pick point B, the floor plan etc., will move to the right. Do the same thing to each of the other elements, moving them away from the floor plan so that you have the space you need to draw the elevations. See Figure 4-5.

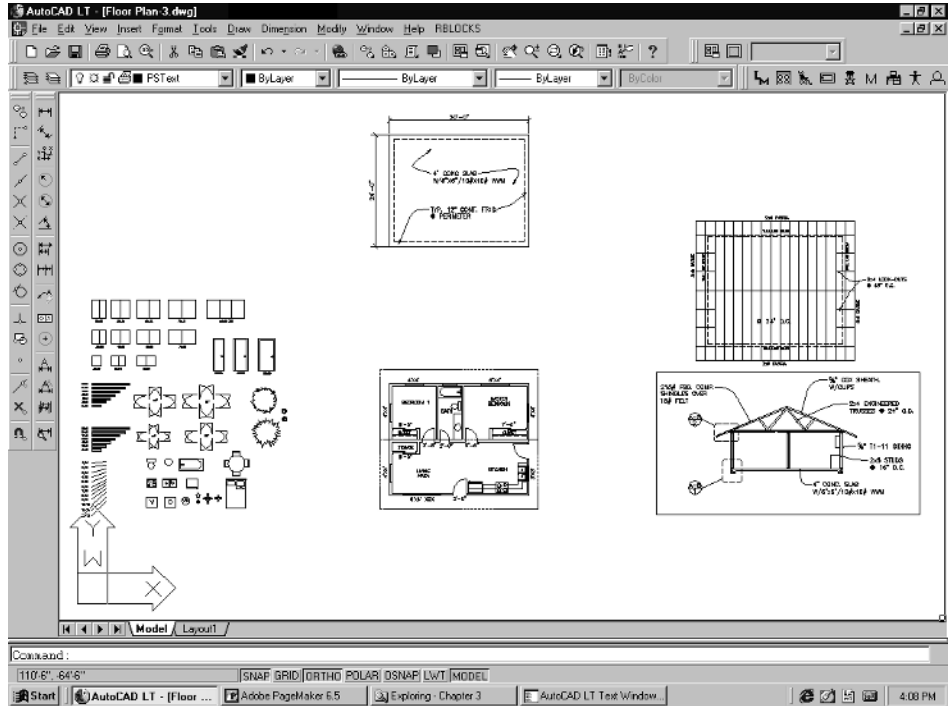


Figure 4-5

Front Elevation

Now that you have enough room, we will start with the front elevation. Make the layer WALLELEV current, and set your Osnaps to Endpoint, Perpendicular, and Midpoint. (In LT 98 type OSNAP. In LT 2000 right-click on OSNAP on the status bar and then pick Settings.)

1. **Zoom|In** to the floor plan, as in Figure 4-6.

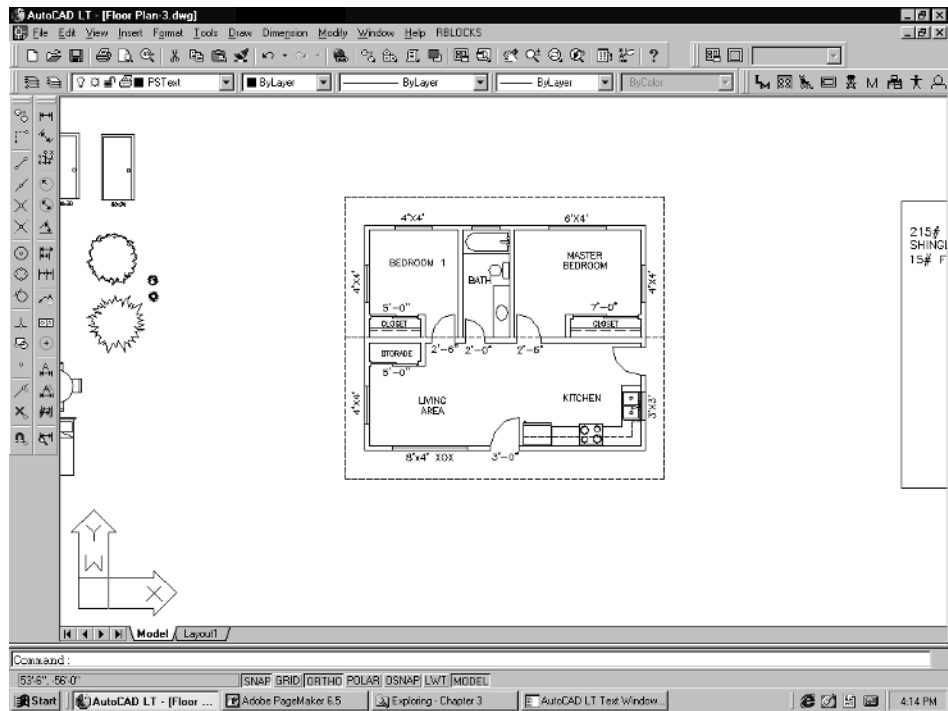


Figure 4-6

2. Type **L** and **Enter**, or pick **Line** from the Draw pull-down menu. Make sure OSNAP is on. If a “glyph” doesn’t light up as you pass your cursor over a wall end or corner, then OSNAP is off. Hit the **F3** key to turn it back on.
3. Start by picking the left exterior wall corner and pulling your cursor down. You can type in a distance, or just pull the cursor and watch the coordinate readout in the lower left corner of your screen. The line should be around 25' long. Do the same for the right wall corner. Next draw a horizontal floor line down near the end of the lines, and then clean these up with the Fillet command. See Figure 4-7.

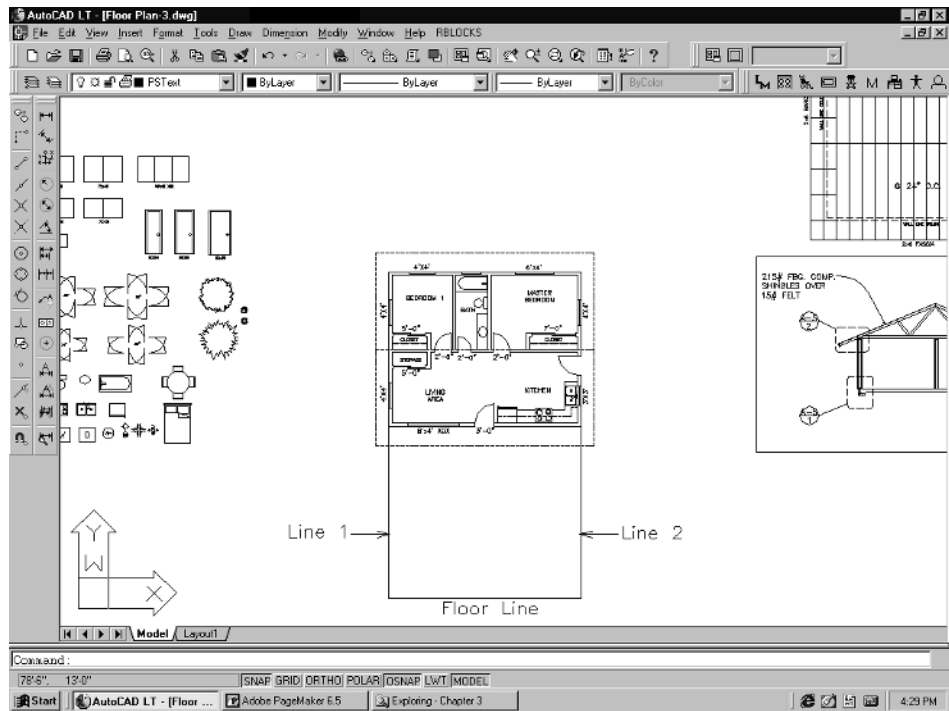


Figure 4-7

4. Next, offset the floor line 8' up to represent the ceiling line. Then offset the floor line 6'-8" up, representing the header or top of window height. Clean up these lines with the Trim or Fillet commands.

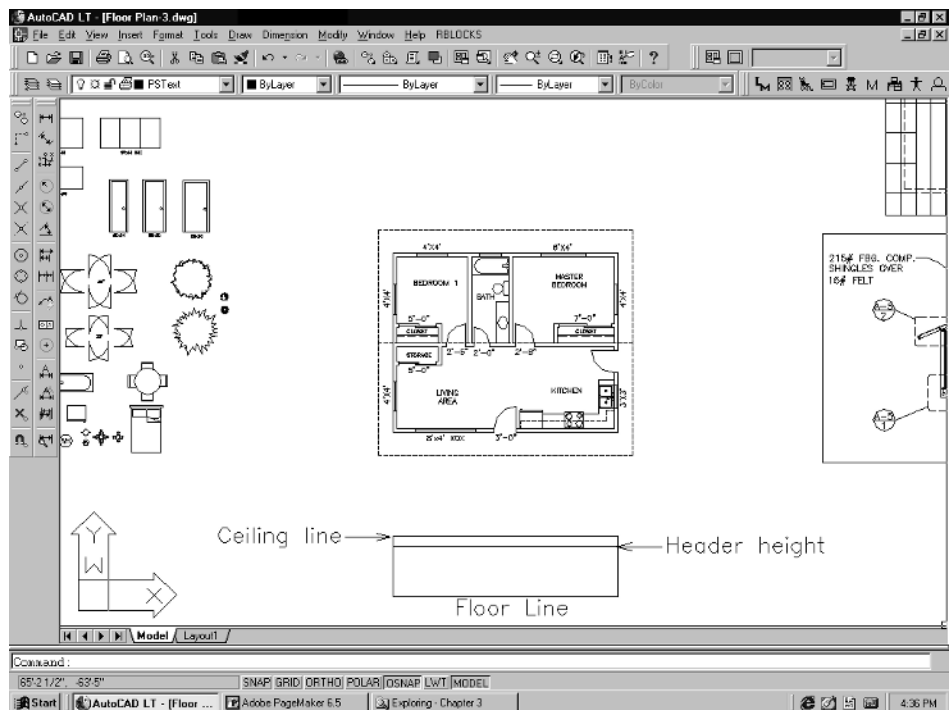


Figure 4-8

- Offset the left and right walls 24" to the outside. These are going to be the barge ends of the roof. Go into the Line command again and draw a line from the midpoint of the 8' window down to the header line. Also, draw a line from the door opening down to the header line.

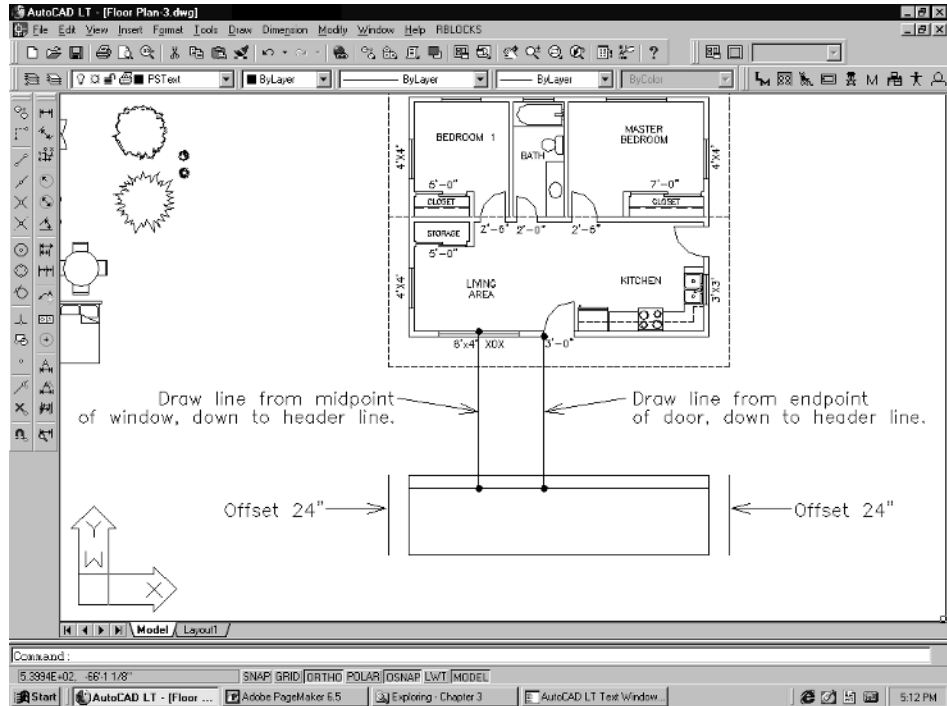


Figure 4-9

- To finish the roof in this view, you need the ridge line. How do you get the ridge line? Here's the formula:
Half of the building width, multiplied by the pitch, plus the rafter width, equals the ridge height.
The building is 24' wide, so half of that is 12'. The pitch is 5/12, so 5" is the actual rise for every foot of run. The rafters are approximately 4" with sheathing.
So here is how it works out: $12 * 5 = 60" + 4" = 64"$
- Offset the ceiling line 64" for the ridge and clean up the lines with the Fillet command.
This same formula works almost identically for the eave lines of the roof. If you have an overhang of 3', which is the case here, you would multiply this by the pitch. The only difference is that you would subtract the rafter width instead of adding it to the total.
So here is how it would work out: $3 * 5 = 15" - 4" = 11"$

Figure 4-10 shows the finished roof lines, except for the fascia. Wait to add the fascia line until we insert the windows and door in this view.

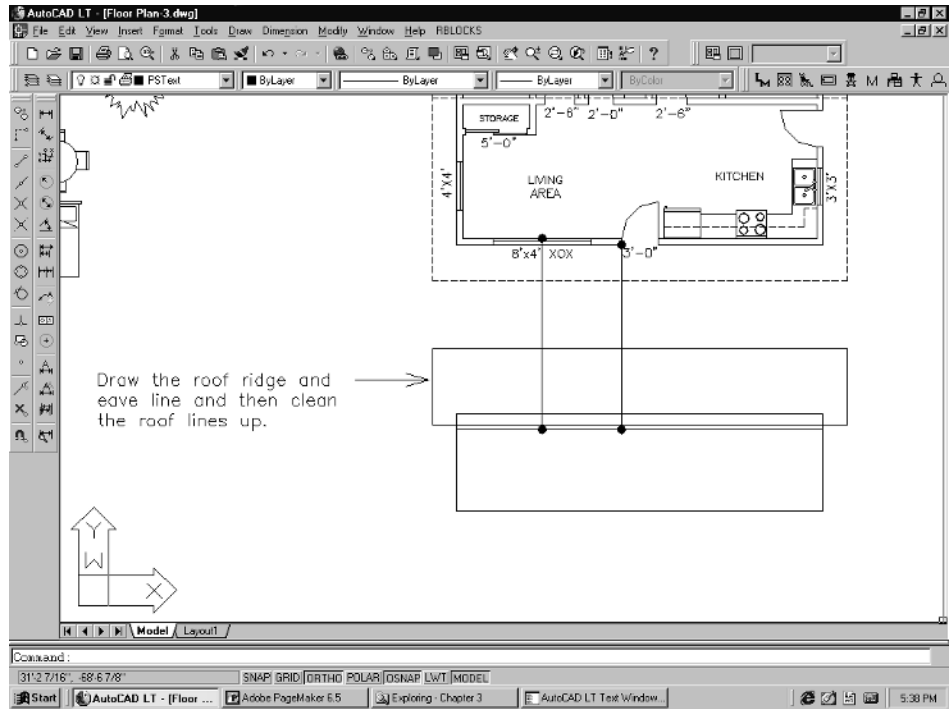


Figure 4-10

8. **Zoom|Out** so that you can see both the elevation and the window and door blocks we provided. Use the Copy command to copy the 8' XOX window.
9. When prompted to *Select objects*, pick the 8' window. Then press **Enter**. At the *Specify base point or displacement, or [Multiple]* prompt, pick the window at the midpoint of the upper line of the window. At the command line prompt *Specify second point of displacement or <use first point as displacement>*, drag the window over to the elevation and drop it on the intersection of the line that you drew from the midpoint of the plan window down to the header line. See Figure 4-11.

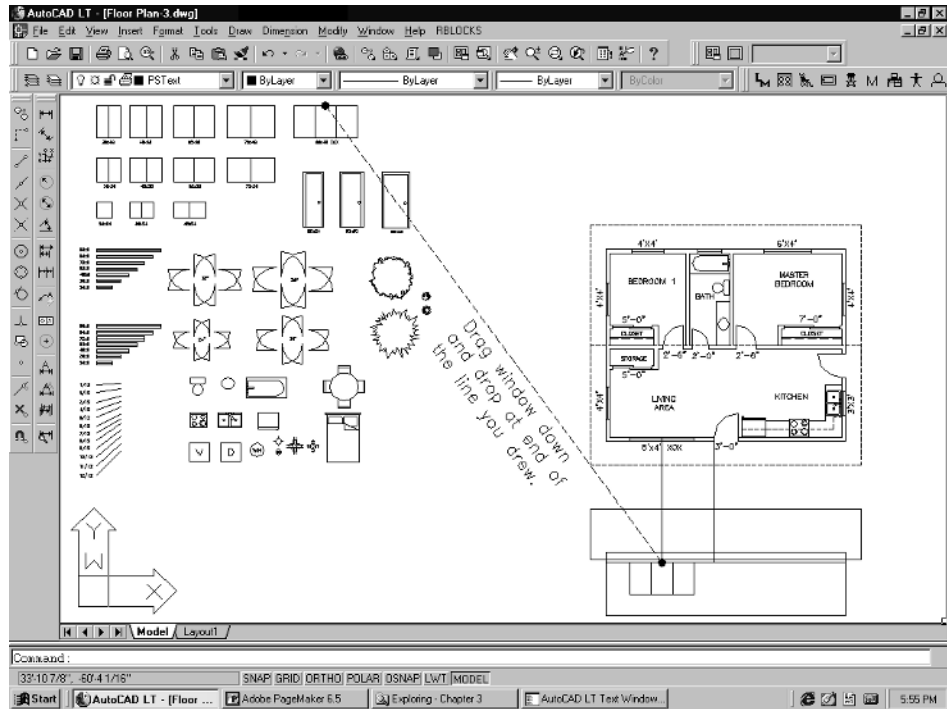


Figure 4-11

10. Except for the *First point of displacement* prompt, everything else is the same for inserting the door. Pick the **Copy** command from the Modify pull-down menu. When prompted to *Select objects*, pick the 3' door. Then press **Enter**. At the *Specify base point or displacement, or [Multiple]* prompt, pick the inside upper left corner of the door. When prompted to *Specify second point of displacement or <use first point as displacement>*, drag the door over to the elevation and drop it on the intersection of the line that you drew from the endpoint of the plan door opening, down to the header line. See Figure 4-12.

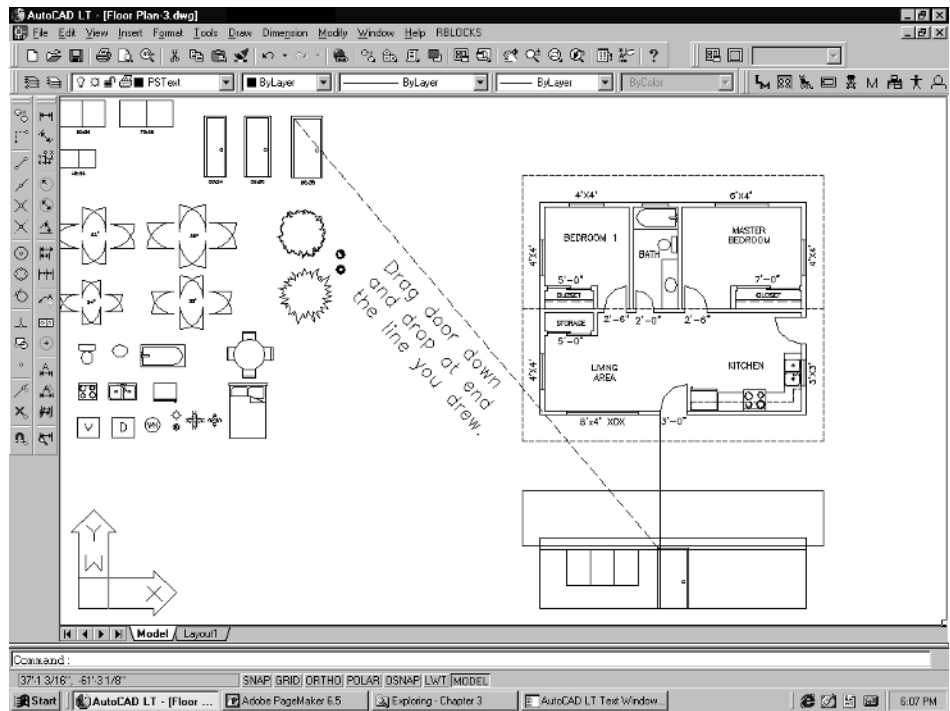


Figure 4-12

Now you can zoom in to the elevation and do some cleanup.

1. The first thing to do is erase any lines that are not needed, like the header line and the ceiling line.
2. Next, offset the window outline by 3" to form a window frame.
3. Offset the eave line 6" to form the fascia. If the fascia overlaps the window and door lines, you will need to trim out these lines. You can add details, like the 1x4 fascia trim or some corner boards. Your drawing should look similar to Figure 4-13.

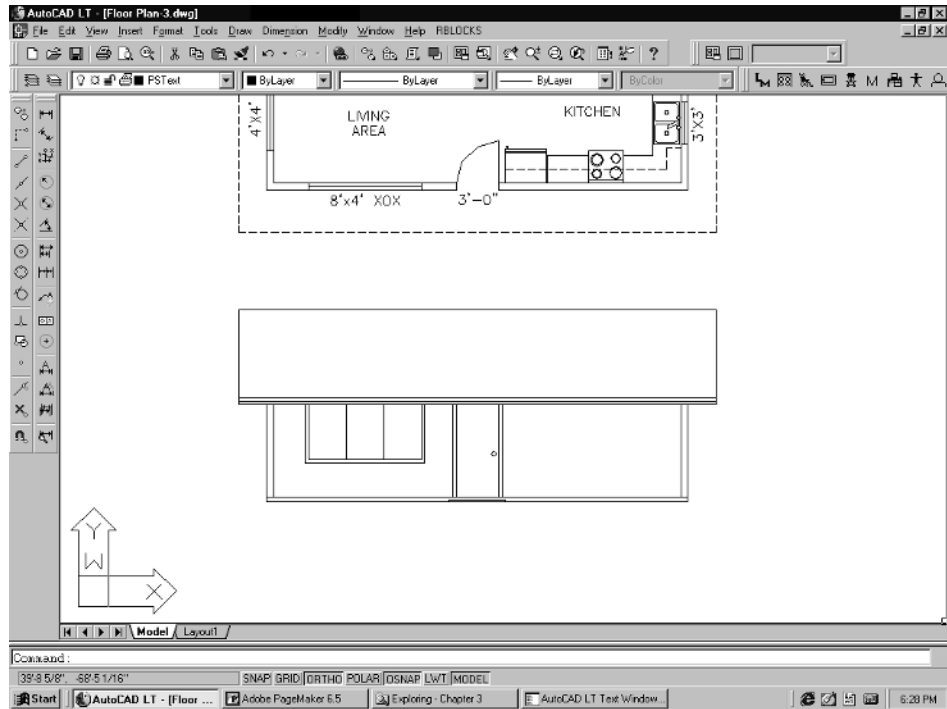


Figure 4-13

If you feel like it, you can add hatching to the elevation. This is usually done after all the elevations have been drawn and lined up, and is presented later in this chapter. So, let us continue with the back elevation.

Back Elevation

On such a simple structure, the fastest way to draw the back elevation is to simply copy the front elevation and move it to the rear of the building. See Figure 4-14.

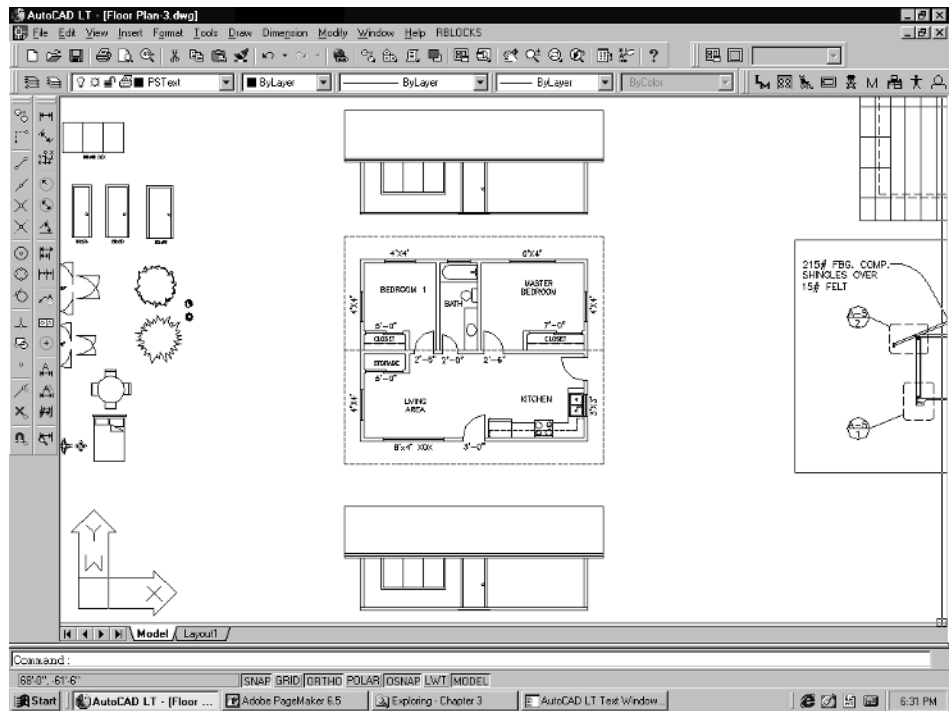


Figure 4-14

You will need to change the windows and doors, but the major components are already finished, so the job will go much faster. This is one of those simple time savers that you will find yourself using over and over during your drafting career.



NOTE: One of the important lessons to keep in mind when using AutoCAD LT is that there are always alternative ways of doing the same tasks. I will guarantee that you will come up with a better way of doing some of the things we show you in this book.

1. **Zoom|In** to this back elevation. Use the Erase command to get rid of the window and door: Type **E** and **Enter**, or pick **Erase** from the Modify pull-down menu. You will use a window type of erase, which allows you to erase multiple entities by drawing a window around them, instead of picking each one individually.
2. When prompted to *Select objects*, pick the lower left-hand corner below the window as the first point (#1 in Figure 4-15). At the *Specify opposite corner* prompt, drag your cursor and pick #2. Then hit **Enter**. That should erase all of the existing window and door lines.

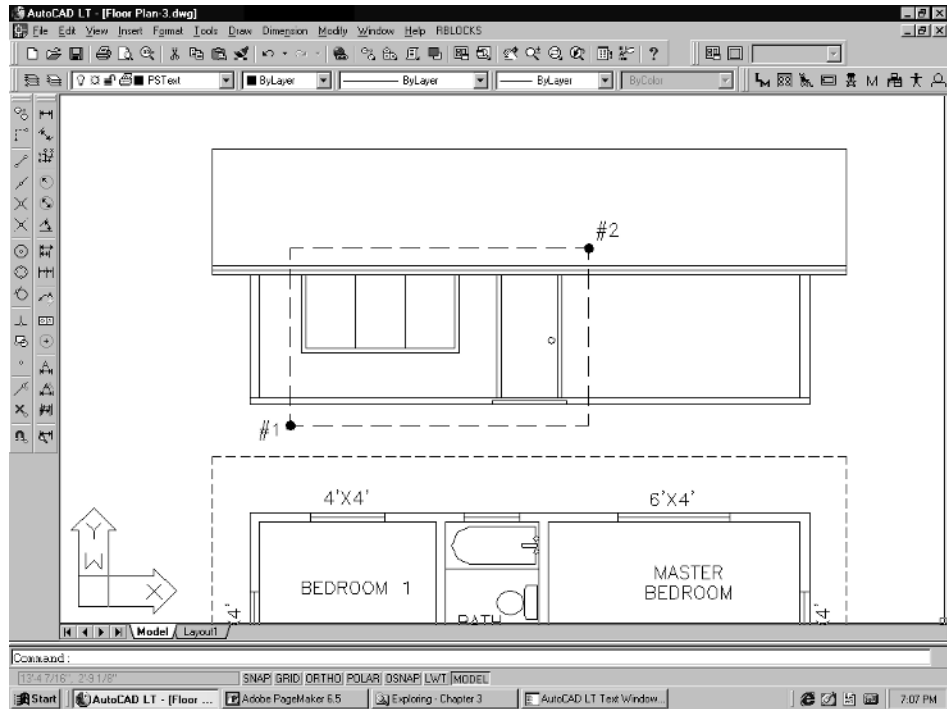


Figure 4-15

3. You will need to reestablish the header height line. To do this, offset the floor line up **6'-8"**. Then, as we did in the front elevation, draw lines from the center of each of the windows in the back wall up to the header line. See Figure 4-16.

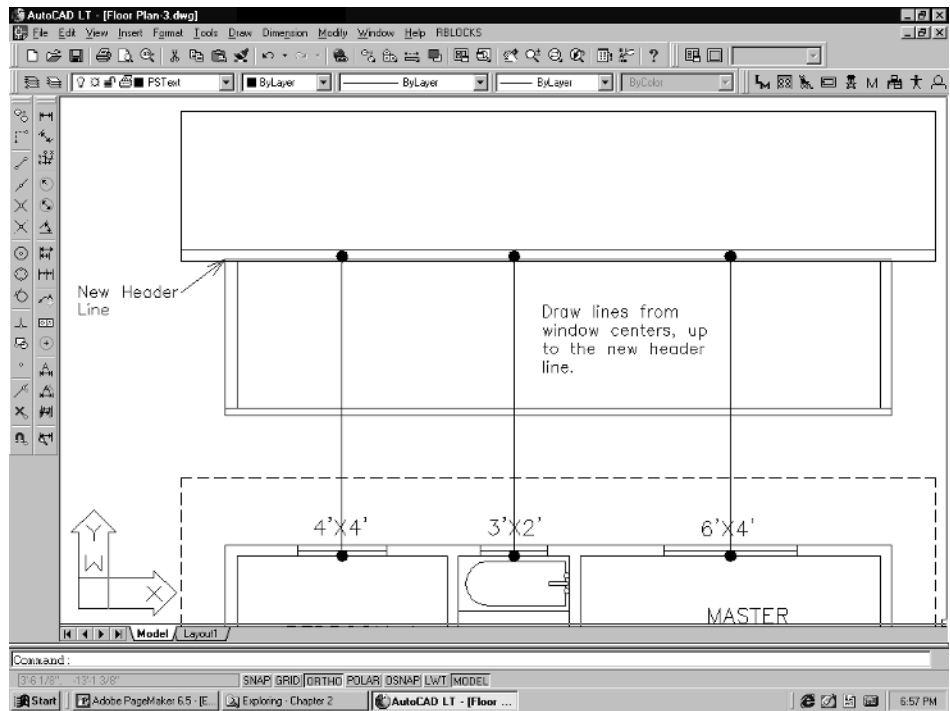


Figure 4-16

4. **Zoom|Out** so that you can see both the elevation and the window and door blocks we provided. Use the Copy command to copy the 4'x4' window.

When prompted to *Select objects*, pick the 4'x4' window. Then **Enter**. At the *Specify base point or displacement, or [Multiple]* prompt, pick the window at the midpoint of the upper line of the window. Then, at the *Specify second point of displacement or <use first point as displacement>* prompt, drag the window over to the elevation and drop it on the intersection of the line that you drew from the midpoint of the 4'x4' plan window up to the new header line. See Figure 4-17.

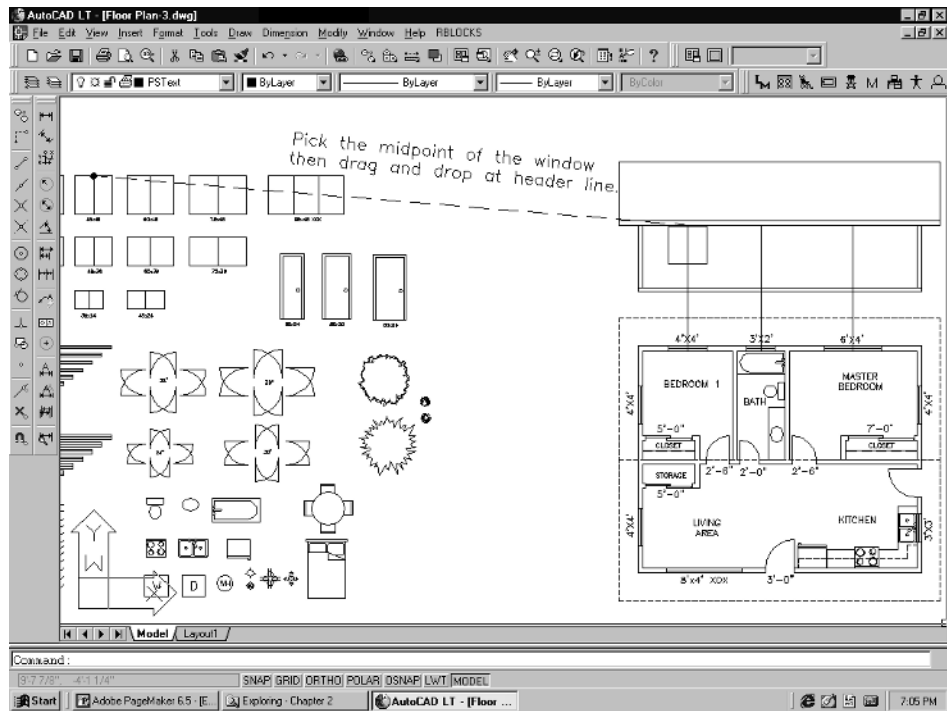


Figure 4-17

5. Follow the same procedure for the other windows. You can then **Zoom | In** to the elevation and take care of any editing. Offset the window exteriors by **3"** to form the window frames, and erase the construction lines you drew, the new header line, and any other extra lines that you may have added. If you wish, you can add corner boards and fascia trims. Your drawing should resemble Figure 4-18.

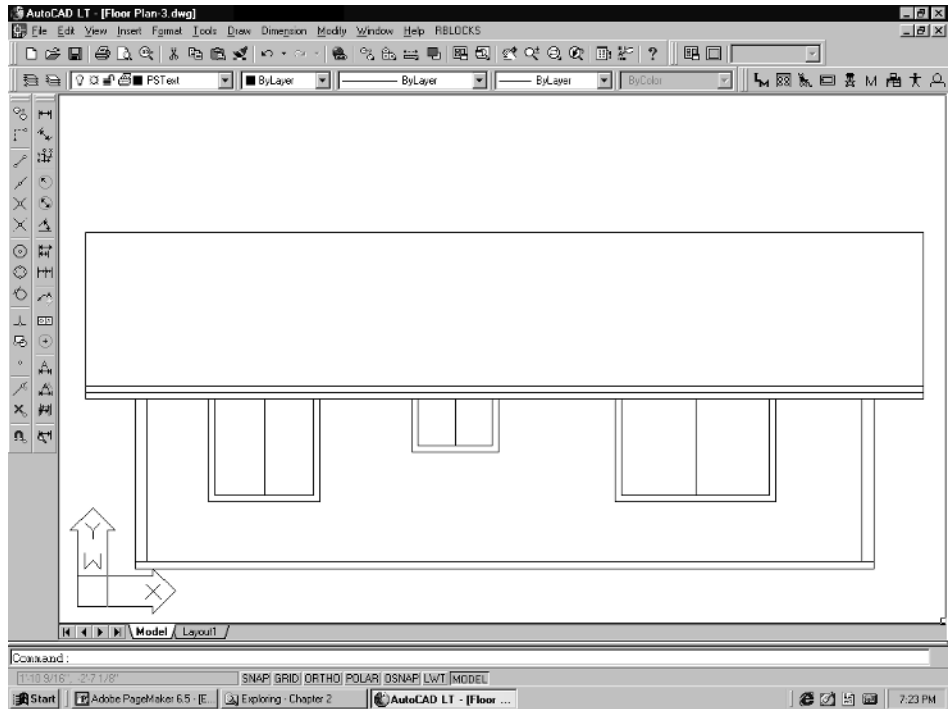


Figure 4-18

Right Elevation

1. To draw the right elevation, first make sure OSNAP is on. (If it is off, hit your **F3** key to turn it back on.)
2. Use the Line command and start drawing the elevation by picking the upper right wall corner. Pull your cursor left, type **25'**, and **Enter**. Do the same for the bottom right wall corner. Next, draw a line near the end of these lines to represent the floor line, and then offset it **8'** to the left. See Figure 4-19.

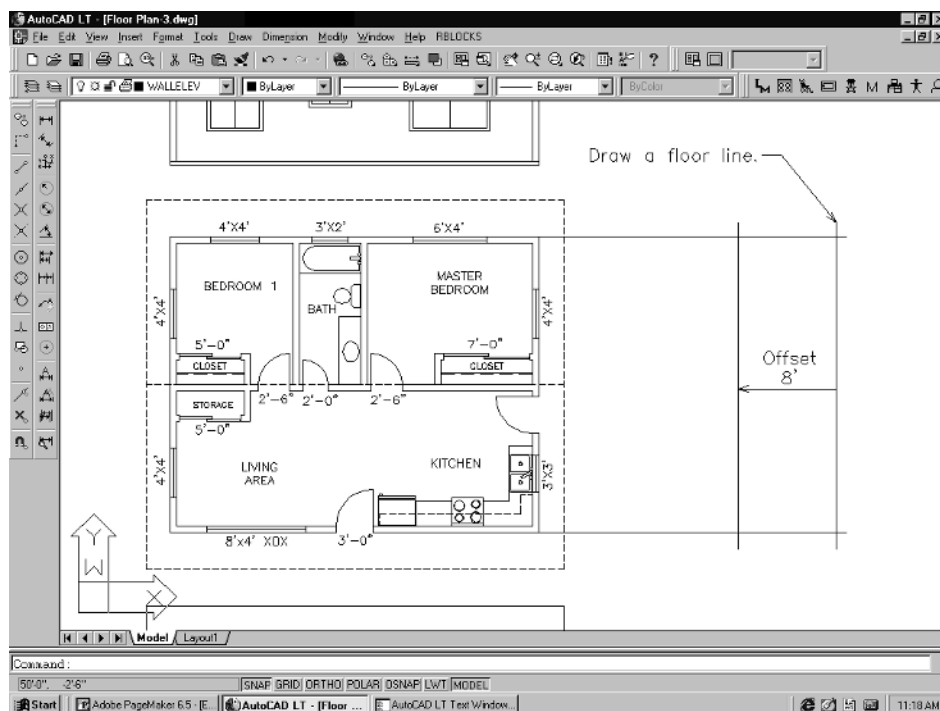


Figure 4-19

3. Clean up these lines using the Trim or Fillet commands. Then offset the floor line 6'-8" to the left to form the header line for window and door placement.

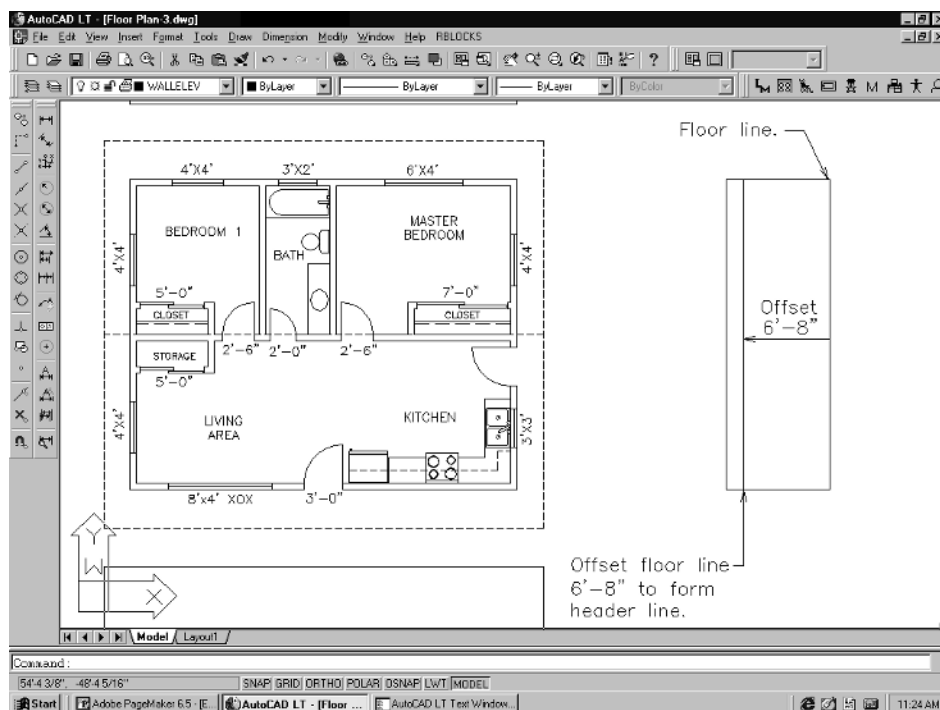


Figure 4-20

4. Draw construction lines from the window centers to the header line. Also, draw a line from the end of the door opening to the header line, as shown in Figure 4-21. These will be used for window and door placement after the elevation has been rotated into a horizontal orientation.

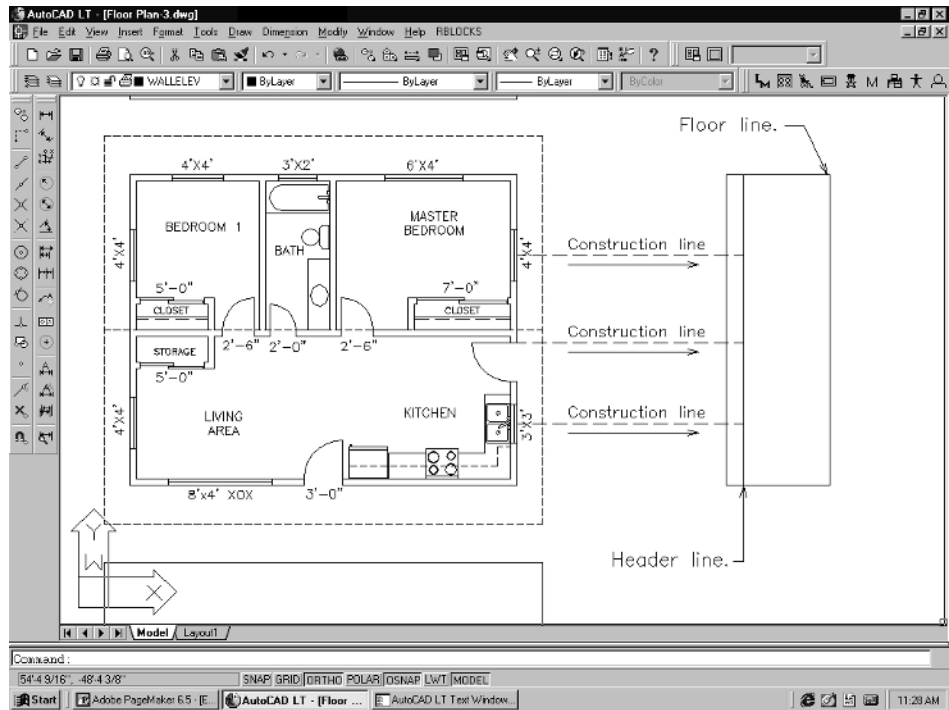


Figure 4-21

These are all the lines that we need drawn for this elevation at this time. We now need to rotate the elevation 90 degrees into a horizontal orientation. We can then add the windows, door, and roof lines.

1. To do this, pick the **Rotate** command from the Modify pull-down menu.
2. When prompted to *Select objects*, use a “crossing window” to select the elevation walls, floor, ceiling, header line, and construction lines by picking point #1 first as shown in Figure 4-22. At the *Specify opposite corner* prompt, pick point #2, then hit **Enter**. Then at the *Specify base point* prompt, pick a base point for the rotation.

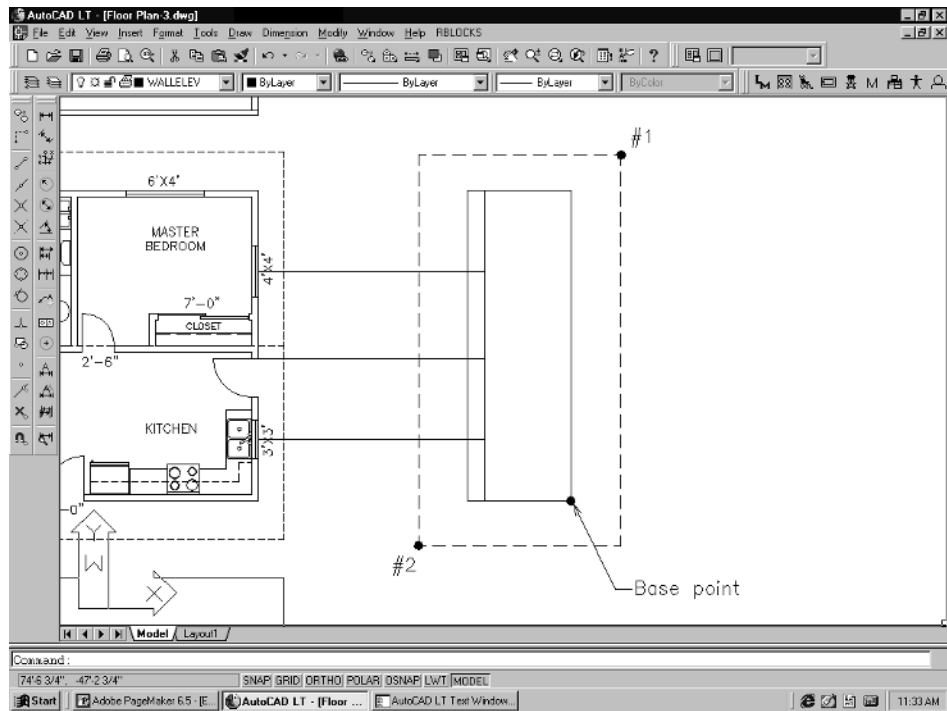


Figure 4-22

3. When prompted to *Specify rotation angle or [Reference]*, pull your cursor straight down and pick. Your elevation should rotate so that it is now in a horizontal orientation as shown in Figure 4-23.

NOTE: Make sure that ORTHO is on when you do this. (F8 toggles it on/off.)



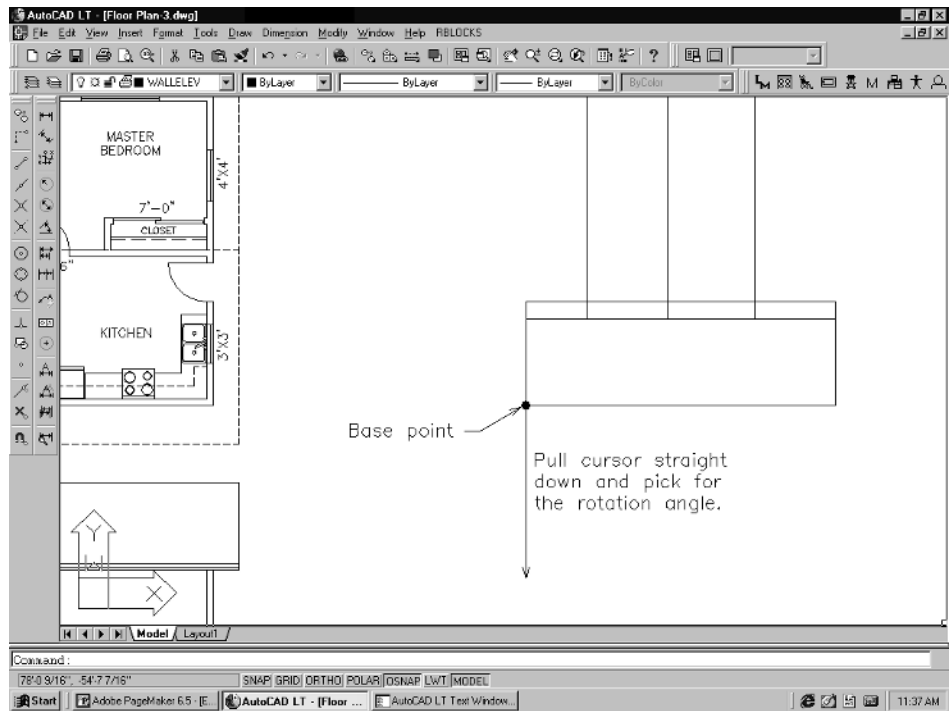


Figure 4-23

4. Draw a line 8' to the right from the floor line of one of your existing elevations. It can be drawn from either the front or back elevation.

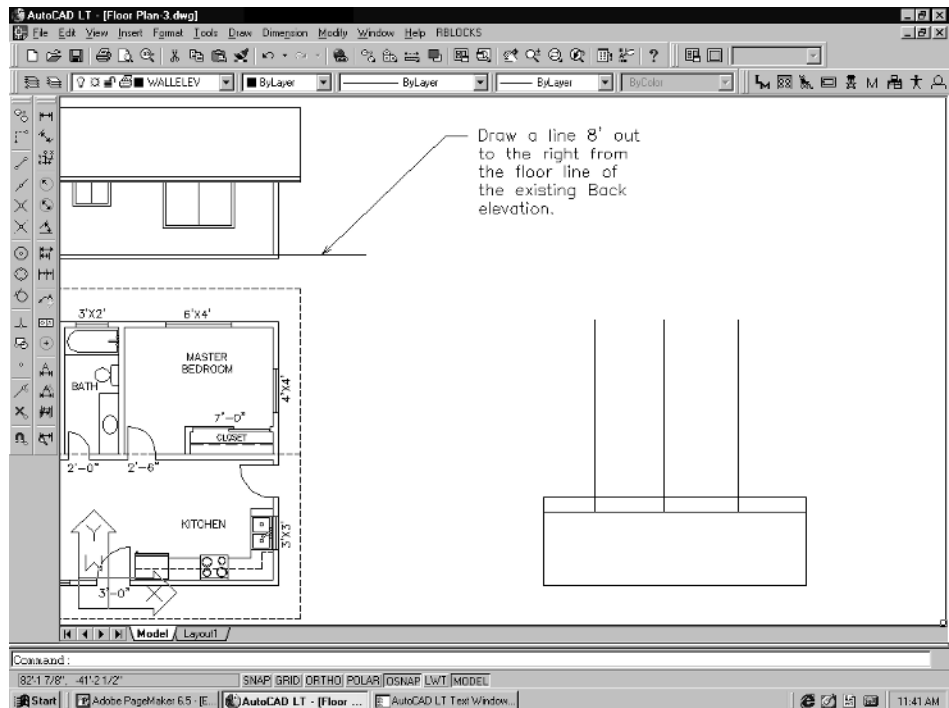


Figure 4-24

5. Move the new elevation up so that its floor line and the line you just drew from the existing elevation's floor line match up. It is important to match elevations like this, because it is one of the ways that you can find if there are any errors in the ridge or eave heights. Use the Move command to do this. You want to “window” the entire new elevation when prompted to select objects.

At the *Select objects* prompt, pick point #1 as shown in Figure 4-25. Then to *Specify opposite corner*, pick point #2. When prompted to *Specify base point or displacement*, pick the bottom corner of the new elevation wall.

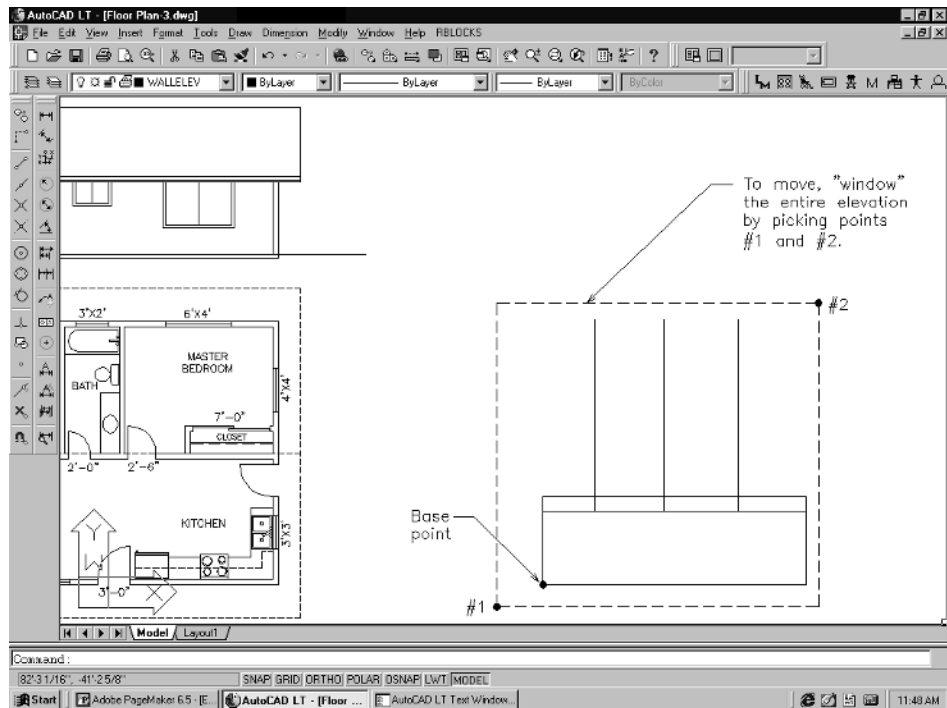


Figure 4-25

At the *Specify second point of displacement or <use first point as displacement>* prompt, pick the endpoint of the line you drew from the existing elevation. Your right elevation is now in line with the back elevation.

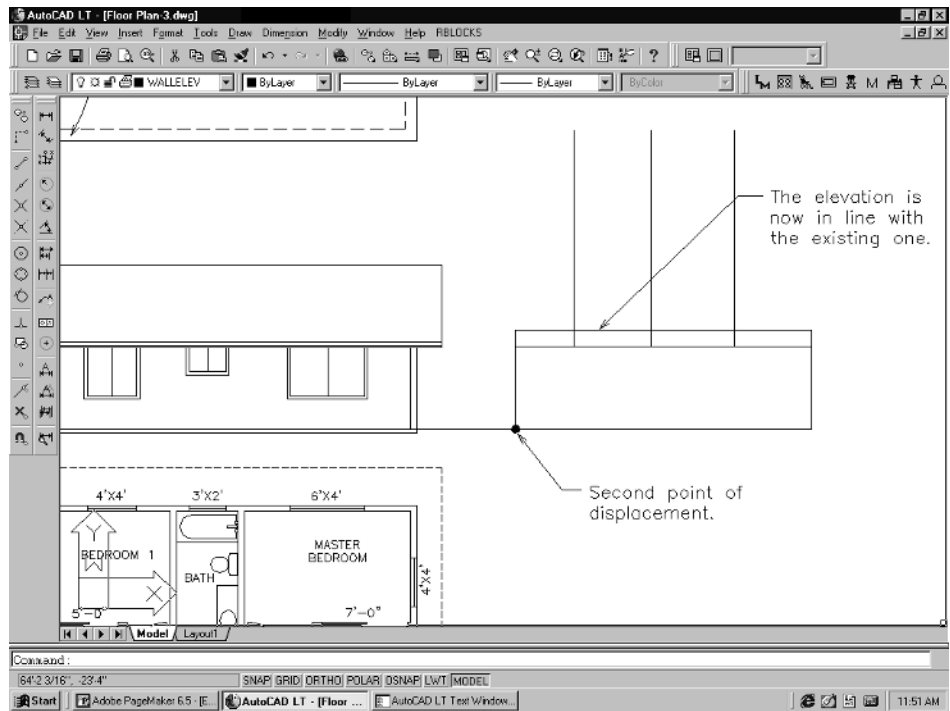


Figure 4-26

- Next, you can add the windows, door, and roof lines. **Zoom|Out** so that you can see the symbols and blocks. Then **Zoom|In** and select the elements that you will need for this elevation. If you look on Sheet #1 (Floor Plan), you can get the window and door sizes, and you know that you want the 5/12 roof line.

Use the Copy command to do this. You need a 4'x4' window, a 3'x3' window, a 36" door, and the 5/12 roof line.

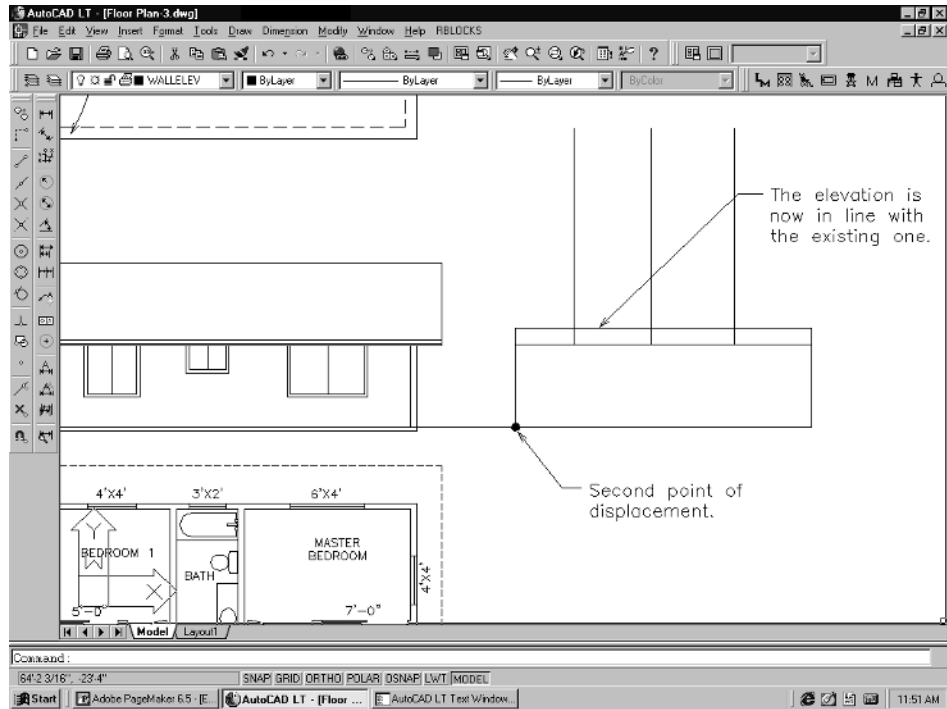


Figure 4-27

7. Pick these elements and hit **Enter**. Pick a base point anywhere in the center of these items. Pan back over to the new elevation and for the *Second point of displacement* prompt, pick a point near the new elevation. Then move the windows into place, using the same methods you have used for the other elevations. See Figure 4-28.

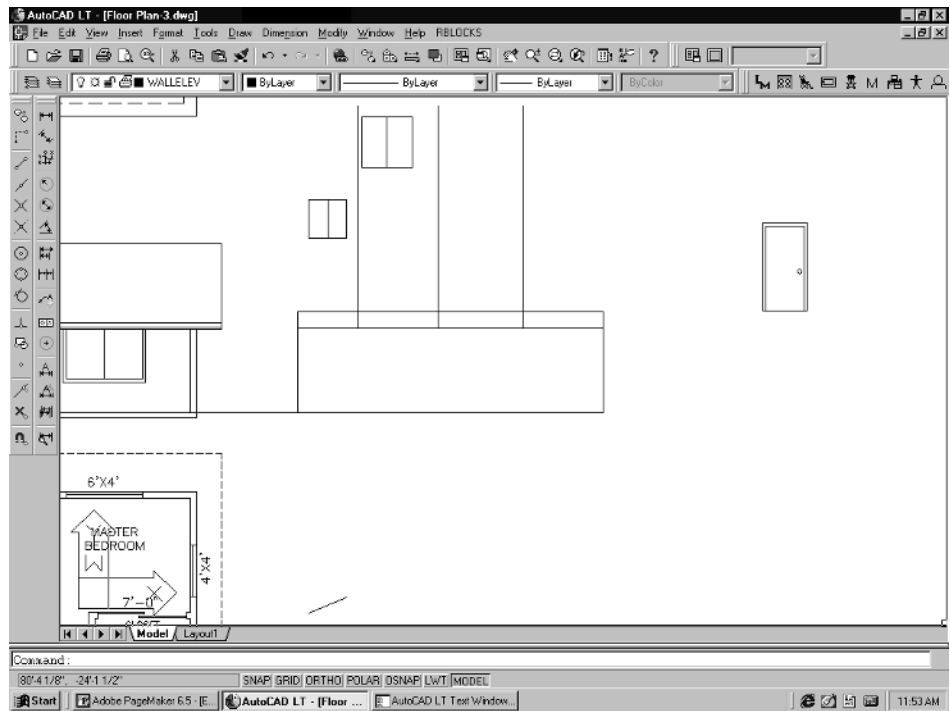


Figure 4-28

8. Use the Move command to move the roof line, windows, and door into place. When prompted to *Select objects*, pick the roof line. Then **Enter**. At the *Specify base point or displacement, or [Multiple]* prompt, pick the roof line at the endpoint. Then, at the *Specify second point of displacement or <use first point as displacement>* prompt, drag the roof line over to the elevation and drop it on the upper left corner of the elevation walls. See Figure 4-29.

