# Visio® 2000 Technical Edition

## Evaluation Guide

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# Getting started

This guide covers the fundamentals of Visio® 2000 Technical Edition, focusing on the drawing types and methods you're likely to use most often.

## Installing the Visio 2000 Technical Edition Test Drive

You must be running Microsoft Windows 95, Microsoft Windows 98, or Microsoft Windows NT 4.0 or later to install Visio 2000 from the Visio 2000 Technical Edition Test Drive CD.

**NOTE** *To prepare for installation, close all programs and turn off virus-protection software to prevent installation conflicts.*

On most Windows-based systems, installation starts automatically when you insert the Technical Edition Test Drive CD into your CD-ROM drive. If installation does not start automatically, you can install the Technical Edition Test Drive using the following procedure.

### To install the Visio 2000 Technical Edition Test Drive

1. Insert the Visio 2000 Technical Edition Test Drive CD into your CD-ROM drive.
2. From the Start menu, choose Run.
3. In the Run dialog box, type *d:\setup*, where *d* is the letter assigned to your CD-ROM drive.
4. Click OK.

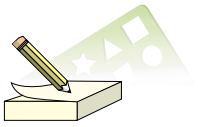
The Visio Installation Manager guides you through the installation process.

## Visio on the Web

To reach Visio Corporation and the Visio Knowledge Base using the World Wide Web, in Visio 2000, choose Help > Visio On The Web. The Visio Knowledge Base offers the latest tips on using Visio 2000 products and includes articles that answer frequently asked questions (FAQs).

You can also visit the Visio Web site (www.visio.com), which contains information on service releases, support forums, and training opportunities. To contact customer service or technical support, visit www.visio.com/visioontheweb, and then follow the links to locate support information for your geographic area.

# What's new in Visio 2000



*You can view the* Technical Edition User Guide *in PDF format, or view online Help on the Visio 2000 Technical Edition Test Drive CD.*

New and powerful additions to Visio® 2000 Technical Edition make it easier than ever to create technical drawings and diagrams.

## Common tasks made easy

You can work faster and smarter using a core group of enhanced features that all of the Visio 2000 products share.

- Easily create custom data for shapes that you can later use for reports.
- Set tabs, margins, and hanging indents using a text editing ruler.
- Nudge selected shapes using the arrow keys for precise placement in your drawing.
- Easily navigate, rearrange, and rename pages using page tabs.
- Edit groups of shapes the same way you edit individual shapes.
- Edit stencils directly in the drawing window.
- Customize menus and toolbars.
- Perform tasks right in the drawing window using quick editing windows.

## For CAD users: Drawing in Visio 2000

Because you work with intelligent shapes in Visio 2000, many of the CAD (computer-aided design) operations you might have used in CAD programs do not exist. Other CAD operations are slightly different (and easier) in Visio 2000. The following table matches some common CAD operations to the Visio 2000 equivalents.

## New and enhanced technical solutions

Visio 2000 offers new and enhanced technical solutions that make it easy to assemble drawings by dragging industry-standard shapes onto a page.

### *Precision drawing tools*

- Draw shapes using the shape extension lines, which provide visual feedback about shape angles, tangents, and other geometric relationships.
- Position and align shapes instantly with the dynamic grid, which provides visual cues to help you align shapes.
- Snap lines to geometric points, such as end points, tangents, and line intersections, for more accurate drawing.

**CAD actions in Visio 2000**

| To perform this CAD action | Do this in Visio 2000 |
|---|---|
| Set drawing scale | Choose File > Page Setup, click the Drawing Scale tab, and then select a scale. Unlike CAD drawings, you generally set the scale for a Visio drawing before you begin. |
| Move an object | Select the shape and drag it. |
| Move an object a specific distance | Select the shape and choose Tools > Macros > Visio Extras > Move. |
| Copy an object | Select the shape and use Ctrl+C and Ctrl+V to copy and paste the shape, or press Ctrl and drag the shape to copy it. |
| Plot a diagram | Choose File > Print. |
| Create a block | Use the Visio drawing tools to create a shape, and then drag the shape to a stencil. |
| Pan and zoom a drawing | Choose View > Windows > Pan & Zoom to open a window in which you can adjust the view of a drawing. |
| Create objects by using operations such as Union, Fragment, and Join | Choose Shape > Operations, and then choose an action. |
| Add a hatch pattern to an object | Select the shape and choose Format > Fill. Choose options from the Color, Pattern, and Pattern Color lists. You can also create your own patterns. |
| Use entity snaps or object snaps | Choose Tools > Snap & Glue and check Shape Extensions. On the Advanced Tab, check the shape extension options you want (for example, Segment Midpoint). |

### *DWG and DGN support*

- Insert CAD drawings created in Autodesk AutoCAD DWG or DXF format or Bentley MicroStation DGN format.
- Convert CAD drawings into Visio format easily by using the new Convert Wizard.
- Choose an industry-standard scale for inserted CAD drawings that either matches the Visio drawing scale or is independent of the Visio drawing scale.
- Snap shapes, such as electrical outlets, HVAC ducts, and furniture, to inserted CAD floor plans.

### *Process Engineering*

- Draw P&IDs (piping and instrumentation diagrams) and PFDs (process flow diagrams) faster using intelligent pipeline connections that automatically reroute.
- Store specification data about process components in customizable datasheets.
- Quickly and easily generate component lists from the data stored in your diagrams.
- Convert your legacy CAD symbols or block libraries into intelligent Process Engineering shapes.
- *New* Print datasheets for many components simultaneously.
- *New* Edit data for multiple components in the Datasheet window, which you can keep open for ease of data entry.

### *Facilities Management*

- Graphically manage office moves and track your facilities assets and employees.
- View relational information about your facilities in the easy-to-navigate Visio CAFM Explorer, which can now be docked so that you can view the Explorer and your drawing at the same time.
- Easily add configured Steelcase 9000 furniture to your facility plan.
- *New* Link to enterprise data in existing corporate databases.

### *Building Architecture*

- Quickly lay out a floor plan by using room and space shapes that you can easily convert to fully dimensioned walls.
- Quickly add dimension lines and guides to any wall, and resize rooms by dragging guides.
- Use space shapes inside rooms to show the room area, which you can update with a single command when you resize the room.

### *Building Services*

- Create HVAC diagrams by using ductwork shapes that automatically rotate, align, and snap to each other.

### *Office layouts*

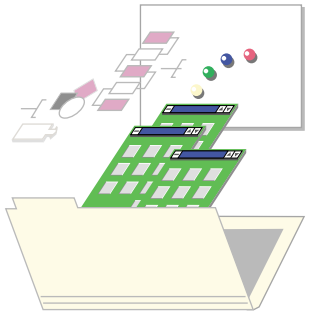
- Quickly lay out office floor plans by using room and space shapes to automatically create walls and dimension lines.

# Visio basics

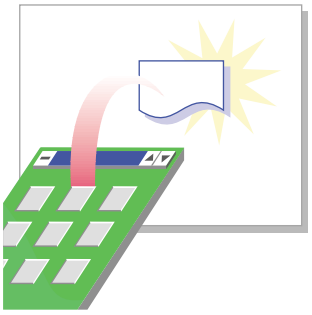
The Visio® 2000 products share a core set of features. This means that you can use the same basic methods to work with all of the Visio 2000 programs to create your drawings.

The following illustration shows five steps that are common to making any Visio 2000 drawing. The next illustration shows the actual workspace you'll use to create Visio drawings.

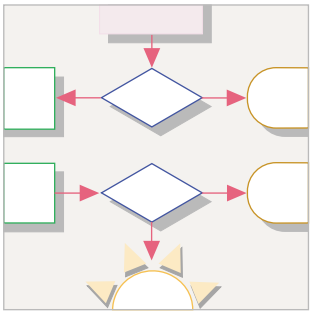
**Five steps to making a Visio drawing**



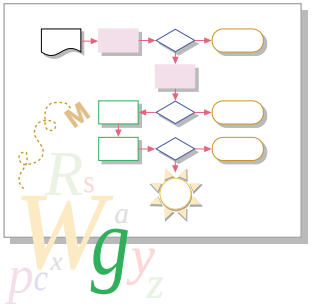
**1** Start a drawing or diagram by opening a drawing type, or template.



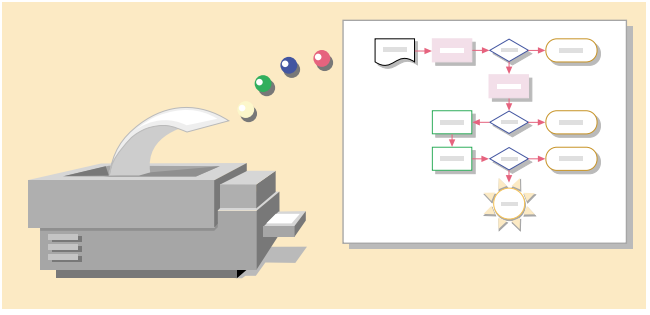
**2** Add shapes by dragging them from the stencil and dropping them onto the drawing page.



**3** Connect the shapes in your drawing.



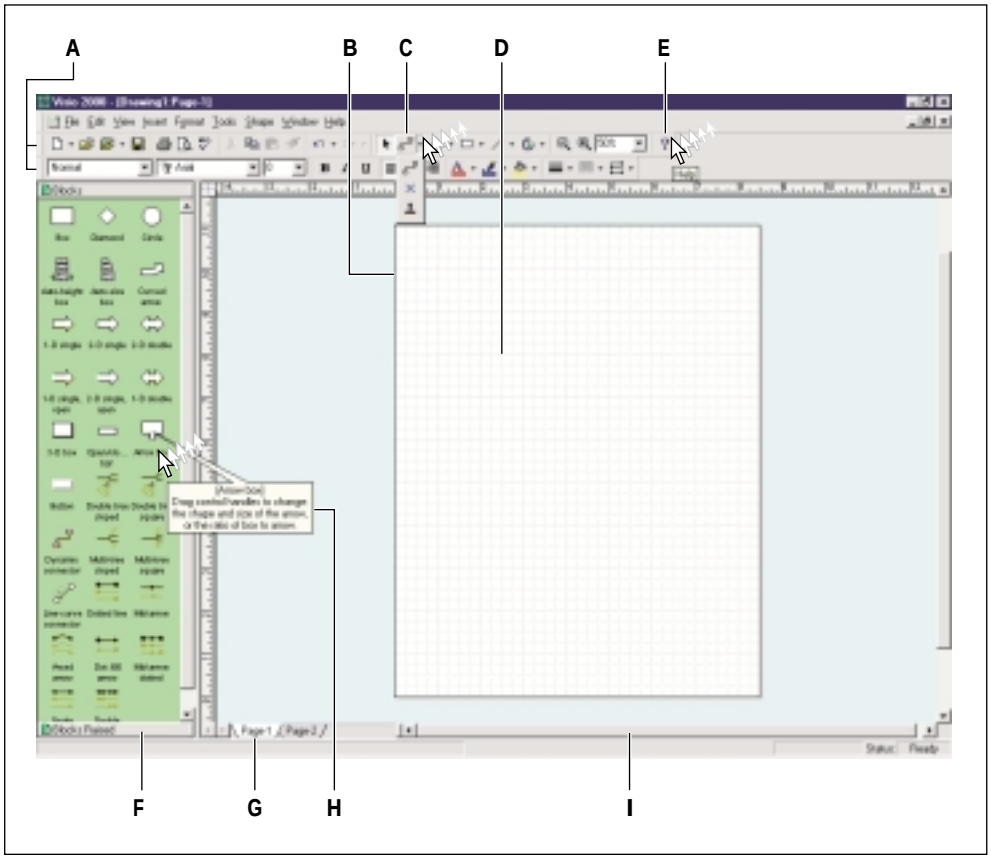
**4** Add text to shapes in your drawing, and add independent text for titles.



**5** Publish your drawing to the Web, or print your drawing to share it with others.

**The Visio 2000 workspace**

Each drawing type opens with stencils, shapes, and toolbars appropriate to that drawing type.




**A** Tools are grouped in functional sets on toolbars. You can specify which toolbars you want to display by choosing View > Toolbars.

**B** The drawing page opens with size, orientation, scale, grid, and measurements appropriate for the drawing type.

**C** You can find additional related tools by clicking the arrows next to the button.

**D** You can use the drawing page grid to align shapes to each other.

**E** ScreenTips appear when you pause the mouse pointer over a toolbar button.

**F** Stencils, or collections of masters, dock to the left of the drawing page, by default.

**G** With page tabs you can quickly insert new pages, navigate multiple-page drawings, delete pages, rename pages, and reorder pages.

**H** Masters are shapes you can add to your drawings. To quickly view information about a shape, pause the mouse pointer over a shape.

**I** When your drawing has multiple pages, you can move the horizontal scroll bar to view all of the page tabs.

# Starting a drawing

When you base a drawing or diagram on a Visio drawing type (also called a template) in Visio® 2000 Technical Edition, you automatically get all the tools and features you need to create that type of drawing. For example, to create an organization chart, open the Organization Chart drawing type.

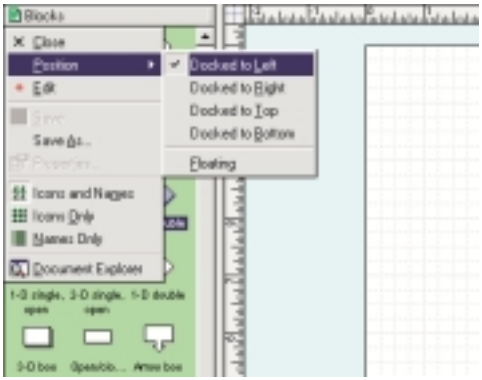
**To start a drawing**

1. Start Visio 2000. In the Welcome To Visio 2000 dialog box, click OK.
2. In the Choose Drawing Type dialog box, click a category name, such as Block Diagram.
3. In the Drawing Type box, double-click the template you want to open, such as Basic Diagram.

   A drawing page appears, with the stencils and tools you need to begin your drawing.

## Working with stencils and shapes

When you start a new drawing or diagram by opening a template, Visio 2000 opens one or more task-related stencils. Stencils contain shapes that you can drag onto the drawing page to create your drawing. You can move stencils in the drawing window to create more workspace by floating, minimizing, or docking them somewhere else.



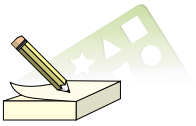

You can dock or "float"—make movable—stencils as you work on your drawing.

**TIP** *To open additional stencils, choose File > Stencils > Open Stencil, choose the stencil you want to open, and then click OK.*

**To add a shape to your drawing**

1. On a stencil, point to the shape you want to add to your drawing.
2. Hold down the mouse button and drag the shape to the location you want on the drawing page, and then release the mouse button.

