



# AutoCAD WORKSHOP

**Instructor: Albert W. Vargas**

**Workshop Schedule: Tuesdays 2:30pm - 3:30pm**

## SOME USEFUL COMMANDS, TIPS AND TRICKS TO START YOU OFF!

**UNITS** - Using this command you can set the drawing units and other settings like the precision of linear and angular dimensions and default rotation angle.

**CO** - This command is used to copy object(s) in AutoCAD.

**TR** - This command is used for trimming a geometry.

**POL** - This command can be used to make a polygon with minimum of 3 sides and a maximum of 1024 sides.

**ARC** - As the name suggests, this command can be used to make an arc in AutoCAD.

**ELLIPSE** - As the name suggests, this command can be used to make an ellipse with the major and minor axis.

**ARRAY** - Using this command you can make Rectangular, polar or Path array.

**BREAK** - This command can be used to break 2D geometries at one or two points. It is helpful if you want to break a curve at the point of intersection with other curve or if you want to create a gap by breaking a part of the geometry.

**DIM** - To access this command you can use DIM command or select the DIM tool from dimensions panel of Annotate tab.

**OVERKILL** - Use this command to remove overlapping or unnecessary geometries from the drawing.

**RECOVERALL** - This command repairs a corrupted or damaged drawing along with all of its attached Xrefs.

**SCALETEXT** - Using this command you can change the scale of existing Text or Mtext object in the drawing. To use this command type SCALETEXT on the command line press enter and select the text from drawing area and press Enter again.

**ISOLATE** - Using this command you can hide all objects from the drawing area except the selected objects. By hiding unnecessary objects from drawing you can get a clean work area. To bring back all the hidden object back to the drawing select UNISOLATE or UNHIDE command.

**PURGE** - This command can be used to remove unused named objects like layers, blocks and dimension styles from the drawing.

**LTSCALE** - This variable sets the Line Type Scale factor globally. Use LTSCALE to change the scale factor of all linetypes for all geometry in a drawing. Changing the line type scale factor causes a 'REGEN' so you can see the result of your changes straight away.

If you only draw and plot from Model space, you can use LTSCALE to scale all your line types to suit your plot scale. If you use Paper space layouts, just leave this set at 1.0.

**PSLTSCALE** - This variable controls the line type scaling of geometry displayed in paper space view ports – Paper Space Line Type Scale. This variable only has two settings. Setting 'PSLTSCALE' to 0 (Off) will mean that the line type scale factor of your model space geometry will not be effected by the scale of your view port.

Setting 'PSLTSCALE' to 1 (On) means that the line type scale of your model space geometry will be scaled to match the view port scale.

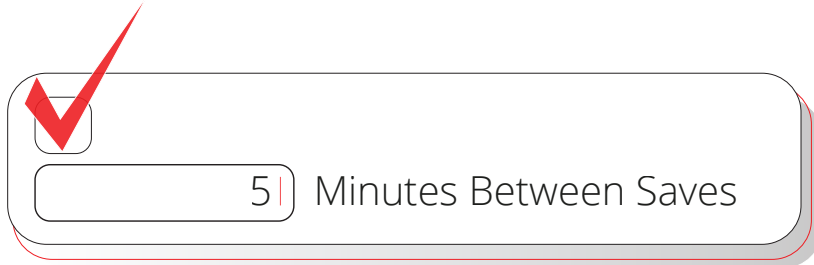
**MSLTSCALE** - This is a reasonably new (Since 2007), but extremely useful variable. Like Paper space line type scaling, Model Space Line Type Scaling only has two options. Setting MSLTSCALE to 0 (Off) is the default setting and will behave as AutoCAD always has.

Setting MSLTSCALE To 1 (On) will cause the Line type scale of any geometry in model space to be scaled by the Annotation scale. This allows you to have a preview of how the line type scale might look when seen through a scaled view port.



# BEFORE YOU START

## SETUP + BASICS - **AUTO-SAVING**

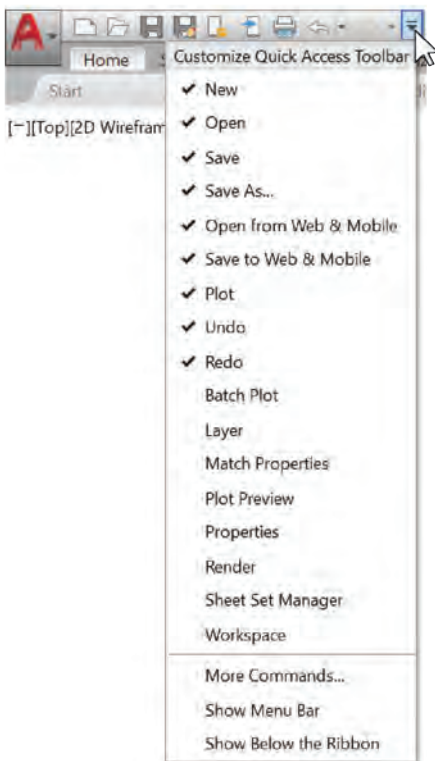


Set your Autosave setting to 5 minutes (or 2 or 3 minutes!), and manually save often with the QSAVE command or Ctrl+S shortcut.

Automatic save files are backup files created automatically by the Autosave feature. Set the number of minutes between automatic saves in the Open and Save tab in the Options dialog box or by using the SAVETIME command. Automatic saves are only done if a drawing has been modified after the last save. QSAVE, SAVE, and SAVEAS will delete the current .sv\$ file – the Autosave file only remains if the application closes unexpectedly.

Find the location of your autosave files by going to the Files tab in the Options dialog box and inspecting the Automatic Save File Location folder in the hierarchy, or by using the SAVEFILEPATH command. Once you find the file, change the file extension from .sv\$ to .dwg to open.

BONUS: If you don't see any file extensions when looking for your Autosave file, you'll need to turn them on. Do so by checking the File Name Extensions box in the Show/Hide panel of the View tab.



## QUICK ACCESS TOOLBAR

Keep your most frequently used tools in the Quick Access Toolbar (QAT) right at the top of your screen. Customize the QAT by clicking the small, pull-down control button on the right. You can check and un-check the commands you want quick access to.

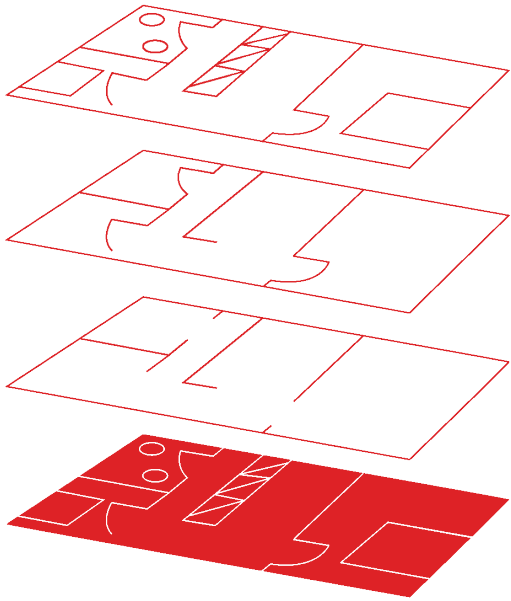
Here, you can also change where the Quick Access Toolbar docks, or even turn on the old-style Menu Bar. You can also drag the elements within the Quick Access Toolbar to change the order in which they appear.

