



Walt Disney World Swan and Dolphin Resort
Orlando, Florida

Lost in Paper Space!

Dan Abbott - Southern Maine Technical College

GD33-2 I thought AU 2004 would be the last time for this workshop, but it looks like there are people who still want one more dose of training to make sense of Paper Space. We will go through this feature step-by-step so you can learn how to use Paper Space, how to solve problems it can cause, what its strengths and weaknesses are, how dimensioning plays a part in its effective use, and how to control its behavior. This course aims to take the mystery out of Paper Space and demonstrate how any office stands to benefit by implementing it well.

About the Speaker:

Dan has been involved with technical education for more than 20 years, the past 16 of which have been as a member of the Architectural and Engineering Design Department at Southern Maine Technical College. Dan trains industry professionals in AutoCAD use and management, AutoLISP, and geometric dimensioning and tolerancing. He works with Knowledge Development Solutions to help create technical exams for Autodesk. Dan earned M.S. and B.S. degrees in Industrial Technology from the University of Southern Maine, and a B.A. degree in Psychology from Swarthmore College.

dhabbott@maine.rr.com

Background

Paper Space allows you to separate the design process from the plotting process. You **design** in Model Space without worrying about plotting. You **plot** from Paper Space by creating as many layouts as you need to document the design.

Years ago AutoCAD had only one space -- Model Space. You started AutoCAD, you created your objects, you inserted a pre-drawn border at a scale that made sense for plotting, and you calculated the correct text height, set a proper DIMSCALE and plotted your drawing. Some people still use AutoCAD this way.

There are some severe limitations: you couldn't plot more than one view of a 3D object; you couldn't plot a detail at a different scale without copying it and making it larger; you had to reorganize the drawing if you decided to plot on a different sheet size or at a different scale; you had some calculating to do when you set a text height, a dimension scale, a hatch scale, a block scale or a linetype scale, all of which had to be changed if the plot scale changed.

Definitions

What is the difference between Model Space (MSPACE) and Paper Space (PSPACE), and what does TILEMODE have to do with it?

Model Space describes the drawing editor when you first start a drawing. It displays an icon, the UCSICON, with an X axis and a Y axis represented by arrows at a right angle to each other. Model Space is where you **create** all of the geometry that represents a 2D or 3D model, full size.

When you are in Model Space, you can use VPORTS to create separate viewports, but you are limited in how those viewports can be laid out. No matter how many viewports you create, they must completely fill the drawing editor, be rectangular, not overlap, and they cannot have any gaps between them.

TILEMODE is a system variable (SETVAR) that enables Paper Space. It is useful when writing Autolisp programs that manage layouts.

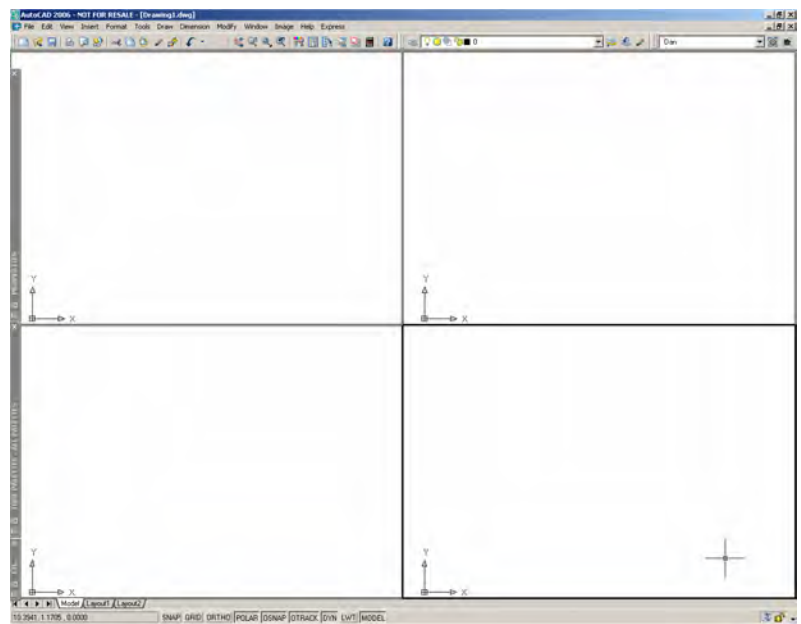


Figure 1 - Model Space Viewports

TILEMODE controls the availability of Paper Space. It is changed automatically whenever you select a layout tab. A setting of 0 turns TILEMODE OFF, and a setting of 1 turns it on. The viewports shown above of Model Space are always placed together like tiles, while viewports in Paper Space ("floating" viewports) can be separated, overlapped, and irregularly shaped. They don't need to be "tiled." Hence the name "TILEMODE."