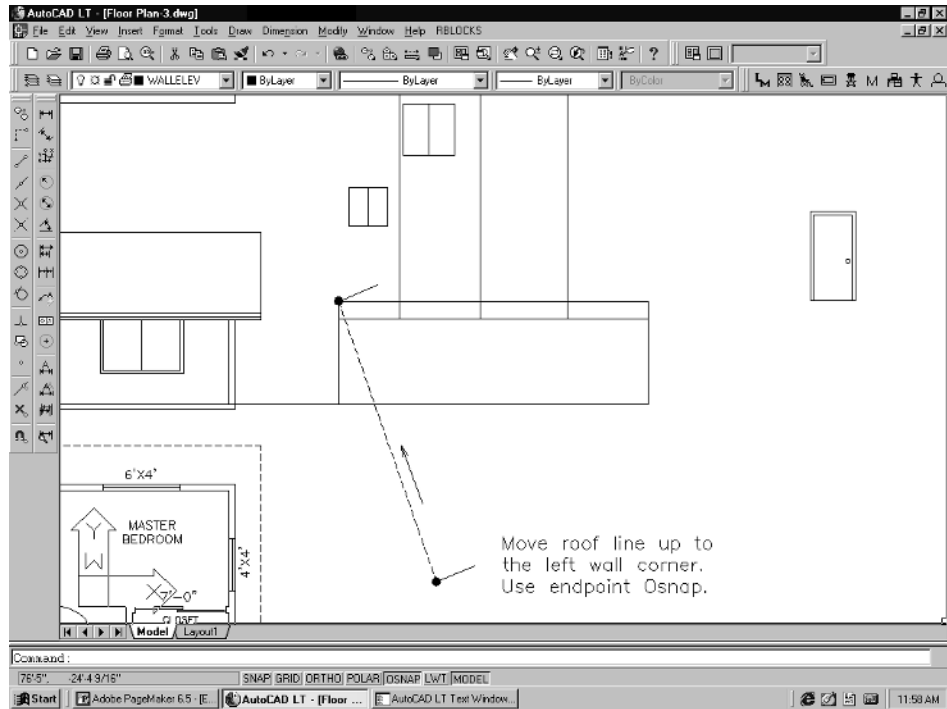


Figure 4-29

9. Hit your right mouse button and pick **Repeat Move** or, type **M** and **Enter**. Pick the 3'x3' window and **Enter**. Pick the midpoint at the top of the window for the *Base point of displacement*. For the *Second point of displacement*, drag and pick the intersection of the header and your construction line.

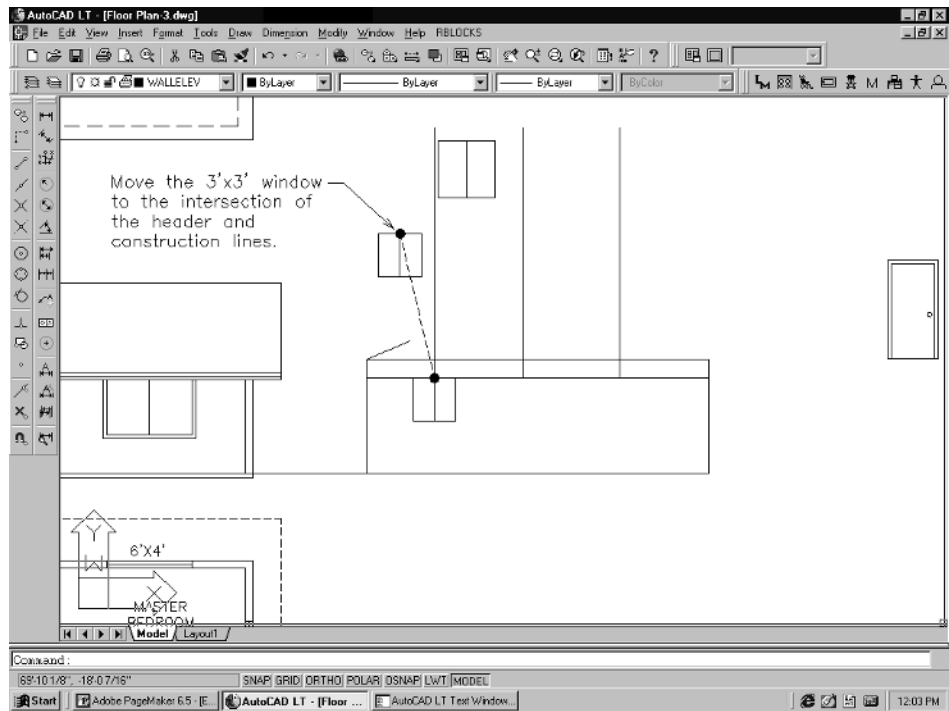


Figure 4-30

10. Hit your right mouse button and pick **Repeat Move** or, type **M** and **Enter**. Continue to move the other window and the door into position. Then, erase the header and construction lines, as shown in Figure 4-31.

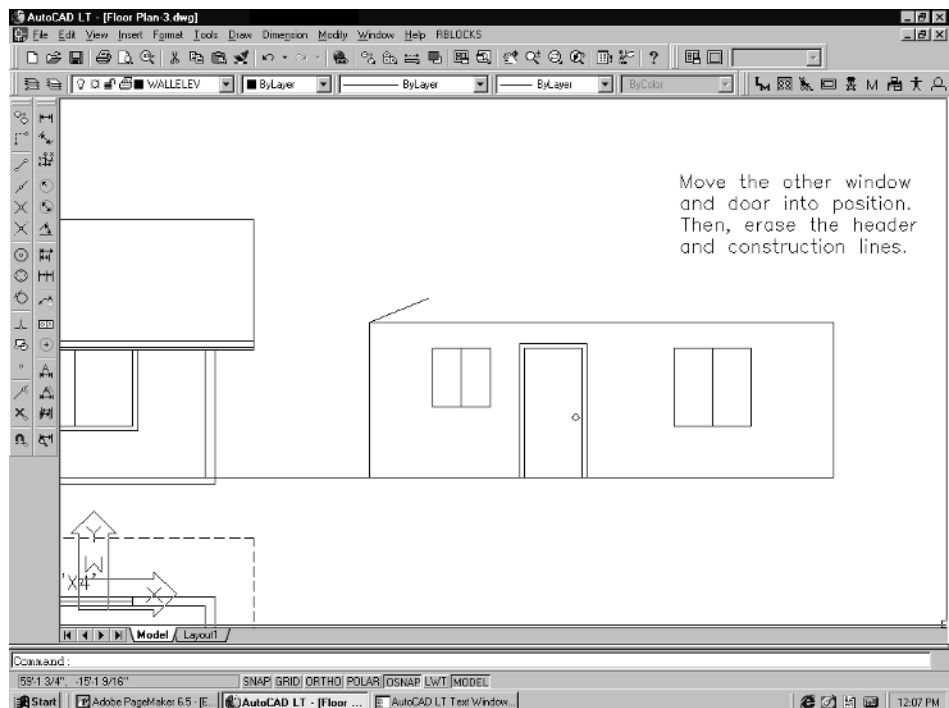


Figure 4-31

11. Next, mirror the left roof line over to the right side. Use the Mirror command to do this. When prompted to *Select objects*, pick the left roof line and **Enter**. At the *Specify first point of mirror line* prompt, pick the midpoint of the ceiling line. Then, at the *Specify second point of mirror line* prompt, pull your cursor down and pick. Hit **Enter** at the *Delete source objects?* [Yes/No] <N> prompt because you want to keep both roof lines. The roof line will mirror over as in Figure 4-32.

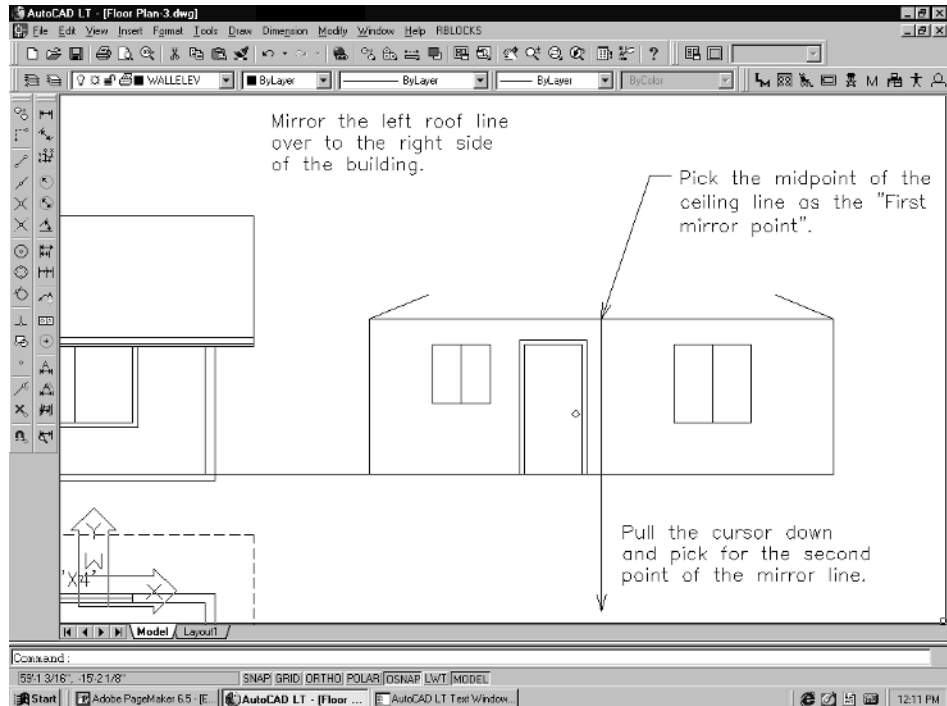


Figure 4-32

Now you can build the roof.

1. The first thing to do is to offset the roof lines 4" up to represent the truss and the sheathing. Then, fillet the top lines together, as in Figure 4-33.

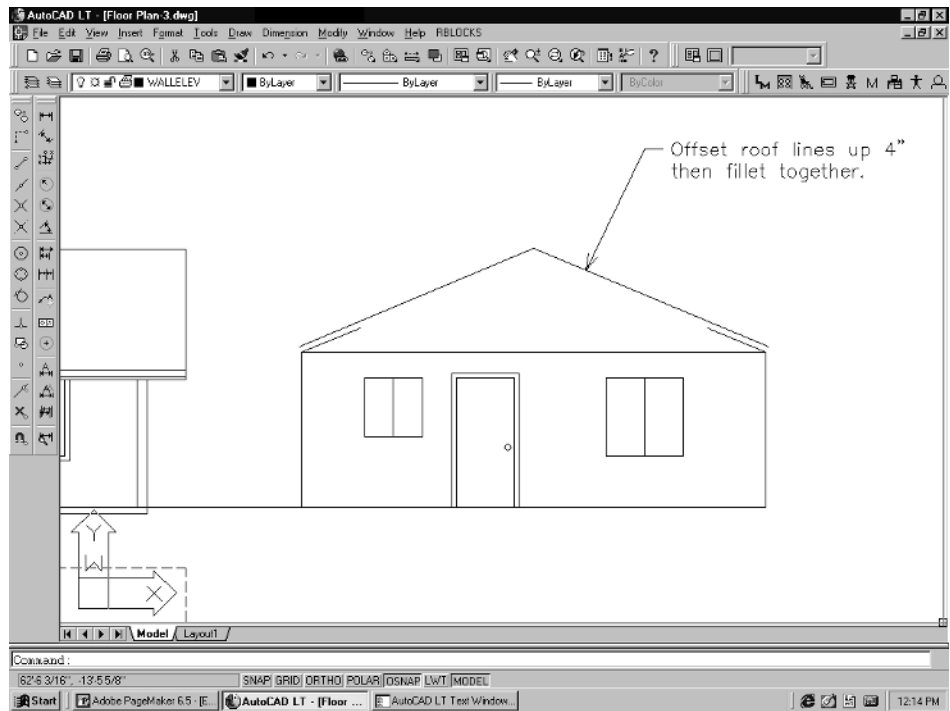


Figure 4-33

2. Next, offset the walls 36" out to either side. If you recall the roof plan, this is the eave overhang distance. Extend the top roof lines down on both sides to these new offset lines.

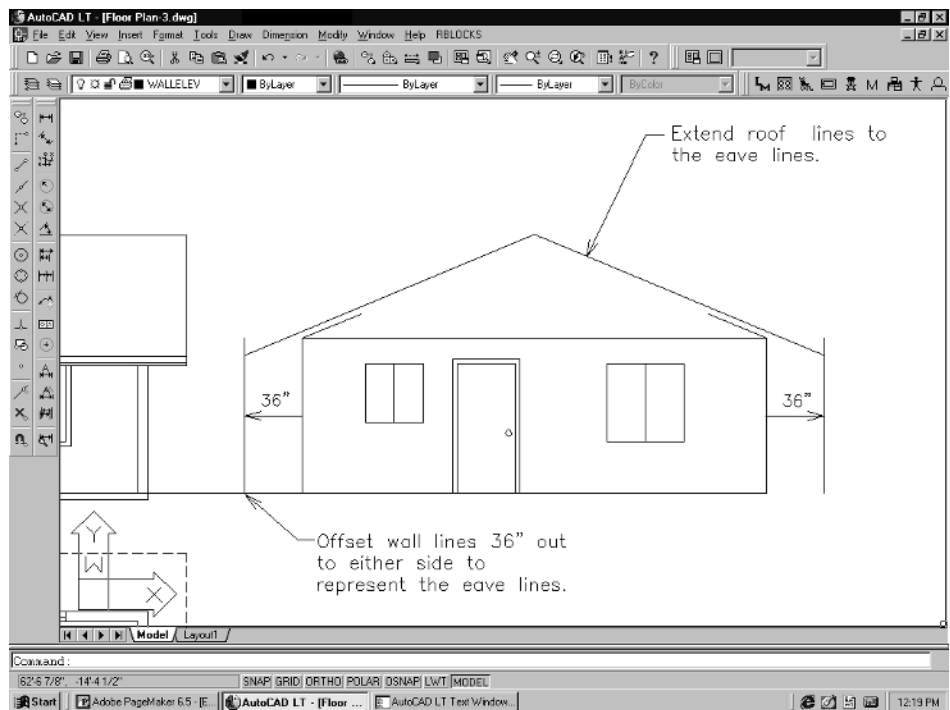


Figure 4-34

3. Fillet the roof line and the offset lines. Then erase the original roof lines.

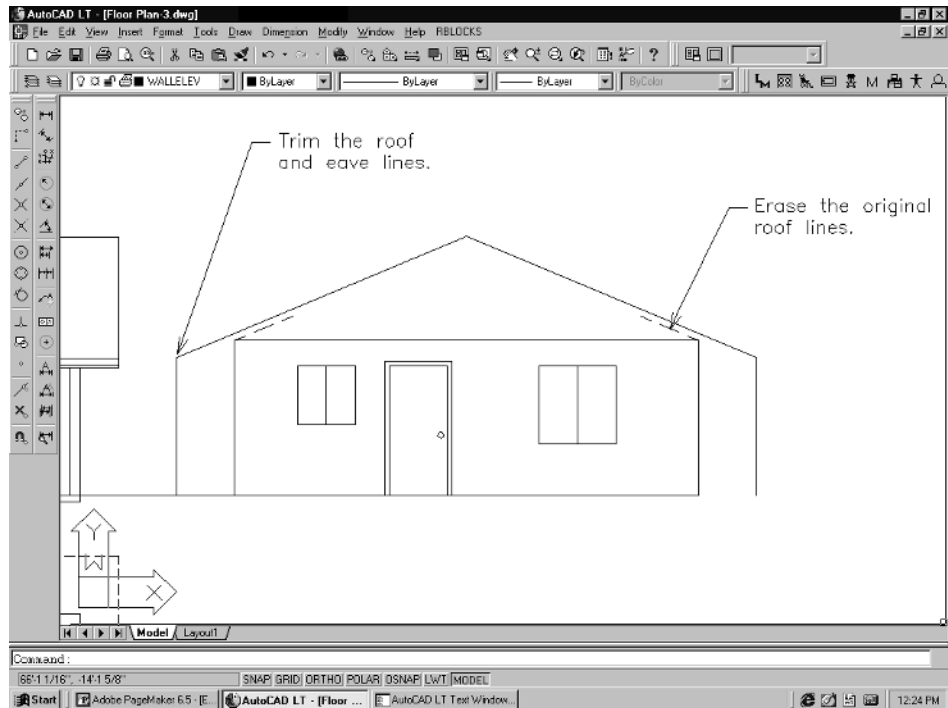


Figure 4-35

4. Offset the roof line down **6"** to form the barge. Then, use Fillet or Trim to clean up all the roof lines. Offset the top roof line down **4"** to form the barge or fascia trim and offset the floor line **4"** down.
5. Next, if you want corner boards, offset the wall lines **6"** in.

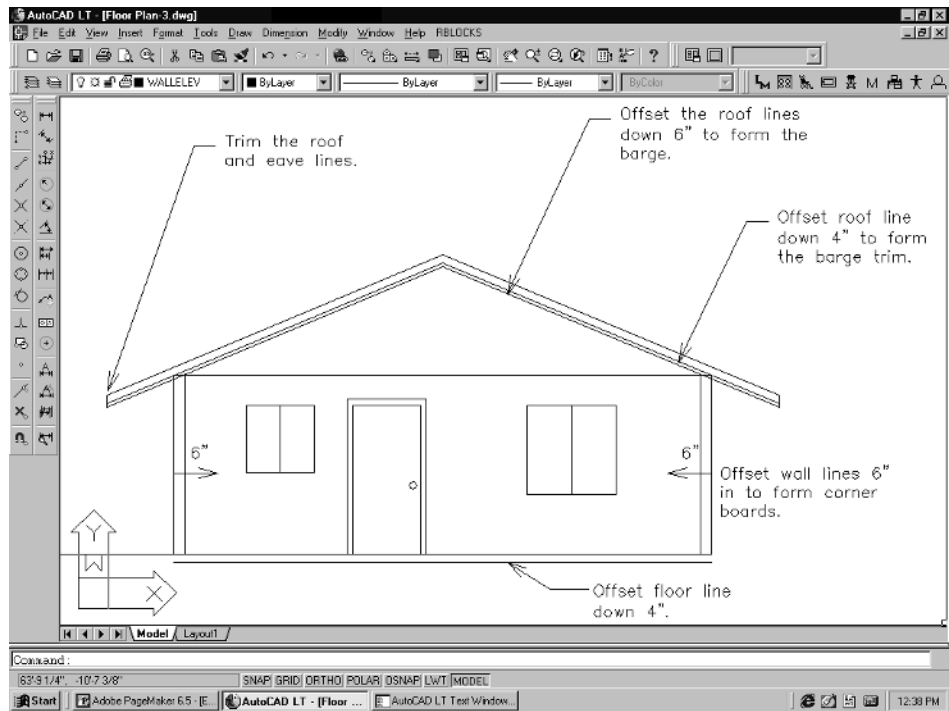


Figure 4-36

6. Lastly, offset the window lines out 3" to form the frames and then clean up the elevation lines wherever necessary.

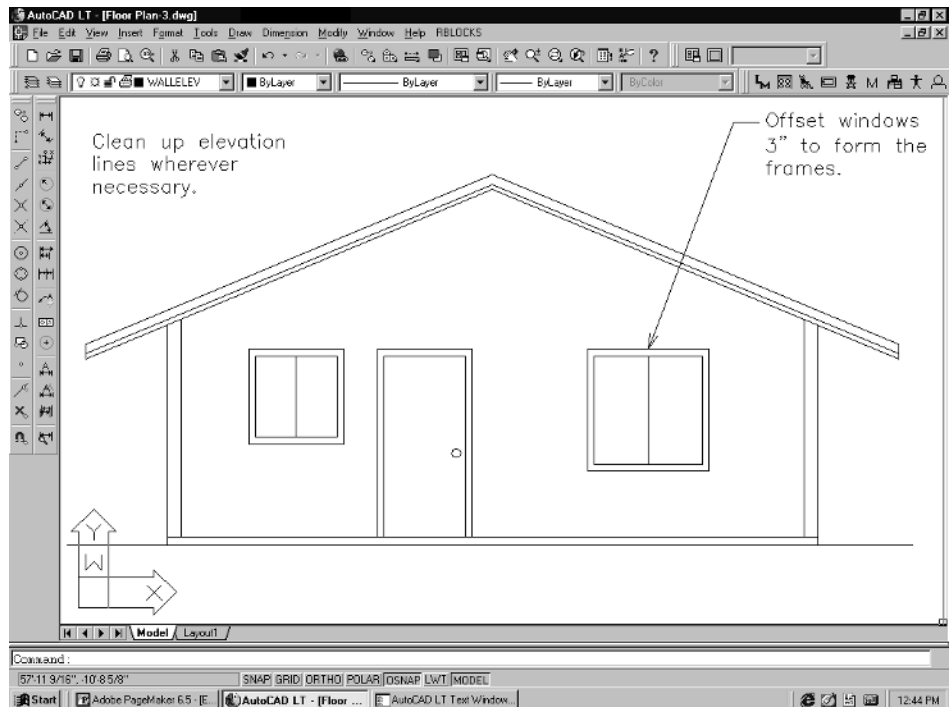


Figure 4-37

Your drawing should look like Figure 4-38. Three elevations down and one to go.

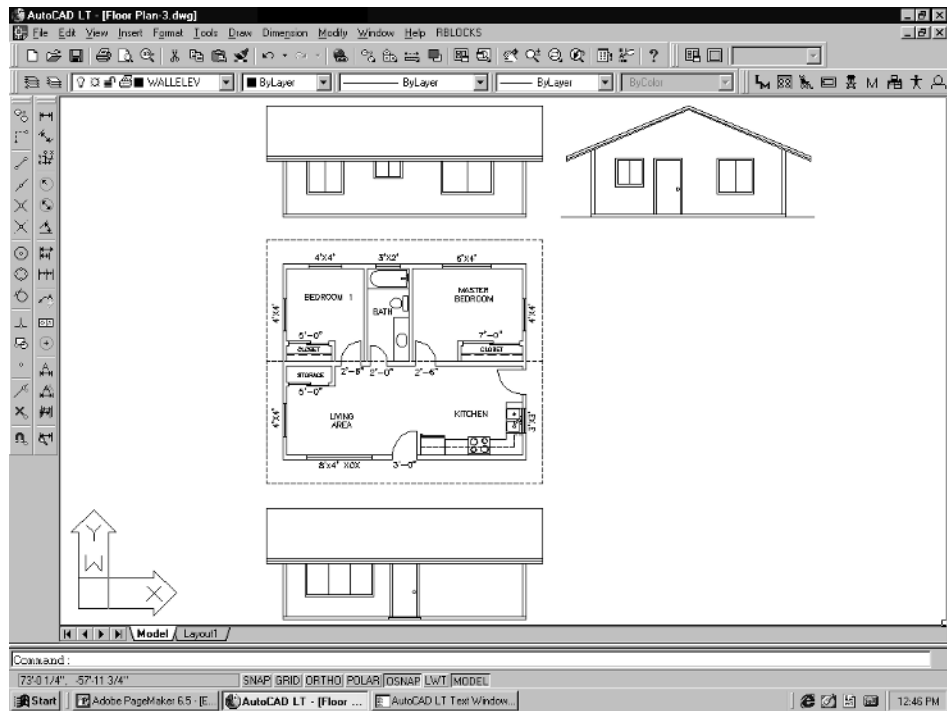


Figure 4-38

Left Elevation

The left side elevation is built exactly like the right side. In a simple structure like this, you could just copy the right elevation, offset the floor line up 6'-8" for the header height, and then figure the window centers. We are not going to do this. We will construct it, just as we did the right side.

1. First, pull your wall lines off the left side wall corners.
2. Draw the floor line, and offset it 8' to the right to form the ceiling.
3. Then offset the floor line to the right 6'-8" to form the header line.
4. Next, trim the lines and draw the construction lines from the window centers to the header line. See Figure 4-39.

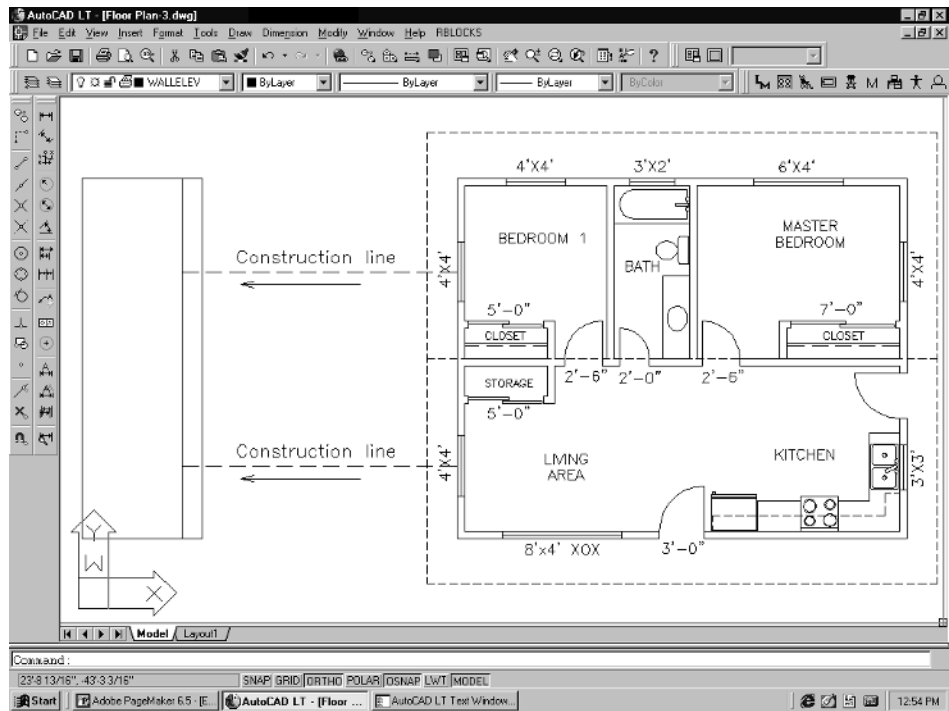


Figure 4-39

- Now, rotate the elevation 90 degrees, using the corner point shown in Figure 4-40 as the base point. Pull the cursor up for the rotation angle.

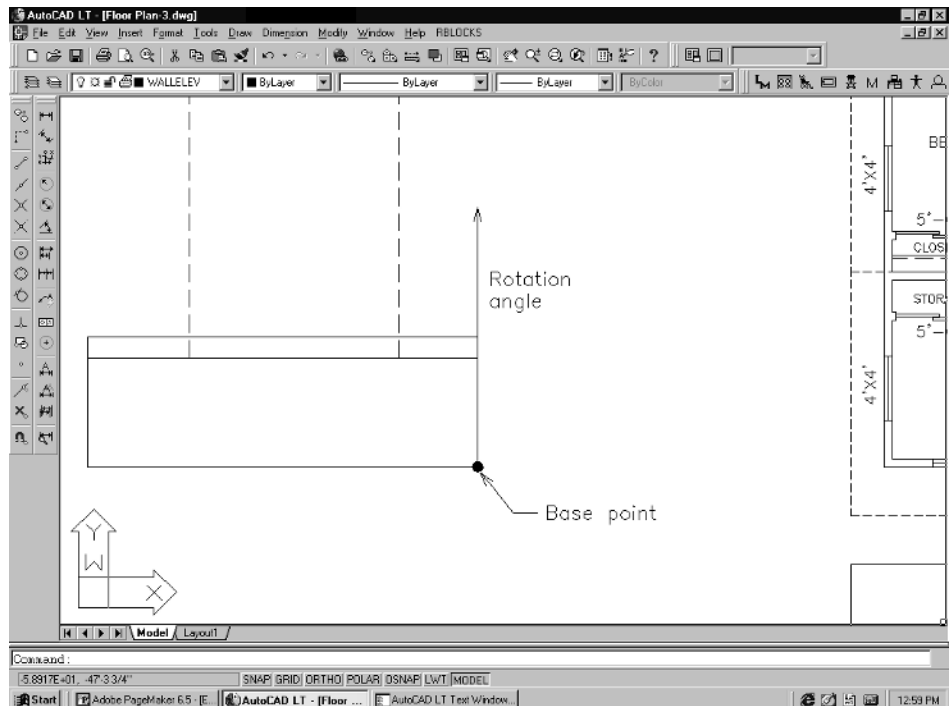


Figure 4-40

6. Draw a line **8'** to the left of the floor line of the back elevation. Then, move the new elevation up so that it lines up with this line. Use the Endpoint Osnap to do this.

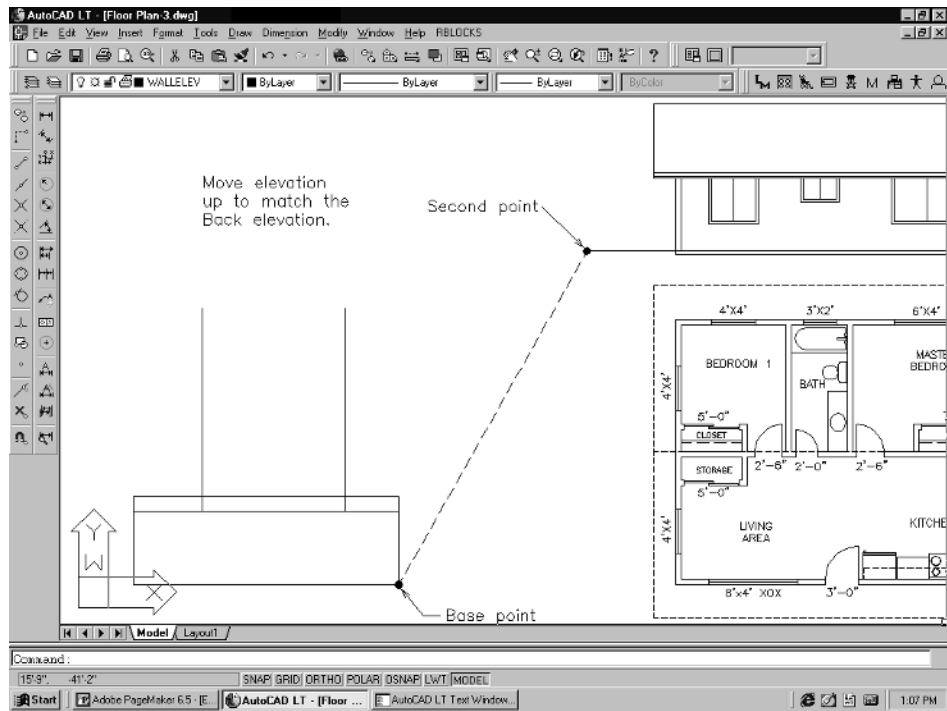


Figure 4-41

- Next, add the windows and roof lines. Mirror the left roof line over to the right side. Offset the roof lines up **4"** and fillet together. Erase the construction and header lines and offset the windows **3"** to form the window frames. Your drawing should be similar to Figure 4-42.

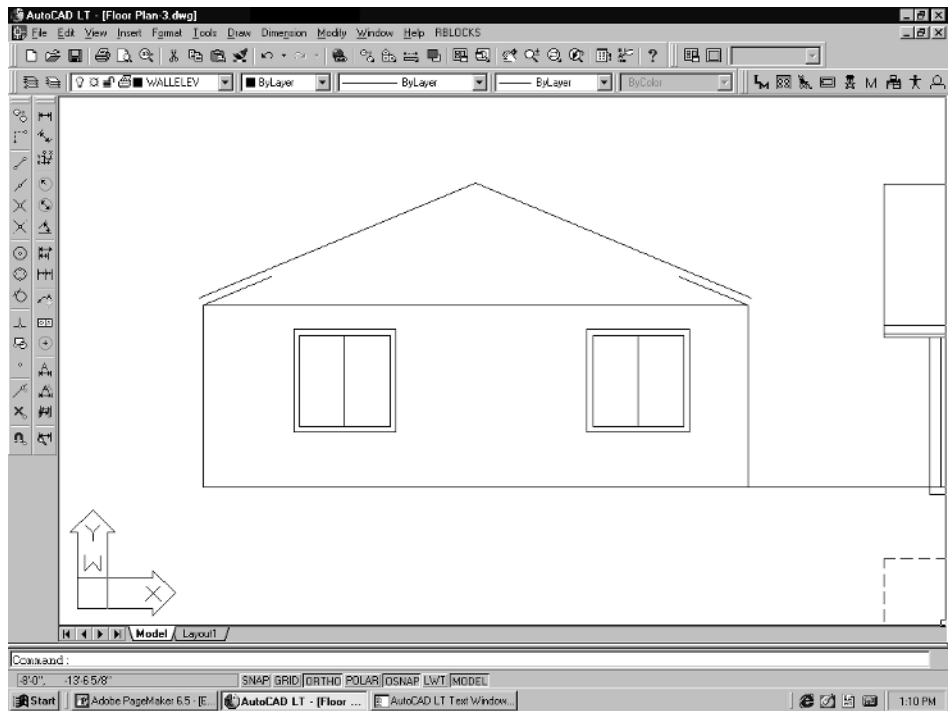


Figure 4-42

8. Offset the wall lines **36"** out to form the eave lines of the roof. Erase the original roof lines, then offset the top roof line down **6"** to form the barge. Clean the eaves up with the Trim or Fillet commands.

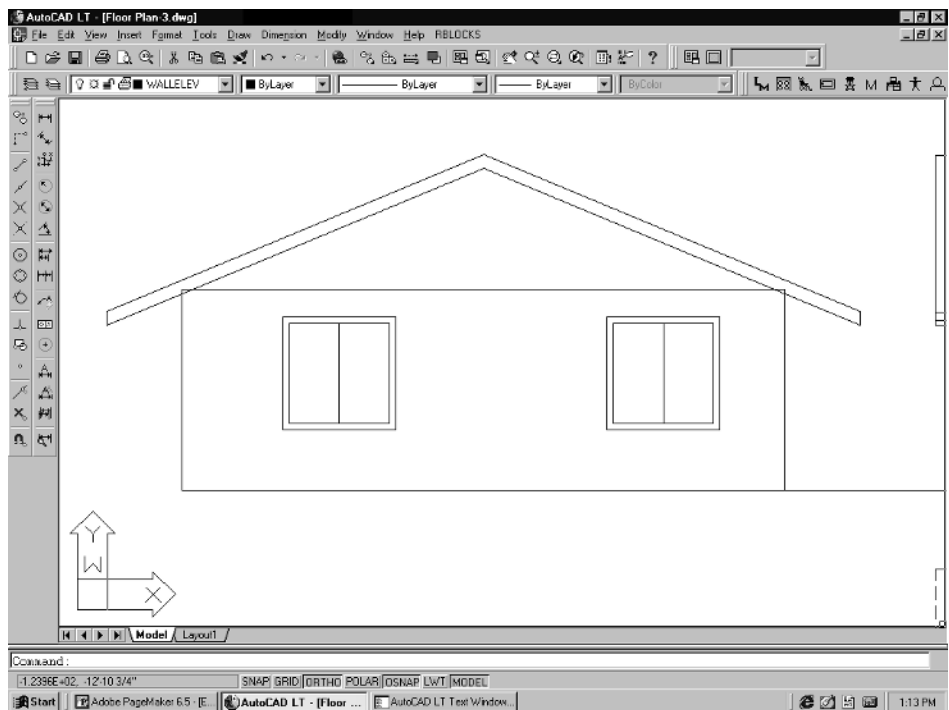


Figure 4-43

9. Offset the floor line down 4". Then, offset the wall lines in 6" on each side to form the corner boards. Offset the top roof line down 4" to form the barge trim line. Clean up any unnecessary lines.

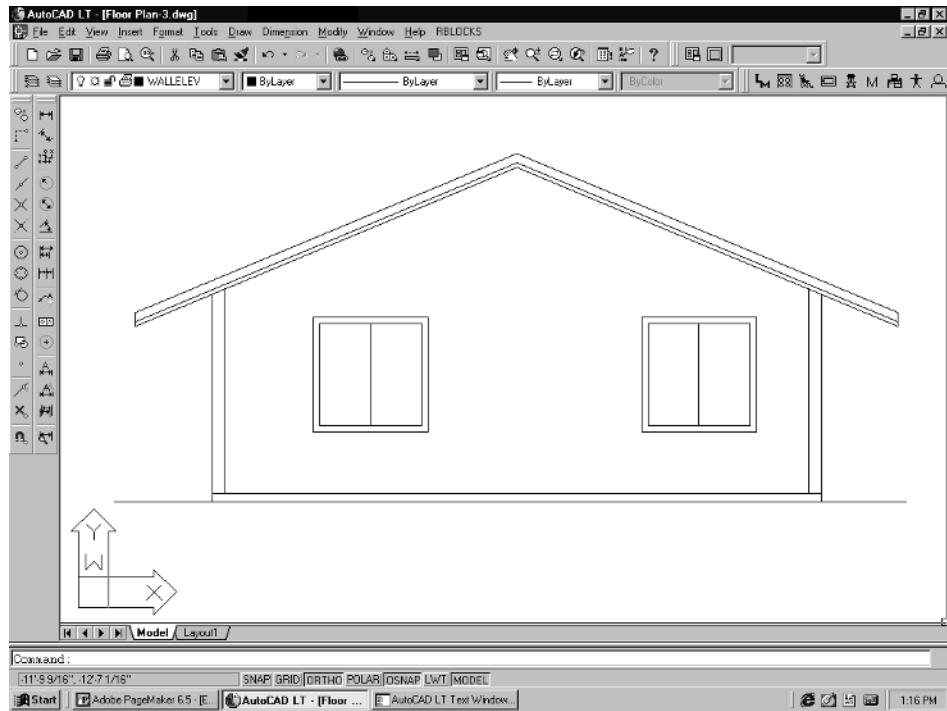


Figure 4-44

10. **Zoom|Out** so that you can see all four elevations, shown in Figure 4-45.

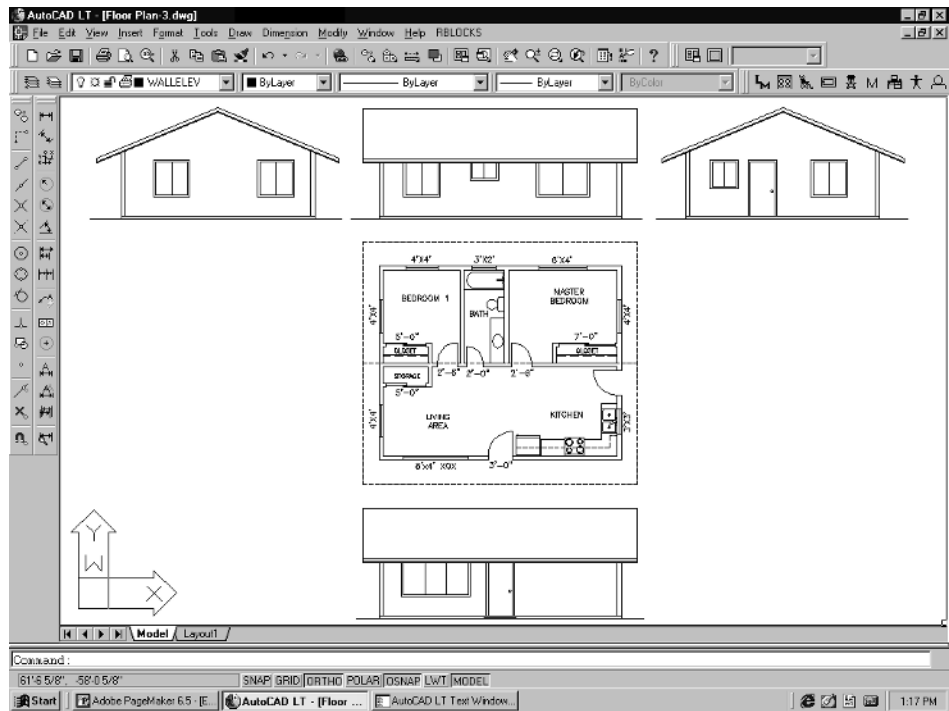


Figure 4-45

There is one more step that must be done before you can consider the elevations complete. The back elevation must be “mirrored” so that it will be in the correct orientation.

1. Use the Mirror command from the Modify pull-down menu. When prompted to *Select objects*, window the entire back elevation, then **Enter**. At the *Specify first point of mirror line* prompt, pick the midpoint of the roof ridge. When prompted to *Specify second point of mirror line*, pull the cursor straight down and pick. Type **Y** and **Enter** at the *Delete source objects?* [Yes/No] <N> prompt. This should mirror your back elevation around, deleting the original, as shown in Figure 4-46.

NOTE: Make sure ORTHO is on when you mirror the elevation. (F8 toggles on/off.)



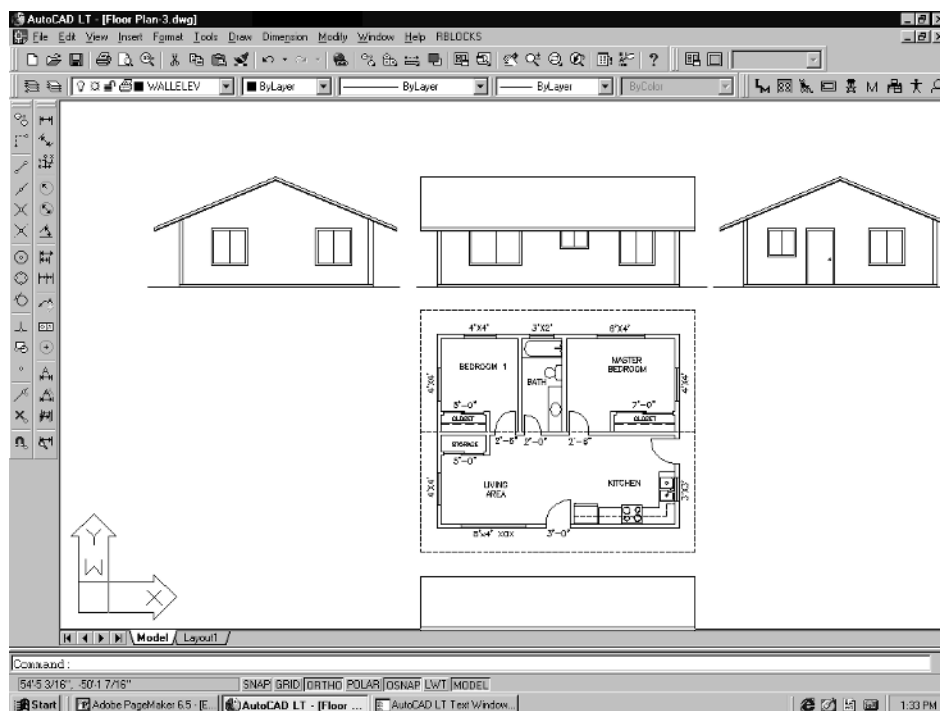


Figure 4-46

Now that the elevations are complete, you should move them down or off to the side so that they are in a clear area of your screen.

1. **Zoom|Out** so that you can see all the different elements in your drawing.

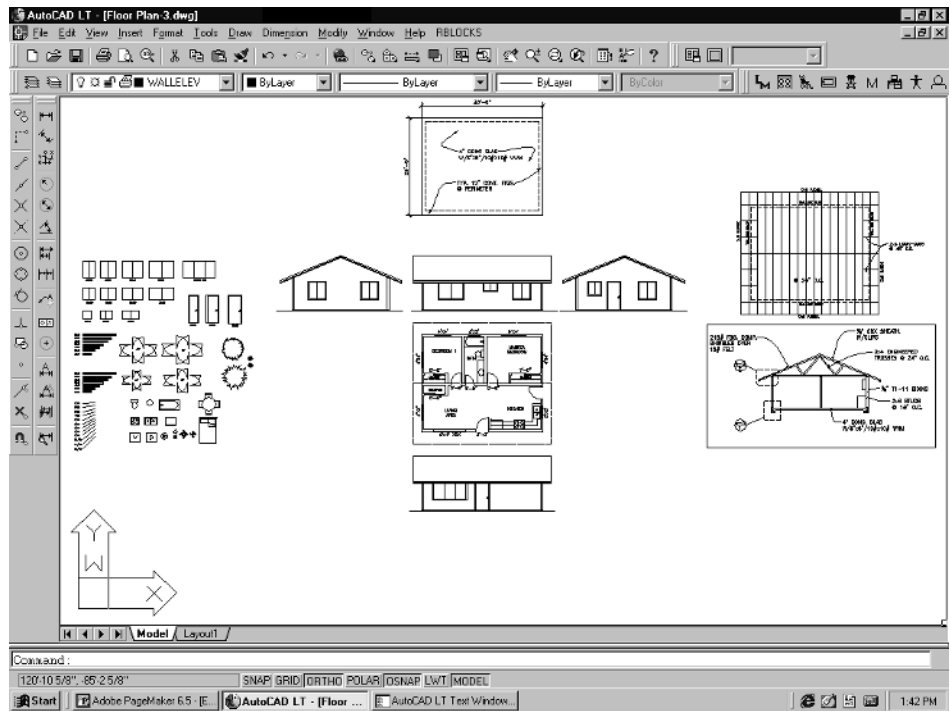


Figure 4-47

2. Move them by using the Move command. Make sure that SNAP and ORTHO are on when you move the elevations (F8=ORTHO and F9=SNAP).

Window the three elevations at the top—left, back, and right—and then **Enter**. Pick a base point, pull down below the front elevation, and pick. Try to get it to look like Figure 4-48.

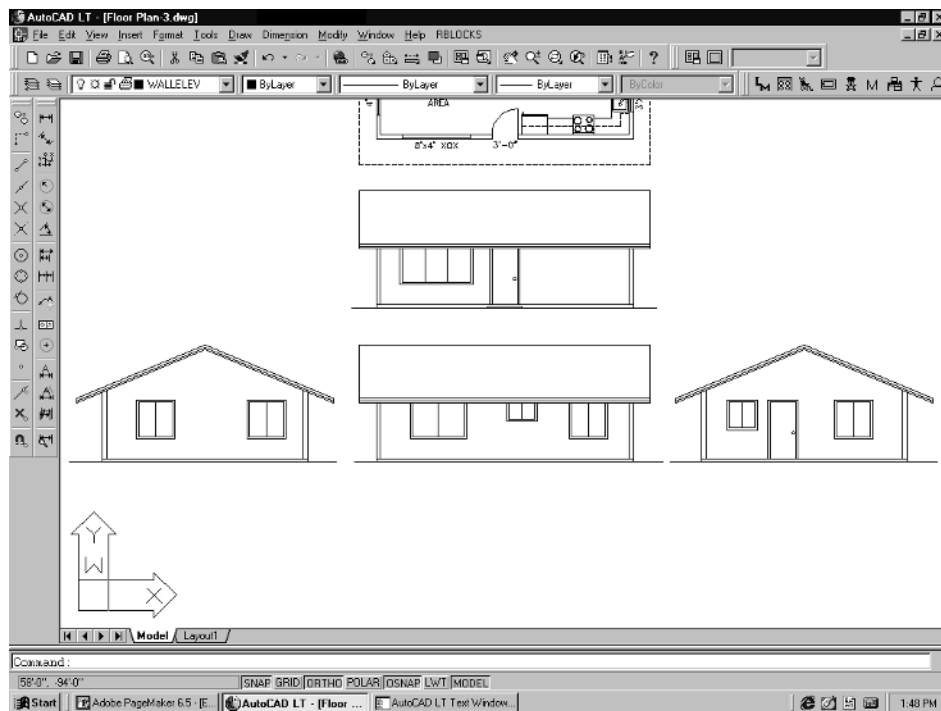


Figure 4-48

Hatching

Hatching can be added to the elevations if you wish. Let's start with the front.

1. **Zoom|In** to the elevation. Pick the **Hatch** command from the Draw pull-down menu. The Boundary Hatch dialog, shown below, will come up.

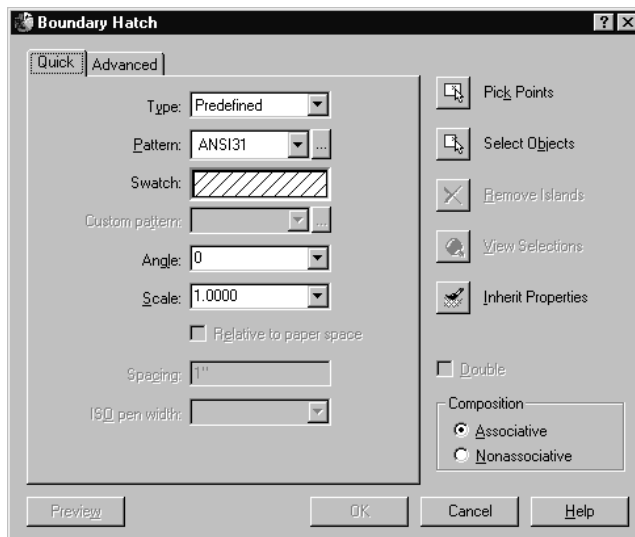


Figure 4-49

2. Pick the box named **Swatch**. This will bring up the Hatch Pattern Palette, shown in Figure 4-50. Change the tab from ANSI to **Other Predefined**, shown in Figure 4-51.

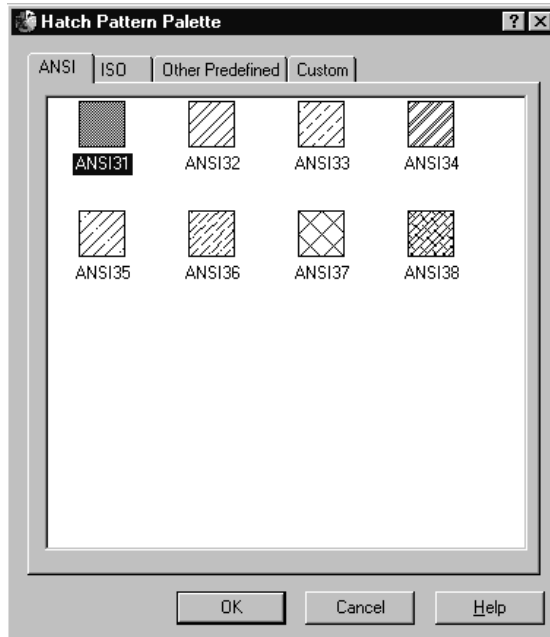


Figure 4-50

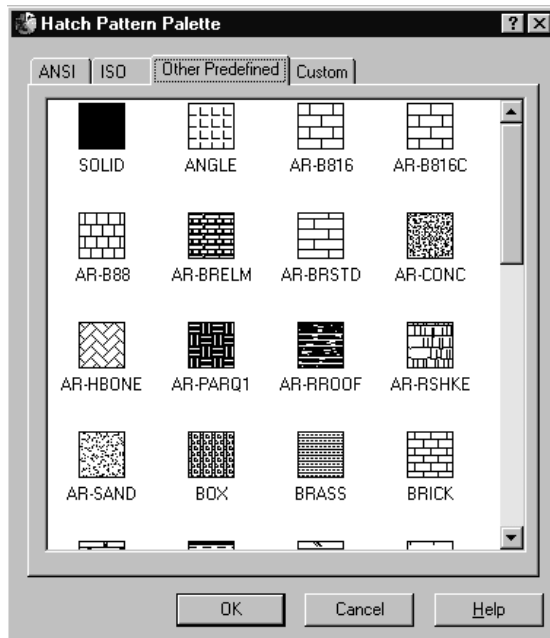


Figure 4-51

3. Select the pattern **AR-RSHKE** by double-clicking on it. You will be taken back to the Boundary Hatch dialog box. Select the **Pick Points** button. You will be prompted to *Select internal point*. Pick inside the roof. The roof outline should “light up.” Hit **Enter**. The Boundary Hatch dialog comes up again. Pick the **Preview** button in the lower left-hand corner. This will show you the hatch and prompt you to hit **Enter** to return to the dialog. At that point you can either make changes to the scale and other settings, or you can hit **OK** to accept the hatching as it is. See Figure 4-52.

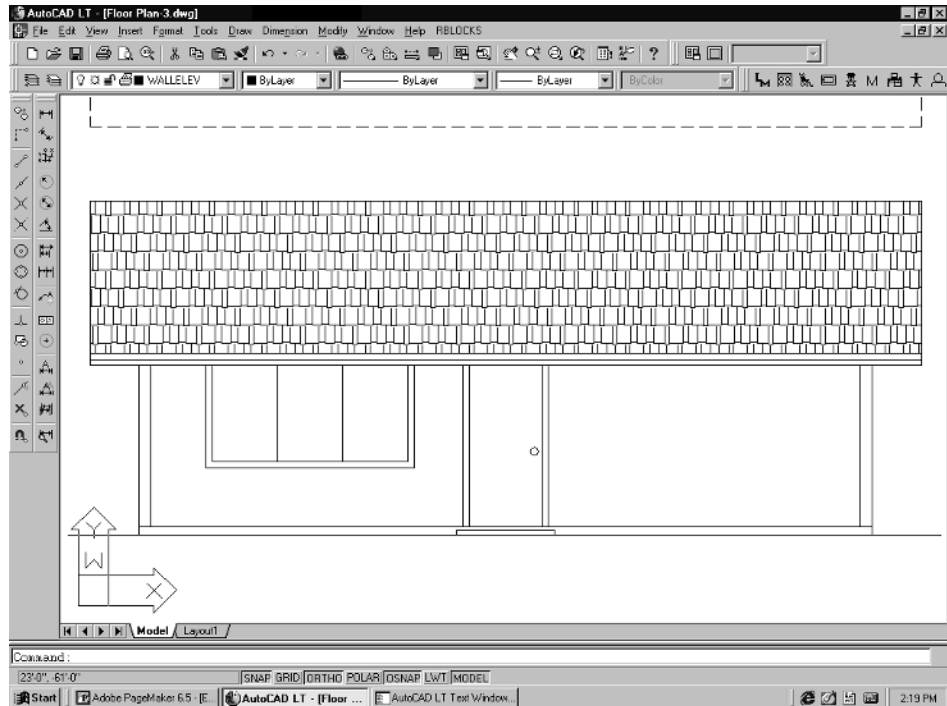


Figure 4-52

4. Next, hatch the walls. When the Boundary Hatch dialog comes up, pick the **Swatch** box. Select the pattern named **LINE**. Change the scale to **60.0**, then select the **Pick Points** button. Pick inside of each wall and then **Enter**. You will see the “boundary” of the area that will be hatched “light up,” as shown in Figure 4-53. This elevation actually requires two picks because the wall is divided by the door.

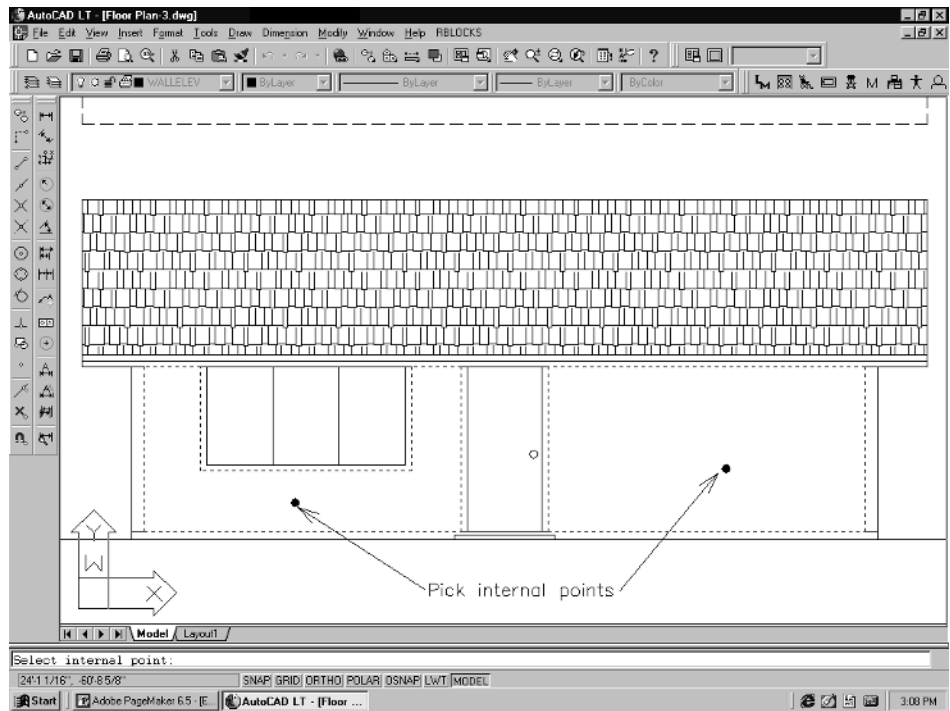


Figure 4-53

5. Preview the hatching; if it looks all right, hit the **OK** button. Your drawing should resemble Figure 4-54.

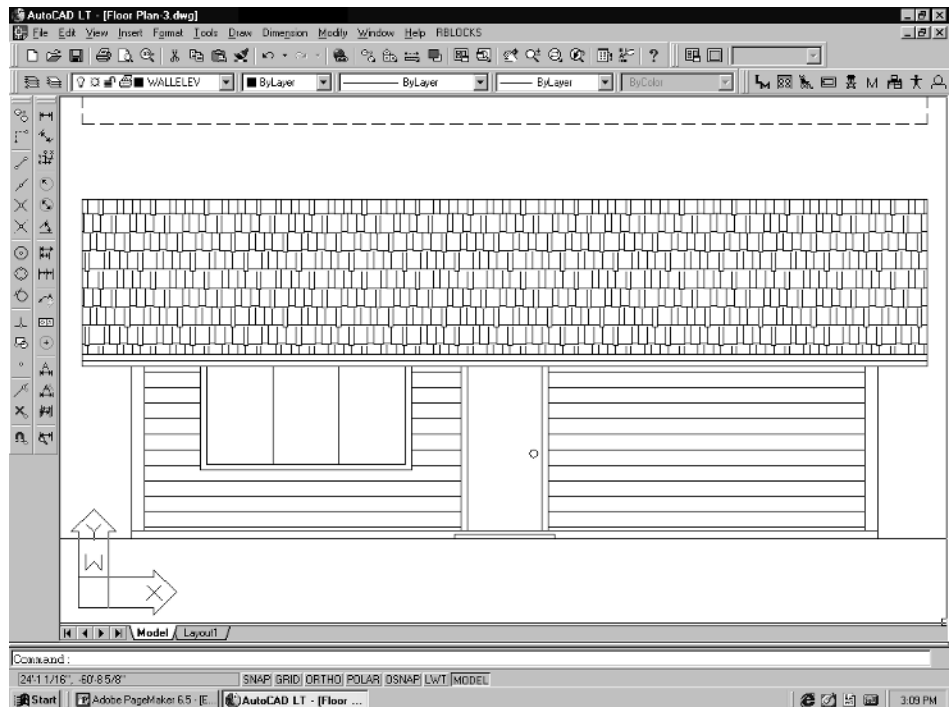
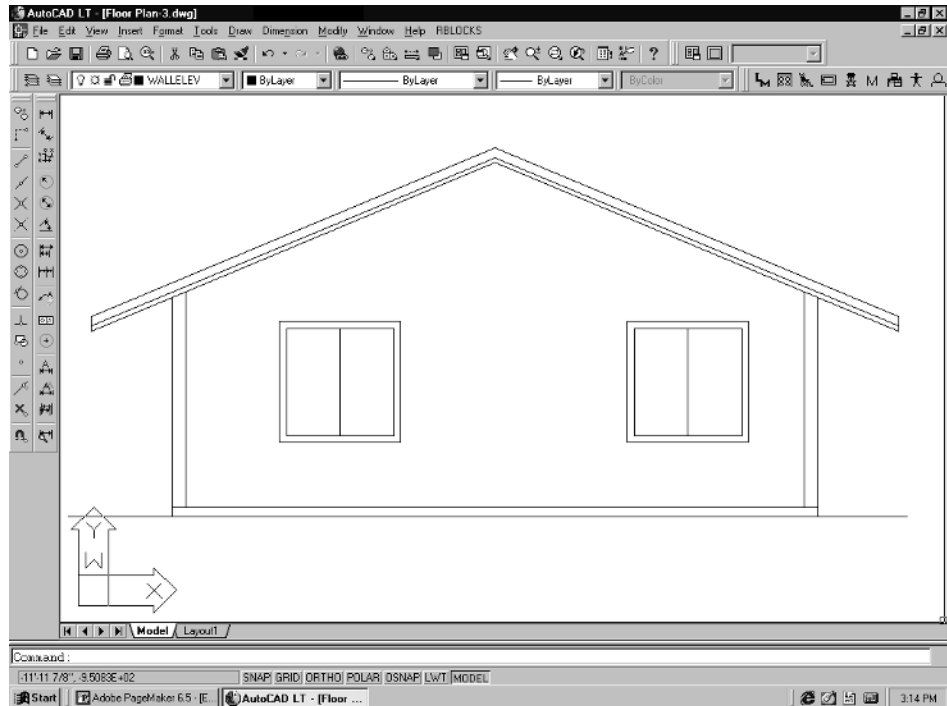
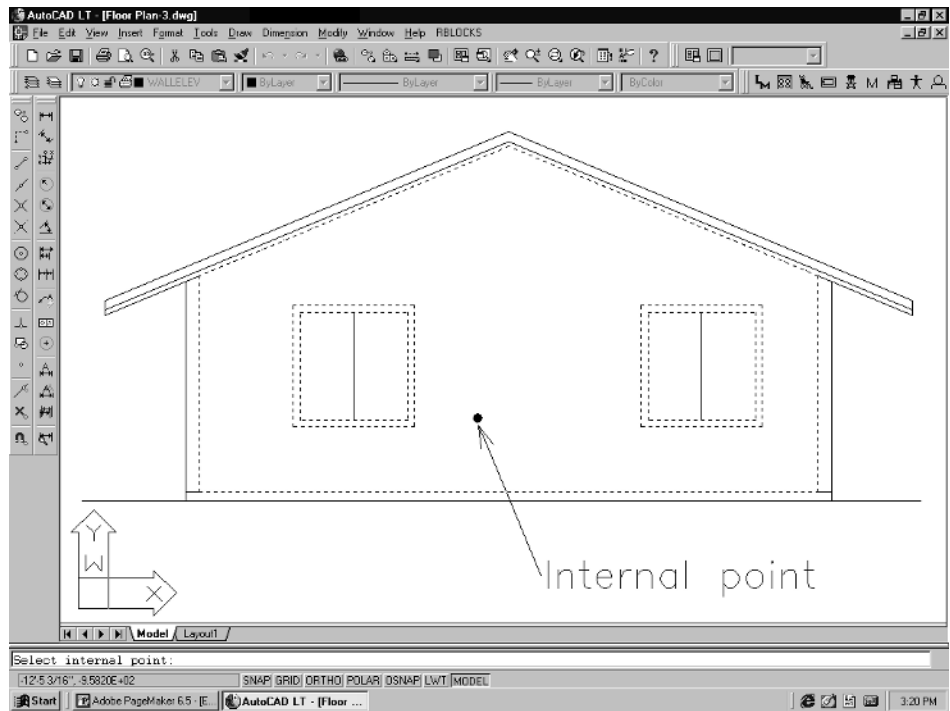


Figure 4-54

- Now, **Zoom|Out** and then **Zoom|In** to one of the side elevations, as shown in Figure 4-55. Pick the **Hatch** command. When the Boundary Hatch dialog comes up, the pattern should still be set on Line, with the same scale and other settings. Select the **Pick Points** button, then pick a point in the wall and hit **Enter**. The elevation should be highlighted as in Figure 4-56.