**BONUS:** For a fast way to add a Ribbon command to the Quick Access toolbar, right-click any command icon on the Ribbon, and then select Add to Quick Access Toolbar from the popup menu. Similarly, right-click on any Quick Access Toolbar item to remove it.



# BEFORE YOU START

## SETUP + BASICS - LAYERS



Resist the temptation to create everything on one layer. Organize your drawings by assigning objects to layers that are associated with a specific function or purpose, for example, walls on one layer and doors on another layer.

*With layers, you can:*

- Associate objects by their function or location
- Display or hide all related objects in a single operation
- Specify linetype, color, line weight, and other standards for each layer.

To see how a drawing is organized, use the LAYER command to open the Layer Properties Manager. You can either enter LAYER or LA in the Command window, or you can click the Layer Properties tool on the Home tab of the Ribbon.

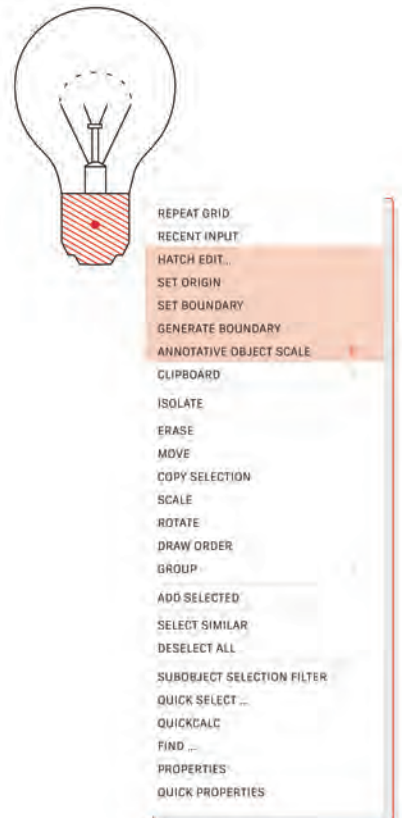
**BONUS:** Got lots of Xrefs and therefore lots of layers? Increase the MAXSORT variable (from its default of 1000) so all your layers can sort correctly.

## SETUP + BASICS - RIGHT-CLICK STRATEGY!

Right-click to access contextual popup menus, a productivity enhancement favorite. Since the menus are contextual, you get commands that are specific to what's selected.

If you're someone who uses a mouse right-click as ENTER, you can still have the best of both worlds. It's easy using this time sensitive right-click feature. To turn it on, simply call up the Options dialog box, go to the User Preferences tab, and then select the Right-Click Customization button. You'll get a second dialog box that contains the control for time-sensitive right-clicks.

When enabled, right-click will still function as you prefer, with a single, quick click working as ENTER, but now, by holding down the mouse button just a little longer – a quarter of a second by default – you'll get the contextual popup menu instead.





# FILE MANAGEMENT

## Why is it useful to have a pre-made AutoCAD file.

**UNITS** - When starting a new file, you should always begin with setting the units of your file first to the desired unit scaled required, whether that be in feet or metrics. Use the command "Units" to initiate the first change for this file.

**LAYERS** - When dealing with layer management, its always a very divisive process of creating, naming, altering and managing the colors of multiple layers depending on how detailed your AutoCAD file is. It is more strategic in planning to have a ready made empty file saved somewhere specifically that contains a pre-made list of all the layers you would typically use in an AutoCAD file such as but not limited to (i.e., interior walls, exterior walls, door swings, furniture, glass windows, mullions, trees, roads, vehicles, text, scale, etc.)

It can save you a lot of time also when pre-setting all your specific line weights into these individual layers, so when you print directly from AutoCAD, no additional time

**TEXT** - When inputting any text within your AutoCAD file, using the appropriated layer, often, these details are never to scale. This property too can be saved within your master AutoCAD file used to generate your specific settings and layer management.

**DIMENSIONS + LEADERS** - These two items are similar to setting up your text properties. They too will never be to scale when using these within a drawing. It is easier to have them preset as well in your master file and such options include:

**Dimension Styles** - These can be altered aesthetically using ticks for end points of your dimension lines, and set rigorous settings such as how far the dimension lines are spaces from the physical drawing.

**Units** - The units will never be the same as the input units for the AutoCAD file itself. You will have to set the specific desired units within the dimension properties.

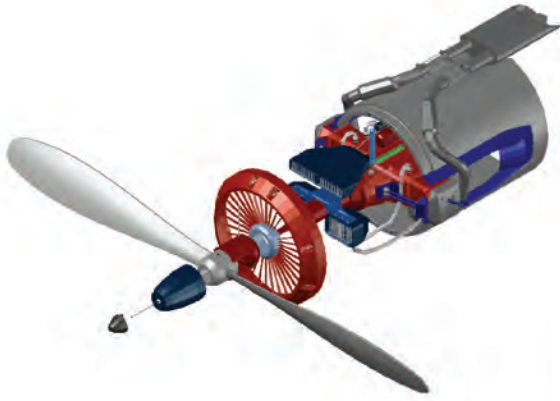
- Display Help
- Toggle text screen
- Toggle object snap mode
- Toggle 3DOsnap
- Toggle Isoplane
- Toggle Dynamic UCS
- Toggle grid mode
- Toggle ortho mode
- Toggle snap mode
- Toggle polar mode
- Toggle object snap tracking
- Toggle dynamic input mode





# DATA MANAGEMENT

## SETUP + BASICS - LAYERS



Insert any drawing file as an external reference (Xref), and changes made in the referenced drawing are reflected automatically in the current drawing when opened or reloaded.

Open the External References palette by using the XREF command and select the DWG icon to attach files. Attached Xrefs are linked to, but not actually inserted in, another drawing – which avoids increasing the file size.

When you attach an Xref, the default path type is set to Relative to avoid broken Xrefs in the future. If you have relative references in the current drawing and save it to a different location, AutoCAD will prompt you to update the relative paths.

**BONUS #1:** To find an external reference in a complex drawing, select an item in the External References palette to highlight all visible instances in the drawing. Conversely, select an external reference in the drawing to highlight its name in the External References palette.

