1

Introduction

Introducing Visio Technical

Whether you use technical drawings to design new products, improve manufacturing productivity, manage facilities, or improve processes and procedures, the Visio® Technical drawing program can help you efficiently create and manage your technical drawings.

With Visio Technical, you can create and share technical schematics efficiently and accurately, without the learning curve that can be associated with computer-aided design (CAD) software. If you're accustomed to thinking of drawings as a collection of vector-based graphics, Visio Technical lets you think about graphics in an entirely new way. You can assemble schematics using predrawn, task-specific SmartShapes® masters that are programmed to behave like the real-world objects they represent.

You can then integrate Visio Technical drawings into reports, proposals, presentations, spreadsheets, and technical documentation created with other Microsoft Windows programs. In addition, you can include word-processed text or spreadsheet data in your technical drawings.

Visio Technical 5.0 provides

- More than 3,000 SmartShapes masters.
- Powerful wizards and other tools that automate tasks such as linking shapes and drawings to databases dynamically, inserting hyperlinks, or creating reports such as a bill of materials based on shapes in a drawing.
- The ability to import and export your existing Autodesk AutoCAD files (Release 10 through Release 13) and other graphic file formats.
- The ability to save drawings as HTML files and publish them on an intranet or the Internet.
- Built-in support for Microsoft Exchange, Microsoft Mail, and Lotus Notes.
- Integration with the Windows Desktop and Microsoft Office 97.
- Visio solutions that can be customized and programmed to suit your needs using Automation and ActiveX controls.

About this manual

This manual provides information specific to Visio Technical. For information about tasks and tools common to Visio Technical, Visio Professional, and Visio Standard, see the *Using Visio Products: For Use with Visio Standard, Visio Professional, and Visio Technical* manual. For information about designing custom shapes and solutions, see the *Developing Visio Solutions* manual.

Contents of *Using Visio Technical*

Chapter	Description
1	Introduces Visio Technical 5.0.
2	Includes instructions and minimum requirements for installing Visio Technical.
3	Shows sample Visio Technical drawings and the templates and stencils used to create them.
4	Summarizes new features of Visio Technical 5.0 and 4.5.
5	Includes drawing tips, such as how to add text to drawings, set up a drawing scale, redline drawings, and print multiple pages.
6	Discusses how you can use templates and stencils to create drawings quickly, and lists all templates and stencils provided in Visio Technical 5.0
7	Lists all wizards and other automated tools in Visio Technical 5.0.
8	Discusses displaying AutoCAD files in Visio Technical, and converting AutoCAD files to and from Visio Technical format.
9	Provides an introductory look at creating custom solutions and working with ShapeSheet technology.
10	Describes where to find more information about Visio Technical including using online Help and Visio sites on the World Wide Web, and where to locate more sample drawings.

2

Installation

Installing Visio Technical

This section includes information about installing Visio Technical and where to go for help if you have installation problems.

System configuration

Required:

- Microsoft Windows 95 or Microsoft Windows NT 4.0
- VGA or better display
- Mouse
- CD-ROM drive for installation

Recommended:

- Pentium, Pentium Pro, or Pentium II PC with 16 MB or more RAM for Windows 95, and 24 MB or more RAM for Windows NT
- Up to 105 MB of hard disk space required for a full installation; 15 MB for minimum installation

Optional:

- Windows-compatible printer or plotter
- Modem and Internet access
- Local area network (volume licenses available)

How to prepare for installation

- Close all programs and turn off virus protection software to prevent installation conflicts.
- If you have another version of Visio installed on your computer and do not want to overwrite that version, change the default installation folder for Visio Technical during installation setup.
- To avoid overwriting stencils or templates you've customized or created, place them into a separate folder before you install.

Installing electronic versions of the manuals and other supplementary files

During installation, you have the option of installing the .pdf format files for the following manuals:

- *Using Visio Products*
- *Using Visio Technical*
- *Developing Visio Solutions*

If you work in a corporate environment where most users don't receive printed copies of the manuals, you can make these electronic copies available on the corporate network or intranet.

To open, read, or print the .pdf files, you need to install the Adobe Acrobat Reader on your computer. You can install the Acrobat Reader by double-clicking the Setup.exe file located in the Acrobat Reader folder on the Visio Technical CD.

If you choose not to install the .pdf files during installation, you can still copy them to your computer. The .pdf files are located in the Docs folder on the Visio Technical CD.

Installing Visio Technical from the CD

You must be running Microsoft Windows 95 or Microsoft Windows NT 4.0 to install Visio Technical.

Installation starts automatically when you insert the Visio Technical CD into your CD-ROM drive. If installation does not start automatically, you can install Visio Technical using the following procedure.

To install Visio Technical on Windows 95 or Windows NT 4.0:

1. Insert the Visio Technical 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, then follow the instructions on your screen.

   The Setup program guides you through the installation process.

Installing Visio Technical on a network

There are two ways to set up Visio Technical on a network server:

- Install a copy on a network server so that multiple workstations can run it from the server.
- Place the Visio Technical files on a network server so the program can be copied onto the hard disks of individual workstations.

For information about network administrator installation options, see Network.txt at the root of your Visio Technical CD.

If you need help with installation

If you encounter problems while installing Visio Technical, call Technical Support (see *Using Visio Products* for the correct number for your area). For help with technical issues, see the Visio Corporation Web site, which you can access from within Visio by choosing Help > Visio On The Web > Online Support; or point your Web browser to http://www.Visio.com/.

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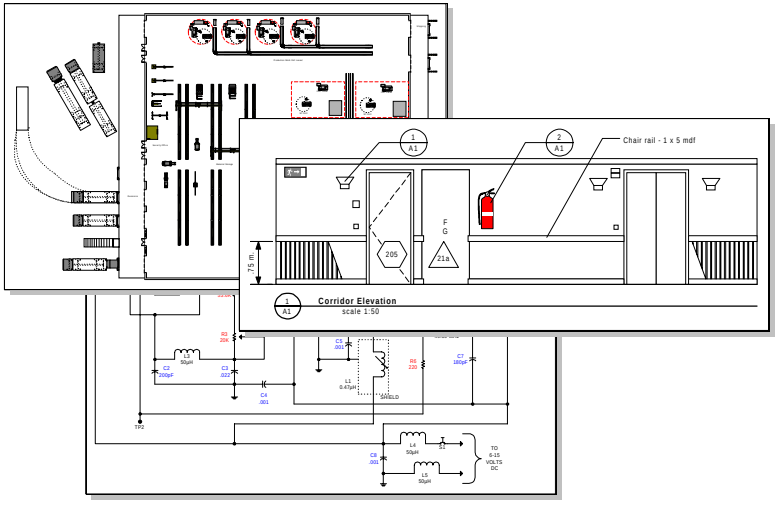
Visio Technical sample drawings

About Visio Technical sample drawings

With its many job-specific stencils and more than 3,000 SmartShapes masters, Visio Technical provides a solution for most technical drawing needs—HVAC diagrams, residential designs, engineering schematics, space plans, mechanical engineering drawings, and more.

This section provides sample Visio Technical drawings and diagrams that you can use as a starting point for your work or as a source of ideas. The template and types of shapes used for each sample drawing are specified above the drawing.



Sample drawings created using Visio Technical

To view these or similar sample drawings online:

- Choose File > New > Browse Sample Drawings.
- Choose Help > Visio On The Web > Visio Home Page.

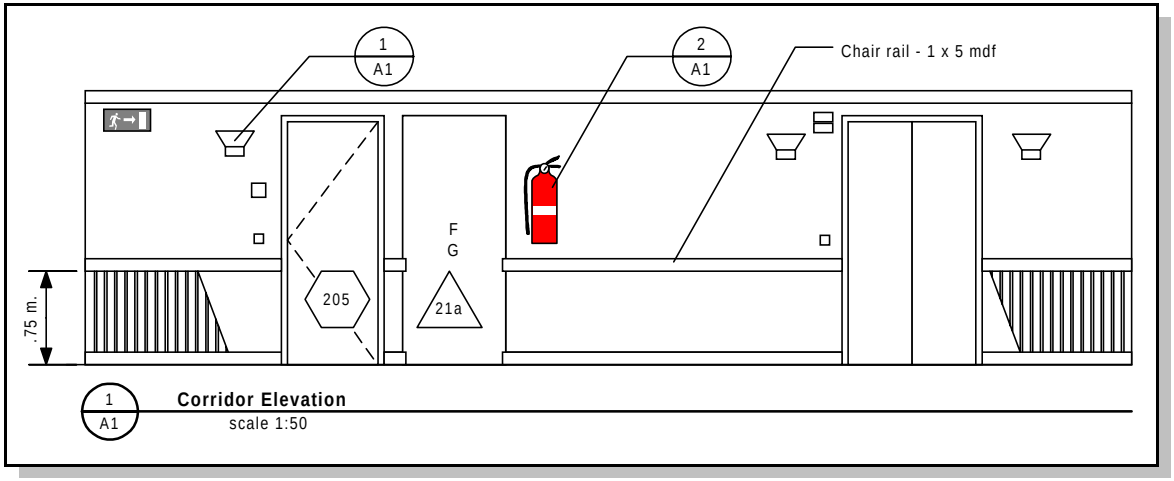
TIP To display template-specific Help on any template, choose Help > Template Help, then select the template name.

Related topics

About Visio Technical solutions, templates, and stencils 37
About wizards and other automated tools 43
Basing new drawings on templates ..... *Using Visio Products* 9

Creating an interior elevation

To create an interior elevation, choose File > New > Facilities Management > Interior Elevations. The stencils for this template contain annotations, dimensioning (architectural), and interior elevation shapes.

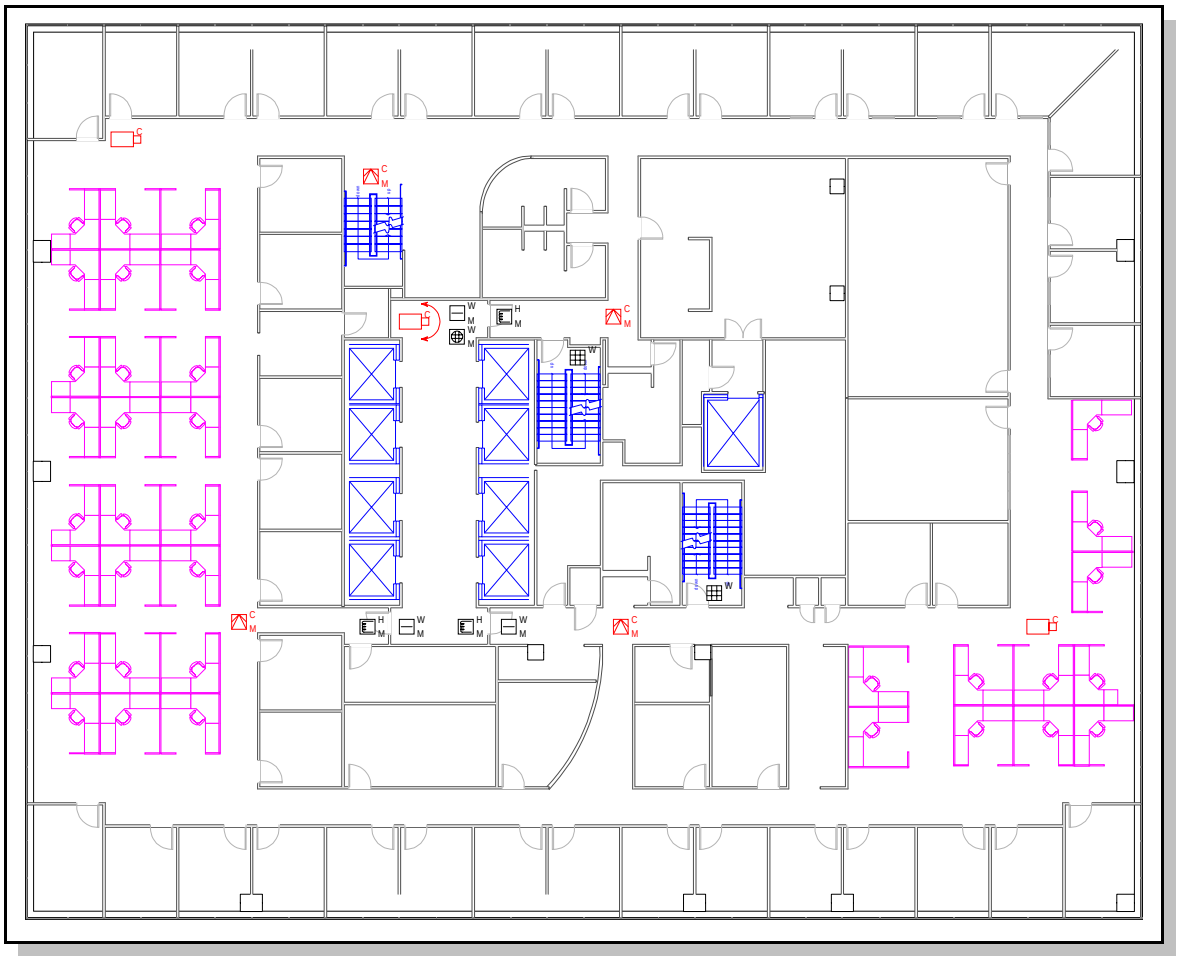


Smart annotation shapes stay connected. Drag and drop dimension lines automatically display real-world measurements.

Creating a floor plan

To create a floor plan, choose File > New > Facilities Management > Space Plan - Building Area; or choose AEC > Home - Large Plan or Home - Small Plan. When you open a Space Plan or Home Template, Visio Technical displays the Wall Utility toolbar. You can use the toolbar buttons with the Double Line Wall and other shapes on the Walls, Shell and Structure stencil to perform a wide variety of tasks, including joining two Double Line Wall shapes, creating a corner joint, and moving a wall without changing the wall length.

TIP Gluing wall shapes to guides or guide intersections allows accurate placement of walls and greater flexibility because all shapes glued to a guide will move with the guide when it is moved.