**Figure 4-55**

**Figure 4-56**

7. Pick the **Preview** button to check the hatching. If your elevation is like ours, you will see hatch lines running right through your windows as in Figure 4-57. This is not acceptable, so hit **Enter** to go back to the main Boundary Hatch dialog.

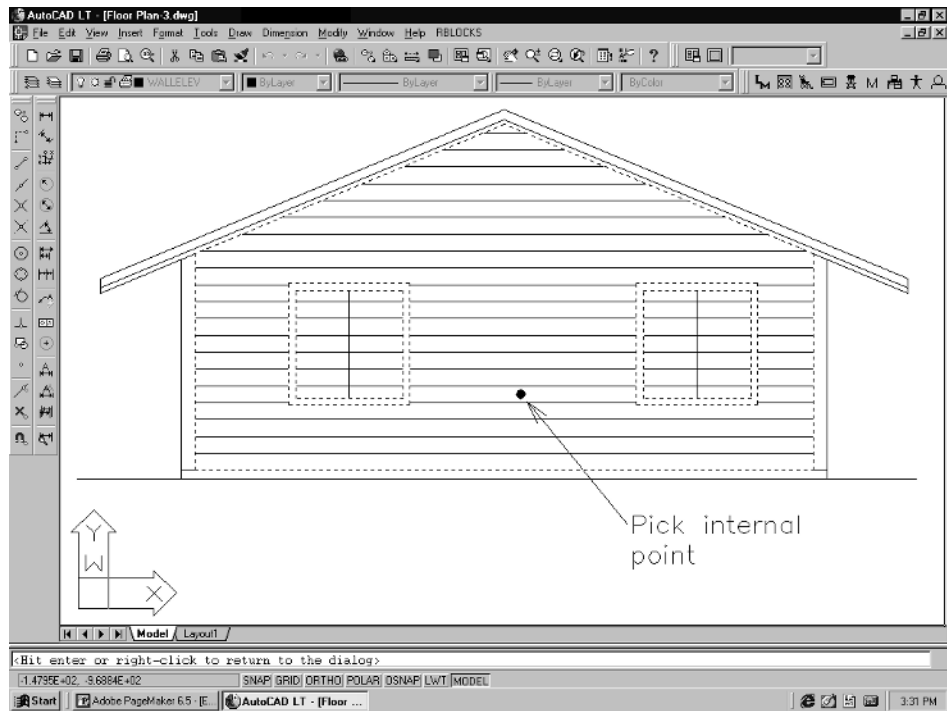


Figure 4-57

8. Pick the **Remove Islands** button. The hatching will be removed so that you can see all the boundary lines as in Figure 4-58. Notice that both the window and the window frame lines are “highlighted.” That is why the hatching is running through the windows. Only the outer frame should be “lit up.”

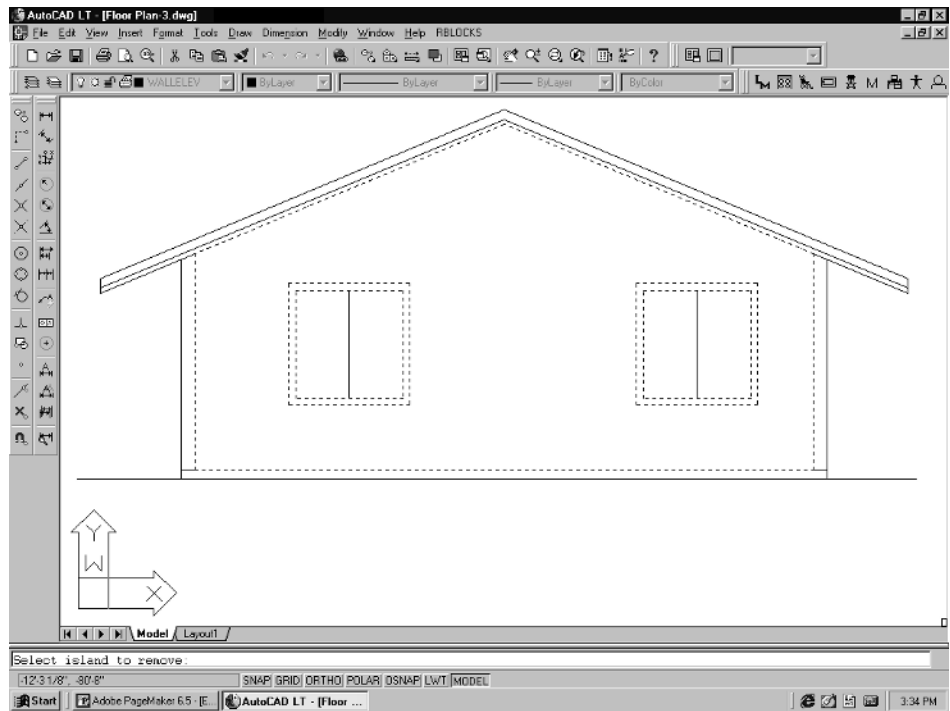


Figure 4-58

9. You will be prompted to *Select island to remove*. Pick the inner window lines, as shown in Figure 4-59. Then hit **Enter** and pick the **Preview** button again. If all looks well, pick the **OK** button to apply the hatch.

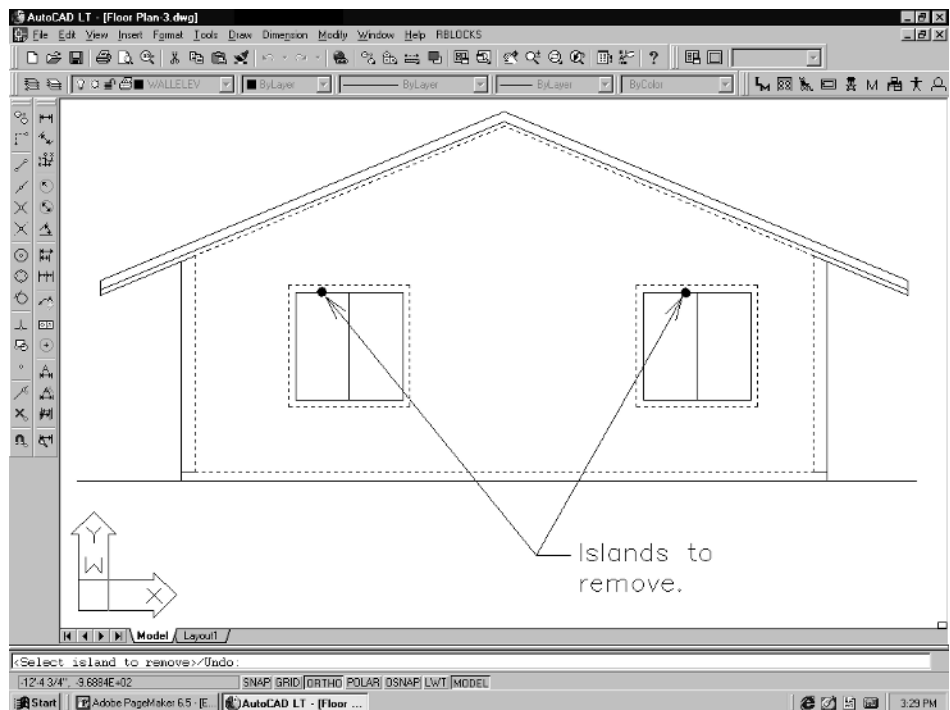


Figure 4-59

- Go ahead and apply the rest of the hatching to the other elevation walls. You will probably run into the same problem with the other side elevation, so just follow the same steps to remove the inner window lines from the boundary set. The finished elevations should look like Figure 4-60.

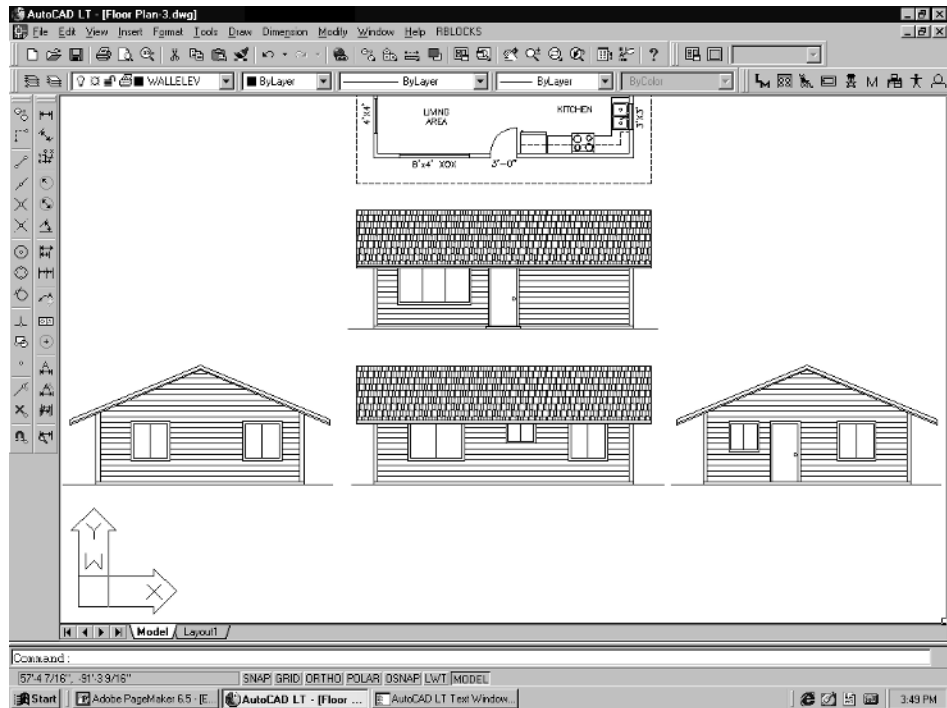


Figure 4-60



NOTE: You can select hatch styles from entities on the screen. If you need to change from one style to another, you can pick the Inherit Properties button. Then you can pick, for example, the roof hatching. This will become the current style.

It is a good idea to hatch each elevation separately. This way you don't run into any problems editing the elevations independently.

Plotting Your Elevations

The last thing we printed was the section drawing. We also did a little experiment with adding another viewport, just to demonstrate the idea of multiple viewports within a single border. It is hard to tell what you will see when you go back to paper space, but it really doesn't matter right now.

Before going back to paper space, we want to position the elevations in our model drawing, so that they will be easier to position within the viewport in

paper space. Again, we must take into account the small space we have to work with. You probably could squeeze all four elevations into the 8.5"x11" border, but I think it's a better idea to break it up into two pages. This lets us spread the elevations out a little so that we can add the notes and text we need to.

Figure 4-61 shows the elevations moved into position in the model so that we can use a single 1/8" viewport to show two elevations at once.

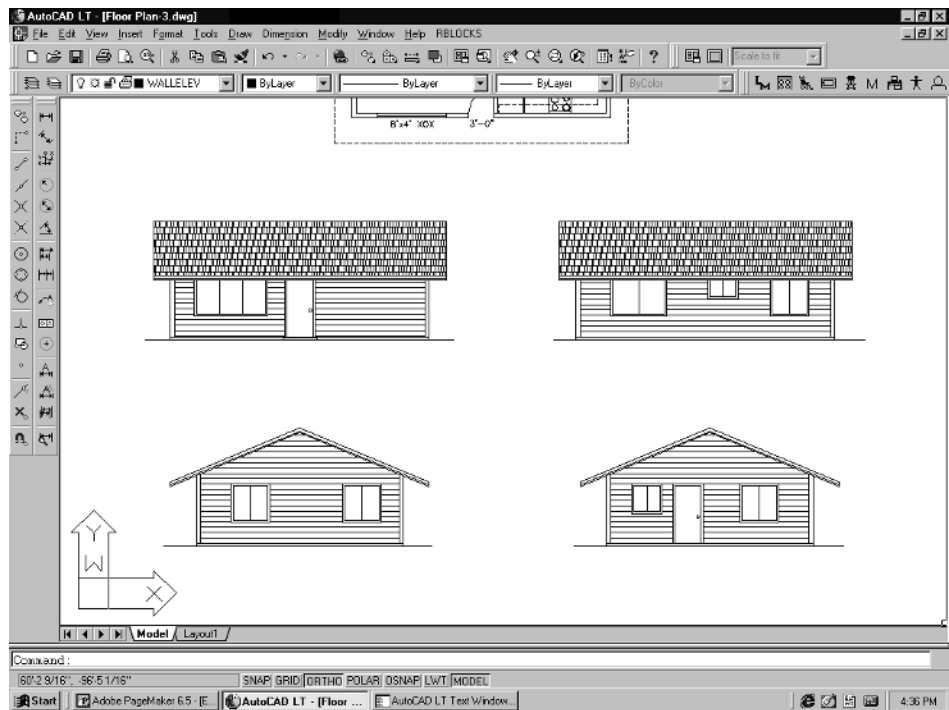


Figure 4-61

If you were so inclined, you could use two separate 1/8" viewports in the 8.5"x11" border, and then show a single elevation in each one. This is not a bad way to go because it allows you to leave the elevation where it was drawn in the model. The choice is yours.

So, if you are in LT 98, pick the TILE button, or if you are in LT 2000, select the Layout1 tab to go back to paper space. If you get back to paper space, and you see two separate viewports in the border, you can either use them to each show a single elevation, or you can just erase one and then stretch the other one out so that two elevations will fit in it.

For this exercise, we will use a single viewport first. Figure 4-62 shows the border and single viewport.

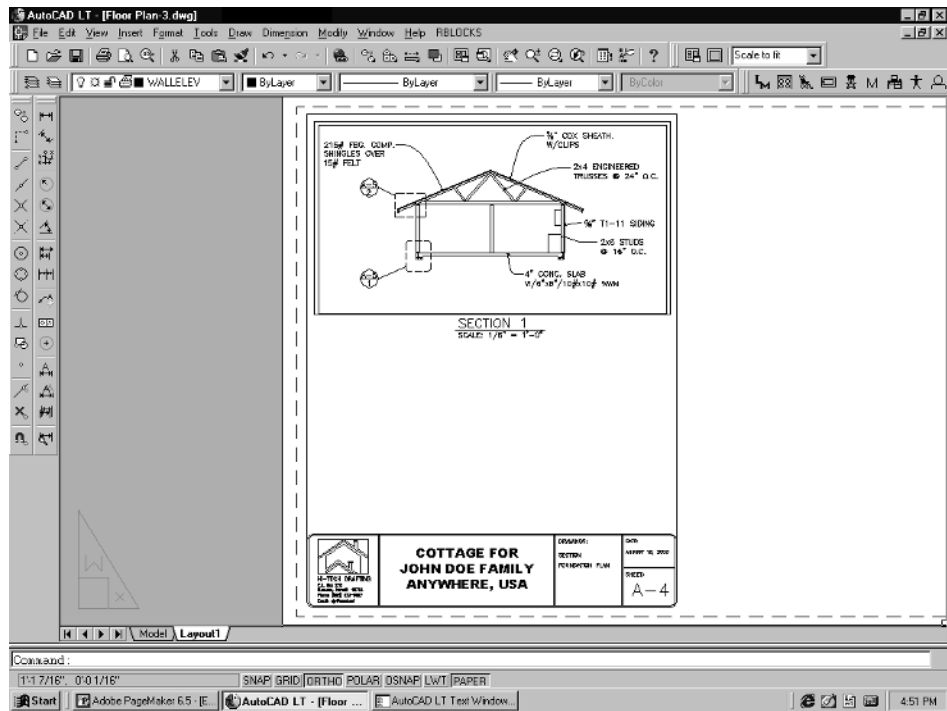


Figure 4-62

1. First, pick on the viewport outer border line. The grips will come up in each corner. Pick one of the lower corners and then drag the viewport down, stretching it out. Use the Move command to move the title (SECTION 1) and the scale. If you remember, you created these in paper space, so they can be moved while in paper space.

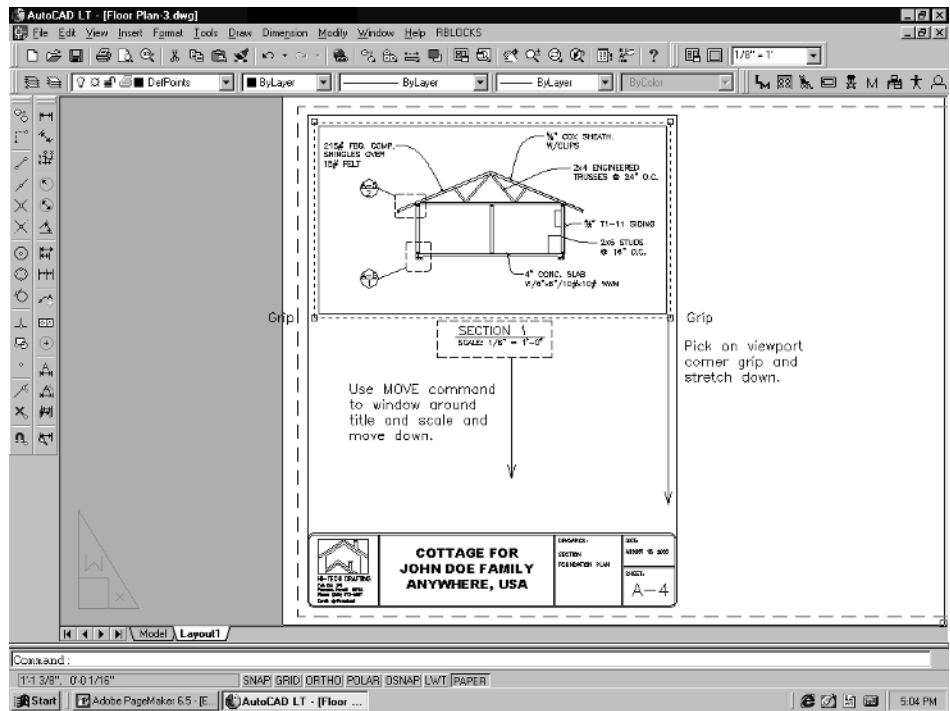


Figure 4-63

2. Once you have the title and scale moved and the viewport stretched down, pick on the **PAPER** button on the status bar. It will change to **MODEL**. Use the Realtime Pan command to move the drawing around. Pan over to the elevations and center them within the viewport, then pick the **MODEL** button on the status bar, changing it back to **PAPER**. See Figure 4-64.

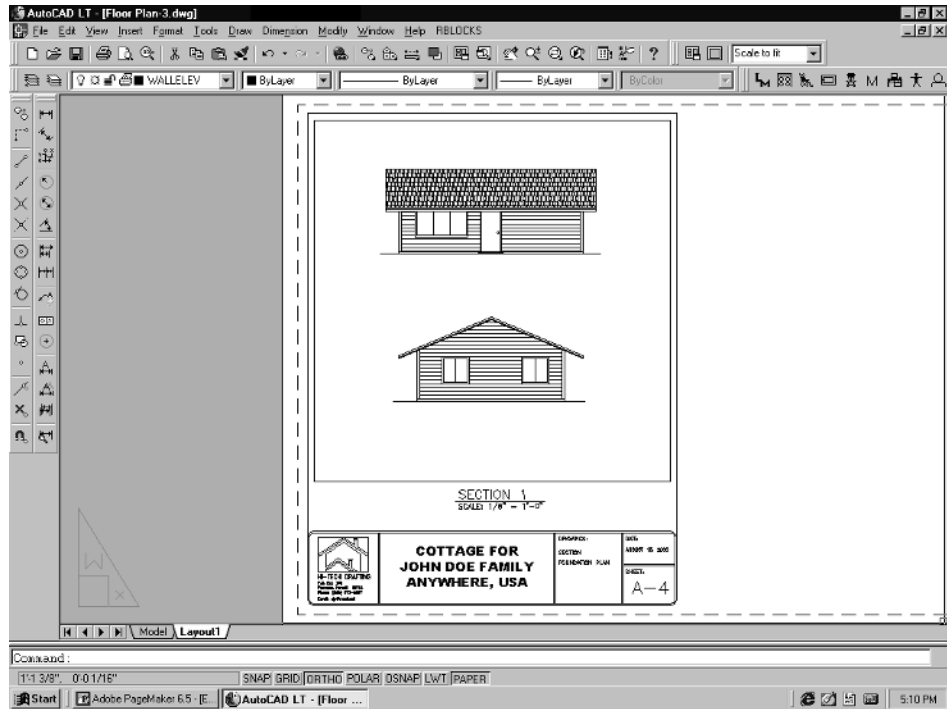


Figure 4-64

3. Change the title SECTION 1 to say **ELEVATIONS**. You don't need to change the scale text if it still reads 1/8" = 1'-0".
4. Select the **Make Objects Layer Current** button on the Object Properties toolbar, and pick on the title **ELEVATIONS**. This will change the current layer to the layer that this title was created on. In this case it is PSText and was created when you printed your section in the last chapter.
5. Now, use the DText or MText command to label the front and the left elevations. The text scale should be .125, or 1/8". Also, change the sheet number and drawings on your border. See Figure 4-65.

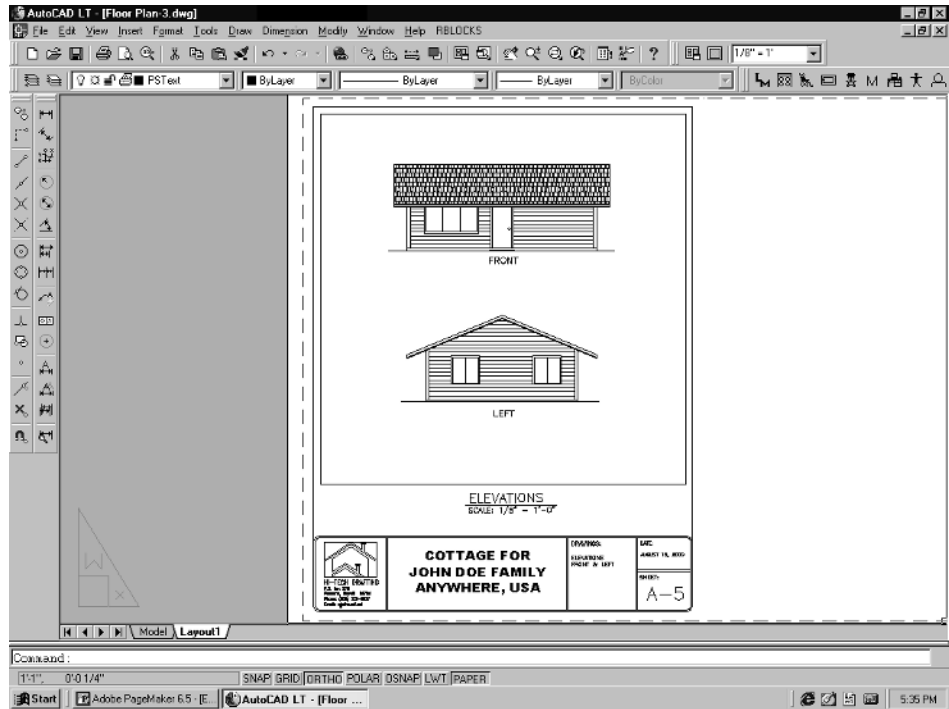


Figure 4-65

- Go ahead and print this sheet. When the printing is done, pick the **PAPER** button down on the status bar. It will change to **MODEL**. Use Realtime Pan to pan to the other two elevations. Center the elevations in the viewport, then pick the **MODEL** button on the status bar to change back to paper space. Change the text **FRONT** and **LEFT** to **BACK** and **RIGHT**. Also change the sheet number, etc., then print. See Figure 4-66.

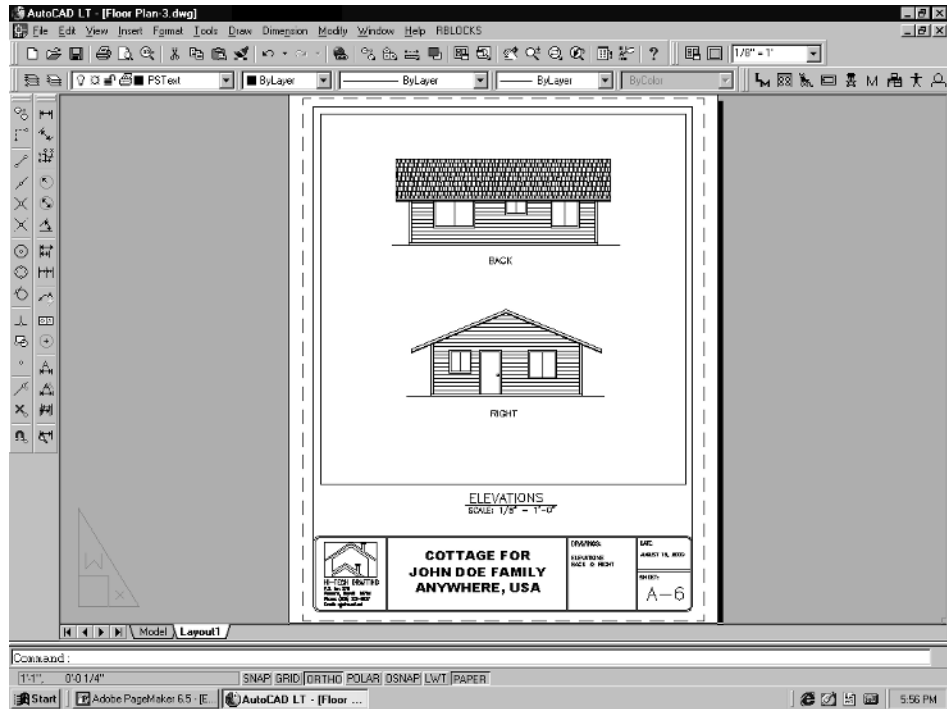


Figure 4-66

Plotting Using a Custom Template File

Let us assume that you built a number of custom template files at the end of Chapter 2. You used the template files that we provided with this book as the base templates for your own custom files.

For this exercise, you want to plot the floor plan and the four elevations of this house on a single 24"x36" custom sheet. The floor plan is to be plotted at $1/4" = 1'$ and the elevations at $1/8" = 1'$.

Here is how to go about doing this.

1. First start a new drawing using the 24"x36" template file that you customized. It should be in paper space (triangular icon in the lower left corner) and should be just an empty border. See Figure 4-67.

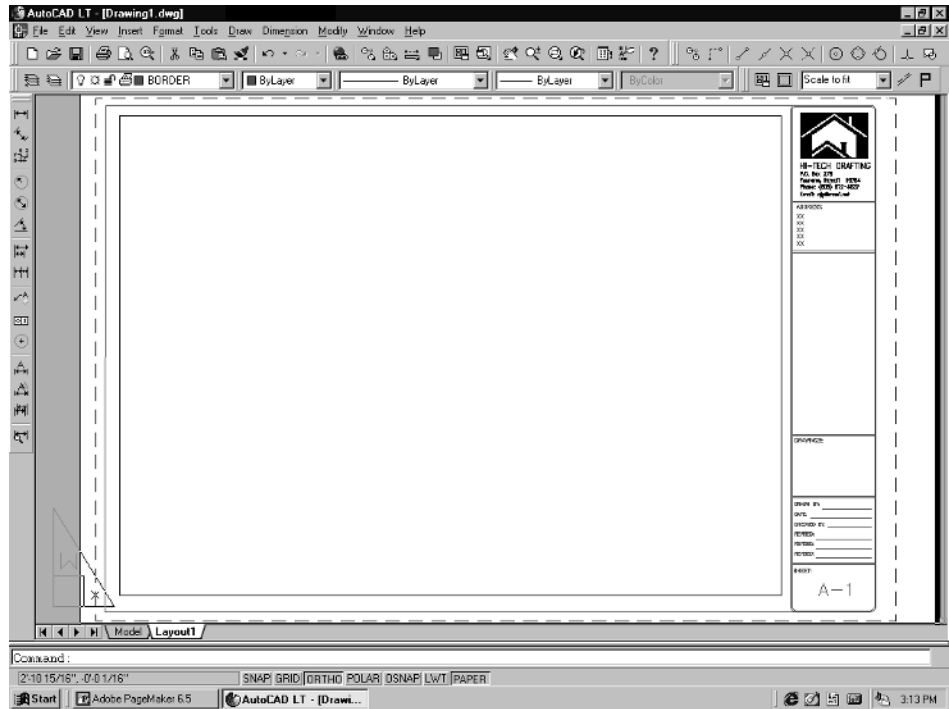


Figure 4-67

2. Next, shrink the original single viewport by picking on it and stretching it using the “grips.” Remember, this must be done while the drawing is in paper space. (Look for the triangular icon in the lower left corner of the screen.)
3. Next, create four additional viewports by copying the original viewport. Move them around so they roughly fit inside of the border. You don’t really have to pay attention to the size of each viewport, as they can be adjusted later as needed.

You do know that one of the viewports will be quite a bit larger than the rest, because the viewport for the floor plan will be scaled at $1/4" = 1'$. The other four for the elevations are only going to be scaled at $1/8" = 1'$. See Figure 4-68 for an example of these viewports.

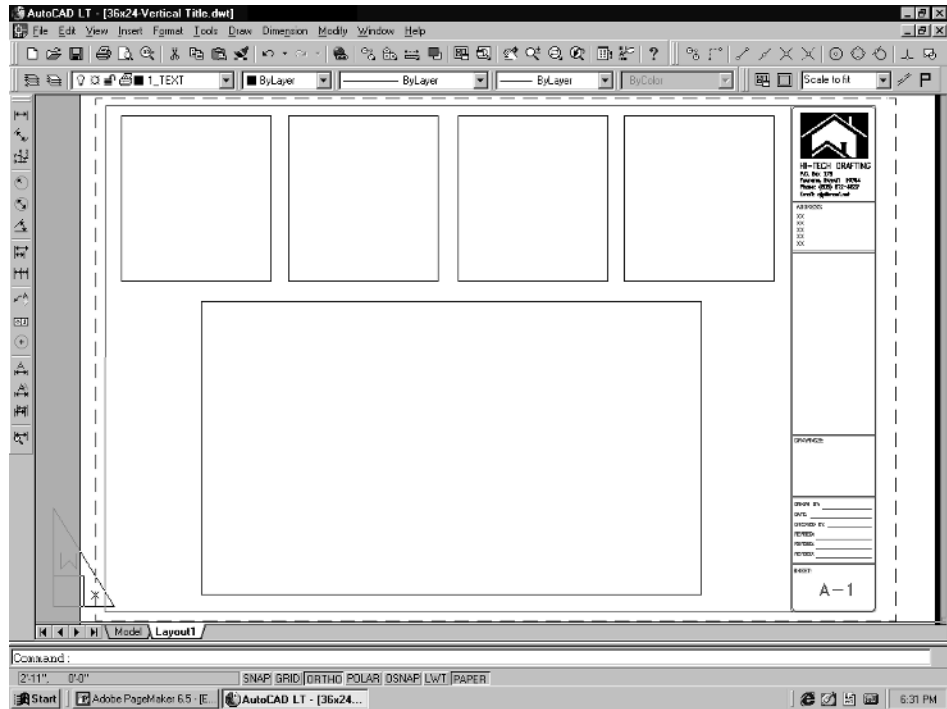


Figure 4-68

4. Next, change the drawing to real model space by picking **TILE** if you are using LT 98, or by picking the **Model** tab if you are using LT 2000/2000i. The border will disappear and you will be looking at a blank drawing, unless of course you have some of your own blocks visible that are part of this custom template drawing.
5. Pick **Xref Manager** from the Insert pull-down menu, and pick the **Attach** button. A new dialog, shown in Figure 4-70, will pop up. Navigate to the file that you have been working on with the floor plan, foundation plan, roof plan, section, and elevations. Select it and then pick the **Open** button.

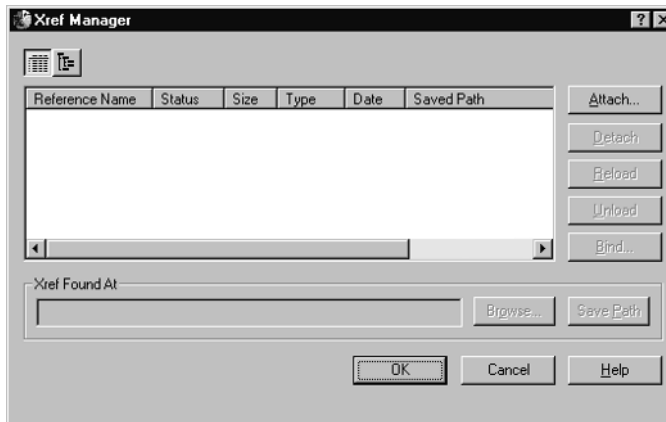


Figure 4-69

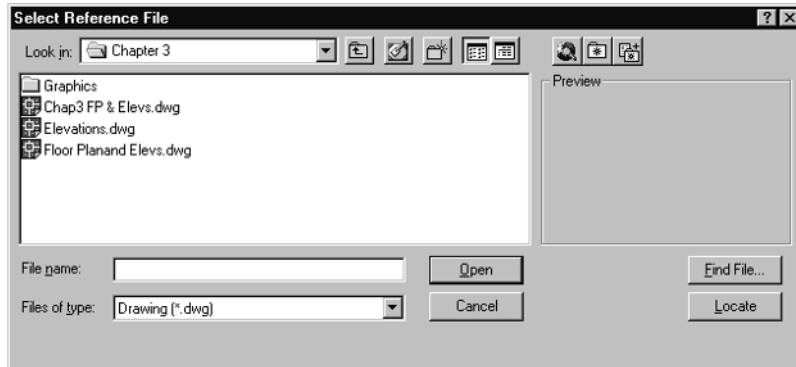


Figure 4-70

6. Pick a point in the middle of the screen for the insertion point.

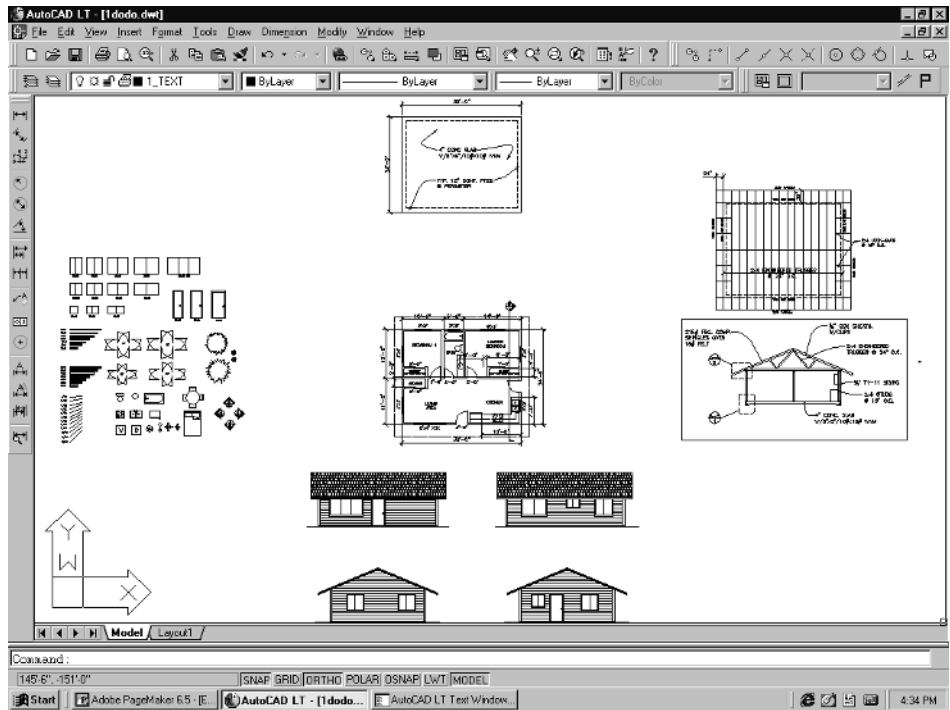


Figure 4-71

7. Change back to paper space by selecting **TILE** for (LT 98) or **Layout1** (LT 2000/2000i). Pick **PAPER** to change to floating model space. Pick inside of the large viewport and scale it to 1/4" = 1'. Type **ZOOM** and **Enter**. Type **E** and **Enter**. This should fill the large viewport up with the entire drawing. You want to zoom in on the floor plan, so type **ZOOM** and **Enter**. Type **W** and **Enter**. Then “window” around the floor plan. This should fill the viewport up with just the floor plan. See Figure 4-72.

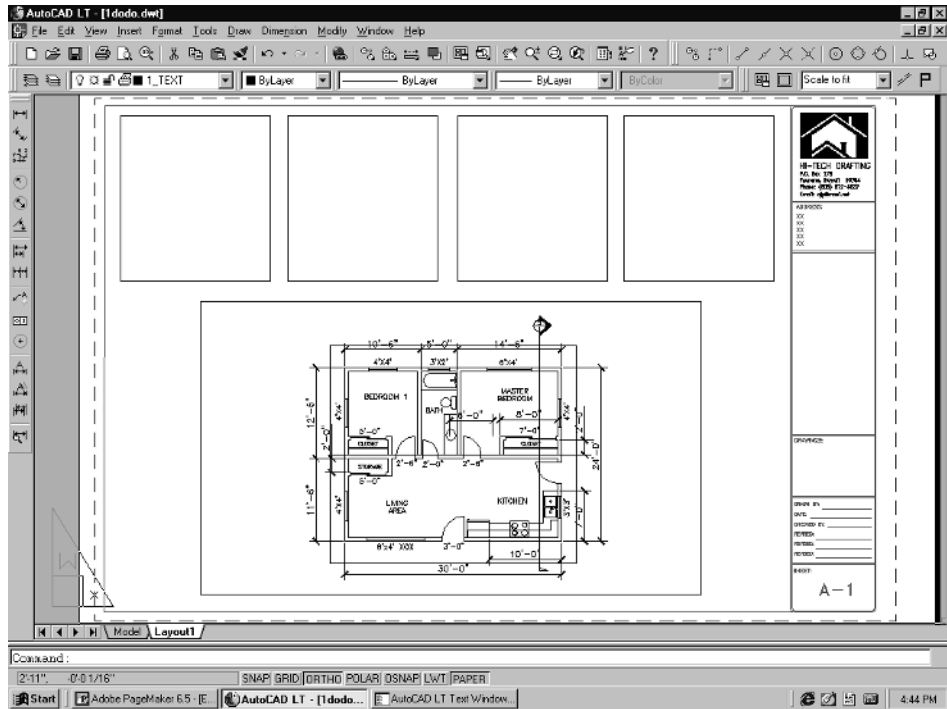


Figure 4-72

8. Now, you need to scale this viewport. For LT 98, type **ZOOM** and **Enter**. Then type **1/48xp** and **Enter**.

For LT 2000/2000i, pick inside the large viewport, then use the Viewports toolbar to pick the scale $1/4" = 1'$. Once the large viewport is scaled to $1/4" = 1'$, you can pan the floor plan around so that it is centered in the viewport. See Figure 4-73.

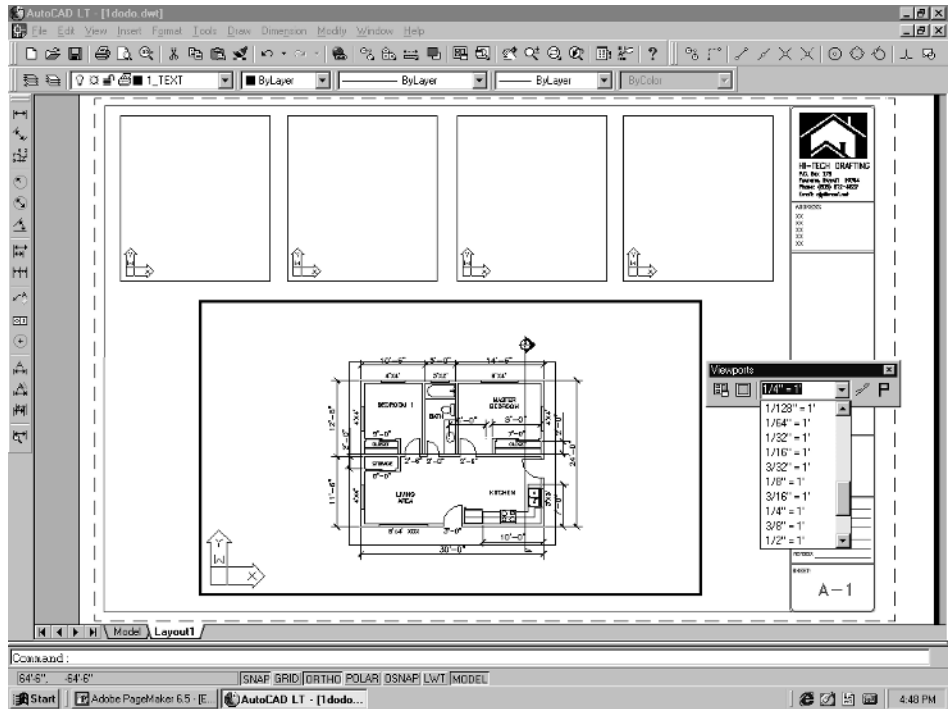


Figure 4-73

Now that the floor plan is set in its viewport at $1/4" = 1'$ scale, we can basically follow the same steps to get our elevations in the other four viewports. Follow these steps:

1. First, change from PAPER to MODEL by pressing the **PAPER** button on the status bar. Pick inside each of the four viewports, one at a time, and type **ZOOM** and **Enter**. Then type **E** and **Enter**. You will end up with all four of these smaller viewports filled with the entire drawing (floor plan, foundations, roof plan, section, and elevations).
2. Pick in the first one on the left and type **ZOOM** and **Enter**. Type **W** and **Enter**. Draw a “window” around one of the elevations. This should fill the viewport with that elevation. See Figure 4-74.

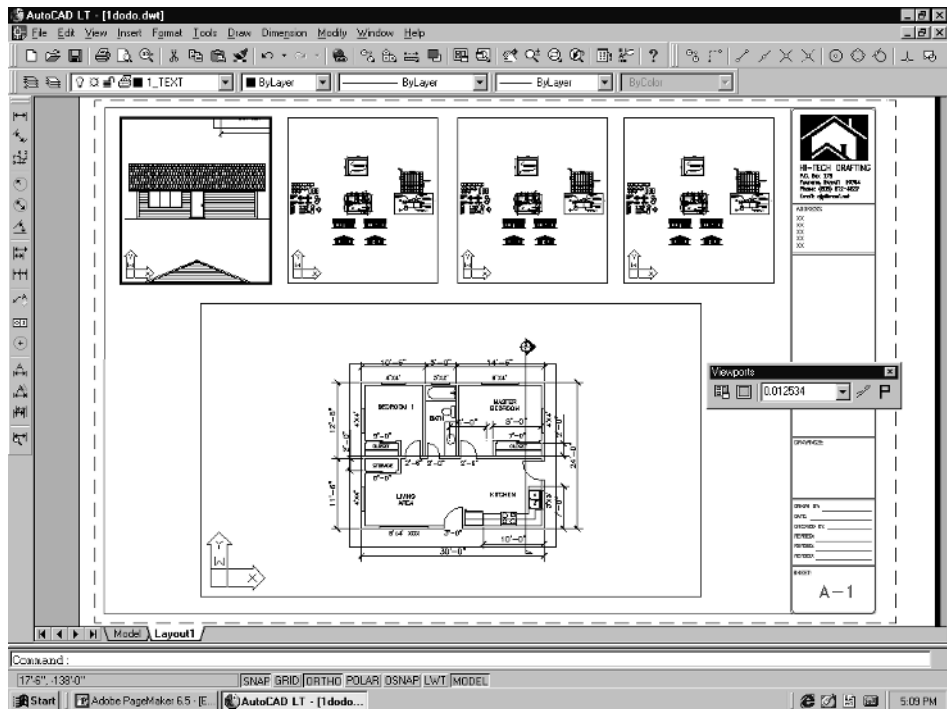


Figure 4-74

It's okay if you can see some of the other elevation parts or any other parts of the drawing in the viewport. Do the same for the other three viewports. **Zoom|In** on one of the other elevations for each one so that each viewport contains a different elevation.

3. The next step is to scale each of these upper four viewports. We want these to be scaled at $1/8" = 1'$. If you are using LT 98, pick in the viewport and type **ZOOM** and **Enter**. Then type **1/96xp** and **Enter**. Do this for each one. If you are using LT 2000/2000i, pick in the viewport and then use the Viewports toolbar to change the scale to $1/8" = 1'$. Do this for each of the viewports.

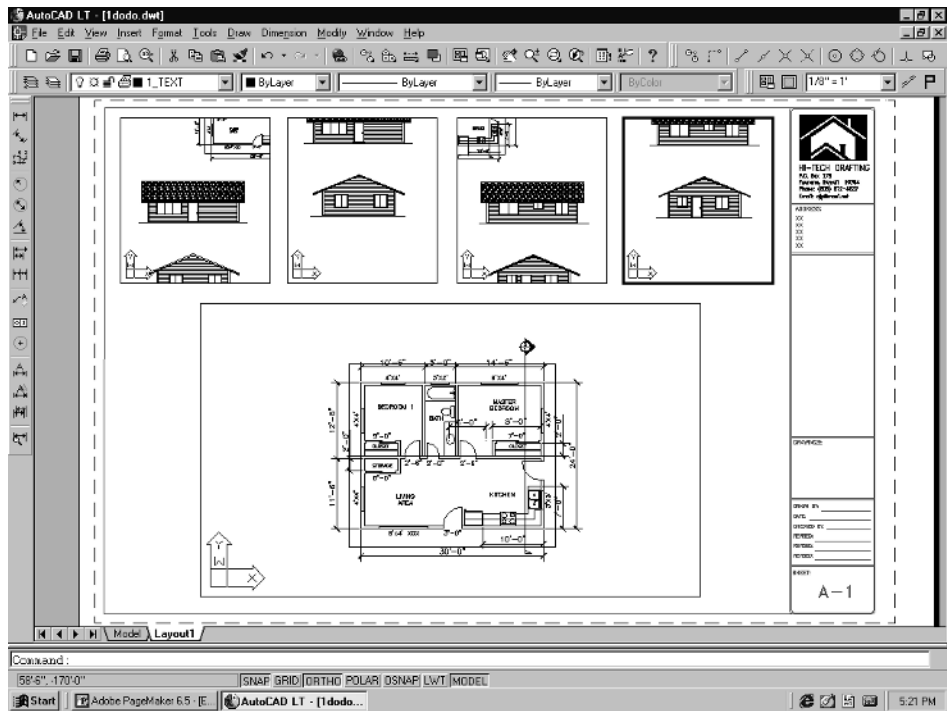


Figure 4-75

4. The last task is to stretch and resize the viewports so that they mask out any extra lines or other parts of the drawing from showing in the viewports. This is easily done by first picking **MODEL** on the status bar, changing back to paper space. Then pick on the viewport outline and grab one of the “grips” and drag it so that the viewport itself reduces down and eliminates the unwanted lines. See Figure 4-76 for the finished product.

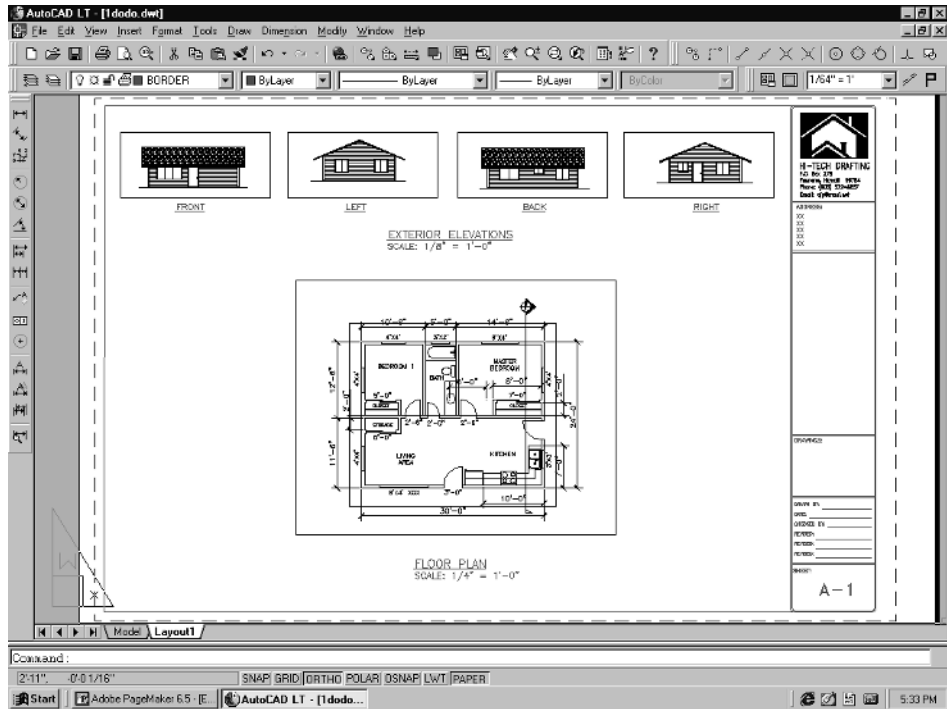


Figure 4-76

Summary

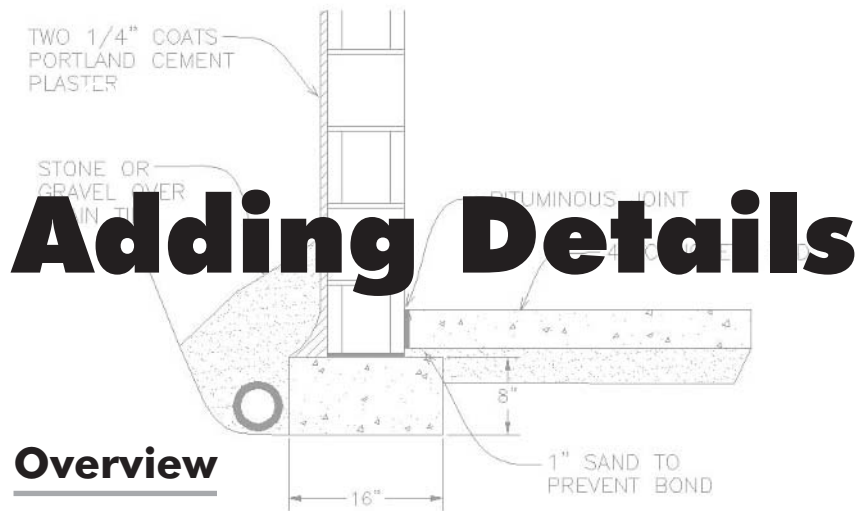
In Chapter 4, you have completed your four elevations for this simple project. We did not cover any labeling of the elevations. Usually you will make callouts for the roofing materials, the roof pitch, type of siding, and other relevant information that the builder may need.

In this chapter we have tried to explain the paper space concept in a little more detail. We introduced the idea of using multiple paper space viewports within a single border. This allows you to plot different elements at different scales. It also allows you to adjust each element within the border. Once you get the hang of using paper space for plotting your working drawings, you will see how helpful it really is.

Many people have resisted using paper space. I was one of them. I always drew everything at 1 to 1, and then plotted at 1 = 48. This worked fine for my floor plans, because I usually plotted them at 1/4" = 1' scale. But when it came to plotting my elevations on the same sheet, I would have to scale them down by half so that they would plot out at 1/8" = 1' scale. This worked all right until the drawing came back for revisions. Then I would either have to scale the elevations back up to work on them, or remember to draw any new additions at half scale. The problem got even worse when it came to doing revisions on

elements like sections that I had scaled to plot at $3/8" = 1'$. This is why paper space makes so much sense.

If you have problems following the paper space concept, please let us know. We will be posting an FAQ on using paper space on our web site at: <http://www.acadstore.com>. I also encourage you to use the AutoCAD LT Help system and the manual to learn more about the paper space concept. You can also e-mail us at ajp@maui.net with any questions you may have regarding this book.



Overview

Every set of construction drawings will require you to draw details. Small residential projects usually only require a few. Large residential or commercial projects may have a number of sheets full of details.

The purpose of any detail is to show more information in areas such as foundation footings and walls, stairs, windows, doors, roof connections, and other special construction.

Each detail will involve different drawing procedures. Some will be very intricate, others very simple. It is important that details show any conditions that the contractor or builder needs to be aware of. Some areas of the country have their own special conditions that need to be taken into account when drawing details. For example, areas that are vulnerable to hurricanes need special ties and clips at many places.

Frequently, you will want to save these details for future use, since only minor changes may be required to use them with another set of plans. This is the beauty of AutoCAD LT: You can save these out to separate drawings, then reuse them whenever necessary. This will greatly reduce your work in the future.

In this chapter, you learn about:

- ♦ **Drawing details using templates and from scratch**
- ♦ **Saving details**
- ♦ **Using Content Explorer (LT 98) and Design Center (LT 2000)**

Drawing Details 1 and 2

If you recall in Chapter 3, we drew a section through our small house. Because of space limitations on the border sheet, we were not able to fully describe the footings nor the wall/truss connections. We decided to call these out as Detail 1 and Detail 2. These were to be blown up later and printed on a separate sheet.

Now let's go ahead and do this. Open up your existing drawing. If the drawing is in paper space, return to true model space by picking the TILE button if you are using LT 98, or by picking the Model tab if you are using LT 2000.

1. **Zoom|Extents** so that you can see the whole drawing as in Figure 5-1. Then **Zoom|In** to the section as shown in Figure 5-2. You will be copying the pieces of the section, like the footing area and the rafter/wall area, and moving them over into a clear area of the screen.

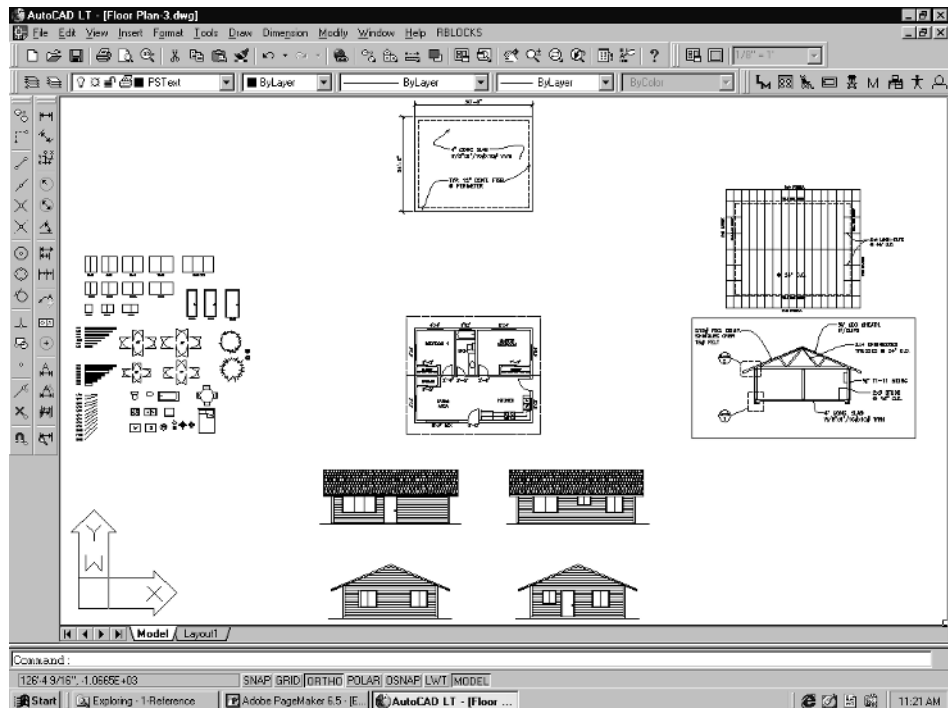


Figure 5-1

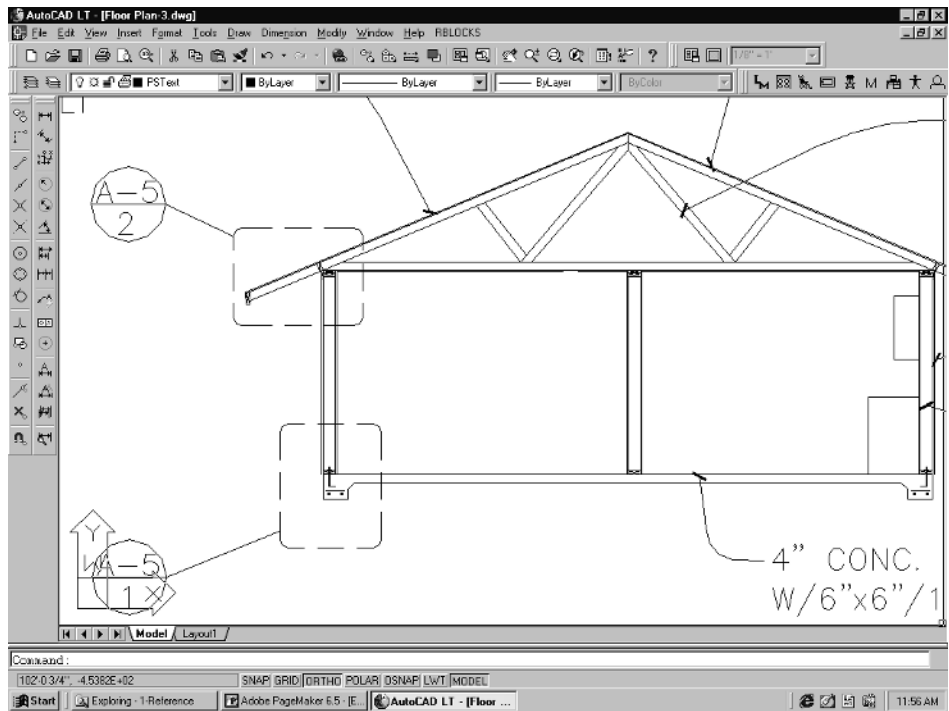


Figure 5-2

You will want to use a “crossing window” when selecting the objects to copy. Once you have copied the detail, you can trim any of the lines that are too long.

NOTE: The Copy command allows you to copy a selection of objects and move them away from the originals, all in the same command.



2. Use the Copy command to copy and move the footing area first. Pick **Copy** from the Modify pull-down menu. Use a crossing window when prompted to *Select objects*, then **Enter**. **Zoom|Out**, then pick a point anywhere near the footing when prompted to *Specify base point or displacement, or [Multiple]*. At the *Specify second point of displacement* prompt, drag the copied footing and walls over to an empty part of the drawing and pick your left mouse button.

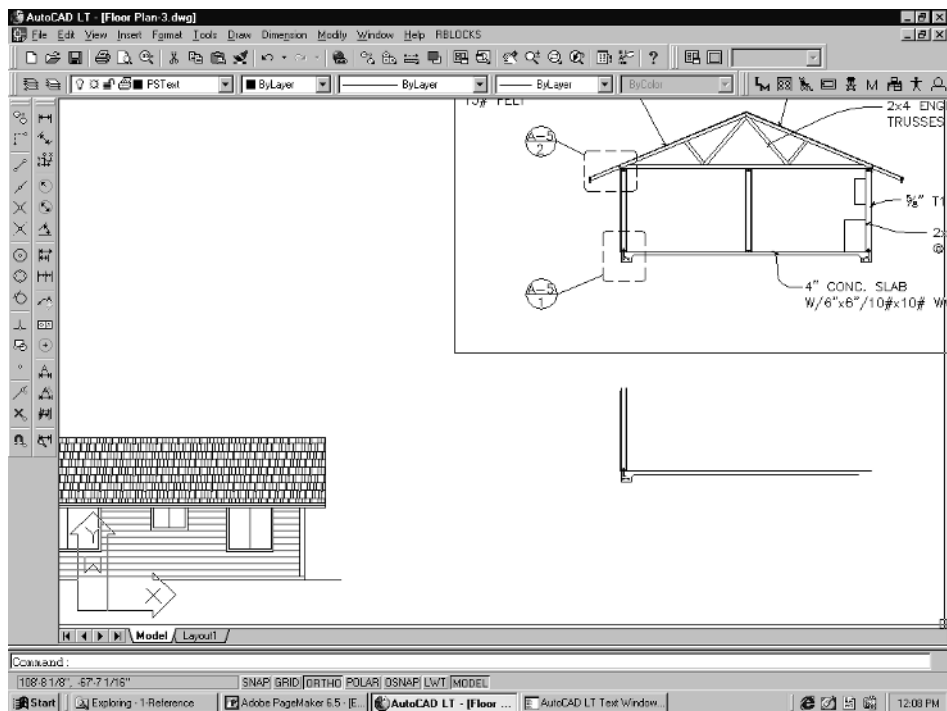


Figure 5-3

3. Do the same thing for the truss/wall area. Copy it to an empty area of your drawing, as shown in Figure 5-4.

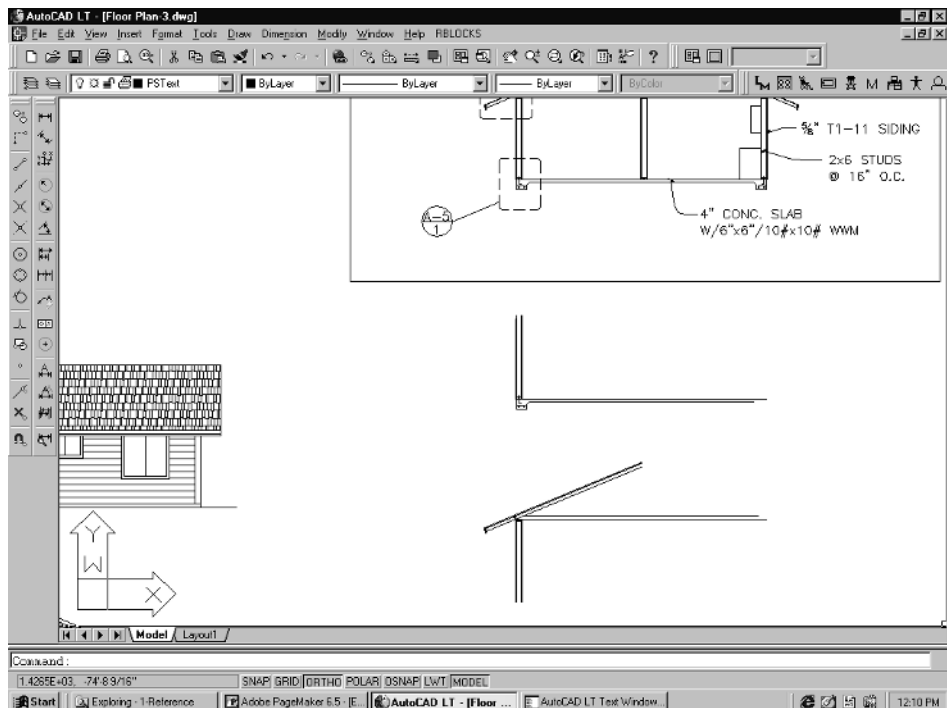


Figure 5-4

- At this point, you don't really know what scale you will use to print Details 1 and 2. The floor plan, foundation plan, roof plan, and section were all printed at a scale of $1/8" = 1'-0"$. Details 1 and 2 will both need to be printed at a much larger scale in order to show the finer details.