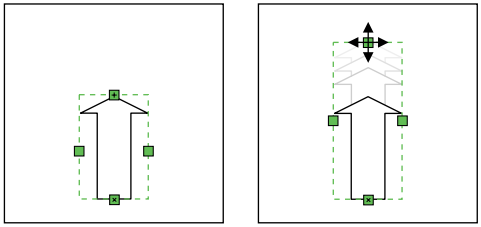
*For quick access to stencil menu commands, use the Stencil toolbar. Choose View > Toolbars > Stencil.*



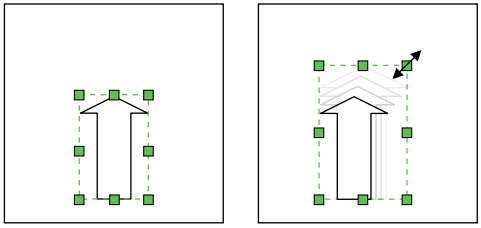
*To locate a specific shape quickly, use the Shape Explorer™ window. Choose Tools > Macros > Shape Explorer.*

## Using 1-D and 2-D shapes

Visio shapes can be one-dimensional (1-D) or two-dimensional (2-D).



1-D shapes behave like lines and display endpoints you can drag to resize the shapes when you select them with the pointer tool.



2-D shapes have corner handles you can drag to resize the shapes proportionally and side selection handles you can drag to resize them horizontally or vertically.

## Aligning shapes with the dynamic grid

You can use a dynamic grid (dashed lines) to indicate the location for the next shape you drag onto the page, based on the location of shapes already on the page. As you move a shape on the page, you can place it precisely using dynamic grid lines to align the shape with other shapes in your drawing.

**To turn on the dynamic grid**

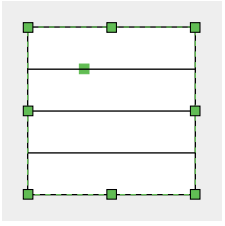
- Choose Tools > Snap & Glue, and then check Dynamic Grid.

  When you drop a shape onto the drawing page, Visio 2000 snaps the shape to the nearest grid line so you can position it precisely in your drawing.

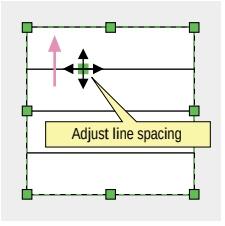
## Using shape handles

Visio shapes have handles you can use to resize or move a shape or to change a shape's appearance, position, or behavior. You use selection handles (■) to resize shapes and control handles (■) to perform actions that are unique to a particular shape.

For example, you might use a control handle to adjust the position of a shape or move a line in a shape.



The control handle looks just like a selection handle, but has darker shading.




To see a ScreenTip for what a control handle does, pause the pointer over the control handle.

## Moving and resizing shapes

Moving Visio shapes is as easy as selecting the shapes and then dragging the selection to the new location in your drawing or diagram. You can resize shapes quickly by simply dragging selection handles.

**NOTE** *When you drag a shape to resize it, you can see exactly how the shape changes as you drag. If the shape has text associated with it, the text resizes accordingly.*

### To move or resize a shape

1. To move a shape, select it with the pointer tool (), hold down the mouse button while dragging the shape to the location you want, and then release the mouse button.

   The pointer turns white when the shape is movable.

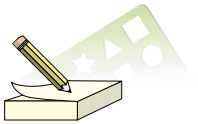
2. To resize a selected shape, point to a selection handle () until the pointer changes to a four-headed arrow (), and then drag the handle to change the size.

### To move multiple shapes at once

1. Click to select a shape, and then hold down the Shift key and click the other shapes you want to select.
2. Place the pointer over one of the shapes until the pointer turns white.
3. Drag the shape to its new position.

   All selected shapes move the same distance and direction from their original positions.

**TIP** *To limit the movement of shapes to horizontal or vertical, hold down the Shift key while you drag the shapes.*



*To nudge a shape slightly in one direction, select the shape, and then click the up, down, left, or right arrow key.*

## Quick editing with anchored windows

You can perform quick editing tasks such as changing a shape's size and position or editing a shape's custom properties directly in the drawing window using anchored windows. You can set anchored windows to AutoHide when you're not using them, and conveniently tuck them away until you want to use them again.

### Anchored windows in Visio 2000

| Window | Purpose |
|---|---|
| Pan & Zoom | Easily zoom in or out with increased precision. |
| Custom Properties | View and edit a shape's custom properties. |
| Size & Position | Change a shape's size, position, or rotation. |
| Drawing Explorer | View all of the elements in your document. |

### To open an anchored window

- Choose View > Windows, and then click the name of the anchored window you want to open.

## Connecting shapes

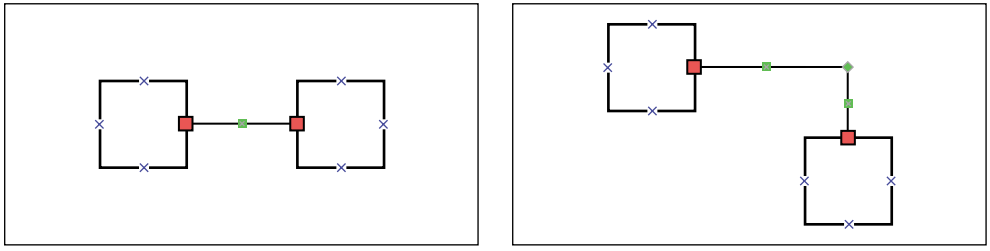
Flowcharts, organization charts, block diagrams, and network diagrams are all connected drawings—drawings that show relationships between shapes.

You can use two types of connections in Visio 2000: shape-to-shape and point-to-point. The type of connection you use depends on how much control you want over your drawing.

With shape-to-shape connections, Visio 2000 maintains the most direct connection between the shapes. This means that the actual points of connection might change when you move the connected shapes in relation to each other.

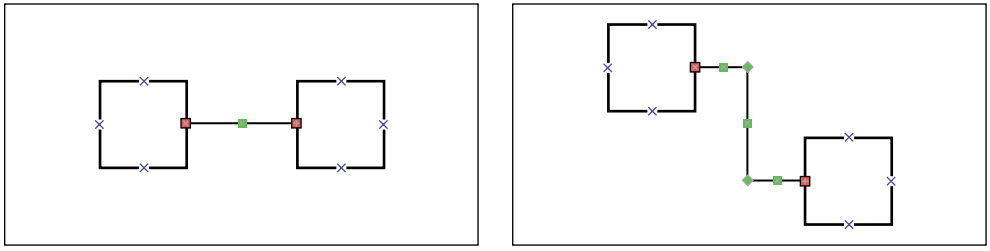
With point-to-point connections, the points of connection stay the same no matter how you move the connected shapes.

**Shape-to-shape connections**



When you move shapes that have shape-to-shape connections, the connector attaches at the closest point between the shapes, which might be different from the original connection points.

**Point-to-point connections**



When you move shapes that have point-to-point connections, no matter how you arrange the shapes in relation to each other on the drawing page, the shapes maintain their original connection points.

**To connect shapes automatically, shape-to-shape**

1. Click the connector tool ( ) on the Standard toolbar.
2. Drag a shape from a stencil onto the drawing page.
3. While the shape is still selected, drag another shape from a stencil onto the drawing page.

   The shapes are automatically connected shape-to-shape.

**To connect shapes automatically, point-to-point**

1. Use the pointer tool to drag two shapes, one at a time, from a stencil onto the drawing page.
2. On the Standard toolbar, click the connector tool, and then drag from a connection point on the first shape to a connection point on the second shape.

   The connection points turn red, and the shapes are connected point-to-point.

## Adding and changing text

You can use text to clarify the meaning of your Visio drawings or diagrams and to document changes you or other Visio users make to a drawing. You can turn on the text ruler to help you format text in a shape.

**To add text to a shape**

- Select the shape, and then type the text you want.

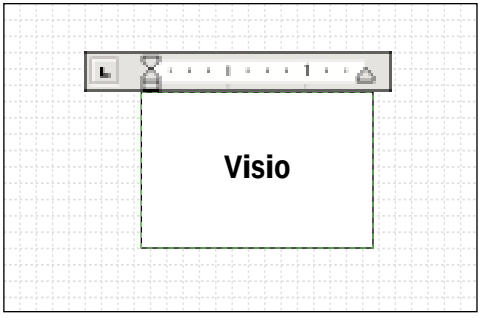
**To edit existing text**

- Double-click the shape to open its text block, and then type. You can also click the Text tool ( ) on the Standard toolbar, click the text, and then type.

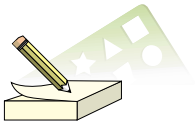
**To turn on the text ruler**

1. Double-click a shape to open its text block.
2. Right-click the shape with its text block selected, and then choose Text Ruler from the shortcut menu.

   The text ruler appears above the shape.




You can quickly change the settings for the selected text by dragging the tab stops and indent markers to the location on the scale you want in the text editing window.



*You can import a graphic from another program to use in your drawing. Choose Insert > Picture, select the file format or type the path and name of the file you want to import, and then click Open.*

## Adding color and line styles to shapes

You can add color to shapes and instantly make your drawings more visually dynamic. You can also change the format of lines and line ends in your drawings. By applying line ends, you can turn any line into an arrow.

### To view the fill color palette

- On the Format toolbar, click the arrow next to the Fill Color button.


Click More Fill Colors on the fill color palette for additional colors.

### To apply color to a shape

- Select the shape and choose the fill color you want to use from the fill color palette.

### To format a line style

- Select the shape and choose the Line Weight, Line Pattern, and Line Ends buttons on the Format toolbar to select the formatting you want to use.

## Flipping and rotating shapes

You can change the direction and angle shapes face in your drawings by flipping and rotating them. Select shapes and then use commands on the Tools menu or buttons on the Action toolbar to flip and rotate shapes.

### To view the Action toolbar

- Choose View > Toolbars > Action.

### Flip and rotate shapes with Action tools

| Action | Tool |
|---|---|
| Flip a shape horizontally | |
| Flip a shape vertically | |
| Rotate a shape right | |
| Rotate a shape left | |

## Grouping shapes

You can group shapes so they function as a unit and so that you can regularly use them together.

### To create a group

1. Drag the shapes you want to group, one at a time, from a stencil onto the drawing page.
2. Select the first shape, hold down the Shift key, and then click to select the other shapes one at a time.
3. Choose Shape > Grouping > Group.

## Using background pages to display common page elements

If you want a common element to appear on more than one drawing, you can create a background page that contains a logo, and then assign it to the foreground page.

### To create a background for a drawing

1. Right-click a page tab ( Page-1 ) in the lower left corner of the drawing window, and then choose Insert > Page from the shortcut menu.
2. On the Page Properties tab, for Type, click Background.
3. If necessary, click the Drawing Scale tab to change the scale or the Page Size tab to change the page size for the new page, and then click OK.
4. Place the design element you want to use as a background onto the drawing page.

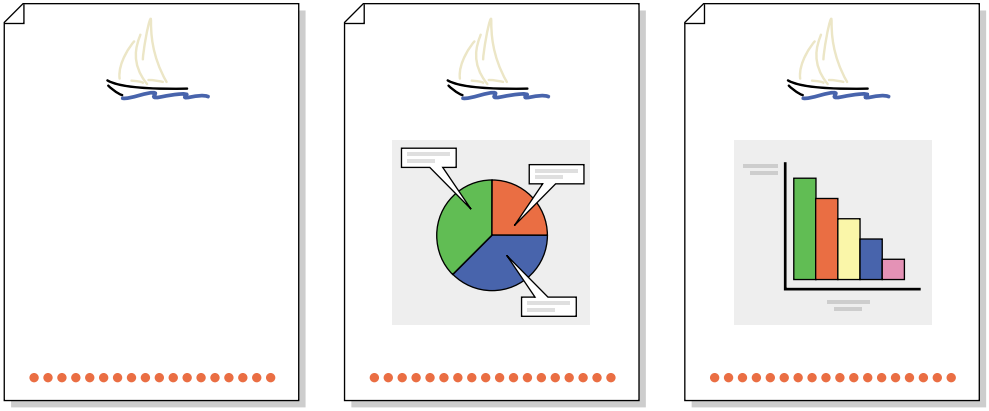
### To assign a background to a drawing

1. Display the page to which you want to assign a background.
2. Choose File > Page Setup, and then click the Page Properties tab.
3. In the Background list, select the name of the background that you want to assign, and then click OK.

   The background appears behind the shapes on the foreground page.

### To display a background so you can edit it

- Display the page to which the background is assigned, and then choose Edit > Go To > Background.



**Using background pages**

Use backgrounds to repeat a common element on several drawings. For example, the sailboat appears on each of these three pages.

## Saving and printing your drawings

The first time you save a drawing, Visio 2000 prompts you for document properties, such as whether or not to save a preview, a small thumbnail version of the drawing. The properties you specify appear in the Open dialog box when you select the drawing file name.

**To save a drawing for the first time**

1. Choose File > Save or Save As.
2. For File Name, type a name for the drawing file.
3. Under Save In, open the folder in which you want to save the file.
4. Click Save.
5. In the Properties dialog box, enter the information you want, and then click OK.
6. Click Save.

To print your drawings, choose File > Print or click the Print button (  ) on the toolbar.

# Creating your own shapes, stencils, styles, and templates

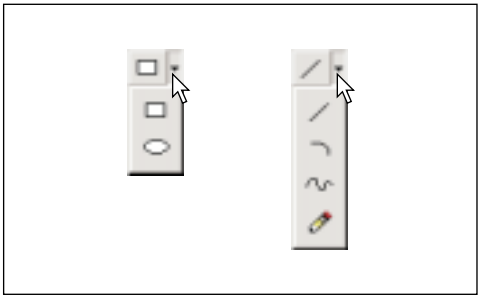
As well as providing you with ready-to-use solutions, Visio® 2000 Technical Edition gives you the flexibility to build your own. You can create your own shapes, stencils, styles, and templates that you and others can reuse. You can even build toolbars and menus that contain the tools and commands you use most frequently.

## Creating your own shapes

There are several ways you can create your own shapes in Visio 2000. You can use Visio drawing tools to create a shape from scratch, merge a shape with other shapes to create a new shape, or revise an existing shape.

**To draw a shape from scratch using the Visio drawing tools**

- On the Standard toolbar, choose a drawing tool, and then click and drag on the drawing page to create the shape you want.

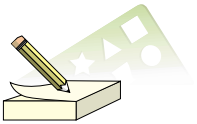


Click the arrows next to the rectangle tool and the line tool to see more Visio drawing tools.

**To merge existing shapes to create a new shape**

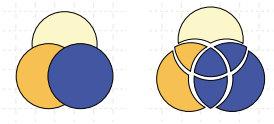
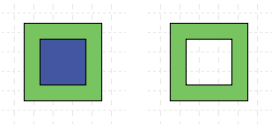
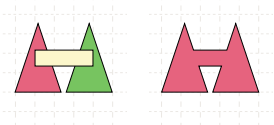
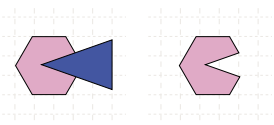
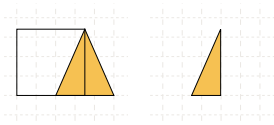
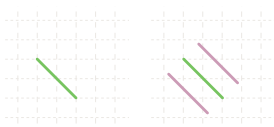
1. Select the shapes in your drawing that you want to use to create a new shape.
2. Choose Shape > Operations, and then choose the appropriate command.