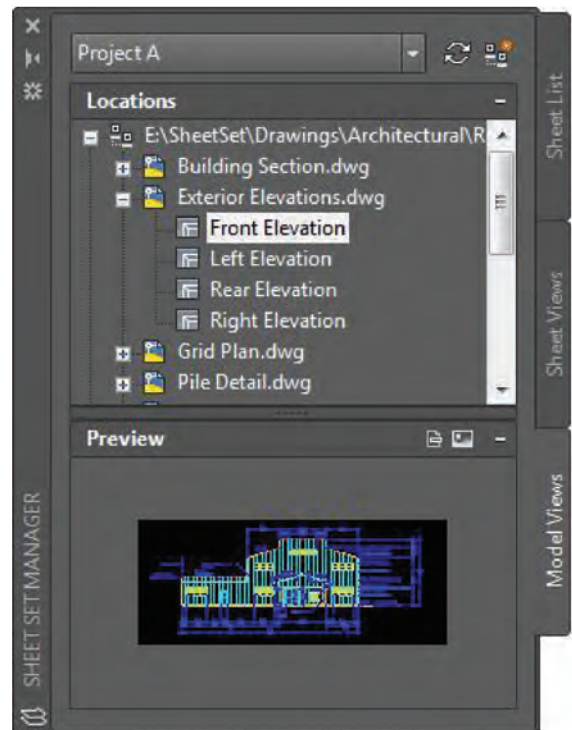
**BONUS #2:** Easily edit an Xref by selecting it, then Right-click and select either Open Xref or Edit Xref in-Place.

## SETUP + BASICS - SHEET MANAGER

Keep your team on track by using the power of AutoCAD's Sheet Set Manager. Organize and maintain your drawing layouts, file paths, and project data from one place, accessible by your entire team.

Sheet Set Manager not only functions as a file management system for your layout sheets, but it also manages saved views in both layouts and Model Space. You can easily publish part or all the entire set, along with defining and updating title block and callout information using Fields. Getting started is easy with the Sheet Set Wizard found in the New section of the Application Menu.

**BONUS:** CAD Managers and others can significantly cut down the time it takes for post-project file delivery by using eTransmit directly from the Sheet Set Manager.







# AutoCAD MULTI-PLATFORM COORDINATION

Why you should use AutoCAD as your stepping stone for your work.

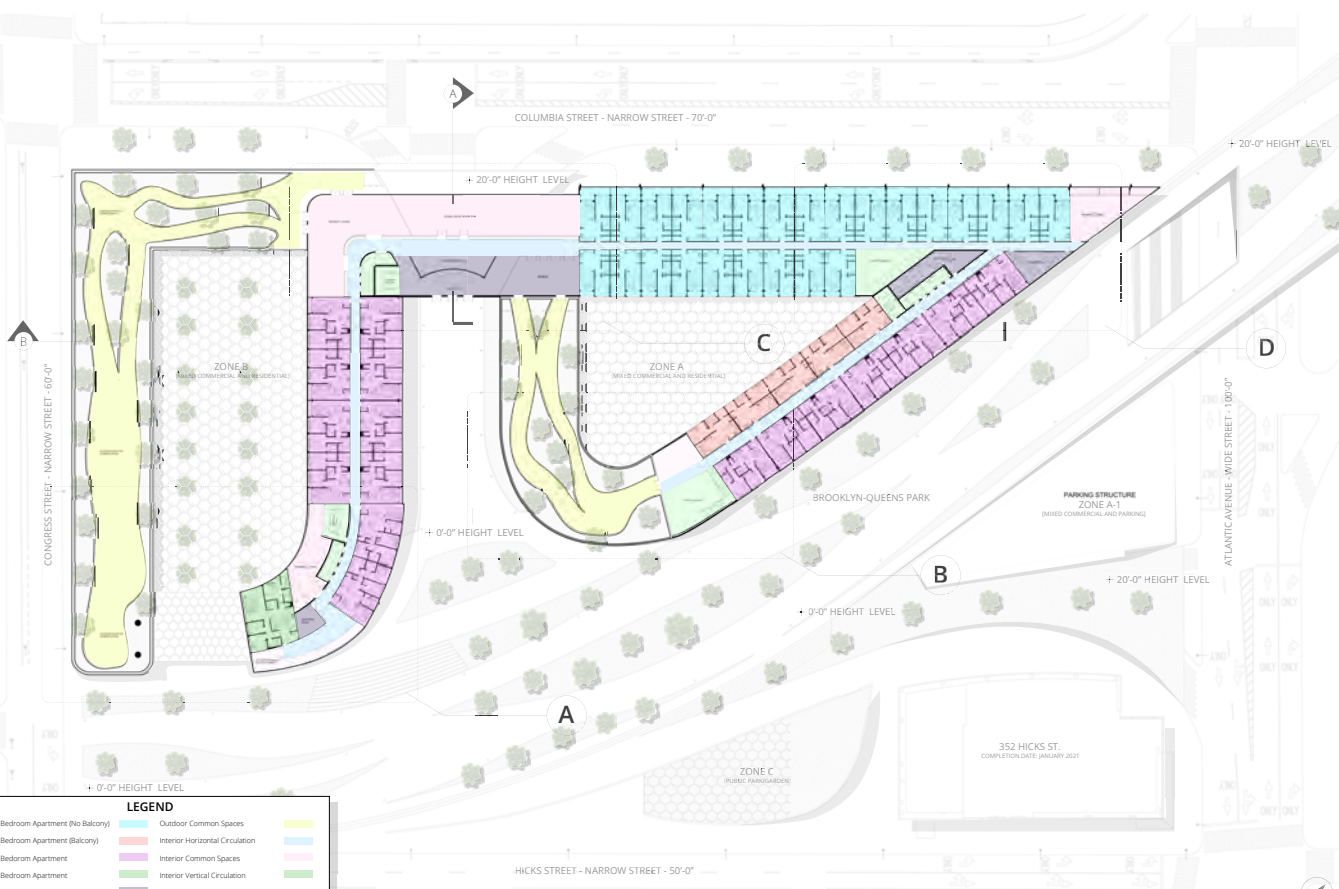
INTERFACE - AutoCAD, just like Rhino, Revit, and Sketchup is a useful tool to further develop the work required to envision a final end product to what is being created. AutoCAD as a single entity is a constructional platform and very organized in work management and plan drafting. AutoCAD as an entity will never be a one-stop shop, but a step in achieving a final end product.

AutoCAD has a very co operable when interchanging and exporting to different softwares and a great tool + easy to use when developing floor plans and extensive 2D detailing.

AutoCAD - Adobe Illustrator Workflow - When finalizing AutoCAD 2D drafting details or drawings such as floor plans, elevation views, sections, etc., Adobe Illustrator allows for a more creative touch to your AutoCAD work. It may allow the user to incorporate a heavy amount of graphic implementations such as textures, scenery details like vegetation, people, background etc. Illustrator is a great workflow tool to use, to bring your referenced work to life.

AutoCAD - Rhino Workflow - When exporting drawings to Rhino, it may easily be opened as a DWG with slight unit modifications to ensure proper data exchange. Rhino is a helpful step in creating a 3D representation of any spaces you create and layout in your AutoCAD floor plans. It allows the user to easily use the nicely managed layers to select certain objects within a plan, and extrude them to create solid poly-surface objects.

## AutoCAD - Rhino 6 - Adobe Illustrator Work Flow. Before:





# ABOUT THE STATUS BAR

## LEARNING AND UNDERSTANDING THE STATUS BAR

The status bar in AutoCAD is one of those areas in the application window that everyone uses, but might not fully understand or get the most out of it. For example, did you know it can be customized to hide infrequently used tools and display those tools you might use more frequently?