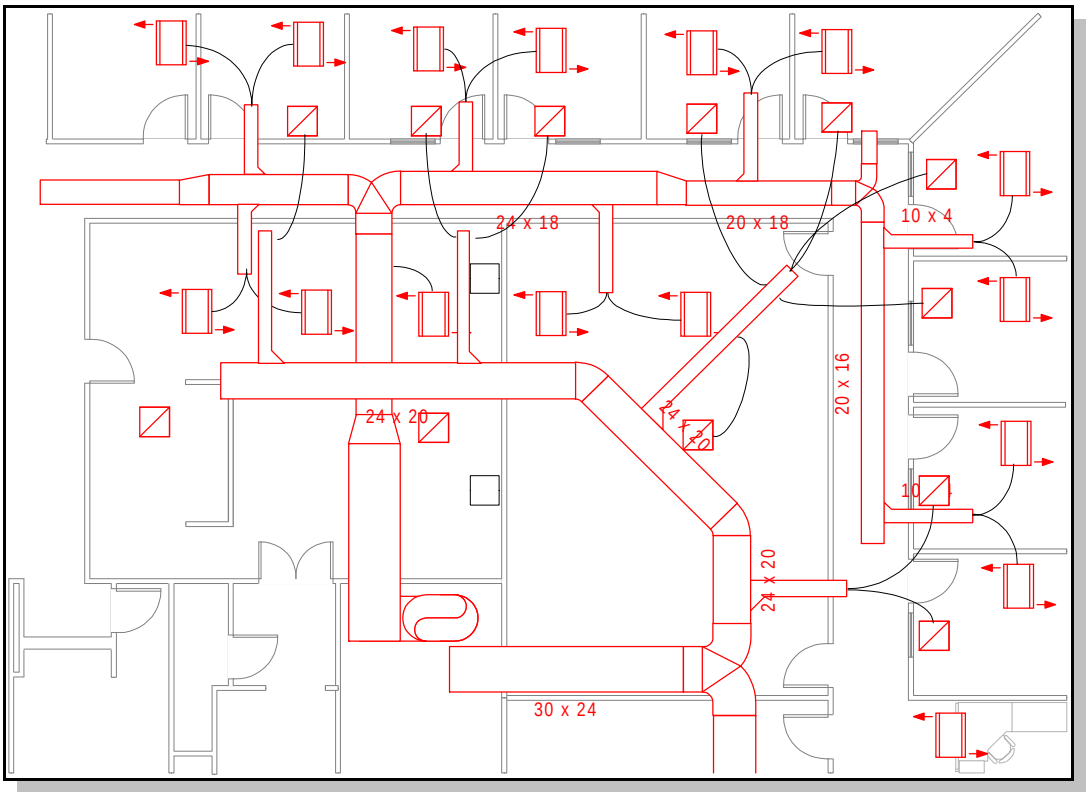


Scaled drawings are a snap when you start with a template. You can change the drawing scale and even set a different scale for each page in multiple-page drawings.

Creating an HVAC ductwork drawing with HVAC equipment and controls

To create an HVAC ductwork drawing, choose File > New > AEC > HVAC Layout. The stencils for this template contain ductwork, pipes, and valves for use in creating single- and double-line HVAC plans.

TIP If you lay out the ductwork equipment as a separate, unique layer in a space plan, you can run the Property Reporting Wizard to generate a bill of materials on just the shapes on that layer.

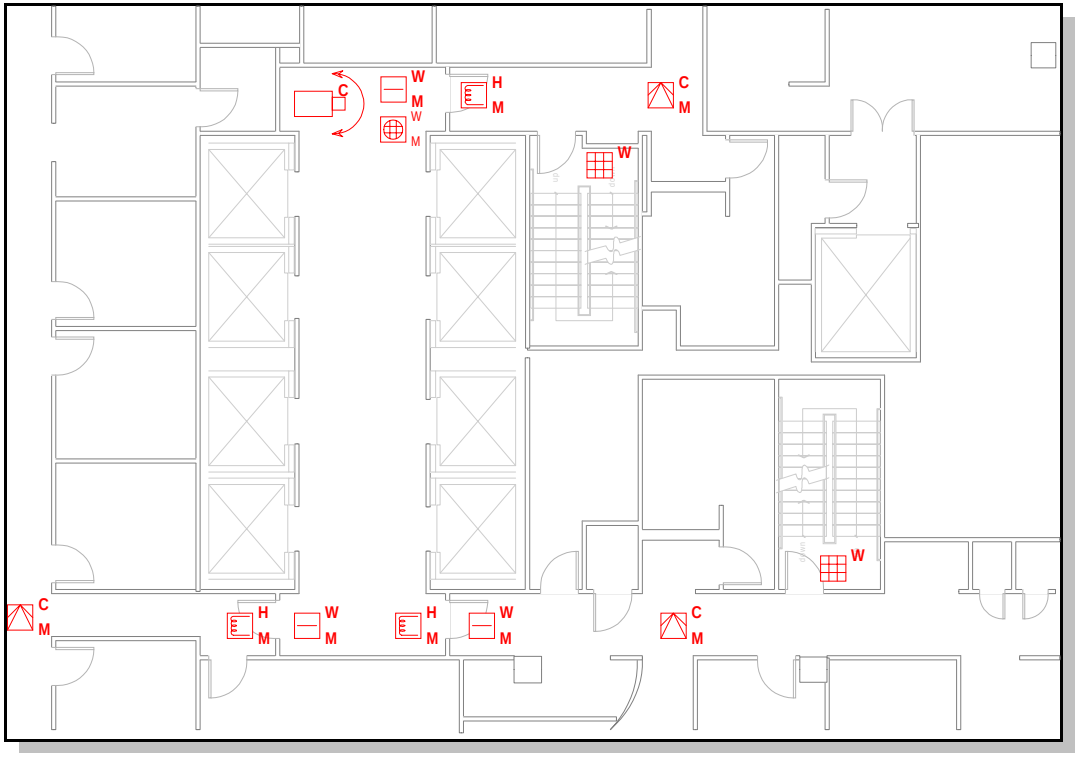


For HVAC and many other shapes, you can quickly configure some of the pipe and valve shapes by right-clicking them and choosing the appropriate command from the shortcut menu. For example, to change an In-line Valve shape to a 3-Way Valve, right-click the shape, then choose 3-Way.

Creating a security monitoring control systems drawing

To create a security systems drawing, choose File > New > AEC > Security Systems. The stencils for this template contain shapes for alarm and access control, video surveillance, and initiation and annunciation.

TIPS 1) If you lay out the security system as a separate, unique layer in a space plan, you can run the Property Reporting Wizard to generate a bill of materials on just the shapes on that layer. 2) If you have an existing drawing of a floor plan in AutoCAD .dwg or .dxf format, you can insert it into your Visio Technical drawing page using Insert > AutoCAD Drawing. Then drag and drop your Security Systems shape on top of the existing drawing.

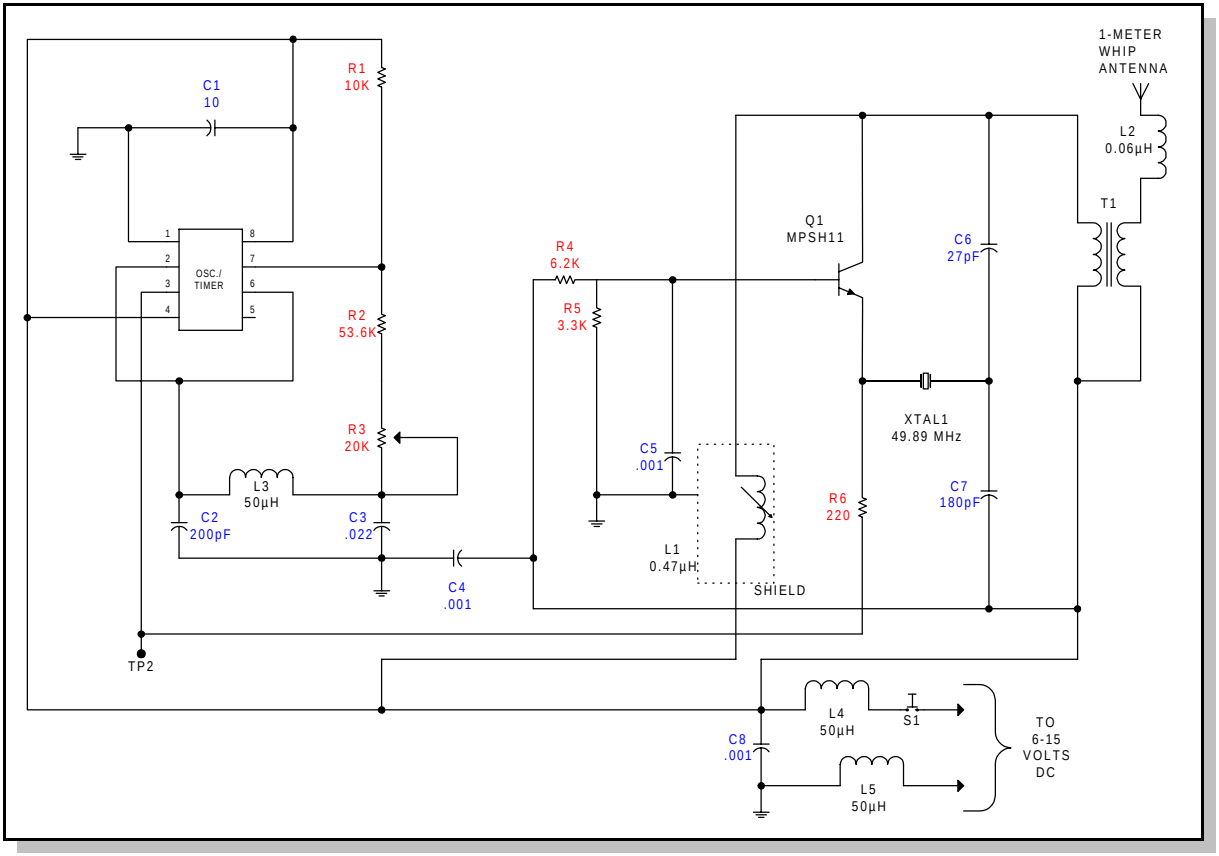


Many Security System shapes include built-in custom-property data that you can change by right-clicking the shape and choosing Properties from the shortcut menu.

Creating an electrical schematics diagram

To create an electrical schematics diagram, choose File > New > Electrical And Electronic > EE - Systems. The stencils for this template include shapes for composite assemblies, maintenance symbols, maps and charts, switches and relays, and telecom switches.

TIPS 1) If you associate custom-property data with your electrical and electronic systems shapes, you can run the Property Reporting Wizard to generate inventory or numerical reports based on the data. 2) If you want to check circuit connections or feed the circuit data into an external analysis program, choose Tools > Macro > Electrical And Electronic > Netlist Generator to output circuit data in Spice format.

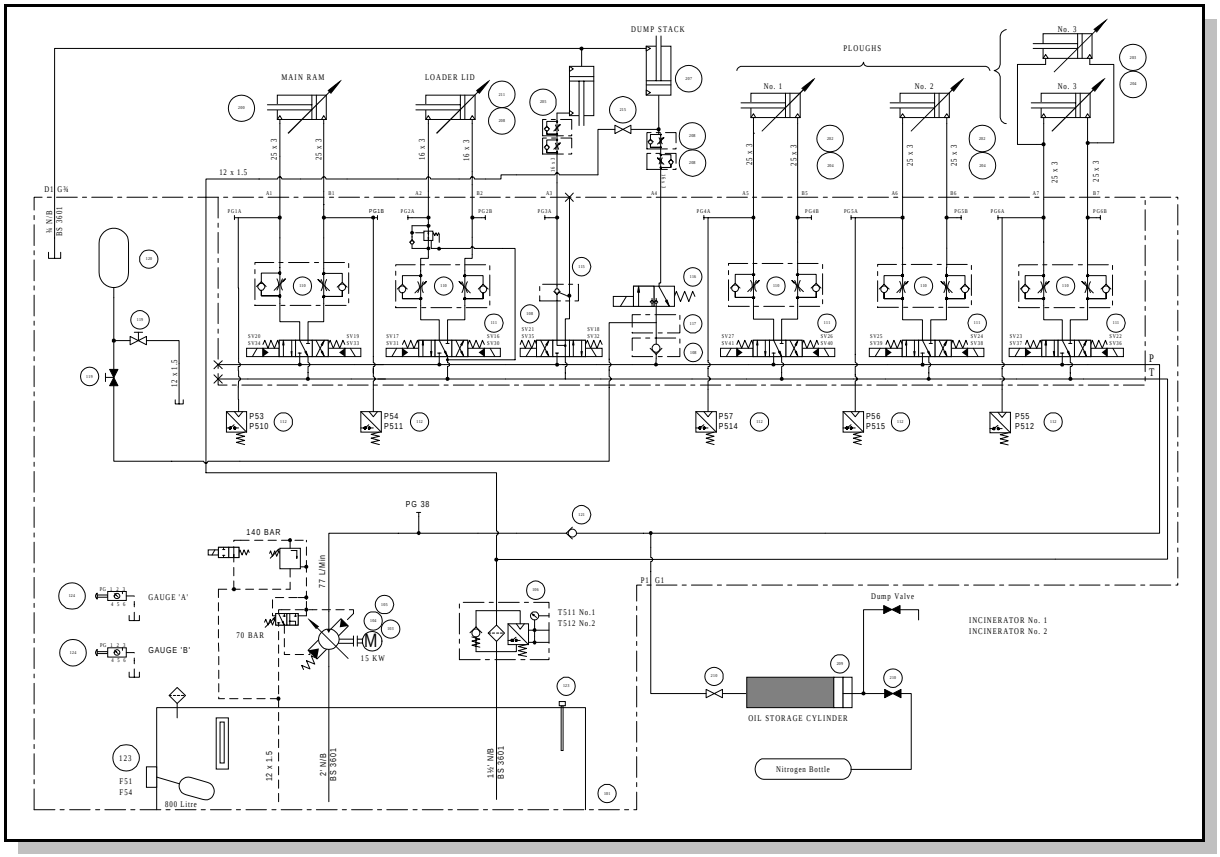


When you drop some of the Electrical And Electronic shapes on the drawing page, Visio Technical prompts you for information about the shape characteristics so that you can, for example, choose the number of pins on a chip.