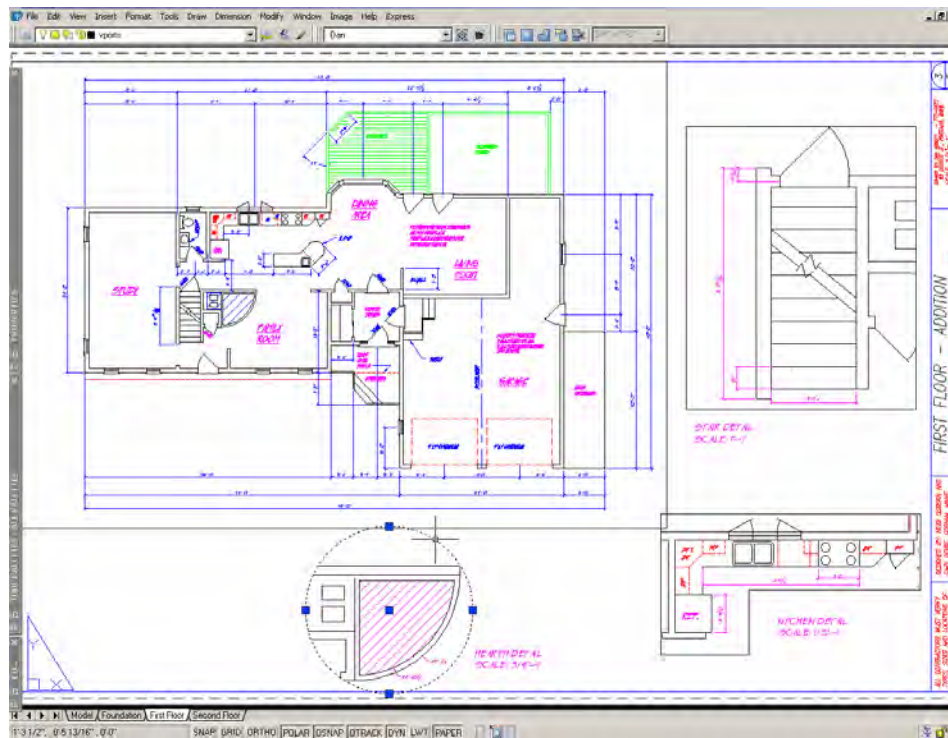


Figure 2 - Paper Space "floating" viewports

Paper Space is a layout, or paste-up area that allows you to arrange multiple views of the objects you create in Model Space. It is like taping a sheet with a pre-printed border to a drafting table, arranging different images on that sheet by pasting them in different locations, and then adding any text necessary. If you don't like the location of the image, you can move it. If you don't want to see it anymore, you can remove it. In Paper Space, you manipulate views of the geometry that you created in Model Space.

Paper Space is called "paper" space because it refers to the sheet on which you plan to plot. Each layout represents a separate sheet of paper. You can have as many different layouts as you want, all of which are saved within the drawing. The views can show your geometry at any scale; display only those layers that you want to see; be created from any closed polyline, circle or region; and be turned on and off at will.

Drawbacks Of Using Paper Space

Although it is getting rare, there are still AutoCAD users who do not plot from Paper Space. They have their reasons, so let's start with a few drawbacks to using Paper Space.

1. It's one more thing to learn.

Although using Paper Space follows a very clear logic, it is not always intuitive, and there is some complexity involved. That complexity is needed to make sure that you can control your plotting the way you want to. If your office is not using Paper Space, it is NOT a good idea to just begin and hope that everyone figures it out. For the sake of consistency, standards should be set, and some training should be provided for understanding it.

2. Objects in Paper Space and Model Space are separate.

This is a potential drawback for some people when using Paper Space, although the separation must be there in order for Paper Space to be usable. Objects created in Paper Space are not associated directly with objects created in Model Space, even though dimensions can be indirectly associated with Model Space objects using the DIMASSOC variable. Although you can use OSNAPS on Model Space objects even while in Paper Space, you cannot select objects in both spaces at the same time. There are several situations where this lack of connection may be a problem.

Creating Blocks.