So, how do you find out how big you can go? First, flip back to paper space by selecting **TILE** in LT 98 or **Layout1** in LT 2000. If you haven't changed anything since the last chapter, your border will probably have a single viewport with the back and right elevations in it. You will also have the labels BACK and RIGHT. These can be moved over to the side, or erased before proceeding. See Figure 5-5.

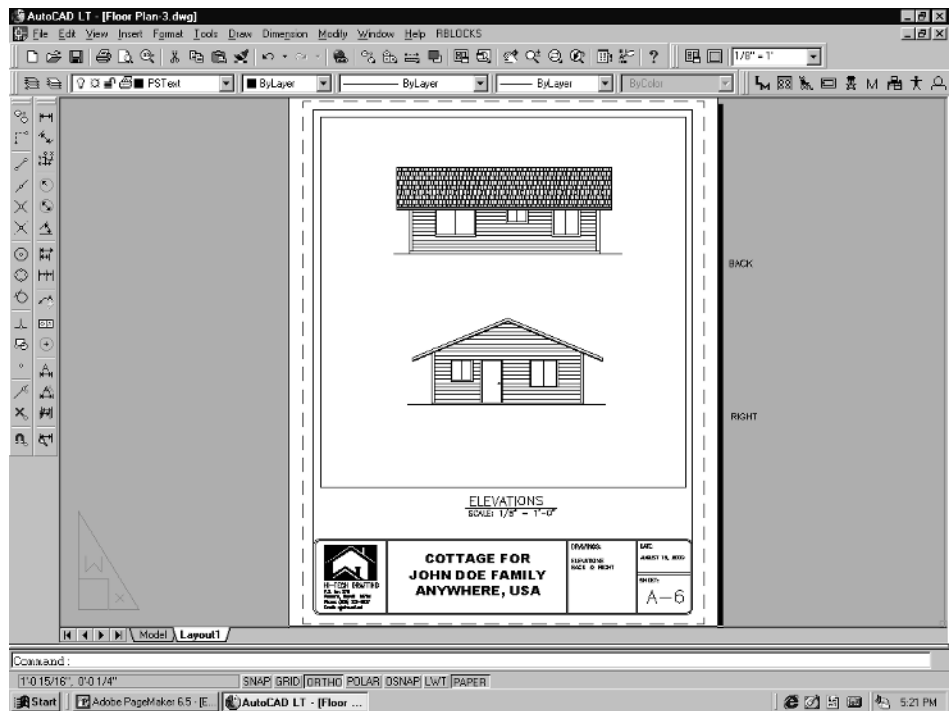


Figure 5-5

- Now, pick the **PAPER** button on the status bar and change it to **MODEL**. Pan the drawing over so that you can see the new details “copy” in the viewport, as shown in Figure 5-6.

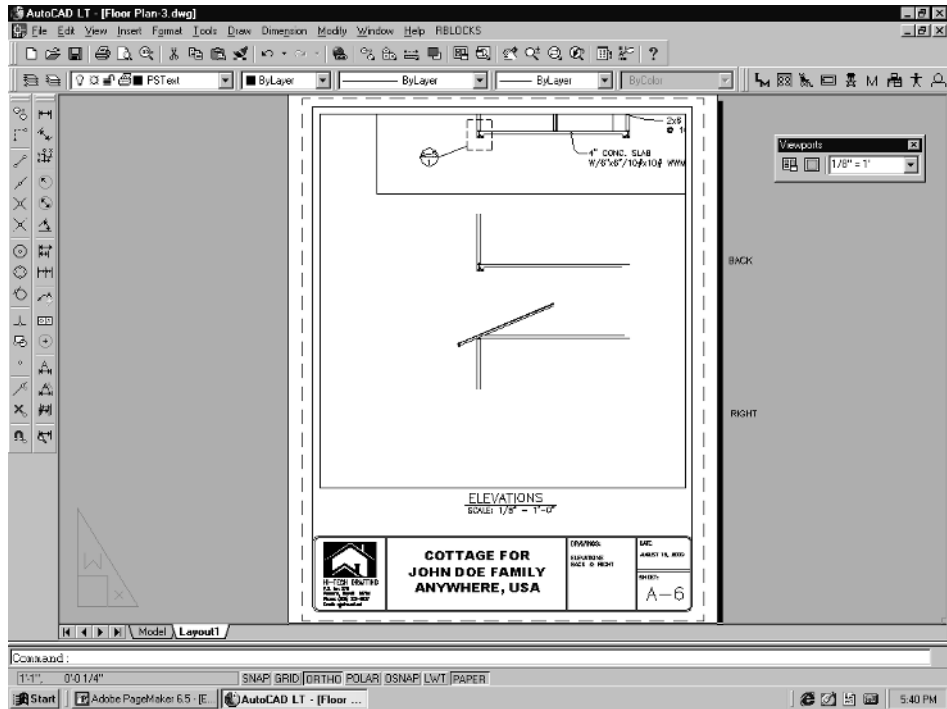


Figure 5-6

6. Notice that we have the Viewports toolbar up on the screen. It's a good idea to have this toolbar up somewhere on your screen all the time (LT 2000/2000i only). This single viewport is at $1/8" = 1'$ scale. If you pick the little arrow key on the right-hand side of the scale window, a cascading menu will drop down with all the different scales. See Figure 5-7. If you want to make sure that the viewport is still holding the $1/8" = 1'$ item from the toolbar, pick on the $1/8" = 1'$ item from the toolbar. For LT 98, you would type **ZOOM** and **Enter**. Then type **1/96xp** and **Enter**.

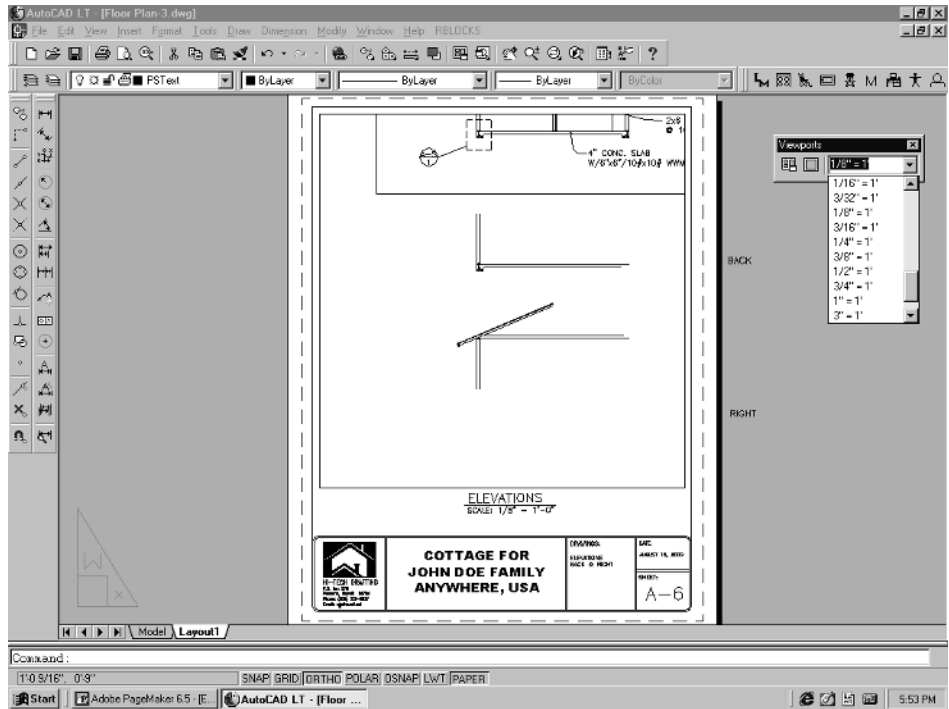


Figure 5-7

7. Change to floating model space by picking **PAPER** on the status bar. This changes to read **MODEL**. Change the scale to $1/2" = 1'$. The drawing will zoom in because you have just changed the scale from a tiny $1/8" = 1'$ to a fairly large $1/2" = 1'$. Figure 5-8 shows the $1/2"$ scale drawing.

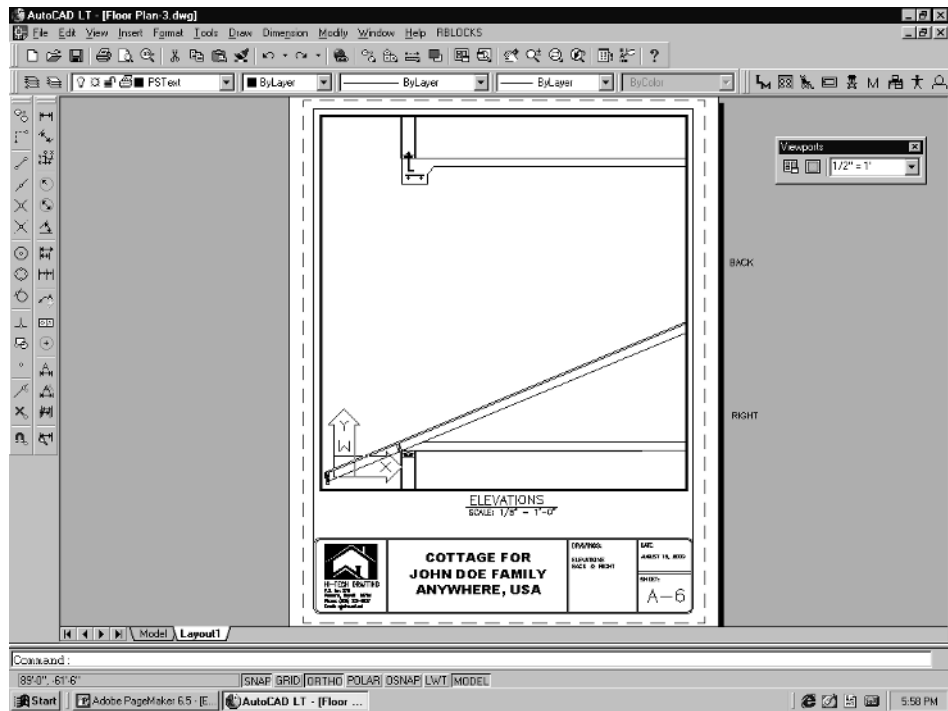


Figure 5-8

8. Use the Pan Realtime command to pan the truss/wall area detail into the center of the viewport. Then, switch back to paper space by picking the **MODEL** button on the status bar. This will change to read PAPER. You can then pick on the viewport outline so that the grips in each corner “light up.” Pick on any of the grips and begin to reduce the size of the viewport, as shown in Figure 5-9.

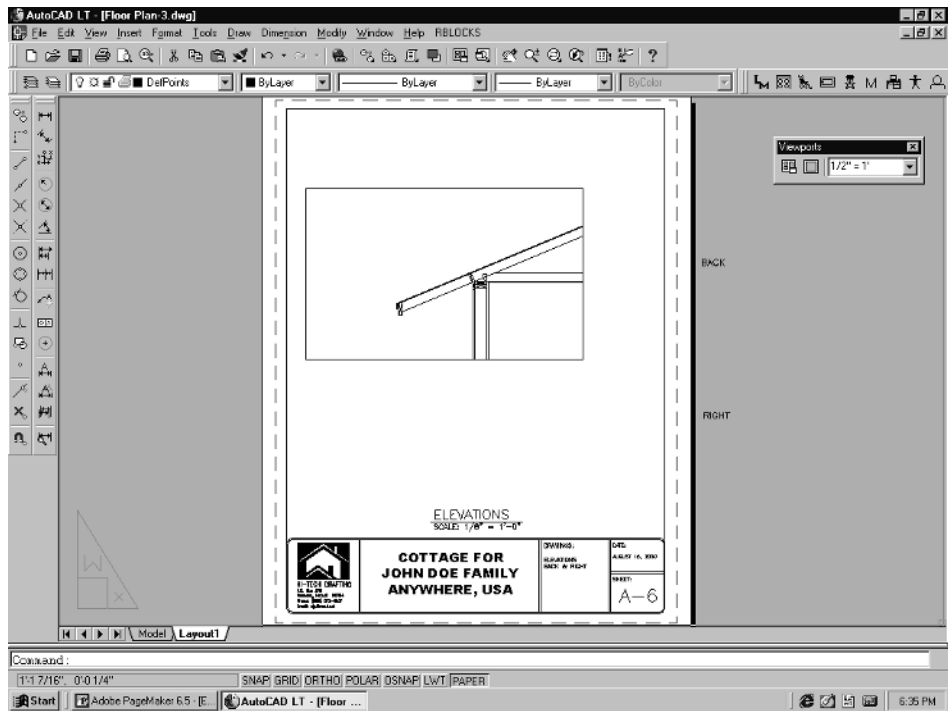


Figure 5-9

9. Next, pick **PAPER** to change to floating model space. Change your current layer to **DefPoints**. Use the Rectangle command, located on the Draw pull-down menu, to draw a box within the viewport. The reason for doing this is to give you a visible “border” representing the paper space viewport, even when you go back to regular model space.

This allows you to add labels and text to the detail drawing, knowing that everything will fit within the paper space viewport. Pick **MODEL** on the status bar to change back to paper space.

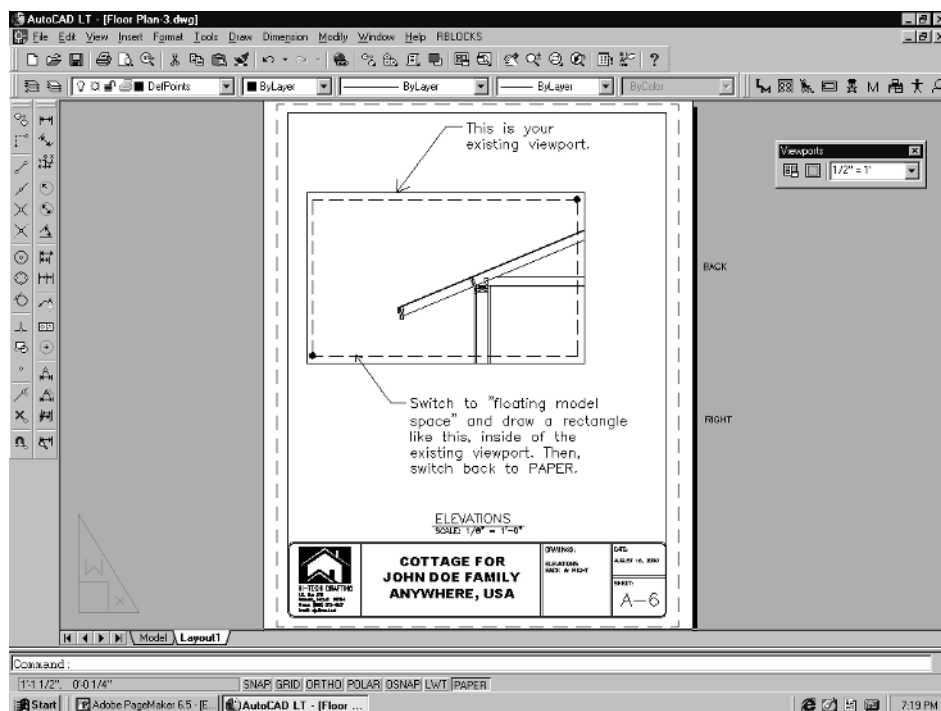


Figure 5-10

10. Next, copy the viewport so that you will have two on this sheet. Use the regular Copy command to do this. This will give you an exact replica of the detail. Move the viewports around inside of the border so that they both fit.

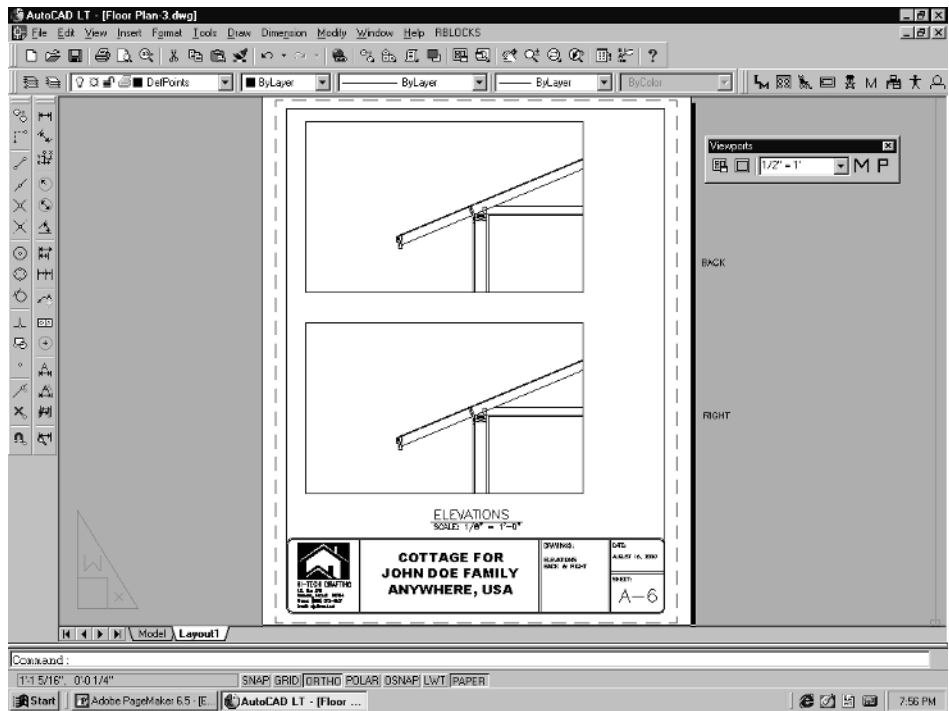


Figure 5-11

11. Pick **PAPER** on the status bar to change to floating model space. Then use the Pan Realtime command to pan the footing detail into the new viewport.

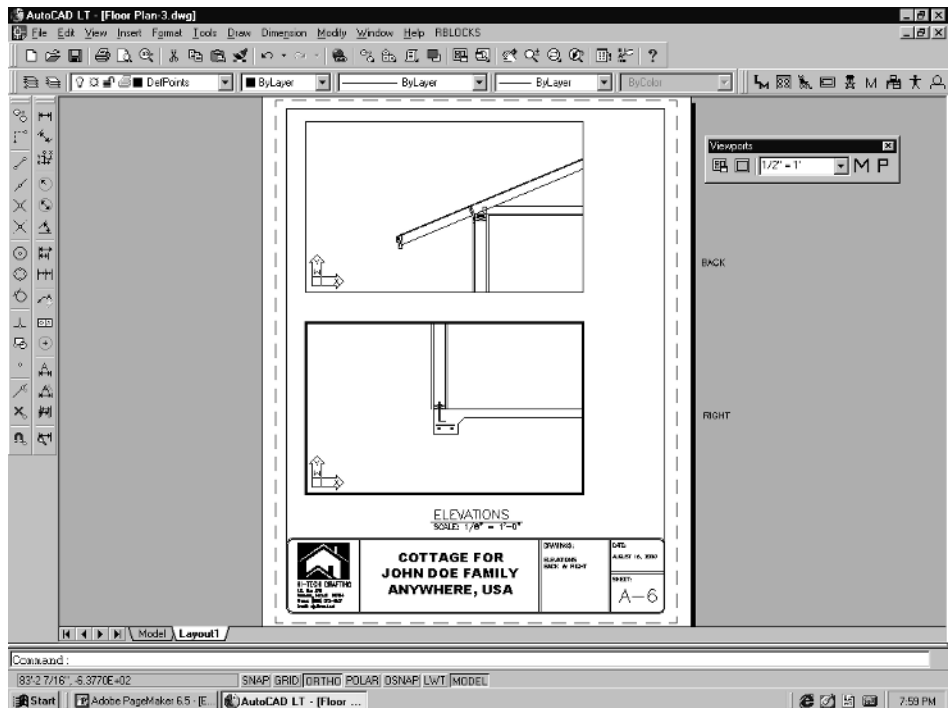


Figure 5-12

12. There is quite a bit of room in the viewport, so we want to blow the footing detail up some more. Change the viewport scale to 1" = 1'. This makes the image twice as large.

Before adding the labels and text, change the layer to **DefPoints** and draw a rectangle within the viewport so that we have a visual representation of the viewport. Then flip back to paper space by selecting **PAPER** on the status bar.

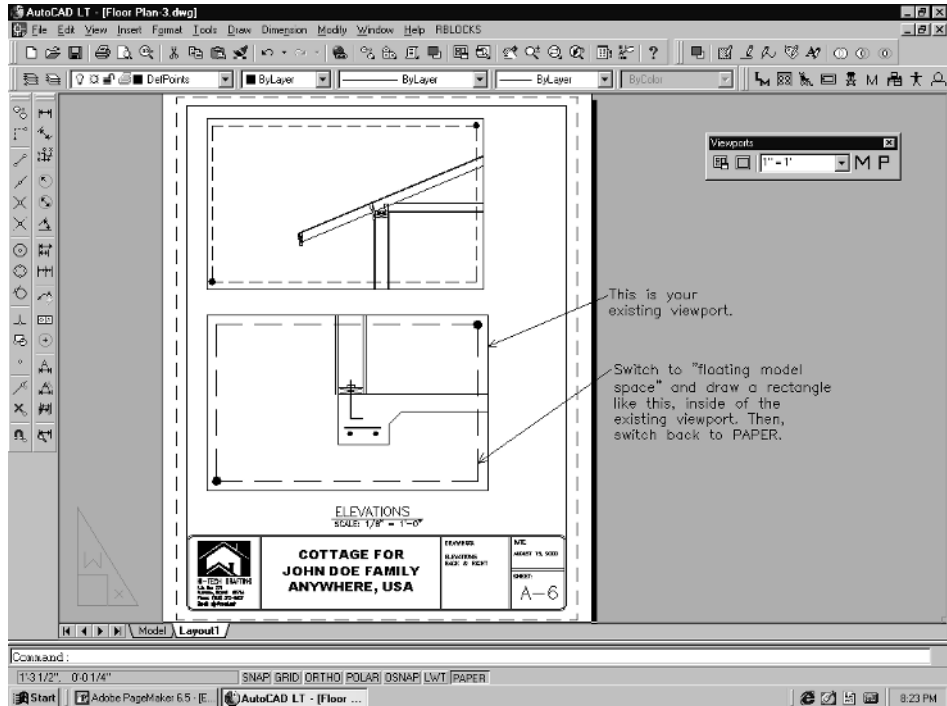


Figure 5-13

13. Now we have our detail viewports set up. We can now switch back to “true” model space (**Model** tab for LT 2000 or **TILE** for LT 98). **Zoom|In** so that you can see both of the details.

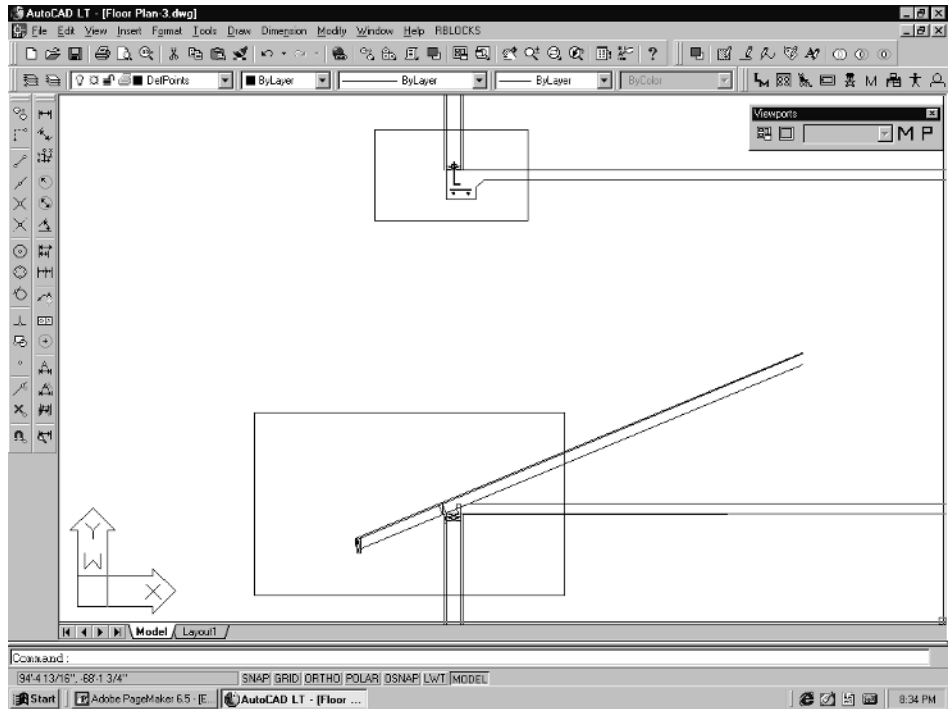


Figure 5-14

14. Trim the extra long lines, using the rectangles that we drew earlier as the cutting edge. Next, look at Sheet #4 (Section) to see what is called out for these areas. Start with the truss/wall area. Remember that this viewport was scaled at $1/2" = 1'$, so you need to set your dimension style to **RA24** and the text style to **TEXT24**.
15. Change your current layer to **DETAIL-TEXT**. Start drawing your leaders by either picking the **Leader** button on the Dimension toolbar, or selecting **Leader** from the Dimension pull-down menu. See Figure 5-15. Add your labels based on Sheet #4.

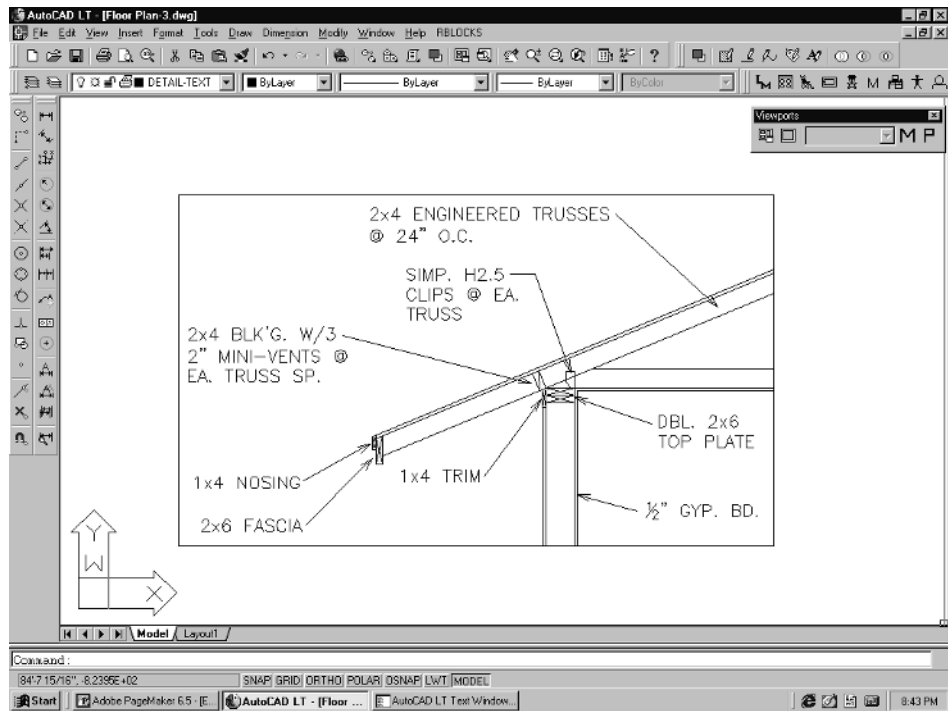


Figure 5-15

16. Next, pan to the footing detail. Remember that the viewport for this detail was scaled at 1" = 1', so we need to change the text and dimension styles. Change the dimension style to **RA12** and the text style to **TEXT12**. Go ahead and add your labels based on Sheet #4. Your footing detail should resemble Figure 5-16.

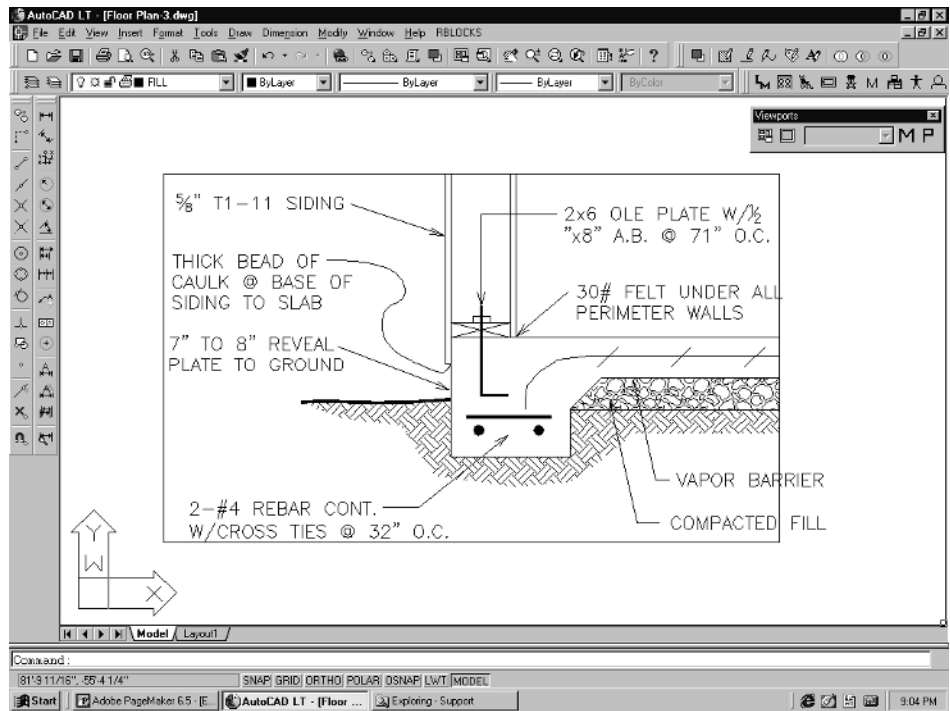


Figure 5-16

17. As you can see, some of the text didn't fit completely within the rectangle. It doesn't really matter because it is pretty close and there is enough room to stretch the viewport a little to accommodate the overrun. So let's see what we have.

Change back to paper space (**TILE** for LT 98 or **Layout1** for LT 2000).

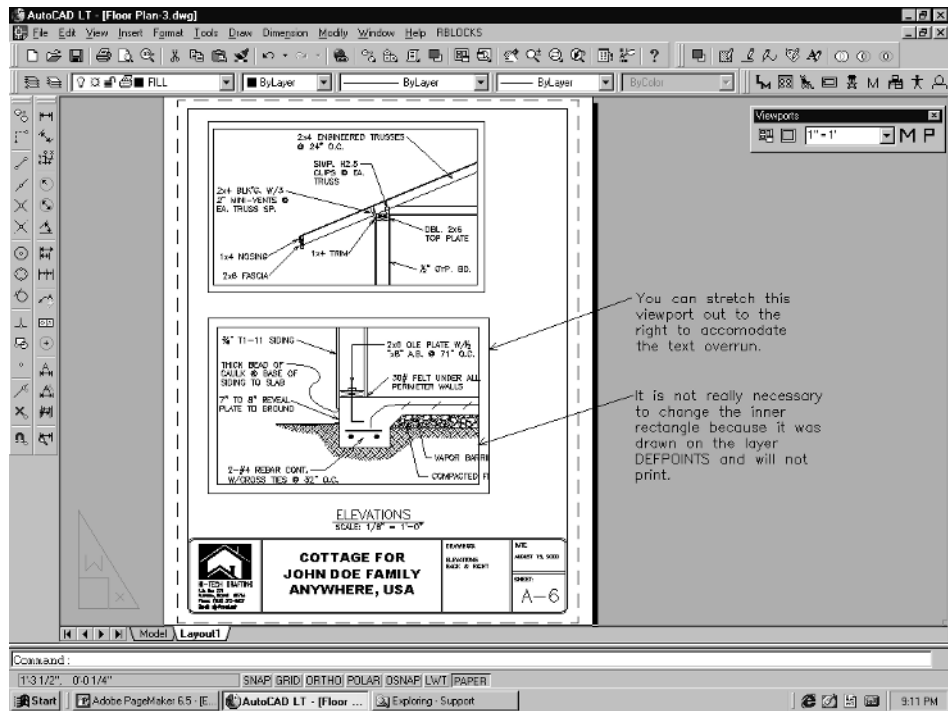


Figure 5-17

Once you have stretched the viewport so that everything fits, you can move the viewports around in the border and edit any of the text before printing. See Figure 5-18.



NOTE: Remember that you can add text in paper space, but you should make it a habit to place it on a separate layer named PText. The text heights in paper space are usually between 1/8" to 1/4". Try 1/4" first, then reduce it if it looks too large.

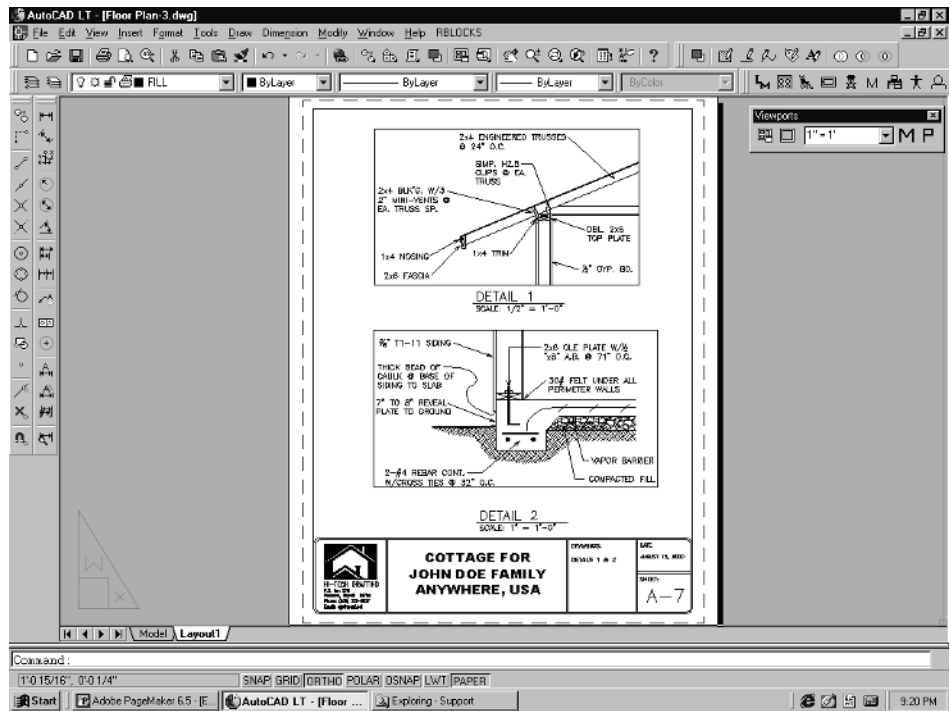


Figure 5-18

Drawing a Detail from Scratch

In this part of the chapter, we will draw a basement wall and footing detail from scratch. You will be using common AutoCAD LT commands to do this.

In all of the previous exercises, you used our template drawings as the base when starting a new drawing. As you recall, our templates contain many different elements and settings such as blocks, symbols, and borders as well as text and dimension styles, snap spacing, and other variables. All these have been preset in the templates and only need to be changed when necessary.

When starting a drawing from scratch, without using one of our templates, you will need to manually set most of these variables. This can be tedious, but you need to know how to do it, so now is as good a time as any to run through it. Let's begin by starting a new drawing.

1. Pick **New** from the File pull-down menu. Pick **Use a Wizard** from the Create New Drawing dialog box. Select **Quick Setup** and pick the **OK** button.



Figure 5-19

2. Change the Units to **Architectural**. Then hit the **Next** button.

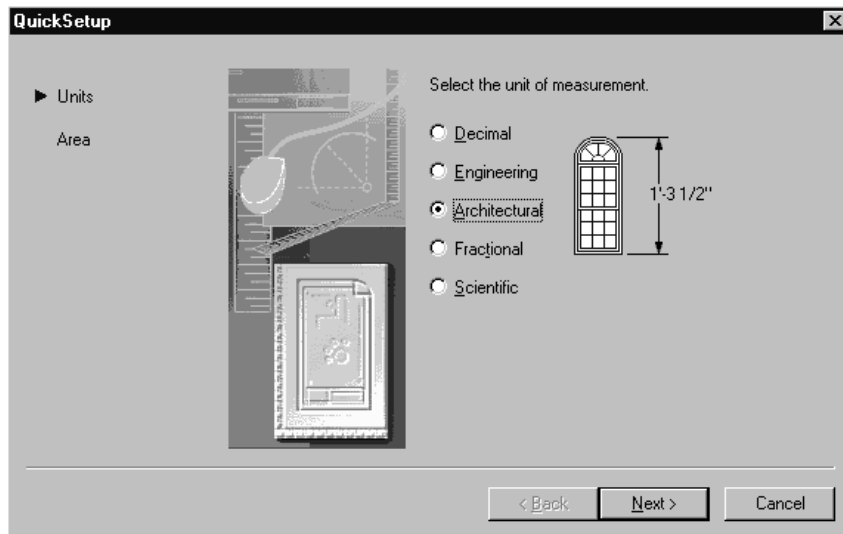


Figure 5-20

3. The last setup prompts are for the size of the drawing screen. The defaults are Width = 12" and Height = 9". Change these to Width = **72"** and Height = **54"** as shown in Figure 5-21. Then pick the **Finish** button.

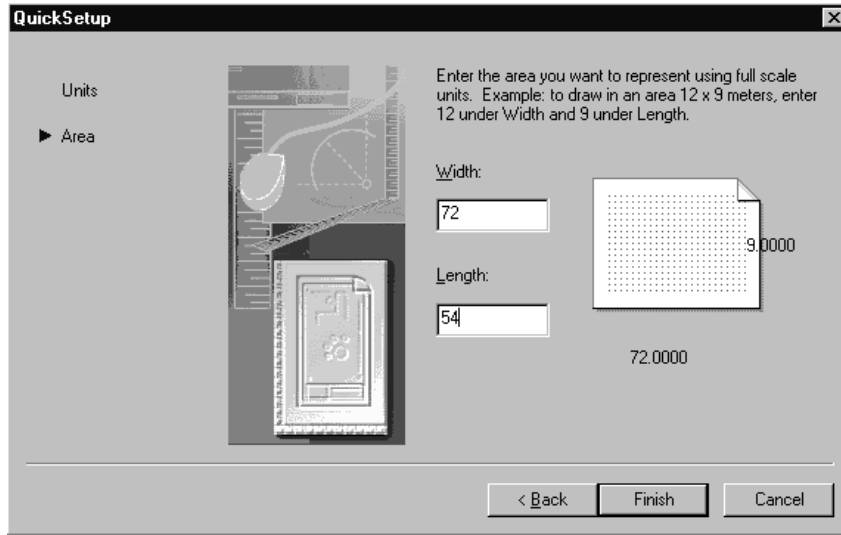


Figure 5-21

4. Type **ZOOM** and **Enter**. Then, type **ALL**. This will zoom the drawing screen out to the limits you set. If you do not do this, the screen will not use the limits you set.



NOTE: The screen size listed above is only for demonstration purposes. You may find that you want a much larger initial screen than this. For example, a reasonable size might be Width = 20' and Height = 15'.

A blank drawing will open up. The only thing set at this point are the units, which are architectural, and the screen limits, which are about 6' by 4'-6". This should be large enough to draw the basement wall/footing detail, but can be enlarged at any time by simply zooming out.

5. Create a layer before you begin drawing. You can do this a number of different ways. Probably the easiest is to type **-LA** and **Enter**. (Make sure to include the hyphen.) Type **M** (for Make) and **Enter**. Type **DETAIL-1** and **Enter**. Type **C** (for Color) and **Enter**. Type **R** (for Red) and **Enter**. Then **Enter** again when prompted to *Enter name list of layer(s) for color 1 (red) <detail-1>*. **Enter** a final time to exit the layer command.

What did this do? You made a layer named DETAIL-1 and changed its color to red. This is now the current layer. The new detail will be drawn using this new layer. Take a look at Sheet #5 (Detail BF). It shows you what needs to be drawn. It is not to scale, but has dimensions and the notations that need to be included in the finished detail.

6. Type **STYLE** and **Enter**. The Text Style dialog box will pop up.

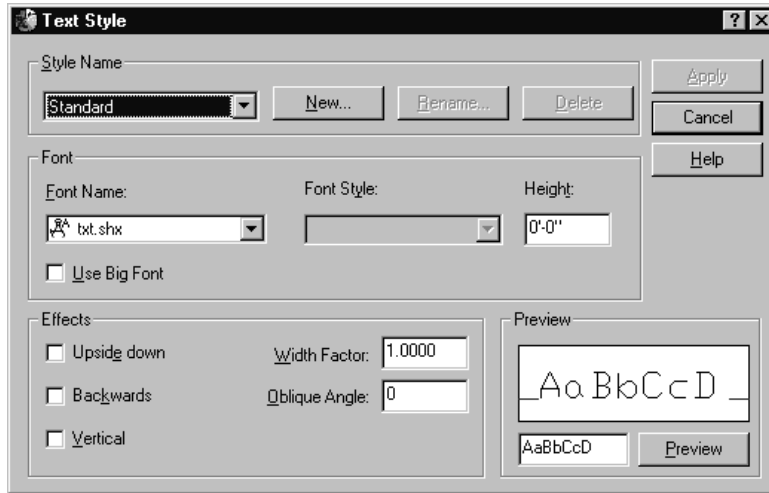


Figure 5-22

7. Pick the **New** button. The New Text Style dialog will come up. Type **Romans** in the Style Name box and hit the **OK** button.



Figure 5-23

8. The main Text Style dialog box will pop back up. Select the little arrow key in the box labeled Font Name. Scroll through the list until you find the font named Romans.shx. Pick it and then pick the **Apply** button. Pick the **Close** (x) button to exit.

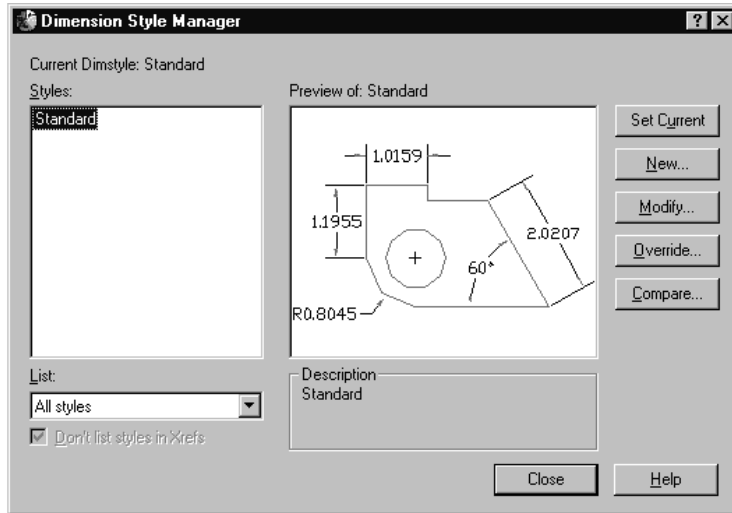
You have now created a new text style for this drawing named Romans and you have made it the current style. All text you apply to this detail will be this font until you change to a different one.

You may be wondering why we used the text style Romans.shx for this exercise. Well, first of all it comes standard with AutoCAD LT, so we know everyone has it. And second, it is not a bad font. It is relatively small as far as byte size goes, but isn't angular or rough looking like the "Standard" style.

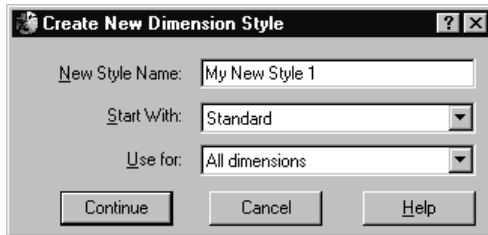
Next, you will need to create a dimension style for the detail you will be drawing. Let's assume that the detail will be plotted at a 1" = 1' scale. To create a new dimension style follow the steps depending on which version of AutoCAD LT you are using:

LT 2000/2000i

1. Pick **Style** from the Dimension pull-down menu. This will bring up the Dimension Style Manager dialog box. Select **New**.

**Figure 5-24**

2. The Create New Dimension Style box will pop up. Type in a name for your new dimension style in the New Style Name box. Then pick the **Continue** button.

**Figure 5-25**

3. The New Dimension Style dialog will come up with a number of tabs at the top. Select the **Fit** tab. Look for the little circle labeled Use overall scale of. Make sure it is selected. To the right of it is a box with the current overall scale. You want the scale to be between 7 and 8, so change the value in the box by either typing it in or using the little arrow keys.

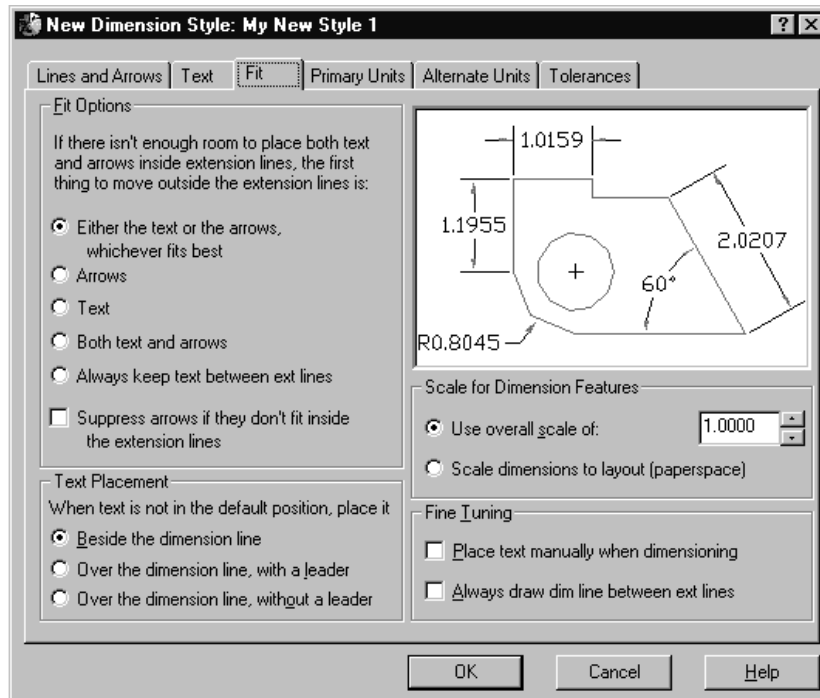


Figure 5-26

4. You probably should change the primary units to Architectural units. To do this, pick the **Primary Units** tab and then change the Unit format from Decimal to **Architectural**. See Figure 5-27. Pick the **OK** button. This takes you back to the Dimension Style Manager dialog. Pick the **Close (x)** button to exit.

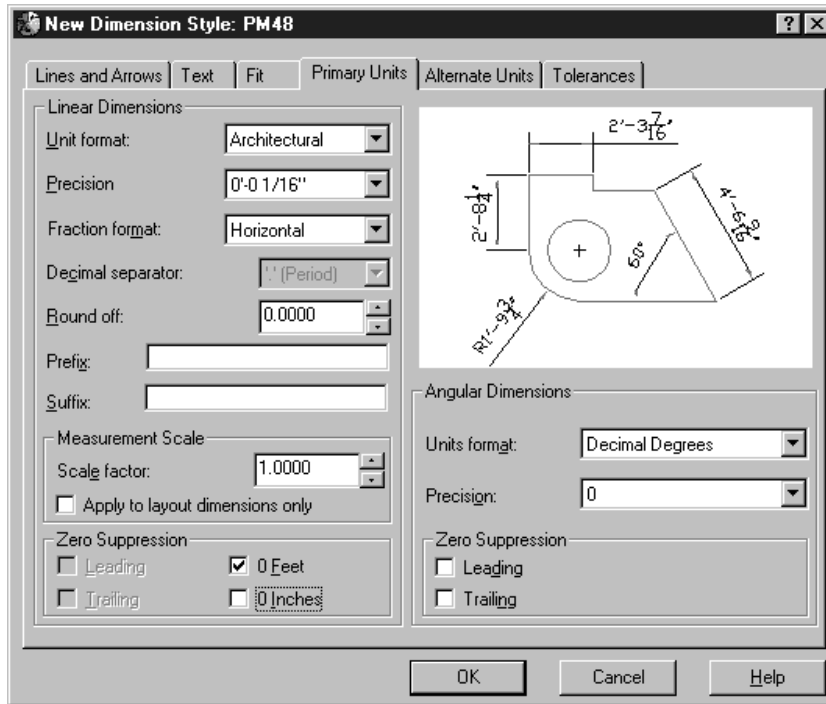


Figure 5-27

LT 98

1. Pick **Style** from the Dimension pull-down menu. This will bring up the Dimension Styles dialog box.

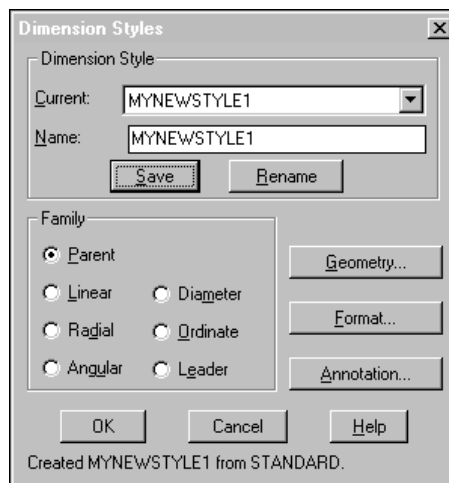


Figure 5-28

2. Type a new name for your dimension style in the Name box. Then pick the **Save** button. Next, pick the **Geometry** button. The Geometry dialog box will come up as shown in Figure 5-29. Change the Overall Scale to **7** or **8**. While you're at it, you can change the arrowheads to **Architectural Tick** if you wish. Then, pick the **OK** button. This will take you back to the Dimension Styles dialog box. Be sure to pick the **Save** button again before picking the **OK** button to exit. If you don't do this, all your changes will be lost.

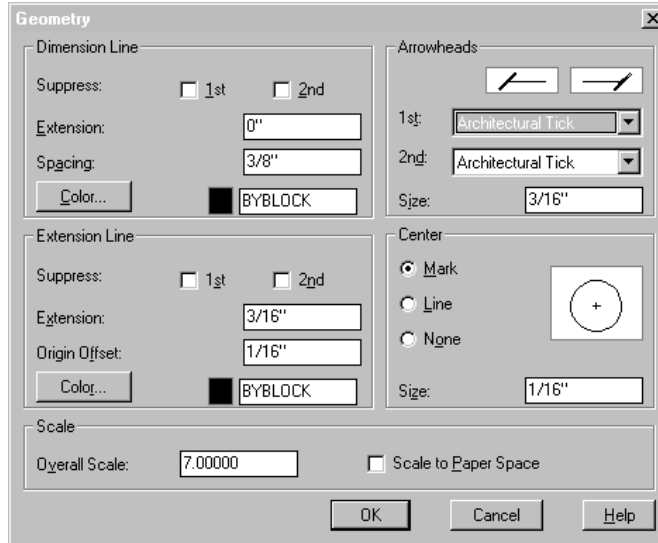


Figure 5-29

If you are not very familiar with using the AutoCAD LT dimensioning system, I recommend that you read up on it in the AutoCAD LT manual. Also, use the Help system whenever you run into something new. The Help system is a quick way to get information, and Autodesk has done a good job of covering just about all their commands and variables in it.

Other settings that should be changed are the snap space and the coordinate readout. The following steps apply to both LT 98 and 2000.

1. Type **SNAP** and **Enter**.
2. When prompted to *Specify snap spacing or [ON/OFF/Aspect/Rotate/Style/Type] <0'-0 1/2">*, type **1** and **Enter**. This sets the snap space to 1".
3. Type **COORDS** and **Enter**.
4. When prompted to *Enter new value for COORDS <0>*, type **2** and **Enter**. This sets your coordinate readout in the lower left corner of your status bar so that it reads exact distances and angles from the last point picked.

5. Turn on **ORTHO** (F8 key) and **SNAP** (F9 key). Or, press each of these from the row on the status bar at the bottom of your screen. Both methods toggle them on/off.

With all these settings done, we can begin drawing the footing/basement wall detail.

6. Type **L** and **Enter**, or pick the **Line** command from the Draw pull-down menu. Draw a line **16"** from right to left.

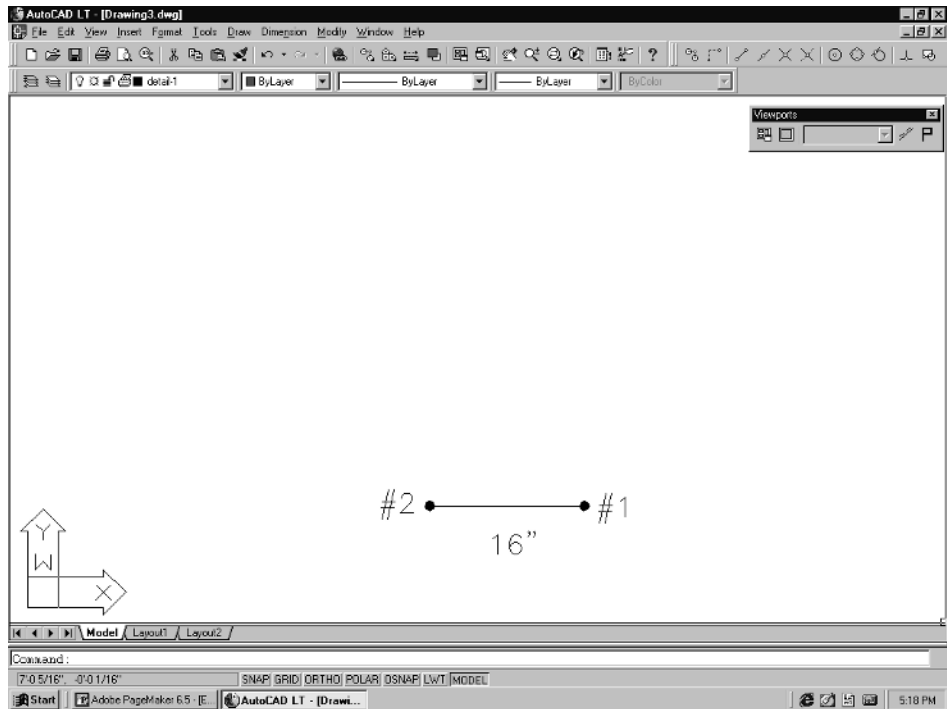


Figure 5-30

7. Next, draw a line up **8"** from point #2, as shown in Figure 5-31. These are the basics that you need to begin building the detail.

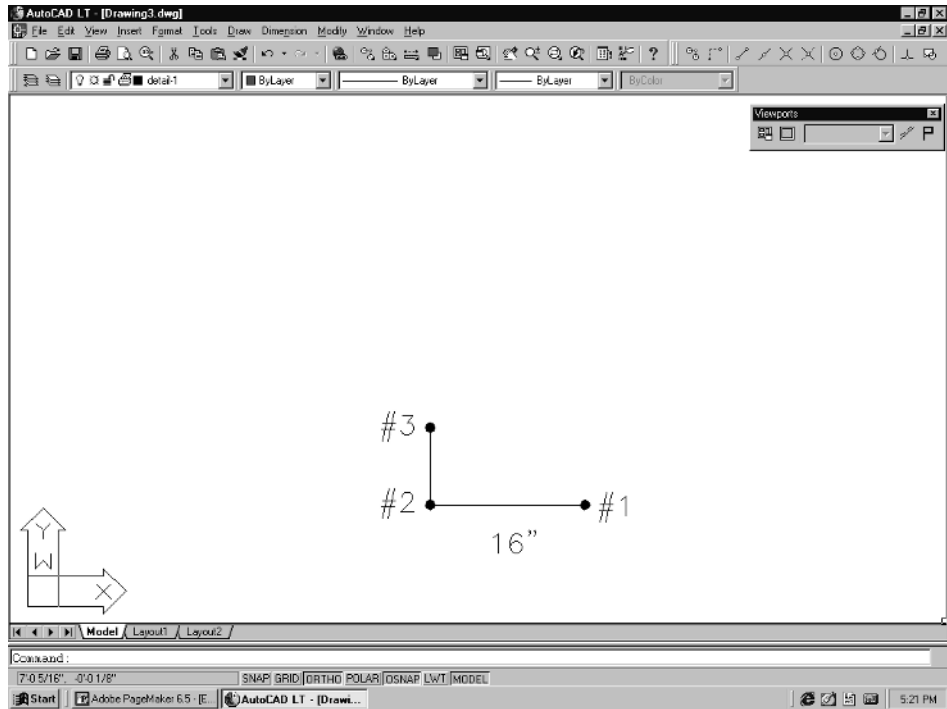


Figure 5-31

From here it's just a matter of offsetting and extending lines to build the footing, wall, and slab.

8. To do this, start by offsetting the left vertical line **16"** to the right. Next, offset the bottom horizontal line **8"** up.
9. Now, draw a line **36"** up from the midpoint of the top horizontal line of the footing. Next, offset that vertical line **4"** to each side. This forms the CMU wall. Erase the center line. The detail should look like Figure 5-32.

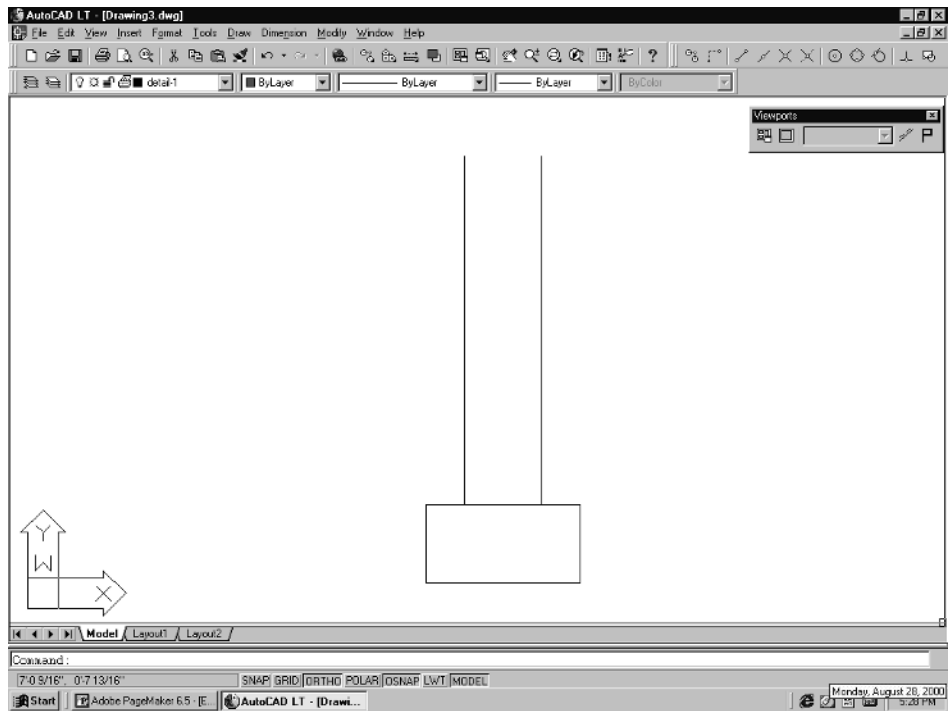


Figure 5-32

10. Offset the top horizontal line of the footing 8" up. Trim each side of the new line, then offset this line 8" up a couple more times to represent each tile.