Creating a pneumatic or hydraulic control system drawing

To create a pneumatic or hydraulic control system drawing, choose File > New > Mechanical Engineering > Fluid Power - All Stencils. The stencils for this template include shapes for equipment, valves, valve assembly, annotations, and connectors.

TIP To facilitate the assembly of custom valves, choose Tools > Macro > Macros > Valve Builder. Or drag and drop the Valve Builder shape from the Fluid Power - Valves stencil.

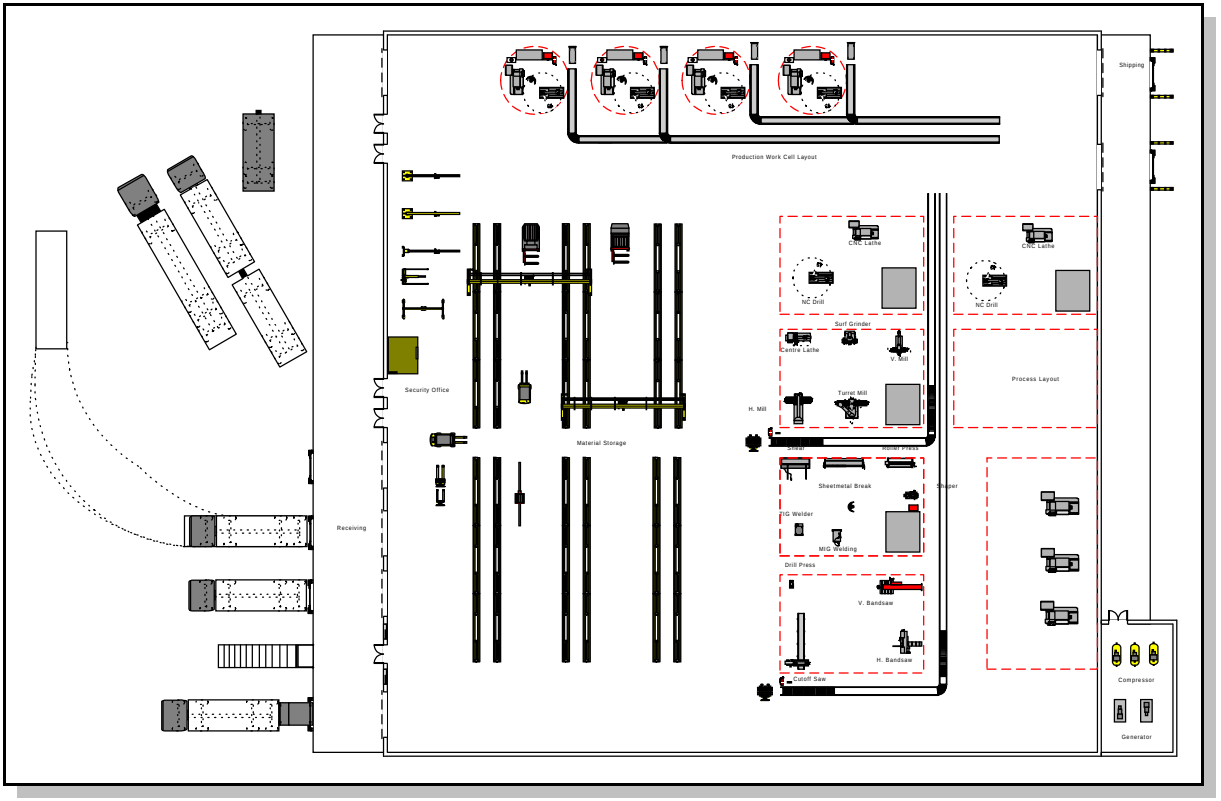


To create valve shapes quickly without having to drag many separate shapes, each with its own settings, use the new Valve Builder tool. Choose Tools > Macro > Mechanical Engineering > Valve Builder.

Creating a process plant design

To create a process plant design, choose File > New > Industrial Process > Process Plant Facilities. The stencils for this template include shapes for machines and equipment, storage and distribution, and warehouse shipping and receiving.

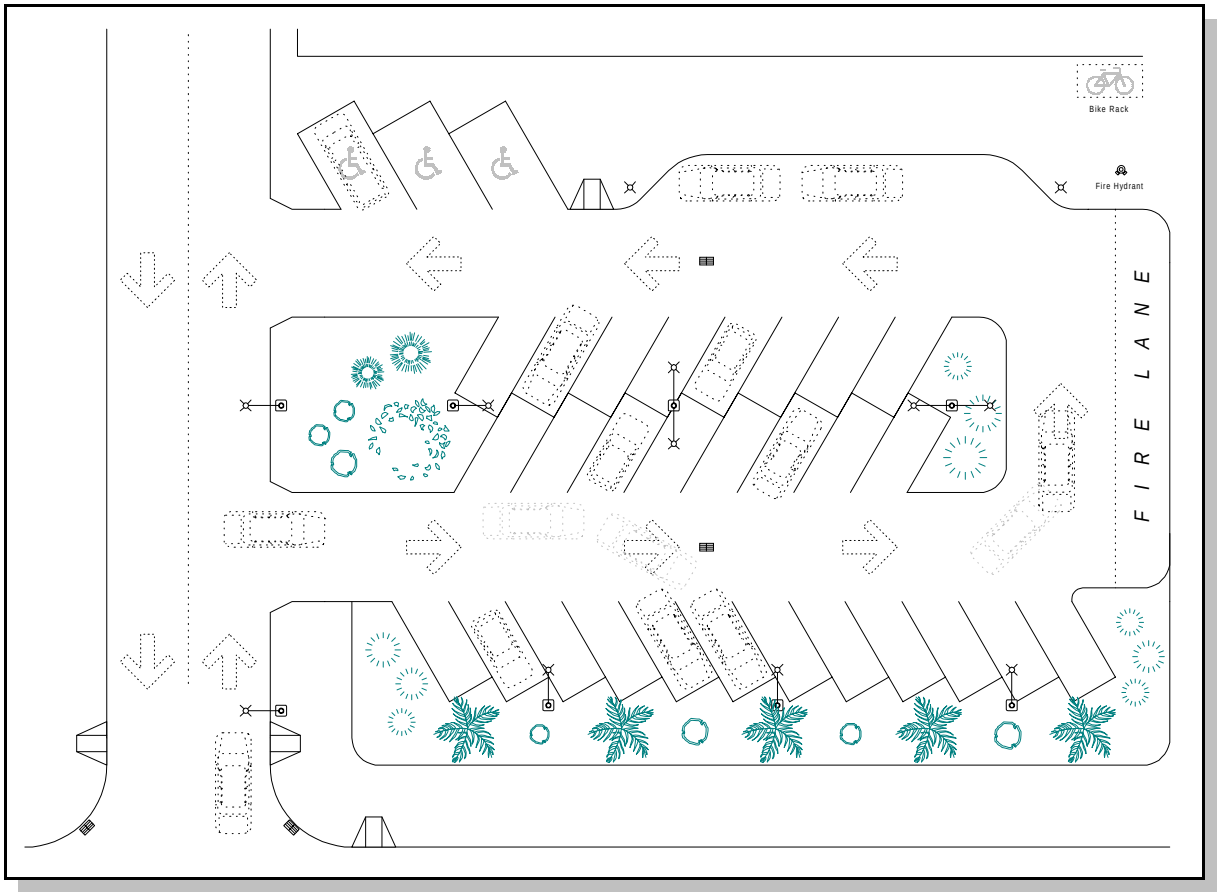
TIP To create the background floor plan, use the shapes from the Walls, Shell And Structure or Building Core stencil. Or insert an existing AutoCAD drawing (.dwg or .dxf format) by choosing Insert > AutoCAD Drawing.



The Visio Technical Industrial Process solutions provide all the shapes you need to create a detailed process plant design.

Creating a site plan

To create a site plan, choose File > New > Facilities Management > Site Plan. The stencils for this template include shapes for vehicles, annotations, dimensioning (architectural), accessories, parking, roads, and irrigation or watering.



You can use the new parking stall shapes to quickly choose stall width, length, and angle precisely to scale.

4

New and improved features

About Visio Technical new features

Visio Technical provides new and improved tools, smarter shapes, improvements to the drawing environment, and smooth integration with Microsoft Office 97 applications. In addition, Visio Technical offers improved AutoCAD compatibility and enhanced Internet support.

For a complete list of new content, tools, and features, see the tables in the following topics.

For a list of developer tools new to version 5.0, see *Developing Visio Solutions*.

Related topics

New and improved features for Visio Technical 5.0

If you are upgrading from Visio Technical 4.5 to 5.0, the following table can assist you with descriptions of the features and functionality that are new or improved in Visio Technical 5.0. Separate tables exist for Drawing environment, Compatibility, Tools, and Content so you can go directly to the features you need most.

Drawing environment

Feature	Description
New! Drawing page behavior	Resize the drawing page by holding down the Ctrl key while placing the pointer over an edge of the page and dragging.
New! Custom fill patterns, line patterns, and line ends	Create your own custom fill patterns, line patterns, and line ends, then easily apply them to shapes.
New! Rotated page and guides	Rotate the page to assist in assembling any aspect of the drawing that is at an angle to normal page orientation.
Improved! Toolbar	**Organization** Access the toolbar buttons more easily now that they're grouped by function. **Independent display** Show or hide groups of toolbars as you work. **Pop-up palettes** Select colors, patterns, and other attributes from pop-up palettes associated with toolbar buttons, such as Fill Color, Fill Pattern, or Line Weight. **Discoverability** Locate the tools on a toolbar quickly, because now all the tools appear when you display a toolbar—they're not hidden on drop-down lists.

Compatibility

Feature	Description
New! Microsoft Office 97 compatibility	**Send To support** From within Visio Technical, route and send drawings through e-mail to other recipients. **Binder support** Add headers and footers to Visio Technical drawings included in Microsoft Binder files and view the drawings in Print Preview mode. **Microsoft Outlook journaling** Automatically record time you spend working on Visio Technical drawings in your Outlook journal.
New! In-place editing	Edit objects you embed in your drawings without leaving Visio Technical.
Improved! AutoCAD compatibility	Use the updated DWG converter and new display component that enables AutoCAD compatibility from Release 10 through 13. Display and control layers more efficiently.

Tools

Feature	Description
New! Connector technology	**Fewer connectors** Choose from fewer but more powerful connectors that make creating your drawing easier. **Dynamic routing** Use connectors that reroute around shapes when you drop or move them.
New! Offset capability	For a specified line or curve in Visio Technical, implement the offset as a pair of lines that are equidistant from the original line or curve.
New! Automated tools	**Area Analysis** Use to calculate the area of a room or space created using the Double Line Wall shape. **Valve Builder** Use to create fluid power valve shapes more efficiently. **Mechanical Parts Library** Use to create over 15,000 bolts, fasteners, and steel sections from a compact library of shapes that are linked to a comprehensive parts database. **Netlist Generator** Use to create a component connection list from electrical circuit diagrams in a Visio Technical drawing. Output the list in Spice format for external analysis.
New! Full-screen preview	View drawings in full-screen or presentation mode without toolbars or other interface elements, and navigate from page to page using the mouse buttons or arrow keys.
New! ODMA support	Handle Visio Technical drawings as part of your Document Management System (DMS). When Visio Technical detects the presence of the Open Document Management API (ODMA), it hands file management operations to the ODMA program.
New! Faster report creation	Generate inventory and numeric reports quickly with the improved Property Reporting Wizard, even for very large drawings that include shapes with many custom-property fields.
Improved! Web tools	**Add hyperlinks** Efficiently add hyperlinks to Visio Technical shapes and drawing pages so you can jump to other drawing pages or files, documents created in other applications, or to Web sites (URLs). Link to a specific location within a document or on a Web page. **Save drawings as HTML files** Use the improved interface for saving Visio Technical drawings as HTML files you can publish on the Web. **Use Microsoft Internet Explorer to open and edit Visio Technical files** Open and edit Visio Techncial files in Internet Explorer. Use the browser's Forward and Back buttons to move between Visio Technical drawings, Web pages, and other files open in Internet Explorer.

Table continued on next page.

Tools *(continued)*

Feature	Description
New! Shape Explorer	Search for and catalog shapes, stencils, or templates stored on your own computer or on the Visio Web site.
Improved! Graphics/file support	Import enhanced metafiles, CorelDRAW 7 .cdr format files, and AutoCAD .dwg and .dxf format files. Export Visio Technical drawings as enhanced metafiles.
Improved! Database Wizard	**Database Wizard** Now supports more ODBC drivers and new custom property types. Use to control some ODBC settings from within Visio Technical. **Drawing monitor** Control when the drawing monitor starts. Add an action to a drawing page so you can start the drawing monitor by right-clicking the page.

Content

Feature	Description
New! AEC solutions	**Security Systems shapes** Includes shapes that meet the SIA/IAPSC standards. **HVAC Double Line (ductwork) stencil** Improved to provide more functionality.
New! Mechanical Engineering solutions	**Valve Builder** Use to efficiently create fluid power valve shapes. **Mechanical Parts Library** Create over 15,000 bolts, fasteners, and structural sections from a compact library of shapes that are linked to a comprehensive parts database.
New! Process Plant Facility solutions	**Shop Floor shapes** Includes machine and equipment shapes, such as drill press, generator, compressor, and conveyor shapes. Also includes storage and distribution shapes. **Warehouse shapes** Includes shipping and receiving shapes, such as loading bays, waste handling, gas handling compounds, and site storage shapes.
New and improved! Facilities Management solutions	**Area Analysis tool** Use to calculate the area of a room or space created using the Double Line Wall shape. **New Interior Elevations shapes** Includes shapes for commercial office interior wall elevations such as doors, windows, wall lights, washroom/restroom shapes, and emergency and life safety signs. **Site - Accessories shapes** Includes solid waste enclosures, site lights, and drains. **Site - Parking And Roads shapes** Includes commercial parking layout shapes for parking lots, sidewalks, and drive aisles. **Vehicles** Shapes for commercial vehicles including turn sweep radius. **Walls, Shell And Structure shapes** Includes shapes for exterior walls and openings, and structural elements such as columns.

Feature	Description
New and improved! Electrical Engineering solutions	**Netlist Generator tool** Creates a component connections list from electrical circuit diagrams in a Visio Technical drawing. Outputs the list in Spice format for external analysis. **Revised Electrical Engineering shapes** Align with grids more effectively.
New! Marketing shapes	New marketing stencils enable quick, customizable creation of colorful and informative marketing presentations that include 3-D pyramids, process and feature comparison charts, matrices, clip art, and more.
Improved! Project Timeline Solution	**Synchronized date information** Tied to Timeline position on the chart. **Ability to read and write Microsoft Project files**

New and improved features for Visio Technical 4.5

If you are upgrading from Visio Technical 4.1 to 5.0, the following tables describe additional new features and functionality that were added in Visio Technical 4.5.

Tools

Feature	Description
New! Microsoft Visual Basic for Applications (VBA) development environment	Built-in VBA and Automation for developing custom solutions. Benefits of an embedded VBA file include faster performance and easier distribution of files.
New! Internet tools	**Hyperlinks** Use the new Hyperlinking wizard to automatically create hyperlinks to a page, document, or URL. **HTML** Publish Visio Technical drawings on the Internet or an intranet by saving them in HTML format with image map capabilities. URL links associated with a shape are preserved. **Drawing formats** Export Visio Technical drawings to the most common Internet raster formats (.gif, .jpg, and .png).
New! Advanced formatting tools	**Automatic layout** Work faster and get better looking flowcharts and block diagrams with automatic placement of shapes and connecting lines. **Custom colors** In addition to allowing custom color selection, you can include formula-driven customizable color behavior. **Gradient fills** Add polish to drawings and diagrams with gradient fills.

Table continued on next page.

Tools *(continued)*

Feature	Description
Improved! Database Wizard	Database Wizard now supports the SQL Server and Oracle databases—and not only database tables, but also views, system tables, and aliases.
Improved! Windows integration	**Switchable interface** Visio Technical 4.5 is designed for Windows NT 4.0 and Windows 95. The switchable Visio Technical user interface now includes the Microsoft Office 97 look. **Enhanced 32-bit performance**

Content

Feature	Description
New and improved! Shapes	**HVAC Industrial Controls** Shapes include symbolic ductwork, sensor, and equipment commonly used in the HVAC industry. Use to schematically represent common HVAC equipment and controls. **Building Wall** Advanced wall shapes and utilities to join, move, and align walls and related shapes such as windows and doors. New double-line geometry based on variable reference line layout. Uses SmartShapes technology to resolve the most common intersection geometry.

5

Drawing tips for Visio Technical

About drawing tips for Visio Technical

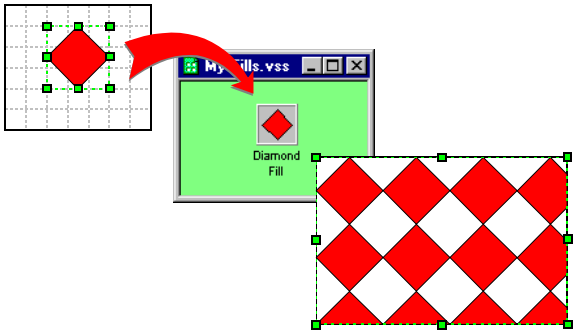
You can use Visio Technical for many drawing tasks, including applying new custom patterns, redlining drawings, adding text to drawings, using pages and layers to structure a drawing, drawing precisely to scale, and working with multiple pages.

For specific tips and techniques, see the following topics.

For general information on drawing in Visio, see the *Using Visio Products* manual.

Working with fill patterns, line patterns, and line ends

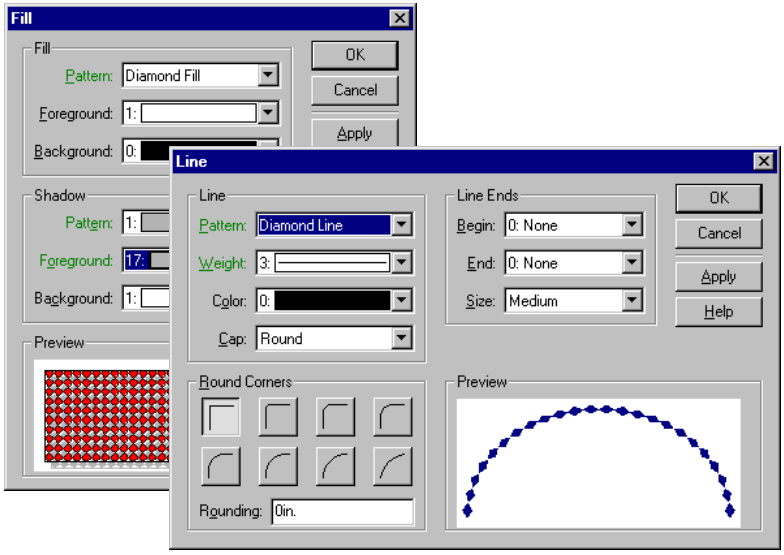
Visio Technical provides a multitude of fill patterns, line patterns, and line ends, many of which are familiar to AutoCAD users. In addition to the numerous new patterns included in Visio Technical, you can also design your own custom line and fill patterns and line ends that you can reuse later in Visio Technical drawings.



Design your own fill pattern to reuse in your drawings.

Visio Technical includes a number of stencils that contain over 200 new fill and line patterns, including architectural and ANSI-standard hatch and fill patterns. When you open these stencils, the patterns they contain appear as a choice in the Line or Fill dialog box. For example, you can open a custom pattern stencil and then apply those patterns as fills from the Fill dialog box. The custom patterns don't appear as masters on the stencil because patterns are not true shapes, but attributes that you apply to shapes. If you open the drawing's local stencil as original, which gives you read/write access, then you can see the fill pattern shapes and edit or delete them.

Once you create a pattern, you can select it and see a preview in the Fill or Line dialog box, including all formatting attributes such as color and shadow.



To apply a line or fill pattern: Select the shape to which you want to apply the pattern. Choose Format > Line to apply a line or line end pattern. Choose Format > Fill to apply a fill pattern.

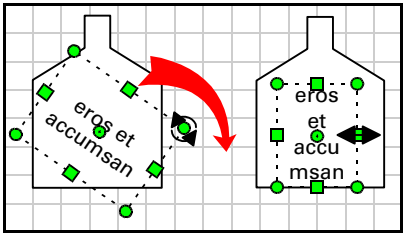
Related topics

Creating custom patterns ..... *Developing Visio Solutions* 150

Adding text to drawings

You may need to include a substantial amount of text for title blocks, labels, or annotations in your technical drawings. Visio Technical simplifies the task of putting text where you want it. Click most shapes and just start typing to add text. In addition, many shapes already include appropriate text or labels that you can quickly customize.

Many shapes have a control handle that allows you to move text easily. For finer control over text, you can use the text (A) and text block ( ) tools on the Standard toolbar. Select a shape with the text tool to open its text block and highlight the contents. Then you can edit the text, change its formatting, or change the color of the text or its background.

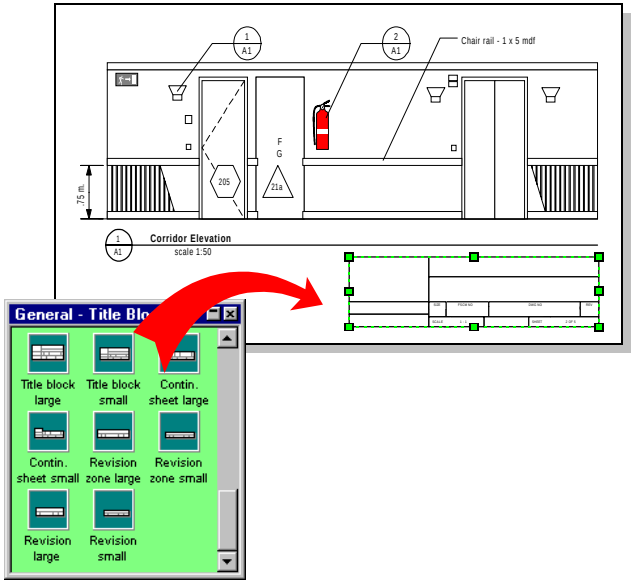


Use the text block tool to rotate, move, and resize a shape's text block.

Adding a title block to a technical drawing

Title blocks are essential to almost all technical drawings. In Visio Technical, the quickest way to add a title block to a drawing is to use shapes from the General - Title Blocks stencil, which includes

- Entire title blocks and labels that conform to appropriate standards for various paper sizes.
- Ruled columns.
- Date, description, revision, page number, and other individual blocks with which you can build a title block of your own.



If the title blocks stencil is not already displayed, choose File > Stencils > Annotation > General - Title Blocks. Drag a title block shape onto the drawing page, and then start typing.

TIP Place title block shapes on a background page of your drawing. That way, if your drawing has multiple pages, each of which requires a title block, you can assign the background containing your title block shapes to each drawing page that needs to use it. You can also change the scale of the drawing page without affecting the title blocks.

Adding labels and annotations to technical drawings

In Visio Technical, you can add labels and annotations to drawings.

- To add a text label to a shape, select the shape, then type.
- To add annotations, choose File > Stencils > Annotation, then choose one or more of the following annotation stencils: General - Annotation; General - Connectors; General - Dimensioning, Architectural; General - Dimensioning, Engineering; General - Drawing Tool Shapes; General - Title Blocks. Or choose File > Stencils > Mechanical Engineering > Mech Eng - Welding for a stencil of annotation shapes for welding.

NOTE With many shapes on the annotation stencils, you can glue the endpoints of the shapes to connection points on drawing shapes, so the annotation stays connected if you move the shape to which it's glued.

Related topics

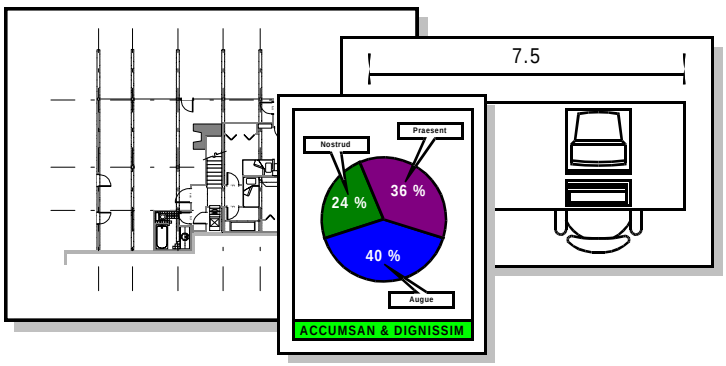
About customizing text behavior ..... *Visio Help*
About storing data in shapes ..... *Using Visio Products* 177
About working with text ..... *Using Visio Products* 75
Adding annotation layers to drawings ..... *Using Visio Products* 84

Using pages and layers to structure a drawing and its shapes

You can structure a single drawing by using multiple pages, layering, and backgrounds.

Working with multiple pages

For some drawing projects, you may want to create a single drawing file that contains many drawing pages. For example, a file could represent a construction project with the overall floor plan on one drawing page, interior elevations on another page, and details for walls and doors on another page. New drawings in Visio Technical open with only one drawing page, but you can add as many new pages as you need.



Each page in a multiple-page drawing can have its own settings, for example, each can have a different drawing scale.

When you create a new drawing page, by default it inherits the size, orientation, scale, measurement unit, shadow offset, ruler, and grid settings of the page currently displayed in the drawing window. You can then change the settings for the new page, if necessary.

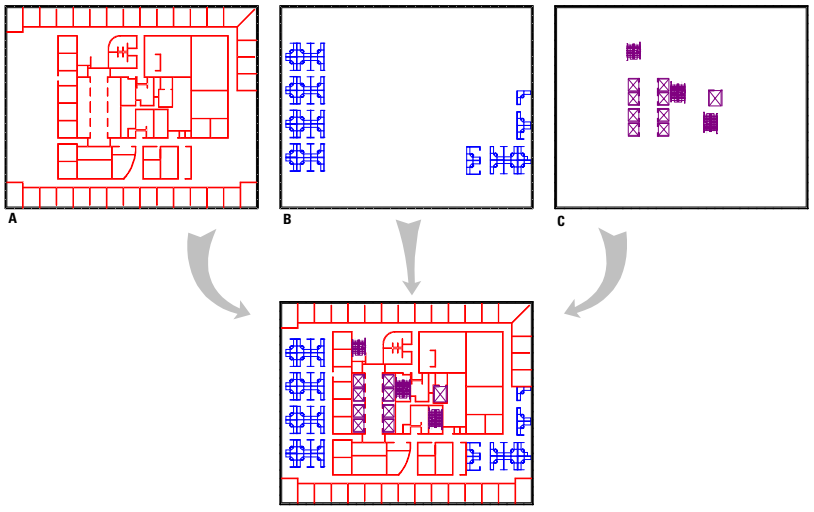
To create a new page: Display a page you want to base the new page on, then choose Insert > Page. In the Page dialog box, name the page or use the name Visio Technical assigns. Set measurement units and shape shadow offsets if you want, then click OK.

To navigate between pages: Click the Next Page button (▶) or the Previous Page button (◀) on the Page toolbar, or choose Edit > Go To, and then select the page you want.

Creating layers and backgrounds in Visio Technical

You can set up your drawing more efficiently by assigning shapes to layers or by placing shapes on a background page. A layer is a category of shapes on a page. A background is a page that appears behind another page. Both layers and backgrounds help you organize information in your drawing, but you use them for different reasons:

- Create layers when you want to organize categories of shapes and text on the same drawing page.
- Create a background when you want the same shape to appear on more than one drawing page, or if you want it to appear at a different scale than the foreground.



Assign shapes to layers so that you can selectively view, edit, print, or lock the shapes against editing based on their layer assignments. For example, this drawing has an Interior Walls layer (**A**), a Work Stations layer (**B**), and a Vertical Circulation layer (**C**).

Visio Technical drawings are different from many CAD drawings, in which you always use layers. In Visio Technical, you don't have to use layers, but when you do, you can easily create and delete layers and assign and reassign shapes to them. You can even assign the same shape to many different layers.