You may want to define a block using objects from both Model Space and Paper Space (this is unlikely if you take my advice later in this paper on what objects to place where). To define a block, everything you want to include in the block definition must be in the same space. If you do have objects in both spaces that you want to include in a single block definition, make a copy of the Paper Space objects, and place that copy in Model Space before defining the block. If Express Tools are installed (I highly recommend that they are), you can use the very useful CHSPACE command to do this very quickly.

Using the WBLOCK command to create a drawing file.

You may want to use WBLOCK to create a new drawing file by selecting objects you have drawn in one layout and those Model Space objects being displayed. You cannot do this directly. You can, however, create a drawing file using only the Model Space objects and then add the original layout to the new drawing. A layout can be added from another drawing easily using AutoCAD Design Center (ADC). You will get the page setup, the viewports, and all objects created in the Layout.

You can also copy layouts by right-clicking on a Layout tab in the new drawing, selecting "From Layout" in the menu, changing the "Files of Type" option from the default ".dwt" to ".dwg," locating the original drawing file, and finally, selecting the layout from that drawing.

Placing dimensions in Paper Space.

When dimensions are placed in Paper Space, they are separated from the objects they annotate. This can be a problem, but I recommend *against* placing dimensions in Paper Space (there are many people who disagree with me). Although there can be associativity between Model Space objects and Paper Space dimensions, you still can't select both dimensions and objects to create a detail block, and there are times when the connection between dimensions in Paper Space and Model Space breaks down. And you simply cannot use QDIM in Paper Space.

Advantages Of Using Paper Space

I think that the advantages of using Paper Space are considerable, particularly in making it more likely that office standards will be applied consistently. I also think most offices find the process of document layout and plotting much more efficient and logical when they use Paper Space.

1. *Plotting multiple views of 3D objects*

For any office creating 3D geometry with AutoCAD, Paper Space is essential. I started working with 3D models long before Paper Space was added to AutoCAD. There were many limitations to this process in early versions, but one of the most frustrating was not being able to create standard orthographic views from the models -- at least not easily. Either you carefully plotted the object several times on the same sheet with the views in different places, or you copied the model 2 or 3 times and rotated it into the

various positions needed for the multiple views, thus dramatically increasing an already large file size. Paper Space addressed that problem by allowing the user to place front, top, side and isometric views on one sheet of paper. This process has been automated by the MVSETUP AutoLISP program, which is available at the command line. When used with the SOLPROF, and SOLDRAW commands, laying out views of 3D models is very quick and easy.

2. Plotting details at multiple scales

Plotting details at different scales without Paper Space can be a problem. If the details are part of something you have already drawn, you have to copy the geometry to a different location, then scale it up to the proper scale. Even if the details are drawn separately, you have to decide after creating them how much larger they should be so that you can ultimately plot to a standard scale and label the details correctly. Once the details are scaled up, you have to change the dimensions so that they give the correct values, since a DIMLFAC of 1 (the default) would give results that are too large. So, with geometry that is scaled two times larger than actual size, you would have to set DIMLFAC to .5, best done by creating a special DIMSTYLE.

With Paper Space, any detail you want to create of an existing full-size object can simply be added to the layout sheet as a view and the view can be scaled instead of the geometry. You don't need to copy or redraw a detail. Even if the detail has to be drawn separately from the original object (a section elevation detail on a foundation plan, for example) you still draw it actual size and scale the view to whatever scale you desire. As a result, there should seldom be a reason to scale the geometry you are drawing to anything other than actual size. This makes it far less likely that you will find dimensions on a drawing that give the wrong values.

3. Less time calculating

When plotting is done from Model Space, there are certain values that must be calculated in order to get the desired results. You must decide what scale you plan to plot the drawing, and then use the reciprocal of that scale factor to identify appropriate text heights, linetype scales, dimension scales, hatch pattern scales and block insertion scales. If you do have details, you need to determine an appropriate linear scale factor for dimension values (DIMLFAC).

With Paper Space, much of that work is eliminated or simplified. Text, if placed in Paper Space, can be created at the actual size you want on the plotted sheet. Dimension Style settings, like text height and arrow size, can be set to actual plotted size. You don't need separate dimension styles for each plot scale. LTSCALE can be set to 1 and the linetypes can be scaled automatically. Title blocks and borders are inserted into Paper Space actual size. Hatch patterns can be scaled automatically. MTEXT, when placed with a leader will scale automatically. The SPACETRANS command provides an easy means of determining other scales, and CHSPACE will automatically scale objects when moving them from Paper Space to Model Space.

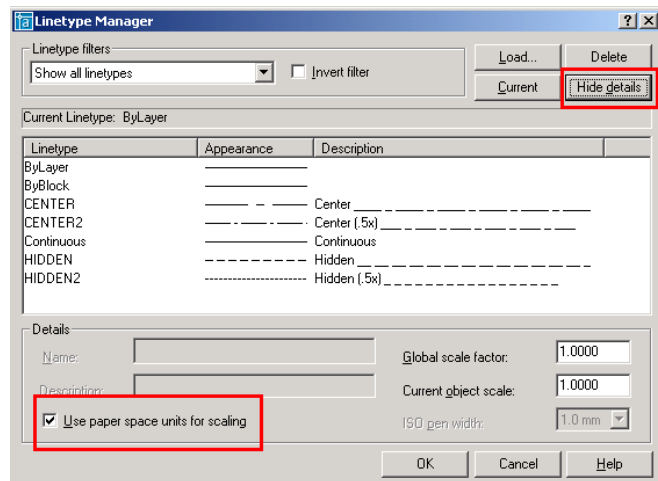


Figure 3 - Automatic linetype scaling

4. More consistency in Plotting

When Paper Space is used, offices get more consistent results from the many different users who plot drawings. Template drawings can include pre-inserted title blocks and borders with all text at actual size. Various layouts can be set up in the template drawing for each sheet size and plotter in the office, allowing a change in plotting with a simple selection of a layout tab. Layers for both detail and full-size dimensions and hatch patterns can be created and frozen in new viewports.

5. Layouts can be changed dramatically without changing the location of geometry

Because modifying layouts in Paper Space requires only that views be moved, there is no reason to relocate geometry to change the way a drawing plots. Changing the location of geometry should be avoided since it can change critical information. If two views on the sheet are too close together, they can be moved without changing coordinates being used for station points, or as origins for baseline dimensions. Views can even be rotated, using the DVVIEW or PLAN command, without changing the geometry or the UCS.

6. Multiple layouts can be included within a single drawing file

It is common for an office to have more than one plotter, each of which uses more than one sheet size. With the layouts available in AutoCAD, a single file can have a different layout for plotting to different sheet sizes (standard and check plot, for instance), or have layouts of entirely different views of the same object. A complete set of drawings can be contained in a single file, eliminating the possibility of drawing files getting separated. Sheet sets, new in AutoCAD 2005, can be created from individual layout tabs across drawings.

7. Views with different layers can be shown on a single sheet

It is common for residential architectural drawings to have XREFS showing different floors in the same location so that features can be lined up properly. The layers containing those different floors can be frozen when you don't want them to be displayed. Using VPLAYER or the "Freeze in Active Viewport" option of the LAYER dialog box, you can have a single file with a layout for the foundation, first floor, second floor, roof framing plan, etc. all consistently laid out with the same border and title block. All you need to do is select a layout tab to switch among them. If you bind the XREFs using the BIND option, you can create a single drawing file that will retain the same layer visibility. It helps to use a command line wildcard in doing this in the form **Vplayer; F; ~FND|*;;**. This will freeze all layers *except* those beginning with FND|, which is the prefix for all layers in an externally referenced drawing named "FND."

8. Plotting information can be stored within the drawing

Layouts are based upon specific plotters and specific sheet sizes. As long as the plotter configuration files and plot style tables exist and are in the path, information about the plotter, the particular line characteristics and the particular sheet size stays with the drawing.

9. You can clip the display of objects when plotting

A user can create a viewport of any shape with the MVIEW command. If a viewport exists it can be reshaped using the VPCLIP command. This allows you to be selective about what objects in a drawing will plot. If an object happens to be an XREF or a BLOCK, that object can also be clipped with the XCLIP command. VPLAYER allows you to be selective about which layers are displayed. Combining XCLIP, VPLAYER, and VPCLIP gives the user nearly unlimited flexibility in presenting geometry and in making plotting changes. You can even use conventional breaks on long objects without actually breaking the object.

10. *Layouts can be copied within and between drawings*

Once you have created a layout that works well in one drawing, you can duplicate it within the current drawing or within any other drawing. See above for a discussion of using ADC or the Right-Click menu of a Layout for this purpose.

Preparing A Drawing For Plotting From Paper Space

In order to use Paper Space effectively, I recommend setting up a template drawing with certain settings.

1. **Title Blocks.** Define blocks containing full-size borders and title blocks for each sheet size you use in your office. If you use the same sheet size with more than one plotter, make sure that your full-size border fits both plotters, since some plotters require a larger paper-gripper margin than others. I would also recommend using attributes to fill the title block out when inserting it. You DO NOT have to have multiple border blocks for different plot scales, since you will almost always plot from Paper Space at a 1:1 scale.
2. **Text Style.** Create an appropriate text style (using a name other than "Standard") with a fixed height set to 0 so it can be used for dimensions and for text at different sizes.
3. **Dimension Style.** Create your dimension styles (using a name other than "Standard") with the DIMSCALE set to 0. You can do this through the dimension style manager, by selecting the "Modify" button, and then going to the "Fit" tab and selecting the radio button "Scale dimensions to layout (Paper Space)." Don't forget to create child styles for dimensions that you might want to have a different appearance. I always create a child style for radius and diameter dimensions, and sometimes for linear, angles, and leaders.
4. **Linetypes.** Set LTSCALE and CELTSCALE to "1" so that linetypes are scaled with the same line segment length with which they were created. This will result in linetypes that may not appear correctly in Model Space. Don't worry. They will look fine in Paper Space if you make sure the PSLTSCALE is set to "1" also. This controls scaling of linetypes in Paper Space and can also be set by checking the Paper Space option in the Details area of the "Linetype" dialog box.
5. **Layers.** Create separate layers for the following: general dimensions; detail dimensions; general hatch patterns; detail hatch patterns; floating viewports. You may need more than two layers for dimensions and hatch patterns if you have multiple details with features that show in more than two views.
6. **Preset layouts.** If your office uses consistent layouts and scales of views for most drawings, your template drawing can also have borders and title blocks inserted into Paper Space in advance, and viewports already set up and scaled in Paper Space.

What to Put Where

You may find that there are good reasons to vary from the following recommendations, but they work well most of the time.

Model Space should include: geometry, dimensions, hatch patterns, and associated text. I recommend strongly that you put ALL geometry and associated annotation, both 2D and 3D, in Model Space, including: solid models, surfaces, visible lines, hidden lines, centerlines, phantom lines and symmetry lines.

Paper Space should include: the title block, title block text, bill of materials and other general text used for annotation.

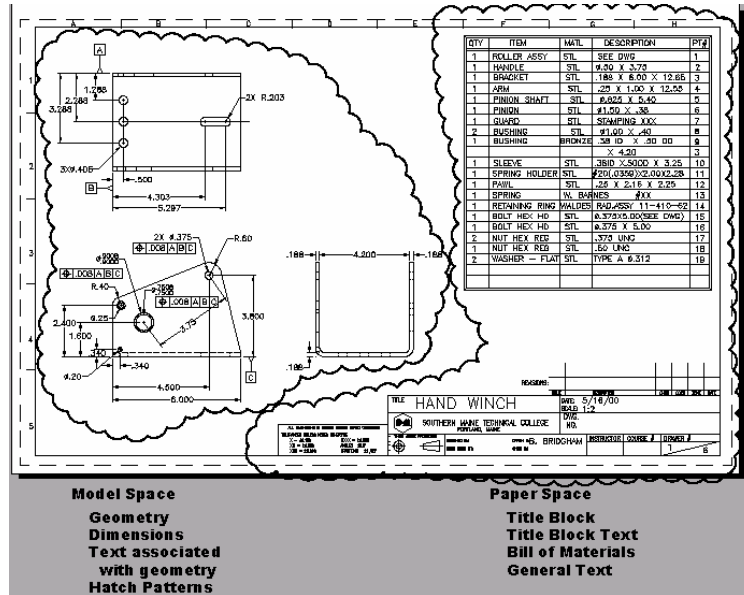


Figure 4 What to put where

Dimensions. I recommend that all dimensions for 2D drawings be placed in Model Space, but only after you have set up a layout, created views with specific zoom magnifications, and locked the viewports. Even though dimensions in Paper Space can be associated with the model, I don't recommend putting them there. There are a number of reasons for this advice.

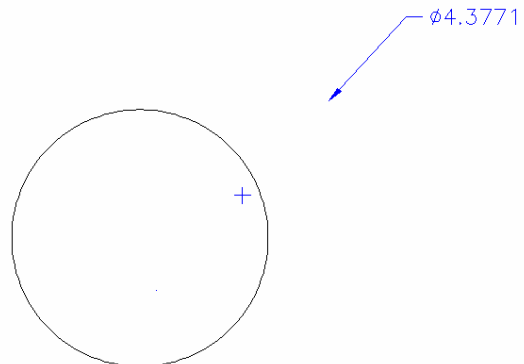
1. If you place dimensions in Paper Space and later move objects in Model Space, the dimensions may not move with them. If you move objects in Model Space outside of your MVIEW, most of the dimensions in Paper Space will move well off the sheet of paper to retain their associative relationship.
2. Leaders can pose problems if they are placed in Paper Space. Generally a leader is in a specific location in reference to an object. If the object or objects the leader refers to is moved, the leader AND text should also be moved. If a leader is placed in Paper Space only the arrowhead will move with an associated object, and then only if the object is actually selected at the time the leader is placed.
3. Dimensions placed in Model Space will always reflect the actual dimension of the geometry and will update when you edit the geometry using stretch.
4. By setting your dimension style up properly, your dimensions will all scale to the proper size in your layout.
5. You can create blocks, or use the WBLOCK command to create new drawings, that include both geometry and dimensions. For common details, this can save a lot of time.
6. In order for dimensions to be associated with an object, you must select an object. If you are dimensioning to the middle of walls, for example, dimensions in 2004 may not be associated with anything and will not move when the walls move.
7. There is a long legacy of placing dimensions in Model Space in earlier releases, so people with prior experience are more likely to understand how your drawings are put together.
8. You must remember to turn on associative dimensions (set DIMASSOC to 2) when you open existing drawings from some earlier releases. If you don't, you can place a lot of dimensions that you assume have the new associativity, but they won't.

9. You may find that you often need to update dimensions placed in Paper Space, particularly when using an intellimouse to pan within a view. The DIMREGEN command is designed for this purpose. If you don't notice that you need to use DIMREGEN, you can have dimensions that are not currently connected to the object. If you plot without reconnecting them, the dimensions won't plot in the correct location, a fact that you may overlook on a complex drawing.

10. You also may find that you have to use the DIMREASSOCIATE command fairly often, which is cumbersome.

11. QDIM *cannot* be used from Paper Space.

QDIM is an enormous advantage, particularly when using ordinate dimensions.



3D Dimensions. There are two kinds of dimensions that can be applied to 3D objects.

Dimensions placed on a model being displayed isometrically in Paper Space. Be prepared to override the value if you do place dimensions on an isometric view in Paper Space. They will be the wrong value in Paper Space. You will get the correct value if they are placed in Model Space.

Dimensions placed on 2D projections of an object (Front, Right, Top, Left, Bottom views). Since you can't stretch or edit solid models in a manner that affects dimensions, at least not easily, you might choose to dimension them in Paper Space to avoid using multiple layers for dimensions. However, in release 2000 or 2000i, be prepared to set a DIMLFAC that is equal your intended plot scale factor, if you do place dimensions in Paper Space. That can be done at the command line or using the "Primary units" tab of the Dimension Style Manager dialog box. Scaling is automatic with R2002 through 2006.

Note that you can limit the application of DIMLFAC to only those dimensions placed in Paper Space, a good safeguard. However, I would create an entirely separate dimstyle named "PS-DIM" with that Measurement Scale Factor, rather than modifying the original dimension style. That will reduce the likelihood of using a measurement scale you don't want for full-size dimensions in this drawing, or affecting the dimensions when a drawing is inserted into another one.

Hatch Patterns

Hatch patterns really have to be placed in Model Space. I make the same recommendation I do for dimensions. Don't place any hatch patterns until you set up the layout and scale your various views. Until you do that, you may not know what hatch scale to use in any one view. You also MAY have to hatch the same area twice if it shows up in different viewports with different scales. Use HATCH when you are done designing or creating geometry. It is possible to have hatch patterns scaled to Paper Space automatically, by checking the "relative to Paper Space" option in the "Boundary Hatch" dialog box (see below). Make sure that you have set the scale to 1:1 in the "Scale" window if you use this feature.

Text

Some text goes in Paper Space, and some text goes in Model Space. Put text in Paper Space, at the size you want it to plot (.125", 3mm, etc.), ONLY if it is a general note, title block information, a bill of materials, or other text that is not associated directly with the geometry.

Put text in Model Space if it is associated directly with the geometry – if it is attached to a leader, or the note must be near a particular part of the drawing to make sense (room identifiers, balloon tags, local notes). You can use the LEADER command to place all text for automatic scaling. Just erase the leader if you don't need it. Or you can use 'SPACETRANS transparently when using MTEXT or DTEXT.

DTEXT. Activate a floating viewport from a layout. Issue DTEXT and select a starting point. When prompted for the text height (you will be prompted ONLY if you set the height to 0 when you defined the text), type 'SPACETRANS (Don't forget the apostrophe. Assign this function to a Function key if you use it a lot). Now simply enter the height at which you want the text to plot and AutoCAD will do a conversion based on the ZOOM scale of the viewport.

MTEXT. Do the same as for DTEXT, but when prompted for the "opposite corner" type "H" to select the "Height" options, then use the 'SPACETRANS command in the same way as for DTEXT.

Change Space

A nice trick for getting text or blocks to be the correct size in Model Space, is to place them in Paper Space at your desired plot size (.10 inch for example), then use the Express Tool "Change Space" (CHSPACE at the command line) to move the text into Model Space. It will automatically be scaled to match the plot scale of that viewport. It's nice and quick.

CHSPACE is one of the best reasons to make sure that the Express Tools are loaded when you are working with AutoCAD. If you don't see the pull-down menu "Express," they may not be available. Try typing "EXPRESSTOOLS" at the command line. This will load them if they were installed. If you get the "unknown command" error, get out the original install disk (or get the IT department to do it) and install them. There are dozens of very useful tools in addition to the CHSPACE command that make it worth your while to have Express Tools installed.

Schematic Symbols

Blocks that are drawings of actual objects, like a washing machine, or an anchor bolt, should be created actual size and placed in Model Space at an X and Y scale of 1. Blocks that are essentially schematic, like a valve symbol, or the receptacle symbol on an electrical plan, should be drawn the size you want them plotted, then inserted into Model Space at the reciprocal of the plot scale. A quick way to do this is to insert schematic blocks in Paper Space, and then use the CHSPACE express tool to change them to Model Space. Change Space will automatically scale them to the correct size, just as it will for text.

It looks like you can automate this process using Tool Palettes, but that is not the case. I am hoping that a future release will allow blocks to be scaled automatically when placed in a floating viewport.

What To Put Where – Paper Space

Your title block and border should be in Paper Space. All the titles of views and title block information should also be in Paper Space. Any general notes, revisions, bills of materials and other text that is not associated directly with the geometry should also be placed here. On occasion it will be convenient to place dimensions here.

USING PAPER SPACE – IN THREE STEPS

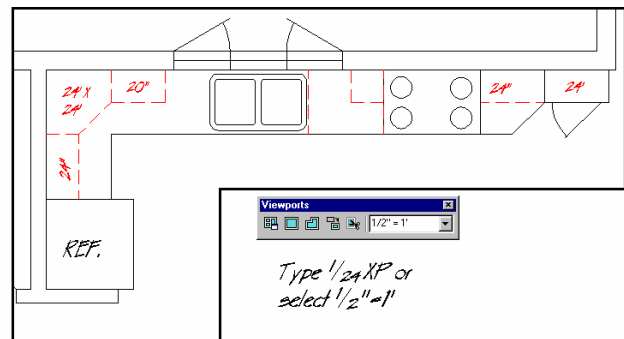
- Step 1.** Create your geometry full-size in Model Space with NO dimensions or hatches.
- Step 2.** Set up your layout with a title block and scaled viewports in Paper Space.
- Step 3.** Add dimensions and hatch patterns, in Model Space, through a Paper Space viewport.

Ok, these are big and broad steps. For more detail see the next section.

USING PAPER SPACE – DETAILED STEP (AFTER taking the preparation steps above.)

1. Create your geometry in Model Space with NO dimensions or hatch patterns. Include object lines, hidden lines, phantom lines, and center lines.
2. Switch to Paper Space using the layout button or the LAYOUT command.
3. Set up the page by selecting a plotter, plot style table and sheet size, making sure that you are plotting the layout at a 1:1 scale. AutoCAD automatically plots at a 1:25.4 scale in 2005 and 2006 if you are in a metric drawing (MEASUREMENT=1) and select a paper size measured in inches. In prior releases, you must select the "metric" option.
4. Immediately insert a full-size border and title block so you can set up your views.
5. Modify the existing MVIEW or create a new one of desired shape and size, and place it on its own layer. Set that layer to "non-plot," or freeze it before plotting.
6. Add other views for details using MVIEW. Place them on the same non-plot layer.
7. Create an appropriate plot scale for each view using the "Viewports" toolbar. Select the edge of a floating viewport and then select a scale.

When you use the XP option of ZOOM you can control the magnification so it matches a plot scale. If you plan to plot your geometry at a 1:1 scale, type 1XP as a ZOOM option. If you plan to plot your geometry at a 1:10 scale, type 0.1XP as a ZOOM option. If you plan to plot a view at a 1/4"=1' scale, type 1/48XP...or just select a scale from the toolbar.



8. Once you have the view you want in the viewport, you should lock the display so you don't use the ZOOM command while in Model Space, which would change your plot scale. Locking a viewport in Paper Space can be done by simply selecting the edge of the viewport and right-clicking (IF you have right-click menus enabled). Display locking is one of the options. You can also lock one or more viewports using the "Lock" option of the MVIEW command. This is NOT the same as locking the *layer* that the viewport is on!
9. Create a dimension layer for each view. When you show two views of the same geometry at different scales, you may end up showing the dimensions intended for one view in another. The

Lost in Paper Space!

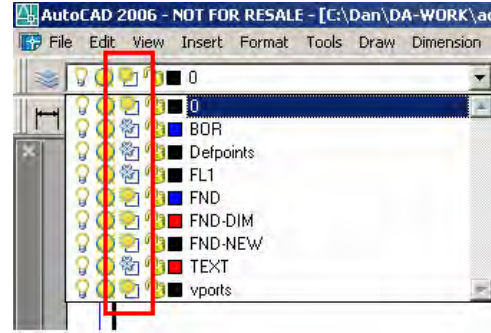
problem with that is that they will appear to be different sizes in each of the viewports, because you have them zoomed to different magnifications. This situation requires that you freeze the layer that the dimensions are on, but **ONLY** in the viewport where you don't want to see them.

This is done using the following steps:

a. Make the viewport active where you **DO NOT** want the dimensions to show.

b. While this viewport is active, use the drop down window in the "Object Properties" toolbar to select the "freeze in the current layer" icon. You can do this in the layer manager dialog box, but this is quicker. You may also use VPLAYER at the command line or within a LISP program, which is much faster.

c. Make a separate dimension layer for detail dimensions and freeze that layer **ONLY** in the main viewport and any others where you **DON'T** want it to be displayed.



10. Add your dimensions in each viewport. If you set up your Dimension Style correctly, they will be automatically scaled based on the ZOOM magnification in each viewport. As a result, all heights will be the same in each view.

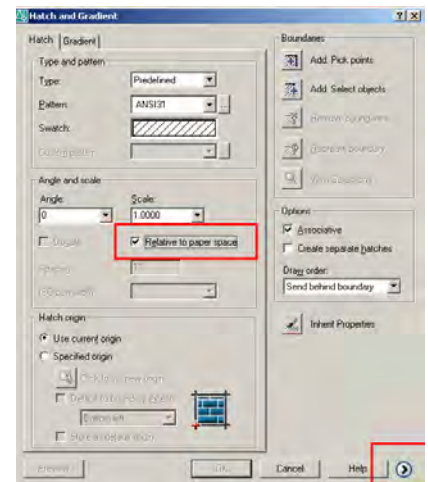
11. Create different layers for hatch patterns in the same way. There is an option for automatically scaling hatch patterns in Paper Space. However, you must be careful when using it. When you check the box shown, make sure the Scale is still set to one. Now, add your hatch patterns in the proper views.

12. Add notes in Paper Space, using full-size (3mm, .125") text.

13. For 3D models only, use MVIEW to control shading.

14. Place all viewports (the viewports themselves, not the contents of the viewports) on a frozen or "no-plot" layer before plotting so they won't plot.

15. User VPLAYER, or the drop-down list in the Object Properties toolbar if you need to manage the visibility of layers in existing viewports. VPLAYER allows you to control the visibility of multiple viewports using wildcards (* for "all," ~ for "all-except").



16. Do a plot preview, check that linetypes and lineweights are correct, and send it off to the plotter, which you have already set up (a topic for another workshop) using plot style tables that are appropriate.

For multiple layouts, just select another layout tab, or add a new one (right-click on any layout tab) and go through the same steps.

Layout Wizard.

Now that you understand layouts, you might want to take a look at the layout wizard. It can simplify the process of using layouts. However, it can also complicate that process if you don't really understand what it does.

So, that's it. You may have to do some training to get everyone comfortable if they have never used this essential feature, or, more likely, are using it badly, but it is well worth the effort.