By default, the status bar is displayed along the bottom of the application window. From the status bar, you can quickly access:

- Commonly used drafting aids
- Settings related to the active viewport
- See the current coordinate value of the crosshairs in the drawing window
- You can also control contextual tools like system variable monitoring, external references, CAD standards, and more.

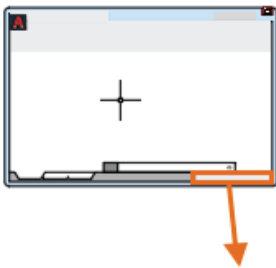
### WHAT IS IT?

The status bar provides quick access to some of the most commonly used drawing aids and tools. Here is the default status bar.



### WHERE IS IT?

The status bar displays in the lower-right corner of the application.



### HOW TO USE IT

If the status bar isn't currently displayed, enter STATUSBAR on the command line and enter. Some controls are toggles, meaning a single click turns the functionality on or off. Toggle the following tools on and off:

- Grid display #
- Ortho mode L
- Object snap tracking

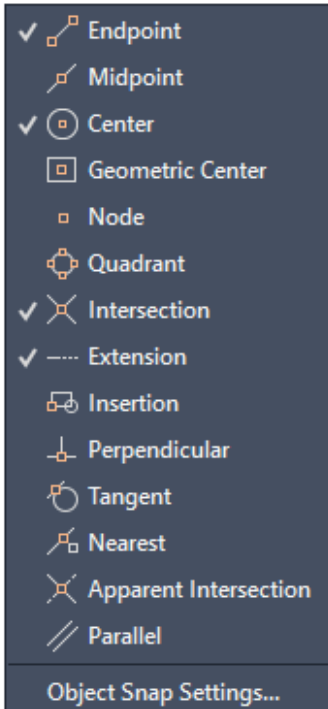
**Note:** The blue background indicates a feature is on.





# ABOUT THE STATUS BAR

## LEARNING AND UNDERSTANDING THE STATUS BAR

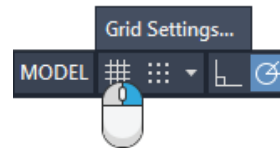


**A. Click on the arrow, or right-click anywhere on the Object Snap icon, to display the associated menu.**

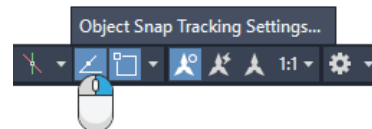
- Check or clear individual object snap settings.
- Click Object Snap Settings to open the Object Snap tab of the Drafting Settings dialog box.

**B. For tools that have option settings, right-click and select the menu option to display the settings dialog box for the tool. For example:**

- Right-click Grid Display and select Grid Settings to set the grid and snap spacing.



- Right-click Object Snap Tracking and select the settings option to set object snap tracking settings.



### CUSTOMIZE IT

Select which tools you want to display on the status bar and which ones you want to hide.

- Click Customization located at the far-right end of the status bar.
- Select tools you want to show or hide. For example:
  - Check LineWeight to display it.
  - Clear Dynamic Input to hide it.

**Note:** A check mark indicates a control is currently displayed in the status bar.

### CUSTOMIZE IT

You can also display the cursor coordinates on the status bar. By default, coordinate display is off.



- Click Customization.
- Check Coordinates.
- Right-click the Coordinates tool to display the menu of options.






**Note:** Press F1 to see an explanation of the options.





# ABOUT THE STATUS BAR

## STATUS BAR - COMPLETE REFERENCE GUIDE

Status Bar	Name	Description
	Coordinates	Displays the coordinates of the cursor position.
	Model space	Indicates that you are currently working in model space. In model space, click this button to display the most recently accessed layout. In a layout, click his button to switch from model space in a layout view port to paper space.
	Paper Space	Indicates that you are currently working in a layout. Click this button to switch from paper space to model space in a layout view port.
	Grid	Displays a grid in the drawing area.
	Snap Mode	Turns on snap-to-grid. When grid snaps are turned on, the cursor snaps to specified grid intervals as you move the cursor. When polar snaps are turned on, the cursor snaps to specified distances along specified polar alignment paths.
	Infer Constraints	Applies geometric constraints automatically when you create or edit geometry.
	Dynamic Input	Displays a tool tip near the cursor, which you can use to specify options for commands and values for distances and angles.
	Ortho-mode	Constrains cursor movement to the horizontal or vertical directions.
	Polar Tracking	Tracks the cursor along specified polar angles.
	Isometric Drafting	Simulates an isometric drawing environment by aligning objects along isometric axes, where the angle between each axis is 120°.
	Object Snap Tracking	Tracks the cursor along vertical and horizontal alignment paths from object snap points.
	Line Weight	Displays line weights in a drawing. Model space displays line weights using a proportional pixel width. Layouts display line weights using real-world units.
	Transparency	Turns on transparency for all objects that have their transparency property set to a non-zero value. When this button is turned off, all objects are opaque.
	Maximize View port	Turns on selection cycling, a feature that assists you select an object, when objects overlap one another.
	Minimize View port	Expands the current layout view port to fill the screen, for editing.
	Selection Cycling	Restores a layout view port that is maximized.
	Annotation Visibility	Displays annotative objects using the annotation scale. When turned off, annotative objects are displayed at the current scale.
	Auto Scale	Automatically adds annotation scales to all annotative objects, when the annotation scale changes.
	Annotation Scale	Sets the current annotation scale for annotative objects in model space.
	View port Lock	Locks the display of a layout view port. When you zoom while the view port is locked, zoom is applied to the entire layout, leaving the view port scale in the layout view port unchanged.



# ABOUT THE STATUS BAR

## STATUS BAR - COMPLETE REFERENCE GUIDE

Status Bar	Name	Description
	View Port Scale	Displays the scale of the selected view port. This is visible only when you select a view port.
	View Port Scale Sync	Indicates that the view port scale and the annotation scale are equal. This is visible only when you select a view port.
	View Port Scale Sync	Indicates that the view port scale and the annotation scale are different. This is visible only when you select a view port. This icon replaces the previous when the view port scale and annotation scale are equal.
	Annotation Mirror	Turns on the annotation monitor. When the annotation monitor is on, the system displays a badge on all non associative annotations.
	Graphics Performance	Enables hardware acceleration to utilize the GPU of the installed graphics card instead of utilizing your computer's CPU.
	Clean Screen	Maximizes the drawing area by clearing it of the ribbon, toolbars, and dock able windows, except the command window.
	Clean Screen	Restores the ribbon, toolbars, and dock able windows.
	Isolate Objects	Hide selected objects in the drawing area, or display objects that were hidden previously.