Related topics

About layers ..... *Using Visio Products* 143
Creating multiple-page drawings ..... *Using Visio Products* 23
Using backgrounds for common page elements ..... *Using Visio Products* 26

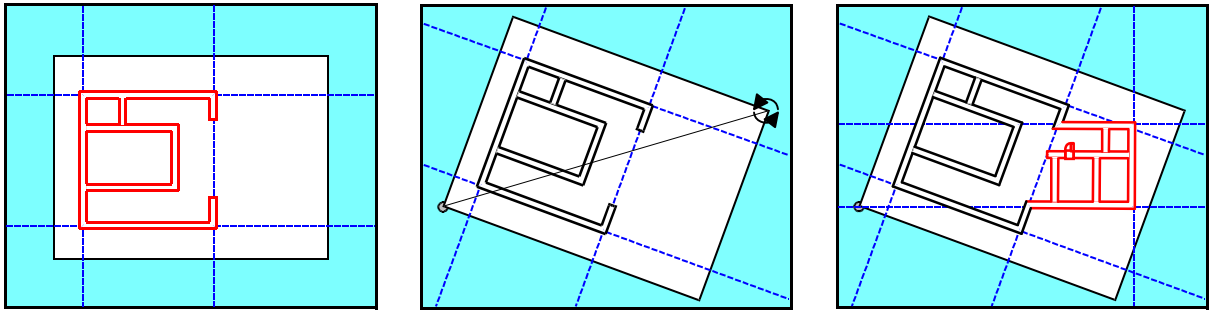
Positioning shapes using rotated pages and guides

In Visio Technical you can work on every detail of the design of your drawing in an orthogonal (horizontal and vertical) manner. You can rotate the contents of the page for any aspect of the drawing that is at an angle to the rest of the drawing. The rulers and grid remain parallel to the window frame, but any guides on the page move with the rotated page.

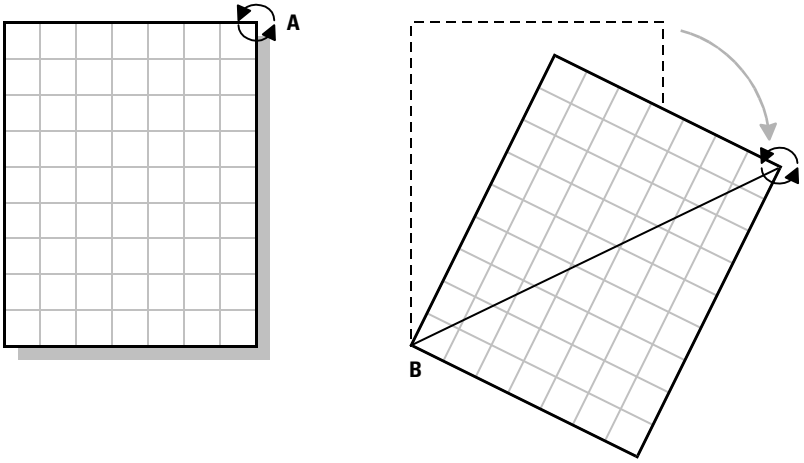
NOTE Rotating the page affects the screen view only—it does not affect the actual drawing or the orientation in which it prints.

Rotating the page

You can rotate the page like any other shape, with the zero point on the ruler as the center of rotation. The status bar displays the degree of the rotation.



Rotating the contents of the page makes it easy to work on every aspect of the drawing in an orthogonal manner.



When you move the rotation tool over a page corner, it becomes a round rotation pointer (**A**). The page's drop shadow indicates that the page is unrotated. A rotated page has no drop shadow. When you drag the round rotation pointer, the page rotates around the zero point (**B**), which is in the lower-left corner by default.

To rotate a page: Display the page you want to rotate, and then choose the Rotation tool () from the Standard toolbar. Position the cursor over any corner of the page. The cursor changes to a round rotation pointer (). Drag the corner of the page to the rotation angle you want, then release the mouse button.

TIP To quickly rotate an angled section of your drawing so that it's orthogonal, right-click an angled guide and choose View As Horizontal or View As Vertical.

Rotating guides precisely

In architectural layouts, the precision provided by the rotation tool (0.1 degree) is adequate. However, some technical drawings, such as those produced in mechanical parts drafting, may require that you specify a precise angle of rotation.

To rotate guides precisely: Select the guide(s) you want to rotate and choose Shape > Size & Position. Under Guide Orientation, choose Rotated. Under Guide Parameters, type a value for Angle to set the angle of rotation.

NOTE Guides are visible at any angle. A guide is constrained to always move in a direction perpendicular to the guide. This ensures that objects glued to the rotated guide continue to move on its axis.

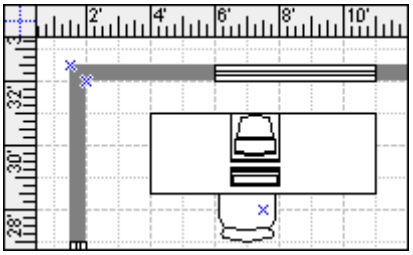
Related topics

About positioning shapes precisely ..... *Using Visio Products* 155
Rotating and resizing pages ..... *Using Visio Products* 19
Snapping shapes for automatic alignment ..... *Using Visio Products* 156
Specifying exact size and position for shapes and guides ... *Using Visio Products* 162
Using guides to reposition multiple shapes ..... *Using Visio Products* 162

Drawing precisely to scale

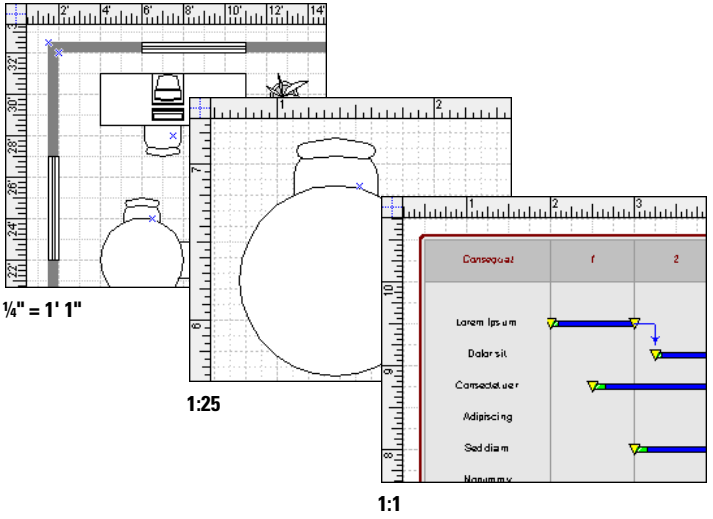
Whenever you need to create the exact spatial relationships of very small or very large objects in the space of a drawing page, you need to set a drawing scale. For example, in an architectural floor plan, the scale might be 1:50 (metric), or ¼" = 1' 0" (imperial); in a drawing of a bolt, the scale might be 1:5.

In Visio Technical, drawing units are sizes in the real world. Page units are sizes on the printed page. The ratio of page units to drawing units is the drawing scale.



When you set a drawing scale, ruler units reflect scale units. To set ruler units that differ from scale units, choose File > Page Setup > Drawing Scale.

All Visio Technical templates that are designed for measured diagrams are set up with the appropriate drawing scale. If you want to work with a different drawing scale, you can change the setting.



Scale is a page property. In a multiple-page Visio Technical drawing, each page can have a different scale.

To set a drawing scale: Display the page for which you want to set a scale. Choose File > Page Setup, then click the Drawing Scale tab. Choose a standard architectural or engineering scale, or under Drawing Scale, enter a custom scale, and then click OK. Visio Technical redraws the page and adjusts the rulers to reflect the new settings.

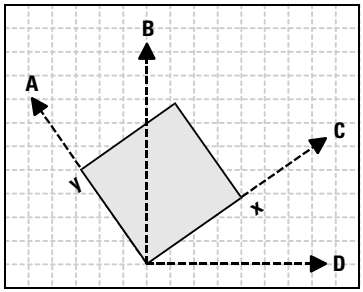
Related topics

Moving a shape a specified distance

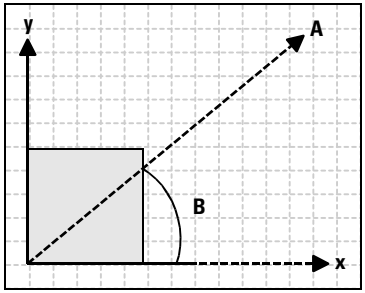
You can move a shape or a duplicate of a shape a specified distance using the Move tool. With this tool, you can specify the direction, distance, coordinates, and angle along which a shape is moved.

To move a shape a specified distance: Choose Tools > Macro > Macros. From the list in the Macros dialog box, choose Move, then click Run. For X, specify the distance to move the shape in the horizontal direction with respect to the page or local coordinate system. For Y, specify the distance to move the shape in the vertical direction with respect to the page or local coordinate system. Complete the remaining options as needed.

TIP If your drawing is based on an AEC or Facilities Management template, you can access the Move tool through the Move X/Y ( ) and Move Polar ( ) buttons on the Wall Utility toolbar.



A Move local y
B Move page y
C Move local x
D Move page x



A Distance to move
B Angle at which to move

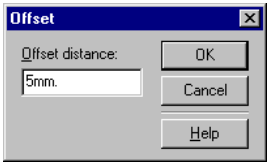
Related topics

About positioning shapes precisely ..... *Using Visio Products* 155
Setting the offset for a shape 33
Snapping shapes for automatic alignment ..... *Using Visio Products* 156
Specifying exact size and position for shapes and guides ... *Using Visio Products* 162

Setting the offset for a shape

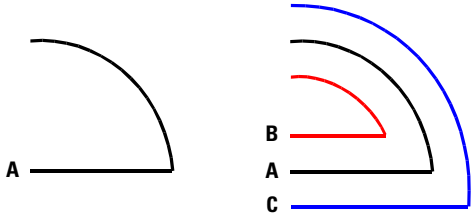
Offset, a basic drawing operation in most CAD systems, is now available in Visio Technical. For a specified line or curve, Visio Technical implements the offset as a pair of lines or curves that are equidistant from the original line or curve. The offset shape types that are produced typically match the original shape. However, if the offset to a curve is not a line, arc, or elliptical arc, then the offset produced is a spline, or series of splines that approximate the offset of the curve. This approximation comes as close as possible to fitting all the points that are a specified distance from a curve.

To set the offset distance for a shape's geometry: Select the shape and choose Shape > Operations > Offset. In the Offset dialog box, enter the distance you want. The offset distance you set last appears as the default offset distance the next time you open the dialog box.



Visio Technical generates offsets on both sides for all the paths in the selected shapes. The result is that two new lines appear—one to the left of the original line, and one to the right. You can then choose to delete a line if necessary, even the original, which is always positioned in the center.

NOTE Offset shapes inherit line patterns from the original shapes. They do not inherit any fill patterns or text that is included in the original shapes.



A Original line and curve

B The offset line and curve on the inside are trimmed to miter corners.

C The offset line and curve on the outside are extended to miter corners.

Related topics

About positioning shapes precisely ..... *Using Visio Products* 155
Moving a shape a specified distance 32

Setting a redlining layer

During the life cycle of a particular technical drawing, an engineer or architect may forward the file to a manager, client, or quality assurance person, who marks changes to be made. Using Visio Technical, you can streamline this markup or redlining process by creating a separate layer for review comments. Placing the comments on a layer by themselves makes them easy to view, print, and color separately from the rest of the drawing.

To set a redlining layer: Display the drawing for which you want to create a redlining layer, then choose View > Layer Properties. In the Layer Properties dialog box, click New, type Redlining, then click OK. Select the Redlining layer, then click the Active cell or the Color cell. If you click the Active cell, a check mark appears next to Redlining in the Active column. If you click the Color cell, choose a color from the Layer Color list at the bottom of the dialog box.

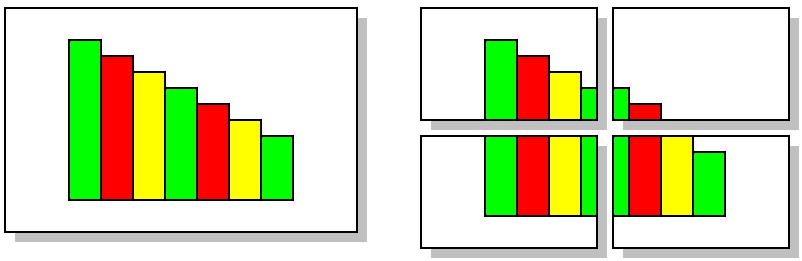
TIP If more than one person is reviewing the drawing, create a redlining layer for each reviewer and assign each layer a different display color.

Related topics

About layers ..... *Using Visio Products* 143
Adding annotation layers to drawings ..... *Using Visio Products* 84
Converting a Visio Technical file to AutoCAD format 57

Printing large drawings

If the size of a drawing is larger than the paper in your printer, you can reduce the drawing before you print. Otherwise, Visio Technical tiles the drawing—that is, the drawing prints across several sheets of paper. Visio Technical never crops a drawing to fit within the margins you have set.



A drawing on a large drawing page prints by tiling across several sheets of printer paper.

To determine whether a drawing will tile: Choose View > Page Breaks. Gray lines appear on the drawing page, indicating the printed page size and margins selected in the Print Setup dialog box.

To increase the area where tiled drawings overlap: Choose File > Page Setup > Print Setup. In the Print Setup dialog box, type larger amounts for the margin settings, then click OK. The larger the margins, the greater the overlap.

Previewing your drawing

To see the effect of changes you make to page settings, you can preview your drawing before you print. Previewing shows you whether the objects that appear on your drawing page onscreen will fit as you intend on the currently selected paper size.

To see how a drawing will appear when it's printed: Choose File > Print Preview. If, after previewing your drawing, you want to make changes to the drawing page or printer settings, such as orientation, size, margins, and so on, choose File > Page Setup.

NOTE Visio Technical supports printing to any plotter that has a Windows driver. For best results, however, make sure you are using the most recent plotter driver for your version of Windows. Otherwise, your drawing may not plot as expected.

Related topics

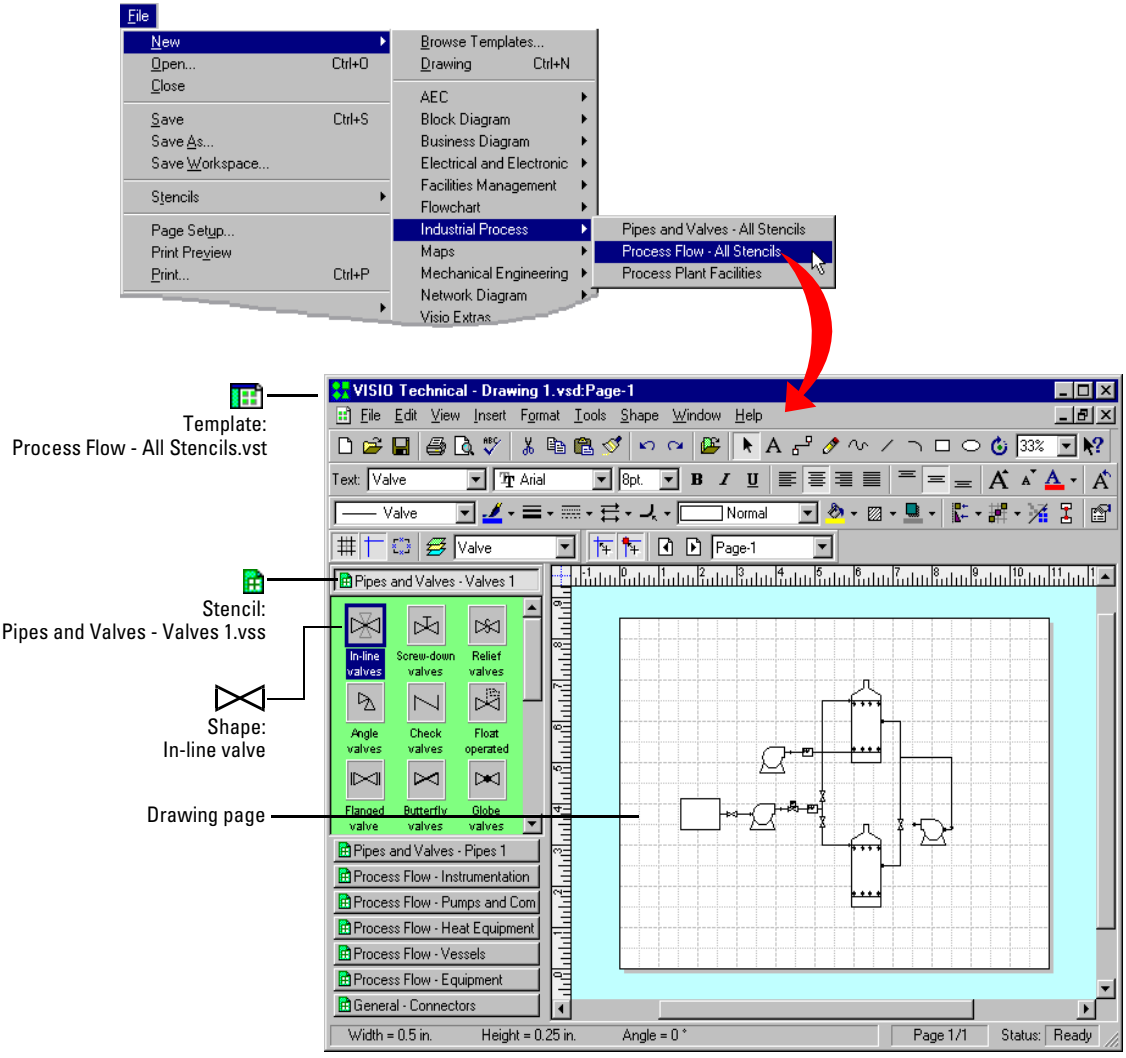
About printing drawings ..... *Using Visio Products* 107
Creating multiple-page drawings ..... *Using Visio Products* 23
Previewing drawings before you print ..... *Using Visio Products* 108
Printing headers, footers, and page numbers ..... *Using Visio Products* 116
Printing selected shapes or pages ..... *Using Visio Products* 115

6

Visio Technical solutions, templates, and stencils

About Visio Technical solutions, templates, and stencils

To create a drawing in Visio Technical, you usually open a solution folder. Each solution consists of a number of templates: a file that serves as the container for the shapes, drawing page, and tools you use to create a drawing. Each template includes one or more stencils with SmartShapes masters—shapes that are programmed to act the way you need them to in a particular context—appropriate styles, and a drawing scale. You can drag the shapes from the stencils to the drawing page to create your drawing, or you can draw your own shapes by using the Visio drawing tools on the toolbar.



When you choose template from a Visio Technical solution folder, you actually open a template file that includes shapes on stencils, a drawing page, styles, and other tools.

TIP To quickly search for shapes, stencils, templates, and wizards in Visio Technical, or in other Visio products you have on your computer, use Visio Shape Explorer. Choose Tools > Macro > Shape Explorer, then type a word or phrase that describes the item you want to find. Shape Explorer categorizes the search results by shape, stencil, template, wizard, and product.

Related topics

About wizards and other automated tools 43
Basing new drawings on templates ..... *Using Visio Products* 9

Templates and stencils in Visio Technical 5.0

The following table, which is organized by drawing type, lists the Visio Technical solutions and the templates and stencils each solution contains.

AEC Solutions

Templates	Stencils
HVAC Layout	Annotations, Connectors, Pipes 1, Pipes 2, Valves 1, Valves 2, HVAC Double Line, HVAC Single Line
Plumbing	Annotations, Connectors, Pipes 1, Pipes 2, Valves 1, Valves 2, Plumbing
Home - Bath And Kitchen Plan	Electrical And Telecom; Dimensioning, Architectural; Annotations; Walls, Shell And Structure; Appliance; Bath And Kitchen; Cabinets
Home - Large Plan	Electrical And Telecom; Dimensioning, Architectural; Annotations; Walls, Shell And Structure; Appliance; Bath And Kitchen; Cabinets; Furniture; Building Core
Home - Small Plan	Electrical And Telecom; Dimensioning, Architectural; Annotations; Walls, Shell And Structure; Appliance; Bath And Kitchen; Cabinets; Furniture; Building Core
HVAC Control Schematics	HVAC Controls, HVAC Equipment
Security Systems	Alarm And Access Control; Video Surveillance; Initiation And Annunciation; Walls, Shell And Structure; Building Core; Annotations
Landscape - Large Plan	Plants; Watering; Site; Recreation; Annotations; Dimensioning, Architectural
Landscape - Small Plan	Plants; Watering; Site; Recreation; Annotations; Dimensioning, Architectural

Annotation Solutions

Templates	Stencils
None	Annotations; Connectors; Dimensioning, Architectural; Dimensioning, Engineering; Drawing Tool Shapes; Title Blocks

Block Diagram Solutions

Templates	Stencils
Basic Diagram	Basic Shapes
Block Diagram With Perspective	Blocks With Perspective
Block Diagram	Blocks (Raised), Blocks

Business Diagram Solutions

Templates	Stencils
Charts And Graphs	Charting Shapes
Form Design	Forms Shapes
Marketing Charts and Diagrams	Marketing Diagrams, Marketing Clipart, Charting Shapes
Office Layout	Office Layout Shapes
Organization Chart	Organization Chart Shapes
Project Timeline	Project Timeline Shapes

Electrical and Electronic Solutions

Templates	Stencils
None	Qualifying Symbols
EE - Circuits And Logic	Analog And Digital Logic, Terminals And Connectors, Transmission Paths, Integrated Circuit Components
EE - General	Fundamental Items, Transmission Paths, Semiconductors And Electron Tubes, Switches And Relays
EE - Industrial Control Systems	Fundamental Items, Transmission Paths, Switches And Relays, Terminals And Connectors, Transformers And Windings, Rotating Equipment And Mech Functions, Annotations, Connectors
EE - Systems	Composite Assemblies; Maintenance Symbols; Maps And Charts; Switches And Relays; Telecom Switching And Peripheral Equipment; Terminals And Connectors; Transformers And Windings; Transmission Paths; VHF, UHF, SHF

Facilities Management Solutions

Templates	Stencils
Interior Elevations	Annotations; Dimensioning, Architectural; Interior Elevations
Site Plan	Vehicles; Watering; Annotations; Dimensioning, Engineering; Accessories; Parking And Roads; Landscape Plants
Space Plan - Building Area	Electrical And Telecom; Walls, Shell And Structure; Annotations; Dimensioning, Architectural; Office Desks; Services; Office Furniture; Building Core
Space Plan - Room Plan	Electrical And Telecom; Walls, Shell And Structure; Annotations; Dimensioning, Architectural; Office Desks; Services; Office Furniture; Modular Office Furniture; Modular Wall Panels; Accessories

Flowchart Solutions

Templates	Stencils
Audit Diagram	Audit, Connectors And Callouts
Data Flow Diagram	Data Flow
Flowchart - Advanced	Audit, Connectors And Callouts, Data Flow, Miscellaneous, SDL, Total Quality Management, Work Flow
Flowchart - Basic	Flowchart, Flowchart (Additional)
Mind Mapping Diagram	Mind Mapping Shapes
IDEF0 Diagram	IDEF0 Diagram Shapes
SDL Diagram	SDL, Connectors And Callouts
TQM Diagram	Total Quality Management
Work Flow Diagram	Work Flow, Connectors And Callouts

Industrial Process Solutions

Templates	Stencils
Pipes and Valves - All Stencils	Pipes 1, Pipes 2, Valves 1, Valves 2, Connectors, Annotations
Process Flow - All Stencils	Valves 1, Pipes 1, Instrumentation, Pumps And Compressors, Heat Equipment, Vessels, Equipment, Connectors
Process Plant Facilities	Machines And Equipment; Storage And Distribution; Warehouse - Shipping And Receiving; Walls, Shell And Structure; Vehicles

Maps Solutions

Templates	Stencils
None	Flags
Directional Map	Directional Map Shapes
Geographic Maps	Maps Of Africa, Maps Of Asia, Maps Of The Middle East, Maps Of N. and S. America, Maps Of The World, Maps Of Europe, Maps Of U.S. And Canada

Mechanical Engineering Solutions

Templates	Stencils
None	Fasteners 1, Fasteners 2, Geometric Dimensioning And Tolerancing, Welding
Mechanical Parts Library	Nuts - Bolts - Screws, Fasteners, Steel And Aluminum Shapes, Bearings And Washers, Seals
Fluid Power - All Stencils	Equipment, Valves, Valve Assembly, Annotations, Connectors
Mech Eng - General Working Drawing	Annotations; Title Block; Drawing Tool Shapes; Dimensioning, Engineering

Network Diagram Solutions

Templates	Stencils
Basic Network	Basic Network, Basic Network (Additional)

Visio Extras Solutions

Templates	Stencils
None	Custom Patterns (Scaled), Custom Patterns (Unscaled), Custom Line Patterns, Borders, Callouts, Clipart, Connectors, Symbols

7

Wizards and other automated tools

About wizards and other automated tools

Wizards and other automated tools in Visio Technical automate routine tasks, perform unique functions, and create special drawing types from scratch. The following list describes what each tool helps you accomplish.

TIP Many wizards and automated tools include a Help or More Info button. Click one of these buttons when you need background information or help understanding the options on a screen.

Wizards and automated tools in Visio Technical

Name	What it does	How to run it
Area Analysis	Allows you to calculate the area of a room or space created using the Double Line Wall shape.	Tools > Macro > Facilities Management > Area Analysis
Array Shapes	Creates and arranges multiple copies of a shape at regular intervals. You can specify the number of rows and columns in the array and the amount of space between each shape.	Tools > Array Shapes
Build Region	Assembles selected geographic shapes into a region. You can designate an anchor shape to control the position and size of other shapes in the region.	Tools > Macro > Maps > Build Region
Chart Shape Wizard	Creates stackable and extendable shapes you can use to add special effects to charts.	Tools > Macro > Business Diagram > Chart Shape Wizard

Table continued on next page.

Wizards and automated tools in Visio Technical *(continued)*

Name	What it does	How to run it
Convert AutoCAD Drawings	Converts multiple AutoCAD drawings into Visio Technical drawings.	Tools > Macro > Visio Extras > Convert AutoCAD Drawings
Convert AutoCAD Library	Converts symbol libraries in AutoCAD to Visio Technical masters on a stencil.	Tools > Macro > Visio Extras > Convert AutoCAD Library
Custom Properties Editor	Edits, adds, or deletes custom-property data from masters on a standalone stencil or that you've used in a particular drawing.	Tools > Macro > Custom Properties Editor
Database Wizard	Links Visio shapes and drawings to databases created in ODBC-compliant database programs.	Tools > Macro > Database > Database Wizard
Flowchart-TQM Diagram Wizard	Guides you through the process of laying out and formatting a Cause/Effect, Force Field, Top Down, or Cross Functional (Rummler-Brache) diagram.	Tools > Macro > Flowchart > Flowchart - TQM Diagram Wizard
Measure	Calculates the total perimeter and area of any closed shape, such as a shape that outlines the floor area of a floor plan.	Tools > Macro > Visio Extras > Measure
Mechanical Parts Library	Allows you to create over 15,000 bolts, fasteners, and structural sections from a library of shapes that are linked to a comprehensive parts database.	File > New > Mechanical Engineering > Mechanical Parts Library
Move	Moves shapes on the drawing page a precise distance using *x*-, *y*-, or polar coordinates.	Tools > Macro > AEC > Move
Netlist Generator	Performs a circuit analysis of electrical circuit diagrams in a Visio Technical drawing and generates a netlist for analysis in Spice format.	Tools > Macro > Electrical and Electronic > Netlist Generator
Office Layout Wizard	Guides you through the process of setting the drawing scale, choosing the page size and orientation, and creating the basic wall structure for an office layout diagram.	Tools > Macro > Business Diagram > Office Layout Wizard
Organization Chart Wizard	Generates an organization chart from a variety of file formats.	Tools > Macro > Business Diagram > Organization Chart Wizard

Name	What it does	How to run it
Page Layout Wizard	Automates the setup for the page size, orientation, and scale for a drawing. Assists you in adding a title block and border to the pages in a new or existing drawing.	Tools > Macro > Visio Extras > Page Layout Wizard
Print ShapeSheet	Prints all values and formulas in a ShapeSheet spreadsheet.	Tools > Macro > Visio Extras > Print ShapeSheet
Project Timeline Wizard	Generates a project timeline from a data file in Microsoft Excel (.xls), comma- or tab-delimited text, or Microsoft Project Exchange (.mpx) format. Or generates a project timeline structure into which you can enter data.	Tools > Macro > Business Diagram > Project Timeline Wizard
Property Line	Draws a shape based on the legal description you provide for a piece of real estate.	Tools > Macro > AEC > Property Line
Property Reporting Wizard	Generates inventory reports, such as bills of materials or equipment and furniture inventories, and numeric reports, such as cost totals or averages, from shapes which have data in their custom-property fields.	Tools > Property Report
Shape Explorer	Locates specific shapes and stencils in Visio products.	Tools > Macro > Shape Explorer
SmartShape Wizard	Customizes the appearance or behavior of a selected shape's text, connectors, notes, or protection.	Tools > Macro > Visio Extras > SmartShape Wizard
Stencil Report Wizard	Generates a Visio Technical drawing of the masters on a selected stencil. You can choose how many masters appear on a page, whether the page includes a header or footer, and whether or not to list each master's name and status bar prompt.	Tools > Macro > Visio Extras > Stencil Report Wizard

Table continued on next page.