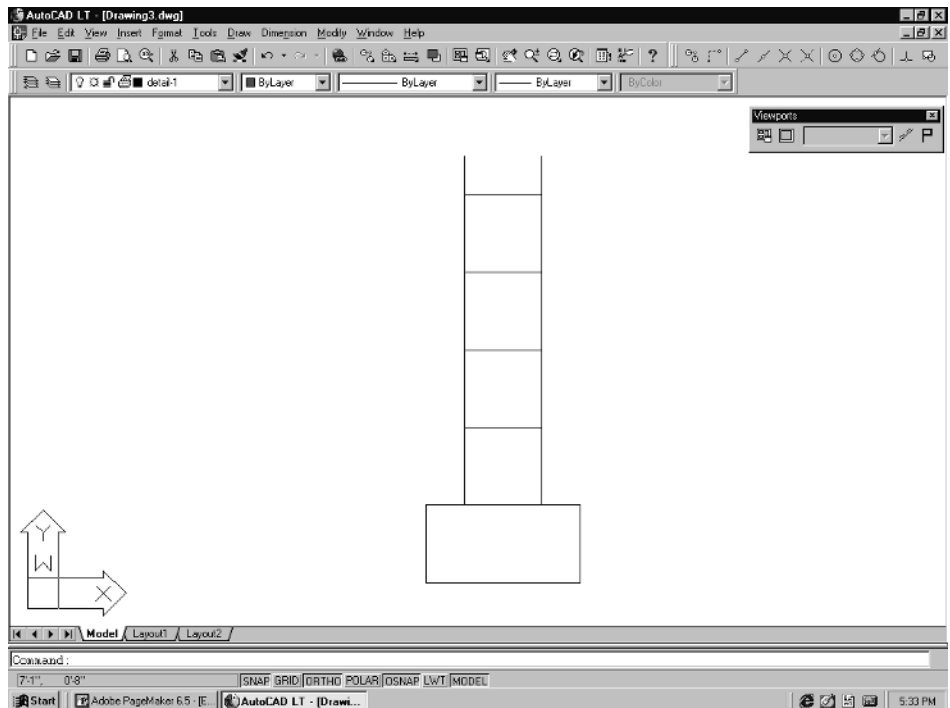


Figure 5-33

11. Next, draw a line from the base of the right-hand wall vertical out to the right 36".

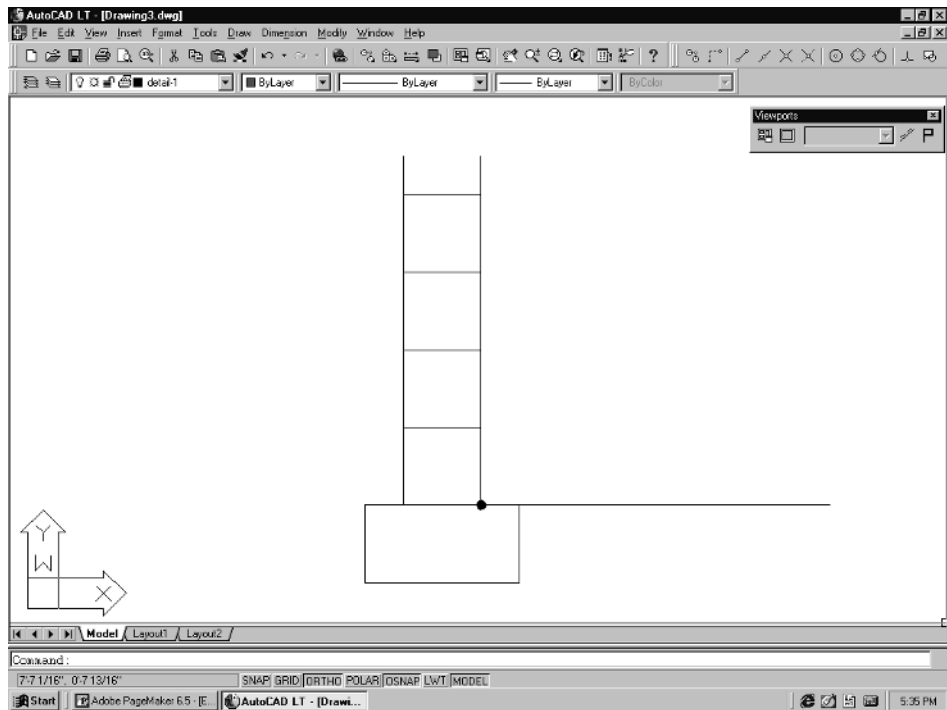


Figure 5-34

12. Move the new horizontal line up 1", then offset it 4" up.

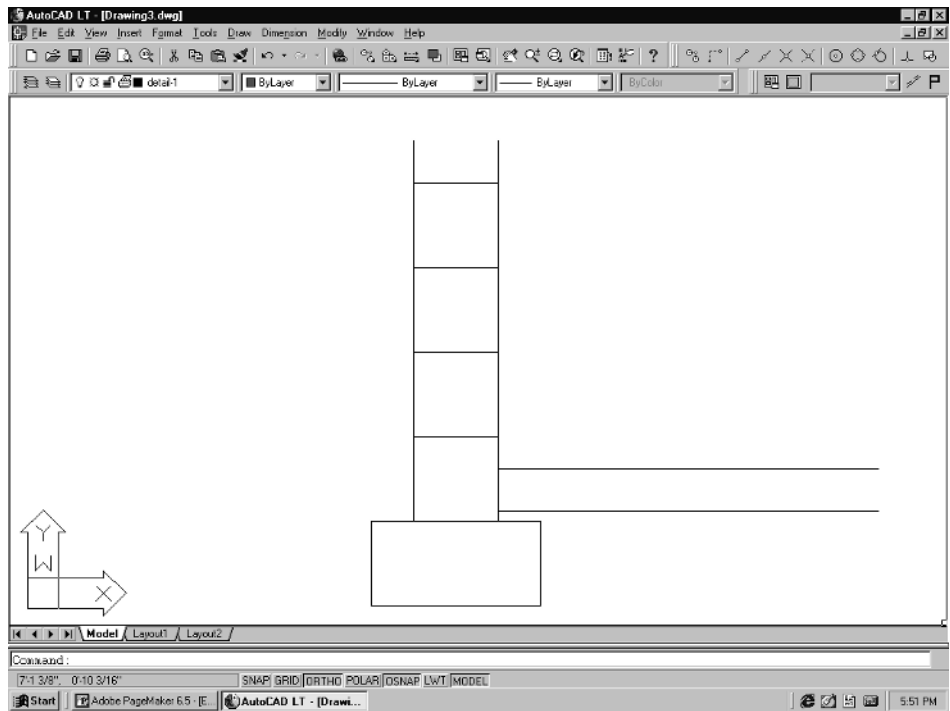


Figure 5-35

13. Use the Offset command to create spaces between the CMU and otherwise dress up the detail. Close off the end of the 4" concrete slab so that you can hatch inside of it and the footing block with a concrete pattern.

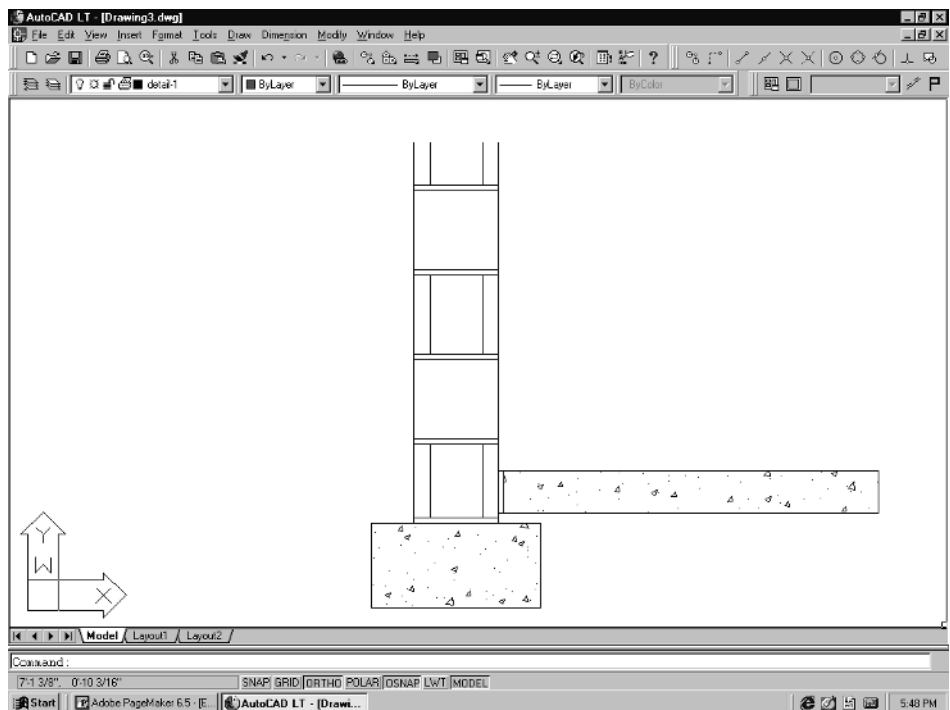


Figure 5-36

14. To finish the detail, draw a circle to represent the drain tile. Then, use the Polyline command to outline areas that you want to hatch with a sand pattern and an earth pattern. Also, use a polyline to draw the plaster line. You can do this freehand. Figure 5-37 shows the finished outlines before adding the final hatch patterns.

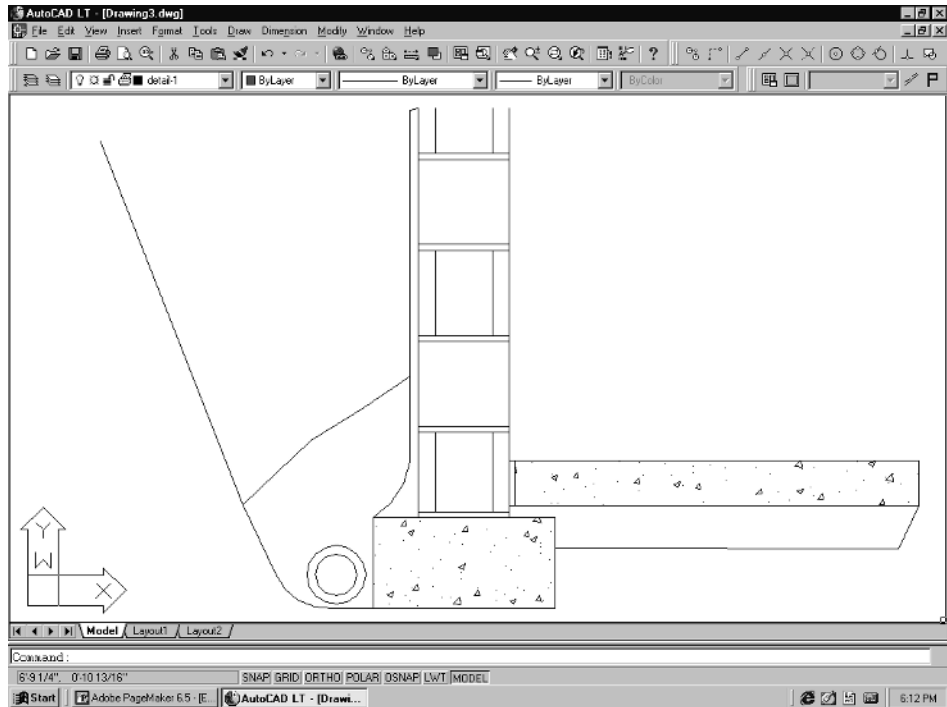


Figure 5-37

The finished detail without the text is shown in Figure 5-38.

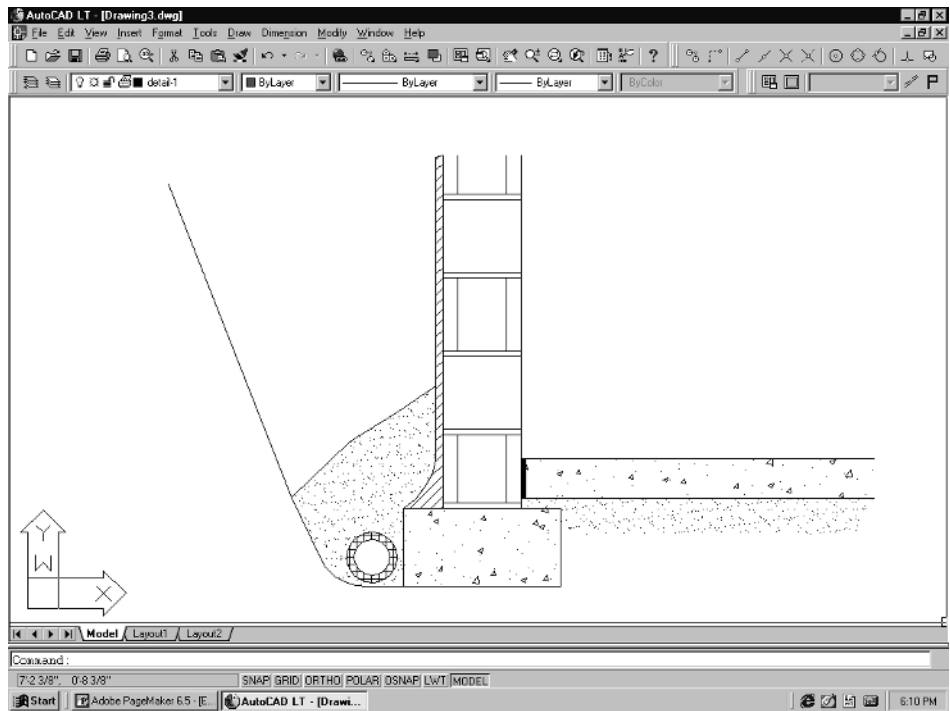


Figure 5-38

Figure 5-39 shows the finished basement wall and footing detail. The text height used for this detail was 1.5" because it is going to be plotted at 1" = 1'. If it was to be plotted at 1/2" = 1', the text height should be about 3".

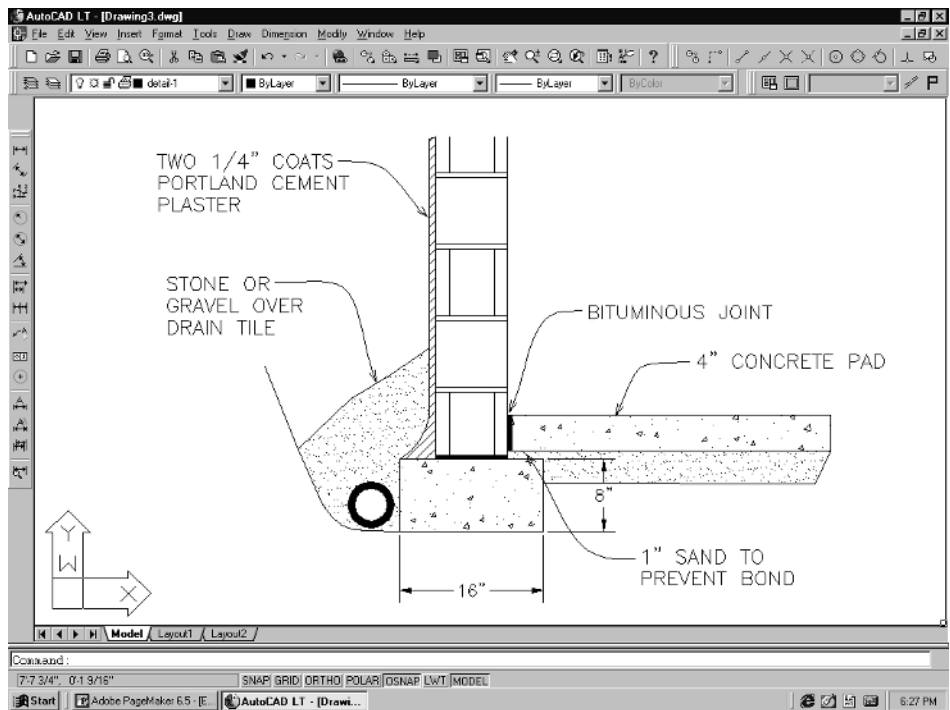


Figure 5-39

Saving Details

You will find that the details you draw can be saved and used in different drawings by making slight adjustments and changes. One of the most important aspects to saving details is to put them in a place where you can easily access them when needed.

Most of us save all sorts of junk on our hard drives. They become so cluttered with all this stuff that we begin to waste huge amounts of time looking for things. Sometimes, we spend as much time searching for a detail as we would drawing a new one. It does not have to be this way!

There is a feature in AutoCAD LT 2000 named the AutoCAD Design Center. LT 98 has a similar feature called Content Explorer. Both of these can show you graphically what “blocks” are in any drawing that you select from a list of directories and files. This allows you to build drawings that contain multiple “blocks” within them, such as foundation details, fixtures, appliances, and electrical symbols. You do this by copying a single drawing of a symbol and “pasting” it into the new multiple block drawing. A single drawing like this can contain as many blocks as you wish. When called up with the Design Center or Content Explorer, you can see little “slides” of the blocks. You can then drag and drop these into your active drawing.

Figure 5-40 shows the Design Center opened on the left side of the screen. We selected a drawing named Details-1.dwg from the list on the left. This opens the various entity lists that are contained in that drawing. One of them is Blocks. By picking Blocks, you will get a name and slide of each block that is contained in the drawing Details-1.dwg. When you select one, you will see a preview at the bottom of the Design Center.

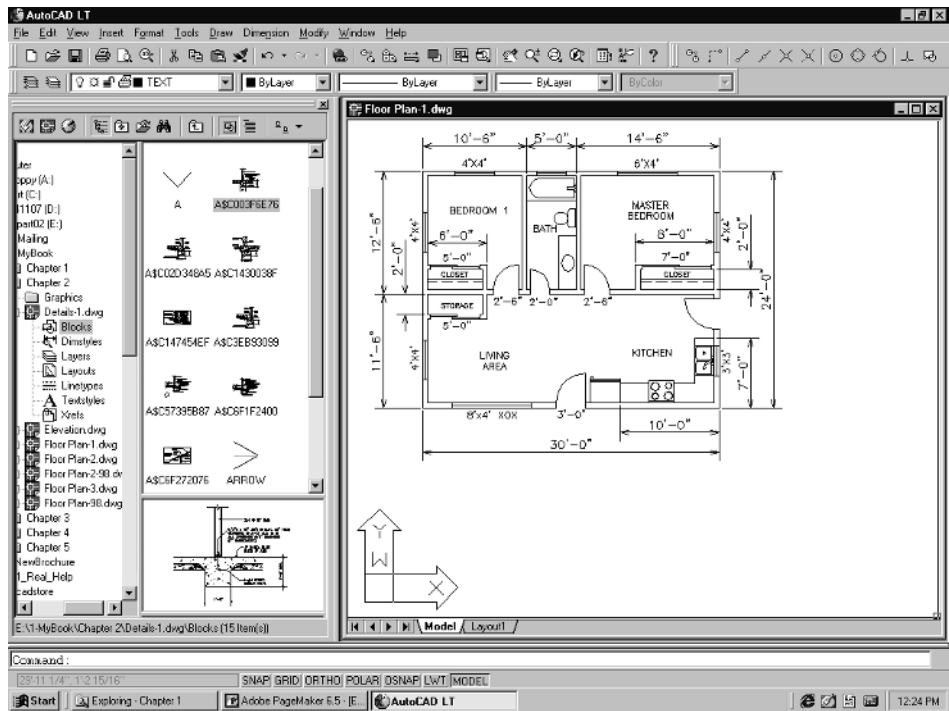


Figure 5-40
Design Center
in LT 2000

To use any of the blocks, you just drag and drop them into the active drawing. If you use your left mouse button, you will be prompted for the insertion point. Pick the insertion point and the block or detail will be drawn. See Figure 5-41.

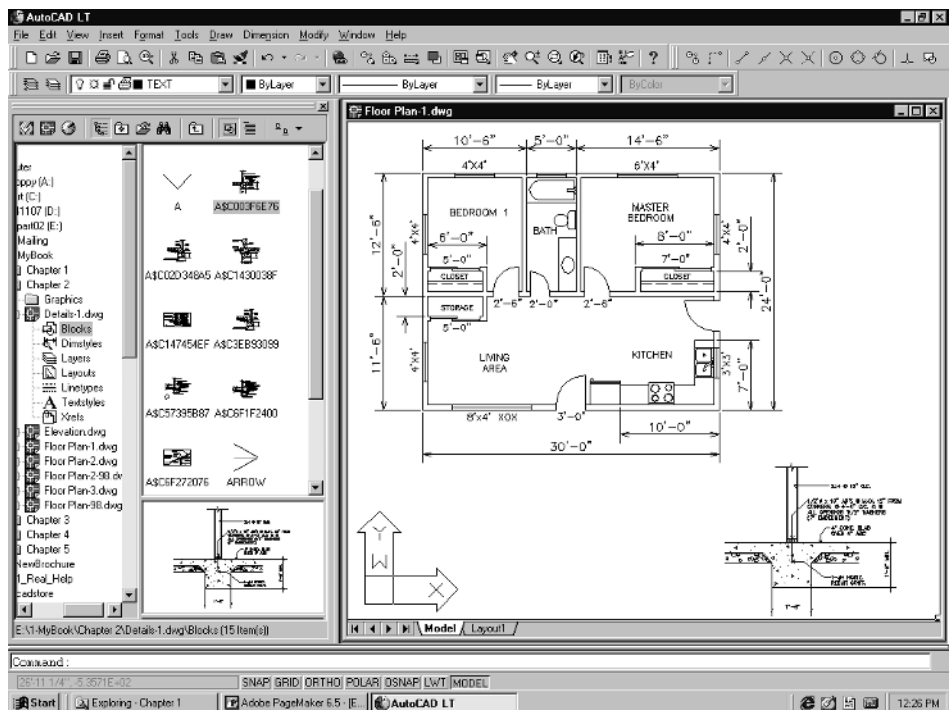


Figure 5-41

You can make as many of these drawings as you need. Name them according to what they contain. For example, you could have a drawing named Rafter Details.dwg, another named Footing Details.dwg, and another one named Fixtures.dwg. These can each contain a large collection of details that relate to the name of the drawing.

The Design Center also allows you to designate “favorites.” This is a list of drawings that is easier to access than having to go through the entire list of folders and files. All you need to do is right-click on the drawing file that you want to add. Then pick Add to Favorites.

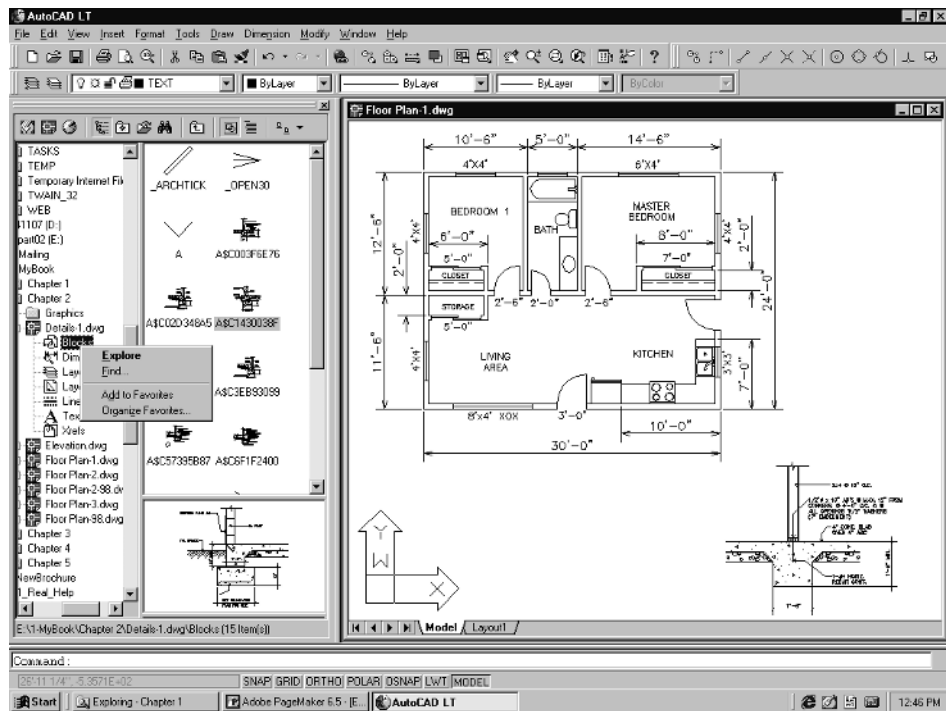
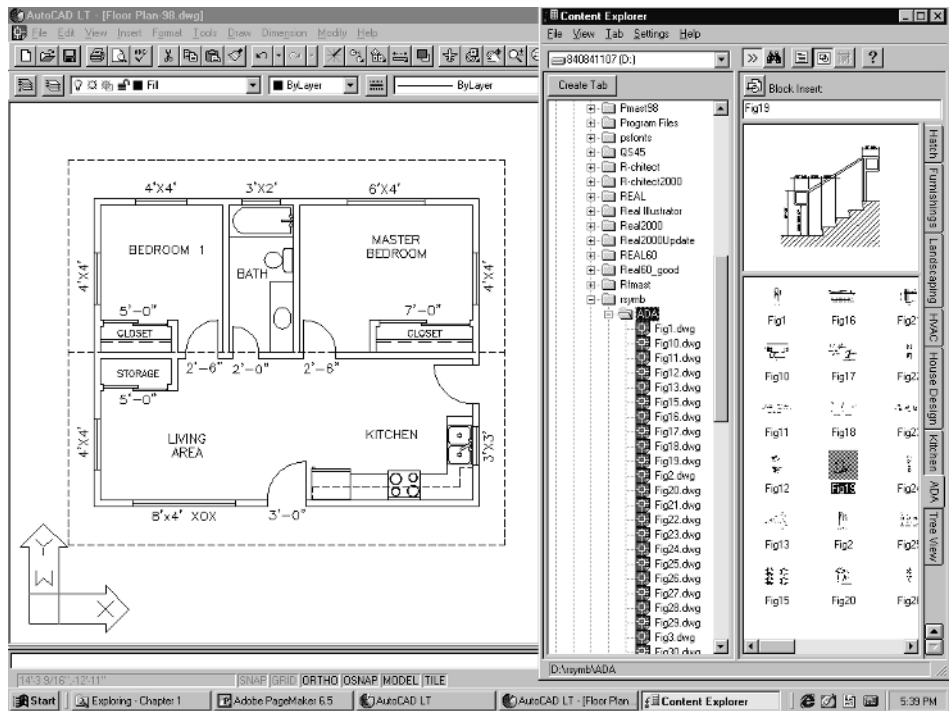


Figure 5-42

If you are using AutoCAD LT 2000, you can add entire directories to the Favorites category in the Design Center. The directory, or folder, will come over with all its subfolders. This works really well if you already have a bunch of separate symbol drawings in named directories. These will actually come up in the Design Center screen as graphic symbols, even if they are separate drawings.

If you are using AutoCAD LT 98, you can do basically the same thing with the Content Explorer. You open up the folder where the symbols are located. Then, hit the Create Tab button and give it a unique name. This will create a tab that calls up all the drawings within the folder you specified. Content Explorer is illustrated in Figure 5-43.

Figure 5-43
Content
Explorer in
LT 98



I have a main symbol folder named RSYMB that contains subfolders with different categories of symbols. Each of these subfolders contains many separate symbol drawing files. Using AutoCAD LT 2000, I added RSYMB to my Favorites list. When I call up Design Center and press the Favorites button, the folder RSYMB comes up, as shown in Figure 5-44.

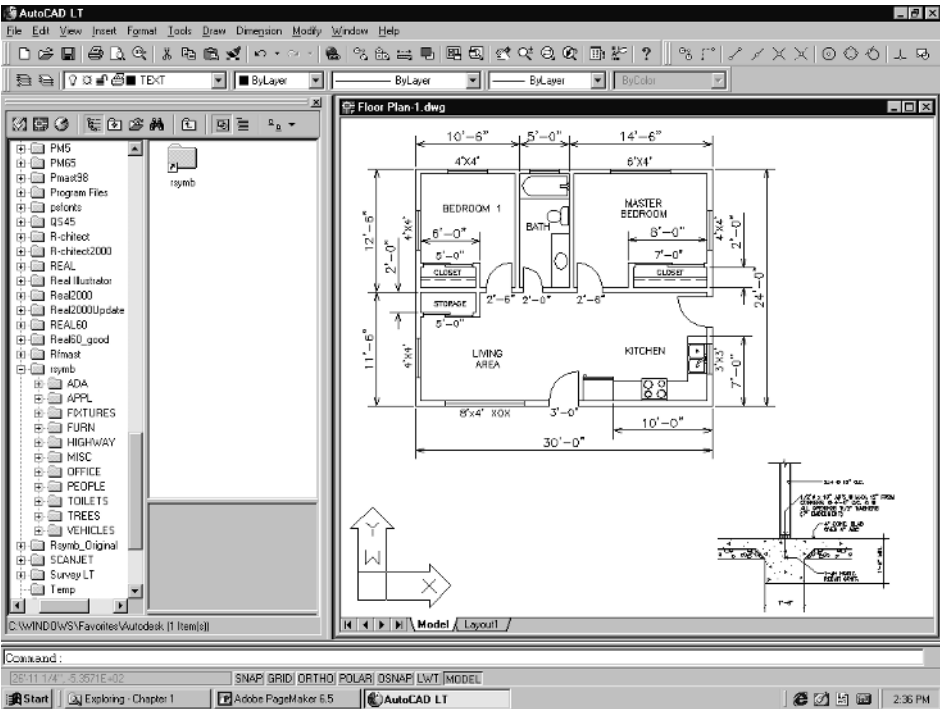


Figure 5-44

When I pick the RSYMB folder, it opens up all of its subfolders, as shown below.

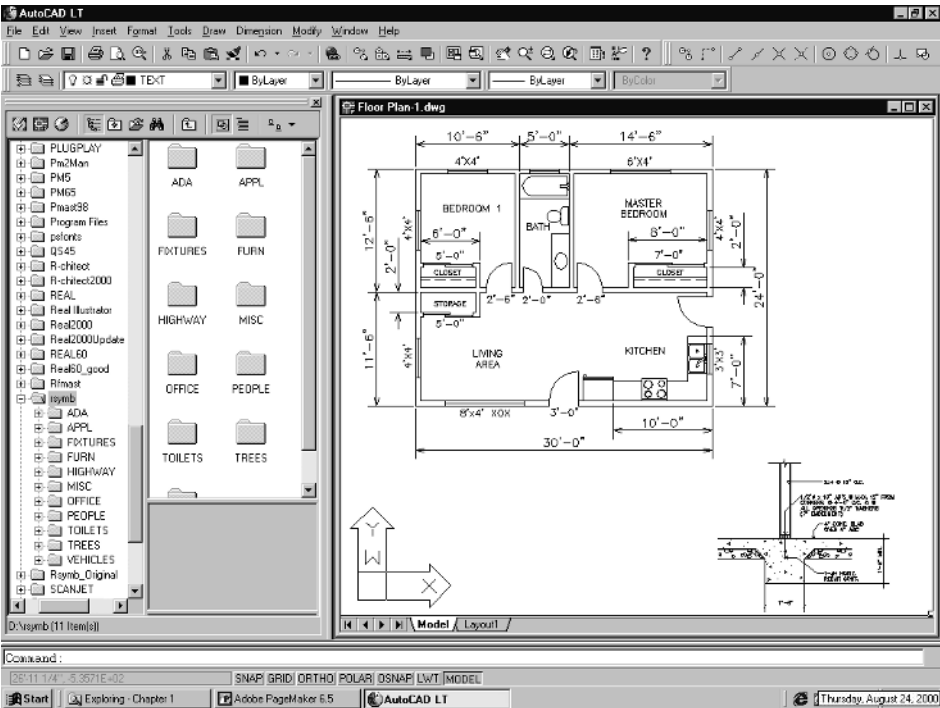


Figure 5-45

Picking on any one of these folders brings up every drawing contained in that folder with a picture and name. I can then drag and drop these into my current drawing easily.

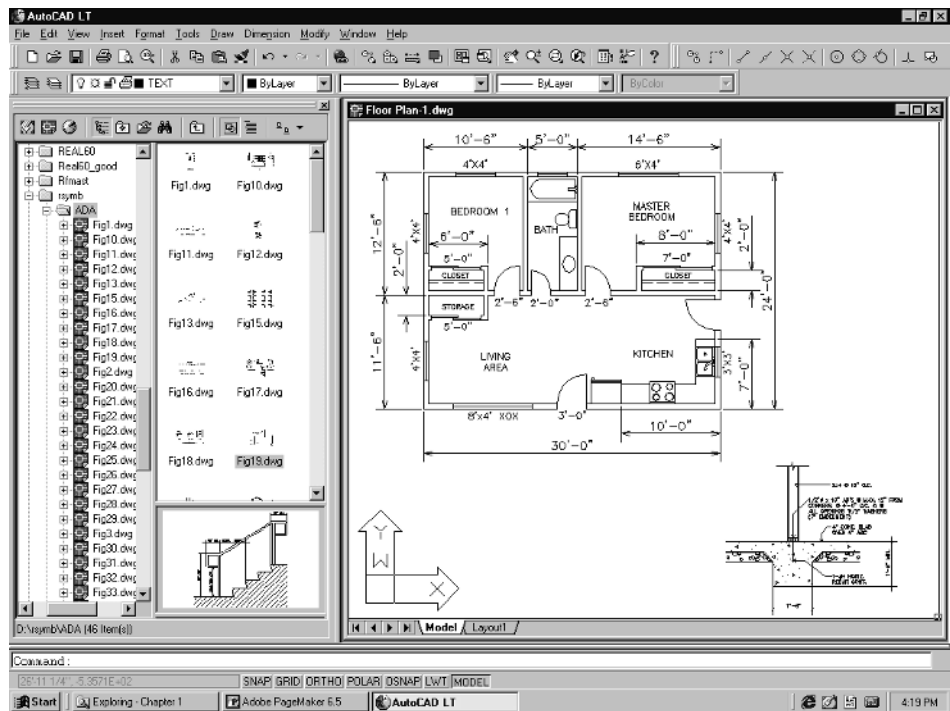


Figure 5-46

Inserting Symbols

Content Explorer and Design Center each have two ways of inserting blocks or symbols. These are described below.

Content Explorer—LT 98

Content Explorer allows you to drag and drop directly into your drawing by selecting the insertion point only. Or, you can insert the symbol like a regular block by double-clicking on the symbol. You will then be prompted for the insertion point, scale, and rotation angle, just like you would if you were inserting a regular block.

Design Center—LT 2000

Inserting symbols using Design Center is more flexible, but a little more difficult to explain. Here are the differences. If the drawing you open in Design Center is a conglomeration of actual “blocks” that have been added into a single

drawing, you can drag and drop them into your active drawing using your left mouse button, just like Content Explorer. You will be prompted for the insertion point only.

On the other hand, if you have opened up a folder in Design Center that contains many separate drawing files, the method for insertion changes. If you drag and drop directly into your drawing with your left mouse button, you will be prompted for the insertion point, scale, and rotation.

If you drag and drop with your right mouse button, you will get a little pop-up menu with the options to Insert as Block or Attach as Xref.

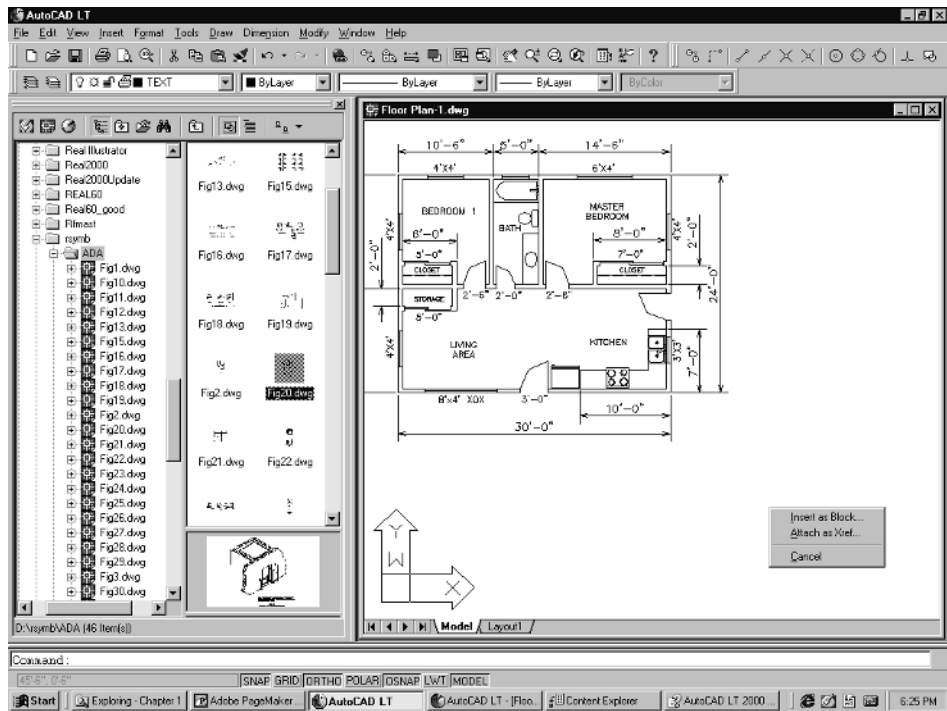
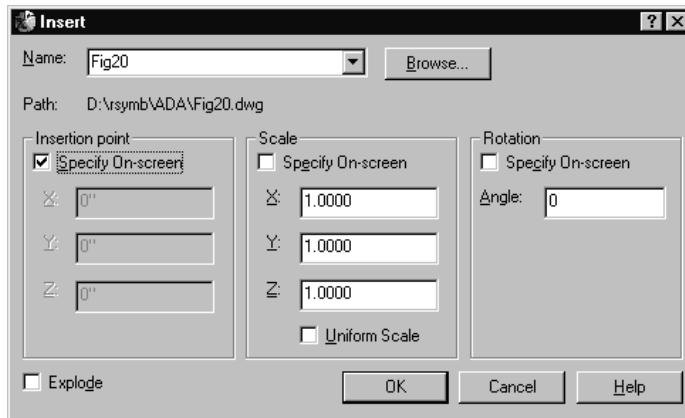


Figure 5-47

If you select the Insert as Block option, you will get a new Insert dialog box, shown in Figure 5-48. Make sure the Specify On-screen box under Insertion point is checked. Do not check the other two options. Pick OK to insert and pick the insertion point.

**Figure 5-48**

Summary

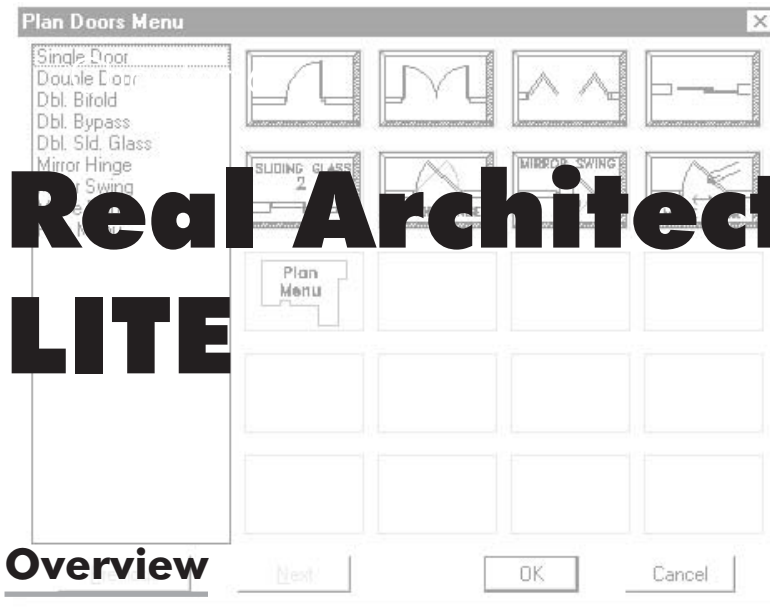
In any case, this chapter is only a primer on creating details, but you should be able to go from here and build your own library of details and symbols. It is a bit confusing, but with a little practice, you should be able to get the hang of it. It will save you huge amounts of time in the future.

Whatever method you decide to use to save your details and symbols, just remember that these are the real time savers when it comes to working drawings. It is a smart move on your part to take the time necessary to set up some kind of system that makes it easy to access your details and symbols.

6 Chapter

Real Architect LITE

Overview



Real Architect LITE is a very scaled-down version of an architectural add-on product for AutoCAD LT. Though the product is scaled down, it does contain enough of its command set to demonstrate the speed and simplicity of the program. If you are in the architectural drafting business, or considering getting into it, Real Architect and AutoCAD LT are a winning combination.

Real Architect LITE's features include:

- Self cleaning walls, windows, and doors
- Labeling and annotation routines
- Wall fills (poche)
- Appliances and fixtures
- Layer controls

Figures 6-1 to 6-4 illustrate some of these features:



Figure 6-1
Main toolbar



Figure 6-2
Color Control
toolbar



Figure 6-3
Polyline Windows
toolbar

**In this
chapter, you
learn about:**

- ◆ Installing and setting up Real Architect LITE
- ◆ Using Real Architect LITE to draw a floor plan and elevation
- ◆ Applying symbols
- ◆ Real Architect LITE's toolbars

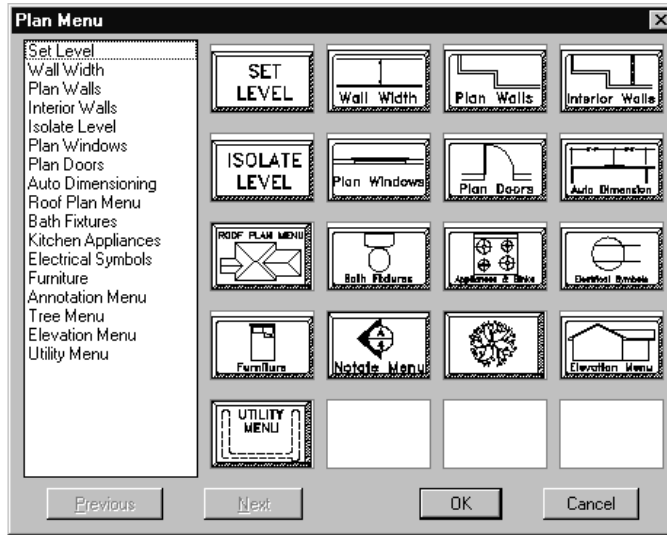


Figure 6-4
Plan Menu in
Real Architect
LITE

The full Real Architect 2000 product contains a huge array of additional functions, such as roof plans, stairs, cabinetry, sections, reflected ceiling plans, multiple line walls, construction grids, and a much larger variety of windows, doors, and other symbols, such as fixtures, appliances, furniture, and a full range of kitchen cabinetry.



NOTE: We are offering a special price of \$144.00 for readers of this book who would like to purchase the full version of the product. This represents a savings of \$55.00, as the regular retail price is \$199.00. Productivity is the key to success, and that is where Real Architect comes in. It saves you time, it's easy to use, and it helps to standardize your drawings. Whether you are just starting out in architectural drafting, or have been in the business for years, Real Architect 2000 is a good investment.

If you are interested in more information on Real Architect 2000, visit our web site at: <http://www.acadstore.com>. Or call us at (808) 572-8637.

This jump start guide is provided as a quick introduction into the workings of the Real Architect LITE program. To begin using the guide, follow the installation instructions and the first-time setup steps that follow. These can only be done the first time you use Real Architect LITE.

Installation Instructions

Real Architect LITE must be installed on the same drive as AutoCAD LT. Do not install Real Architect LITE under the Program Files folder. It must be installed directly off of the root drive in its own folder, which is named R-Lite. Follow the instructions below carefully.

1. Load the companion CD into your CD drive.
2. Pick **Start** and **Run**. Type **E:\RA2000\SETUP**

NOTE: If your CD drive is other than E, change it in the previous line.



3. Follow the Install Wizard instructions. When you come to the Destination Directory screen, check the name of the Destination Directory. It should say C:\R-LITE. If you are installing on your C drive, you can proceed to the next screen.

If you are installing to a drive other than C, pick the **Browse** button, and then change the drive letter in the Path box (to, for example, D:\R-LITE). Change only the drive letter; the directory name must remain named R-LITE. Hit **OK**. You will be asked if you want the install program to create this directory. Pick **Yes**, then **Next**.

4. When the installation is complete, proceed to the next section.

First-Time Setup

There are a number of steps that are necessary when starting Real Architect LITE for the first time.

1. Start AutoCAD LT.
2. Once you are in AutoCAD LT, you will need to select **Options** or **Preferences** from the Tools drop-down menu. Select the **Files** tab. Pick the + sign next to Support File Search Path, and pick the **Add** button. Type **C:\R-LITE\SLB** in the newly created text box.



NOTE: If you installed Real Architect LITE on a drive other than C, substitute the C in the previous path statement with the appropriate drive letter.

3. Pick the + sign next to Template Drawing File Location. Pick the **Browse** button. Navigate to the R-LITE folder, and pick the + sign next to it.
Pick the **Template98** folder if you are using AutoCAD LT 98.
Pick the **Template2000** folder if you are using AutoCAD LT 2000.
Pick the **Template2000i** folder if you are using AutoCAD LT 2000i.
Pick the **OK** button when done. This will bring you back to the main preferences box. Pick the **OK** button to accept your changes.



NOTE: You might get an alert stating that changes you made may not take effect until you restart the system. Press OK to this.

4. Type **MENULOAD** and hit **Enter**. The Menu Customization dialog will pop up. In the box labeled File name, type in the following:
LITE98.MNS if you are using AutoCAD LT 98.
LITE2000.MNS if you are using AutoCAD LT 2000.
LITE2000i.MNS if you are using AutoCAD LT 2000i.
Pick the **Load** button. Once the menu has finished loading, pick the **Close (x)** button.

From now on, whenever you start AutoCAD LT, the Real Architect LITE menu will load automatically, along with the standard AutoCAD LT menu. To begin using Real Architect LITE, follow the instructions below.

Starting from the Desktop

1. Start AutoCAD LT in the normal manner. The Create New Drawing dialog will pop up. Select the Use a Template option, then select the template file according to the version of AutoCAD LT you are using: **1Real98.dwt** for LT 98, **1ra2000.dwt** for LT 2000, or **1ra2000i.dwt** for LT 2000i.
2. Use the Settings toolbar for changing the building values as necessary.

Settings That Will Help Your Drafting

AutoCAD LT comes with its own set of default settings for certain drawing parameters. There are a number of them that you will probably want to change in order to improve your architectural drafting efficiency. You do not have to

change any of them. If you like the way the setting is already configured, by all means leave your system the way it is. These are simply settings that we find helpful and are only suggestions.

- Change the Crosshair percentage from 5% to 100%. This makes it much easier to visually line up different elements on the screen. You do this by going to Preferences or Options under the Tools pull-down menu. Look for it under the Work Space tab in LT 98 or under the Display tab in LT 2000 or LT 2000i.
- Change your automatic save time interval to something close to 5 to 10 minutes. This setting is located under the System tab in LT 98 and under the Open and Save tab in LT 2000/2000i.
- This next suggestion has to do with the cursor action after you have run a command. Normally, the right mouse button can act as the Enter key while a command is in progress. When a command is not running, the right mouse button can be set to recall the last command, or it can be set to pop up the cursor menu that contains the last command and a number of other actions that are pertinent to that command. Here is how you set these right mouse button actions.

For LT 98, select the Work Space tab from the Preferences dialog box. Select AutoCAD classic (Enter) in the Right-click mouse button box.

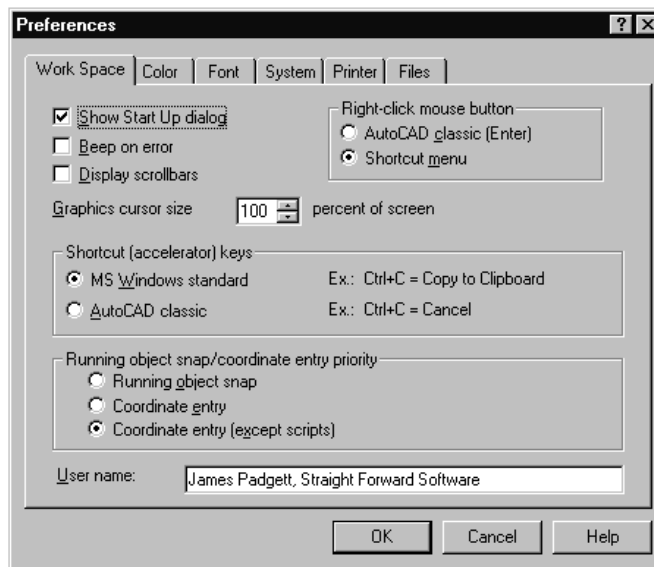


Figure 6-5
The Work Space
tab in LT 98

For LT 2000/2000i, select the User Preferences tab in the Options dialog box. In the Windows Standard Behavior box, check both Windows standard accelerator keys and Shortcut menus in drawing area. Then pick the Right-click Customization button.

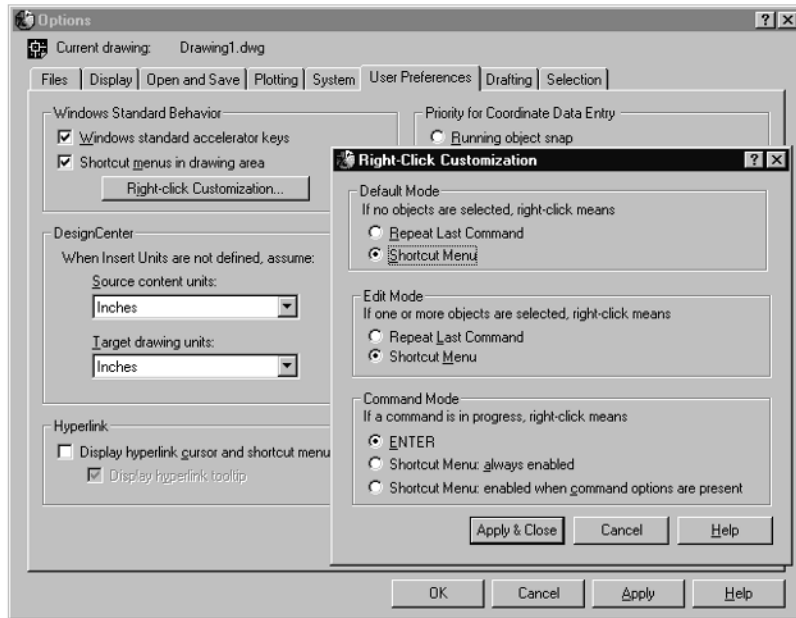


Figure 6-6
The User Preferences tab in LT 2000/2000i

Below is an overview of the dialog box that will come up.

The Right-Click Customization dialog box controls whether right-clicking in the drawing area displays a shortcut menu or has the same effect as pressing Enter. If you are accustomed to using the right-click method for Enter while a command is active, you might prefer to turn off command shortcut menus. You can also control shortcut menus by using the SHORTCUTMENU system variable.

Default Mode determines what happens when you right-click in the graphics area while no objects are selected and no commands are in progress.

Repeat Last Command. Turns off the default shortcut menu. As a result, right-clicking in the graphics area when no objects are selected and no commands are in progress is the same as pressing Enter, which repeats the last command issued.

Shortcut Menu. Turns on the default shortcut menu.

Edit Mode determines what happens when you right-click in the drawing area while one or more objects are selected and no commands are in progress.

Repeat Last Command. Turns off the Edit shortcut menu. As a result, right-clicking in the drawing area when one or more objects are selected and no commands are in progress is the same as pressing Enter, which repeats the last issued command.

Shortcut Menu. Turns on the Edit shortcut menu.

Command Mode determines what happens when you right-click in the drawing area while a command is in progress.

ENTER. Turns off the Command shortcut menu. As a result, right-clicking in the drawing area when a command is in progress is the same as pressing Enter.

Shortcut Menu: always enabled. Turns on the command shortcut menu.

Shortcut Menu: enabled when command options are present. Turns on the command shortcut menu only when options are currently available on the command line. On the command line, options are enclosed in square brackets. If no options are available, right-clicking is the same as pressing Enter.

I set the Default Mode to Shortcut Menu, the Edit Mode to Shortcut Menu, and the Command Mode to Enter. You do not have to set yours this way, but I have found it to work well for me.

- Other things you will want to check are your pickbox, grips, autosnap marker, and tracking settings aperture sizes. Change these all to a reasonable size. Not too big, not too small. You can always change them later if you don't get them right the first time.

Floor Plan Tutorial

The following floor plan tutorial will walk you through the commands related to drawing a floor plan with Real Architect LITE. Make sure you start a new drawing using our template as the base.

Drawing Plan Walls

1. Pick the **Plan Menu** button from the main toolbar, or pick the **Plan Menu** item from the Master pull-down menu. The Plan Menu, shown in Figure 6-7, will pop up.

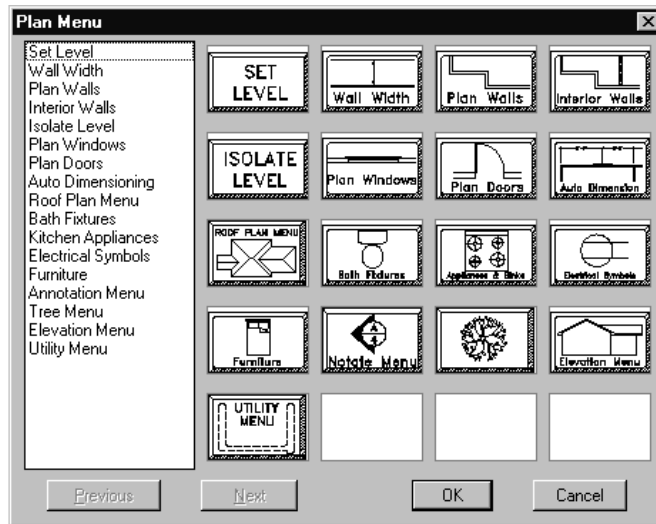
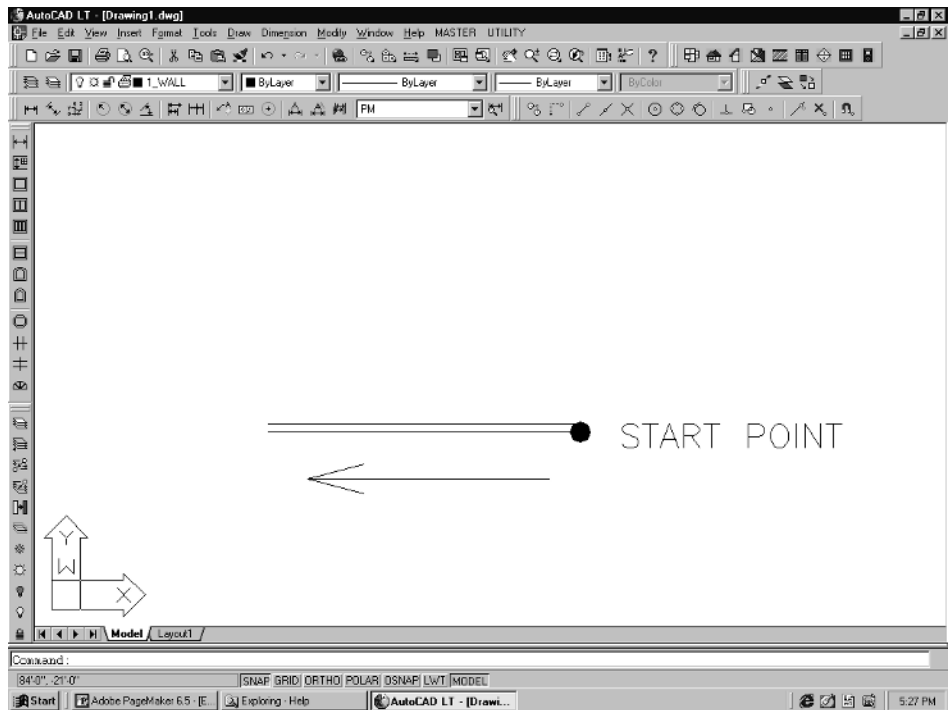


Figure 6-7

2. Double-pick on the **Utility Menu** button. The Utility menu will pop up. Double-pick on the **Left Just** button. This sets the wall justification to left and then takes you back to the Plan Menu.
3. Select the **Set Level** button by double-picking on it. Look down at your command line. It should be prompting you for a value. Type in the number **1** and hit **Enter**. The Plan Menu will pop back up.
4. Double-pick on the **Wall Width** button. Type **6** on the command line and hit **Enter**. The Plan Menu will pop back up.
5. Select the **Plan Walls** button by double-picking it. The prompt will say *Break/Caps/Dragline/Offset/Snap/Undo/Width/<Start Point>*. Pick a point in the lower right of your screen to begin drawing your walls.

**Figure 6-8**

6. Pull your cursor to the left. As you do this, look at the coordinate readout on the menu bar. Notice that it reads out the exact distance from the point you first picked. Pull **20'** and then pick. The wall lines will be drawn as shown in Figure 6-9.

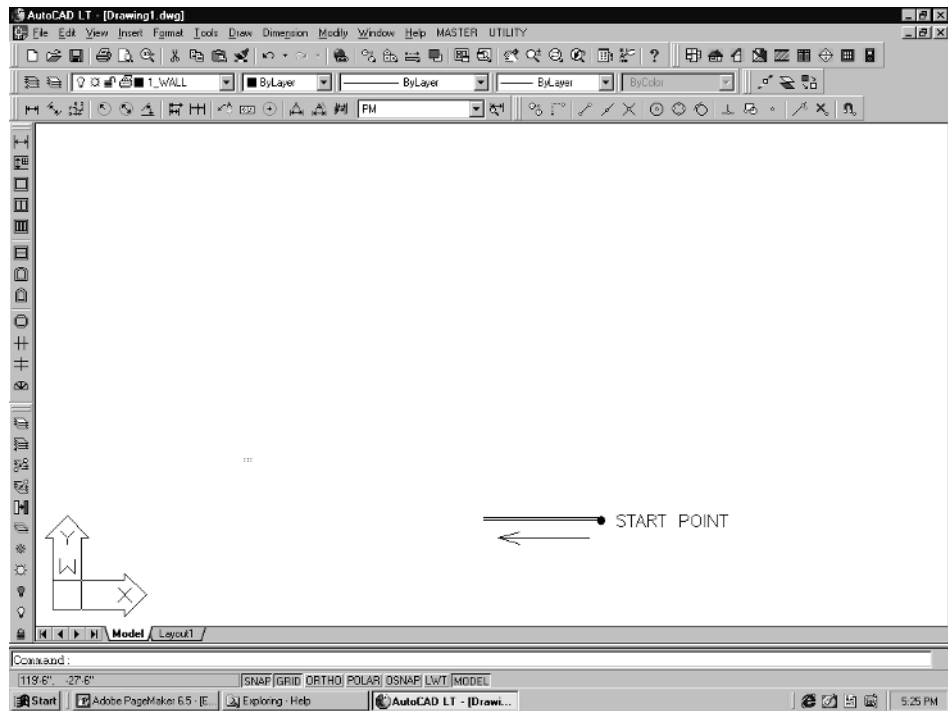


Figure 6-9

7. You can also use direct distance entry to draw the wall lines. To use this method, first pick the start point. Then, pull your cursor in the direction of the wall line and type in the distance. For this tutorial type in **20'** for the first wall. The wall line will be drawn. Now, pull your cursor up and type **20'**. The second wall line will be drawn, as shown in Figure 6-10.

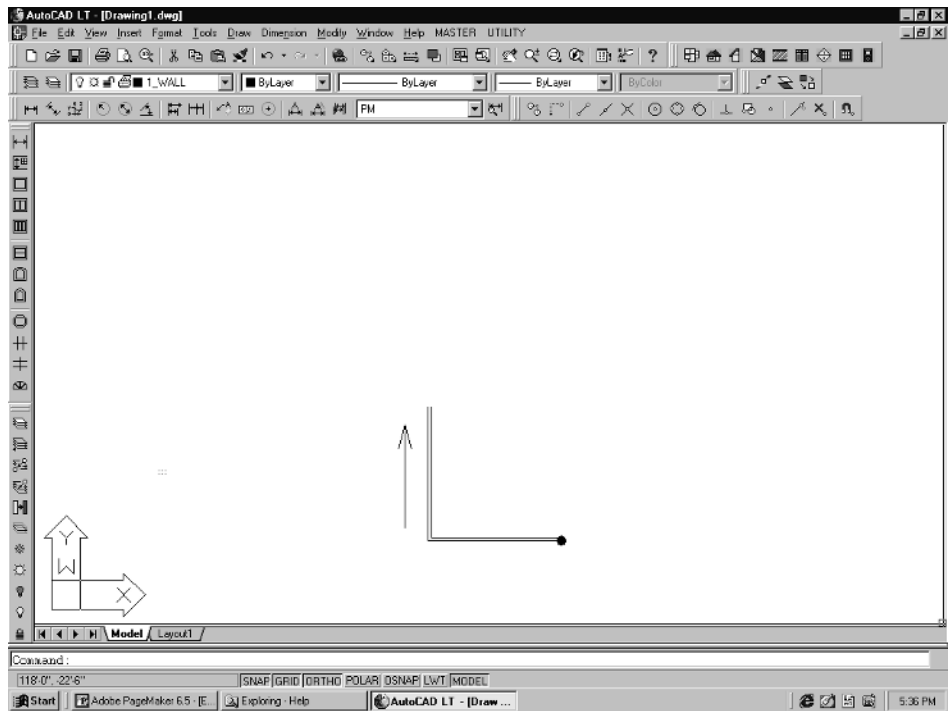


Figure 6-10



NOTE: Always draw walls in a clockwise direction when the wall justification is set to left. This may be changed at any time to center or right justified by picking the Utility Menu button from the Plan Menu, and then selecting the appropriate button.

8. Continue around the floor plan with either method using the distances shown in Figure 6-11. Stop when you get to point Z. Then type **CL** and the walls will close back to the start point.