- Coordinates
- Model Space
- ✓ Grid
- ✓ Snap Mode
- Infer Constraints
- Dynamic Input
- ✓ Ortho Mode
- ✓ Polar Tracking
- ✓ Isometric Drafting
- ✓ Object Snap Tracking
- ✓ 2D Object Snap
- ✓ LineWeight
- Transparency
- Selection Cycling
- ✓ 3D Object Snap
- ✓ Dynamic UCS
- ✓ Selection Filtering
- ✓ Gizmo
- ✓ Annotation Visibility
- ✓ AutoScale
- ✓ Annotation Scale
- ✓ Workspace Switching
- ✓ Annotation Monitor
- ✓ Units
- Quick Properties
- Lock UI
- ✓ Isolate Objects
- ✓ Graphics Performance
- ✓ Clean Screen

Customization	Specifies what command buttons to display on the status bar.
2D Object Snap	Snaps the cursor to the nearest 2D reference point, as you move the cursor. For example endpoints, centers of circles, midpoints, and so on.
3D Object Snap	Snaps the cursor to the nearest 3D reference point, as you move the cursor. For example vertexes, midpoints on edges, nearest to face, and so on.
Units	Set the drawing units for the current drawing.
Lock UI	Locks the position and size of toolbars and dock able windows such as Design Center and the Properties window.

- ✓ Endpoint
- Midpoint
- ✓ Center
- Geometric Center
- Node
- Quadrant
- ✓ Intersection
- Extension
- Insertion
- Perpendicular
- Tangent
- Nearest
- Apparent Intersection
- Parallel
- Object Snap Settings...

- ✓ Vertex
- Midpoint on edge
- ✓ Center of face
- Knot
- Perpendicular
- Nearest to face
- Object Snap Settings...

- Architectural
- ✓ Decimal
- Engineering
- Fractional
- Scientific
- Decimal ▾
- ✓ Floating Toolbars/Panels
- ✓ Docked Toolbars/Panels
- ✓ Floating Windows
- ✓ Docked Windows



# FUNCTION KEYS

## FUNCTION KEYS - DESCRIPTIONS

If you prefer to use the keyboard, some of the function keys perform the same toggle action as controls on the status bar.

These are some of the most common functions any user would typically use and consistently activate and deactivate within an AutoCAD file.

Key	Feature	Description
F1	Help	Displays Help for the active tool tip, command, palette or dialog box.
F2	Expanded History	Displays an expanded command history in the Command window.
F3	Object Snap	Turns object snap on and off.
F4	3D Object Snap	Turns additional object snaps for 3D on and off.
F5	Isoplane	Cycles through 2D isoplane settings.
F6	Dynamic UCS	Turns automatic UCS alignment with planar surfaces on and off.
F7	Grid Display	Turns the grid display on and off.
F8	Ortho	Locks cursor movement to horizontal or vertical.
F9	Grid Snap	Restricts cursor movement to specified grid intervals.
F10	Polar Tracking	Guides cursor movement to specified angles.
F11	Object Snap Tracking	Tracks the cursor horizontally and vertically from object snap locations.
F12	Dynamic Input	Displays distances and angles near the cursor and accepts input as you use Tab between fields.



# ABOUT THE RIBBON

## RIBBON ORGANIZATIONAL TOOLS

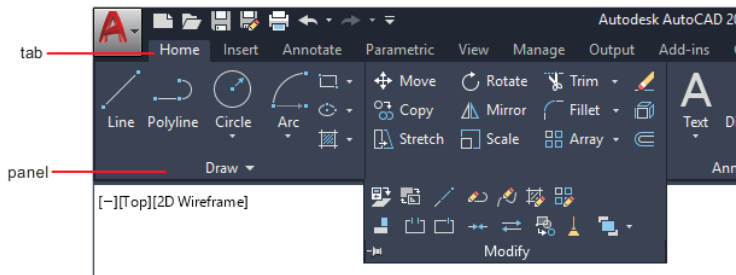
The ribbon organizes tools into logical groupings.

The ribbon provides a compact palette of all of the tools necessary to create or modify your drawing. It can be placed in the following places:

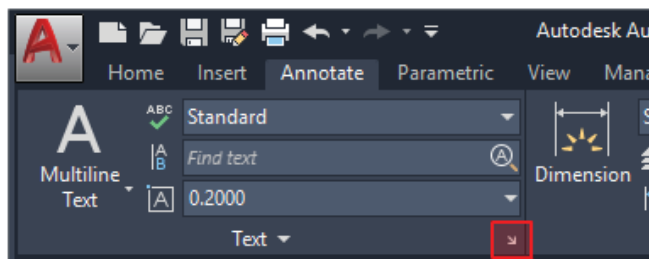
1. Docked horizontally at the top of the drawing area (default)
2. Docked vertically along the right or left edge of the drawing area
3. Undocked, or floating within the drawing area or on a second monitor

## RIBBON TABS AND PANELS

The ribbon is composed of a series of tabs, which are organized into panels that contain many of the tools and controls available in toolbars.



Some ribbon panels provide access to a dialog box related to that panel. To display the related dialog box, click the dialog box launcher is denoted by an arrow icon in the lower-right corner of the panel.

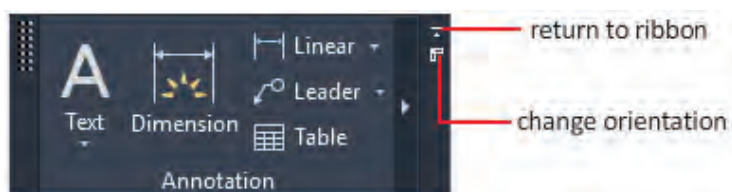


dialog box launcher

**Note:** You can control which ribbon tabs and panels are displayed. Right-click the ribbon and click or clear the names of tabs or panels listed on the shortcut menu.

## FLOATING PANELS

You can pull a panel off a ribbon tab and into the drawing area or onto another monitor. The floating panel remains open until you return it to the ribbon, even if you switch ribbon tabs.