Wizards and automated tools in Visio Technical *(continued)*

Name	What it does	How to run it
Valve Builder	Facilitates more efficient creation of valve shapes. You can select basic valves and assembly-required controls from a dialog box.	Tools > Macro > Mechanical Engineering > Valve Builder; or File > Stencils > Mechanical Engineering > Fluid Power - Valves, then drag the Valve Builder shape to the drawing page.
Wall Utility	Displays a toolbar that works with shapes on the Walls, Shell And Structure stencil to form T-joints or corner joints between walls, extend walls to meet others, and match doors and windows to wall thicknesses and angles.	Tools > Macro > AEC > Wall Utility

Related topics

About Visio Technical solutions, templates, and stencils 37

8

Working with AutoCAD files

About working with AutoCAD files

If you create drawings using AutoCAD and other CAD programs, you can work with those drawings in Visio Technical either by displaying them in Visio Technical or converting them to Visio Technical format. You can also convert your Visio Technical drawings to AutoCAD format.

Visio Technical can both read from and write to the .dwg and .dxf file formats, but converting drawings works best in one direction: either from AutoCAD to Visio Technical, or from Visio Technical to AutoCAD. Because each file format supports capabilities unique to its program, converting a file only once from one format to the other best maintains data integrity.

This section discusses the different ways to open AutoCAD files created in Release 10 through Release 13 in Visio Technical, how to customize the template that controls file conversion, and how to work with a Visio Technical drawing in AutoCAD.

Related topics

Working with AutoCAD files in Visio Technical

You can view an AutoCAD drawing file in Visio Technical or convert it to Visio Technical file format. When you display a file, the displayed (non-editable) layers that you select for the AutoCAD file appear on the Visio Technical page background.

When you convert a drawing to editable layers, Visio Technical converts blocks into masters, block inserts into instances, and entities into drawn shapes. You can then edit and format these shapes using all the standard Visio Technical tools and techniques.

About comparing AutoCAD terminology and Visio Technical terminology

The following table describes several AutoCAD terms and how they correspond to Visio Technical elements.

AutoCAD and Visio Technical terminology

AutoCAD term	Visio Technical term	Details
Block	Master	A block is a collection of entities that forms a single object and can be used multiple times. You insert a block reference in an AutoCAD drawing. A master is a predefined shape contained in a stencil from which you can create an instance in a drawing.
Entity	Drawn shape	An entity is a single graphic object you create using text, lines, polylines, dimensions, and so on. A drawn shape is created with Visio Technical drawing tools.
Attribute	Custom-property field	A block definition can contain attributes, or data fields. When you convert an AutoCAD drawing, its attributes are converted to custom-property fields. When you export, custom-property fields are converted to AutoCAD attributes.

About the conversion process for AutoCAD files

To convert the fonts, line styles, page size, and scale of the original .dwg or .dxf file, Visio Technical uses the settings defined in its AutoCAD Converter Template (_dwgcnvt.vst), located in the Visio Tech\Solutions\Visio Extras folder. If you are converting many files of the same size and scale, you can edit this template to change default settings used during the conversion process.

NOTE AutoCAD 3-D entities, viewports, and paperspace cannot be converted to Visio Technical format. However, 3-D views and named views can be incorporated into a Visio drawing as display-only.

Visio Technical and AutoCAD use different methods to determine the size of a drawing. As a result, you may need to adjust the drawing scale or size during the conversion process to ensure that the converted drawing fits within the Visio Technical printable area (the drawing page). When converting an AutoCAD file, Visio Technical reads the size of the AutoCAD drawing extents to determine if the drawing can fit on the drawing page.

If you convert an AutoCAD file with drawing extents that exceed the Visio Technical drawing page size, the portions of the drawing that fall outside the page won't print. When you attempt to convert such a drawing, the Page Size/Scale dialog box that appears includes a warning that the AutoCAD drawing exceeds the Visio Technical page extents. You can:

- Do nothing and proceed with the conversion; parts of the drawing will fall outside of the printable drawing page.
- Set a different drawing scale.
- Choose a larger paper size.

Other differences between AutoCAD and Visio Technical

CAD programs feature the idea of "model space" or world coordinate system, in which you create a model. In Visio Technical, you can think of the drawing page as a single, two-dimensional viewport into model space. In a sense, the Visio Technical drawing page is a model of a piece of paper in the two-dimensional world with a coordinate system measured in drawing units. For example, if you're drawing a town map, the Visio Technical drawing page can be 20 km wide in drawing units.

In AutoCAD you draw in the real-world units of the world coordinate system. In Visio Technical, you draw in drawing units that you specify. A Visio drawing scale is the ratio of real-world units to drawing units. For example, a path in a town map appears onscreen on the drawing page to be 10 m long in drawing units. To print the map, the path must fit on a piece of paper that may be only 21 cm wide in real-world units. So, in Visio Technical, you can specify a drawing scale where 1 cm in the real-world equals 10 m in drawing units, or a drawing scale of 1:1000.

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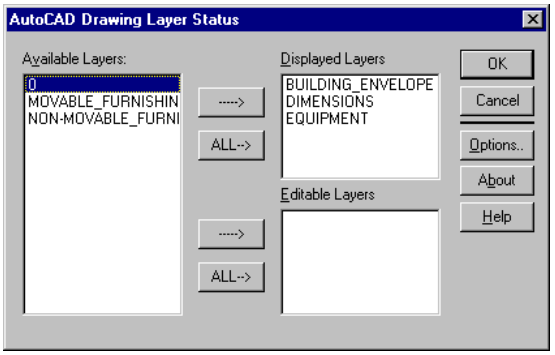
Displaying AutoCAD files in Visio Technical

You can save time by displaying and working with AutoCAD drawings in Visio Technical without converting them to Visio Technical format.

After the file is opened as display-only, you can work with the drawing in Visio Technical. For example, you can redline, annotate, or drag shapes onto the page without inadvertently modifying the original content.



If you want to display an AutoCAD drawing without converting it, move all layers to the Displayed Layers box.

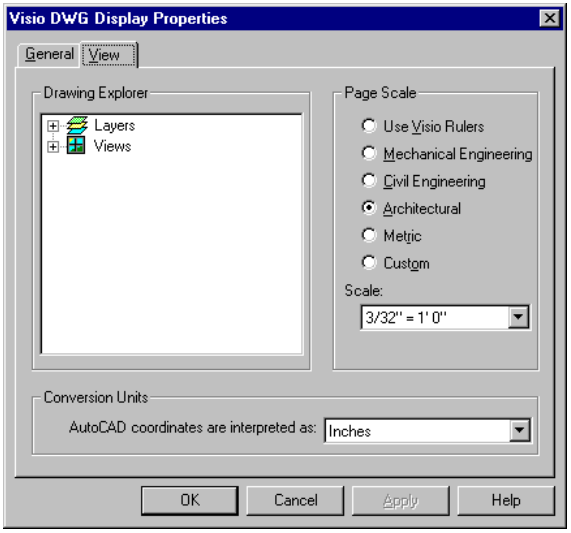
To display an AutoCAD file in Visio Technical without converting it:

1. Choose File > Open.
2. Under Files Of Type, choose AutoCAD (*.dwg, *.dxf). Select a file, then click Open.
3. In the AutoCAD Drawing Layer Status dialog box, select the layers you want to view as displayed, then click OK.
4. In the Page Size/Scale dialog box, select the page and scale settings you want.
5. Click OK to display the drawing.

   When you are finished making changes to the drawing, you can save it as a Visio Technical or an AutoCAD drawing by choosing File > Save As, then selecting the appropriate file type under Save As Type.

Setting the properties for an AutoCAD drawing

When you're viewing the AutoCAD drawing (.dwg or .dxf) in Visio Technical, you can view the drawing's properties and change them if necessary. For example, you can change the page scale or which layers are visible.



In the Drawing Explorer window, you can change the view and layers you want to display in Visio Technical.

To set the properties for an AutoCAD drawing:

1. Place the pointer over the AutoCAD drawing, then right-click the drawing.
2. Choose Visio DWG Display Object > Properties, then click the View tab.
3. In the Drawing Explorer window, select the layers and view you want to display in Visio Technical.

   You can select only one view.
4. Under Page Scale, click the scale you want to use.

   When Use Visio Rulers is selected, the AutoCAD drawing is sized and positioned to be consistent with Visio Technical scaled drawing rulers. If you do not select Use Visio Rulers or a predefined scale such as an architectural scale, you can specify the size of the drawing page in other units by choosing Custom under the Page Scale option.
5. Click OK to accept the new settings.

Related topics

Converting AutoCAD and other file formats to Visio Technical

Visio Technical supports import and export of files in the latest versions of most graphic file formats, including the following:

- CorelDRAW version 7 .cdr format (import)
- AutoCAD .dwf format (import, export)
- AutoCAD Release 10 through 13 .dxf format (import, export)
- AutoCAD Release 10 through 13 .dwg format (import, export)
- Scaled .dwg and .dxf format backgrounds (import for display only)

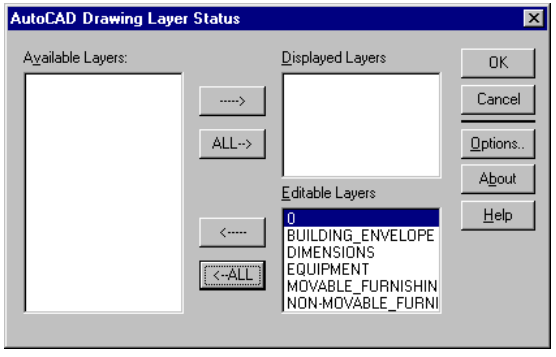
NOTE It takes more time to convert an AutoCAD file to editable layers, so unless you need to revise the drawing in Visio Technical, convert your drawing as display-only layers. Visio Technical may not be able to convert all elements in a drawing file from .dwg or .dxf format. However, you can still view these items by importing them as displayed layers.

You can work with an AutoCAD (.dwg or .dxf) file in Visio Technical as follows:

- View objects on specific layers of a single AutoCAD file created in Release 10 through Release 13 for display only or to fully editable shapes and layers in a new Visio Technical drawing (.vsd).
- Convert one or more AutoCAD files into fully editable Visio Technical drawings. Each AutoCAD file, and all its layers, is converted to a new Visio Technical drawing file.
- Convert AutoCAD symbol libraries to Visio Technical masters.

Converting a single AutoCAD drawing file

When you convert a single AutoCAD drawing created in Release 10 through Release 13, convert only the layers you need to change to editable layers, and convert the rest as display-only.



If you want to convert all the layers of an AutoCAD drawing, move all layers to the Editable Layers box.

To convert an AutoCAD (.dwg or .dxf) file:

1. Choose File > Open.
2. Under List Files Of Type, choose AutoCAD (*.dwg, *.dxf). Select the file you want, then click Open.

   Or to insert the AutoCAD drawing into the current Visio Technical drawing (merging the two drawings and masters), choose Insert > AutoCAD Drawing. Select the file you want, then click Open.
3. In the AutoCAD Drawing Layer Status dialog box, select the layers you want to convert.
4. To change conversion options, click Options. When you're finished, click OK. In the AutoCAD Drawing Layer Status dialog box, click OK to continue.
5. In the Page Size/Scale dialog box, verify page settings in the Drawing Dimensions box.
6. Click OK to convert the AutoCAD drawing.

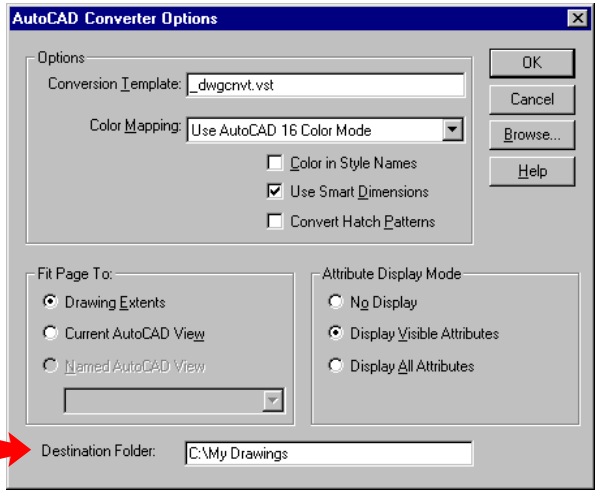
The drawing is converted to a Visio Technical file with one drawing page. If any layers are editable, the drawing includes one stencil containing masters created from the blocks or symbols (or no masters if the original drawing had no blocks). The masters are stored in the new file's local stencil, and the shapes on the page are instances of the masters.

NOTE Visio Technical converts AutoCAD blocks to shapes with a stacking order. This means that shapes can appear on top of other shapes. If the top shape is transparent, or does not contain a fill, the bottom shape shows through. To adjust which shape appears on top of another in Visio Technical, change the shapes' stacking order using the commands on the Shape menu (Bring To Front, Send To Back, Bring Forward, Send Backward).

If a converted AutoCAD object appears transparent in Visio Technical and you want it to look solid, you can edit the ShapeSheet spreadsheet so that the shape can be filled. Select the converted shape, choose Window > Show ShapeSheet, then set the Geometry.A1 cell to FALSE. Now the shape is a closed path and you can apply a fill. For details about entering shape formulas, search online help for "shapesheet."

Converting multiple AutoCAD drawing files

When you convert multiple AutoCAD (.dwg or .dxf) files at once, Visio Technical reads all the layers in each drawing to create a .vsd file for each AutoCAD file. The converted files are stored in the folder you specify.



Type the full path of the location in which you want Visio Technical to save the converted files.

To convert several AutoCAD files at once:

1. Choose Tools > Macro > Visio Extras > Convert AutoCAD Drawings.
2. In the Convert AutoCAD Drawings dialog box, press Ctrl+click to select the files you want to convert, then click Open.
3. In the AutoCAD Converter Options dialog box, under Destination Folder, type the path where you want Visio Technical to save the converted files, then click OK.
4. In the Page Size/Scale dialog box, verify page settings in the Drawing Dimensions box.
5. Click OK to convert the AutoCAD drawings.

   Visio Technical converts the files to .vsd format and stores them in the specified destination folder. A message appears informing you where Visio Technical wrote a log file of information, such as any errors that occurred during the conversion process.

Converting symbol libraries

If you frequently use particular symbol libraries in AutoCAD drawings, you can convert the symbols to Visio Technical masters on a stencil. A symbol library is composed of multiple symbol files (usually .dwg files). Visio Technical converts each symbol file into a single master. When you convert multiple symbol files at once, Visio Technical places all the masters on the same stencil.

You can open and use the stencil in other Visio Technical drawings, or as a new converter template for AutoCAD drawings. This converter template would contain masters of symbols you use. If you specify this template when you next convert a drawing, Visio Technical creates instances of these masters instead of converting each block insert—which saves considerable time during the conversion process.

To convert AutoCAD symbols to Visio Technical masters:

1. Choose Tools > Macro > Visio Extras > Convert AutoCAD Library.
2. In the Convert AutoCAD Library dialog box, press Ctrl+click to select the symbol files you want to convert, then click Open.

   Visio Technical converts each symbol file you select to a single master and places it on the drawing's local stencil. Each master is named for its corresponding symbol file.
3. To display the local stencil, choose Window > Show Master Shapes.
4. To save the converted symbols as a new stencil or template, click the title bar of the stencil to make it the active window, then choose File > Save As.
5. In the Save As dialog box, under File Type, choose Stencil (.vss) or Template (.vst).

   Visio Technical creates a new stencil or template file with the name you specify, and saves it in the folder you specify.

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Controlling AutoCAD file conversion results

You can control the results of the AutoCAD file conversion process by editing the Visio AutoCAD Converter Template (_dwgcnvt.vst). When Visio Technical converts AutoCAD data, it reads the drawing line and text style information for each AutoCAD object and matches it to a style with the same name in the AutoCAD Converter Template. You don't have to open the converter template to convert a drawing in the way you open a template to start a drawing. Visio Technical automatically uses the template. You open the template when you want to edit style information.

When you edit the converter template, you can save your changes as a new, custom template that you can tell Visio Technical to use during file conversion. You can edit the converter template in the following ways:

- Modify style definitions to specify the line styles and fonts to use for each AutoCAD element.
- Define custom fill patterns that can be used later to enhance the converted drawing.
- Specify the page size and drawing scale to use.
- Create new styles to match the font and line attributes of custom AutoCAD drawing attributes.
- Add custom masters to the template's stencil. Visio Technical can then use the masters, which is faster than converting AutoCAD symbol libraries or blocks.

To modify the AutoCAD Converter Template or create a custom converter template:

1. Choose File > Open, then select AutoCAD Converter Template (_dwgcnvt.vst) from the Visio Tech\Solutions\Visio Extras folder.
2. In the Open dialog box, check Original, then click Open.
3. Choose Format > Define Styles. From the Style list, select a style to modify, choose the options you want, then click OK.
4. To create a new style, choose Format > Define Styles. In the Style box, type the new style's name, choose the options you want, then click OK.

   NOTE Visio Technical fill styles don't affect how AutoCAD objects are converted.

5. Choose File > Page Setup. On the Page Size tab, choose a paper size, orientation, and drawing scale, then click OK.
6. To add a master to the template's stencil, drag the shape you want into the stencil window.
7. Save and close the template. Or choose File > Save As and specify a name for a custom converter template.

   To specify the new converter template when you are converting AutoCAD files, enter the template name in the AutoCAD Converter Options dialog box, which appears after you choose the file or files you want to convert.

Related topics

Converting a Visio Technical file to AutoCAD format

You can convert, or export, a Visio Technical drawing to a .dwg or .dxf format file by using the Save As command. For best results when saving a Visio Technical drawing to AutoCAD format, assign all Visio Technical shapes to a layer, and no shape to more than one layer.

Depending on the type of drawing you are saving, the conversion procedure has the following results:

- If a Visio Technical page contains Visio shapes only, Visio Technical converts it to a .dwg or .dxf file.
- If a Visio page contains a single embedded .dwg or .dxf file (Release 10 through Release 12) and you've placed Visio shapes on top of it, Visio Technical saves the file as an AutoCAD file and appends Visio Technical data to the file as AutoCAD layers. Where a Visio page contains a .dwg or .dxf file originally created in Release 13, Visio Technical saves the appended file in Release 12 format. The units from the embedded AutoCAD file are maintained.

NOTE If you convert an AutoCAD drawing as a fully editable Visio Technical drawing, and then save the file back to AutoCAD format, you may lose Visio Technical formatting that AutoCAD does not support. Converting a drawing works best in one direction: either from AutoCAD to Visio Technical, or from Visio Technical to AutoCAD.

To save a Visio Technical drawing as an AutoCAD drawing:

1. Choose File > Save As.
2. Under Save As Type, select either AutoCAD Drawing (*.dwg) or AutoCAD Interchange (*.dxf), then click Save.
3. In the Visio Drawing Layer Status dialog box, select the layers you want to export.
4. To set options, click Options, select the options you want, and then click OK.
5. Click OK to save the drawing.

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Saving files with embedded AutoCAD drawings to previous versions of Visio Technical

With Visio Technical 5.0 you can save drawings as Visio Technical 5.0, 4.5, or 4.0 files. The ability to save files as previous versions of Visio Technical facilitates the process of sharing drawings with others. However, embedded AutoCAD drawings cannot be viewed in versions prior to 5.0.

To save Visio Technical files with embedded AutoCAD drawings:

1. Choose File > Save As.
2. In the File Name box, type a file name for the drawing file.
3. For Save File As Type, choose the version of Visio Technical you want.
4. Under Save In, open the folder in which you want to save the file.
5. Click Save.

9

Creating custom solutions

About creating custom solutions

By taking advantage of the Visio SmartShapes® technology and open architecture, you can create specialized shapes, develop combinations of shapes and programs that model the real world and solve specific drawing problems, and customize the user interface.

The following tools are available to you in the Visio Technical development environment:

- The ShapeSheet spreadsheet, which takes you under the surface of shapes to create formulas for specific shape behavior.
- Microsoft Visual Basic for Applications (VBA), with which you can create macros and control Visio Technical through Automation.
- The Visio Type Library, which contains Automation descriptions of the objects, properties, methods, events, and constants that Visio Technical exposes to Automation controllers.

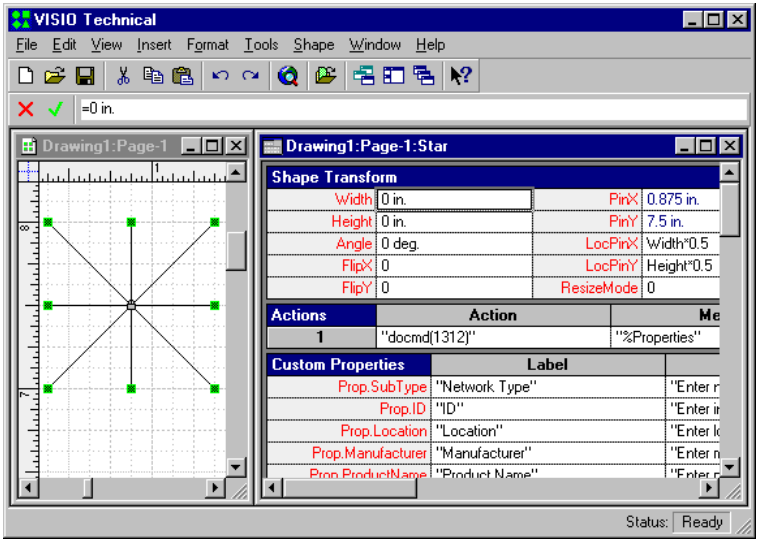
The book *Developing Visio Solutions*, which comes with Visio Technical, contains everything you need to know about Visio Technical as a development platform, including sample code, tips, and techniques. In addition, you can view the online Automation Reference by choosing Help > Automation Reference in Visio Technical.

You can also visit the Visio Solutions Development section of the Visio Corporation Web site (http://www.visio.com/devweb/), where you can learn more about Visio Technical as a development platform and find other developer resources.

Working with the ShapeSheet spreadsheet

When you want to use specialized shapes that model the behavior and appearance of the real-world objects they represent, you can create them by working with formulas in the shapes' ShapeSheet spreadsheets.

Behind each Visio shape or shape you draw using the Visio drawing tools is a ShapeSheet spreadsheet containing formulas that determine how a shape behaves. When you make changes to a shape on the drawing page, you update its ShapeSheet formulas. You can also make changes directly in the ShapeSheet spreadsheet, where you have more precise control over a shape's appearance and behavior. For example, you can add formulas that create a control handle, change a shape's fill color if it reaches a certain size, or make one shape's behavior dependent upon the behavior of another shape on the drawing page.



The ShapeSheet spreadsheet contains sections, each of which controls part of the shape.

To display a shape's ShapeSheet spreadsheet:

- Select the shape, then choose Window > Show ShapeSheet.

Once you've created specialized shapes, you can make the shapes part of a drawing solution by storing them on new stencils and distributing the shapes and stencils in a template.

For more information about ShapeSheet spreadsheets, press F1 in Visio Technical, click Index, then type "shapesheets."

Working with Automation

You can take advantage of the Visio open architecture to solve graphics problems and create custom solutions. Open architecture means that Visio Technical exposes its objects, such as windows, drawing pages, shapes, layers, menus, and toolbars, through a well-structured Automation interface. Using a development environment that supports Automation, you can write programs to control Visio objects. For example, you can automatically update drawings you create from data that changes from day to day. Or, you can automate routine shape development tasks that you perform over and over.

To write the programs, or macros, that control Visio objects, you can use the fully-licensed version of Microsoft Visual Basic for Applications (VBA) that comes with Visio Technical, or you can use Visual Basic, C/C++, or any other Automation controller.

Visio Technical includes a type library—a file that contains Automation descriptions of the objects, properties, methods, events, and constants that Visio Technical exposes to Automation controllers. Visio object types can help you write code more effectively because you can view Visio Automation descriptions in and copy code templates from the Object Browser.

To open the Visual Basic Editor and create, debug, or run VBA programs:

- Choose Tools > Macro > Visual Basic Editor.

TIP You can also press Alt+F11 to open the Visual Basic Editor.

For details about using the Visual Basic Editor, press F1 in Visio Technical, click Index, then type "Visual Basic Editor."

Related topics

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Where to go from here

This book focuses on features and tools unique to Visio Technical. You can learn more about working with Visio products from several other sources.

For example, if you're new to Visio products, you might want to start with *Using Visio Products*, which includes chapters on creating and saving drawings, working with shapes and text, and printing. Or, if you're a developer and your focus is Visio as a development platform, *Developing Visio Solutions* contains the information you need.

If you prefer to get help from online sources, you can access an electronic version of the information in this manual and in *Using Visio Products*, or access certain Visio reference tools that are available only in online form. The Visio Corporation Web site at http://www.Visio.com/ also includes information and downloadable files that can help you get the most out of Visio Technical.

For a complete list of information sources, see the table in the following topic.

Related topics

Additional sources of Visio Technical information

The following table lists places you can find information about Visio Technical and describes the type of information you'll find in each place.

More information on Visio Technical

Source	Type of information
Using Visio Products	A good place to start if you've never used Visio products before. Covers tasks common to Visio Standard, Visio Technical, and Visio Professional.
Developing Visio Solutions	Contains information about the Visio program as a development platform, including sample code, tips, and techniques.
Online Automation Reference	Describes the Visio objects, properties, and methods that you can access from an external program. Choose Help > Automation Reference.
More Info buttons on Visio Technical wizard screens	Opens a window of information about the options on a wizard screen, or about Visio features relevant to the task the wizard helps you complete. Click More Info on a wizard screen.
Screen tips	**Toolbar buttons** Float the pointer over a toolbar button for a moment to see a tip about what the button does. **Control handles** Float the pointer over a control handle (■) on a shape for a moment to see a tip about what dragging the handle accomplishes.
Online help	An online version of the information in *Using Visio Technical* and in *Using Visio Products*, and an explanation of every Visio command and dialog box option. You can search the file by keyword. To look in online help, choose Help > Visio Help. To learn about options in a dialog box, click the Help button in the dialog box.
Template help	Provides information about how to create specific drawing types, including the most efficient sequence in which to work, how shapes work together, and tips and tricks. Choose Help > Template Help, double-click Visio Templates, and then double-click a drawing type.

Source	Type of information
Shape help	A window of information that explains how to use a shape. Right-click any shape, then choose Shape Help.
Technical support	Choose Help > Visio On The Web > Online Support.
Visio Corporation Web site	Includes information about Visio Corporation and its products, such as: Case studies that describe how corporations have used Visio products. White papers that describe in detail certain Visio features or functionality. Downloadable files for updates and programs that can help you use Visio more effectively. Developer tips and tools. Choose Help > Visio On The Web > Visio Home Page.
Drawing Resources Web page	A Web page on the Visio Corporation Web site that contains links to resources related to drawing types Visio Technical supports. Choose Help > Visio On The Web > Drawing Resources.
Visio Solutions Library	A section of the Visio Corporation Web site where you can learn about and purchase job-specific shapes, time-saving utilities, and other custom drawing solutions. Choose Help > Visio On The Web > Visio Solutions Library.

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