**NOTE** *The new shape you create using any shape operations command inherits the formatting of the first shape you selected.*



*When you use the pencil, line, rectangle, or ellipse tool, try holding down the Shift key while you draw to see how that constrains the drawing behavior.*

**Using shape operations commands**

| Command | Result | Example |
|---|---|---|
| Fragment | Breaks a shape into smaller parts or creates new shapes from intersecting lines or from 2-D shapes that overlap. |  |
| Combine | Creates a new shape from selected shapes. If the selected shapes overlap, the area where they overlap is cut out (discarded), creating a cookie-cutter effect. |  |
| Union | Creates a new shape from the perimeter of two or more overlapping shapes. |  |
| Subtract | Creates a new shape by subtracting the area where selections overlap from the primary selection. |  |
| Intersect | Creates a new shape from the area where the selected shapes overlap, eliminating non-overlapping areas. |  |
| Offset | Creates a set of parallel lines or curves to the right and left of the original shape. |  |

## Adding your own shapes to stencils

If you want to reuse your own shapes the next time you open a particular drawing type, you can save them to existing stencils in your drawing, and then save the file as a template (.vst).

You can also create a new stencil, and then add your own shapes to it as well as any existing Visio shapes. Then, you can save the stencil in a template file so that you and others can reuse it in other drawings.

### To add your own shape to an existing stencil

1. Open the template containing the stencil to which you want to add your shape.
2. Click the icon on the stencil title bar ( ), and then choose Edit from the menu.

   A red asterisk appears on the stencil icon ( ) to indicate that the stencil is editable.
3. Hold down the Ctrl key, and then drag your shape from the drawing page onto the stencil.

   A new icon representing your shape appears on the stencil with a generic name, such as Master.01.
4. Click the new master on the stencil, click it again, and then type the name you want for the new shape.
5. Click the stencil icon ( ), and then choose File > Save As to open the Save As dialog box. Navigate to the Solutions folder in which you want to save the stencil, and then type a name for it in the File Name box.
6. For Save As Type, choose Stencil (*.vss), and then click Save to save your stencil.

   When you open the stencil again, you can use the new shape as you do any other Visio 2000 master.

### To add your own shape to a new stencil

1. Choose File > Stencil > New Stencil. You can also choose View > Toolbars > Stencil, and then click the New Stencil button on the Stencil toolbar.

   The new stencil appears docked to the left side of the drawing window. The stencil icon has a red asterisk ( ) to indicate that it is editable.
2. Hold down the Ctrl key, and then drag your own shapes, one at a time, from the drawing page onto the new stencil.
3. Click the Save icon ( ) on the right side of the stencil title bar.
4. In the Save As dialog box, navigate to the folder where you want to save the stencil, and then type a name for the stencil in the File Name box.
5. Make sure Save As Type is Stencil (*.vss), and then click Save.

*You can view the* Technical Edition User Guide *in PDF format, or view online Help on the Visio 2000 Technical Edition Test Drive CD.*

## Defining and editing styles

A style in Visio 2000 is a named collection of formatting attributes that you can apply to your shapes. You can create styles that format the elements of a shape: fill, line, and text. For example, you might create a style that gives shapes a black outline, a green fill, and black bold italic text.

When you define or edit styles in a drawing file, the changes you make are available only in the current drawing or diagram. To make a style available for future drawings, you can define or edit it in an existing template. The style is included in every new drawing you create.

**To define a new style**

1. Choose Format > Define Styles.
2. In the Style list, type a name for the new style.
3. If you want to base the new style on an existing style, select that style from the Based On list.
4. Under Includes, check the attributes that your style includes. A style can include formatting from any combination of the three attributes.
5. Under Change, click Text, Line, or Fill to change the settings for each attribute you included in Step 4.
6. When the style contains the settings you want, click Apply to add the new style and apply it to selected shapes.

**To change a style**

1. Choose Format > Define Styles.
2. In the Style list, select the style you want to change.
3. To rename the style, click the Rename button, type a new name in the Rename Style dialog box, and then click OK.
4. To change style settings, click the Change button. When you have finished changing the attributes, do one of the following:
   - Click Apply.
   - Click Change to add the changes and continue working in the dialog box.

## Creating your own template

You might want to create your own template when your drawings

- Require customized settings such as page size or scale, window size and position, or shape or text styles.
- Often include a particular background or set of layers. For example, if you place your company logo in every drawing, you can create a template with that background or set of layers in place.

**To create and save your own template**

1. Open a drawing or start a new drawing based on the template you want to modify.
2. Open any additional stencils you want to save with the template by choosing File > Stencils > Open Stencil and then choosing the stencils you want.
3. Change drawing page settings and styles to those you want to use in future drawings that are based on this template.
4. Choose File > Save As, and then do the following:
   - For Save As Type, select Template (*.vst).
   - For File Name, type a name for your template.
   - For Save, make sure Workspace is checked.
   - For Save In, select the folder in which you want to save the template.
5. Click Save.

## Creating your own toolbars

To work more efficiently, you can create your own toolbars that contain only the tools you need as you create your drawings.

**To create your own toolbar**

1. Choose View > Toolbars > Customize.
2. On the Toolbars tab, click New, type a name for your new toolbar, and then click OK.
3. A new, small toolbar appears.
4. Click the Commands tab, and then from the Categories list, select the category that contains the command for which you want to create a button.
5. Drag the commands you want to include, one at a time, from the Commands list to the toolbar.

**To attach a custom menu or toolbar to the drawing file so others can use it**

1. Choose View > Toolbars > Customize, and then click Attach.
2. In the Custom Toolbars list, select a toolbar to include in the drawing file, and then click Copy.
3. When all of the toolbars you want in the drawing file are listed in the Toolbars In Document list, click OK.

*To show or hide toolbars while you work, choose View > Toolbars, and then click to add or remove a check mark next to the toolbar you want to show or hide.*

# Drawing precisely

Engineering and architectural diagrams and drawings require accurate measurements and precise positioning of shapes. Visio® 2000 Technical Edition provides drawing and positioning tools that are easy to use but powerful enough for the most complex drawings.

## Setting the drawing scale

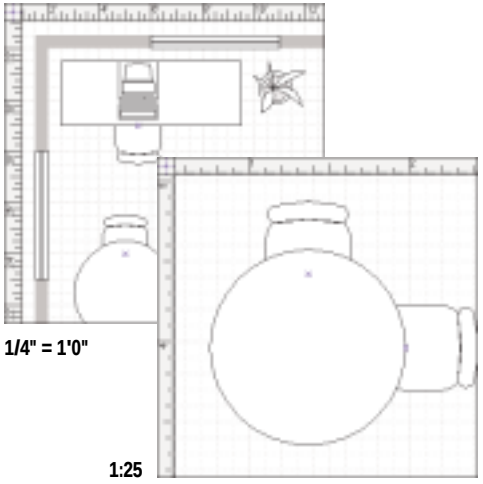
Many engineering or architectural drawings require a drawing scale that makes it possible to represent very large or very small objects on a sheet of paper.

When you begin a measured drawing in Visio 2000, the drawing page opens with a default drawing scale. You can change the drawing scale at any time, and you can set a different drawing scale for each page of your drawing.

**To change the drawing scale for a page**

1. Display the page whose scale you want to change.
2. Choose File > Page Setup, and then click the Drawing Scale tab.
3. Click Pre-Defined Scale, and then select an engineering or architectural scale.

   Or, click Custom Scale, and then type a custom scale. When you type a custom scale, enter the measurement units or click the Page Properties tab and select the appropriate measurement units.
4. Click OK.




As the drawing scale changes, shapes take up more or less space on the page. The rulers in each drawing show the actual size of the objects the drawing represents in the measurement units you have selected.

## Setting measurement units

Measurement units are the measurements that appear on the ruler and in dimensions. Measurement units represent sizes in the real world. For example, in an architectural drawing, the measurement units might be feet and inches.

Selecting a predefined drawing scale automatically sets the measurement units. If you are creating a custom scale, you might need to specify the measurement units. For example, if you want 1 inch on a landscape layout to represent 3 yards in the real world, set your measurement units to yards.

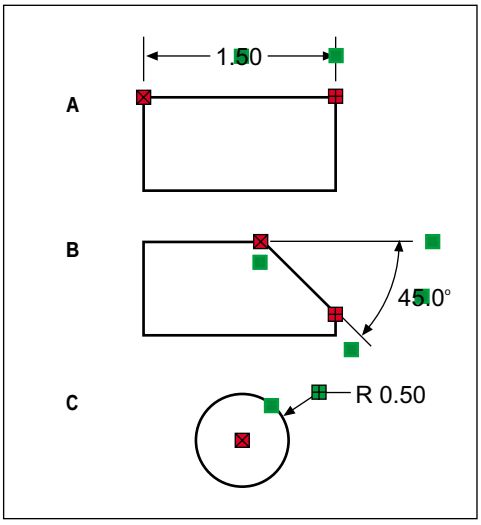
**To set measurement units for a page**

1. Display the page for which you want to set the measurement units.
2. Choose File > Page Setup, and then click the Page Properties tab.
3. From the Measurement Units list, select the units you want.

## Showing size by using dimension lines

Visio 2000 provides dimension lines that calculate and display linear and angular dimensions. When you resize a shape that has attached dimension lines, the dimensions are automatically updated.

You dimension a shape by dragging a dimension shape onto your drawing and connecting its endpoints to geometric points on the shape you want to measure. You can choose from a variety of dimensioning shapes, including horizontal and vertical baselines, horizontal and vertical outside dimensions, and diameter and radius dimensions.




**A** Linear dimension line **C** Radius dimension line
**B** Angle dimension line

## Snapping to grids, guides, and guide points

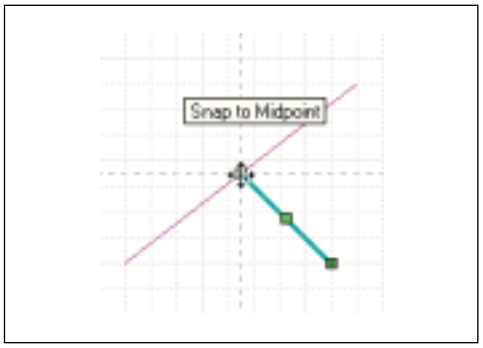
To position shapes quickly and accurately, you can snap them into position. Snapping pulls shapes to rulers, grids, or guides and is useful for positioning and aligning shapes.

**To set snap settings for grids, guides, and rulers**

1. Choose Tools > Snap & Glue.
2. Under Currently Active, make sure Snap is checked.
3. Under Snap To, check Ruler Subdivisions, Grid, and Guides, and then click OK.

## Snapping to shapes

When you are drawing shapes, you can snap to points on other shapes by using extension lines that appear when your pointer is positioned near the target point. For example, you can snap to the endpoint of a line or the center of an ellipse.




Use extension lines to snap to points on shapes, such as the midpoint of a line.

### To turn on shape extensions

1. Choose Tools > Snap & Glue.
2. On the General tab, under Snap To, check Shape Extensions.
3. On the Advanced tab, under Shape Extension Options, check the ones you want, and then click OK. Click the Help button ( ? ) to see an explanation of the options.
4. While using a drawing tool, move the pointer toward or along a shape to see an extension line that pinpoints your target.

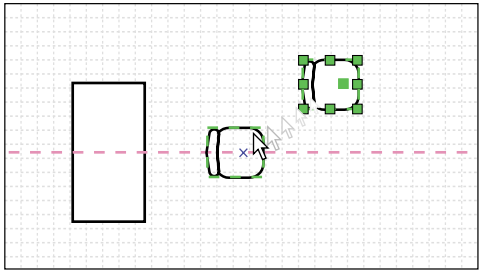
Shape extensions work with the line, arc, freeform, pencil, ellipse, rectangle, and connection point tools.

## Positioning shapes by using the dynamic grid

When you turn on the dynamic grid, dotted lines show the most desirable position of a shape in relation to the shapes near it.

### To turn on the dynamic grid

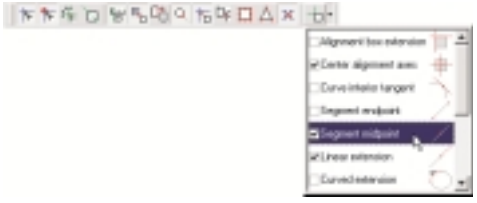
1. Choose Tools > Snap & Glue.
2. Under Currently Active, check Dynamic Grid, and then click OK.



Use the dynamic grid to align shapes at their center points.

## Using the Snap & Glue toolbar

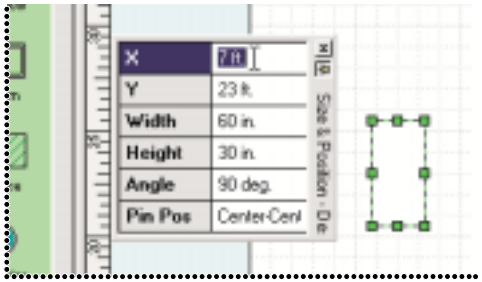
You can change your snap and glue settings quickly by using the Snap & Glue toolbar. To view the toolbar, choose View > Toolbars > Snap & Glue.



Use the Snap & Glue toolbar to quickly change snap settings.

## Positioning shapes by using coordinates

You can position shapes at exact *x*- and *y*-coordinates in your drawing. The *x*- and *y*-coordinate values determine the position of a shape's reference point, or pin, on the page.




Position a shape by entering coordinates in the Size & Position window.

**To position a shape by using coordinates**

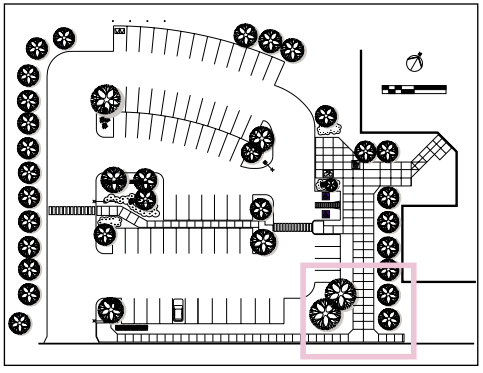
1. Drag a shape to the approximate location you want on the page.
2. Choose View > Windows > Size & Position, or click the status bar.
3. Enter values for the new location in the X and Y boxes, and then click OK.

## Panning and zooming drawings

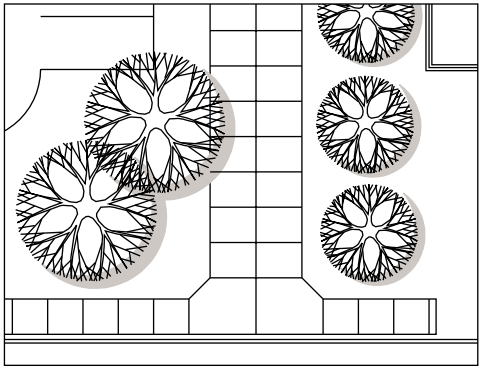
Instead of frequently zooming in and zooming out of a drawing, you can use the Pan & Zoom window to quickly locate and magnify an area of a large drawing.

**To pan and zoom a drawing**

1. Choose View > Windows > Pan & Zoom.
2. In the Pan & Zoom window, drag a box around the area you want to magnify.
3. To pan to a different part of the drawing, drag the box.



View in Pan & Zoom window



View in drawing page

**Pan & Zoom window**

# Working with CAD drawings

You can insert existing CAD drawings into your Visio® 2000 Technical Edition drawings to use as background images or as detail images. For example, you might want to insert a floor plan drawn in Autodesk AutoCAD and add HVAC shapes on top of the floor plan. Or you might want to insert an equipment drawing into a Process Engineering document.

You can insert CAD files in the following formats:

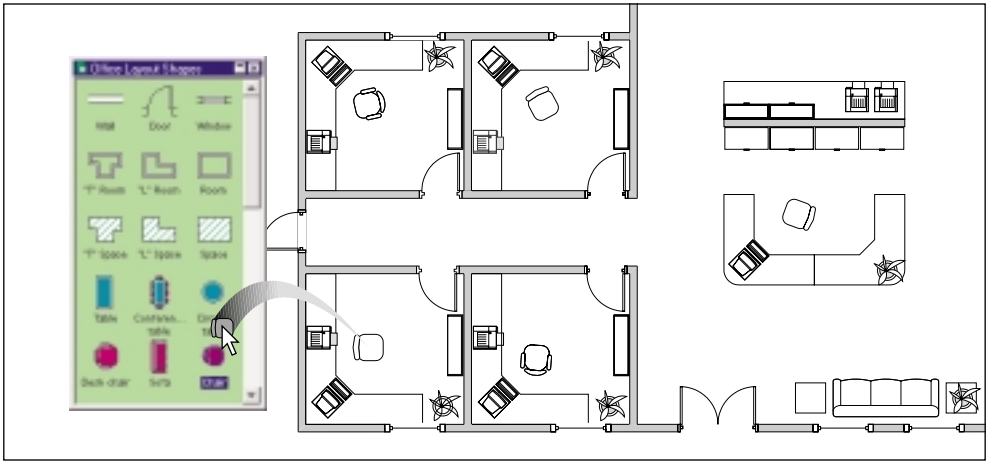
- Autodesk AutoCAD DWG and DXF file formats
- Bentley MicroStation DGN file format

## Inserting CAD floor plans as background images

You can insert a floor plan drawn in a CAD program into your Visio drawing to use as a background page or as a reference layer.

After you have inserted the floor plan, you can drag Visio shapes onto it, add comments, or hide layers. Visio shapes will snap to objects in an inserted DWG drawing.

**CAD floor plan**



You can drag Visio shapes onto an inserted CAD drawing. Shapes automatically snap to the lines in a CAD drawing. For example, workstation shapes snap to wall lines in a floor plan.

**To insert a floor plan as a background image**

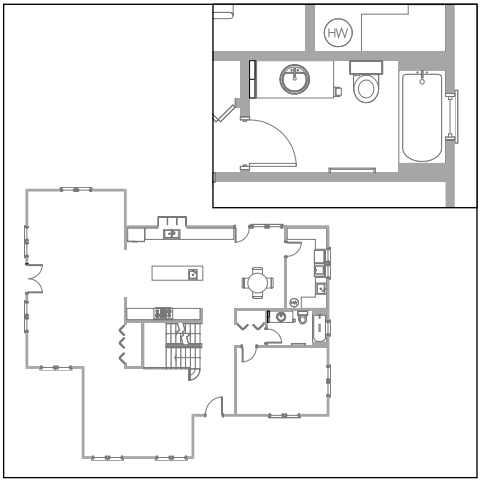
1. Create a blank Visio drawing that has the page size and drawing scale you want.
2. In the Visio drawing, choose Insert > CAD Drawing.
3. Under Files Of Type, select the CAD drawing file format you want. Locate the CAD file containing the background image and click Open.

   If you plan to drag shapes such as office furniture onto the CAD drawing, set the CAD drawing and the Visio drawing to the same scale. For details, see "Changing the scale of an inserted drawing" on page 26.
4. On the General tab of the CAD Drawing Properties dialog box, check Lock Position and Lock Cropping so that you don't accidentally move or resize the drawing while you are working with it.
5. Click OK to begin working with the inserted drawing.
6. To lock the Visio layer that contains the inserted drawing, right-click the inserted drawing and choose View > Layer Properties. Click the Lock column for the CAD Drawing layer, and then click OK.

## Inserting CAD drawings as detail images

You can insert a CAD drawing into an existing Visio drawing to show a detail of a floor plan or of a mechanical part.

After you have inserted the detail image, you can add comments to it, crop it, change its scale, or hide layers.




You can insert a CAD drawing to show a detail of a mechanical part, a portion of a floor plan, or an alternate view of an object.

**To insert a CAD drawing as a detail image**

1. Open the Visio drawing into which you want to insert the CAD drawing.
2. Choose Insert > CAD Drawing.
3. Under Files Of Type, select the CAD drawing file format you want. Locate the CAD file you want and click Open.
4. To reduce or enlarge the image, set the CAD drawing scale on the General tab of the CAD Drawing Properties dialog box.

   If you are not planning to drag Visio shapes onto the inserted image, you can set the CAD drawing to a scale different from that of the Visio drawing. For details, see "Changing the scale of an inserted drawing" on page 26.

5 On the General tab, uncheck Lock Position and Lock Cropping so that you can move and crop the inserted CAD drawing, and then click OK.

6 To position the CAD drawing on the Visio page, select the drawing and drag it.

## Changing the scale of an inserted drawing

When you insert a CAD drawing, Visio 2000 chooses a drawing scale that fits the CAD drawing onto the Visio drawing page. You can change the scale of the CAD drawing to make it larger or smaller, and you can match the scale of the CAD drawing to the Visio drawing scale.

### To change the scale of a CAD drawing

1 Right-click an inserted CAD drawing and choose CAD Drawing Object > Properties.

2 Click the General tab and choose a CAD Drawing Scale option. For details about these options, see the following table.

3 Verify the size of the CAD drawing on the Visio drawing page by looking at the preview. If the CAD drawing does not fit on the Visio drawing page, try the following actions:

- Choose a smaller CAD drawing scale or Visio drawing scale. For example, 3/32 inch = 1 foot is a smaller scale than 1/4 inch = 1 foot and will show more of the inserted CAD drawing.
- Choose a larger page size. For example, the ANSI Architectural page size of 36 inches by 24 inches might be large enough to display an entire floor plan. Click Page Setup. On the Page Size tab, select a page size, and then click OK.

4 Click OK to accept your changes. If you have set the CAD drawing to a scale different from that of the Visio drawing, click Continue Without Matching Scale in the dialog box, and then click OK.

**CAD drawing scale options**

| If you want to do this... | Choose this CAD scale option... |
|---|---|
| Drag Visio shapes onto an inserted CAD drawing. | Click Pre-defined Scale, and then select Page Scale. This option matches the CAD drawing scale to the Visio drawing scale so that shapes are sized correctly when you place them on the CAD drawing. |
| Set the CAD drawing scale to a smaller or larger scale than the Visio drawing scale. | Click Pre-defined Scale, and then select an industry and a specific scale from the list. When you select this option, Visio shapes that represent physical objects (such as desks and chairs) are not sized correctly when you place them on the CAD drawing. You can, however, use annotation shapes or add text blocks to the inserted drawing. |
| Set your own scale. | Click Custom Scale, and then type in a scale. CAD drawings generally have a custom scale when you first insert them. |

## Hiding layers or levels

You can hide layers or levels to hide objects in an inserted CAD drawing. For example, you might want to turn off all the layers containing office furniture in a CAD floor plan so that you can drag Visio office furniture shapes onto the floor plan.

### To hide layers or levels

1. In Visio 2000, right-click the CAD drawing and choose CAD Drawing Object > Properties. Click the Layer tab or the Level tab.
2. To hide a layer or level, uncheck it, and then click OK.

## Converting CAD drawings into Visio format

When you insert a CAD drawing, you get an image of the CAD drawing that you cannot alter by deleting, resizing, or modifying the objects in the drawing. If you need to modify the CAD objects in a drawing, you must convert those objects into Visio shapes.

For example, if you want to move an interior wall in a floor plan, you must convert the CAD objects that represent the wall into Visio shapes. You select the objects to convert by selecting the CAD layer or level on which they appear.

### To convert CAD objects

1. In Visio 2000, right-click the CAD drawing and choose CAD Drawing Object > Convert.
2. In the Convert Wizard, press Ctrl+click to select the layers or levels containing the objects you want to convert, and then click Next.
3. Choose whether to delete or hide the original layers or levels.
4. For DWG files, specify how you want to convert dimensions:
   - To get dimension lines that are updated when you resize the associated Visio shapes, click Convert Into Visio's Dimension Shapes. Converted dimension lines lose their original CAD font and line style.
   - To preserve the CAD formatting of dimensions, including the font and line style, click Convert Into Lines And Text.
5. Click Finish to convert the objects on the selected CAD layers or levels.

## Converting Visio drawings into CAD format

You can convert, or export, a Visio drawing into CAD format by choosing the Save As command. You must convert each page of a multipage drawing separately.

You can convert files into the following formats:

- Autodesk AutoCAD DWG and DXF file formats
- Bentley MicroStation DGN file format

### To convert a Visio page

1. Go to the Visio drawing page you want to convert, and then choose File > Save As.
2. Under Save As Type, select the CAD drawing file format (for example, AutoCAD Drawing [*.dwg]), and then click Save.

# Process Engineering: Drawing PFDs and P&IDs

Industries of all kinds rely on process plants to manufacture and deliver products or refined materials. Effectively managing the design of processes and the systems that support them is critical to the success of these plants.

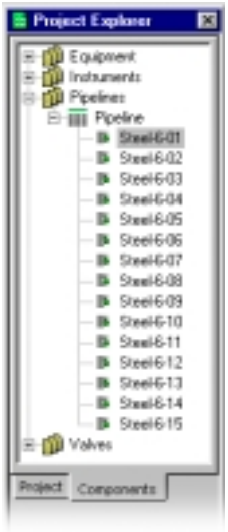
The Process Engineering solution provides the drawing tools you need to create PFDs (process flow diagrams) and P&IDs (piping and instrumentation diagrams) and tools for creating process component specifications.

## Working in projects

In the Process Engineering solution, you work in projects where you create and edit the PFDs, P&IDs, datasheets, and equipment lists (or bills of materials) for your process plant. The Project Explorer makes it easy to manage project-related documents.

Visio® 2000 Technical Edition includes a full sample Process Engineering project that you can explore, which includes sample P&IDs, datasheets, and lists.


Project view shows all of the diagrams in a Process Engineering project.




Components view shows the datasheets of all the components in a project.

**Try it: Explore the sample project**

1. Start Visio 2000. In the Welcome To Visio 2000 dialog box, click Open Existing File, and then double-click Browse Existing Files. In the Open dialog box, navigate to Visio\Samples\Process Engineering\Process Engineering Project. Select Sample Project.vsd, and then click Open.
2. In the Project Explorer, click the Project tab, and then double-click SamplePID1 to open the sample P&ID.
3. Select the Centrifugal Pump shape in the diagram, and then choose Process Engineering > Datasheets > Edit Datasheet to see the specifications for the pump. Choose File > Close to close the datasheet.
4. In the Project Explorer, click the Components tab to see a list of all the datasheets in the sample project. Click the plus sign (+) next to Valves to see the Valve datasheet, and then click the plus sign next to Valve to see the tags of all of the valves in the project that use that datasheet. Right-click any valve and choose Edit Datasheet to open its datasheet.
5. In the Components tab, right-click any valve and choose Go To Shape. The valve is highlighted in the drawing.
6. When you have finished exploring, choose Process Engineering > Close Project.

## Starting a new project

To use the Process Engineering intelligent shapes and to access process component data, you must work in a project. Starting a new project is as easy as starting any new drawing in Visio 2000.

**Try it: Start a new project**

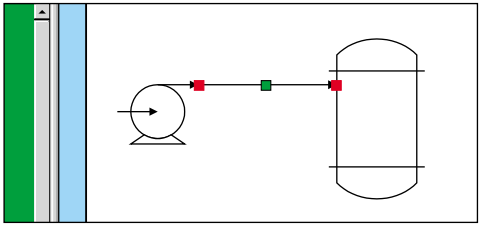
1. Create a project folder on your computer named Heat Project.

   Create a separate folder for each Process Engineering project.
2. In Visio 2000, choose File > New > Process Engineering > Process Engineering. Click the Create A New Project option, and then click the Browse button to locate and open the Heat Project folder.
3. Name the project Heat_Proj.vsd, and then click Save. Click OK to open the new project.

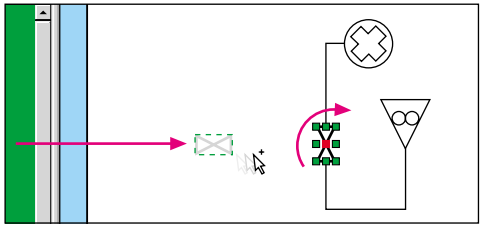
**TIP** *To make it easier to distinguish project files from diagrams, indicate in the file name whether a .vsd file is a project file or a diagram.*

## Creating PFDs and P&IDs

You create PFDs and P&IDs by dragging Process Engineering shapes from stencils onto your drawing page. The Process Engineering solution comes with a library of SmartShapes® symbols that are specifically designed for process engineering schematics, making it easy to create and modify them.



Pipelines connect equipment shapes on a P&ID. Pipelines are drawn with Visio connectors that stretch and contract as you move equipment shapes.



Valves rotate into position and glue themselves to a pipeline as you drag them onto the pipeline.

**Try it: Draw a P&ID**

1. Open the Heat_Proj.vsd project file you created in "Starting a new project." If the default blank drawing page is open, choose File > Close to close it.
2. Choose Process Engineering > New Project Document > Drawing. Name the drawing Steam1.vsd, and choose a sheet format from the Based On list to determine the page size, border, and title block format of the new diagram. Click OK.
3. Click the Equipment - Pumps stencil to see the pump shapes, and then drag the Centrifugal Pump shape from the stencil onto the drawing page.
4. From the Equipment - Heat Exchangers stencil, drag the Shell And Tube shape to the right of the pump shape, and then choose Shape > Rotate Left. If necessary, press Ctrl+Shift+click to zoom in.
5. Click the connector tool ( ) on the Standard toolbar to draw a pipeline. On the Centrifugal Pump shape, click the outlet arrow, and then drag the connector tool to any connection point on the Shell And Tube shape.

**TIP** *You can connect a pipeline to any point on the outside of an equipment shape. Visio 2000 creates a new connection point wherever you attach the pipeline.*

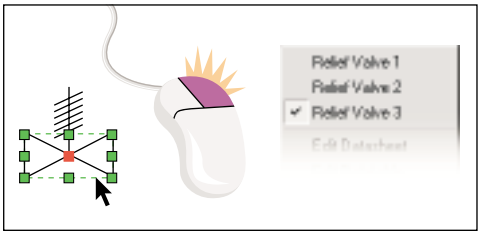
6. Click the pointer tool ( ), and then from the Valves And Fittings stencil, drag the Check Valve shape onto the pipeline.

   The valve is now associated with this pipeline and moves with it.
7. From the Instruments stencil, drag the Indicator shape and place it above the pipeline to the right of the Check Valve.

**8** Drag the association control handle (■) from the instrument to the pipeline.

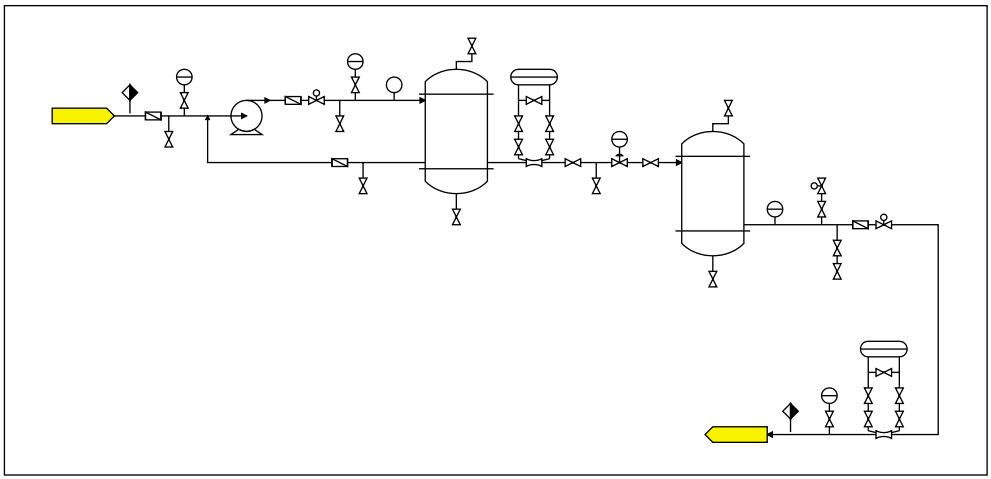
A red dashed line appears, indicating that the instrument is now associated with the pipeline it monitors and will move with the pipeline.

**9** Choose File > Save.




You can quickly change some Process Engineering shapes by right-clicking the shape and choosing a different shape variation from the shortcut menu.

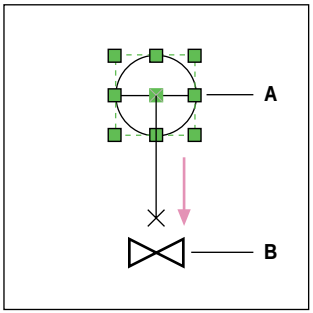
**A P&ID drawing**



The Process Engineering solution provides drawing tools with which you can quickly and efficiently create and modify PFDs and P&IDs.

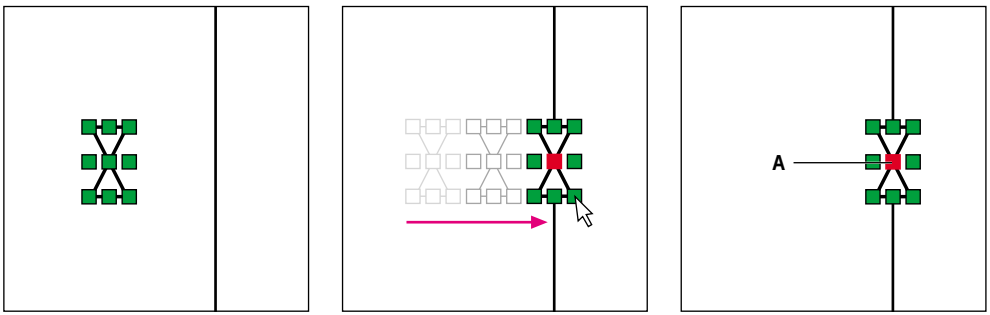
## Associating components in diagrams

A P&ID shows how physical components are functionally or mechanically related. In a Visio 2000 P&ID, this relationship is called an *association*. You can associate shapes when you want the shapes to stay together in a drawing. You can also associate shapes when the components they represent are functionally dependent. For example, because a valve is physically mounted on a pipeline, the valve is functionally dependent on the pipeline.




Drag the association control handle from an instrument (**A**) to a valve (**B**) to manually associate the two components.

**Associating a valve with a pipeline**




Some components in a P&ID are automatically associated to show the relationship between them. The association control handle (**A**) turns red to show that this valve is associated with the pipeline.

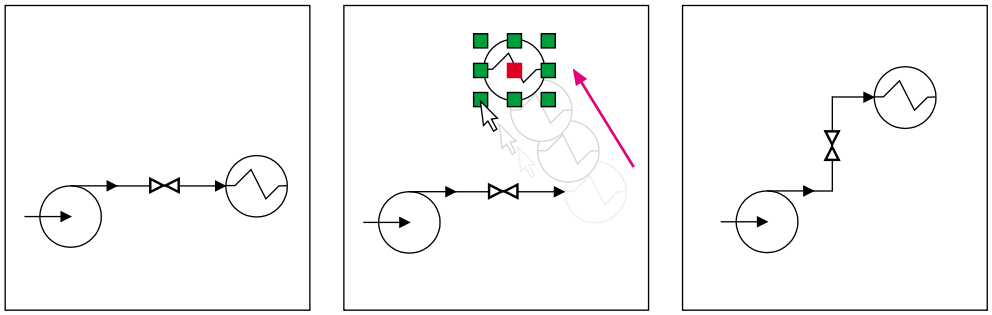
## Modifying your diagrams

As you design and refine a process, you need to be able to manipulate components on your diagrams quickly and easily. The intelligent shapes in Visio 2000 make it easy for you to modify diagrams.

To move an equipment shape, simply select it and move it. All of the pipelines connected to the shape move with it. Pipelines stretch or contract as needed; pipelines can even jump over other pipelines. Branched pipelines retain their branches.

Valve shapes move with the pipeline with which they are associated. To move a valve shape along a pipeline, select it and slide it. If you move the valve around a bend in the line, the valve will reorient itself to match the line.

To change a pipeline's appearance, select the pipeline, and then select a new style from the Line Style list on the Format Shape toolbar.



**Moving equipment shapes**

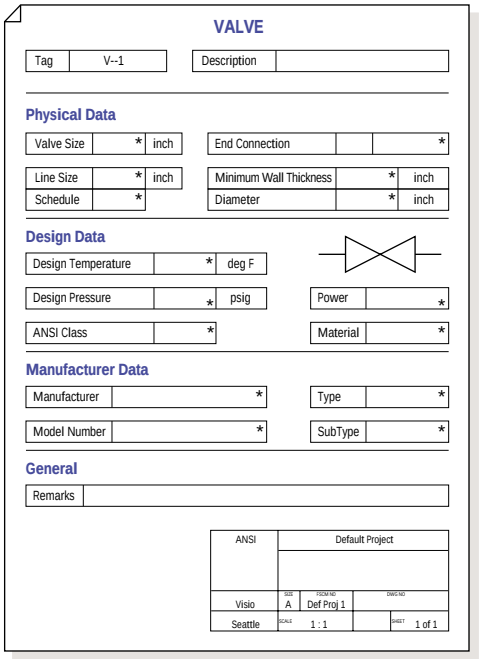
As you move equipment shapes, the connecting pipelines are rerouted and valves are repositioned.

## Entering component data

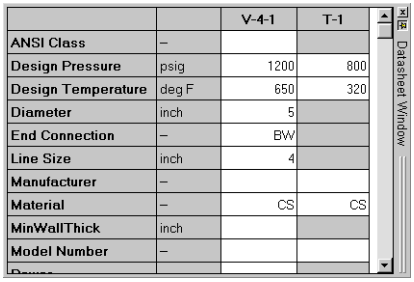
From the piping and fittings you order from standard vendor catalogs to the custom equipment you have manufactured for your plant, you specify and track large amounts of data about the components in your process plant. In the Process Engineering solution, you can add data directly to components in the diagram without calling up a separate database or spreadsheet program.

Each component in a diagram has a related datasheet, an electronic form that contains fields of data for the component. For example, the datasheet for a pipeline generally specifies the line size, material, and design temperature and pressure.

You can enter all the data for one component at a time or finish a portion of a diagram and enter data for several components at once.




Add data to a diagram by filling out a datasheet for each Process Engineering component in your diagram. To access a shape's datasheet, right-click the shape and choose Edit Datasheet.




The Datasheet window stays open so that you can add data to or edit data for several shapes at once.

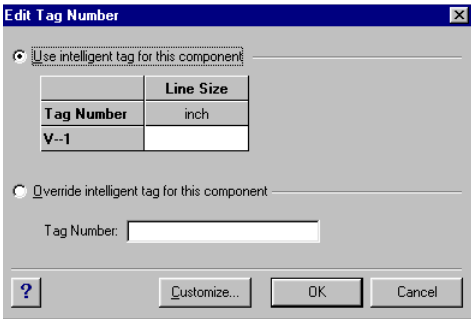
**Try it: Enter data for several components at once**

1. In the Steam1.vsd diagram, choose Process Engineering > Datasheet Window.
2. Select several valves in the diagram and, in the Datasheet window, set some values that are typical for these types of valves. The datasheet is automatically updated as you type values into the Datasheet window.

## Numbering or tagging components

Component tags often provide information about components. A pipeline tag might indicate the line size, pressure rating, material, and type of fluid carried.

To make entering tags faster, you can set up datasheets so that component tags are constructed directly from certain fields in a datasheet. These intelligent tags appear on the diagram when you enter data into the datasheet for the component. The default datasheets for components have intelligent tags, and you can create intelligent tags for your own datasheets.




You edit an intelligent tag by changing the datasheet fields from which the tag is constructed. You can also override an intelligent tag and manually type the tag number.

**Tagging a pipeline**

1. Open the Steam1.vsd diagram you created in "Drawing PFDs and P&IDs."
2. Right-click the major pipeline between the pump and the heat exchanger, and then choose Edit Tag Number.
3. In the Line Size field, type *4*, and then click OK. The pipeline tag is updated to show the new line size.
4. To move the tag on the diagram, select the tag's green control handle (■) and move it.

## Generating equipment, line, and valve lists

You can generate lists of equipment, pipelines, valves, and instruments directly from the data in datasheets. As you modify diagrams, you can quickly generate a new list from the updated datasheets. You can create lists in Microsoft Excel format or plain text format, or you can create a list in a new Visio drawing.

**Try it: Generate a list of all valves in a diagram**

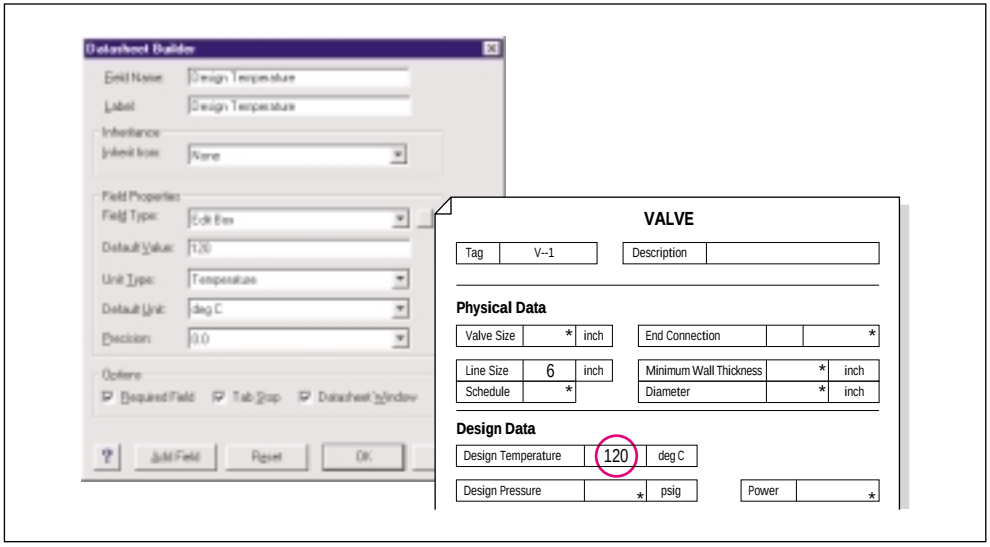
1. Open SamplePID1.vsd in Visio\Samples\Process Engineering\Process Engineering Project.
2. Choose Process Engineering > Lists > Generate List. From the List box, select Valve List.
3. Under Include In List, choose Entire Document.
4. Under Output File, name the file. Click Write To Visio Drawing, and then click OK to generate the list.

   Visio 2000 opens a new drawing page that contains the generated list. You can save, print, or copy the list to another Visio 2000 drawing.

## Creating your own datasheet

Visio 2000 provides default datasheets for equipment, pipelines, valves, and instruments. You can modify the default datasheets, or you can create your own datasheets. You can also create your own lists and sheet formats.

**Personalized datasheets**




When you create your own datasheet forms, you specify the label, format, and default unit for each field.

**Try it: Create a new datasheet**

1. Open the Steam1.vsd diagram you created in "Drawing PFDs and P&IDs."
2. Choose Process Engineering > New Project Document > Datasheet. In the New Datasheet dialog box, name the datasheet MyPump, and select Equipment from the Based On list and from the Category list. Click OK.
3. In the Datasheet Builder dialog box, type *Motor* in the Field Name box. The Label box is updated to use the same name.

   The field name is a unique identifier for the datasheet field; the label is the name that appears on the datasheet.
4. For Unit Type, select Power. Accept the default settings for the rest of the dialog box, and click Add Field.

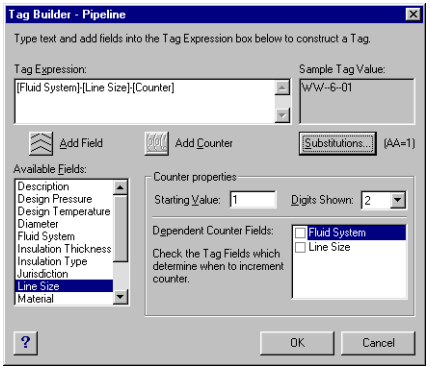
   A field shape is added to the datasheet page, and the dialog box is cleared so that you can create the next datasheet field.
5. Add more fields, and then click OK to exit the dialog box. When you have finished, choose File > Save to save the new datasheet, and then close it.

To use the new datasheet, you use the Assign Datasheet Wizard to assign it to some components in your project. For example, you could assign this MyPump datasheet to all of the shapes on the Equipment - Pumps stencil.

## Creating intelligent tags

You can create component tags that are automatically constructed from fields in the component's datasheet. These intelligent tags are useful for component tagging schemes that provide information about the component, such as the line size, material, and fluid.

You can set up intelligent tags that substitute codes for values in a datasheet field. For example, if the fluid carried by a pipeline is designated as Waste Water in the datasheet, the tag can substitute the code WW for that value. You can also create tags that are automatically incremented as components are added to a diagram.




You use the Tag Builder dialog box to create intelligent component tags that are constructed from fields in a datasheet.

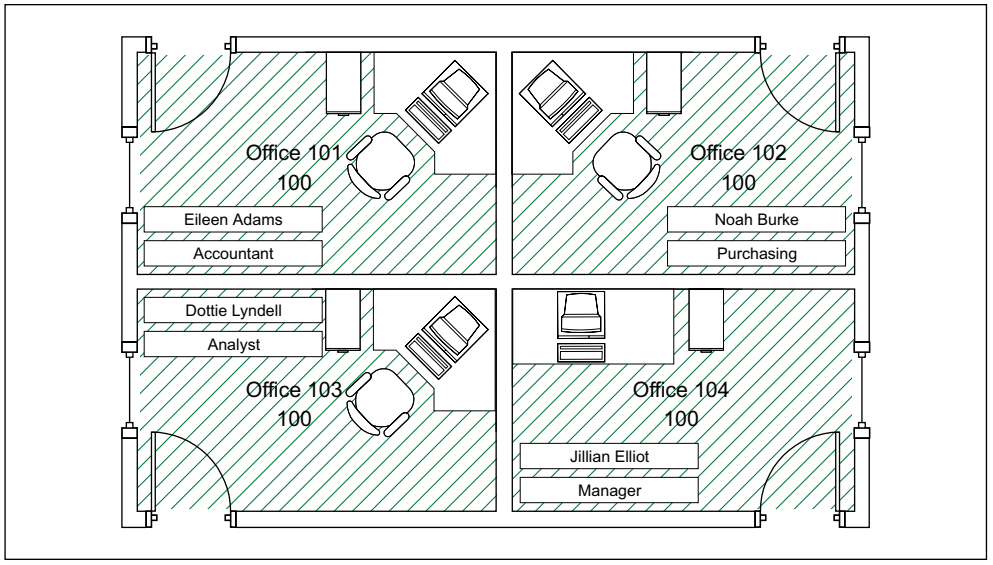
# Facilities Management: Drawing facilities plans and tracking assets

The Facilities Management solution in Visio® 2000 Standard Edition combines space-planning and asset-tracking capabilities in one easy-to-use software package. This solution offers two different views of your facility information: a spatial view when you use the facilities plan, and an organizational view when you use Visio CAFM Explorer.

You can

- Create and revise facility plans based on head count, workstation configuration, and other space requirements.
- Locate and list assets, such as furniture, equipment, and fixtures.
- Graphically view room assignments and quickly update them.

**Sample facilities plan**




If you followed the procedures in this chapter, your facilities plan should look similar to this one. After you create a facilities plan, you can use it as a tool to list, locate, and print your facilities information.

## Starting a facilities plan

When you start your facilities plan, you connect to a facilities database that contains the information you want to track. To get started quickly, you can use the basic Microsoft Access database that is created by default when you start a facilities plan.

You can also create a custom facilities database in Microsoft SQL Server format instead of Microsoft Access format. A custom database can be located on a network server.

**Try it: Start a facilities plan and connect it to the default database**

1. Start Visio 2000, and then choose File > New > Facilities Management > Facilities Plan.
2. On the first screen of the Facilities Management Setup Wizard, click Next. On the next screen, click Yes to track information in your drawing. Click Basic: Facilities Data.mdb to track information in the basic database, and then click Next.
3. Enter a company name, location, building, and floor name.
4. Click Finish until you exit the wizard.

## Creating a building shell

Each page in your Visio drawing represents a floor or a section of a floor in your facility. You can represent an entire floor on one page or sections of a floor on different pages. You cannot, however, represent more than one floor on the same page.

With the Facilities Management solution, you can

- Create a building shell from scratch using the shapes on the Walls, Shell And Structure and the Building Core stencils. You can also insert a building shell you've already created using these shapes.
- Insert a building shell from a CAD (computer-aided design) program such as Autodesk AutoCAD or Bentley MicroStation.
- Convert an existing facilities plan created in a CAD program into Visio format. Doing this converts the CAD objects that represent assets into Visio SmartShapes® symbols. You can then convert symbols that represent assets into Facilities Management shapes that have asset-tracking capabilities.

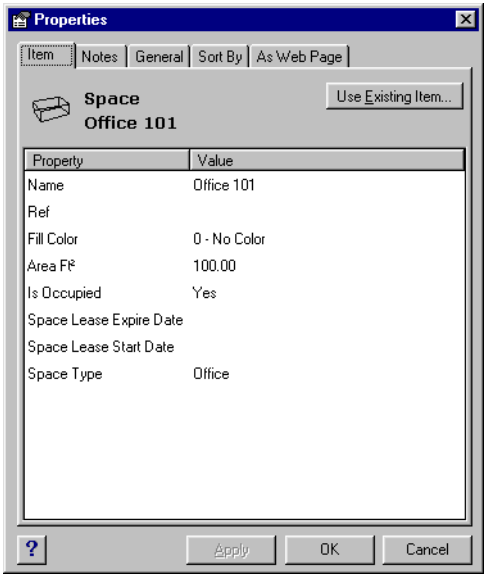
## Designating spaces

You need to designate spaces in your facilities plan so you can associate people and assets with a particular space, such as an office or conference room.

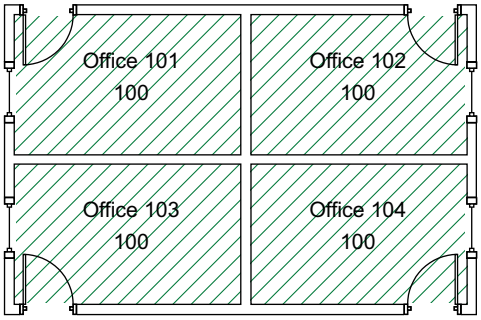
**Try it: Designate office spaces in your facilities plan**

1. From the Resources stencil, drag the Space shape into the top-left office in your facilities plan. The Space shape automatically resizes to fit the office.

2. To specify information (properties) for the space, double-click the Space shape. In the Properties dialog box, select the area beside the property in the Value column, and then
   - Type *Office 101* for the Name property.
   - Type *Yes* for the Is Occupied property.
   - Type *Office* for the Space Type property.
3. Click OK.
4. Copy and paste the Space shape into the other similarly shaped spaces, and then enter properties for each office, including office numbers.




Double-click a shape to view its category and properties. Values in the Properties dialog box are saved as soon as you change them, as is the case when you change the fields in a database.




Once you size a shape to fit a particular space, you can copy and paste the shape into other spaces.

## Resizing spaces

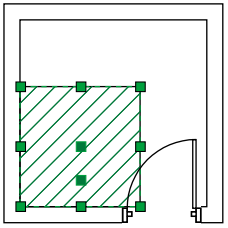
The Space shape is automatically resized when you drag the shape into an office created with Visio wall, door, and window shapes. If you move a wall, you can fit the Space shape to the new office by using the Auto Size command.

If you are working with an inserted CAD building shell (one that you have not converted into Visio format) or with rooms that are not completely enclosed by Visio wall, door, and window shapes, you must resize the Space shape manually. For irregularly shaped rooms, use the Edit command to modify the Space shape.

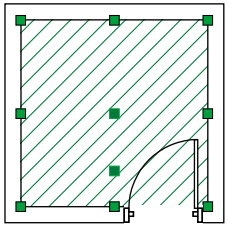
### To resize a Space shape by using the Auto Size command

- If the Space shape is completely bounded by Visio wall and door shapes, right-click the Space shape and choose Auto Size. The Space shape is automatically resized to fit the new room.

- If the Space shape is bounded by shapes converted from a CAD drawing or by any other Visio shapes, such as lines, right-click the Space shape and choose Auto Size. Press Ctrl+click to select each bounding wall of the room. Be sure to select any shapes or lines that represent interior structural features, such as interior columns. Click OK to resize the Space shape.



To resize a Space shape completely bounded by Visio wall shapes, right-click the Space shape and choose Auto Size.



The Space shape expands to fill the room.

## Assigning people to spaces

You assign people to spaces to associate them with that location. In many organizations, a manager might occupy offices in several buildings or locations, and two people might share an office. With the Facilities Management solution, you can assign a person to more than one space, and you can assign more than one person to a single space.

**Try it: Assign a person to each office space in your facilities plan**

1. From the Resources stencil, drag the Person shape onto the Space shape for Office 101.
2. To specify information (properties) about the person, double-click the Person shape. In the Properties dialog box, select the area beside the property in the Value column, and then
   - Type *Eileen Adams* for the Name property.
   - To add Eileen's manager, type *Jillian Elliot* for the Manager property.
   - Type *Accountant* for the Title property.
3. Drag Person shapes onto the Space shapes for the rest of the offices in your facilities plan, and enter properties for each person.

**NOTE** *You can use Visio CAFM Explorer to organize people within departments. For more information, see "Tracking organizational data by using Visio CAFM Explorer" on page 46.*

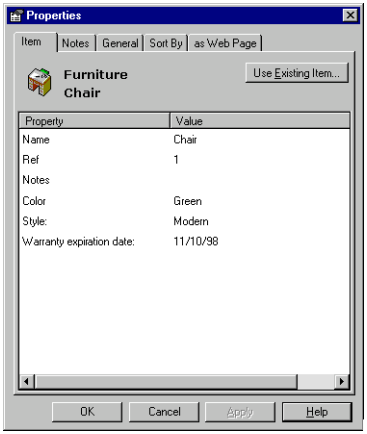
## Tracking data by using asset shapes

To track your assets, just drag an asset shape from the appropriate stencil onto a Space shape to associate it with that space, and then double-click the asset shape to specify properties.

**Try it: Add assets to your facilities plan and track data for each asset**

1. From the Office Furniture stencil, drag a Corner 2, Chair, and File shape onto the Space shape for Office 101. Size them to fit the office. To rotate the chair, drag the control handle (■) on the shape.

2 Double-click each furniture shape, and then specify properties.



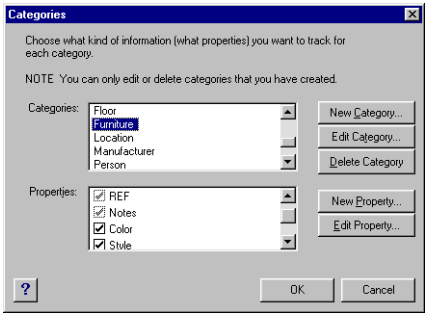

Shapes belong to different categories and have different properties. To find out which category a shape belongs to, double-click it.

3 Repeat steps 1 and 2 for Offices 102 and 103 in your facilities plan.

4 Choose File > Save.

## Designating new tracking information

The facilities information that you decide to track is organized into *categories*—the groups to which shapes belong—and *properties*—the information you can track for a given category. For example, furniture shapes belong to the Furniture category, and office equipment shapes belong to the Equipment category.




Every category has Name, Ref (user-defined reference word or number), and Notes properties and other properties specific to that category.

You can customize the default categories to track information specific to your organization by adding your own properties to the default categories or by adding your own subcategories and properties.

### Try it: Add new categories and properties

1 Choose Facilities > Customize > Categories.

2 In the Categories dialog box, add the following subcategories and properties in this order:

- Computer subcategory (base this subcategory on the Equipment category) and these properties: Manufacturer, Part Number, Processor, RAM, and Hard Drive Size
- Cost Center Number property for the Person category
- Contractor and Employee subcategories (base these subcategories on the Person category)

## Assigning a category to a shape

The Facilities Management solution offers the flexibility to track any information you want for your facility. To track facilities information with a shape, you must assign the shape to a category that has properties for the information you want to track.

You can create your own shapes and assign a category to them as well as change or assign a category to any shape on the drawing page or on a Visio stencil.

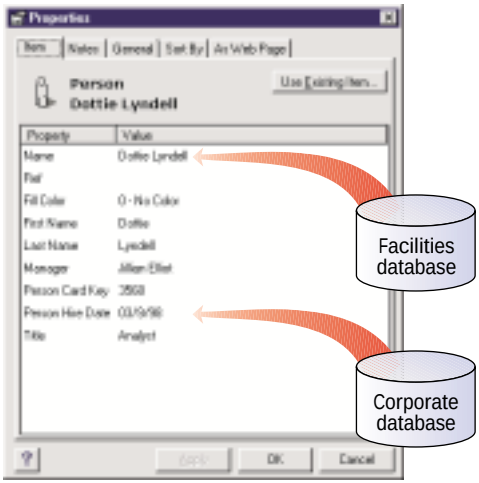
**Try it: Assign a category to shapes on a stencil**

1. Make sure nothing is selected on the drawing page, and then choose Facilities > Convert Shapes. Click Next.
2. In the second screen of the wizard, choose the Office Equipment - Electronic stencil from the list, click Next, and then click Yes to open the original stencil.
3. In the next screen, uncheck Show Only Unassigned Shapes so that you can see all of the shapes.
4. From the Categories list, select Computers.
5. Under Shapes, select PC, and then press Ctrl+click to select Tower PC. Click Add.
6. Click Finish to reassign the shapes. Click No to indicate that you are finished assigning categories.
7. From the Office Equipment - Electronic stencil, drag a PC shape onto the desk in Office 101 of your facilities plan.
8. Double-click the PC shape to enter information for the Manufacturer, Part Number, Processor, RAM, and Hard Drive Size properties.
9. Repeat steps 7 and 8 to add PC shapes to the remaining offices in your facilities plan.
10. For the purpose of this exercise, don't save the changes you made to the stencil. However, if you were creating a real facilities plan, you would click the stencil title bar of the stencil you changed and then choose File > Save.
11. With the drawing window active, choose File > Save to save your facilities plan.

## Using data from existing databases

Much of the information you would track in a facilities plan already exists in databases within your organization. For example, a Human Resources database might contain employee information such as a social security number or manager's name.

You can link properties in your facilities plan to fields in existing databases so that you do not need to reenter the existing data into your facilities plan. Whenever the external database is updated, your facilities plan is also updated.




You can link properties to fields in existing databases to reuse your organization's data.

To access an external database, you must know its data source name. If the database is protected, you also need a user name and password. Contact the database administrator for that information.

**To connect to an existing database and choose data**

1. Choose Facilities > Customize > Get External Data.
2. Click Create to create a new connection, or link, to the existing database.
3. Type a connection name for this connection to the database.

   You create a unique connection name for each Facilities Management category you link to a table or view in the external database. For example, if you were accessing a Human Resources database, you could name the connection *Employees*.
4. Select the data source that points to the existing database, and then click Next.
5. Under Object Types, click the type of database objects you want to view, and then under Database Objects, select the particular table or view you want. Click Next.
6. Choose one or more columns (database fields) to use as the primary key to identify each record in the table, and then click Next.

   A primary key is one field or a set of fields that uniquely identify the records stored in a table. You can use up to five columns as the primary key for a table.
7. Select the Facilities Management category that will use data from the existing database.

   For example, if you were connecting to an existing Human Resources database, you would choose Person from the categories list.

8 Select a Facilities Management property and a database field to link together, and then click Add.

For example, you could link the Hire Date property with a Hire Date field from an employee table in a database.

9 When you have finished linking Facilities Management properties to database fields, click Finish.

**To use linked data in your facilities plan**

1 Double-click the asset or the Person shape in your facilities plan.

2 In the Properties dialog box, click Use Existing Item.

3 In the Search For box, type text to locate the correct record in the external database.

For example, to locate the record associated with an employee, type the person's first name or last name.

4 Select the record you want, and then click OK.

Any property that is linked to a database field is automatically filled in. You cannot edit linked properties in the Properties dialog box.

5 Click OK to save your changes and close the Properties dialog box.

## Listing and locating assets in your facilities plan

One of the most important uses of your facilities plan is to list assets and track their location in your facilities plan. For example, you can locate a person in your facilities plan or list all of the copiers on a particular floor.

**Try it: List and locate the chairs in your facilities plan**

1 Choose Facilities > Find.

To find Steelcase furniture that has particular specifications, choose Facilities > Furniture > Find.

2 In the Find Facilities Data dialog box, on the Name & Location tab, type *chair* in the Search For box and select the Furniture category.

3 Click Find Now.

All shapes that match the criteria appear in the list at the bottom of the dialog box.

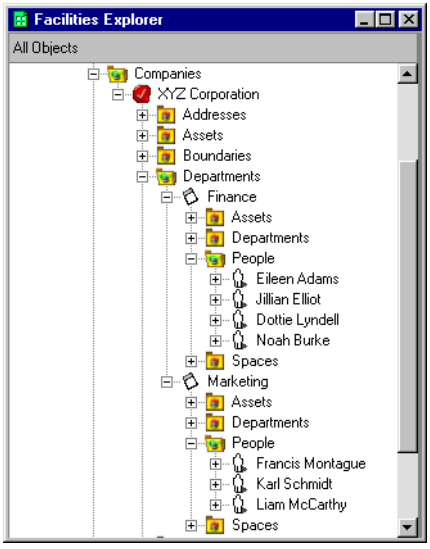
4 From the list of shapes, select the chairs you want to locate in your facilities plan, right-click any one of the selected chairs, and then choose Add-Ons > Locate.

Visio 2000 selects the chair in your facilities plan.

5 Click Close.

## Tracking organizational data by using Visio CAFM Explorer

Visio CAFM Explorer offers a hierarchical view of your facilities data. You can set up departments and organize people within departments so that you can quickly view the structure of your company. Or, you can enter information for a department that you wouldn't track in your facilities plan, such as the total budget for a department.




Visio CAFM Explorer complements your facilities plan by offering a hierarchical view of your organization and facilities information.

You can also use Visio CAFM Explorer as a holding place for information about resources or assets that you haven't placed in your facilities plan yet. For example, suppose the Human Resources department just hired an employee, but the manager doesn't know where the employee will sit yet.

**Try it: Add new employee information to Visio CAFM Explorer**

1. In Visio CAFM Explorer, navigate to the department to which the new employee belongs.
2. Right-click the People folder, choose New > Person, type the new employee's name, and then press Enter.
3. Right-click the new employee name, and then choose Properties to enter information you know about the new employee.

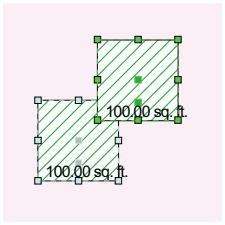
When you determine where the new employee sits, you can add a Person shape to your facilities plan. You can then associate the Person shape with the employee information you added using Visio CAFM Explorer.

# Building Architecture: Drawing floor plans and site plans

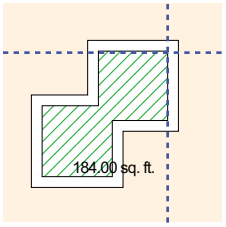
Whether you are an architect designing a commercial building or a facilities manager planning interior spaces, Visio® 2000 Technical Edition provides the drawing tools you need to quickly and easily draw floor plans and site plans.

## Drawing a space plan

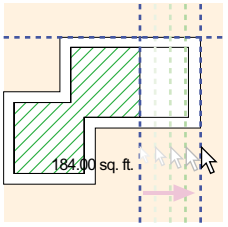
In Visio 2000, you can start a floor plan from a space plan, a conceptual design sketch that shows the required spaces in a building and the relationship between spaces. When you have finalized the layout of your building, you can convert the spaces into rooms outlined by fully dimensioned wall shapes. You can then continue to create a full floor plan with as much detail as necessary.



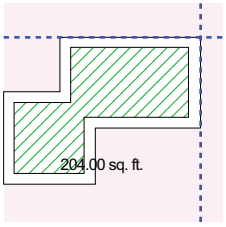

Join two space shapes by right-clicking the shapes and choosing Union.




Choose Architecture > Convert To Walls to convert the space shape into wall shapes.




To resize the room, drag a guide.




To resize the space shape, right-click the shape and choose Auto Size.

**To start your space plan**

1. Start Visio 2000, and then choose File > New > Building Architecture > Floor Plans.
2. To change the page size or drawing scale, choose File > Page Setup.
3. Click the Page Size tab and choose a page size, and then click the Drawing Scale tab to choose a drawing scale.
4. Click OK to accept the new settings and begin working on your space plan.

**To create rooms by using space shapes**

1. From the Walls, Shell And Structure stencil, drag a space shape onto the drawing page.
2. To resize the space shape, drag any corner of the shape.

   The shape is updated to show its new area.
3. To create a room that is not rectangular, position several space shapes to represent the room. Select all of the shapes, right-click them, and then choose Union, Subtract, or Intersection to combine them.
4. Position shapes to represent all of the rooms and common areas in your space plan.
5. To convert a space shape into a room, right-click the shape and choose Convert To Walls.
6. In the Convert To Walls dialog box, check Add Dimensions and Add Guides so that you can reposition the walls easily after they are created.
7. Under Original Geometry, click Retain to keep the original space shape.

   **TIP** *If your floor plan will be used with the Facilities Management solution, keep the space shape.*
8. Click OK to create the room.

**To create rooms by drawing lines**

1. Use the line tool ( ) or the rectangle tool ( ) on the Standard toolbar to draw an outline of a room.
2. Draw the outlines of all of the rooms and common areas in your space plan.
3. To convert lines into walls, select the lines that represent the rooms, and then choose Architecture > Convert To Walls.
4. In the Convert To Walls dialog box, check Add Dimensions and Add Guides so that you can easily reposition the walls after they are created.
5. Under Original Geometry, click Convert To Space Shape to delete the original lines and insert a space shape into the converted room.
6. Click OK to create the room.

**To resize rooms**

1. To change the size of a room, drag the guides to which the walls are attached.
2. If the room contains a space shape, update the space shape by right-clicking it and choosing Auto Size.

## Starting a floor plan

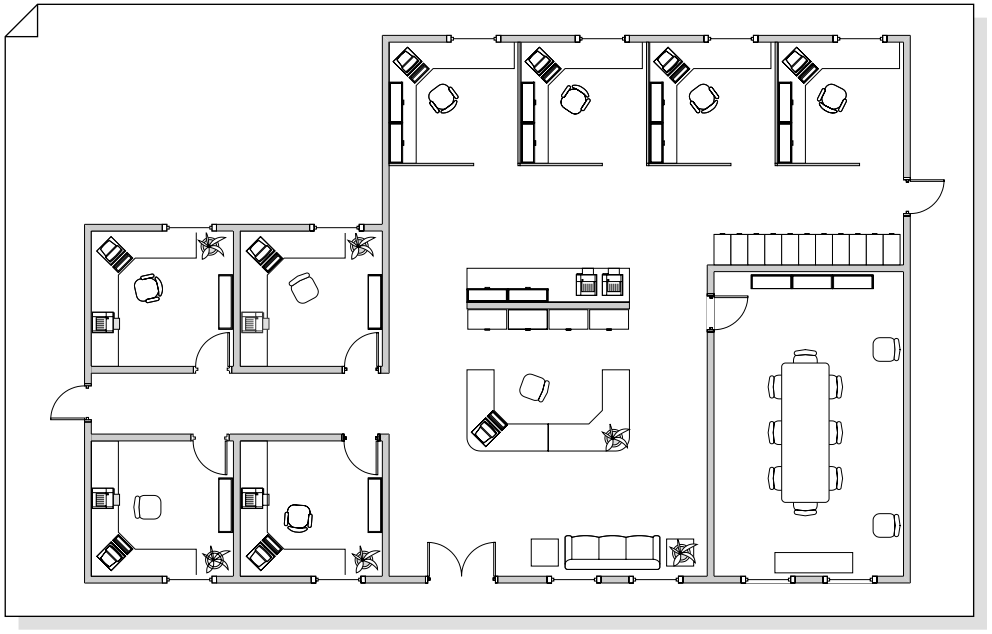
Floor plans are the core drawings in a set of construction documents and are frequently used as background images in a wide range of drawings, from office furniture layouts to electrical wiring diagrams.

You use wall shapes from the Floor Plans stencils to draw a detailed floor plan. You can also create a floor plan by creating a space plan and then converting the spaces into walls. For details, see "Drawing a space plan" on page 47.

**To start a floor plan**

1. Start Visio 2000, and then choose File > New > Building Architecture > Floor Plans.
2. To change the page size or drawing scale, choose File > Page Setup.
3. Click the Page Size tab and choose a page size, and then click the Drawing Scale tab to choose a drawing scale. For details, see "Setting the drawing scale" on page 20.
4. Click OK to accept the new settings and begin working on your floor plan.

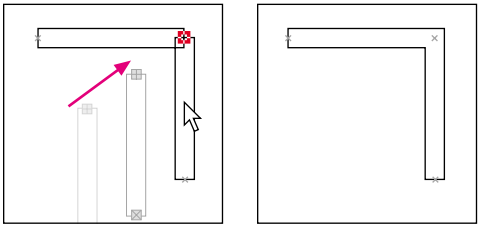
**Floor plan**



The Building Architecture solution simplifies the complex task of drawing scaled floor plans.

## Drawing the building shell

The building shell includes exterior and interior walls and columns and major structural features, such as stairways and elevators. Visio 2000 provides wall shapes that you can glue together to form exterior or interior walls. When wall shapes that form a T-joint or corner joint are glued together, the joint is automatically redrawn so that it is displayed correctly.



Wall joints are displayed correctly when you glue the endpoints of walls together.

### To draw the building shell

1. Drag guides from the horizontal and vertical rulers, and position the guides on the page so that they indicate the perimeter of the building.
2. For each exterior wall, drag a wall shape onto the page. Drag the endpoints of the wall shape to the intersections of the horizontal and vertical guides to glue them to the guides.
3. To reposition exterior walls, drag the guides to which they are attached.
4. Add columns or other structural shapes from the Walls, Shell And Structure stencil or the Building Core stencil.
5. Position interior and cubicle walls by dragging the wall shapes onto the page. Drag the endpoint of one wall to another wall to join them.
6. Add guides to interior walls by right-clicking a wall and choosing Add A Guide.
7. To reposition interior walls, drag the guides to which they are glued.
8. To change wall properties, such as thickness, right-click a wall and choose Set Wall Properties.

## Adding doors, windows, and openings

It's easy to add the shapes for doors, windows, and other openings to your floor plan. When you drag a door or window shape onto a wall, the door or window automatically rotates to align with the wall and glues itself to the wall. Door and window shapes also acquire the wall's thickness.

### To add doors, windows, and openings to walls

1. Drag a door, window, or opening shape from the Walls, Shell And Structure stencil onto a wall.
2. To reposition a door or window, drag it along the wall.
3. To change door or window properties, such as width or offset within a wall, right-click a door or window and choose Set Door Properties or Set Window Properties.

## Measuring and dimensioning

In Visio 2000, you can add dimension lines to walls at any time. As you refine your plan, the dimensions are automatically updated. You can also find out the area and perimeter of rooms in your floor plan.

**To add dimension lines to a wall**

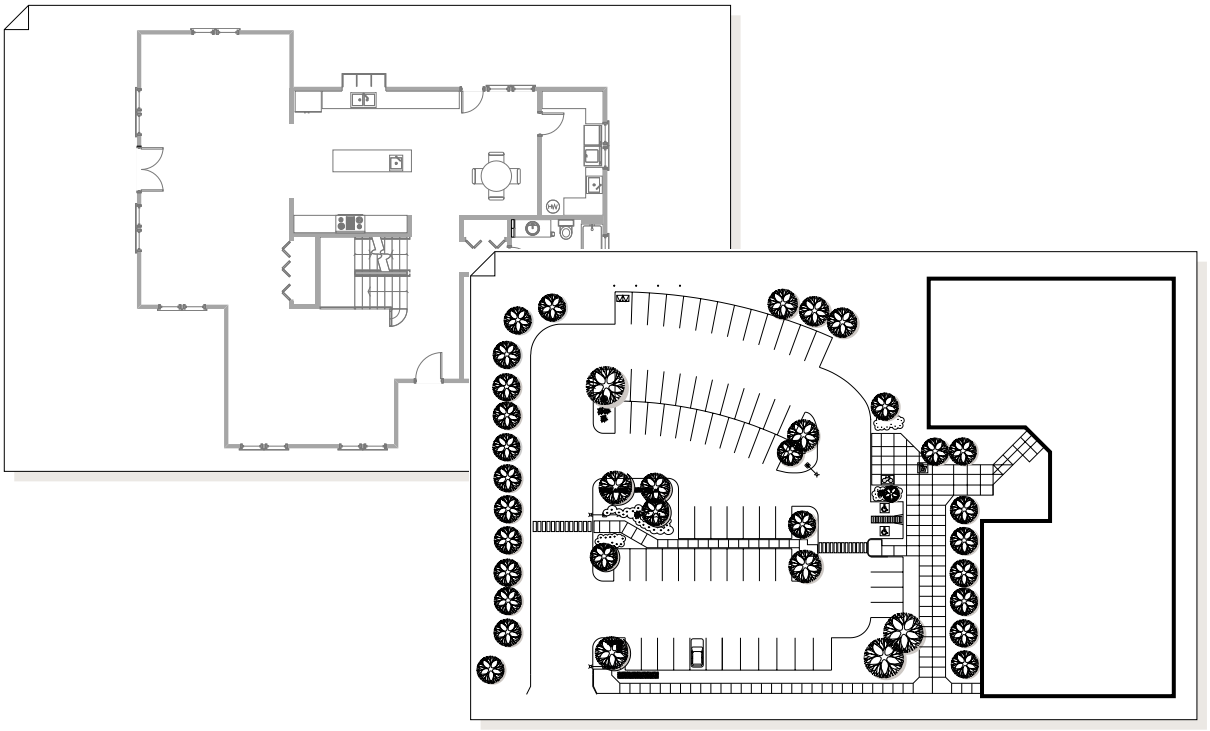
1. Select the walls to which you want to add dimensions.
2. Right-click the walls, and then choose Add A Dimension.

**To measure the area and perimeter of rooms**

1. Select the shapes.
2. Choose Tools > Macros > Visio Extras > Shape Area And Perimeter.

## Additional architecture drawings

You can use the Building Architecture solution to draw home plans and site plans.



Use home plans for remodeling your house or for a complete residential floor plan. Use site plans to show how a building is situated on a piece of property or to show how a site will be landscaped.

# Building Services: Drawing HVAC diagrams

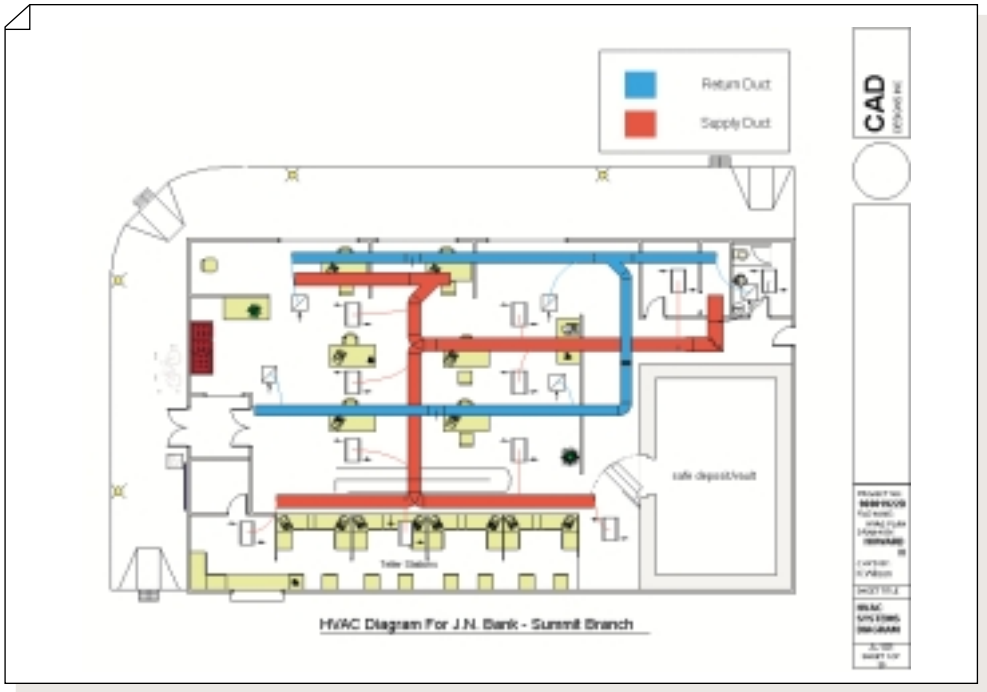
Visio® 2000 Technical Edition provides shapes for creating HVAC control logic diagrams that show a schematic view of the equipment, wiring, and sensors used to control an HVAC system.

### To create an HVAC control logic diagram

1. Start Visio 2000, and then choose File > New > Building Services > HVAC Control Logic Diagram.
2. Drag HVAC shapes onto the drawing page.

   You can configure many shapes by right-clicking them and choosing Set Properties from the shortcut menu. For example, you can change ducts from double line to single line.

**HVAC plan**




Using the Building Services solution, you can draw HVAC plans to show ductwork for heating, ventilation, and air conditioning systems.

3 To label a shape, select it and type the label text. You can reposition a label by dragging the label's control handle (■).

4 Save your drawing.

**To create an HVAC plan**

1 Start Visio 2000, and then choose File > New > Building Services > HVAC Plans.

2 Drag ductwork shapes onto the drawing page. Ductwork shapes rotate into position and glue to other ductwork shapes.

You can configure many shapes by right-clicking them and choosing the appropriate command from the shortcut menu. For example, you can change the angle and radius of a Variable Bend shape.

3 To label a shape, select it and type the label text. You can reposition a label by dragging the label's control handle (■).

4 Save your drawing.

## Using an existing floor plan

Many HVAC, electrical, and plumbing drawings are created on a floor plan or building shell to show the location of the components in the building. You can insert an existing floor plan in DWG, DXF, or DGN format. For details, see "Drawing precisely" on page 20.

To use a floor plan saved in a Visio product format, open the floor plan, and then open the Building Services stencils you want.

**To use a floor plan saved in a Visio product format**

1 Choose File > Open. In the Open dialog box, navigate to the folder that contains your Visio drawing, select the Visio drawing file you want to use, and then click Open.

2 Choose View > Layer Properties. Select each floor plan layer and check Lock.

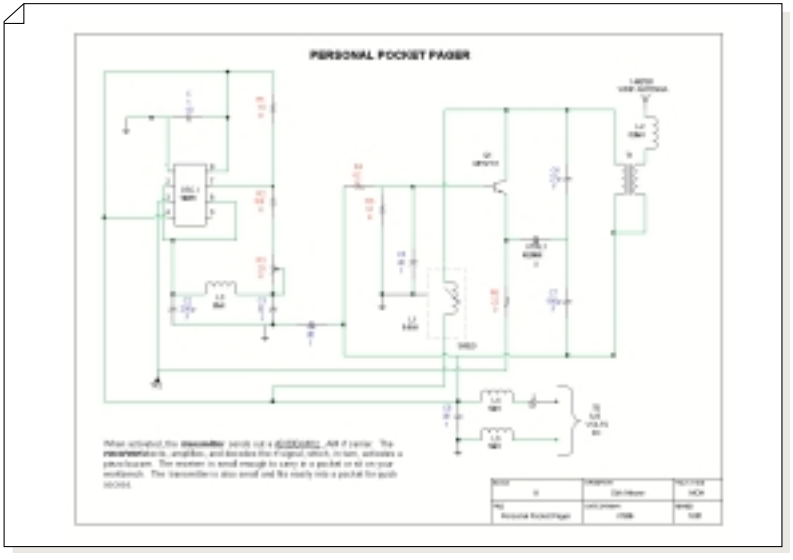
3 Choose File > Stencils > Open Stencil. In the Open Stencil dialog box, navigate to the folder that contains the stencils you want. For each stencil you want to use, press Ctrl+click, and then click Open.

For example, to open the stencil for electrical and telecom plans, navigate to Visio\Solutions\Building Services and open the file Electrical And Telecom.vss.

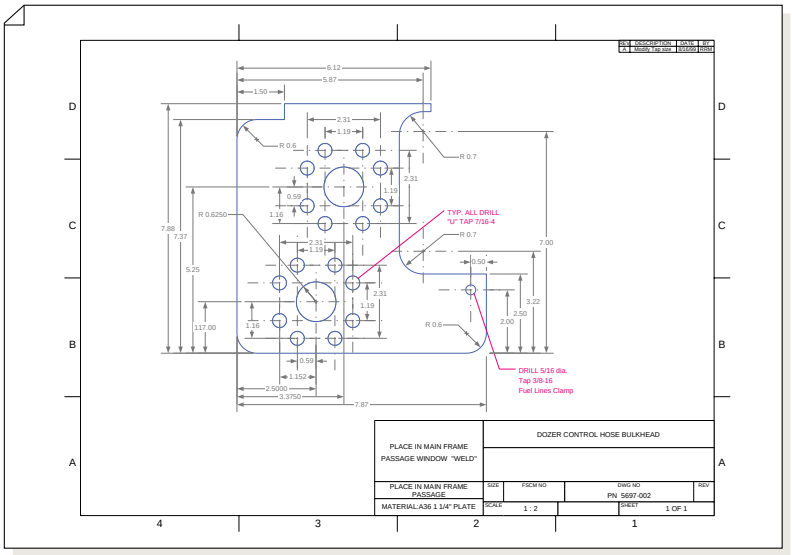
4 Begin working with your drawing.

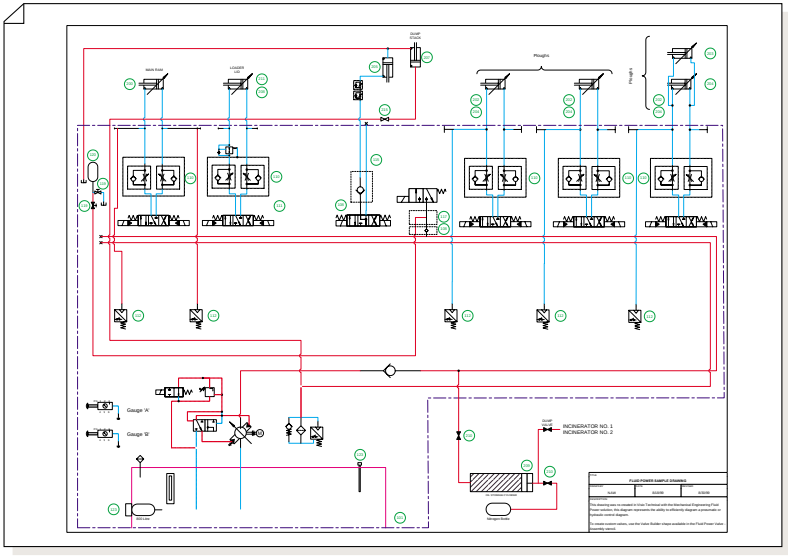
# Additional industry drawings

**Electric and Telecom Plans and Electrical Circuit Diagram**



**Mechanical Part Drawing and Fluid Power Sample**



# Sharing your drawings with others

With Visio® 2000 Technical Edition, publishing your drawings or diagrams to the Internet or an intranet site is as easy as saving a file. Visio 2000 automatically adds the HTML codes necessary to display the drawing in a Web browser, so all you have to do is make sure your drawing looks the way you want.

You can make your drawing a launching point for users who want more detail and related information by adding hyperlinks to shapes. When users click a "hot" shape, they jump to the linked location.

## Adding hyperlinks to drawings

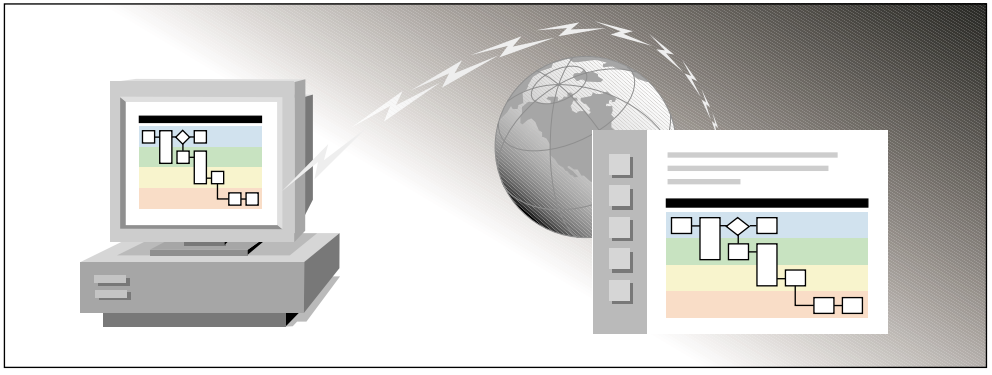
You can add one or more hyperlinks to Visio shapes and drawing pages. A link can jump to another page in the same Visio drawing or diagram, another Visio drawing, or a non-Visio document.

When you add hyperlinks to other pages in the same drawing, you can use them to move among pages in the Visio drawing. For example, you can link a Process shape in a flowchart to Total Quality Management (TQM) documentation in a Microsoft Word document for that process.

When you link a shape or page to a file, you can decide whether the path to the link should be a relative path or an absolute path.

- **Relative path** A relative path describes the location of the linked file in relation to the Visio drawing or another path, which you can set on the Summary tab of the Properties dialog box (choose File > Properties). You can move the Visio drawing and the linked file together (that is, move the entire path structure) without breaking the link, but if you move the drawing or file separately, you break the link.

**Converting Visio drawings to Web pages**



You can easily convert Visio drawings to Web pages by saving them in HTML format.

- **Absolute path** An absolute path identifies the exact location of the linked file in terms of drive, folder, and file name. You can move the Visio drawing file without affecting the link, but if you move the linked file, you must reset the path.

#### To link a shape or page to another Visio drawing page, a Web page, or a non-Visio file

1. Create or open a Visio drawing. To add a link to a page, display the page with nothing selected. To add a link to a shape, select the shape.

   **NOTE** *If you are linking to a Visio 2000 drawing, make sure to save the drawing so that you can open the source to which you are linking.*

2. Choose Insert > Hyperlink.
3. Do one of the following:
   - To link to a Web site, for Address, type the Web site's URL. If you don't know the URL, click Browse, and then choose Internet Address to open your default Web browser.
   - To link to a file, for Address, click Browse, and then click Local File. Navigate to the file you want, and then click Open. (If necessary, change the type of file in Files Of Type.)
4. If you are linking to a file and you want to display a particular page, click Browse next to Sub-Address, select the page you want, and then click OK.
5. Under description, type a name for the link that identifies the location you're linking to.
6. Do one of the following:
   - To specify an absolute path, uncheck Use Relative Path For Hyperlink.
   - To specify a relative path, check Use Relative Path For Hyperlink. To set a path that is not based on the location of the Visio drawing, choose File > Properties. For Hyperlink Base, type the base path that you want.
7. To add another hyperlink for the selected shape or page, click New, and then repeat steps 3 through 6.
8. To link to another page within the document, or to a shape in the document, click the Browse button to the right of Sub-Address, specify the page, shape and zoom level you want, and then click OK.

## Converting drawings to HTML

After you create Visio 2000 drawings, you can convert them into Web pages with links to other Web pages by saving them as HTML files.

#### To convert a drawing to an HTML file

1. Open the drawing you want to save as an HTML file, and then choose File > Save As.
2. Type a name for the HTML file, using the .htm extension, such as *Drawing.htm*.
3. For Save As Type, choose HTML Files (*.htm, *.html), and then click Save.
4. In the Save As HTML dialog box, accept the default settings, and then click OK.

   You are prompted to view the HTML pages.

5 Click Yes to view the new Web pages in your default browser.

**NOTE** *Visio 2000 provides support for VML (Vector Markup Language), which facilitates the exchange, delivery, and editing of high-quality vector graphics on the Web. You must have Microsoft Internet Explorer 5.0 installed to save a drawing in VML format.*

## Routing your drawings for comments

You can use e-mail to send a Visio drawing or diagram to another user. For example, if you need information from coworkers to complete your drawing, you can route the drawing to them electronically and ask for their comments.

The Visio program also lets you take advantage of Microsoft Office routing features, including sending drawings to Microsoft Exchange folders, adding routing slips to drawings you send by means of e-mail, and adding journal entries to Microsoft Outlook.

**NOTE** *Visio products are compatible with e-mail programs that support the Messaging Application Programming Interface (MAPI) protocol.*

### To send a drawing with a routing slip

1 Display the drawing you want to send, and then choose File > Send To > Routing Recipient.

2 In the Routing Slip dialog box, click Address to open your address list, select the individuals or groups to which you want to route your diagram, and then click OK.

3 To route the drawing to people in a specific order, select a person's name, and then click the up or down arrow in the Move section to change that person's position in the list.

4 Under Route To Recipients, specify whether to route the drawing to one person at a time or to everyone at once.

If you choose to route the drawing to one person at a time, the first person on the list views or updates the drawing, routes the drawing to the next person, and so on.

If you route the drawing to a designated group (called a group alias), all group members will receive the drawing at the same time.

5 Check Track Status to receive an update as each person on the list passes the drawing to the next person, or check Return When Done if you'd rather not see the drawing again until everyone has seen it.

6 Under Message Text, type the text you want in the e-mail message, and then click Add Slip.

7 Choose File > Send To > Next Routing Recipient to send the drawing to the first person on the routing list.

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