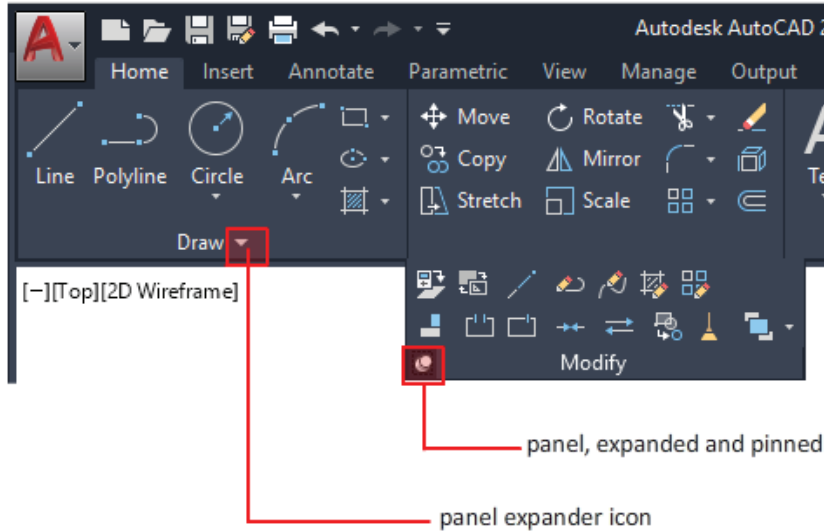


# ABOUT THE RIBBON

## RIBBON ORGANIZATIONAL TOOLS

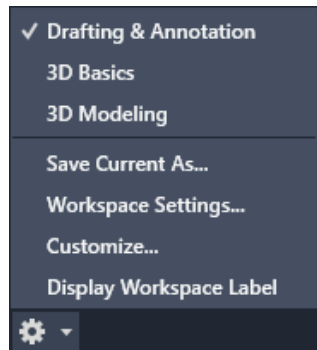
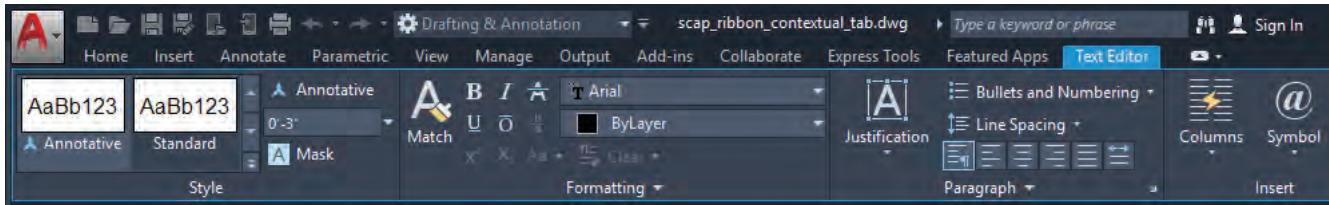
### SLIDE-OUT PANELS

If you click the arrow in the middle of a panel title, the panel will expand to display additional tools and controls. By default, slide-out panels automatically close when you click another panel. To keep a panel expanded, click the push pin, in the bottom-left corner of the slide-out panel.



### CONTEXTUAL RIBBON TABS

When you select a certain type of object or start certain commands, a contextual ribbon tab is displayed instead of a toolbar or dialog box. The contextual tab closes when you end the command.



### WORKSPACES AND THE RIBBON

For products that run on the Windows operating system, a workspace is set of ribbon tabs and panels, menus, toolbars, and palettes that provide you with a custom, task-oriented drawing environment. You can change to a different the ribbon by changing the workspace. On the status bar, click Workspace Switching and select the workspace you want to use. For example, here are the initial workspaces available in AutoCAD.





# ABOUT THE RIBBON

## RIBBON CUSTOMIZATION

Yes, the tabs, panels, command buttons, and controls displayed on the ribbon can be customized. Customizing the ribbon allows you to be more productive by reorganizing the panels, command buttons, and controls you use most frequently in a way that better fits the way you or those at your company work with the product. The ribbon can be customized within the application window or using the Customize User Interface (CUI) Editor.

*These ribbon customization tasks can be performed within the application window:*

- Show and hide ribbon tabs.
- Show and hide ribbon panels.

The ribbon customization tasks previously mentioned along with many more can be performed using the Customize User Interface (CUI) Editor:

### Ribbon Tabs

- Create new and modify, including to delete, existing ribbon tabs
- Add and remove ribbon panels.
- Show and hide ribbon panels.
- Set the initial order of ribbon panels on a ribbon tab.

### Ribbon Panels

- Create new and modify, including to delete, existing ribbon panels.
- Add and remove command buttons and controls.
- Resize command and drop-down menu buttons.
- Reposition command buttons and controls.
- Position command buttons and controls in a slideout.
- Organize and group command buttons and controls with separators, drop-down menus, rows, and sub-panels.

### Workspaces

- Add and remove ribbon tabs from a workspace
- Show and hide ribbon panels
- Reorder ribbon tabs on the ribbon
- Reposition ribbon panels on a ribbon tab

In addition to ribbon customization, the Customize User Interface (CUI) Editor can be used to customize these user interface elements:

- Quick Access toolbar
- Classic toolbars
- Pull-down menus
- Shortcut (contextual) menus
- Quick properties and rollover tooltips
- Keyboard shortcuts and temporary override keys.
- Mouse buttons and double-click actions
- Legacy user interfaces (tablet menus and buttons, and image tile menus)



# CREATING VIEWPORTS

## LAYOUTS + LAYOUT VIEWPORTS

Layout viewports are objects in paper space that display views of model space. You create, scale, and place them in paper space on a layout.

On each layout, you can create one or more layout viewports. Each layout viewport is like a closed-circuit TV monitor of a view of the model at a scale and orientation that you specify.

### TO CREATE A NEW LAYOUT

Click the views tab, then click + New Layout.

### LAYOUT PROPERTIES

Paper size: Choose among the supported standard paper sizes.

Plot style: Choose acad, Grayscale, and monochrome, or None.

Orientation: Choose portrait or landscape.

Note: If a layout has an unsupported paper size, its properties can't be modified. Layout Properties work best with layouts that are created in the AutoCAD web app. Some layouts that are created in desktop AutoCAD won't have modifiable properties.

### MODIFY LAYOUT VIEWPORTS

After you create a layout viewport, you can change its size and properties, and also scale and move it as needed.

Note: Because layout viewports are objects, you can also use editing commands such as COPY, MOVE, and ERASE on layout viewports.

### TO MODIFY THE SCALE OF A LAYOUT VIEWPORT

Click a layout viewport's border to select it. Click the Properties tab to open the Properties panel. alt  
In the Properties panel, go to Viewport Scale and choose a scale from the list of options.

### CUSTOM SCALES

You cannot key in a custom scale. The only way to create a custom scale is to double-click inside a layout viewport to activate it, and then zoom within the viewport to resize the scale. However, if an uploaded drawing has a layout viewport with a custom scale as its current scale,

the viewport will maintain that scale until you change it. You can also use the MATCHPROP command to match the properties of an existing layout viewport to any other layout viewports.

The only available scale options are the ones you see in the Viewport Scale drop-down. Drawings created in the AutoCAD web app have a default list of scale options. Drawings that are uploaded to the AutoCAD web app will inherit the existing scale options that are associated with each layout viewport.

### TO MODIFY THE PROPERTIES OF A LAYOUT VIEWPORT

*Here are the steps below:*

1. Click a layout viewport's border to select it.
2. Click the Properties tab to open the Properties panel. alt
3. In the Properties panel, you can view and modify any of the viewport's properties, including layer, color, viewport scale, and display lock.

### TO MOVE OR RESIZE A LAYOUT VIEWPORT

Click a layout viewport's border to activate it, then use its grips to move or resize the viewport.

### TO CREATE ADDITIONAL LAYOUT VIEWPORTS IN A LAYOUT

Use the COPY command to copy an existing layout viewport.

### LOCKED LAYOUT VIEWPORTS

To prevent accidental panning and zooming, each layout viewport has a Display Locked property that can be turned on or off. You can access this property from the properties panel.



# CREATING VIEWPORTS

## ABOUT SCALING + EDITING VIEWS IN LAYOUT VIEWPORTS

To scale each displayed view accurately for output, set the scale of each layout viewport.