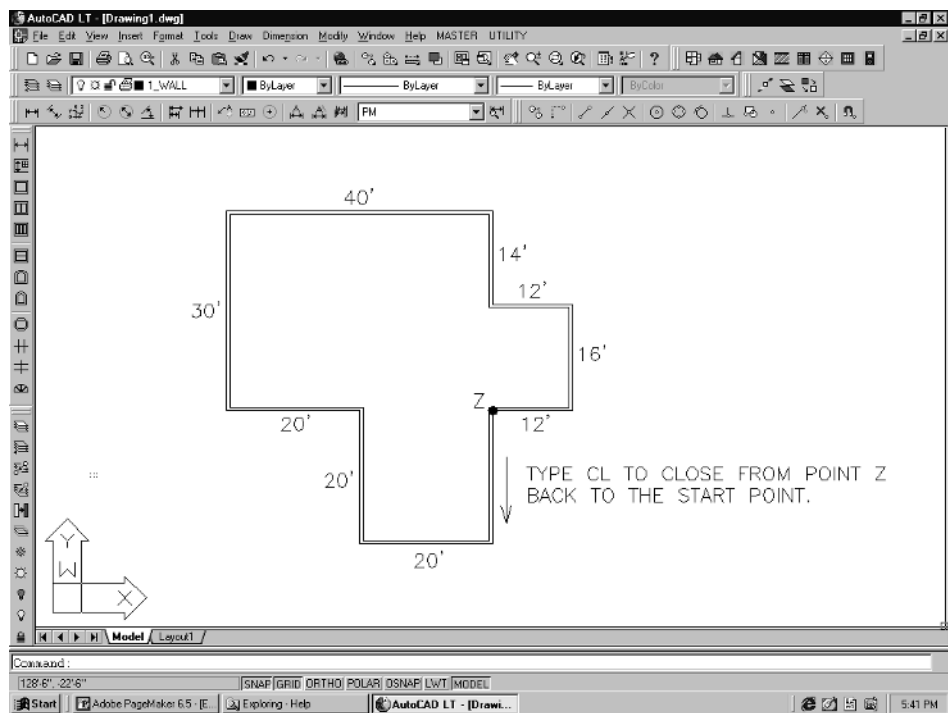


Figure 6-11

9. The finished exterior wall lines should look like the following illustration.

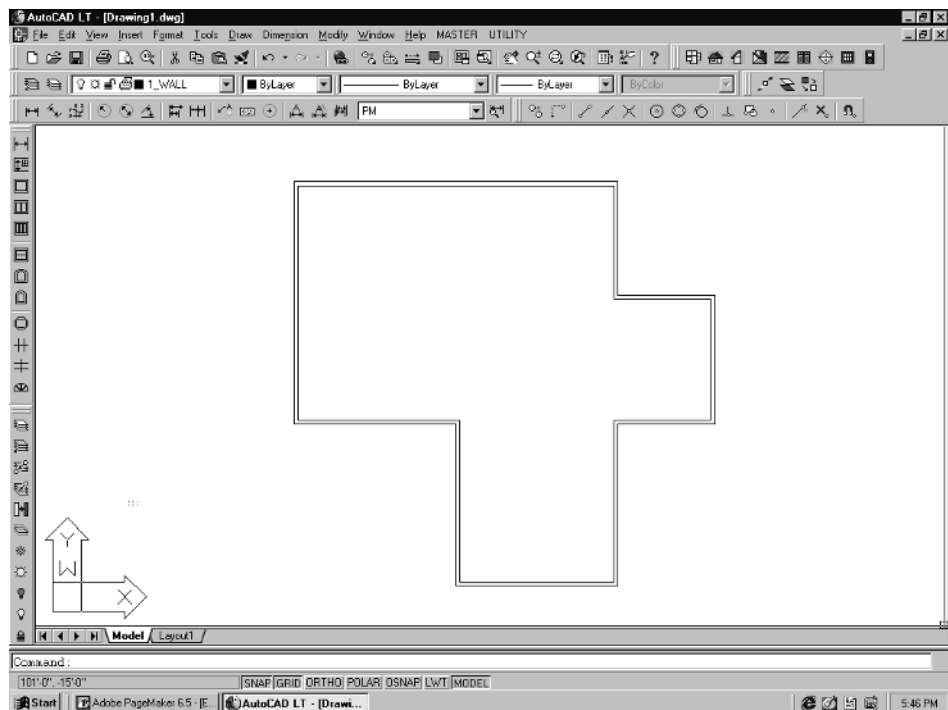


Figure 6-12

NOTE: If you make a mistake, you can type **U** and hit **Enter** to undo the previous line and then pick over again.



10. To draw the interior wall lines, pick the **MASTER** pull-down menu. Pick **Plan Menu**, and select **Interior Walls** from the icon menu. The command prompt will say *_line from point*. It is asking you to pick the wall line that you intend this interior wall to be attached to. Pick the inside wall line as shown below. The cursor will automatically attach itself to the endpoint of that line. Now pull the cursor to the right **12'** and pick. This will be the starting point of the new interior wall.

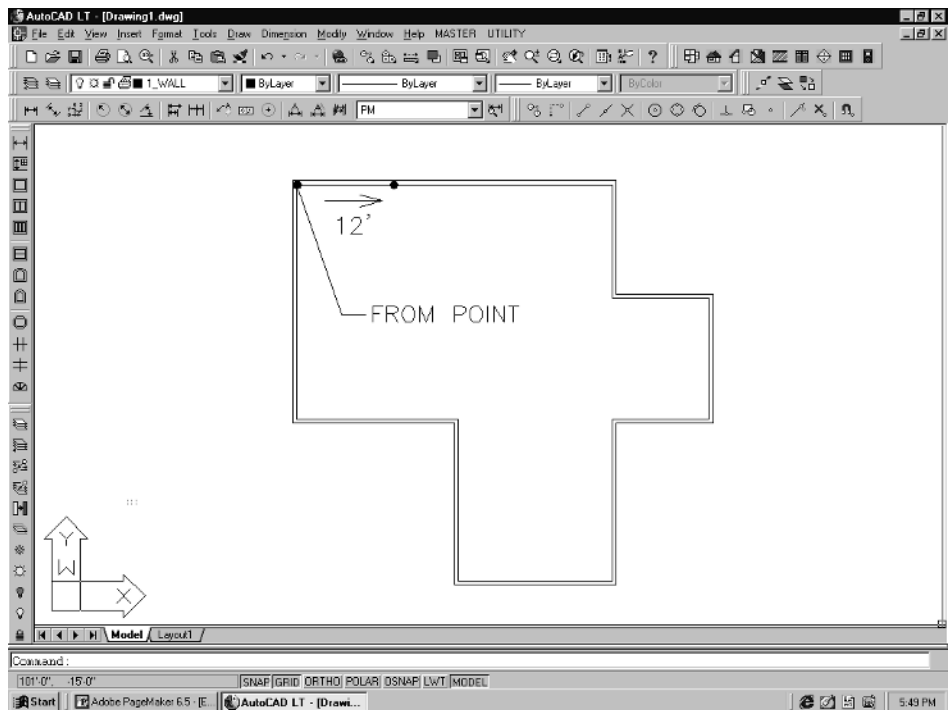


Figure 6-13

NOTE: You can also use direct distance entry by picking the start point and then pulling the cursor in the direction indicated by the arrow in Figure 6-13. Then, type 12' and hit Enter. This establishes the starting point for the interior wall.



11. Pull the cursor **12'** down and pick. The wall will be drawn from the start point. Now pull the cursor **12'** left and pick. This will connect the interior wall to the side wall. (You could also have pulled the cursor down and typed 12', then pulled left and typed 12'.) The command should exit. If not, hit **Enter** to cancel it. The walls should look like Figure 6-14.

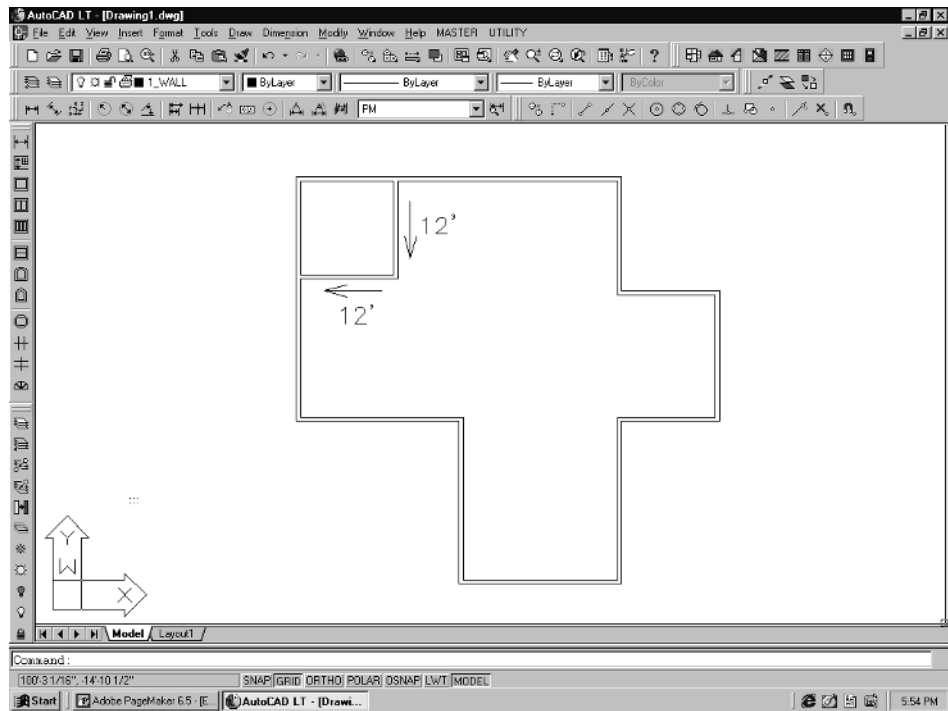


Figure 6-14

12. Pick **Interior Walls** again from the icon menu. For the *from point* prompt, pick the inside wall line as shown in Figure 6-15. Pull the cursor to the right **5'-6"** and pick for the beginning point of the interior wall. (Or pull right and type **5'6** and pick **Enter**.)

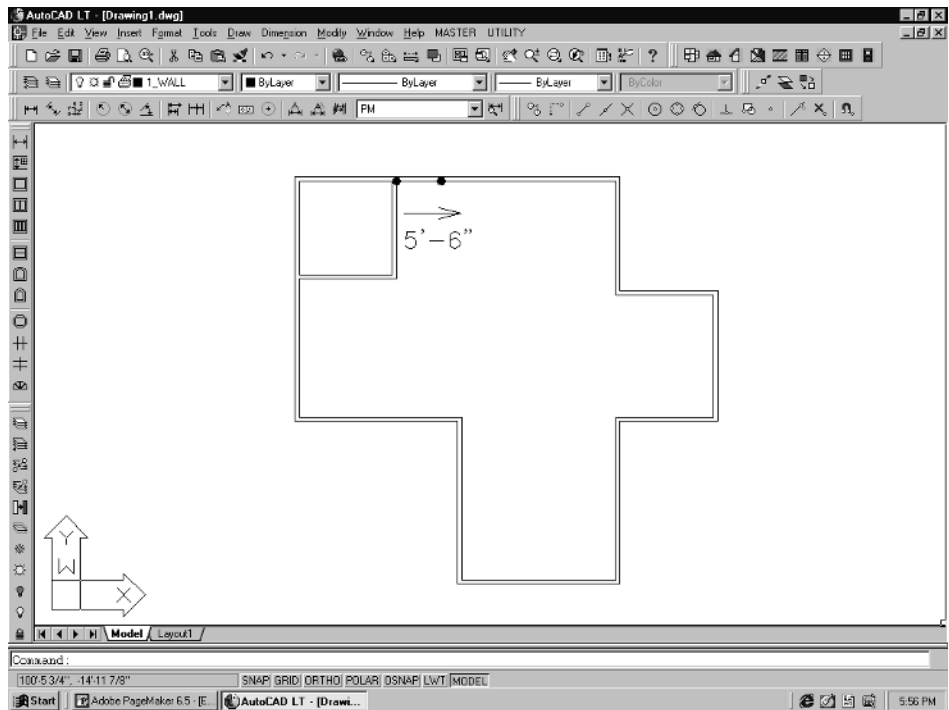


Figure 6-15

13. Now, pull down 12' and pick, or type 12' and **Enter**. Then pull 5'-6" left and pick, or type 5'6 and **Enter**. Press **Enter** again to exit. The new interior walls will be drawn. See Figure 6-16.

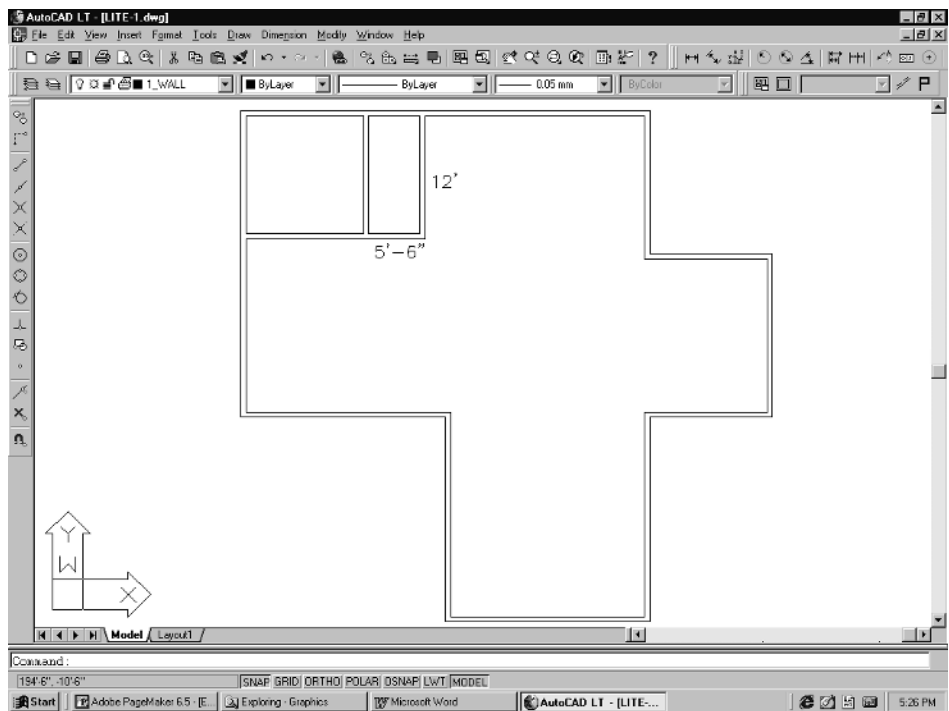


Figure 6-16

14. Finish the other walls using the same steps. The lengths of these walls are shown in Figure 6-17. You can add more interior walls whenever you wish. Use the Fillet or Trim commands if there are any lines to clean up.

There is also a Trim Wall Intersections command, located on the UTILITY pull-down menu. It works by picking a point near the intersection you wish to trim. The command automatically zooms you in close to the intersection. You then pick the lines to trim out and pick **Enter. Zoom|Previous**, then pick a point near the next intersection you wish to trim. Pick the lines to trim then **Enter. Zoom|Previous** again. This is a continuous running command, so you can trim as many intersections as you wish. To exit, hit **Ctrl+C** or **Esc**.

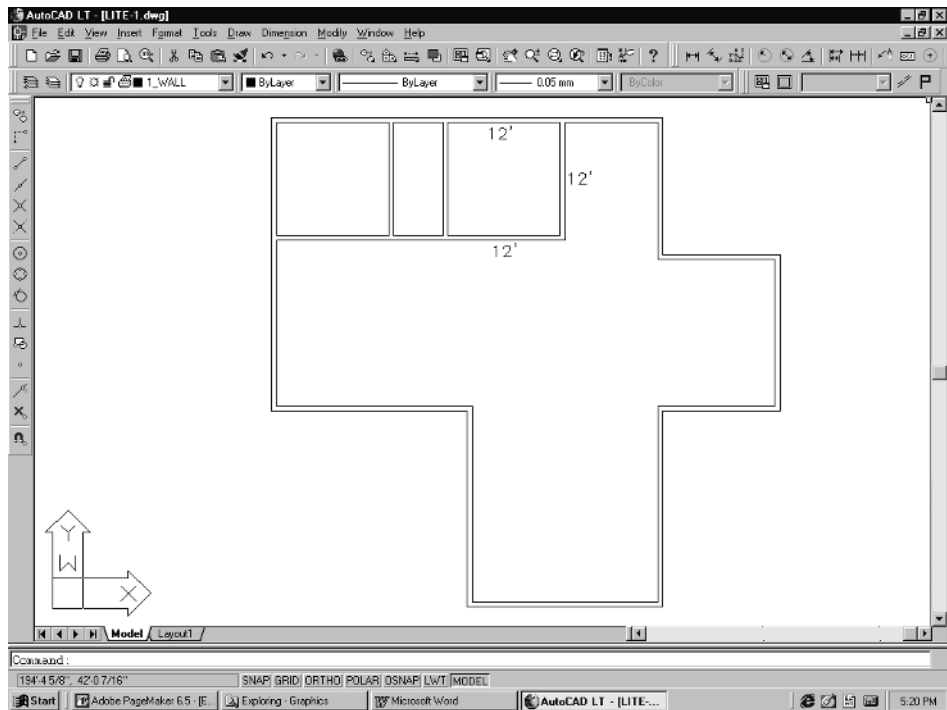


Figure 6-17

Drawing Plan Windows

Now that you have a simple footprint similar to Figure 6-17, you can begin adding the windows. You will first be prompted for the length of the window. This prompt for the window length is rather cryptic, since AutoCAD LT has no means of passing text strings to users. The prompt actually ask for the value of "USERI5." This is a variable we use to pass on to the program whatever number you type in for the window length.

This can either be typed in, or it can be selected from the number buttons on the Number Pad. You must type the length as inches, although no inch sign is required. For example, if you want to insert a 4'-long window, you would type it as 48 and Enter at the *USERI5 prompt*.

When placing plan windows, Real Architect uses a reference point so that you can measure the exact distance to the window center. This reference point can be a wall corner, the end of another window, or the center of a previously inserted window.

You pick a reference point and then pull your cursor along the wall to the insertion point for the center of the window and pick. Or, using direct distance entry, you pick the reference point, pull your cursor along the wall, and type in the distance to the window center, then Enter.

Here are the steps to placing a plan window.

1. To insert the plan windows, pick **Plan Menu** from the MASTER pull-down menu. Pick the **Window** button. Select the window style you wish to insert. Windows are inserted by referencing off of wall corners, window ends, etc. They work in essentially the same manner that the interior walls do. You will first be prompted for the window length with *New value for USERI5 <0>*. Type in the window length. An example would be 72 for a 6'-long window. It must be typed in as the inch equivalent, but no inch sign is required.

NOTE: You can also use the Number Pad for entering numeric values like window and door lengths.



2. The next prompt will be *From point: endp of*. Pick a point close to the end point of a wall or window opening. See Figure 6-18.

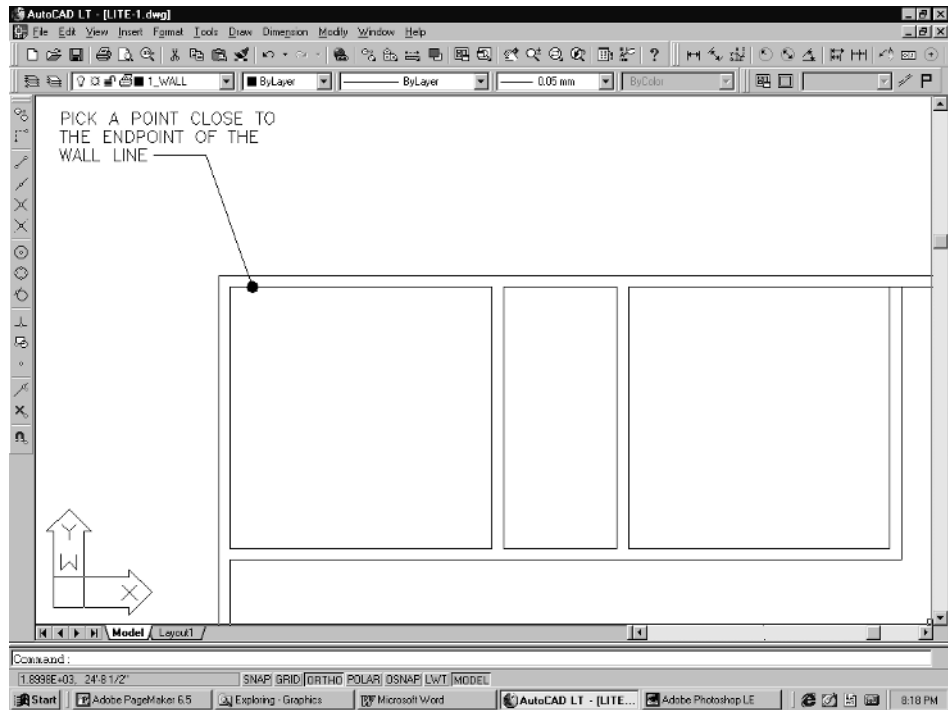


Figure 6-18

This will be the reference point that the center point of the window will be measured from. For example, if you know the distance from a wall corner to the center of the window is 4', you would pick the wall corner as the reference point, then pull the cursor in the direction of the window and type 4'. This will place the center of the window exactly 4' from that corner.

3. The next prompt is *To point*. Pull the cursor where you want the window inserted in the wall and pick or type in the distance from the reference point. This will establish the insertion point for the center of the window. You can also use your Osnaps, such as Midpoint, to establish the center point for the window, as in Figure 6-19.

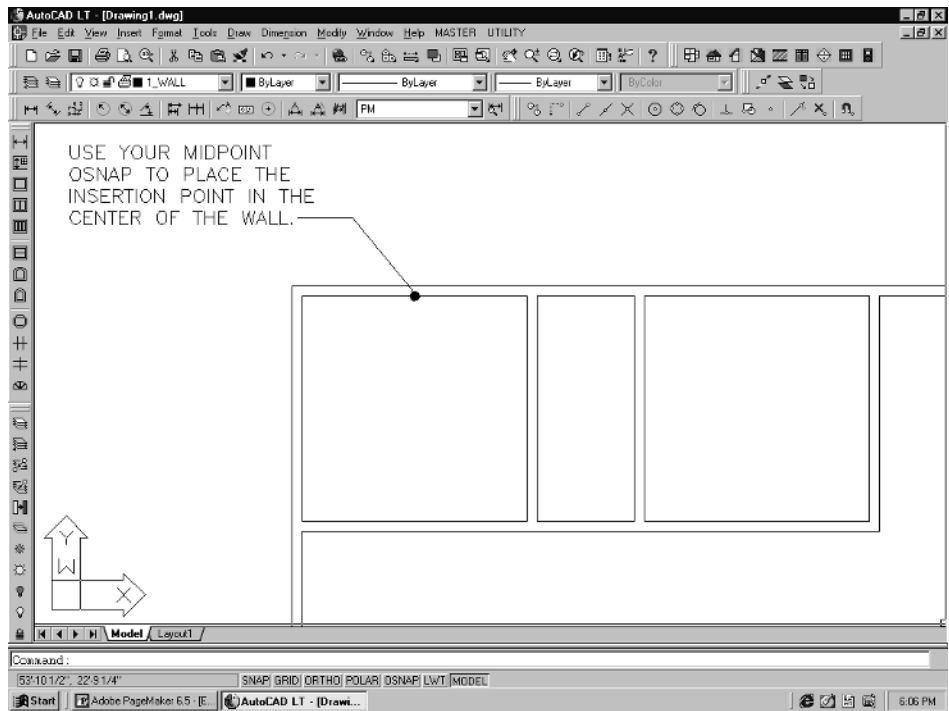


Figure 6-19

4. The next prompt is *From point: _per to*. This is prompting you to pick the opposite wall line. See Figure 6-20.

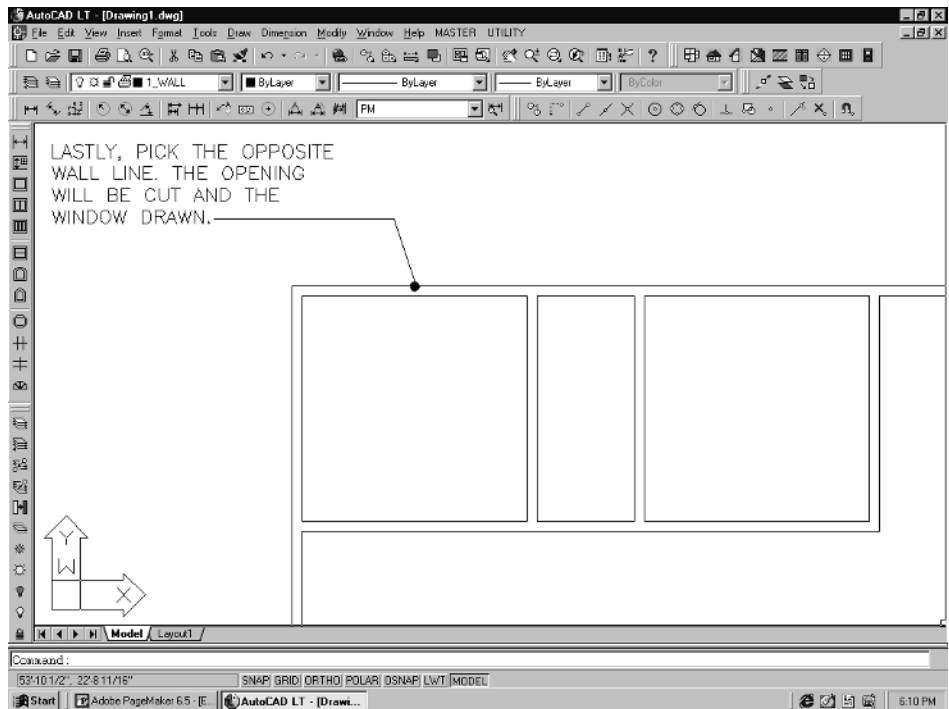


Figure 6-20

5. As soon as you pick the opposite wall line, the window will be drawn.

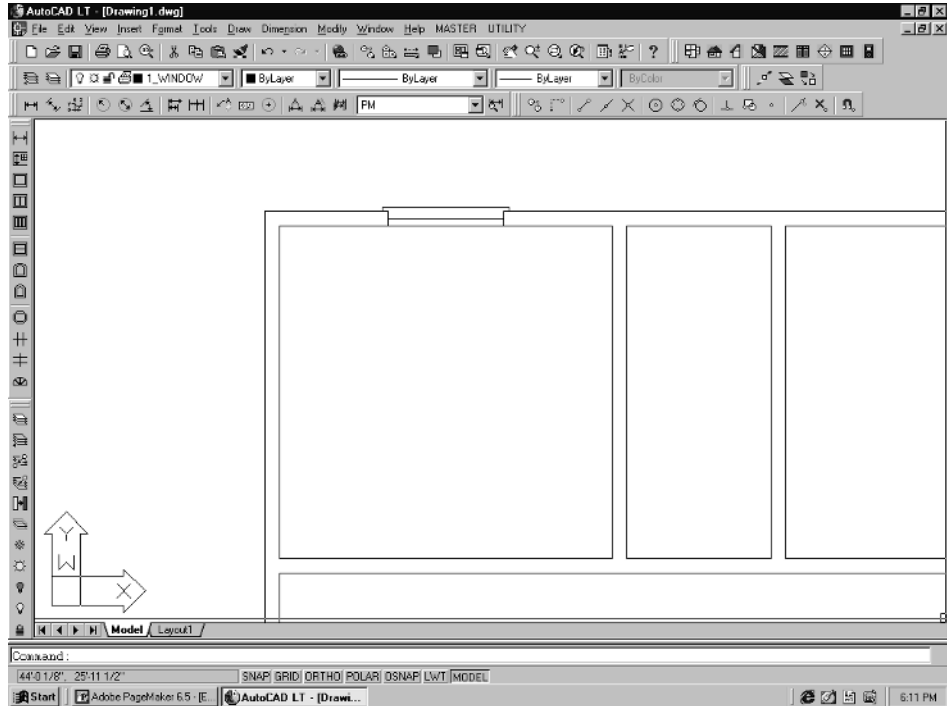


Figure 6-21

Flipping Windows Over

Windows with a single sill will occasionally have the sill drawn to the inside of the walls rather than the outside. Whenever this occurs, use the Rotate Text button on the Window menu to rotate the window around to the correct orientation. To do this, pick Rotate Text, then select the window to rotate. Pick the window again and it will “flip” around to the proper direction.

NOTE: There is also a Rotate Entity 180 item on the UTILITY drop-down menu that does the same thing.



Moving Plan Windows

The Move command, located on the Window menu, allows you to move a window. It uses a crossing window to do this. If your drawing is dimensioned, make sure to cross the entire window as well as the dimension line that is associated with the window. See Figure 6-22.

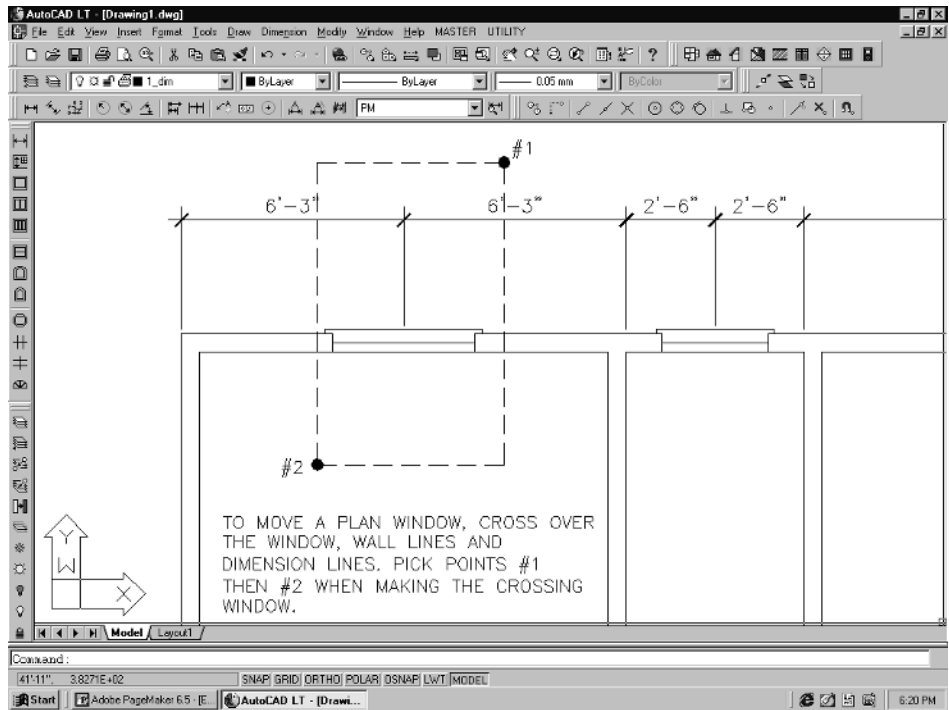


Figure 6-22

Real Architect provides a couple of different window label styles to choose from. They are the text type label and the tag style. They are located on the Annotation Menu, which is accessed from the Plan Menu. Both have dialog interfaces that pop up once you have selected the insertion point and rotation angle. The information you enter in either style can be edited at any time.

First, you will be prompted for an insertion point for the label or tag. Pick a point where you want the label or tag drawn. The prompt will then ask for the rotation angle. The default is 0. This is normally okay for the tag style label. But, if you are using the text style label, you will probably want to pull your cursor parallel to the wall where the window is located and pick. This will rotate the text label in line with the wall. See the example in Figure 6-23.

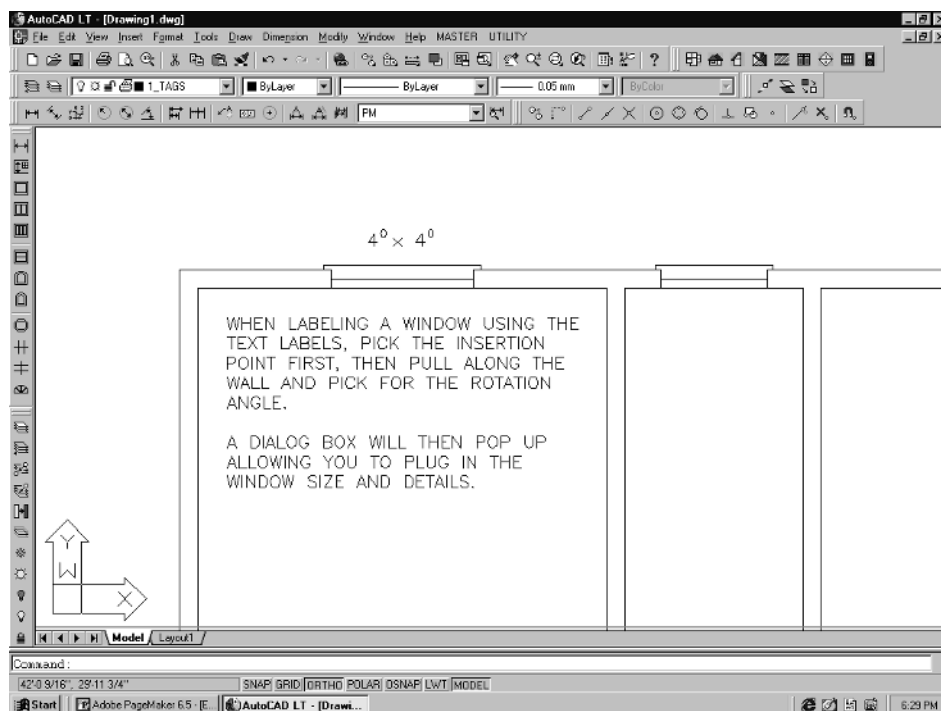


Figure 6-23

The Enter Attributes dialog box, shown below, will then pop up with the window label information. Change as necessary. You may accept the defaults and then come back later and make changes to this information. Pick OK when done.

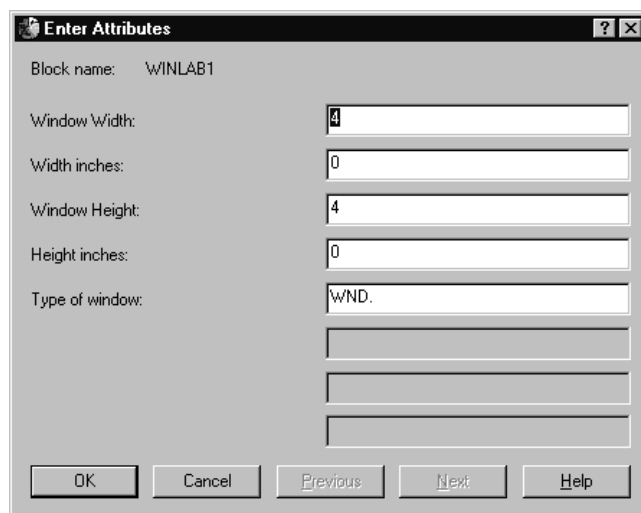


Figure 6-24

Inserting Plan Doors

1. To insert the plan doors, pick **Plan Menu** from the MASTER pull-down menu. Pick the **Plan Doors** button. Select the door style you wish to insert. Doors are inserted by referencing off of wall lines. just like the plan windows.

You will first be prompted for the door width. The prompt will say *New value for USER15 <0>*. Type in the door width. An example would be 36 for a 3' wide door. It must be typed in as the inch equivalent, but no inch sign is required.

2. The next prompt will be *From point: endp of*. Pick a point close to the end point of a wall. This will be the reference point that the edge of the door will be measured from.

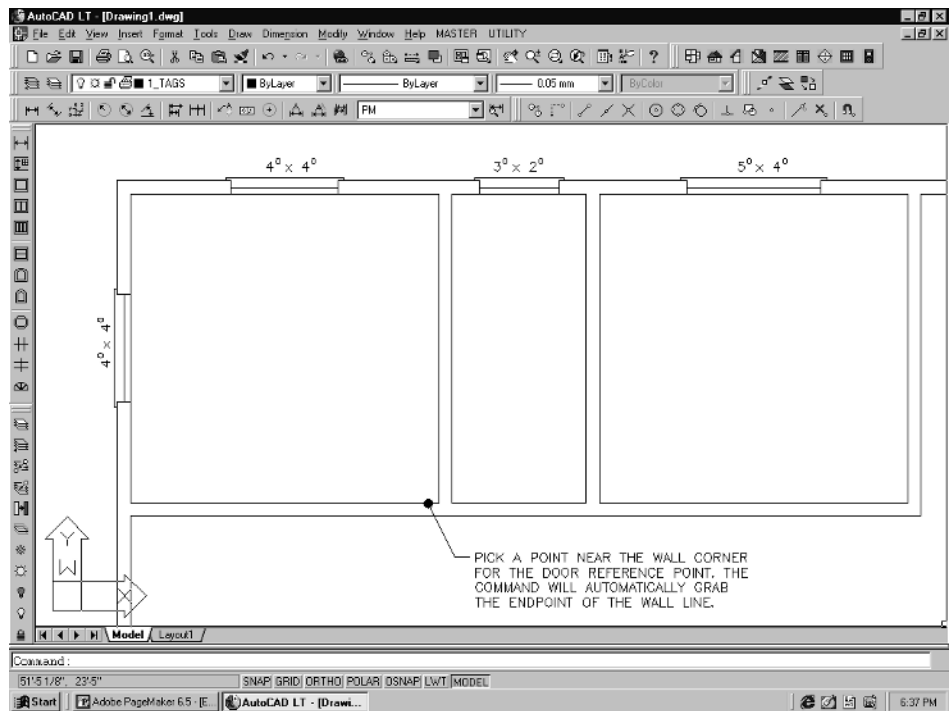


Figure 6-25

3. The next prompt is *To Point*. This is asking for the actual insertion point of the door. In the case of a single door, it will be the edge of the door. In the case of a double door, it will be the door center.

For example, if you know the distance from a wall corner to the edge of a door is 3", after first picking the reference point, you would pull the cursor along the wall in the direction of the door and type **3** and **Enter**. This would place the edge of the door exactly 3" from that corner.

Alternatively, you could have pulled your cursor along the wall 3" and picked the point. See Figure 6-26. You may use an Osnap, such as Midpoint, when picking the insertion point for the center of a double door.



NOTE: Windows and doors are drawn with headers. These headers are used by the program to fill the window and door openings, when required by certain commands. They can be turned on and off from the MASTER pull-down menu. It is a good idea to turn them off.

There are times that the headers inadvertently come back on by themselves. When this occurs, simply turn them back off. Do not erase the headers. You can tell they are on when a door opening looks like the wall lines were not cut out.

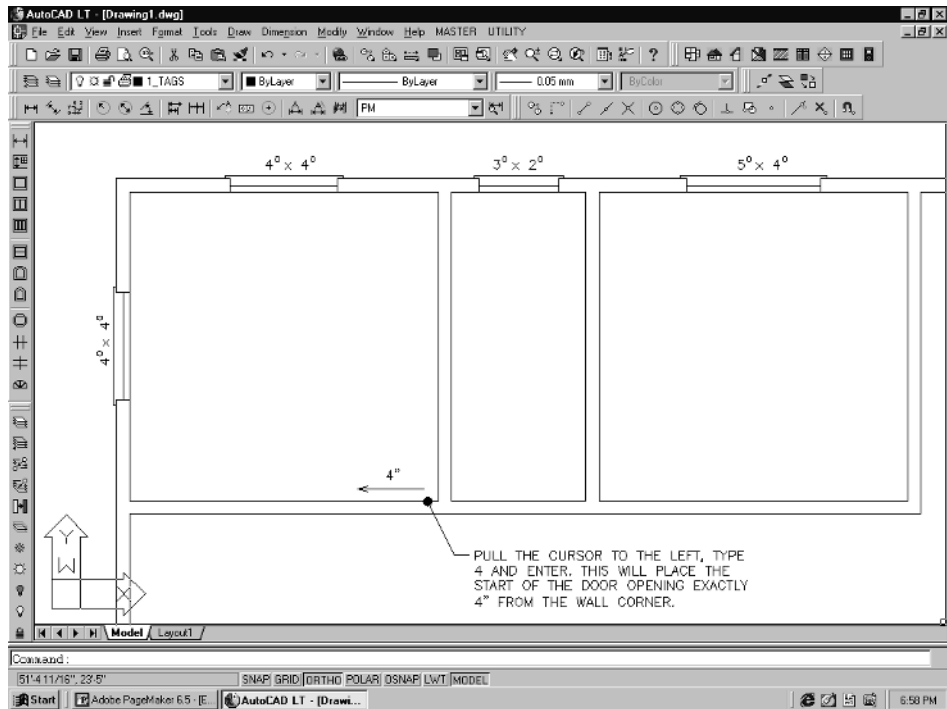


Figure 6-26

4. The next prompt is *From point: _per to.* This is prompting you to pick the opposite wall line. See Figure 6-27.

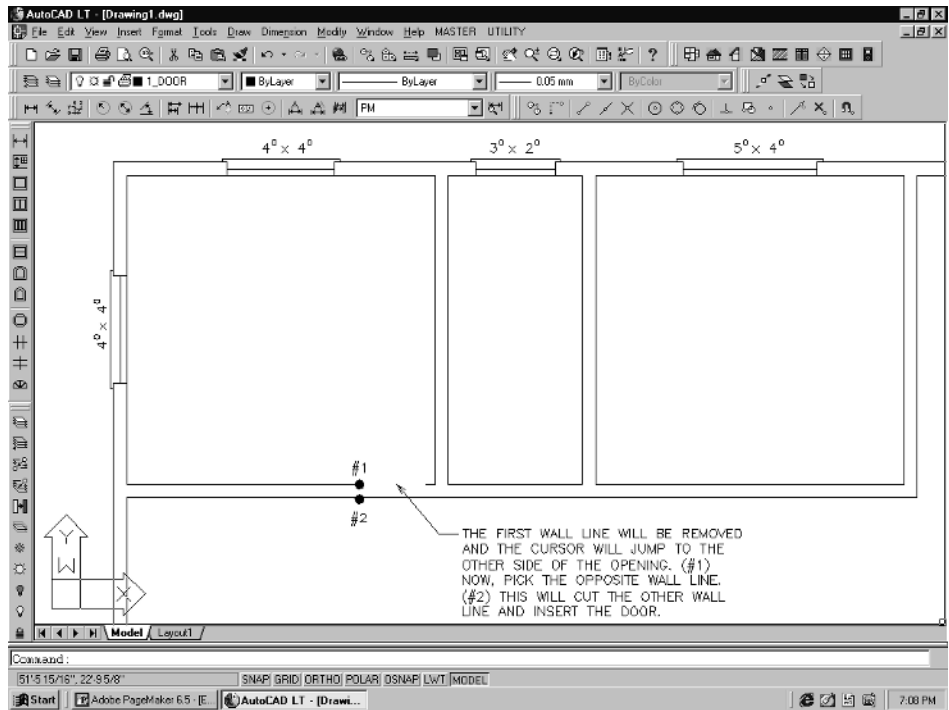


Figure 6-27

5. The wall lines will automatically cut once you have picked this point, and the door will be inserted. The next prompt is for *Rotation angle*. The door is in a “live” state when it is inserted. Pull the cursor around and the door will rotate with it. Line it up to the correct rotation and pick.

NOTE: Make sure ORTHO is on when you rotate the door around the insertion point. Otherwise, it will not line up correctly with the wall.



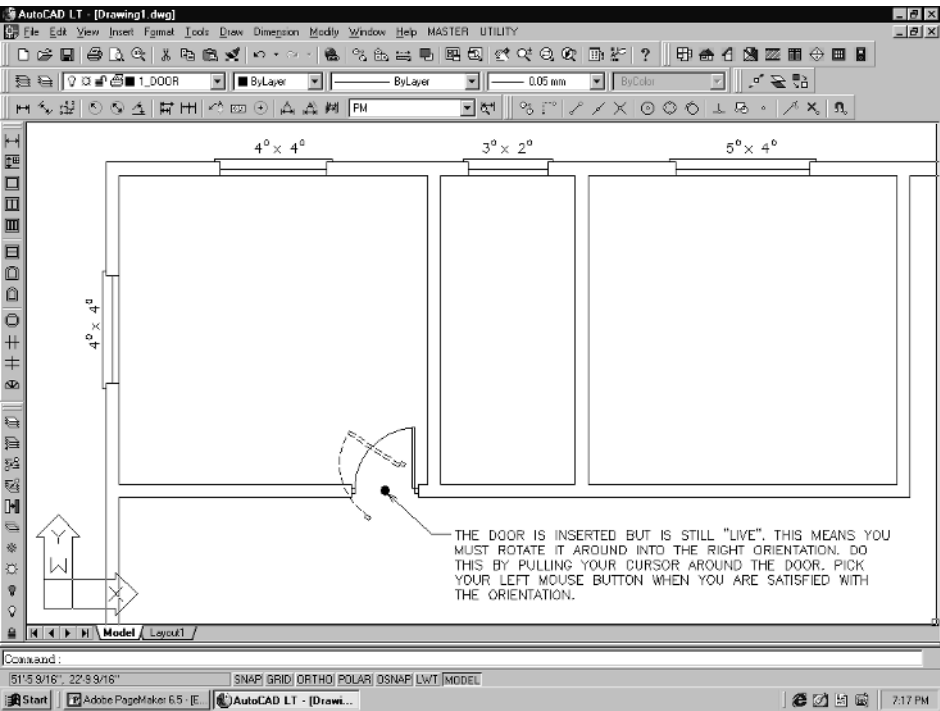


Figure 6-28

The following door menus show you the differences between the LITE and the full versions of Real Architect 2000. The same applies to the Windows menu as well as all the block libraries, including fixtures, appliances, electrical symbols, and cabinetry.

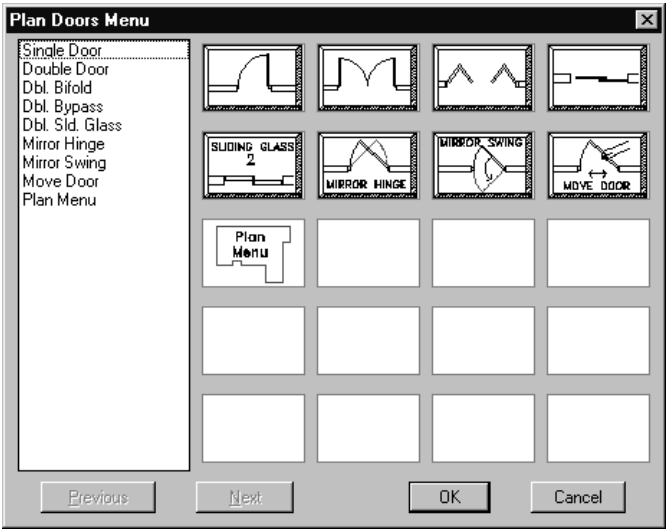
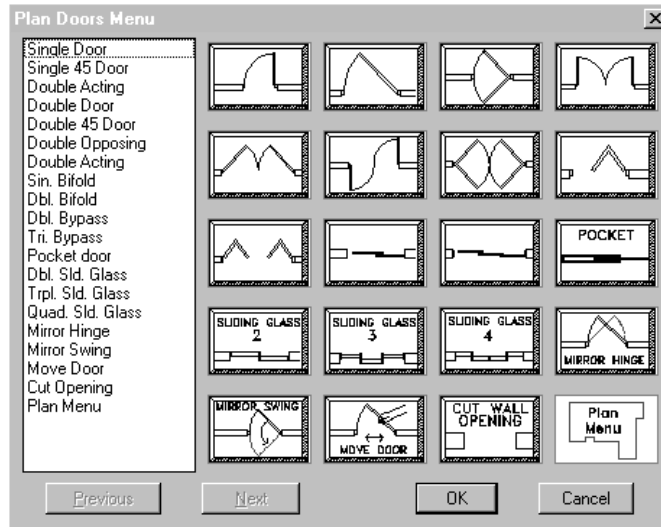


Figure 6-29
Plan Doors
Menu in Real
Architect LITE

Figure 6-30
Plan Doors
Menu in Real
Architect



Changing Door Hinge and Swing

The door swing and hinge point can be changed easily with Real Architect. These commands are located on the Plan Doors Menu.

Changing Hinge Point

If you happen to insert a door and it comes in with the hinge side of the door opposite to where you want it, you will want to use the Mirror Hinge command. It is located on the main door menu.

To change the hinge point on a door, pick the Mirror Hinge command from the door icon menu, or from Door Utilities on the UTILITY drop-down menu. First select the door. Then pick it again. The cursor should attach itself to the center of the door opening.

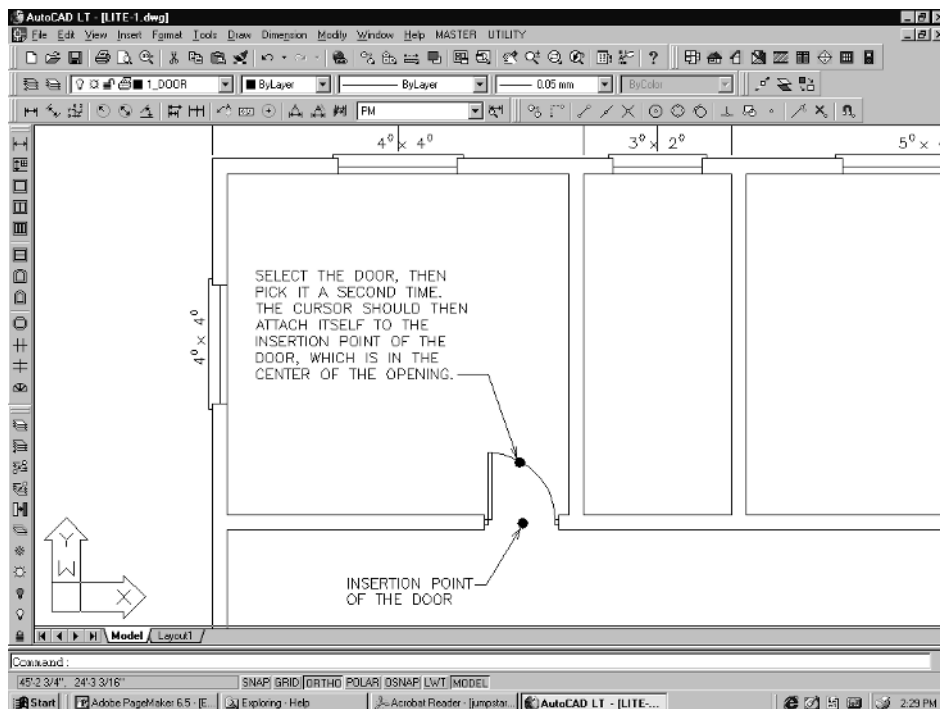


Figure 6-31

Pull your cursor up, as shown in Figure 6-32, and pick. The door hinge should flip over.

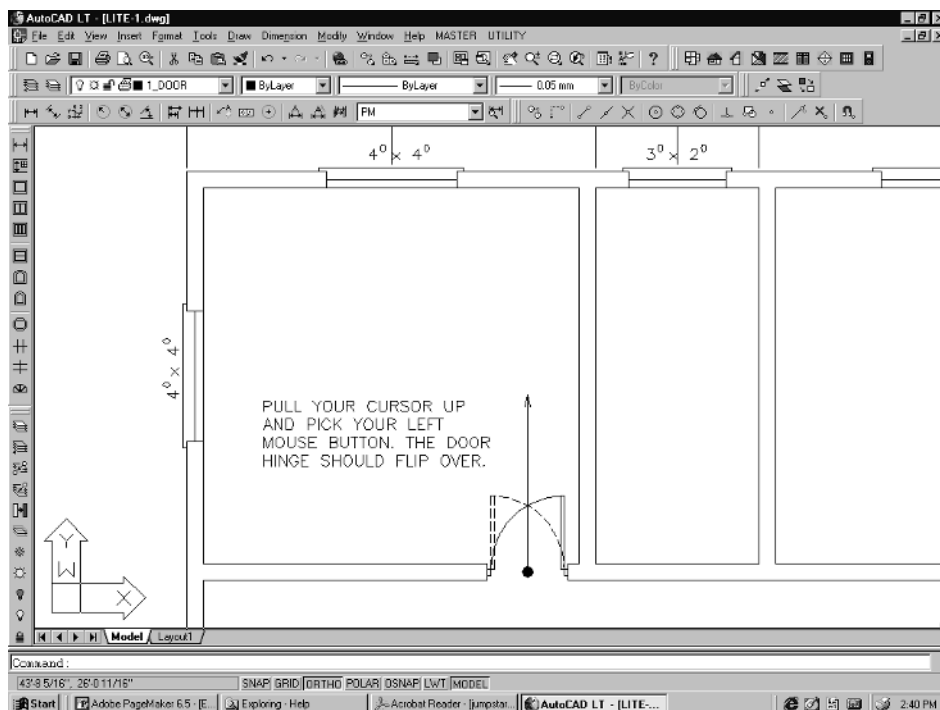


Figure 6-32

Changing Door Swing

To change the swing on a door, pick the Mirror Swing button on the door menu. Pick the door once, then pick it again. The door will automatically mirror around. See Figure 6-33.

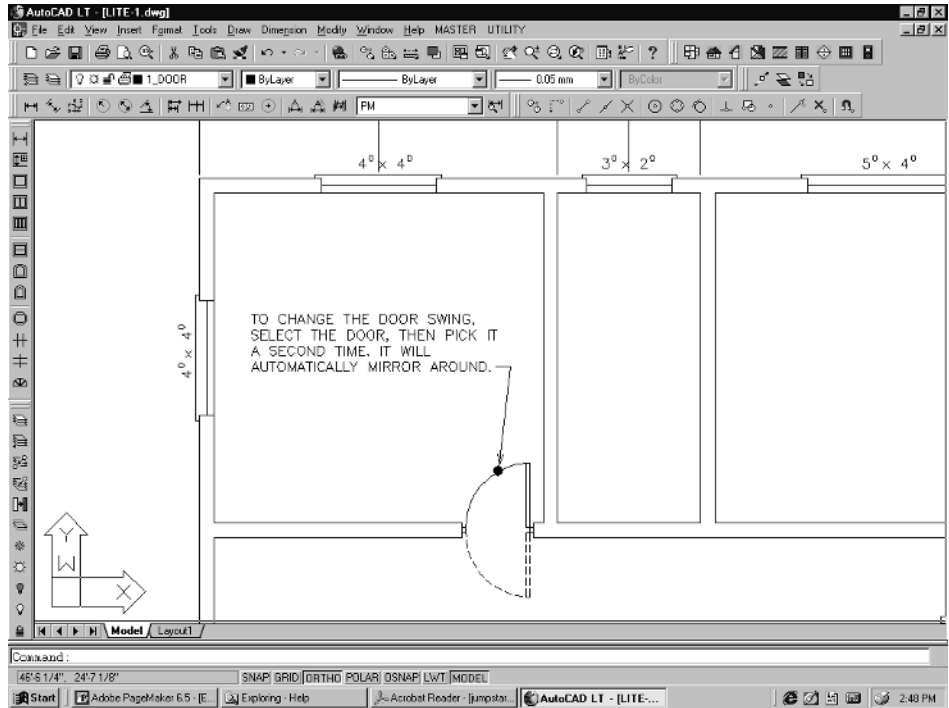


Figure 6-33

Doors can be moved using the Move Door command on the main door menu, or by using the standard Stretch command. Make sure to use the crossing window option when using the Stretch command. See Figure 6-34.



NOTE: Be sure to turn on the layer named HEADER before stretching. The Header on/off command is located on the MASTER pull-down menu.

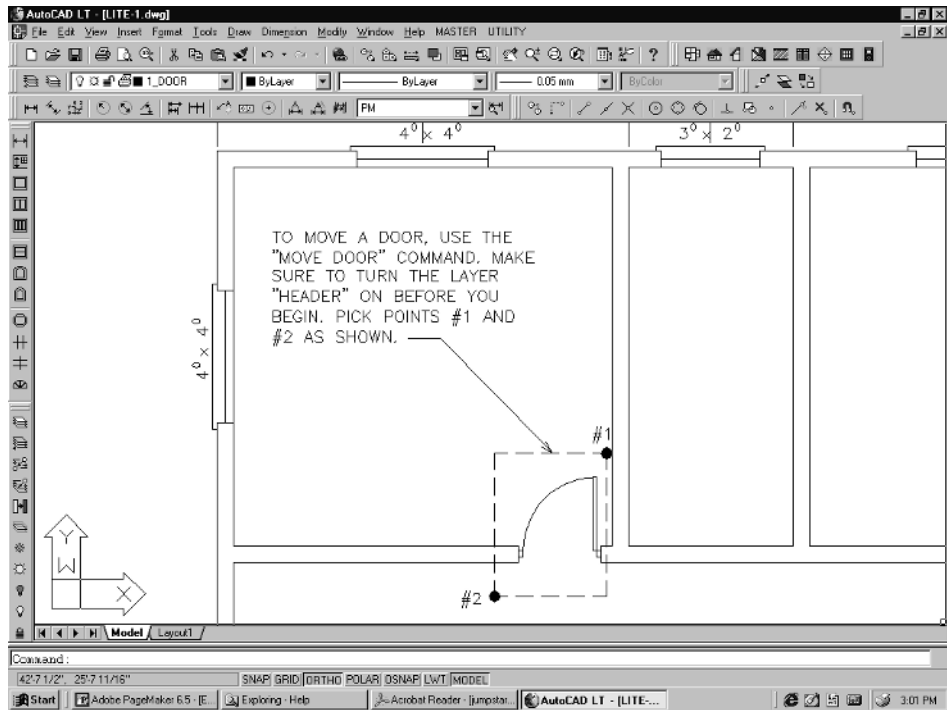


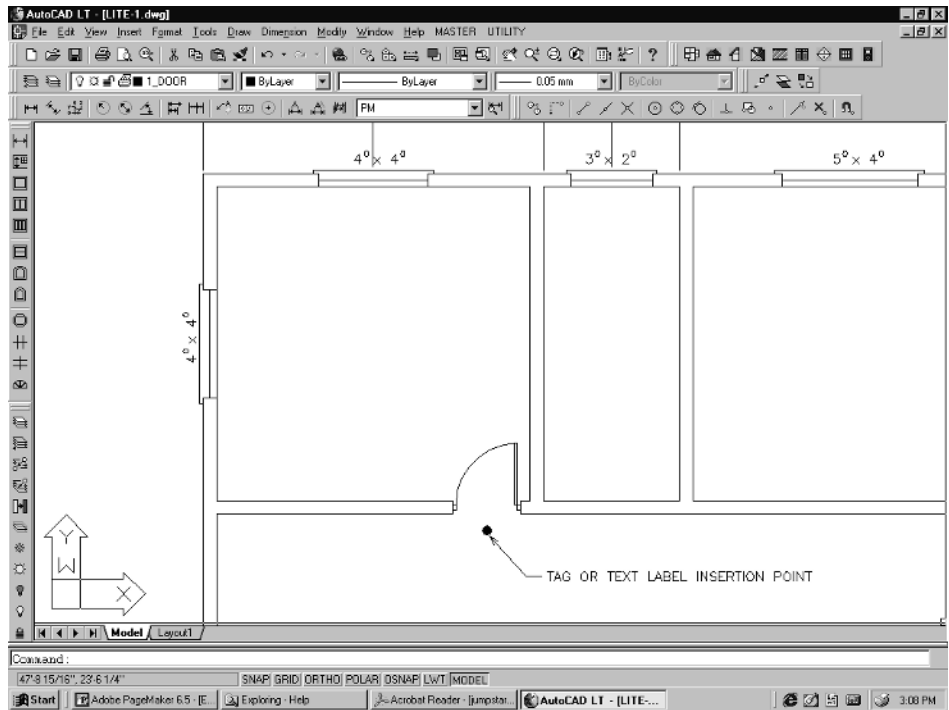
Figure 6-34

If the walls have been poched or filled with hatching, the hatch pattern will automatically adjust when doors and windows are moved using the Stretch command.

Labeling Doors

Doors are labeled exactly like windows. There are a couple of different door label styles to choose from—text style and tag style. They are located on the Annotation menu. Both have dialog interfaces that pop up once you have selected the insertion point and rotation angle. The information in both styles can be edited at any time.

1. Pick the **Door Text Tag** button from the Annotation Menu. You will be prompted for an insertion point. Pick a point as in Figure 6-35.

**Figure 6-35**

2. The prompt will ask for the rotation angle. The default is 0. This is normally okay for the tag style label. If you are using the text style label, you will probably want to pull your cursor along the wall where the door is located and pick. See Figure 6-36.

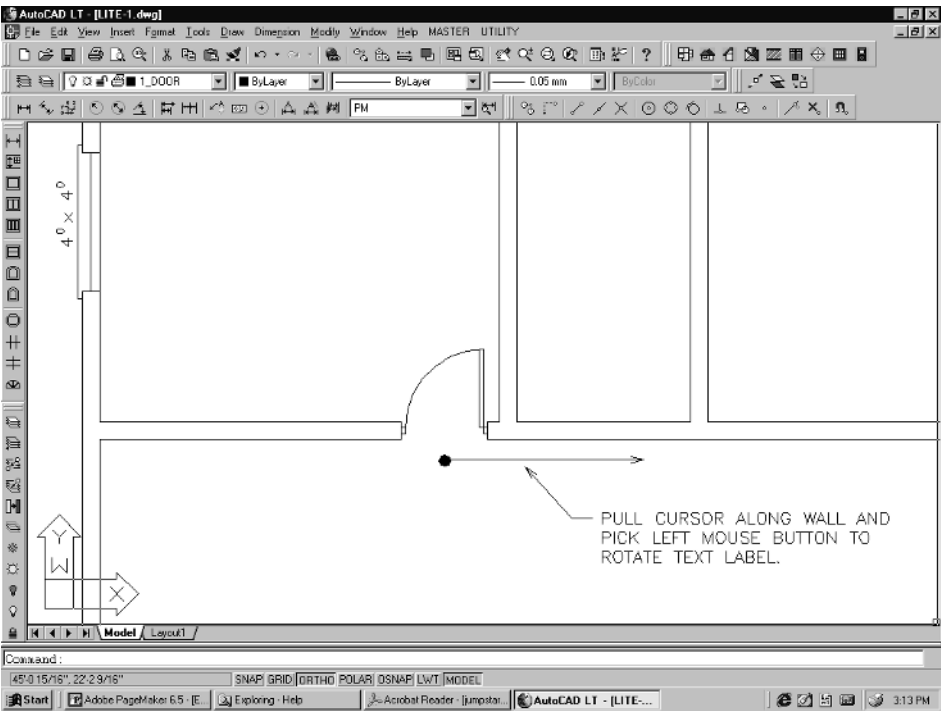


Figure 6-36

3. A dialog box will then pop up with the door label information. Change as necessary. You may accept the defaults and then come back later and make changes to this information. Pick **OK** when done. The door label will be drawn, as in Figure 6-38, and the door menu will pop back up, ready to insert the next label.

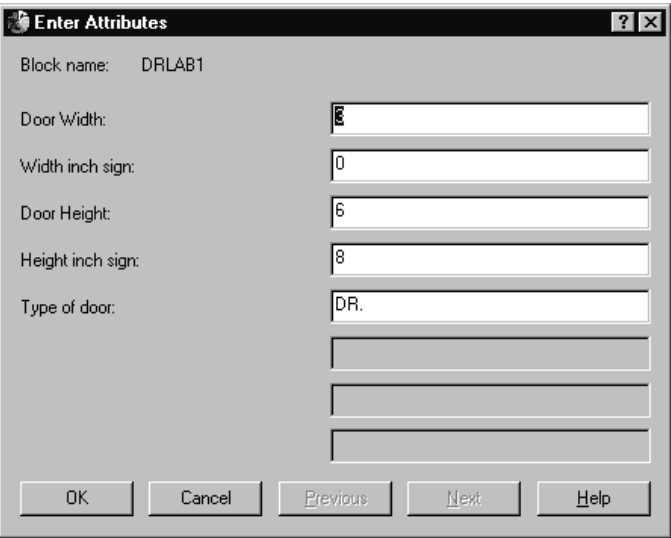


Figure 6-37

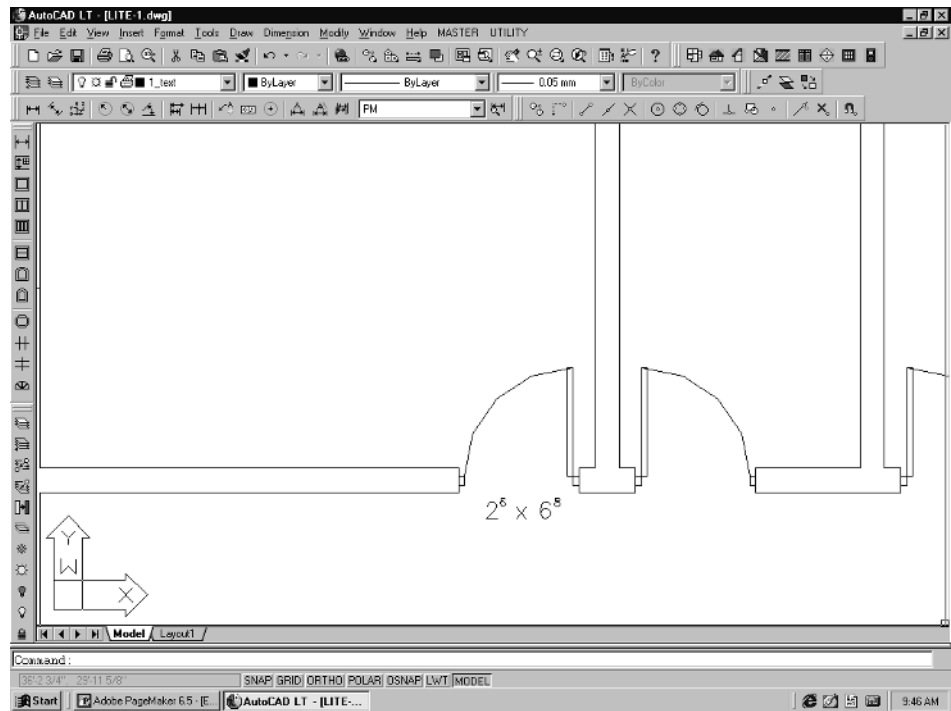


Figure 6-38

Tag style labels work the same as the text style labels. Some architects prefer to use tags rather than text labels, and then build window and door schedules. This method allows you to add more information, such as the material, finishes, hardware, etc. Figure 6-39 shows a typical tag drawn by Real Architect LITE. Once placed, the same dialog type interface pops up to allow you to make changes to the number and letter of the tag.

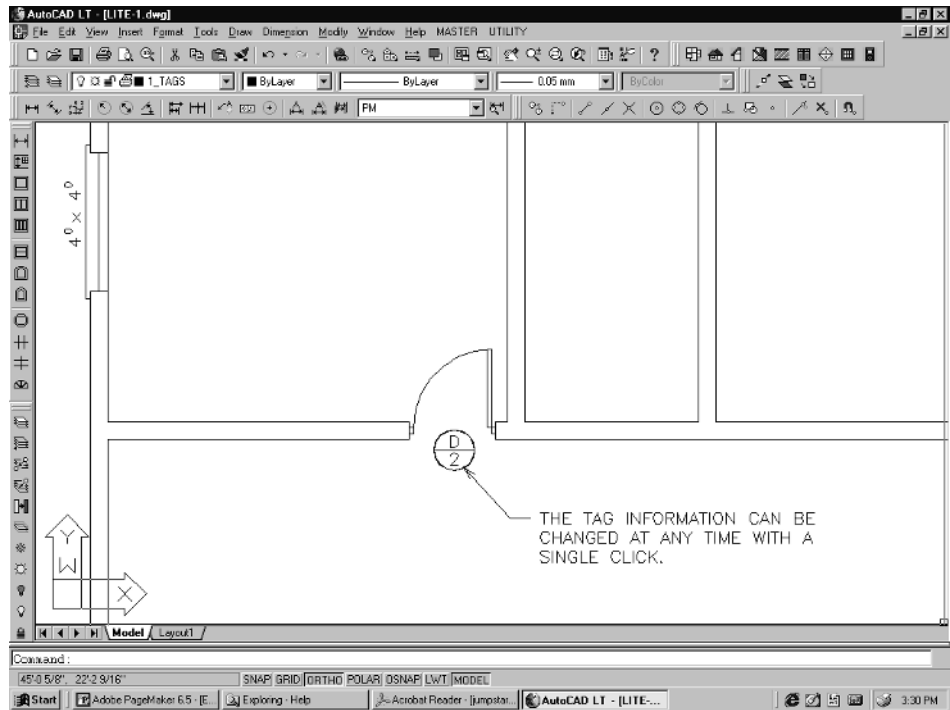
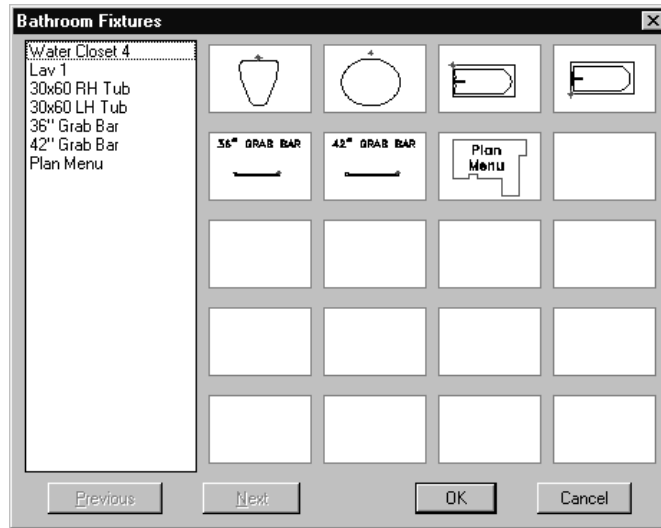


Figure 6-39

Applying Plan Symbols

All of Real Architect LITE's plan symbols are inserted in the same manner. They are all drawn to size. You need only select the block or symbol from its menu by double-clicking on it with your left mouse button, then selecting an insertion point and the rotation angle.

1. For a brief overview of using the bath fixtures we will insert a tub/shower, WC, and sink in the bathroom. Pick **Bath Fixtures** from the Plan Menu. A new icon menu with the available fixtures will pop up. Pick the tub by double-picking on it, or picking on it and then selecting the **OK** button.

**Figure 6-40**

NOTE: The little red dot on the slide denotes the insertion point for the symbol.



2. Pick the back right corner for insertion. If your snap is not on, use your Endpoint Osnap to get the corner. Now, pull the cursor around to align the tub with the wall and then pick. See Figure 6-41.

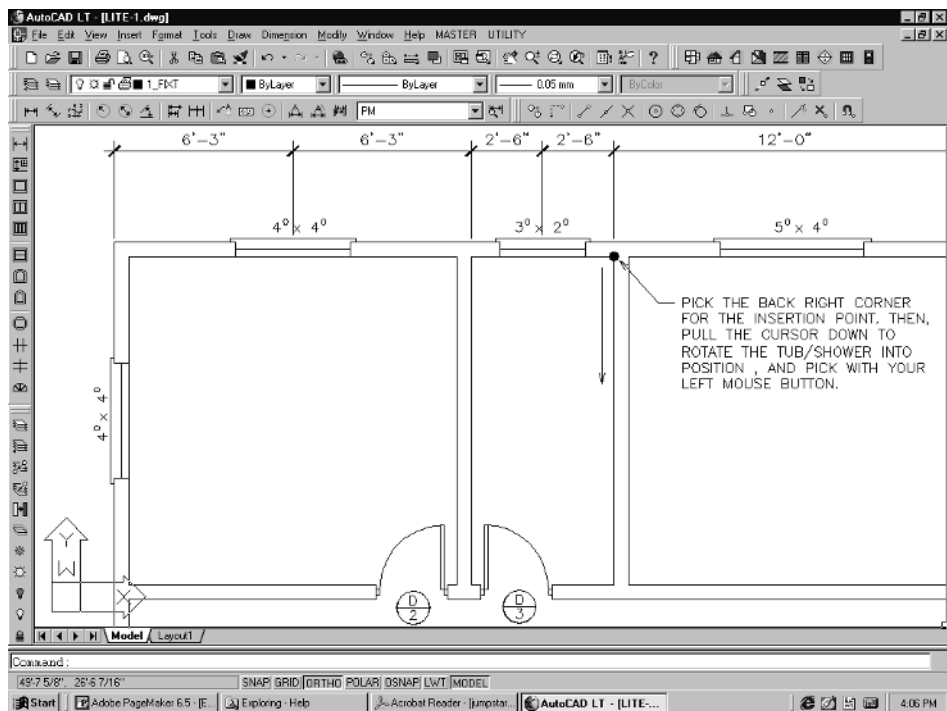


Figure 6-41

3. The tub/shower will be drawn, as shown below, and the bath fixture icons will pop up again.

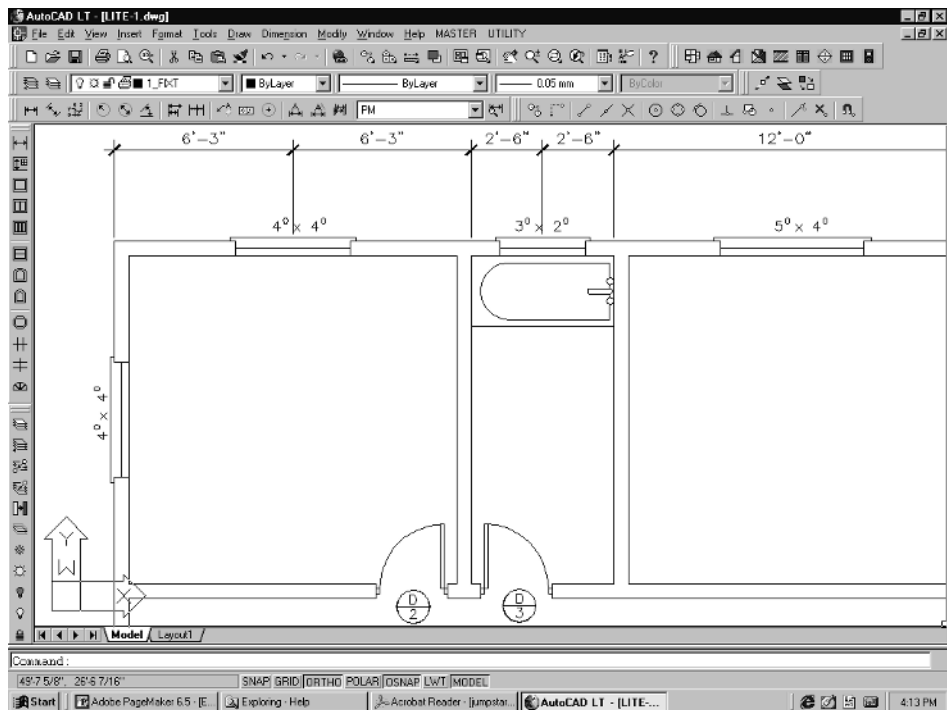


Figure 6-42

Now, you can go ahead and place the WC and lavatory, using the same method. Draw the lavatory counter by offsetting the wall **21"** out and **60"** long. Make a layer named **1_COUNTER**. Change the counter lines to this layer by using the Modify command.

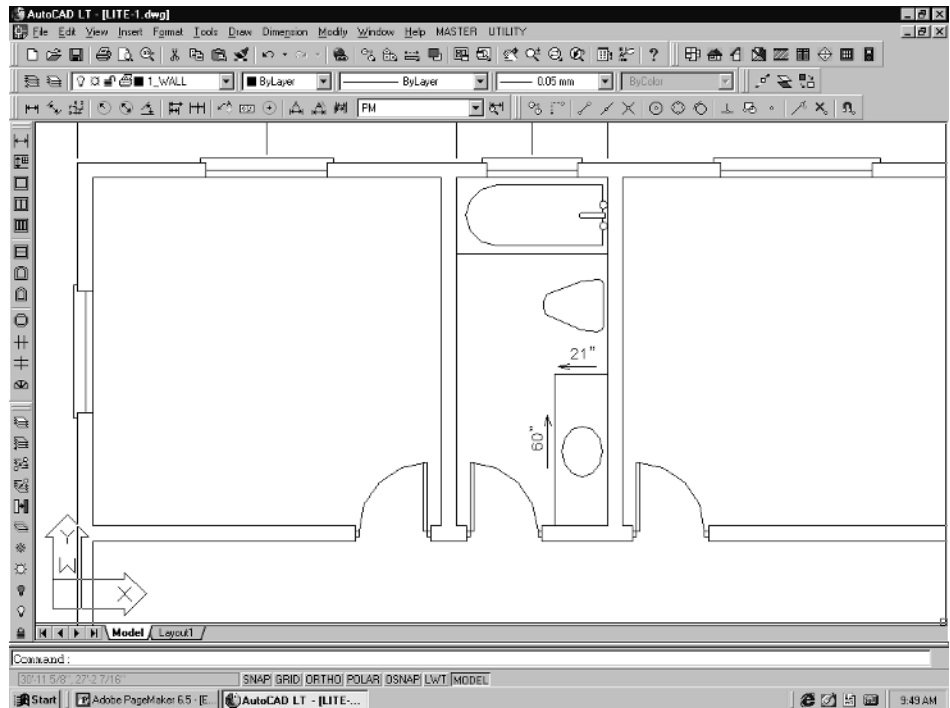


Figure 6-43

4. Notice when any one of the icon menus comes up there is always a button that will take you back to the main Plan Menu. This feature allows you to navigate to any of the other menus easily, without leaving the icon menus. In this case we will go to the electrical menu and insert some outlets and switches into the drawing. So, pick the **Plan Menu** button. When the Plan Menu comes up, double-pick on the **Electrical Symbols** button. Inserting the electrical symbols is easy. Just pick any of the symbols from the menu and pick an insertion point. Then rotate it to the correct angle. The electrical symbols will automatically be drawn on a layer named **1_ELEC**. See Figure 6-44 for examples of electrical symbols drawn in the floor plan.

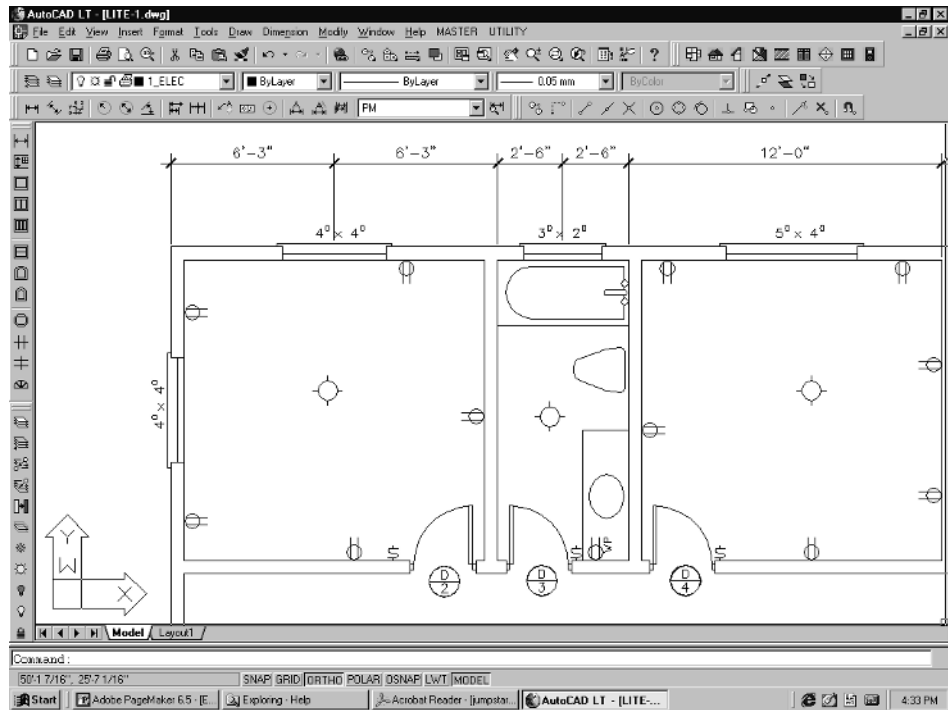


Figure 6-44

5. To add the wiring, use the Arc command to draw the wires. Set your Osnaps to Endpoint, then just pick the start, middle, and endpoints of the arc. You can draw the wiring in a house in a matter of minutes using this method. You can change the linetype of the wires to dashed or hidden if you wish, by selecting the wires, picking the linetype from the Properties or Object Properties toolbar, and changing them to the new linetype. Note the wiring drawn in Figure 6-45.

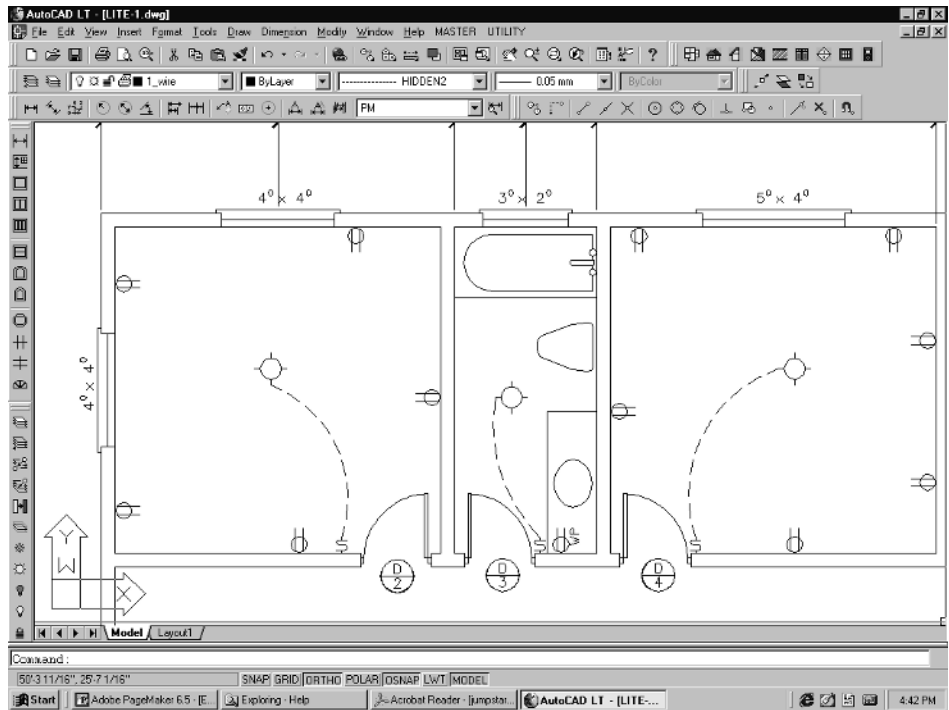


Figure 6-45

Kitchen appliances and all the other symbols are applied in the same manner. Remember that you can scale symbols up or down by using the Scale command, or by selecting the symbol and then picking Properties under the Modify pull-down menu.

You can also select the object and then right-click your mouse button. A list will pop up with a number of selections. One of them is an item named Properties. Selecting it will bring up the Properties dialog box. You can change the X, Y, and Z scales, among other things. This can be helpful if you want to elongate a symbol like a refrigerator or range. Although it is not precise, it works fine for “down and dirty” drafting. To see how this works, let’s do a quick kitchen.

1. **Zoom|Out** so you can see the whole house. Next, **Zoom|In** to the area shown in Figure 6-46. We will be using this area to build our kitchen and to show you some of the techniques and tricks that will help save you time.

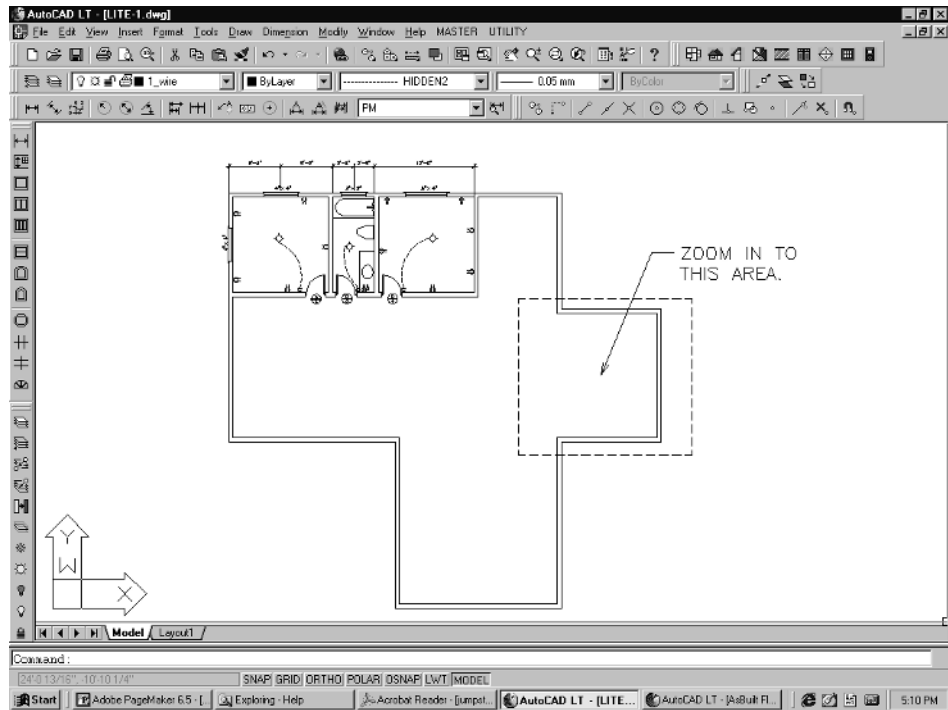


Figure 6-46

2. The first thing to do is to offset the wall lines **24"** to the inside. This will form the counters. Add a 3'x3' window centered in the right-hand wall. Then add the sink, range, refrigerator, and cabinet outlines. Your drawing should look like Figure 6-47.

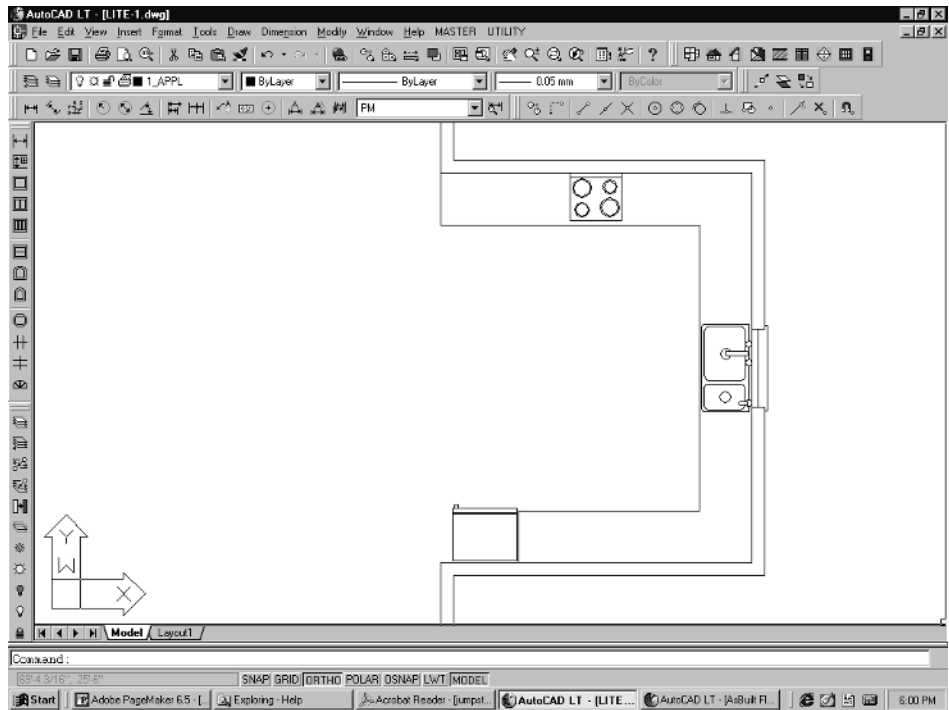


Figure 6-47

3. Change the counter lines to the layer **1_COUNTER** by using the Match Properties command, located on the Standard toolbar. If you haven't used this command yet, it's time you got acquainted with it. This command allows you to first pick an object, like one of the lavatory counter lines in the bath, then pick all the kitchen counter lines. The kitchen counter lines will then inherit the properties of the lavatory counter lines, such as layer, color, linetype, etc. This is an excellent way to change objects to match other objects.
4. Next, we need to change the oven/range so that it sticks out past the counter a little. This can be done by using the Properties command and then changing the value for either the X or the Y scale. Which one you change is rather hit or miss, but if it looks wrong, simply Undo and try the other. For this example we want the range to be 24" wide. It is a small apartment-sized range. If you measure it, you will see that it is 24" wide. But we want the length of the range to be a little wider than the counter. This is strictly for aesthetic reasons, but can be accomplished very easily, without exploding the block and stretching it out.

Pick the range with your left mouse button. Then, pick your right mouse button. Select the **Properties** item. A listing of many things that pertain to this block will come up. Three of them are the X scale, Y scale, and Z scale.

See Figure 6-48 for a view of what the Properties dialog looks like in AutoCAD LT 2000. Notice that the X, Y, and Z scales are set at 1.0000.

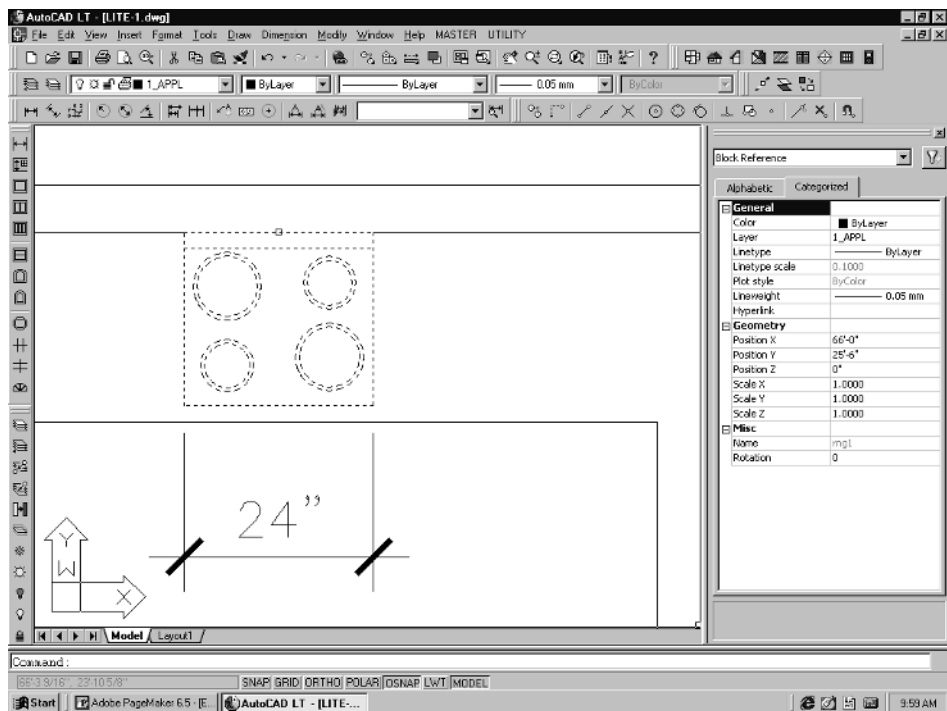


Figure 6-48

We want to change the Y scale factor just a little. All we are trying to do is make the range front stick out a little past the counter. So, change the Y scale to 1.1 and check the range. You will see that it has elongated itself a little, but not so much as to distort the round burner holes.

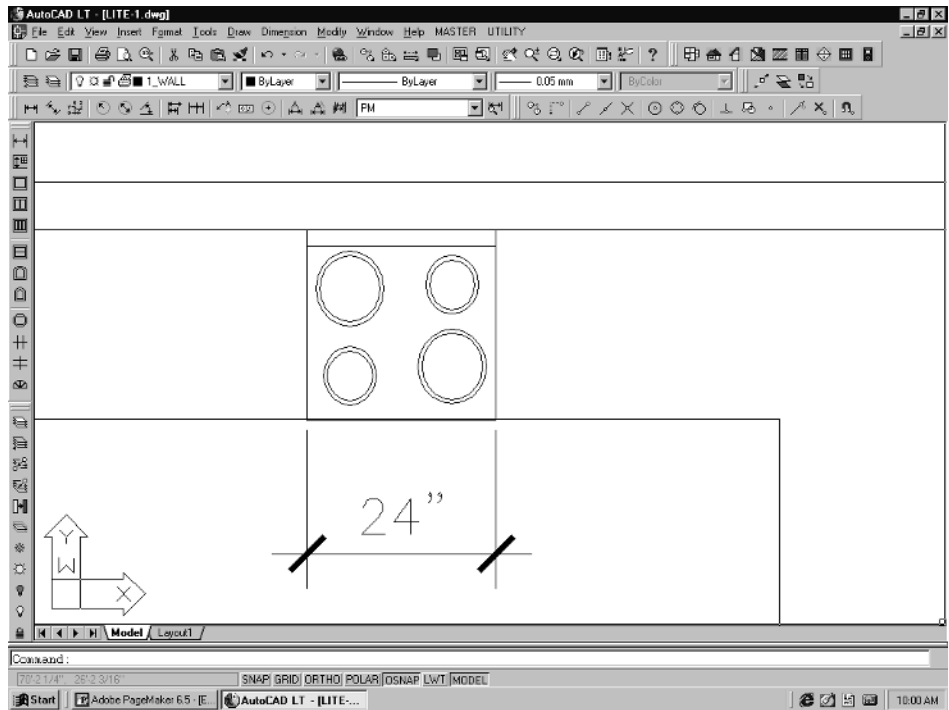


Figure 6-49

- Next, to add the wall cabinet lines, offset the wall lines out 12". Change their layer to **1_COUNTER** using the Property Painter or Match Properties tool. Change the linetype for the wall cabinets to dashed or hidden.

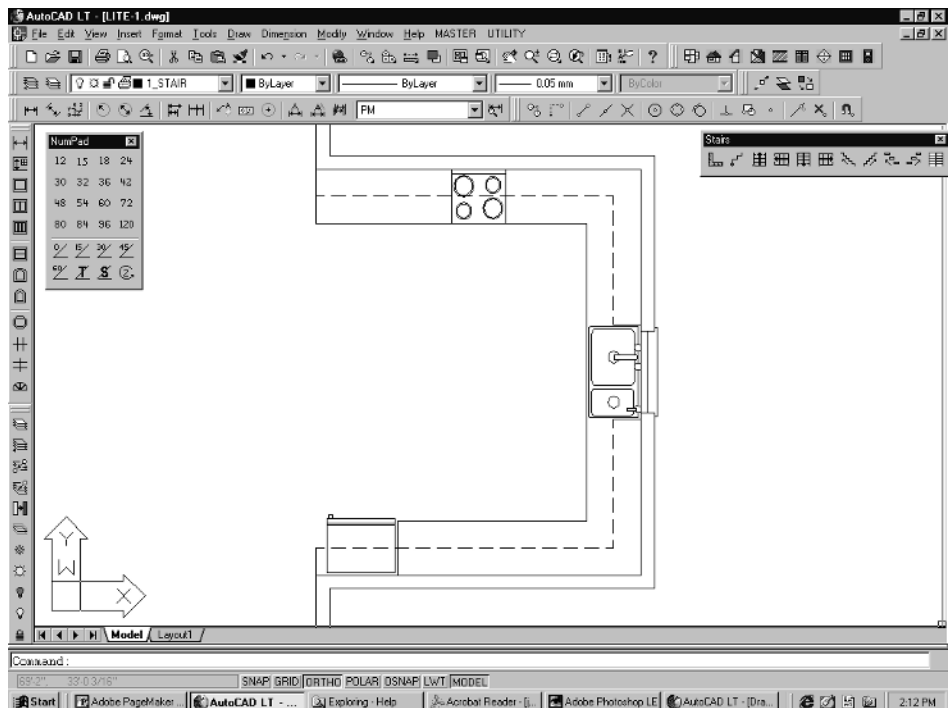


Figure 6-50

You may add additional details to the floor plan as you wish. We will leave this up to your discretion as to dimensions and sizes of rooms, windows, doors, and symbols. The floor plans seen in Figures 6-51 and 6-52 are only two examples of how the drawing can be finished.

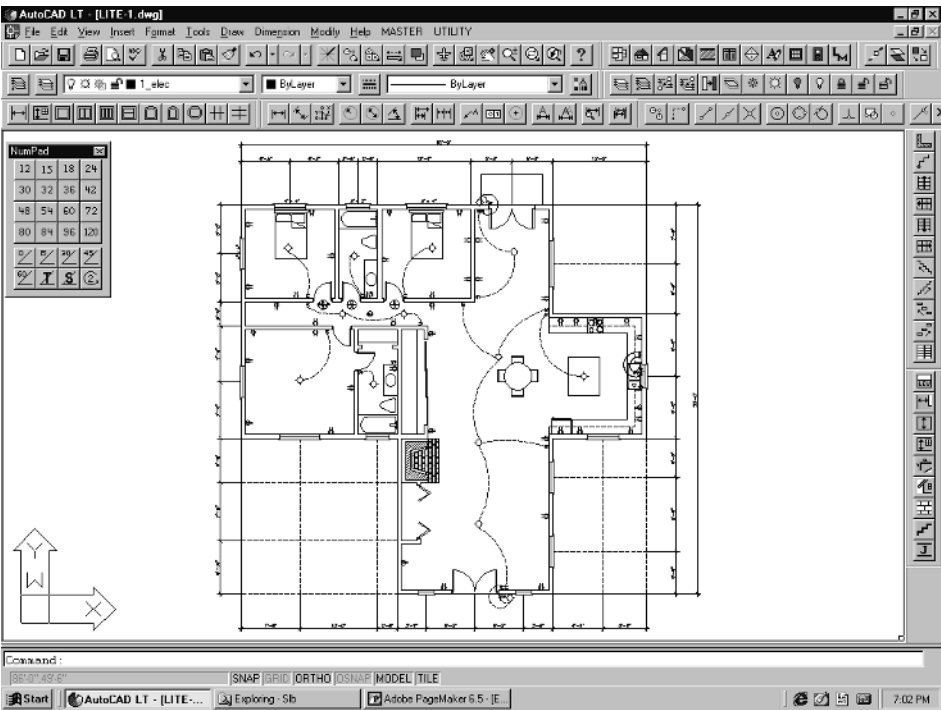


Figure 6-51

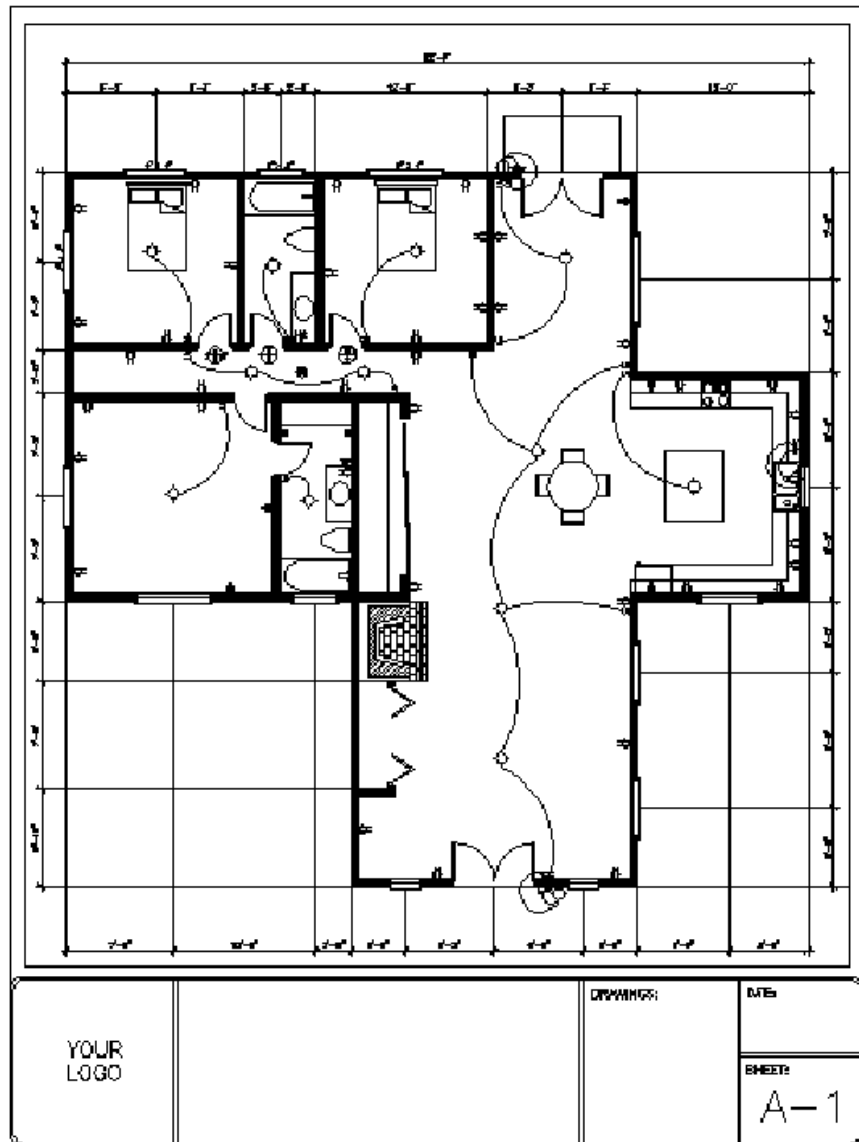


Figure 6-52

Creating Elevations

The Real Architect LITE menu contains an elevation menu that semi-automates the process of creating your four elevations. If you look back at Chapter 4 of this book, you will remember that we used a method for building our elevations that was very similar to the way you would do the job on a drafting board.

Real Architect LITE works in a similar manner, although much of the work is reduced by commands that do a number of functions with just the press of the mouse button.

You don't need to build a library of window and door blocks. This is taken care of by the program. You also don't have to worry about the sizes of windows or doors. The windows and doors are all "parametric," which means that you select the style, and then just type in the width and height. The program automatically builds the window or door for you, exactly where you want it.

This is also true of variables such as wall heights, header heights, roof pitch, and eave overhangs. All these parameters are set by you and can be changed at any time. The program automatically uses these when building your elevations. Real Architect LITE has also created some unique tools for drawing your elevations. These "tools" allow you to draw your elevation in a manner similar to the traditional style we talked about in Chapter 4. The difference is that the program handles all the "orientation" functions automatically.

Before we begin to draw a set of elevations for our new floor plan, remember that Real Architect LITE contains only a small portion of the commands that are available in the full version of the program. We will be somewhat limited in what we can do, but it will give you an idea of the method used in constructing elevations. See Figures 6-53 and 6-54 for the differences.

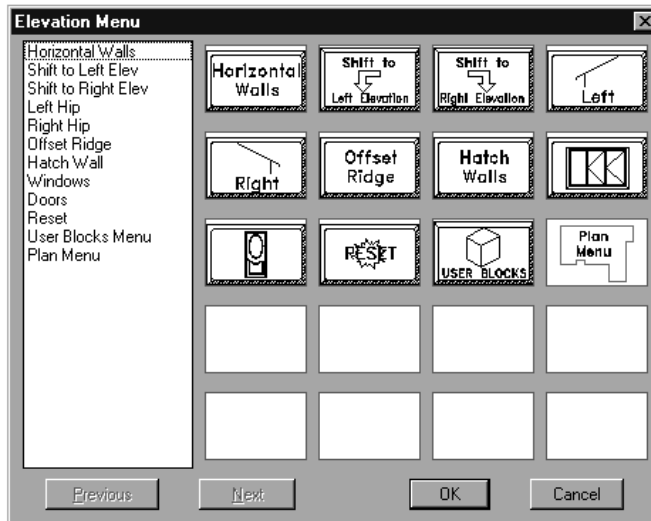
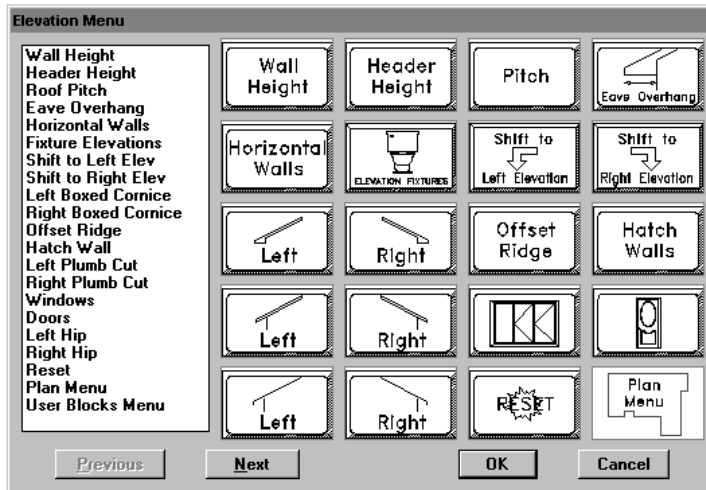


Figure 6-53
The Elevation
Menu in Real
Architect LITE

Figure 6-54
The Elevation
Menu in Real
Architect



Turning Off Unnecessary Layers

Before starting with our front elevation, it is a good idea to turn off any layers that are not needed. Some of these are the dimensions, fixtures, appliances, and any wall fill or poche.

1. To do this, go to the Layer Control toolbar and pick on the gray lightbulb. This turns off layers as you pick them on the screen.

Figure 6-55



2. Pick on one of the dimensions. This should turn off all the dimensions. Do the same for any other layers you want to turn off. See Figure 6-56.

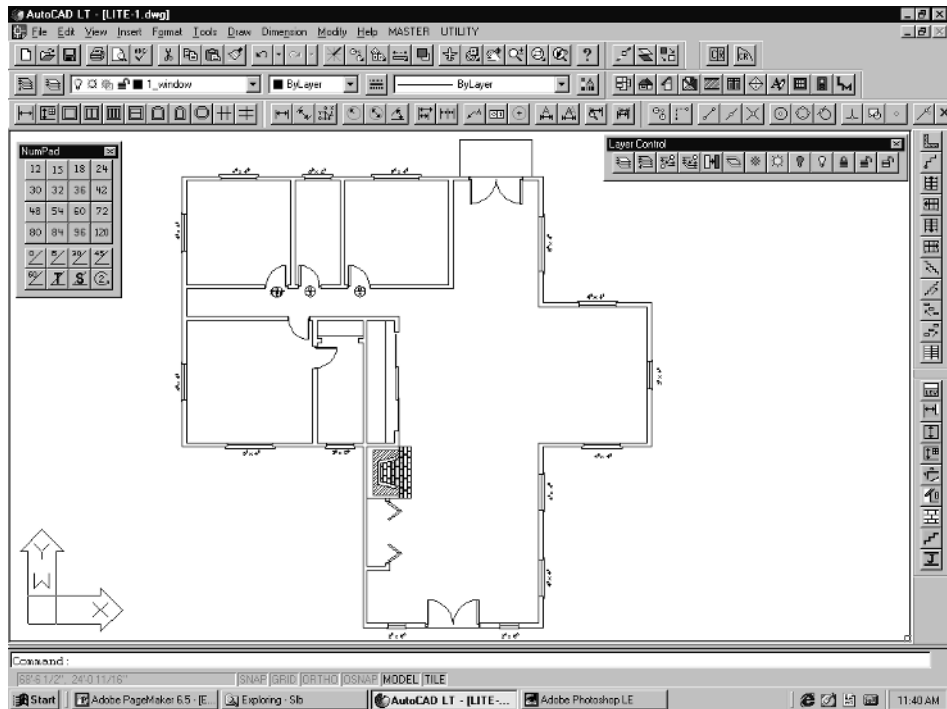


Figure 6-56

3. You can continue turning off layers by either picking on the gray light bulb again to run the command, or picking your right mouse button and picking **Repeat Off Selected** at the top of the pop-up menu that comes up. The yellow light bulb turns all layers back on. Just so you know, all of the other layer control buttons are disabled in the LITE version.



Figure 6-57

Drawing the Front Elevation

Pan the drawing up so that you have sufficient room to begin drawing the front elevation. This will be drawn below the front of the house, so pan the floor plan up so that you have room for the walls and roof below the floor plan.

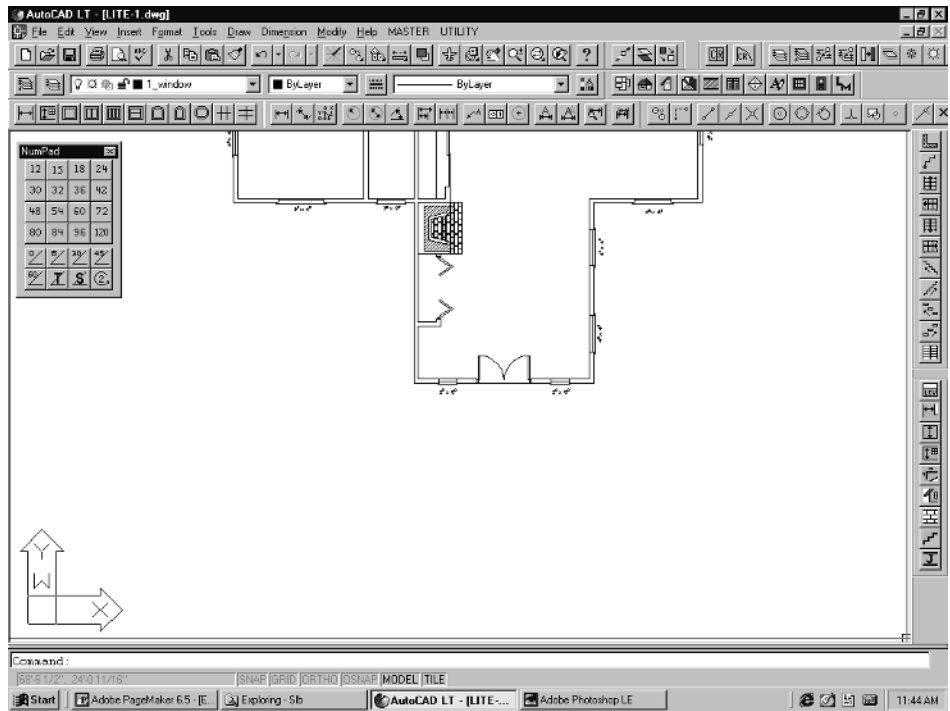


Figure 6-58

1. Pick on the Settings toolbar and check the following buttons: **Wall Height**, **Header Height**, **Roof Pitch**, and **Eave Overhang**. Set as shown in Figure 6-59.

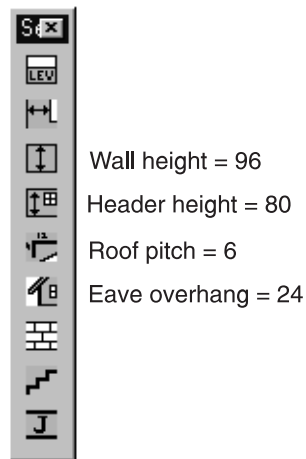


Figure 6-59

2. Type **SNAP** and **Enter**. At the *Snap spacing or ON/OFF/Aspect/Rotate/Style* <0'-6"> prompt, 6 is what we want because our walls are 6" thick, so just hit **Enter** to continue. If your walls were 4" thick, you would want to change the snap value to **4** and **Enter**.

- Next, pick the **Elevation Menu** item from the MASTER pull-down menu. Pick the **Horizontal Walls** button. At the *First point* prompt, line your crosshairs up with the first wall corner on the left side of the building, as shown below.

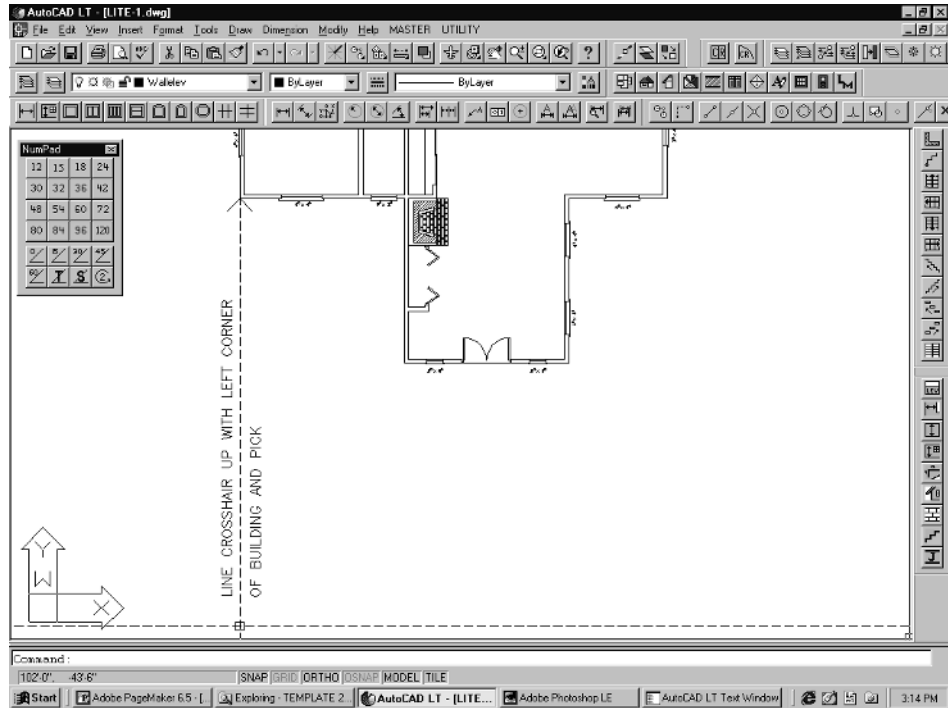


Figure 6-60

- Pull the cursor to the right, line up the crosshair with the next building corner, and pick with your left mouse button. The first section of the elevation wall will be drawn, as in Figure 6-61. The Elevation Menu will pop back up.

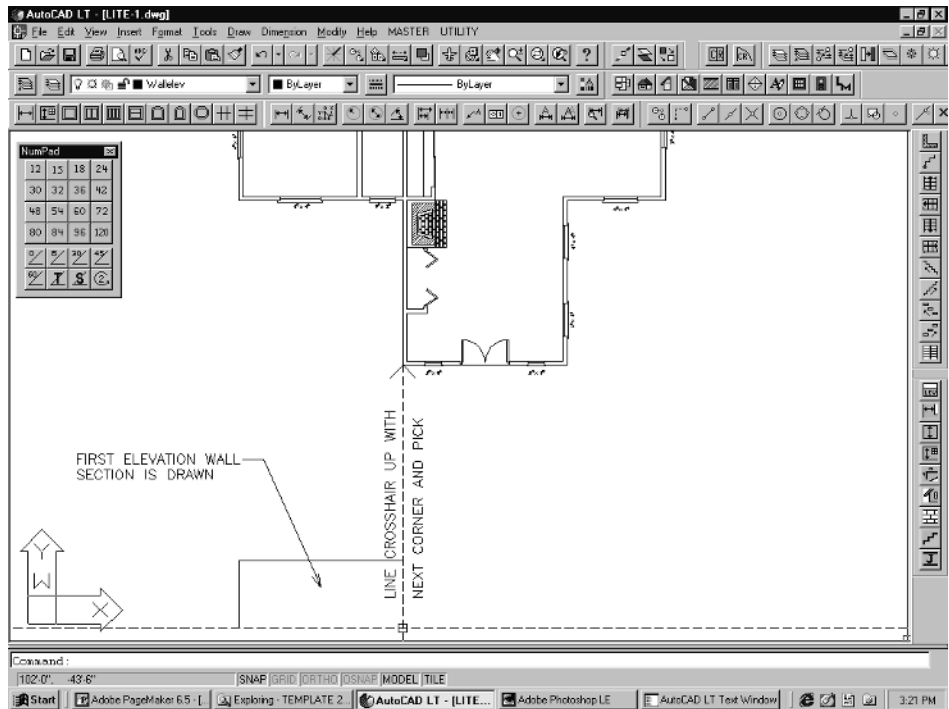


Figure 6-61

5. Select the **Horizontal Walls** button again by either double-clicking on it, or by selecting it and then picking the **OK** button. When prompted for the *First point*, pick the bottom corner of the first elevation wall. Use your End-point Osnap to make sure you are grabbing right on the lower corner.

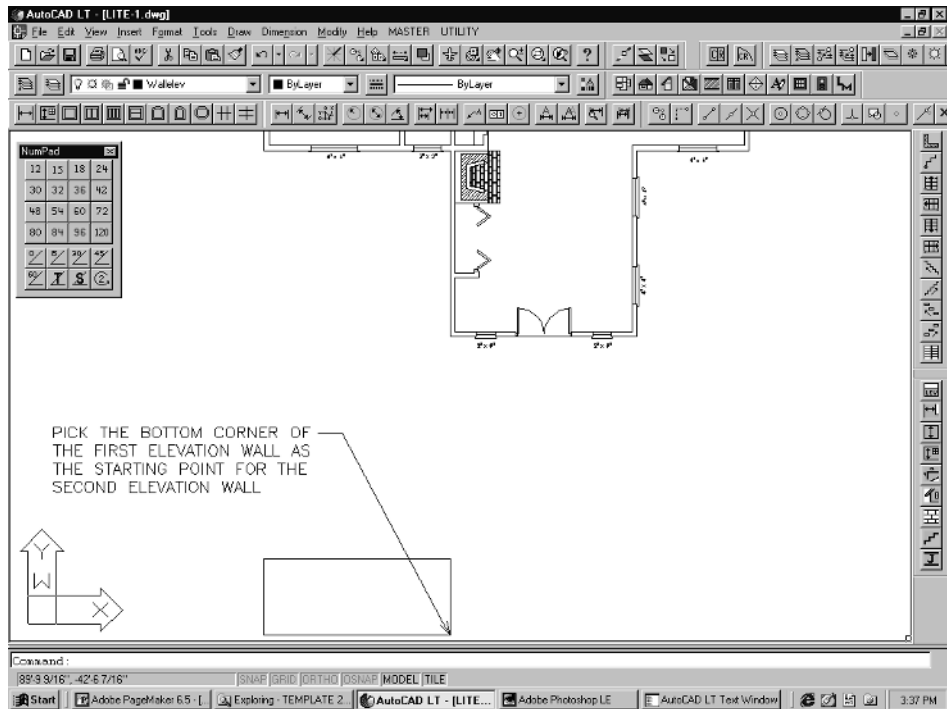


Figure 6-62

6. Pull the cursor to the right, line up the crosshair with the next building corner, and pick with your left mouse button. The second section of the elevation wall will be drawn, as shown in Figure 6-63. The Elevation Menu will pop back up.

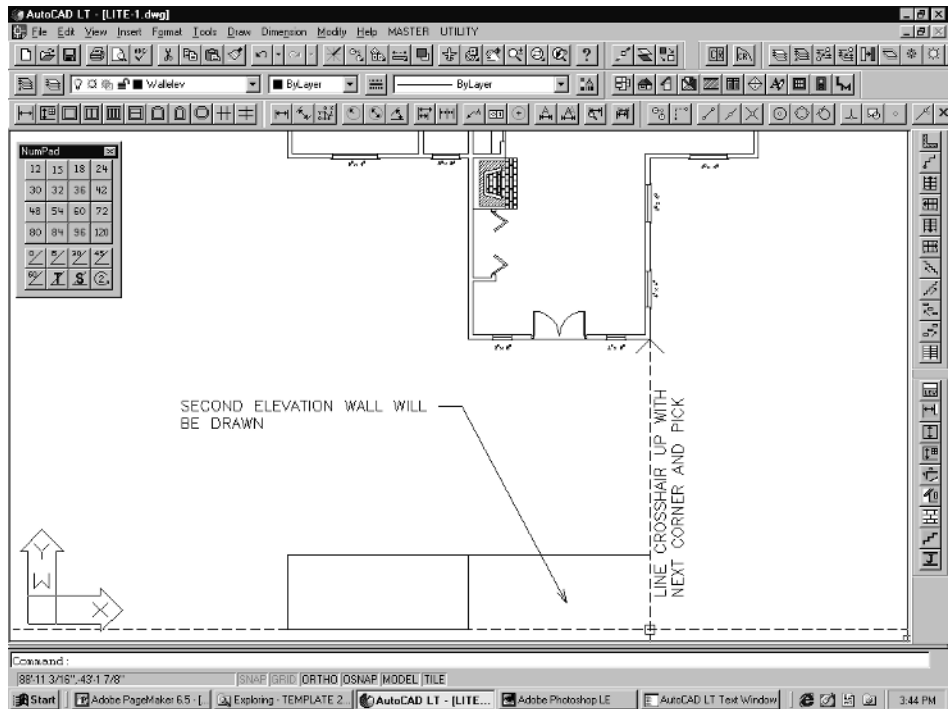


Figure 6-63

- Again, select the **Horizontal Walls** button. At the *First point* prompt, pick the bottom right corner of the second elevation wall. Use your Endpoint Osnap to make sure you are grabbing the corner.

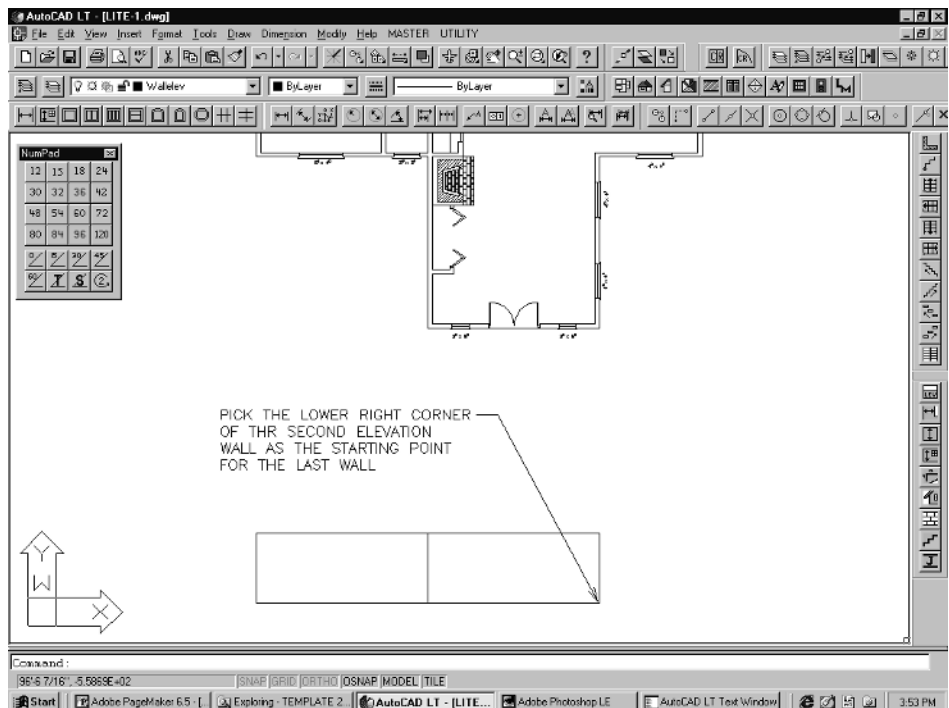


Figure 6-64

8. Finally, pull the cursor to the right, line up the crosshair with the last building corner, and pick with your left mouse button. The third section of the elevation wall will be drawn, and the Elevation menu will pop back up.

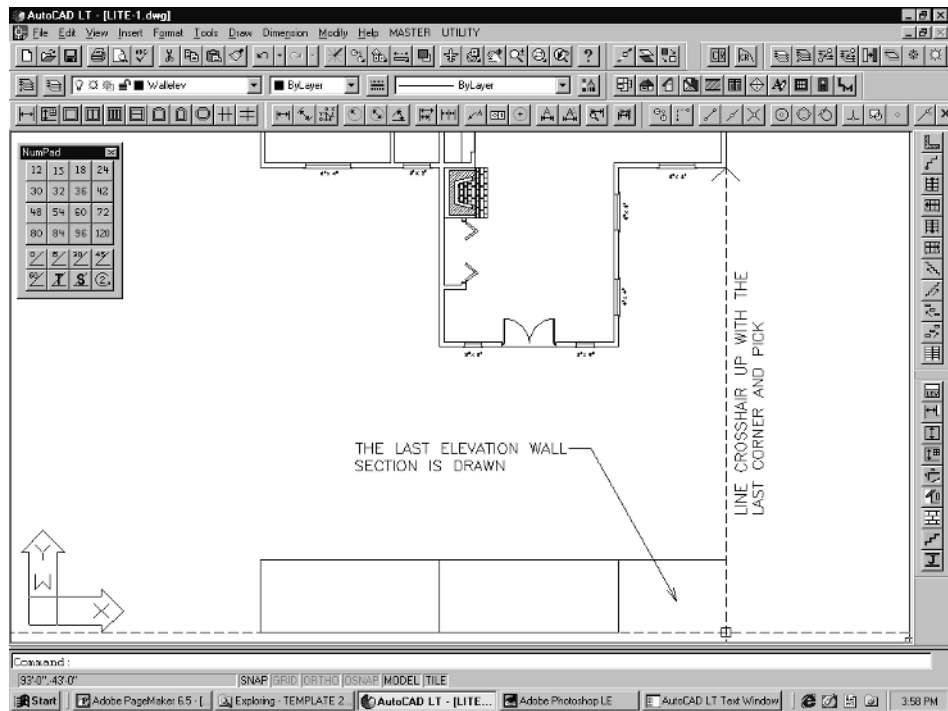


Figure 6-65

Drawing Elevation Windows and Doors

Next, you will insert the elevation windows. Back in Chapter 4, you needed to draw a header line and you not only needed to have a collection of all sizes of elevation windows, but also all styles of these sizes. This is a big collection of blocks you need to create. You also need to draw the frames, etc.

This is not the case with Real Architect. The program simply places windows based on the style you choose and the size you select. It places the windows exactly where they should be placed. You define the header, or top of window height, and the program does the rest. It even knows that the wall hatching should not run through the windows, as it did when we inserted the hatching manually in Chapter 4.

Here's how it works. You have already defined the header height as 80", or 6'-8". This is fairly standard. You know the window sizes because you labeled them earlier. I prefer to use the Polyline Windows, located on the Polyline Windows toolbar.

Figure 6-66



The first button from the left is used for setting the window frame width. The second button allows you to change header height on the fly. The last two buttons are for adding muntins, or divided lights, to any of the windows. The rest of the buttons are the various types of window styles available.

1. Once you have set the frame width, select the type of window you want to use. Since this is the scaled-down version of Real Architect, there is only one type of window available. This is the fourth from the left, the sliding window. Pick this window button. The first two prompts will be for the width and height of the window.
2. When prompted for the *Variable name: Winwidth Value <30>*, type in **60** and **Enter**, or pick the number **60** from the Number Pad. At the *Variable name: Winheight Value <36>* prompt, type in **48** and **Enter**, or pick the number **48** from the Number Pad.
3. Next you will be prompted to pick a point *ins of*. This is telling you to pick on the plan window. The cursor will automatically grab the center of the window as you pass the cursor over it.
4. The last prompt is *per to*. This is telling you to pick on the floor line of the elevation wall. The cursor will automatically grab the perpendicular point of the floor line as you pass the cursor over it. See Figure 6-67.

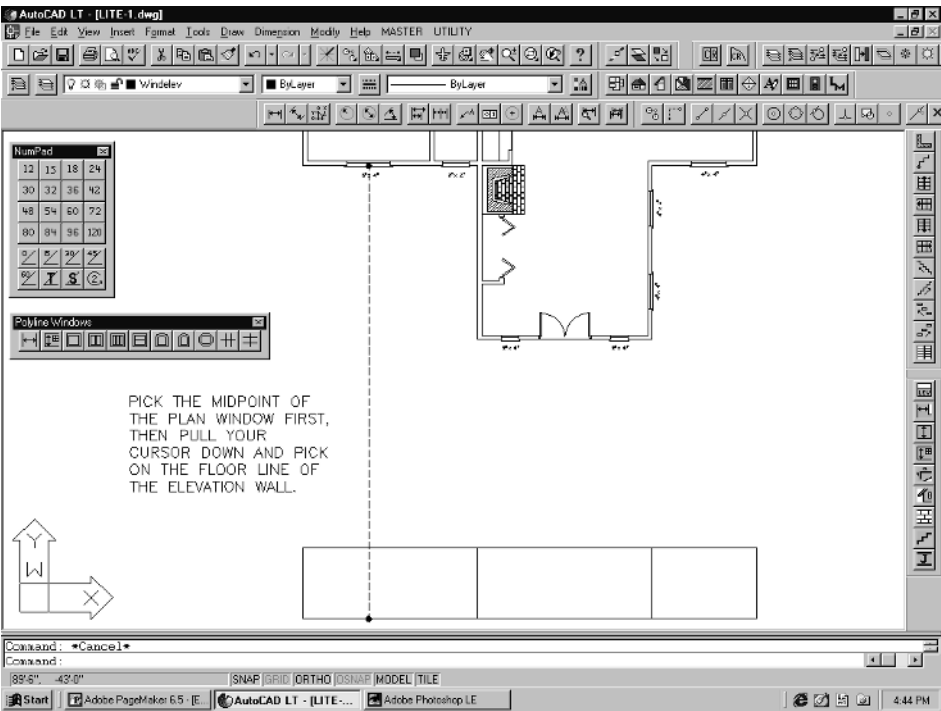


Figure 6-67

The window will then be drawn.

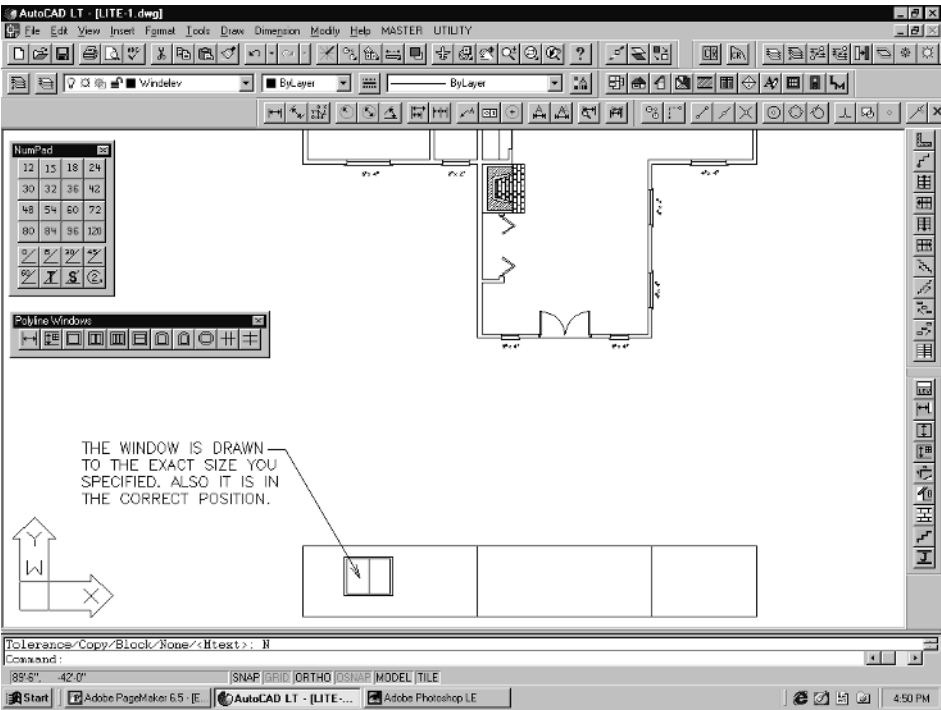


Figure 6-68

5. Go ahead and select the next type of window and finish the windows for this elevation, as shown in Figure 6-69.

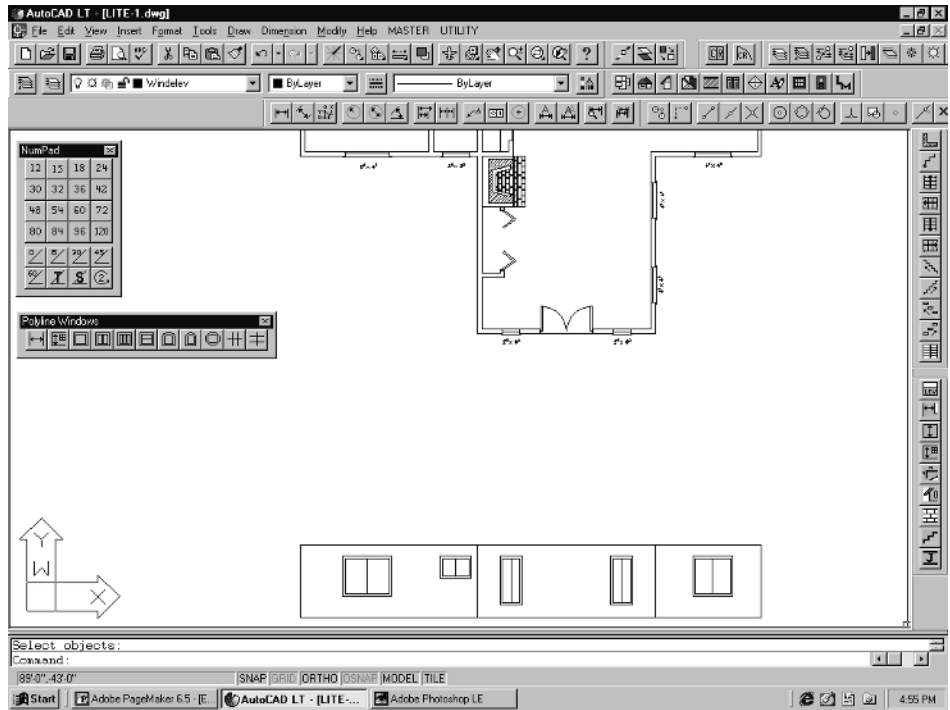


Figure 6-69

6. To add the double front door, pick the **Elevation Menu** again. Pick the **Doors** button. The elevation door menu will pop up.

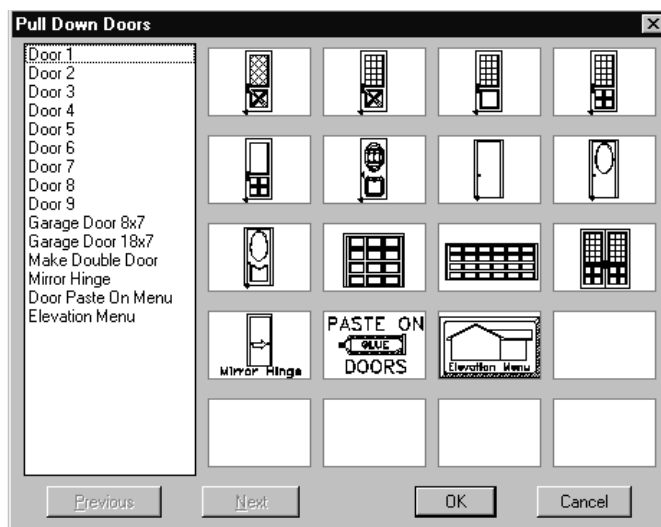


Figure 6-70

7. Select any one of the single doors. You will be prompted to pick a point *ins of*. This is telling you to pick on the plan door. The cursor will automatically grab the center of the door opening, as you pass the cursor over the door itself. When you see the “glyph” light up, pick with your left mouse button.
8. The last prompt is *per to*. This is telling you to pick on the floor line of the elevation wall. The cursor will automatically grab the perpendicular point of the floor line as you pass the cursor over it. See Figure 6-71.

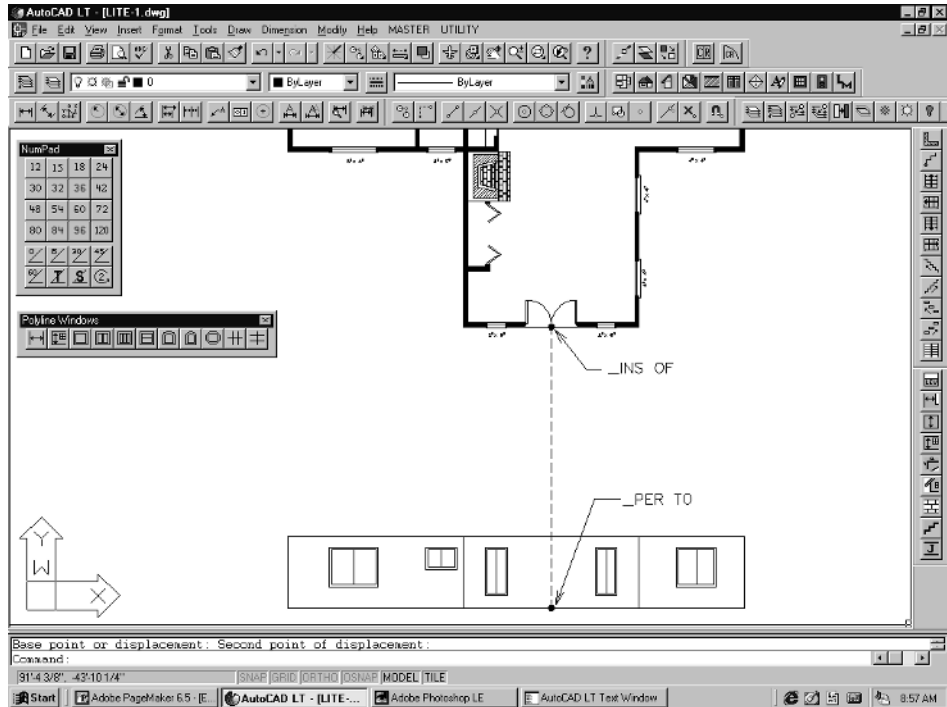


Figure 6-71

The single door will be drawn as shown in Figure 6-72.

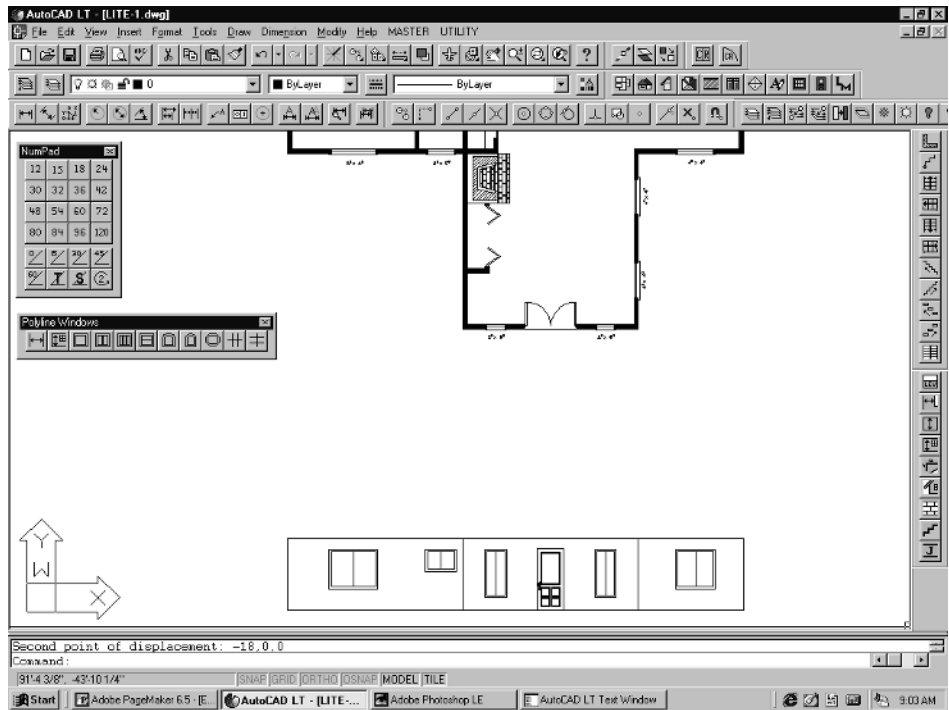


Figure 6-72

9. The elevation door menu will pop back up. Select the **Make Double Door** button to change the single door into a double door. As soon as you select the button, you will be prompted to *Select objects*. Pick on the new elevation door. The second prompt will say *Select objects: First point of mirror line: _ins of*. Slide your cursor over the door. When you see the “glyph” light up in the lower corner of the door, pick with your left mouse button. The double door will be drawn, as shown in Figure 6-73.

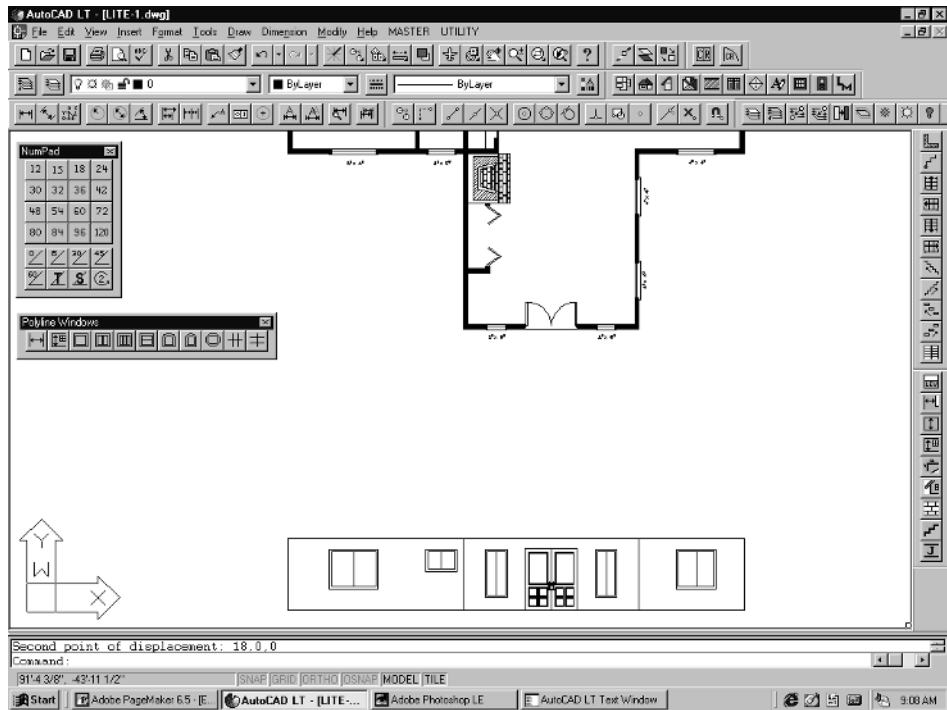


Figure 6-73

That's it for the walls, windows, and doors. Drawing the roof is a little trickier.

1. First, start with the roof over the room with the double doors. Pick the **Elevation Menu**. Select the **Left Hip** button. The first prompt will be for *Point: _endp of*. Pick the top left corner of this room, as in Figure 6-74.

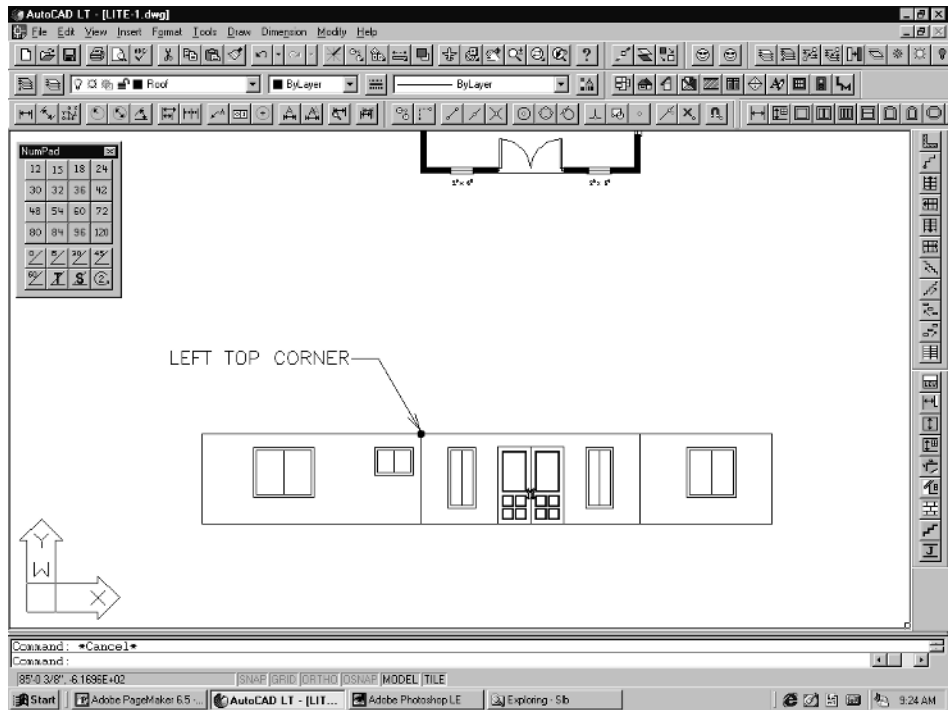


Figure 6-74

2. The roof line and fascia will be drawn. You will be prompted *<Select object to change>/Undo: @*. Just pull your cursor to the right. You will see the roof line lengthen as you pull. Pick with your left mouse button when you feel it is long enough. See Figure 6-75.

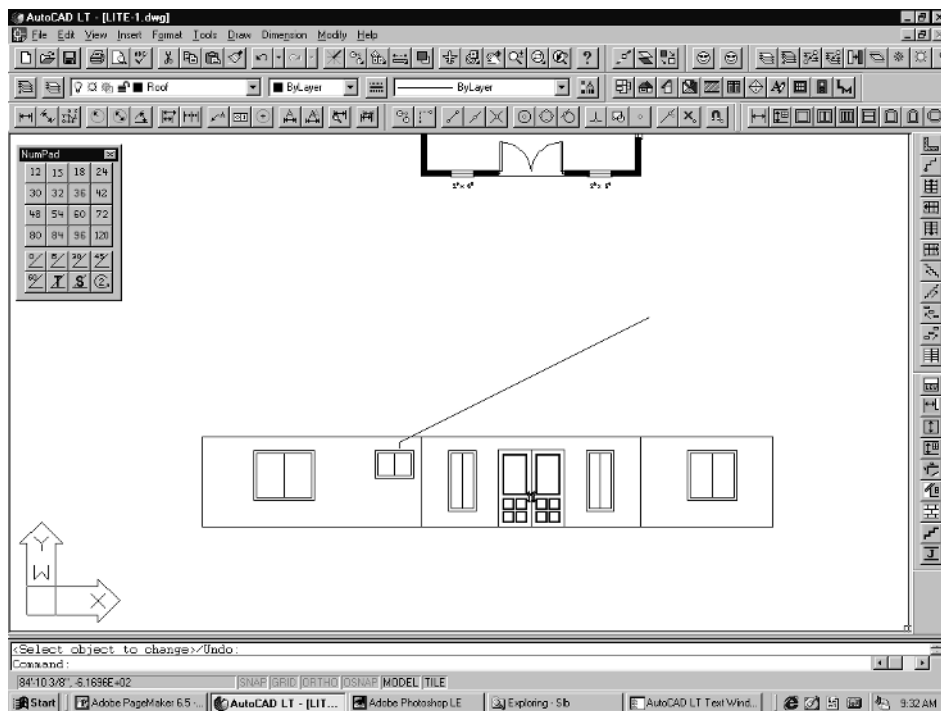


Figure 6-75

3. The Elevation Menu will pop up again. Select the **Right Hip** button and follow the same steps. Don't worry about how long the roof lines are. You can always trim them later. See Figure 6-76.

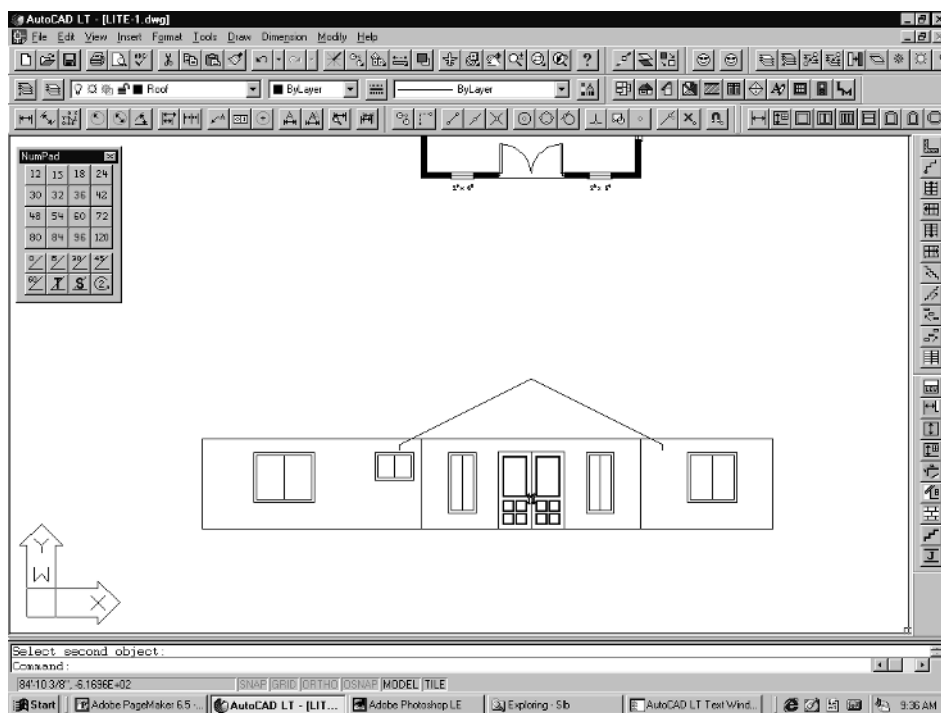


Figure 6-76

Real Architect LITE lacks all of the tools necessary to show you how to complete the roof on this house. However, Figure 6-77 shows a finished set of all four elevations that were done with the full Real Architect 2000 program. These elevations took only a few minutes each to complete.

There is much more to the program including a roof layout menu, complete elevation cabinetry libraries, many more symbols and blocks, and also a large collection of utilities that you will find not only saves you time, but just makes drafting a much easier job.

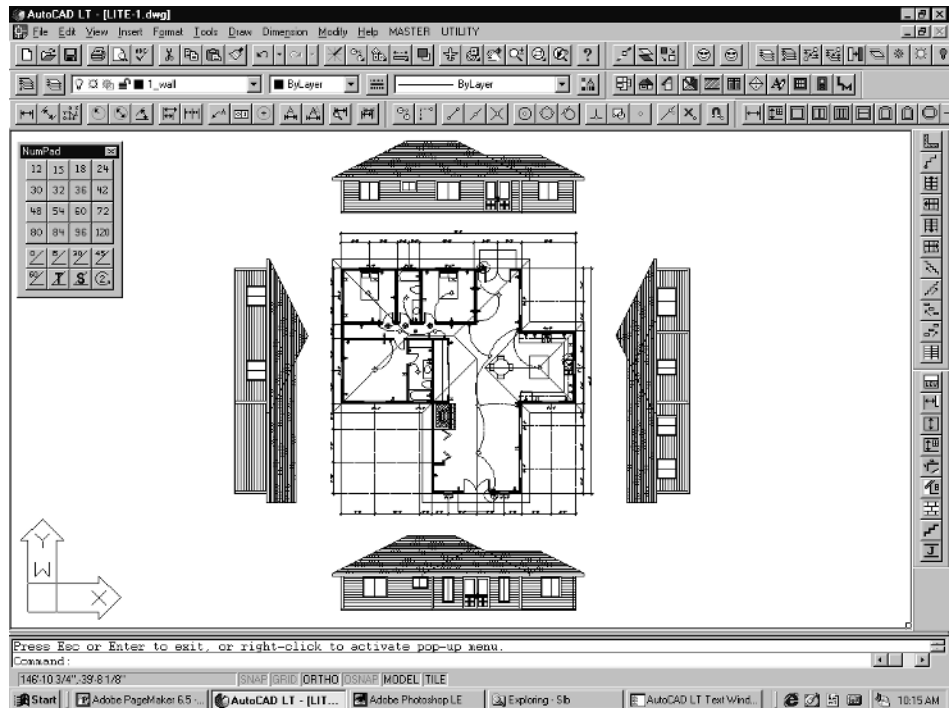


Figure 6-77

Real Architect Utility Toolbars

Real Architect contains a large assortment of tools and utility commands that will help you maintain control over the elements in a drawing. These tools will also help to improve your productivity. We recommend that you keep the Layer Control and the Settings toolbars on your desktop.

Here are a couple of tips that can really help when using Real Architect LITE or the Real Architect full version.

- If you need to stretch your dimension lines, use the Lock Selected button on the Layer Control toolbar. Pick it, then pick on any layer that you don't want stretched while stretching the dimension lines. You can use this for wall lines as well. When you're done, pick the Unlock All button.

- Turn off your headers on a regular basis. The command is located on the MASTER pull-down menu. The headers will still be drawn when you insert a window or door, you just won't see them.
- Make sure you have the Settings toolbar up at all times. This way you can check and change settings easily.
- Try to get used to using the Number Pad, especially when placing plan or elevation windows or doors. It is much easier when drawing an elevation window to pick the 72 button and the 48 button, rather than type 72 and Enter, then type 48 and Enter when prompted for the width and the height.
- The Color Control toolbar is a great way to change colors of a layer by simply selecting the color you want, and then picking on an entity on the screen that is on that layer. It will automatically change all the entities on that layer to the new color. Great for printing or plotting.

These are just a few hints for some of the utilities available in Real Architect. The next few pages take a more in-depth look at each of these features. They are real time savers and help to make learning to use AutoCAD LT a bit easier.

Settings Toolbar

The Settings toolbar allows you to change your drawing variables quickly. To change a setting, simply pick the button for the one you want to change. The existing value will be shown on the command line at the bottom of your screen. Type in a new value and press Enter or your right mouse button.

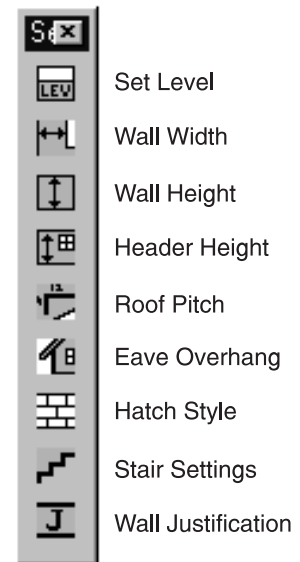


Figure 6-78

Number Pad

The Number Pad is used for selecting sizes for windows and doors, instead of typing in the numbers. It is a regular toolbar and can be moved or docked anywhere on the screen. The Number Pad does not have to be used, but we think that you will find it useful when placing windows and doors. To use it, simply pick on the appropriate button when prompted for the USER15 value (window or door length) as you place the window or door. You can always type this value and Enter, if you prefer.

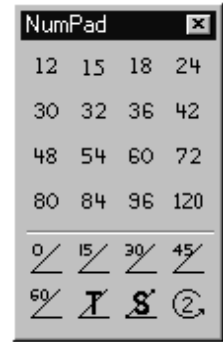


Figure 6-79

Color Control

The Color Control item is located on the UTILITY drop-down menu. You can use this to change the color for the different architectural elements in the drawing. To change the color of your walls in the current drawing, you would pick the Color Walls item. The Select Color dialog box will pop up. Double-pick on the color you want to use. The walls will automatically be changed to that color.

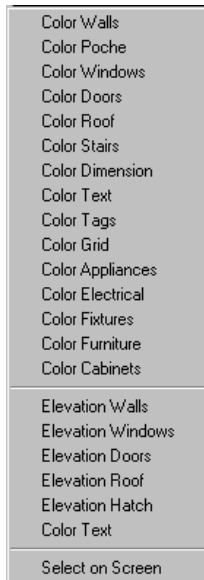


Figure 6-80

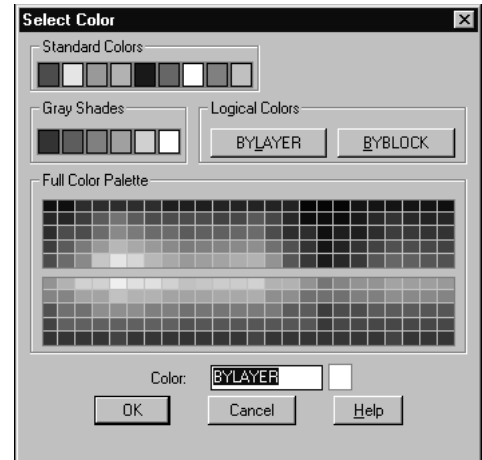


Figure 6-81

You can also use the Select on Screen option in the pull-down, which allows you to change the color of a layer by picking it from the screen. The Select Color dialog box will come up. Select the color you wish to use by double-picking on it. Then select an object on the screen that is on the layer whose color you want to change. It will be changed to the color you selected.

There is also a Color Control toolbar. The first button is the Select on Screen option. The second button changes the current layer's color. The third button is for changing the color of individual entities.



Figure 6-82

Layer Control Toolbar

You will probably find yourself using the Layer Control toolbar more than any other, because it is so useful. This toolbar allows you to manipulate layers by selecting objects on the screen. For example, you can turn a layer off by picking an object on the screen that is on that layer. All elements on that layer will be turned off. Additionally, you can turn layers on, freeze, thaw, copy to another layer, change to another layer, and lock and unlock. This is a powerful tool that you will find indispensable for architectural or any other type of drafting. Only a couple of these layer control buttons are functional in the LITE version of Real Architect. These are the button that turns off a layer by selecting an object on the screen, and the button that turns all layers back on. However, these two buttons will give you an idea of how useful the layer controls can be.



Figure 6-83

AutoCAD LT 2000i has a new Layer States utility that is located in the Layer Properties Manager dialog box. It allows you to save layer settings as a group. For example, you might want only certain layers visible when you print your roof plan. You simply turn on or off the layers you want to save as a layer state, then pick the Layer State button. Type a name for the layer state, such as Roof Plan, in the New layer state name box. Make sure you check off the On/Off item in the Layer States box below the name and then pick OK. Whenever you want to recall this layer state, call up the Layer Properties Manager and select the Restore State button.

You can also use the Layer States utility to change color and linestyle of layers. As an example, let's say you have a floor plan. When you print the floor plan, you want the wall lines to be continuous and the color to be red. When you print your roof plan, you also want to show the wall lines, but you want them to be dashed and blue in color. You can save these "states" with the Layer States utility. Instead of having to change the wall lines every time, you simply restore the different layer states you have defined.

Stairs Toolbar

The stair commands are located on the MASTER pull-down menu. You will need to set the stair variables before you build the stairs. These variables are located on the main control dialog or on the Settings toolbar. The variables are tread rise, tread run, and stair width. Average settings might be an 8" rise, 12" run, and a total stair width of 36".

The Stairs toolbar is pictured here. It contains all the commands for building both plan and elevation stairs.



Figure 6-84

The other way to access the stair commands is from the MASTER pull-down menu, under the Stairs & Decks item. The Stairs & Decks pull-down is shown below with explanations for each command.

Stair Start Point	Defines the starting point for both plan and elevation stairs.
Stair Up	Draws plan stair treads going from bottom to top.
Stair Down	Draws plan stair treads going from top to bottom.
Stair Left	Draws plan stair treads going from right to left.
Stair Right	Draws plan stair treads going from left to right.
Elev LineStair ==>	Draws line type elevation stairs from left to right.
Elev LineStair <==	Draws line type elevation stairs from right to left.
Elev BlockStair ==>	Draws block type elevation stairs from left to right.
Elev BlockStair <==	Draws block type elevation stairs from right to left.
Stair Rail	Draws stair baluster lines.
Decking Elevation	Draws deck rail pickets.

Figure 6-85

You must use the Stair Start Point command to establish the starting point for both the plan or elevation stairs. Pick the command and then pick a starting point for the bottom of the stairs.

Once you have done this, go back to the menu and pick the appropriate stair command. If they are plan stairs, you can pick Up, Left, Down, or Right. If they are elevation stairs, they either go up to the left or the right.

All the stair commands loop continuously, so you just keep picking the right mouse button to add treads. Hit Esc when you are done. Figures 6-86 and 6-87 show the different types of stairs available.

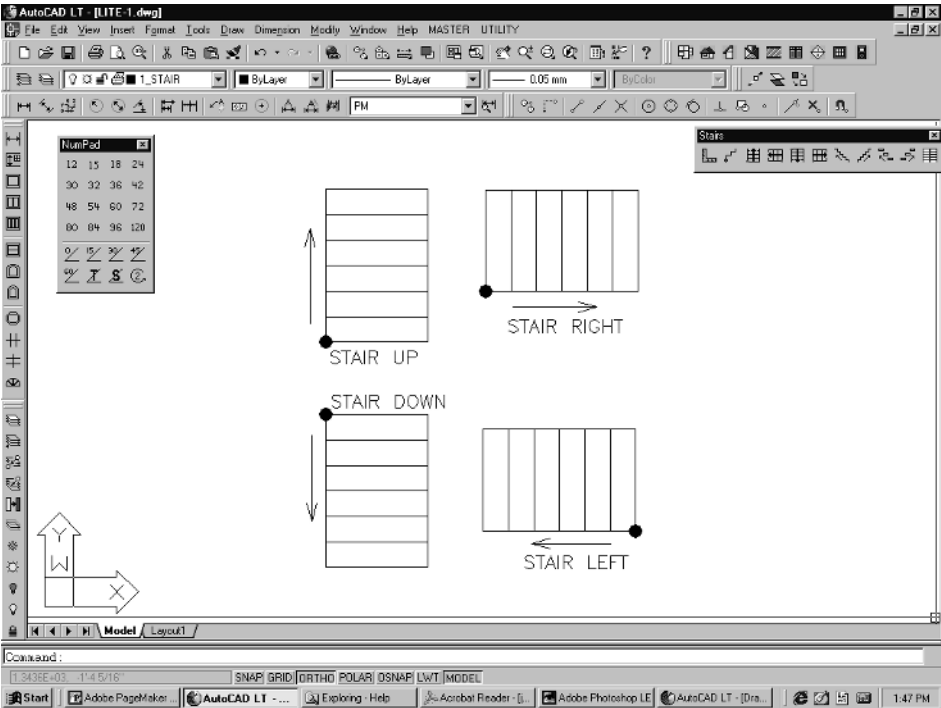


Figure 6-86

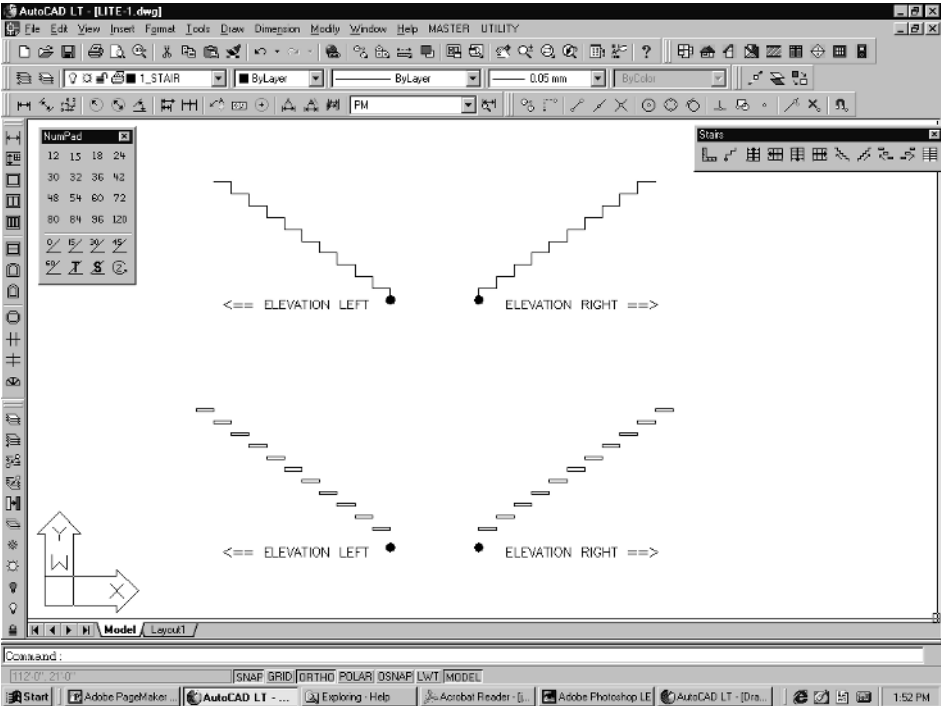


Figure 6-87

The Elevation Stairs have two styles—simple lines or a “block” type. If you were building stairs with 4x12 treads, you would probably use the “block” type.

Because the program does not automatically figure out the individual tread rise and run based on the total floor to floor height, you need to do a little calculating first. These individual rise and run dimensions are required by the program.

The first item you pick is the Stair Setup item or button. There are three prompts. The first is for the “strise” which is the height of each individual rise. If the rise is 8 inches per tread, type 8 and Enter. The second is for the “strun” which is the run of each individual tread. If each tread is 12" wide, type 12 and Enter. The last is for the “strwid.” This is the total width of the stairs. This is for the plan stairs only. If your stairs are 4 feet wide, type 48 and Enter. These can be changed at any time.

Here is a formula to use when figuring out individual rise and run. First, take the total floor to floor height in inches, and divide it by 8. Eight inches is the maximum permissible height in most countries for individual stair risers. You normally want to keep the individual riser height between 7 and 8 inches.

Total Height in Inches / 8 = Number of Risers

Example: 108" divided by 8 = 13.5

The number of risers must be a whole number, so this means 8 will not work, because you can't have 13.5 risers. This means you must go to the next higher number of total risers, which would be 14. Then, divide the total floor to floor height by that number. This will give you a new individual riser height.

Example: 108" / 14 = 7.7142

This would make each riser 7-11/16" high. It is slightly lower than 8", but it will work. You could go to 15 risers and still keep the individual risers over 7" in height.

Example: 108" / 15 = 7.2

This would make each riser 7-3/16" high. The second and third examples both work, but we will use the third example for this exercise.

The total number of individual treads is always one less than the number of risers. This is because the floor serves as the top tread. So, if you have 15 risers, your stairs will have 14 treads.

The total run of the stairs depends on what the individual tread width is. They usually are between 10-1/2" and 11-1/2" wide. Let's go with 10-1/2" per tread. This is what we end up with:

Floor to floor height of 108"

Individual risers are 7-3/16"

Individual treads are 10-1/2"

Total run is 12'-3"

The other consideration, of course, is the space that you have to play with for the total stair run. This is why the individual tread run is so important. It would be great if all buildings had enough room so that you could build a straight run of stairs with each tread 11-1/2" inches long and each riser 7-5/8" high. Unfortunately, this is not usually the case.



NOTE: Remember that you can enter distances using either fractions or decimals. The full Real Architect 2000 stair tools allow you to draw L- and U-shaped stairs, as well as the standard straight style. The LITE version of the program is missing most of these tools, although it contains enough to give you an idea on how they work.

There are many more tools and utilities in Real Architect LITE, but we will leave these to you to find. If you have any questions regarding the program, e-mail us at: support@realarchitect.com.

Summary

Chapter 6 has given you a brief look at the Real Architect LITE program. The advantage of using an add-on product like this is that you save time. It not only cuts down on the setting up of an architectural drawing, but you also save time with all of the repetitive tasks involved in creating a set of plans.

I hope that this book has helped you to get a better handle on using AutoCAD LT for architectural drafting. This is a “starter” type of book. There are many aspects of drafting that we did not cover, such as creating a site plan, multistory construction, floor framing, and much more. But the real reason the book was written was not to teach you architectural drafting, but rather to teach you how to use AutoCAD LT for architectural drafting.

If you do not have a drafting background, you should definitely consider reading books on the subject and even taking a course at a local technical school. If you know a contractor or architect in your area, you might ask them to lend you an old set of blueprints for study. This is an excellent way to see what drawings are required in your area in order to get a building permit. It is also an excellent way to practice using AutoCAD LT.

If you have a drafting or building background, but have always used the traditional pencil and paper to create your plans, I hope that this book has helped you to get a little more comfortable using AutoCAD LT. Remember, there are no magic programs out there that create sets of working drawings with a couple of mouse picks. Drafting takes time, but by learning to use AutoCAD LT more efficiently, you begin to realize the true benefits of CAD. So, good luck and give us a call or e-mail us with any suggestions, feedback, or questions you may have.

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Appendix

Sheets #1 through #4 are hand-drawn sketches of the different elements for the project you will be creating in Chapters 1 through 5. These sketches are similar to the types of materials you can expect to get from architects and contractors when starting a new project. Sheet #5 is a schematic view of a detail.

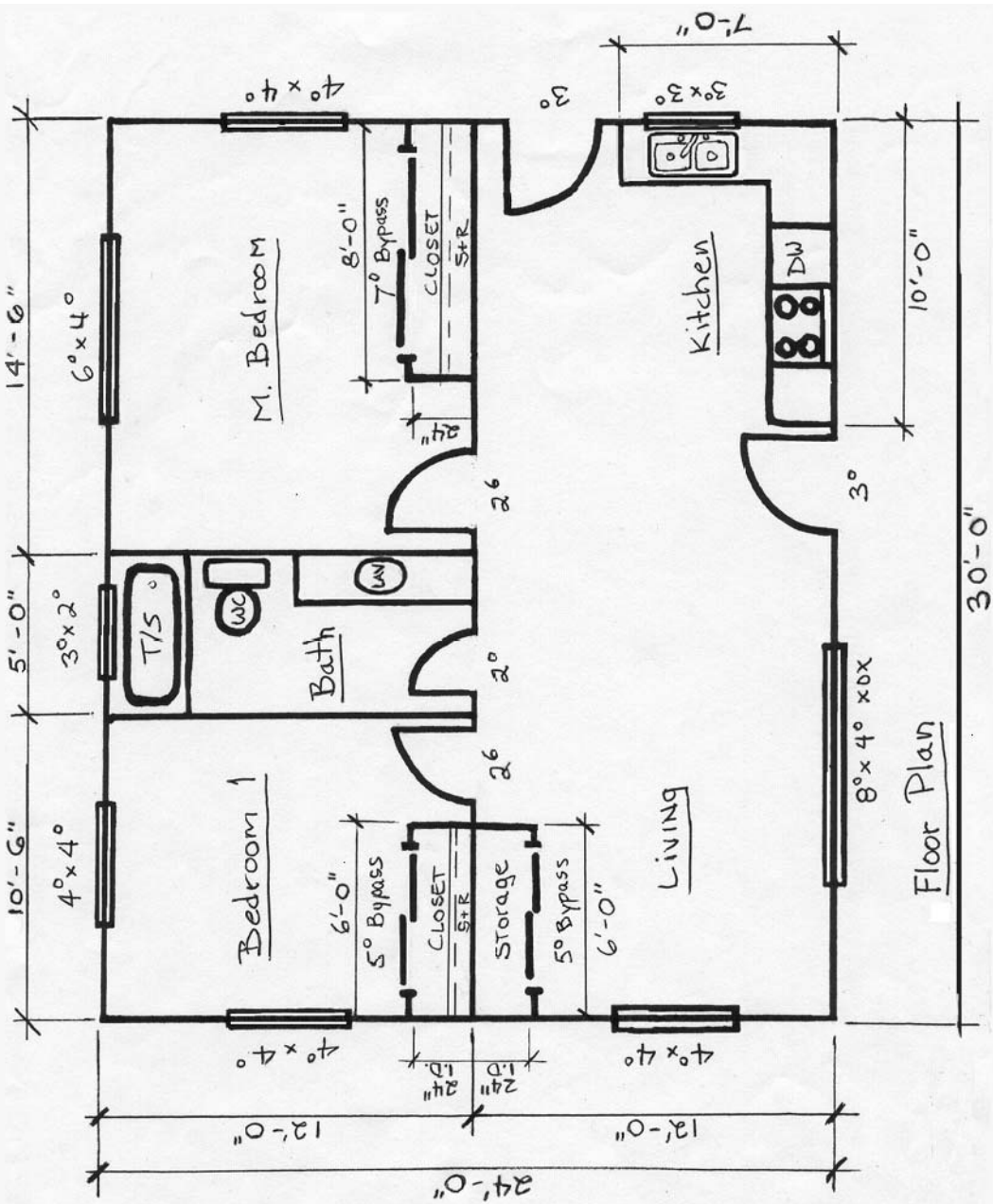
These drawings are referenced throughout the early chapters in the book. They are helpful because they give you an overall concept of the project you will be working on. They also contain the information necessary for drawing the floor, foundation, and roof plans, as well as the section and elevations. This information includes window and door sizes, dimensions, roof pitch and overhang, notes, and labels.

Sheets #1 through #5 are also available on the companion CD. You will find them in the folder named Sheets 1-5. They are Adobe Acrobat Reader files (.pdf) and can be opened and printed. This allows you to reference them without having to turn to the back of the book. To open any of these sheet files, simply double-click on the file. This will start the Acrobat Reader program and the sheet drawing will come up automatically. To print the file, select Print from the File pull-down menu.

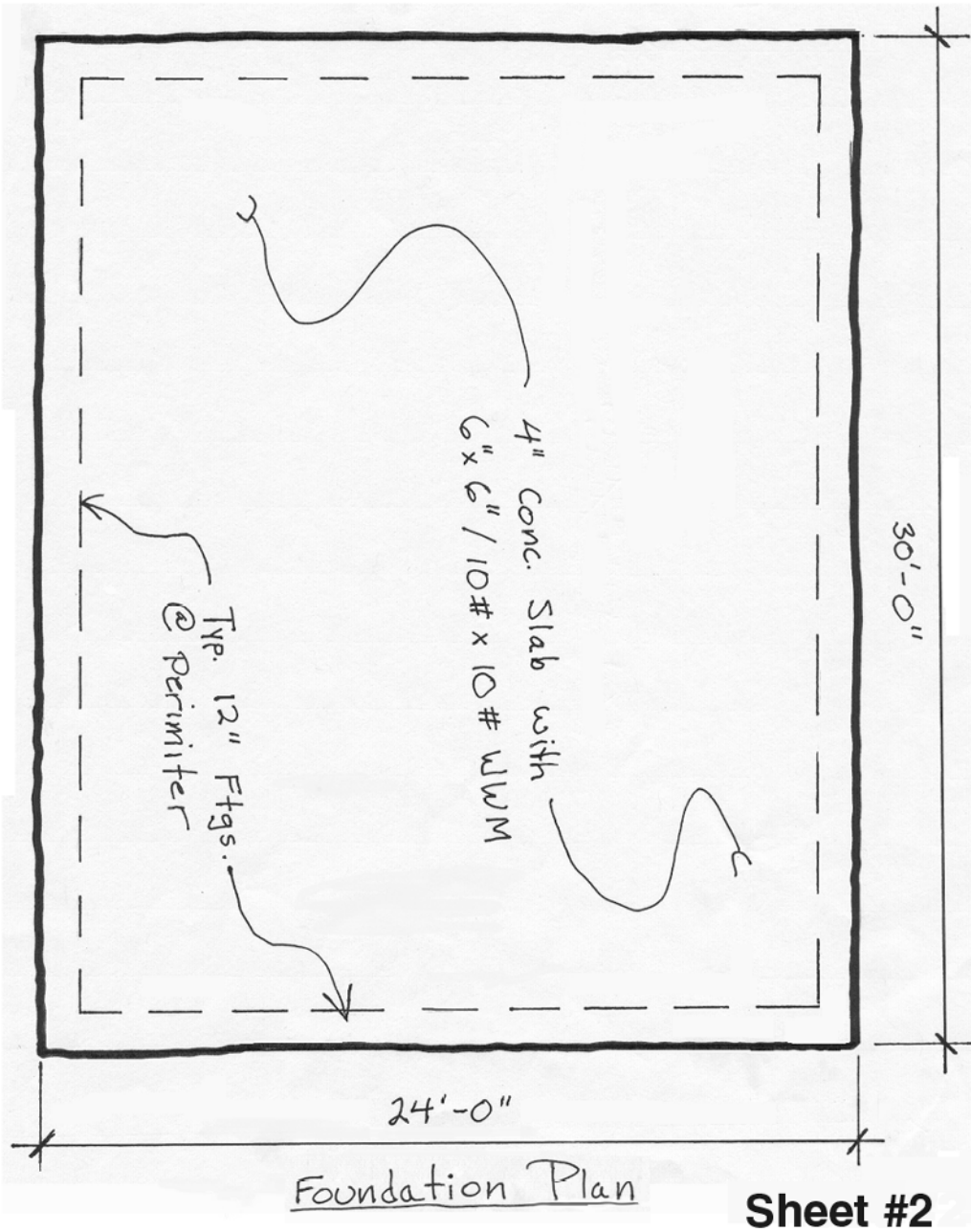


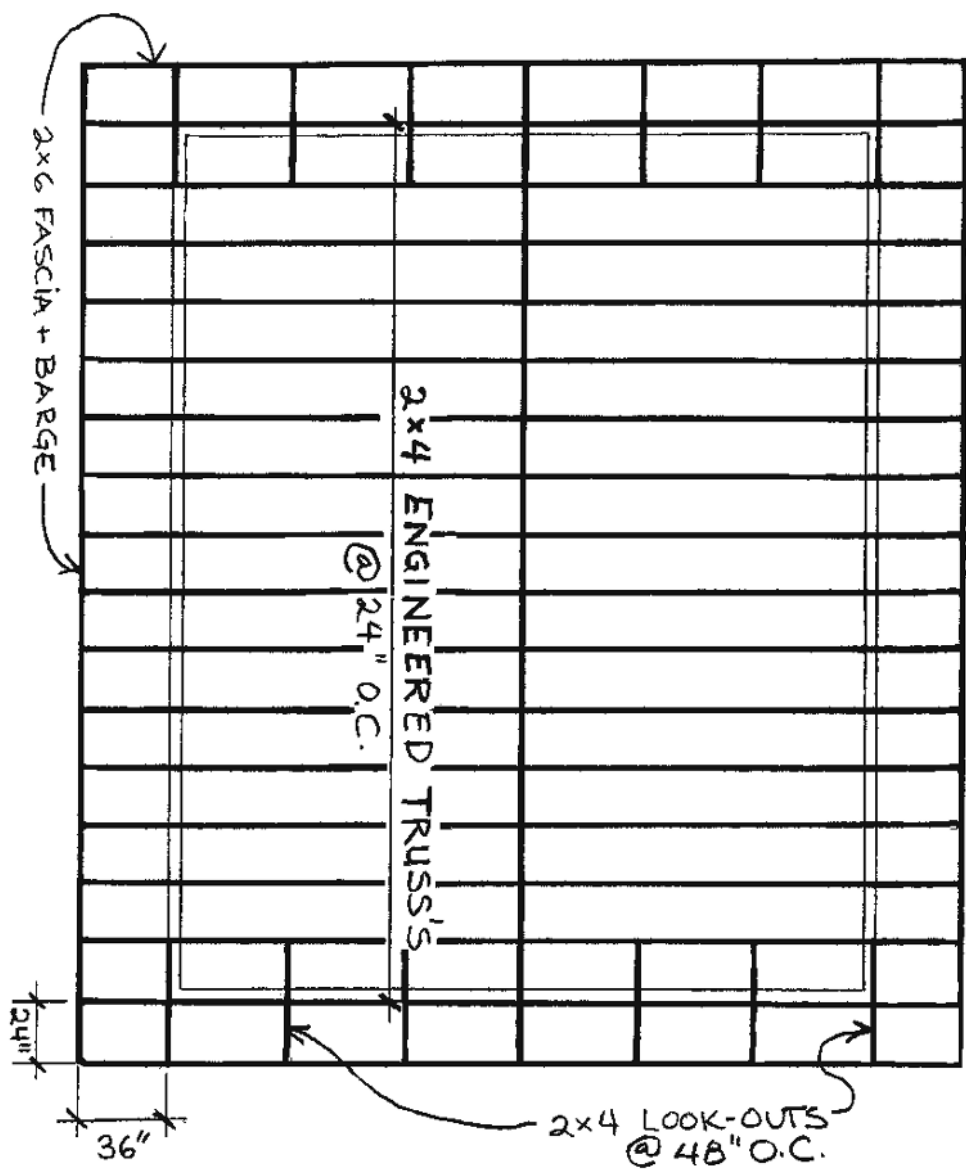
NOTE: You must have the Adobe Acrobat Reader program installed on your machine in order to view and print these files. If you followed the procedures above and nothing happened, you probably don't have Acrobat Reader installed. There is a free copy of the Acrobat Reader program on the companion CD. To install it, use Windows Explorer to go to your CD drive. Pick on the folder named Acrobat Reader. Double-click on the file named Setup.exe to begin the installation, then follow the on-screen instructions.

Once the program is installed, you can then go back to the CD drive with Windows Explorer and pick the folder named Sheets 1-5. Then, double-click on the file you wish to open.

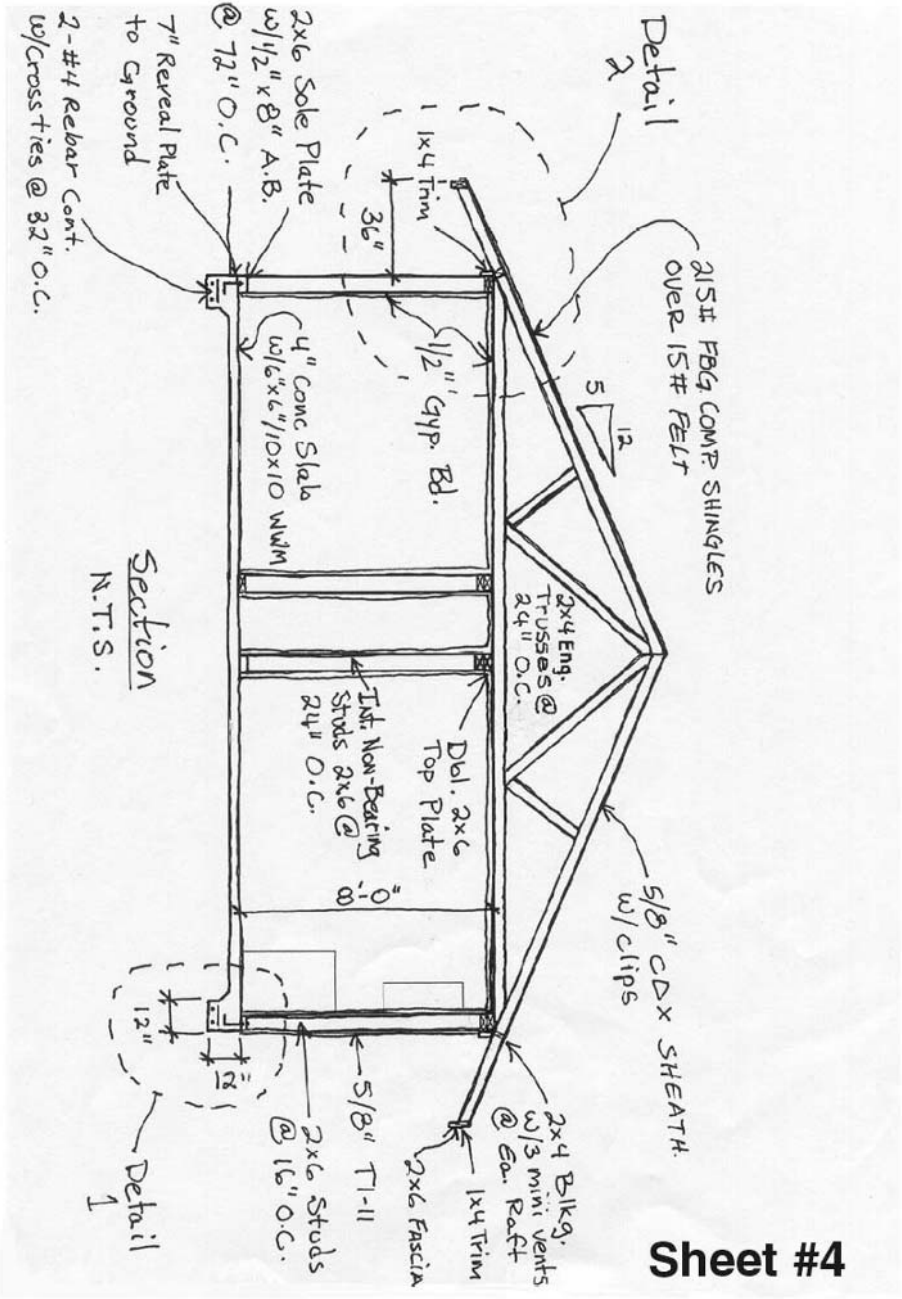


Sheet #1

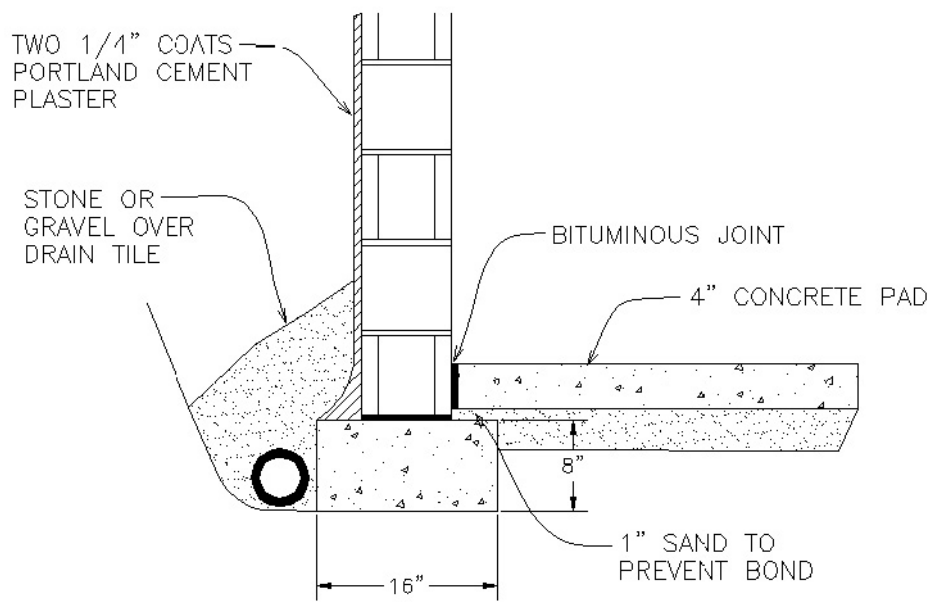




Sheet #3



Sheet #4



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About the CD

The companion CD-ROM contains template files used in the creation of a floor plan, sections, and elevations; Real Architect LITE, a scaled-down version of an architectural front end; sample documents similar to those you would receive from a contractor; and a 30-day trial version of AutoCAD LT 2000i from Autodesk.

When you insert the CD into your CD drive, the AutoCAD LT 2000i trial version will autorun. Follow the on-screen installation instructions.

Use Windows Explorer to access the Ralite, Ra2000, and Sheets 1-5 folders. Ralite contains the templates and toolbar that are installed in Chapter 1. Ra2000 contains Real Architect LITE, which is used in Chapter 6. See the respective chapters for installation instructions. The sample documents shown in the appendix are located in the Sheets 1-5 folder. See the appendix for information on accessing these documents.

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