When you work in a layout, the scale factor of a view in a layout viewport represents a ratio between the actual size of the model displayed in the viewport and the size of the layout. The ratio is determined by dividing the paper space units by the model space units. For example, for a quarter-scale drawing, the ratio would be a scale factor of one paper space unit to four model space units, or 1:4.

You can change the view scale of the viewport by using

1. The Properties palette
2. The triangular scale grip in a selected viewport
3. The Viewports Scale on the status bar
4. The XP option of the ZOOM command when model space is accessed from within a layout viewport

### **Note:**

- Scaling or stretching the layout viewport border does not change the scale of the view within the viewport.
- When creating a new drawing based on a template, the scales in the template are used in the new drawing. The scales in the user profile are not imported.
- You can modify the list of scales that are displayed in all view and plot scale lists with SCALELISTEDIT. After you add a new scale to the default scale list, you can use the Reset button in the Edit Drawing Scales dialog box to add the new scale to your drawing.

## ANNOTATIVE OBJECTS AND SCALING

Annotative objects are defined at a paper height instead of a model size and assigned one or more scales. These objects are scaled based on the current annotation scale setting and are automatically displayed at the correct size in the layout or when plotted. The annotation scale controls the size of the annotative objects relative to the model geometry in the drawing.

You can specify the default list of scales available for layout viewports, page layouts, and plotting in Default Scale List dialog box.

## TO LOCK THE SCALE OF A LAYOUT VIEWPORT

When you lock the display of a layout viewport, you can still perform a zoom, but the result of the zoom is applied to the entire layout, leaving the viewport scale in the layout viewport unchanged.

1. Select the border of a layout viewport.
2. Right-click and choose Display Locked = Yes.

**Note:** For non-rectangular layout viewports, select the viewport object rather than the associated geometric object.



# CREATING VIEWPORTS

## ABOUT SCALING + EDITING VIEWS IN LAYOUT VIEWPORTS

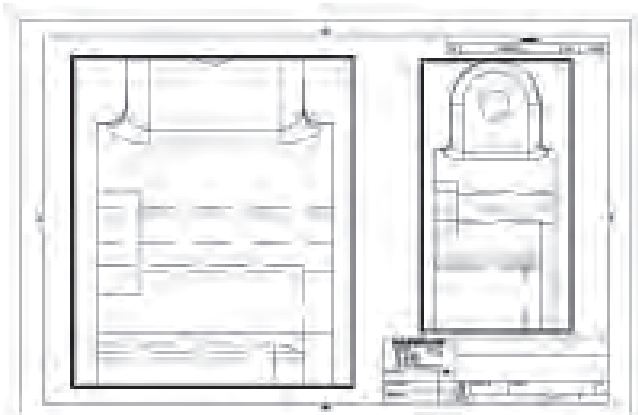
### TO SCALE LINETYPES IN LAYOUT VIEWPORTS

You can scale linetypes in paper space either based on the drawing units of the space in which the object was created or based on the paper space units.

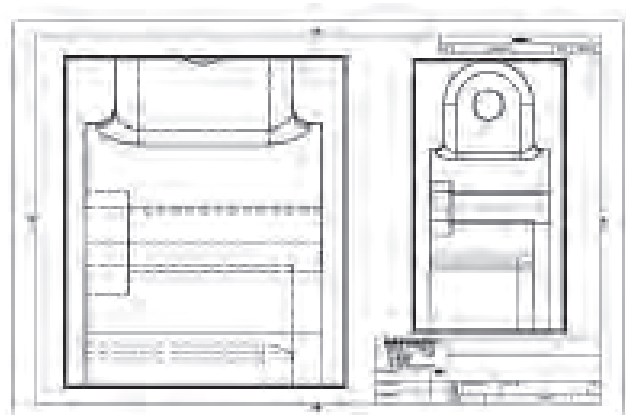
You can set the PSLTSCALE system variable to maintain the same linetype scaling for objects displayed at different zoom factors in the layout (paper space) and in the layout viewport (model space). For example:

1. With PSLTSCALE set to 1 (default), set the current linetype to dashed, and then draw a line in a paper space layout.
2. In the layout, create a viewport with a zoom factor of 1x, make that layout viewport current, and then draw a line using the same dashed linetype. The dashed lines should appear to be the same.
3. If you change the viewport zoom factor to 2x, the linetype scaling for the dashed line in the layout and the dashed line in the layout viewport will be the same, regardless of the difference in the zoom factor.

With PSLTSCALE turned on, you can still control the dash lengths with LTSCALE and CELTSCALE. In the following illustration, the pattern of the linetypes in the drawing on the left has been scaled to be the same regardless of the scale of the view. In the drawing on the right, the scale of the linetypes matches the scale of each view.



PSLTSCALE=1, dashes scaled to paper space



PSLTSCALE=0, dashes scaled to space where they were created



# CREATING VIEWPORTS

## ABOUT SCALING + EDITING VIEWS IN LAYOUT VIEWPORTS

### TO MODIFY THE SCALE OF A LAYOUT VIEWPORT

#### Using the triangular scale grip:

1. Select the layout viewport that you want to modify.
2. Click the triangular scale grip near the center of the viewport, and click the desired scale from the list.
3. The scale you choose is applied to the viewport.

**Note:** With this method, you do not have to unlock the layout viewport, and the border of the layout viewport automatically adjusts to maintain the clipping boundaries of the view.

#### Using the Properties palette:

1. Select the layout viewport that you want to modify.
2. Right-click, and then choose Properties.
3. If necessary, click Display Locked and choose No.
4. In the Properties palette, select Standard Scale, and then select a new scale from the list. The scale you choose is applied to the viewport.

**Note:** To use a custom scale, enter a scale in the Custom Scale field in the Properties palette.

### TO CREATE A NON RECTANGULAR VIEWPORT LAYOUT

You can create a new viewport with nonrectangular boundaries by converting a geometric object created in paper space into a layout viewport using the MVIEW or -VPORIS command.

With the Object option, you can select a closed object, such as a circle or closed polyline created in paper space, to convert into a layout viewport. The object that defines the viewport boundary is associated with the viewport after the viewport is created.

With the Polygonal option, you can create a nonrectangular layout viewport by specifying points. The prompts are the same as the prompts for creating a polyline.

1. If necessary, click a layout tab.
2. Set the current layer to a layer that's reserved for layout viewports (recommended).

The border visibility of layout viewports is controlled by layer visibility.

3. Click Layout tabLayout - Viewports panel - Rectangular, Polygonal, or Object.
4. Follow the prompts.

**Note:** When you want to suppress the display of the boundary of a layout viewport, you should turn off the layer of the nonrectangular viewport instead of freezing it. If the layer of a nonrectangular layout viewport is frozen, the viewport is not clipped correctly.





# CREATING VIEWPORTS

## ABOUT SCALING + EDITING VIEWS IN LAYOUT VIEWPORTS

### TO REDEFINE LAYOUT VIEWPORT BOUNDARIES

Two methods are available for redefining the boundary of a layout viewport.

#### ADJUST A LAYOUT VIEWPORT BOUNDARY USING GRIPS

1. Click a layout tab.
2. Select a layout viewport.
3. Click one of the rectangular size grips on the layout viewport border, and adjust its location.

#### REDEFINE A LAYOUT VIEWPORT BOUNDARY

1. Click a layout tab.
2. Click Layout tab - Layout Viewports panel - Clip.
3. Select either an existing object to designate as the new viewport boundary, or specify the points of a new boundary.  
The new viewport boundary does not clip the old boundary, it redefines it.
4. Click OK.
5. On the layout, specify two points to indicate the area to contain the viewport configuration.

**Note:** A nonrectangular viewport consists of two objects: the viewport itself and the clipping boundary. You can make changes to the viewport, the clipping boundary, or both.



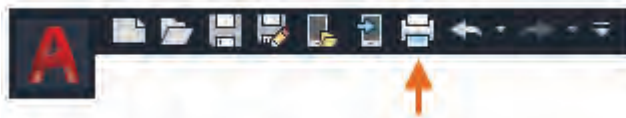
# ITS ALL ABOUT PRINTING

## AUTOCAD PRINTING STEPS - PLOTTING/PRINTING

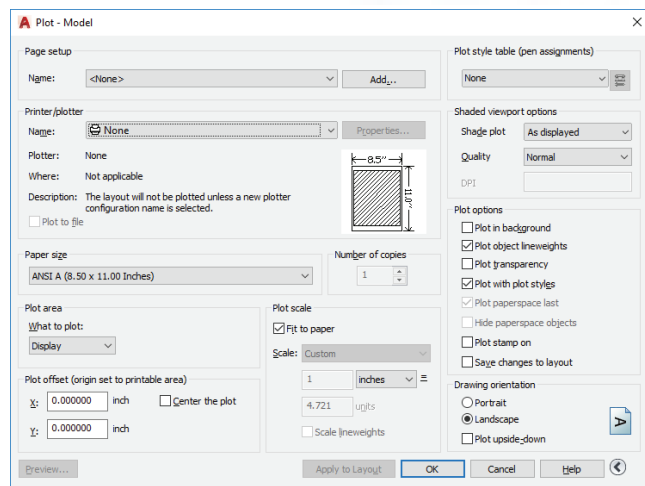
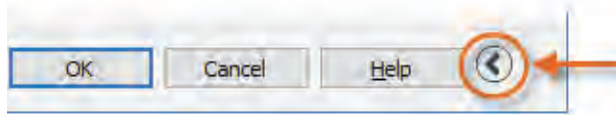
Output a drawing layout to a printer, a plotter, or a file. Save and restore the printer settings for each layout.

Originally, people printed text from printers and plotted drawings from plotters. Now, you can do both with either. So this guide will also use the terms print and plot interchangeably as everyone else does.

The command to output a drawing is PLOT and you can access it from the Quick Access toolbar.



To control whether all of the options in the Plot dialog box are hidden or displayed, click the More Options button.



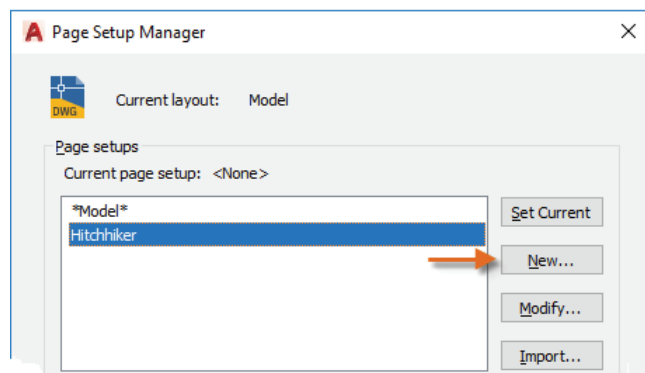
When all of the options are displayed, there are a lot of settings and options available for your use.

For convenience, you can save and restore collections of these settings by name. These are called page setups. With page setups you can store the settings that you need for different printers, printing in gray scales, creating a PDF file from your drawing, and so on.

### CREATE A PAGE SETUP

To open the Page Setup Manager, right-click on the Model tab or a layout tab and choose Page Setup Manager. The command is PAGESETUP.

Each layout tab in your drawing can have an associated page setup. This is convenient when you use more than one output device or format, or if you have several layouts with different sheet sizes in the same drawing.



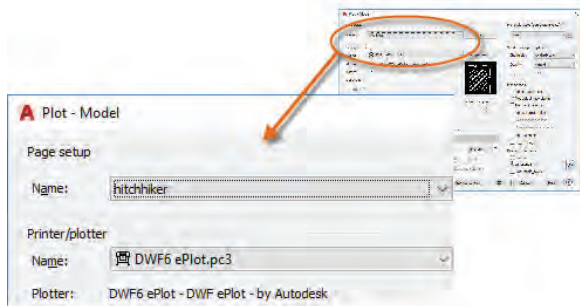
To create a new page setup, click New and enter the name of the new page setup. The Page Setup dialog box that displays next looks like the Plot dialog box. Choose all the options and settings that you want to save.

When you are ready to plot, you simply specify the name of the page setup in the Plot dialog box, and all your plot settings will be restored. In the following illustration, the Plot dialog box is set to use the Hitchhiker page setup, which will output a DWF (Design Web Format) file rather than print to a plotter.



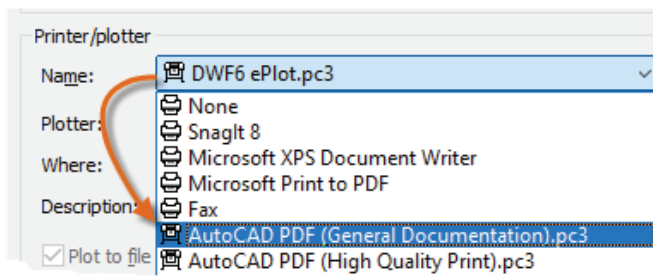
# ITS ALL ABOUT PRINTING

## AUTOCAD PRINTING STEPS - PLOTTING/PRINTING



**Tip:** You can save page setups in your drawing template files, or you can import them from other drawing files.

## OUTPUT TO A PDF FILE



The following example shows you how to create a page setup for creating PDF files.

From the Printer/plotter drop-down list, choose AutoCAD P`DF (General Documentation).pc3:

Next, choose the size and scale options that you want to use:

- Paper Size. The orientation (portrait or landscape) is built into the choices in the drop-down list.
- Plot Area. You can clip the area to be plotted with these options, but usually you plot everything.
- Plot Offset. This setting changes based on your printer, plotter, or other output. Try centering the plot or adjusting the origin, but remember that printers and plotters have a built-in margin around the edges.
- Plot Scale. Choose your plot scale from the drop-down list. A scale such as 1/4" = 1'-0" is meant for printing to scale from the Model tab. On a layout tab, you normally print at a 1:1 scale.

The plot style table provides information about processing colors. Colors that look good on your monitor might not be suitable for a PDF file or for printing. For example, you might want to create a drawing in color, but create monochrome output. Here is how you specify monochrome output:

