



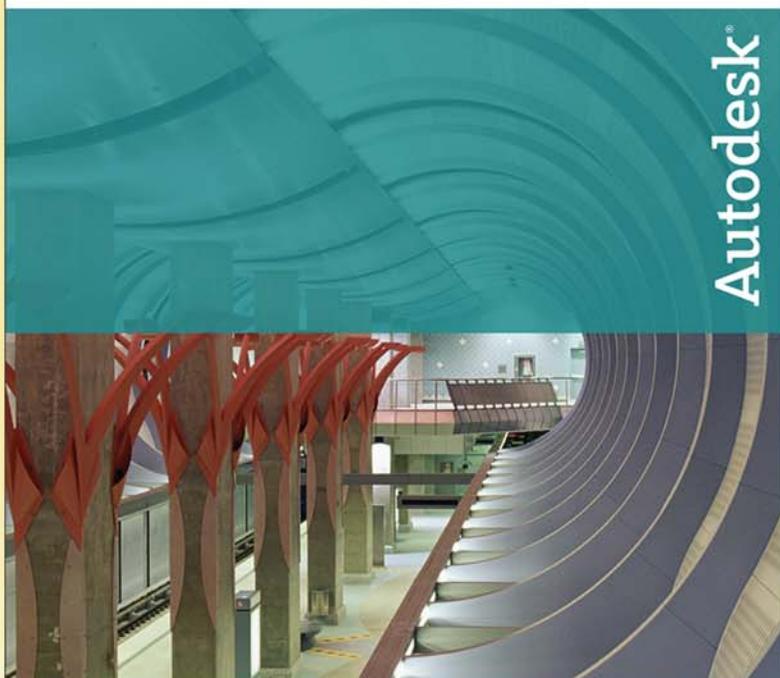
What's New in AutoCAD 2006?

Take a closer look at the newest release of AutoCAD. What's new? What's improved? What's different? This series of articles answers all of those questions, and more

AutoCAD®
2006

Also in this issue

- New Education and Training column
- Nested families in Autodesk Revit
- Is Autodesk Raster Design good for everyone?

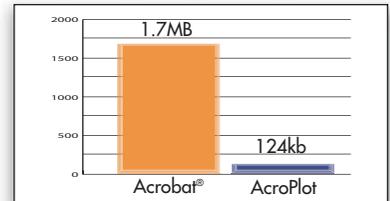




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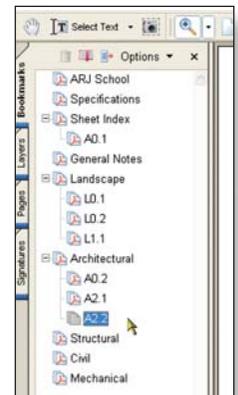
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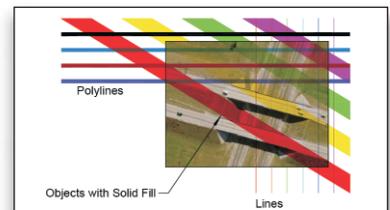


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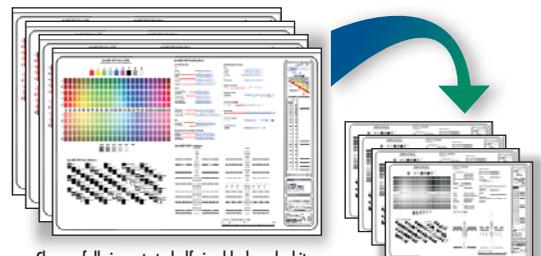
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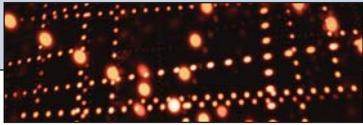
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feature

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What's New in AutoCAD 2006?

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The newest release of AutoCAD offers many new and improved features designed to enhance usability and users' overall productivity. *AUGIWorld* takes a closer look at AutoCAD 2006.

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The End of an Era

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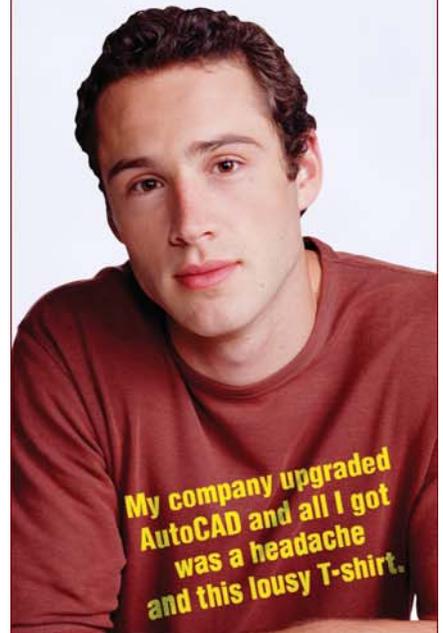
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The Cad Manager



David Harrington

Are you certifiable?

Ok, I don't mean that you might be eligible for the funny farm, where the men in clean white coats force you to have a nice day—every day. No, what I mean is do you have the right stuff? Are you the big dog on your AutoCAD® block?



Well, we all probably think we are, anyway. In most cases the guy with the most years of sitting in front of a variant of AutoCAD is the head cheese. And odds are high that he (and many times, she) in fact is the best leader of the pack. They get the amiable task of upgrades, reinstalling, configuration, customization,

ROI calculations, and the billion “Hey, why doesn't my plot look right?” questions. It's a tough life but someone has to do it.

But how do you know you have the right stuff? Many of the items I just listed are not what you would call a piece of cake to learn. You ever ask your IT manager to configure a Pen Table? Well unless he has a history in the CADD world, he is going to tell you that it isn't his job to do that. And he's right. You use the program every day, right? This should be something you know and can manage. If you ever ask an old-timer where he learned his AutoCAD skills, more than likely he will say, “trial by fire.” Many of the high-end techniques are not anything you will learn in a class. Oh, sure, you may get the basics. But try and

change every odd pen weight in a CTB to be 0.50mm. Hmm, not so easy, is it? Well, if you knew about PCP files you could create one from scratch using Excel where it is easy to build lists of repeating but odd data. Then save that sucker to a PCP text file. And then import it, thus creating a new CTB file. It's good to have a few gray hairs, isn't it? Or in my case, no hair at all. But I digress.

Fairly recently Autodesk has gone about offering official certifications for Autodesk® Architectural Desktop. You can also, if you can pass, get certified in Autodesk Inventor®. You simply schedule it and hit the testing location on the appropriate day and bring your brain. Bingo! Proof you know what the heck you are talking about! Then perhaps people will begin to shut up and stop arguing the intricacies of the Display Manager and just get back to work. I applaud this trend really. But come on, where's the number one Autodesk product, AutoCAD? MIA! It's not there. If my memory serves, the last certification one could get on AutoCAD was Release 14. Way back in the day I took the Level 2 test at an Autodesk University and passed with flying colors. I was so proud! And then AutoCAD 2000 came out. Bummer, it had no certification to go along with it. And none since then! I have a great time when I get a resume and the prospect says he has AutoCAD certification. Oh really? By whom? This is where it usually ends up being a technical school offering. I'm sorry, but that just doesn't cut it for me. Where is the accreditation? How do you compare your “certification” with one that some guy in California has?

In order for any certification to be of any real value, either to the user or the employer, it has to have a standard measure governed by a single source.

In order for any certification to be of any real value, either to the user or the employer, it has to have a standard measure governed by a single source. In this case it should be Autodesk and/or perhaps authorized training centers. Now why doesn't it exist? Well, I can speculate that not enough people did it last time around to warrant the expense of management. It could be that there are so many AutoCAD users (and therefore many experts) that experts who would take the test are not needed as much, or are easier to replace, and probably cheaper then, too. :(

But, dang it, I disagree! It is precisely the experts in this field that keep the ball moving forward. We give Autodesk the ideas for the next release. We beta test it for them to make sure it works well. We write the applications that extend the software beyond the vanilla flavor that 80 percent of us use! The least they can do is give us something that helps us prove to the penny-pinching, AutoCAD-ignorant manager that we know more than every other person in the firm! And we deserve that new Herman-Miller chair! We have been sitting a long time, after all.

Ok, so what do we do now? Well, don't just email me telling me you agree!

Although it is nice to hear from my fellow AutoCAD peers, I have no power in this. Better yet, email me *and* contact your local reseller and pester them! Tell them you want Autodesk to develop and offer a certification program for AutoCAD users. Tell them you want two, no three, levels of certification. Tell them you want an AutoCAD Level 1 Intermediate, AutoCAD Level 2 Expert, and AutoCAD Level 3 God (or Master). Tell them you won't upgrade until you get it! I know this is a lie, but what the heck. Can't hurt.

The fundamental thing is that as AutoCAD continues to improve and be enhanced, the divide between the average user and the super users get bigger and bigger. You know you know more, the Joe User next to you knows he knows less (but he will never admit it). So, I feel Autodesk should help out the guru base that makes this all work by giving us opportunities that help others understand our increased value. Sounds like a win-win to me. To all you experts, enjoy AutoCAD 2006—it has many new and cool features. To all you novices <sigh> please provide your 2006 questions in written form on monetary notes.

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Education and Training



How to Avoid the Pitfalls of Perceived Productivity

It's that time of year again. At the time of this writing, winter is here with a vengeance in New England. The local tradition is to take out your skis and get them tuned up for the season. Not me! I love to ski, but I don't own ski gear anymore. Instead, I rent my gear and take a refresher lesson when I hit the slopes. Why? Because the technology and techniques change every year, and I'd rather benefit from the latest equipment and the one-hour free lesson that accompanies the rental. There's no point in trying to ski my old way with today's high-tech gear. Today's gear practically skis for you, so why would I force myself to ski old school?

The last call for upgrades to AutoCAD® 2000i-based products is over. I hope you took advantage of the upgrades. Now it's time to also take advantage of the features and functionality that will make you and your company more productive. You're not going to use the new version the same way as you used the previous version, are you?

Fact is, companies spend thousands of dollars every year upgrading to the latest software release. But once the upgrade is installed, the users and designers force the software to look and work like the previous version. Hours are spent installing old menus and routines, thus disabling the new features that enable higher productivity. Why? Would you buy the latest high-tech ski boots and slap them on those old wooden planks?

Most companies don't budget for software upgrades, let alone budget for training to maximize the productivity of the software purchase. But software upgrades and training go hand in hand. Proper training is the best investment you can make because upgrading your software does not, in itself,



Why use old techniques with new technology?

Proper training is the best investment you can make because upgrading your software does not, in itself, make you more productive.

make you more productive. So what should you do? How do you learn, adapt, and implement the new innovations in the software? I am going to outline what I consider the key pitfalls when people think they are being more productive. Also, I will outline the steps you can take to leverage the latest technology to your advantage.

Pitfall #1: Using superseded commands

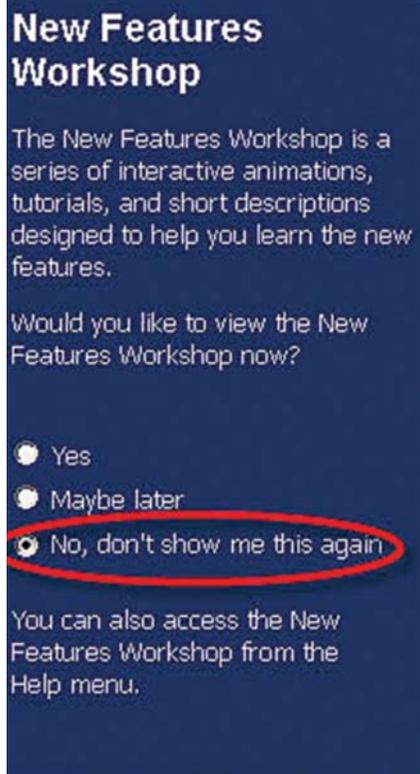
When was the last time you saw someone downhill skiing with wooden skis? I know AutoCAD users who still draw construction lines (like they were board drafting) instead of using object snap tracking. They also use the zoom and pan commands or the scroll bars instead of the Intellimouse wheel. I bet these people still use Vpoint or Dview for viewing 3D wireframe models! Why are they still using these old techniques? Usually it's because they don't know about the new techniques!

A drawback to AutoCAD is that Autodesk doesn't eliminate superseded commands. So how do users know if there is a new and better way?

Pitfall #2: Not knowing what's new

The What's New or the New Features Workshop dialog box is the first thing peo-

ple see when they fire up the new version of the software. It's also the first thing they close. Why? Well, you might feel you just don't have time to learn something new. We often don't like stepping outside our comfort zone. But taking a few minutes now will translate into long-term economies of time. Don't close that box!



Don't say "No!"

But even if you are informed about the new features, there's a difference between having the knowledge and applying it. Incorporating new functionality into your design process is not easy. Once you know what the new feature is, you'll need to try it, apply it, and then adapt.

When the temptation is to go back and "do it" the way you have always done it, you're going to have to change.

Pitfall #3: Not eliminating the repetitive steps

There are many people who still think that speed is the key to being productive when using design software. Speed has nothing to do with being productive. Becoming productive using AutoCAD lies in choosing the shortest and fewest number of clicks, picks, and keystrokes. The way to do this is to eliminate the repetitive steps.

When new features are added to a new version of the software, they are typically added to eliminate many of the repetitive steps that have bogged you down. But it's possible to force these features to work your old way or simply ignore them altogether and try to do it faster. Breaking old habits and old techniques is not easy. You can learn new techniques, but can you apply them? Even if you do, are you using them the way the software was designed?

Pitfall #4: Not getting training from an Authorized Certified Trainer and Provider

I have a friend who has read books about downhill skiing and has watched every winter downhill ski event since he was 12 years old. So now at the age of 36 he knows quite a bit about skiing. But since he has never actually put on a pair of skis, does he know how to ski?

Even the best skiers in the world take lessons and learn how to adapt to the newest and latest technology. They constantly ask the questions, "What's new? How do I incorporate this new technology and technique to improve my ability?" Authorized certified trainers can help you not only learn about the new features, but also how to apply them. The best way to learn how the software should be used is to learn it from an Authorized Training Center.

Preparing an implementation strategy

Next time, I'll take a closer look at how to prepare a personal implementation plan and how to set measurable objectives and goals from your training. I'll also explain the what, why, and how of process-based training and how it will provide the greatest productivity return on your training budget.

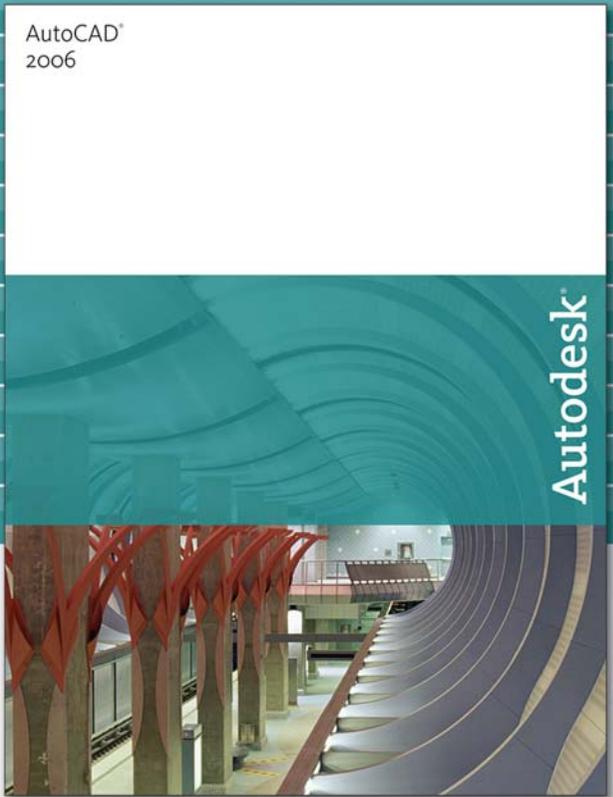
If you're looking for tips to deliver effective instructor-led training, go to www.AUGI.com and watch for my "Training the Trainer" articles in *AUGI HotNews*.

Until next time, don't close that new dialog box!



Matt Murphy, chair of the Autodesk Training Center Advisory Board (ATCAB), is an Autodesk Certified Instructor (ACI). He teaches AutoCAD productivity seminars at Autodesk University, AUGI CAD Camps, and private companies. He can be reached at matt.murphy@ACADventures.com

What's New in AutoCAD 2006?



The newest release of AutoCAD offers many new and improved features designed to enhance usability and users' overall productivity. In this article and others in this issue, *AUGIWorld* takes a closer look at AutoCAD 2006

Just about a year ago, *AUGIWorld* published an article similar to this one about AutoCAD® 2005. AutoCAD 2005 was a worthy follow-up to AutoCAD 2004, but it was still a hard sell for some to convince their superiors to upgrade. AutoCAD 2006 is packed full of changes that just about everyone will use, so it should make it easier for you, the user, to make the case for an upgrade to your boss.

AutoCAD 2005 focused on productivity, but its main focus was on project management with features such as Sheet Sets and Fields. AutoCAD 2006 focuses on productivity and it isn't hard to see that by the changes that have been made. When you first start up AutoCAD 2006 you might not notice much difference right away. That is because the changes are not focused on one specific tool, but on a lot of tools throughout the application.

User interface changes

There have been many changes to the User Interface or UI that offer improvements over previous releases with some new features mixed in. The UI, if you are not sure what it is, is the part of the application that is made up of toolbars, pull-

downs, or even shortcut keys. The first change is one that is quickly noticed when you select a pull-down menu. Figure 1 shows a pull-down menu displaying icons that match those found on a toolbar, which should help new users to learn the different parts of the interface quickly.

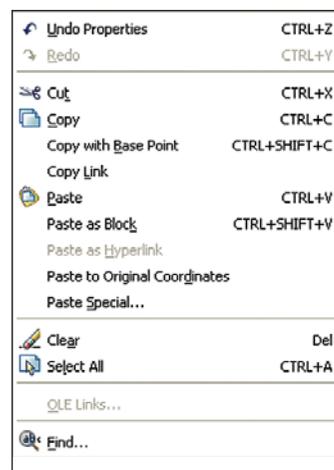


Figure 1: New icons in Pull-down menus

To incorporate an icon with a pull-down menu item, Autodesk created a new file type called CUI. The CUI file format replaces the old MNU/MNS file format for menus. To manage and edit this new file

format, a new authoring tool called CUI or Customize User Interface was created. The CUI allows for the modification of pull-down and shortcut menus, toolbars, shortcut keys, temporary overrides, mouse buttons, screen menus, image menus, and tablets from one, easy-to-use interface.

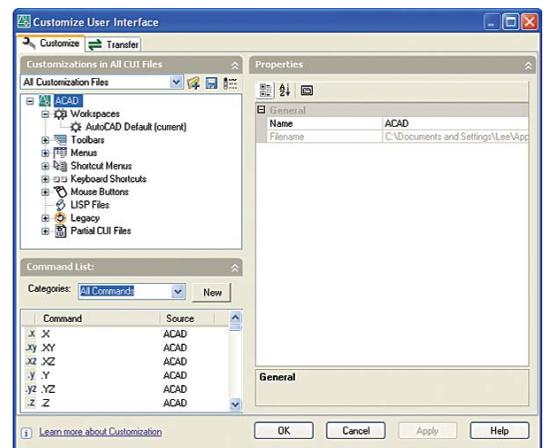


Figure 2: CUI – Customize User Interface tool

Figure 2 shows the new CUI authoring tool. Some other new User Interface changes include the ability to lock toolbars and palettes so they can't be moved, and Temporary Overrides. The Temporary

Overrides feature allows you to press and hold a key combination to override a specific drawing precision tool like Ortho or Snap while you select objects or a point on screen. After the key combination is released, the setting is returned to its previous state. To learn more about CUI, refer to “A Closer Look at the Custom User Interface (CUI)” in this issue.

Getting organized

At the onset of each new year, most of us make plans to do different things such as go back to school, get a job promotion, and others—all with the idea of reorganizing or reprioritizing. AutoCAD 2006 can't help you with those things, but it can help you organize your toolbars, pull-downs, and palettes with a new feature called Workspaces. Workspaces allow you to organize what toolbars, pull-downs, and palettes are to be displayed based on a user-defined name. This allows you to create Workspaces for things like annotating or general design workflow. By being able to easily manipulate the display of many toolbars, pull-downs, and palettes at once, you can quickly regain some screen real estate. Workspaces are created through the CUI tool and can be loaded from the Window pull-down or the new Workspace toolbar shown in Figure 3. To learn more about Workspaces, refer to “A Closer Look at the Custom User Interface (CUI)” in this issue.

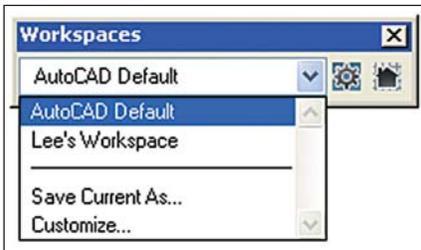


Figure 3: Workspace Toolbar

The Command Line

AutoCAD 2006 has a new feature called Dynamic Input, which brings the Command Line to you. If a command is running and you are prompted for some information or given some options, this information now can be displayed near your crosshairs as a series of tool tips and menu options. Figure 4 shows the use of the Dynamic Input with the Circle command.

The Dynamic Input system has many different settings that control the way it is displayed on screen and how the user inputs coordinates into the fields. The down arrow can be pressed to get a listing of the command options when available.

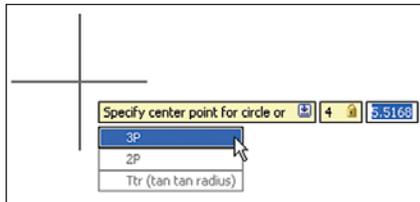


Figure 4: Dynamic Input

There is also a nice feature that allows you to lock in a specific X or Y coordinate value or even an angle. This allows you to fine-tune the entering of coordinates for commands.

Improved commands input

This release is full of small improvements in the area of user input. As you saw with the Dynamic Input feature, Autodesk has made great strides in helping users keep their eyes on the design and not on the Command Line. The input enhancements don't end there; there have been improvements with object selection, too. Autodesk has provided a shading effect during Crossing and Window selections, which gives you more feedback on what is being selected and the area of selection. Along with this visual cue, a feature called Rollover Highlighting has been added. Rollover Highlighting works just like it sounds—as you move the crosshairs over an object, it highlights, giving you a better understanding of what is about to be selected. Figure 5 shows the effect of the enhanced crossing/window selection visual cue and the Rollover Highlighting.

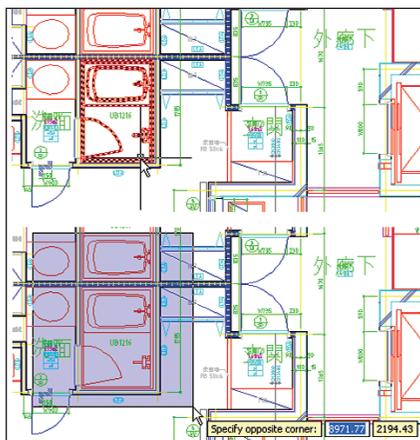


Figure 5: Enhanced Object Selection Tools

Along with the new visual effects for selecting objects, AutoCAD includes a new feature for accessing commands. It is now possible to type the first couple of letters for a command, an alias, or system variable at the Command Line (or

Dynamic Input) and then press the Tab key to cycle through all the commands that match the letter or letters that were typed.

As you can see, there has been a lot of work done in the area of improving user input. One last feature that helps to improve user input is the QuickCalc command, a replacement to the old CAL command. It is now a palette/dialog-based interface that allows for crunching numbers, which can then be passed to the Command Line or a value in the Properties Palette. This new interface has much to offer: from basic to scientific math operations and unit conversions. Refer to the “Quick Calculation (QuickCalc)” article in this issue for a closer examination of this new feature.

Enhanced tool palettes

Among the improvements made to Tool Palettes is the ability to add Text and Separator objects. These two features help to organize tools and place textual notes about tools on the palette.

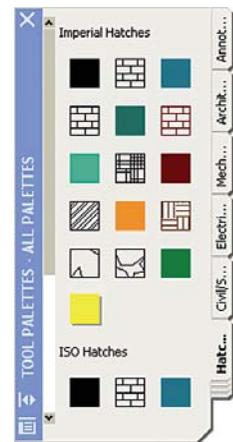


Figure 6: Tool Palettes with Text object

Figure 6 shows the use of the new Text object on a Tool Palette. Along with the ability to add Text and Separators to Tool Palettes, you can select multiple tools with the Control key and change the common Properties for all the selected tools. You also have the ability to update images for block tools and there is a new tool for Dynamic Blocks.

Hatching

Hatching in AutoCAD has evolved over the last couple of releases to help provide some fine-tuning tools and techniques for hatching. AutoCAD 2006 continues to add some very nice features to the Hatch dialog box. Figure 7 shows the new Hatch dialog box layout, which now includes a More Options button just as the Plot dialog box

does. This hides/shows the options that were provided on the Advanced tab in previous releases.

Along with the ability to show more options with an easier to follow layout, it packs some additional options into the interface. The Hatch dialog box allows you to specify an origin directly from the interface instead of needing to change the SNAPBASE system variable before hatching and then having

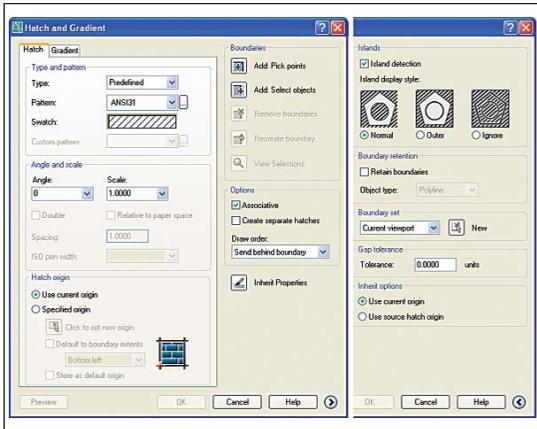


Figure 7: Hatch dialog box can be expanded and collapsed

to switch it back once done. You can now pick several different areas to hatch, but create them as separate objects, which can help to speed up the design process. By far, one of the best hatch enhancements is the improved boundary calculation for off-screen objects.

Annotation with text and tables

You spend so much time producing your design and then you have to place annotation in the drawing. Annotation in AutoCAD 2006 has been improved further over AutoCAD 2005. Mtext has a couple new features to make it faster and easier to

1	2	3	4	5	6	7	8	9	10
SYM.	WIDTH	HEIGHT	STYLE	REF#	MANUFACTURER	QTY	COST	TOTAL	
1	0.900	1.2 m	DOUBLE-HUNG	TH02E10	ANDERSEN	3	188.00	557.00	
2	0.500	1.2 m	CASEMENT	CH14	ANDERSEN	20	159.00	3180.00	
3	1.80	1.2 m	CASEMENT	C34	ANDERSEN	7	249.00	1743.00	
4	0.70	.9 m	CASEMENT	CH12	ANDERSEN	7	159.00	1113.00	
5	0.30	1.4 m	TILT-WASH	DHP1042	ANDERSEN	2	109.00	218.00	
6	1.80	.9 m	CASEMENT	C33	ANDERSEN	1	229.00	229.00	
7	1.40	1.2 m	CASEMENT	W24	ANDERSEN	2	189.00	378.00	
					ESTIMATED COST OF WINDOWS			7368.00	

Figure 8: Table Indicator and Text Formatting toolbar

release, the in-place editor has found its way to the Dtext command, so that some of the tools that are available from the right-click menu for Mtext are now available for Dtext. By using the same in-place editor as Mtext, it is now easier to understand how the text will look in the drawing during both creation and editing.

Figure 8 shows the new Table indicator along the top and left edges of a Table to call out row and column locations like in MS Excel. You might be wondering why this is important. Well, now with Tables in AutoCAD 2006 it is possible to use formulas in cells. The formulas are Field objects and can use cell ranges to do such things as Average, Sum, Count, and reference Cell values.

Improved dimensioning

Every design contains dimensions and AutoCAD 2006 includes enhancements that help to improve flexibility when working with dimension arrowheads and extension lines. It even introduces a couple new dimension types. The Dimension Style dialog box has been changed a little bit to allow for some new features. The Lines and Arrows tab has been split into two different tabs: one called Lines and one called Symbols and Arrows. This is partially due to the addition of a new feature that

Along with the ability to have a different Linetype for each extension line, you can now choose to have extension lines be a fixed length. Using a fixed length allows the extension lines of a dimension to be a specific length from the dimension line, rather than to its origins. To support the new DimArc and DimJogged dimensions there are two new settings under the Symbols and Arrows tab. These settings control the Jog angle for DimJogged and what type of symbol appears with DimArc. After all those changes you might

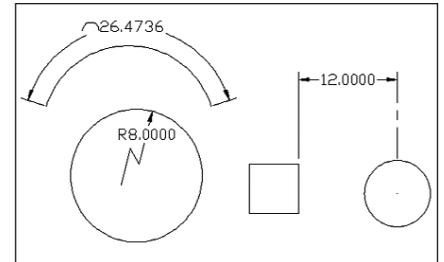


Figure 9: DimArc (upper-left), DimJogged (lower-left) and Linear dimension with different Linetypes and fixed extension lengths.

be wondering what could be left to change in this release, but wait, there's more. An interesting feature for flipping arrowheads around the extension/dimension lines is available via the right-click shortcut menu after a dimension has been selected. Figure 9 shows some of the new dimension features.

Block enhancements

Blocks, which help manage and group geometry together into a single object, have for years been one of the most widely used concepts in AutoCAD. Blocks haven't been changed for some time, until now. Wouldn't it be nice to create one block that could represent several different piping valves or maybe a block that could be stretched to represent different lengths for conference tables? Or how about the ability to move nested geometry in a block, but not have it affect other inserts of the same block in the drawing? Wouldn't it be nice to reduce the number of blocks that need to be managed in your block library?

This, and much more, is possible with blocks in AutoCAD 2006. The new release expands the block concept into a new approach called Dynamic Blocks. Dynamic Blocks are created in the new Block Editor, which allows you to build things such as Lookup lists and determine Grip order/placement. Figure 10 shows the Block Editor with a Dynamic Block open for edit. The Block Editor allows you

AutoCAD 2006 is a feature-rich release that takes many giant steps forward in user input over previous releases.

use than before. These features include an improved formatting toolbar and support for both bulleted and numbered lists. Figure 8 shows the new formatting tools on the Text Formatting toolbar. In this

allows you to assign different Linetypes for each extension line. This feature allows you to use a Continuous Linetype with the first extension line and a Center Linetype with the second extension line that goes through the center of a circle.

to assign different parameters and actions that range in ways to manipulate objects in a block. These actions include moving, scaling, stretching, and rotating, among

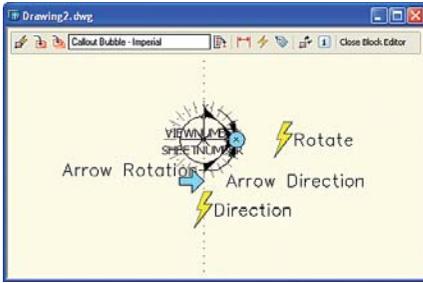


Figure 10: Block Editor for working with Dynamic Blocks

others. The Tool Palette has a variety of Dynamic Blocks that can help you get started learning how to use and create them. You can learn more about Dynamic Blocks by reading "Dynamic Blocks, a New Tool in the Toolbox" in this issue.

Odds and ends

With all the changes—major and minor—in AutoCAD 2006, it is hard to cover them all. Below is a round-up of some of the smaller but noteworthy changes in this release.

Scale List Editing – It is possible to edit the list of scales that appears on the Properties Palette for Viewports, the Viewport toolbar, and the Plot dialog box with the SCALELISTEDIT command. You can add scales that aren't there by default or remove the ones your company does not use.

View Transitioning – Zooming now has a smooth transition effect that allows you to keep your orientation in the drawing. You will no longer get lost when zooming in and out of areas in a drawing.

Join Command – There is a new command called JOIN that allows you to mend lines, polyline, arc, spline, or elliptical arc into a single object. The objects selected must be similar in type and results/steps vary based on what type of object is selected.

Hatch Area – The area of a hatch object is now listed in the Properties Palette.

Improvement of Legacy Commands – You will find some new features hidden in commands that you use every day—from the copy option in the Scale and Rotate commands to the erase and layer options of the Offset command.

3D DWF Publishing – The 3DDWF-PUBLISH command allows you to create a DWF file of your model that can be shared

with your clients. The model can be rotated and viewed in the updated DWF Viewer.

AutoCAD 2006 is a feature-rich release that takes many giant steps forward in user input over previous releases. Everywhere you go in the application you are bound to find an improvement that will help the day-to-day design process. AutoCAD 2006 offers many compelling new features, but doesn't lose sight of basic commands such as Scale and Rotate. We give AutoCAD 2006 two thumbs up!



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What's New in AutoCAD 2006: A Closer Look at the Custom User Interface (CUI)

Flashback... it is November 1994 and AutoCAD® Release 13 for Windows has just been released. Why is this relevant today? AutoCAD R13 helped lay the foundation for the User Interface with which we are so familiar today. Autodesk continued to improve/evolve the User Interface with AutoCAD 2000 and the introduction of dockable tools like Design Center and the Object Properties Manager.

AutoCAD 2004 brought more User Interface changes that helped to give users additional control over dockable tools which became known as Tool Palettes. Palettes could be rolled up to help save screen real estate. AutoCAD 2006 now joins the growing list of AutoCAD releases to include User Interface improvements. This time around, the changes appear to be targeted at further resolving the screen real estate problem and providing some new productivity features.

The dawn of the CUI

AutoCAD 2006 introduces a new file structure to replace the old and aging file structure of the MNU/MNS files, which were used to implement many of the User Interface features since AutoCAD R13 and before. The new file structure is referred to as the CUI or Custom User Interface. CUI was designed to help provide for a cleaner and better way to customize the User Interface. Another reason for the change was to provide a way to track changes for future migrations and help to manage/deploy CAD standards with some greater flexibility.

The CUI Interface appears to be Autodesk's response to user requests for an easier and more intuitive way to customize AutoCAD. The new CUI interface, shown in Figure 1, provides a way to customize Toolbars, Pull-downs, Shortcut Menus, Keyboard Shortcuts, Mouse Buttons, and legacy tools such as Image Menus, Screen Menus, and Tablets. Whereas in previous releases, customization such as Toolbars and Shortcut Keys could be done inside AutoCAD, for others you had to venture

outside of AutoCAD. If you are someone who enjoys customizing AutoCAD, this tool will make things much easier, compared to the steps you had to take before when working with the legacy MNU/MNS files. If you never have gotten involved in customization or didn't know how to get started, this tool will help you to become a customization wizard in no time.

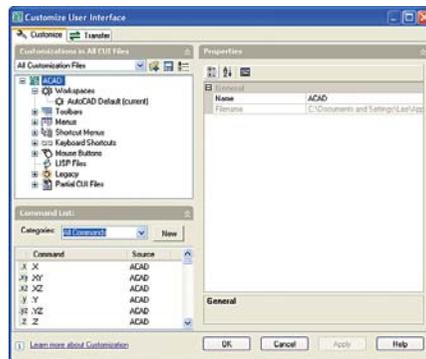


Figure 1: CUI – Customize User Interface Tool

The CUI file structure is based on XML, which is used for some other items in AutoCAD ranging from Tool Palette Catalogs/Content to storing some user preferences. CUI has many exciting features that extend a user's experience with the software. One of the new features that is targeted toward new users is the ability

to display an icon for an item on both the Pull-downs and Toolbars. Figure 2 shows part of the File Pull-down with icons displayed next to some of the items.

CUI, up close

Now that you have an overview of CUI, let's take a look at some of the things that make it tick. Autodesk has provided a collection of tools within the CUI interface that allow you to effortlessly migrate your legacy MNU/MNS files forward to the new file format. Nothing is lost during the migration process.

The main command that you will be using is CUI, which can also be found under Tools>>Customize>>Interface... . There are other commands that you might need based on the level of customization you employ. Table 1 shows the many different commands that you might need or use when working with CUI files.

There is no way to cover all the features that are available in the CUI interface in this small amount of space, so take your time when you are going through the tool at first. Also, don't forget that the online help system is just a click away by using the Help button located near the bottom of the CUI interface. The next two sections will focus on some new concepts that are part of the CUI interface and are designed to help increase productivity.

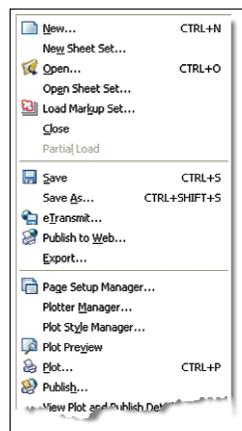


Figure 2: File Pull-down with icons next to menu items

New Command	Description
CUI	It replaces most of the functionality that was in the CUSTOMIZE command. The only feature remaining in the CUSTOMIZE command is Tool Palette groups.
CUIEXPORT	Allows for exporting customization from the Acad.cui into another CUI file.
CUIIMPORT	Allows for importing or transferring customization from a CUI or legacy menu file (MNU/MNS) into another CUI file.
CUILOAD	Allows for the loading of a CUI file or a legacy menu file (MNU/MNS).
CUIUNLOAD	Allows for the unloading of a CUI file.

Table 1: New commands for working with a CUI

Temporary Overrides

For some time now, AutoCAD has had the ability to toggle precision tools On/Off through the function keys on the keyboard or with a click of a button on the Status Bar. This has been a great feature, but at times, based on what task you are trying to perform, you might only want to turn off a specific tool for a moment while you are creating a selection set or picking a point. This process of turning tools On/Off for a moment is what Autodesk is now calling Temporary Overrides.

Temporary Overrides are used when you want to toggle a drawing precision tool such as Ortho off for one or more operations while a defined key combination is being pressed and held down. Before, you would press the F8 key to turn Ortho On, then proceed to pick your second point and then you would turn Ortho back off by pressing F8 again. This new technique will help to reduce the amount of toggling that one had to do in the past.

To use a Temporary Override, start a command such as Move. Select the objects as you normally would and pick the base point that you want to use. When you want to pick the second point, hold down the Shift key and Orthomode is toggled On/Off based on the current setting of Orthomode. You can also use the F8 key as a Temporary Override for Orthomode, too. Now letting go of the Shift key will return Orthomode back to its previous state. You can tell when a Temporary Override is active by a small icon being displayed next to the Crosshairs, as shown in Figure 3. The icon looks like an arrow pointing down over a key. Once the mode that you want to use has been toggled, pick your second point for the move.

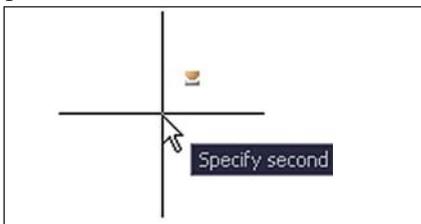


Figure 3: Crosshair with the Temporary Overrides icon displayed

You use the CUI interface to add or modify Temporary Overrides (see Figure 4). Autodesk has provided many different standard Temporary Overrides that most users should find helpful. Some of the default Temporary Overrides are set up to work with Snap, Polar, Orthomode, Object Snaps, and many others.



Figure 4: Part of the CUI Interface showing Temporary Overrides

If you are a huge fan of System Variables, you will be happy to know that there is one to control the behavior of Temporary Overrides. This variable is called TEMPOVERRIDES and has two possible values. A value of 0 (zero) means that Temporary Override is disabled and a value of 1 means that Temporary Override is enabled.

Organizing your space

Do you find yourself turning Toolbars On/Off to perform certain tasks when doing design work and then displaying some additional Toolbars when dimensioning or placing annotation on your design? Or you might be leaving all the Toolbars that you use on your screen during all phases of the design process. If you have a lot of Toolbars and Palettes on your screen, you might find yourself running out of precious real estate for the Drawing area. If any of these statements are true, you have a new friend in Workspaces.

Workspaces are created in the CUI (see Figure 5) and are used to control the display of Pull-down Menus and Toolbars, along with options to control the default behavior of Palettes. There are some additional options for which Workspaces allow, including controlling the display of the Screen Menu, Scroll Bars, and Layout

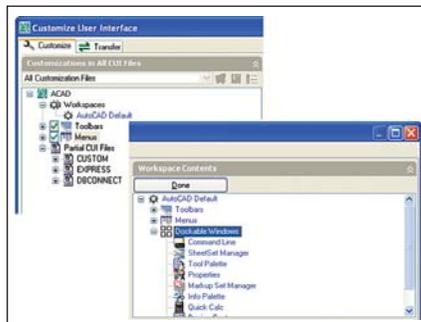


Figure 5: Part of the CUI Interface showing Workspace components

tabs, along with whether a drawing is opened with Model or Paper Space layout set as current. If a Paper Space layout is to be set current, there is no control over which Paper Space layout should be set current from the drawing. Rather, what happens is that the last activated Paper Space layout is set current.

Like most things in AutoCAD, there is almost always a System Variable that controls the behavior or stores a value for a feature. Workspaces are no different; there is a System Variable that allows you to change the Workspace that is currently active. This System Variable is called WSCURRENT. There is also a command called WORKSPACE that allows you to perform some tasks with Workspaces outside of the CUI interface. The System Variable and command allows you to take advantage of this feature in scripts and/or AutoLISP/Visual LISP programs. You might find it easier to switch Workspaces using the CUI interface or the Workspace Toolbar over the use of the command or System Variable. Figure 6 shows the new Workspace Toolbar.

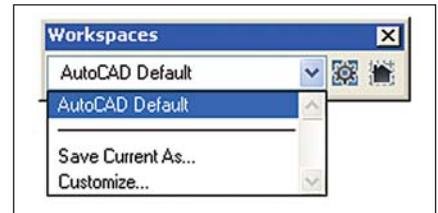


Figure 6: Workspace Toolbar

The three major features discussed in this article will most likely have an impact on all users of AutoCAD 2006 in some way. If you haven't customized AutoCAD in the past, hopefully you will find benefit in the new CUI interface and get started today. As with any new feature, it takes practice to understand the tools and the concepts behind them. So get out there and gain productivity by customizing the User Interface.



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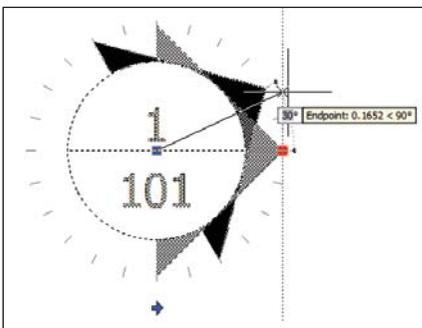


What's New in AutoCAD 2006: Dynamic Blocks, A New Tool In the Toolbox

Blocks are an important part of the tools available to you in AutoCAD®. Take a moment to think about your toolbox at home. Twenty years ago, would your toolbox have included bit drivers, self-adjusting wrenches, or laser levels? The same way that the tools in your toolbox have evolved, your tools in AutoCAD have also.

AutoCAD 2006 introduces Dynamic Blocks. These dynamic blocks will be somewhat familiar to users of the vertical products such as Autodesk Architectural Desktop or Autodesk Building Systems. Yet they represent quite the enhancement for users of AutoCAD. What are dynamic blocks?

Traditional blocks in AutoCAD are similar to the screwdrivers in your toolbox. You need a different screwdriver for each type of screw. Wouldn't it be great if you had one tool that could be modified to handle each type of screw? That tool is the bit driver. You alter the tool by changing the bit from a standard head to a Phillips head. One tool, multiple variations. Dynamic blocks are blocks that can be dynamically modified to represent different variations of the block.



What are the benefits?

- Simplify block management
- Streamlined block insertions
- Flexible in-process design changes
- Block authoring tool

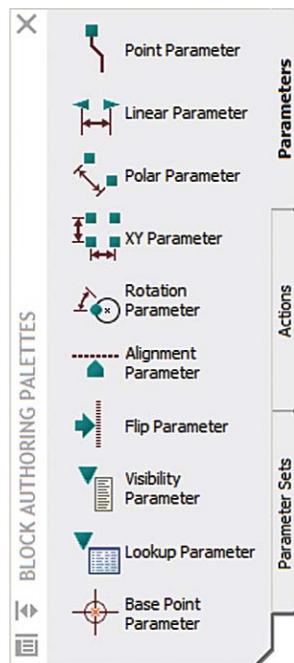
What makes a block dynamic?

Blocks are made dynamic by the addition of parameters and actions. These fea-

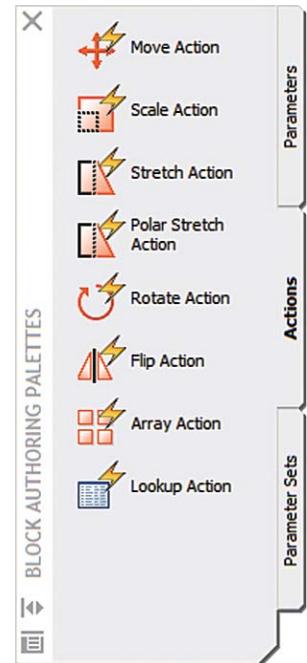
tures are added and modified in a new AutoCAD tool, the Block Editor (BEdit). Once those features are added, the inserted block can easily be changed while you work. You modify the inserted block's appearance using custom grips or properties. This allows you to modify that specific insertion of the block rather than searching for a matching static block in your library.

Parameters add custom properties to the block. They may also add custom grips to help the user change the properties by using the grip. Actions are the instructions for modifying the dynamic block when a property is changed. Parameter Sets combine parameters and actions into one easy-to-place set. These three groups are available in the Block Authoring palettes that appear when you enter the Block Editor.

Parameters available include: Point, Linear, Polar, XY, Rotation, Alignment, Flip, Visibility, Lookup (think of lists of specific values), and Base Point.



Actions for those parameters are: Move, Scale, Stretch, Polar Stretch, Rotate, Flip, Array, and Lookup.



Simplify block management

No doubt you have quite the library of blocks that you use project after project. Many of those blocks are similar to other blocks. For instance, the firm I work for has 14 different blocks to represent the types of push buttons used for control panels. Now I am able to accommodate all 14 variations with one dynamic block!

In your own library of blocks, several blocks are probably similar. These are perfect candidates for a single dynamic block. Other candidates would be blocks that have limits on their dimensions. Parameters such as Linear and Rotation can be limited to a specific list of predefined values, or an incrementing value (with possible max/min limits).

Streamlined block insertions

The Alignment and Point parameters add some exciting abilities to dynamic blocks. These two parameters can affect the block during its insertion.

The Alignment parameter detects when the block is inserted on another object in

the drawing and aligns the entire block to that object. For instance, inserting a sofa along a wall will automatically align the sofa to the wall.

Both the Alignment and Point parameters have a property named Cycling. When that property is set to 'Yes' it allows the user to toggle the insertion point of the block to those parameters within the block. An example would be a valve symbol that not only has an insertion point in the middle of the symbol, but also at each end of the valve.

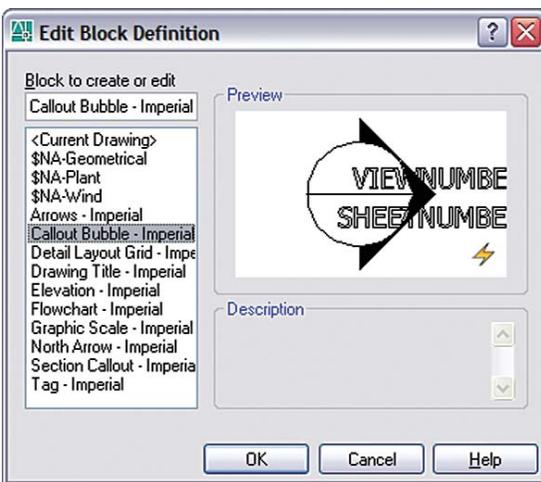
Flexible, in-process design changes

Changes occur throughout the entire design process. While static blocks make the initial work of placing geometry easier, modifications to the design are more complicated. For instance, you need to change a valve symbol from a gate to a butterfly. Your options with a static block are to either erase the old block and insert the new one, explode the block (CAD Managers everywhere shudder) and modify the geometry, or run some customization to swap the blocks.

A dynamic block changes everything. You would simply pick a Lookup grip on the valve symbol, select the butterfly valve, and the block's appearance would change.

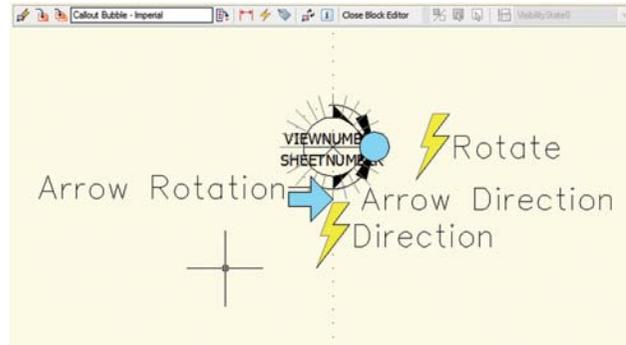
Block authoring tool

A new interface, the Block Editor, was developed to help you create dynamic blocks. You may select blocks defined in the current drawing, or the current drawing itself, in case the drawing you have open is actually the block definition.



After you select the block, the block's geometry will be displayed in the Block Editor window. By default, the Block

Authoring Palettes will open up. Those palettes offer the easiest way to add parameters and actions, or the combina-



tions offered in the Parameter Sets palette.

There are also 17 new commands and a new toolbar that are only available while in the Block Editor:

There is a new field named BlockPlaceholder available under the Object category. All the parameters you add to a dynamic block will appear in the 'Block reference property' list.

Note that if you modify a dynamic block's properties, the changes won't be reflected in the field until a regen is performed (or whatever setting you have applied to Field Update Settings

under Options).

Counting dynamic blocks

You can count (extract) the variations of a dynamic block based on its properties.

The same way that the tools in your toolbox have evolved, your tools in AutoCAD have also.

Additional notes

Legacy AutoCAD

You may be wondering how dynamic blocks will appear in older versions of AutoCAD. Obviously, there is no way to dynamically alter the block in older versions. However, the display of the block insertions as they were in AutoCAD 2006 will be unchanged. Whatever you saw in AutoCAD 2006 will be what you see in AutoCAD 2005 (or earlier).

In addition, those dynamic blocks will list as anonymous blocks. That way they will still act as blocks, including attribute support. If you try to insert the block using an older version of AutoCAD you will not see the block name. Remember, the block is anonymous in older versions of AutoCAD and you cannot use the Insert command to place anonymous blocks. However, you can copy an existing insertion without any issues.

Attribute support

Attributes can be modified automatically using a dynamic block's properties.

Therefore, even though there are multiple variations of a specific dynamic block name, you can "drill down" into the specific properties of the dynamic block.

Migrating to dynamic blocks

You can modify your existing blocks to be dynamic. When you save your changes in the Block Editor, all the custom properties you defined will appear on existing insertions of the block.

Wrapping it up

Blocks are no longer just a static, stale representation of some geometry. Now they are dynamic and interactive. You will reduce the size of your block libraries, improve your productivity while inserting blocks, and simplify design changes.

Dynamic blocks is a tool that deserves to be in every AutoCAD user's toolbox.



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is on the AUGI Board of Directors and can be reached at robert.bell@augi.com



What's New in AutoCAD 2006: Quick Calculator (QuickCalc)

One of AutoCAD® users' most-requested tools throughout the years is an improved calculator. Notice I said an improved calculator and not a calculator feature. AutoCAD has had a calculator feature for quite some time, but, frankly, it is showing its age and many users have been resorting to using an external calculator for years. Autodesk has decided to include an improved calculator feature in AutoCAD to help workflow. In this new version, called Quick Calculator or QuickCalc for short, Autodesk sure hasn't held back anything. Both the old and new calculators do a similar job; QuickCalc does a better job of getting the task done efficiently. If you have been using the calculator that comes with Windows, you will find QuickCalc to be similar.

started, you can use the QuickCalc command or select QuickCalc from the Tools Pull-down. Like most Palettes and the old AutoCAD calculator command, the QuickCalc command can also be executed transparently. This allows the command to be an aid in responding to the current command. To use the QuickCalc command transparently, simply add an Apostrophe in front of the command, like this: 'QuickCalc.

Scientific section called r2d and d2r, which are used to convert from Radians to Degrees and Degrees to Radians.

Just below the Scientific operations is a section that is nice if you need to work with different types of units. This feature was not found in the old CAL command. Up until this point, you had to use an AutoLISP function called CVUNIT, which required you to know a specific syntax to convert from one unit to another. If you didn't use the CVUNIT function, you might have used a utility from the Internet to do unit conversions or perhaps you did the conversion manually.

The type of units I am talking about are not from Decimal to Feet and Units, but rather from Meters to Feet or Inches. There are four categories of Unit types available: Length, Area, Volume, and Angular. Figure 4 shows the Unit

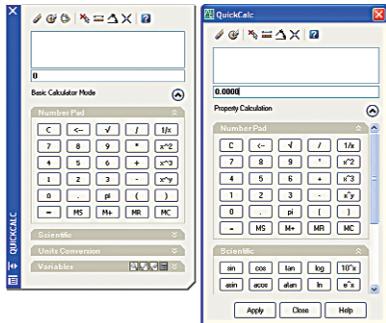


Figure 1: QuickCalc – Quick Calculator is available in two command modes

As you can see in Figure 1, Quick Calc is well designed. Figure 1 shows the two different states of the QuickCalc command interface. The interface can be displayed as a modeless palette, so you can perform some serious number crunching whether or not a command is running. Based on what command is running or how the QuickCalc command was initiated, you might be working with the modal dialog box interface. The dialog box interface is common if you launched the QuickCalc command transparently during a command or selected the calculator icon in the Properties palette. This is done so that AutoCAD understands where the result should be sent when the Apply button is clicked.

I'm sure you're itching to find out what the Quick Calculator has in store. To get

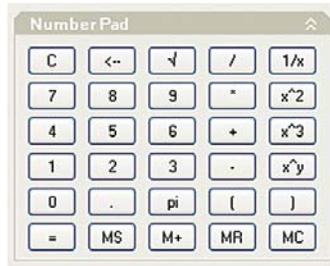


Figure 2: Basic Mathematic Operations

So now that you know how to access the QuickCalc command, I'm sure you're wondering what you can do with it. Because it is a calculator, obviously you have the ability to do basic mathematic operations. These operations are found in the upper portion of the interface under the NumberPad section. Figure 2 shows the basic math operations that range from simple addition to grouping and even exponents.

The basic math operations are a very nice start, but there is more to this interface. It has several different sections of organized tasks. The next section of the interface contains Scientific operations. Figure 3 shows the Scientific section of the QuickCalc interface and as you can see, there isn't much that has been omitted. Some of the operations you will find under this section are things like Cosine (cos), Sine (sin), Tangent (tan), and Absolute (abs). I like that Autodesk included two buttons in the



Figure 3: Scientific Mathematic Operations

Units Conversion	
Units type	Length
Convert from	Meters
Convert to	Meters
Value to convert	0
Converted value	0

Figure 4: Unit Conversion

Conversion section of the interface. You will find that most of the common formats are available for the Convert from/to values.

The final section, located near the bottom of the QuickCalc interface, is for working with custom Variable Definitions. The two types of definitions that can be created and stored for future use are Constants and Functions. You will most likely create constants for use in the future. Autodesk has provided many different default constants and functions for use. If you used the old CAL command in the past, you will be glad to know that they have included many of the functions that were previously available. Some of these functions are Midpoint between two Endpoints (MEE) and Distance between two Endpoints (DEE).

Figure 5 shows the Variables section of the QuickCalc interface. To create or modify a constant or function, you will be using

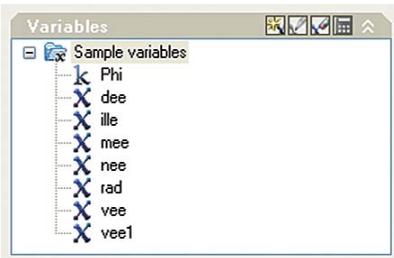


Figure 5: Custom Variables and Functions

the buttons located in the roll-out for the section. To create a new variable, click on the button that looks like a burst with a diagonal line below it—this is the one located on the left. Clicking this button launches the Variable Definition dialog box shown in Figure 6. Your custom variable can have a name, description, and a group name for organization in the tree. To edit a variable, highlight it in the tree under the Variable section and click the second button from the left. This will load the variable into the Variable Definition dialog box. The third button allows you to remove a variable from the tree. The fourth button or the one furthest to the right simply adds the value stored in the



Figure 6: Variable Definition dialog box

variable to the Input Area located near the top of the interface.

Because QuickCalc is designed for use in AutoCAD, you might have noticed that there are some tools located near the top of the interface. These are special tools to get some input from the AutoCAD drawing editor and to work with the Input and History areas near the top of the interface. Figure 7 shows the top area of the QuickCalc interface more clearly.

The two buttons on the left near the top of the interface are used to clear the Input Area or the History Area. The one that looks like a pencil with an eraser on the end is the button used to clear the Input Area, while the one that looks like a gold disk with an eraser is used to clear the History Area. The four buttons in the middle are used to interact with the drawing



Figure 7: Top portion of the QuickCalc interface

editor. The buttons from left to right are used for the following tasks: Get a Coordinate (or pick a point), Distance Between Two Points, Angle of Line Defined by Two Points, and Intersection of Two Lines Defined by Four Points. The tool furthest to the right really doesn't need much explanation as it is used just about everywhere in the software, but nonetheless is the Help button.

Using results from the QuickCalc Interface

There are many different ways to use the result from the QuickCalc command. If you are in the dialog box interface, click the Apply button to return the result to the calling command. Another option is to select the value in the Input Area and then copy/paste it to the command line or place it in a control on a dialog box. Both of these options will be the most logical to use. However, a new feature called CalcInput in AutoCAD 2006 works in conjunction with QuickCalc.

CalcInput allows you to assign a point, real or integer to a variable that can then be used in most text box fields in dialog boxes within AutoCAD. To use this feature you need to first assign the result to a variable. To create a variable, type the name of the variable preceded by an equals sign (=). The variable and equals sign must be placed in front of the result in the Input Area. These variables are then created as AutoLISP variables and can be used in a dialog box, Properties palette, or the old CAL command. To use the variable in the Properties palette, for example, place an equals sign (=) in front of the variable name and then press the End key on the keyboard to have it evaluated. Figure 8 shows creating a variable in QuickCalc and then using it in the Diameter property of a Circle loaded in the Properties palette.

Below is a simple example of how to use the QuickCalc command with the Circle command.

1. Start the Circle command, use any method that you normally would use.
2. When prompted to select the center point of the circle, pick a point in the drawing.

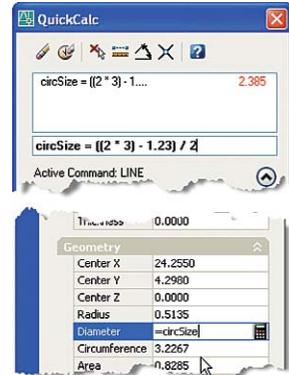


Figure 8: Creating a variable and then using it in Properties palette

3. Since there is a command in progress, we need to call the QuickCalc command transparently, so type in 'QuickCalc or 'QC at the command line when prompted for the radius.
4. The QuickCalc modal dialog box is displayed on the screen. You can use the click the buttons to input the values or type directly in the Input Area. Use the method you feel most comfortable with, but get the value $((2 * 3) - 1.23) / 2$ into the Input Area.
5. Press the Enter key to have the input string evaluated. The result will be placed in the Input Area and placed up in the History Area.
6. Click the Apply button to assign the value to the radius prompt of the Circle command. The Circle command is completed as that is the last prompt that needed to be answered.

As you can see, the new calculator is greatly improved and is tightly integrated into the AutoCAD environment. Experiment with the QuickCalc interface and further investigate the options available to you. This feature does take a little bit of getting used to, but once you grow accustomed to it, you should find that the workflow becomes more streamlined than using an external calculator.



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Making AutoCAD Scream: *Counting Bytes*



» When I first started learning AutoCAD, my thirst for learning was unquenchable. Besides a full curriculum in Engineering Design, and seven semesters of applied AutoCAD, I sought as many outside sources as I could find.

I sought books at the bookstore and purchased four magazine subscriptions. As I devoured each one I kept searching for more sophisticated sources to satiate my need for learning. Understand, we were using the original IBM PCs (8088), and there was NO Internet. In fact, when Prodigy and CompuServe (forerunners of the Web) emerged, I started up my own users' groups immediately.

When I learned of AutoLISP, I discovered a whole new world opened before me and my thirst for knowledge was about to

join a feast. Often I am asked the best road to travel when studying this powerful language. Surely the best path will always change, but the road I took was very comfortable.

You should know that every copy of AutoCAD since R9 has come with a LISP tutorial called "Down the Garden Path." This can now be found either on a tutorial CD, in the Customization Manual, or in the Help/Contents section of VLIDE. Another good starter is a book called *AutoLISP in Plain English* by George O. Head. This was a great way to

be escorted through my dedication to learning a new language.

Eventually I would turn to more advanced teaching such as *Inside AutoLISP* by New Riders Publishing, but now I had my plate full of exploring. Each day became more exciting as I developed more new techniques to make AutoCAD Scream. We needed it.

Computers and plotters were slow and memory was tight. We were cognizant of the limitations and were merciless in scraping away every wasted byte so that we could fit as much power as possible into

our small spaces. Today, we have machines that are THOUSANDS of times more potent, so we can sit back and let efficiency falter a bit...or can we?

Efficiency examples

Let me give you some examples. When you create a variable name, you can fit up to six characters in the first byte of data, but when you add a seventh or more, you add extra bytes. Of course, you want to make the variable recognizable, but usually this can be done in six characters. You might say, "Who cares about one extra byte? I have millions." Well, add an extra byte for each time that seventh character is added, and variable used. Multiply that times the hundreds of routines you might have, and backup files, and it starts to add up in memory, speed, and storage.

Still, are we talking large quantities? We are if every application, every data file, and every author were wasteful of a "few mere bytes." However, there is more.

It is very common in AutoLISP to see a sequence similar to the following, used to identify the layer of a selected entity:

```
(Setq ssl (entsel))           ; select object
(Setq ename (car ssl))       ; get its name
(Setq elist (entget ename))  ; save the raw data
(Setq llist (assoc 8 elist)) ; get the layer field from
the data
(Setq lname (cdr llist))     ; the layer name from the
field
```

Now we have a variable "lname" that contains the name of the layer of a selected entity. So, what's wrong with this picture?

First, if the intent is only to obtain the layer name from a pick, we have far too many SETQs. Since SETQ will accept any EVEN number of arguments, the variable assignments could be grouped together under one SETQ like this:

```
(Setq  ssl (entsel)           ; select object
      ename (car ssl)         ; get its name
      elist (entget ename)    ; save the raw data
      llist (assoc 8 elist)    ; get the layer field from the data
      lname (cdr llist))      ; the layer name from the field
```

We save 23 bytes this way. Remember, this is a very common sequence and could happen again in the same routine. It certainly will happen in many other routines.

Continuing with the premise that we are only seeking the layer name, do we really need all those variables? In this case they are only used to save data for use in the next operation. We can eliminate most of them:

```
(Setq lname (cdr (assoc 8 (entget (car (entsel))))));
layer name from a selection
```

Another 19 bytes bites the dust

Here someone might say, "Well, my routine needs the elist variable for use elsewhere in the routine." That's a piece of cake. Nest it!! Like this:

```
(Setq lname (cdr (assoc 8 (setq elist (entget (car
(entsel))))))))
```

Now you have two variables "lname" and "elist" trapped from a single line of code and using 36 less bytes than the original

example. Mind you, this can add up. There is yet more... Oh boy, is this fun?

Over time, LISP programmers discover many such sequences and develop a library, partly from having to re-type the code, partly from having to re-think the code, and partly to save bytes. Our example here can further serve to show how such libraries can be created:

```
; Layer name from a selection
```

```
(Defun GETLAY () (Setq lname (cdr (assoc 8 (entget (car
(entsel)))))))
```

Now whenever a routine needs to obtain layer data from a selection, as long as this part is loaded, it need only be called by its new name, GETLAY. Since your LISP routines likely do this quite frequently, it is not a bad idea to keep this in your master LISP file and replace the sequence with (GETLAY). For example, here is a function that sets the layer of a selection set to that of another selected entity:

```
(Defun c:CLA ()
      (Setq ss (ssget)
      (command "change" ss "" "p" "la" (getlay "")))
```

OK...before you tell me that Express Tools and Matchprops does this already remember that this was written 16 years ago, before those tools, and it is still as valid today. The point is the simplicity and efficiency. Here is another example:

```
(Defun c:CCL () (command "-layer" "s" (getlay "")))
```

This sets the current layer to that of a selected object. Way cool, elegant in its simplicity, tight in code. Are you starting to get the picture? I can take this even one step further:

```
(Defun GESP()(setq ELIST(entget(setq S1(car(setq
ESP(entsel))))))EP(cdr esp)))
```

This is my universal GET from a single pick. From one pick, it saves the Point/Entity of the pick in ESP (useful in OFFSET), the Entity in S1, the Point in EP and the raw data of the entity in ELIST.

One final idea before closing for this issue. These lines can be placed (along with GETLAY and GESP) in your master LISP file:

```
(Setq ? pause # "erase" : copy % mirror); add your own
(Defun ss (setq ssl (ssget)); save selection set as SS1
(Defun C6 (a1 a2 a3 a4 a5 a6)(command a1 a2 a3 a4 a5 a6);
I have seven of these
```

This allows you to write routines like this COPY-TWICE:

```
(Defun c:CP2 () (ss)(C6 : SS1 "" ? ? ?))
```

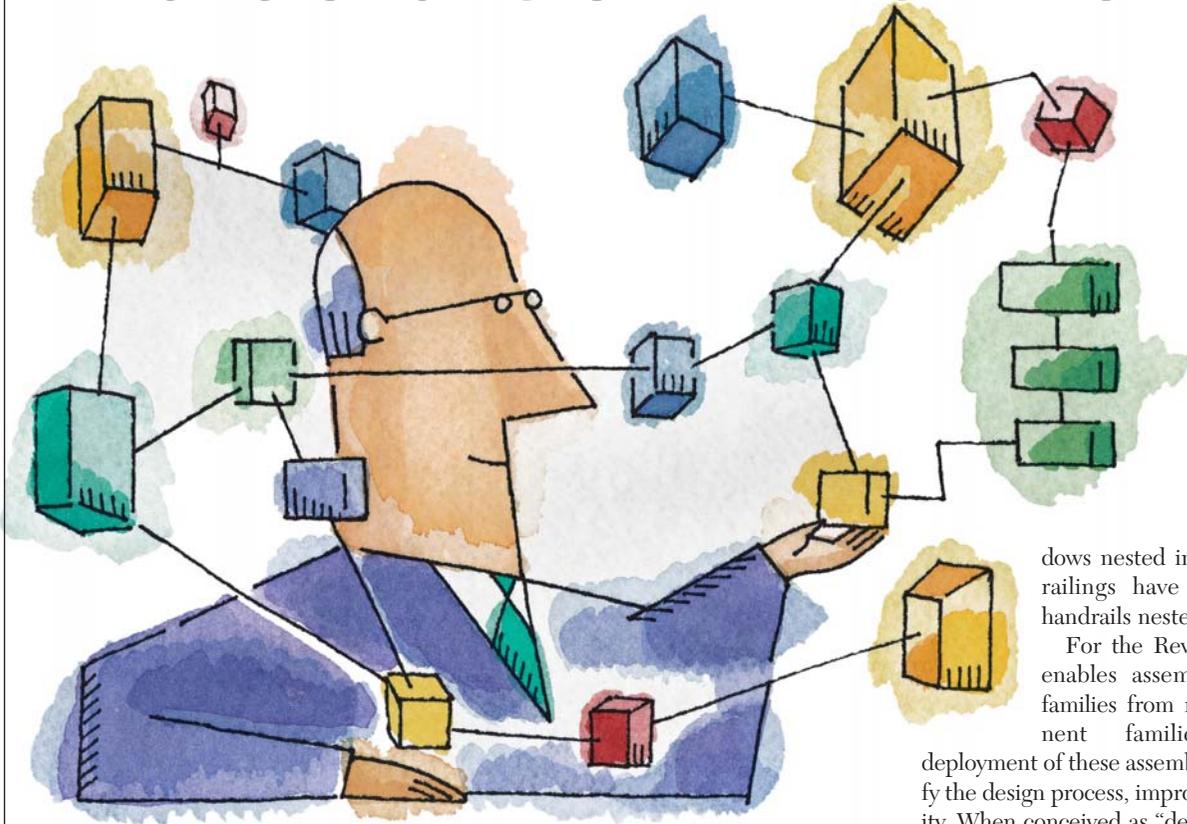
Tight!

Warning! Using these techniques will limit the portability of your routines. When sharing, you will need to either translate them or include the lines that are called. However, when applied to your own personal files, they become a fine road to efficiency and another method for Making AutoCAD Scream.



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Nested Families in Autodesk Revit



Introduction

For the typical Autodesk® Revit® user, building component families are a valuable resource, providing parametrically controlled windows, doors, or furniture. Recent releases of Revit have included a little-known, but powerful feature for families—“family nesting.” Nesting allows one family to incorporate other families

within it—a family within a family. While it is NOT true that “the possibilities are endless,” nesting provides some intriguing opportunities.

Examples

In a way, Revit has always included nesting. A Revit project has wall “nested” into it. And the walls may have doors or win-

dows nested into them. Even railings have balusters and handrails nested within them.

For the Revit user, nesting enables assembling complex families from reliable component families. Effective

deployment of these assemblies can simplify the design process, improving productivity. When conceived as “design options for families,” nesting can be used to facilitate client collaboration in the design.

Figure 1 – Door with transom options, shows a door family that includes three transoms. A more complex nested door could include options for sidelights.

Figure 2 – Door with glass options, demonstrates optional leaded glass configurations.

Figure 3 – Lamp with shade options, shows only two possibilities. However, it may be possible to create a “super lamp” that includes choices for bases, posts, and shades, multiplying the design options.

Figure 4 – Casework with hardware options, shows how changing hardware could be as easy as changing the material on project casework.

Additional examples (not shown) are a retail sign with graphic options, a retail fixture with product display options, a window with mullion options, or a light fixture with diffuser options.

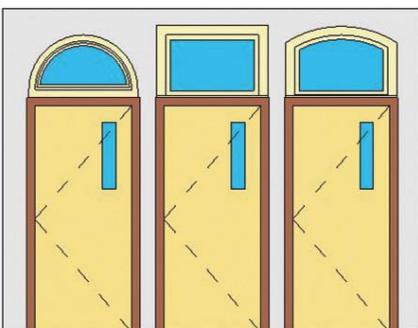


Figure 1

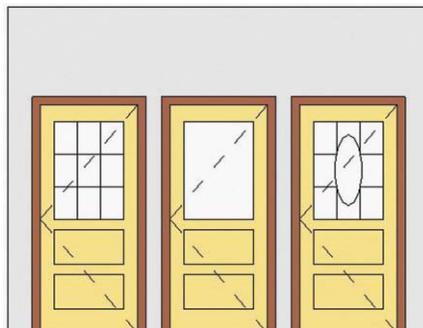


Figure 2

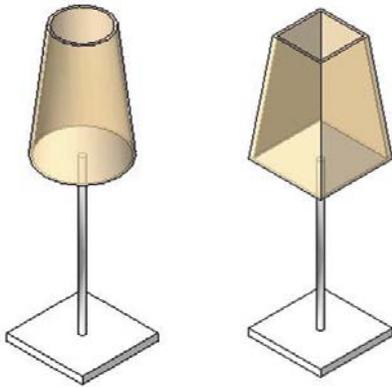


Figure 3

Nesting step-by-step

To begin creating your own nested families, start with the tutorial, "Working with Nested Families," that is included in the Revit installation. We will not duplicate details from the tutorial here. Rather, our outline summarizes the steps and offers some guidance not included in the tutorial. It is highly recommended that you complete the tutorial before creating your own nested families.

From an overall perspective, the nesting process is simply "Create Them, Nest Them, and Test Them." In the details, it's a little more complicated:

Plan & Design – The first step in creating nested families is to understand the goal. What should this family look like? How should it behave in the project? What parameters need to be shared between parent and child families? Is the increased file size of the family worth the payoff in ease of use?

Create Parent Family – Create the family that will have other families nested within it. This is the "Parent" family. Fully test the parent family in the family editor and in a sample project.

Create Child Families – The idea of nesting implies more than one nested component. Create each of the child families with consistent geometry and parameters. Fully test the child families in the family editor and in a sample project.

Load the Children – Load all the child families into the parent family. Select one child family in the project browser and insert it into proper position in the parent.

Link Children to Parents with Type Parameter – Select the child object that is inserted into the parent family and create a family type parameter. This new parameter will automatically link all the other children into the parent. Using the Family Types dialog for the parent, test to be sure the model changes from child to child as expected.

Associate Common Parameters – Some parameters are (or should be) common between the parent and child families. For example, for a door with a transom, the width of both objects needs to be the same. This is accomplished by "association." Using the project browser, select each child, in turn, and modify the child's Width parameter to associate it with the parent's Width parameter. Refer to the Revit tutorial for detailed instructions.

Test in the Family Editor – Flex the parameters of the parent to be sure each combination works as expected with each child family.

Test in a Sample Project – Load the parent family into a sample project and flex both dimensional and child-selection parameters.

Scheduling

The Revit tutorial on nested families exposes a potential complication in scheduling. If the parent and child are of different categories, the default schedule will list the parent's parameters without the "Child Option." In the case of the door-with-tran-

som, the transom will not show in the door schedule, because it is a window.

The way around this problem is to add a shared parameter to the parent family. This is accomplished in three steps:

1. In the Family Types dialog, change the "Child Type" parameter to a shared parameter.

2. Create a shared parameter text file and save it in the same folder as the parent family. Be sure to select the category that matches the child family's category.

3. Create the parent schedule and select the "Child Type" as one of the available fields.

Tips and tricks

Creating a nested family using the Revit tutorial seems simple, and it is. However, there are a few tips that help ensure a trouble-free nested family.

Start at the end – If the parent and child are of the same type, like our lamp example, first create a combined assembly, (in this example, a lamp with a shade). Then use "save-as" to save a parent family. Next, use "save-as" to save a child family. In the parent family, delete the child geometry. In the child family, delete the parent. This can simplify creating consistent, aligned geometry.

Align and lock – When inserting the child into the parent, the align tool to position the child's geometry to the parent's reference planes. Then lock the lock. This will keep the child component flexing properly with the parent.

Multi-view editing – When working in the family editor, "tile" the windows for Front, Left, Top, and 3D views. The multiple views will help in aligning geometry.

Flex the model – Experienced family modelers know the importance of catching problems at the earliest stage. Flex the model for each component at each stage of development. Flex to extremes of size in both the family editor and in a sample project before adding the nested family to the production library.

Extensions

Since it is possible to nest a family into another family, it may be possible to create multi-level nests. Maybe the possibilities ARE endless.

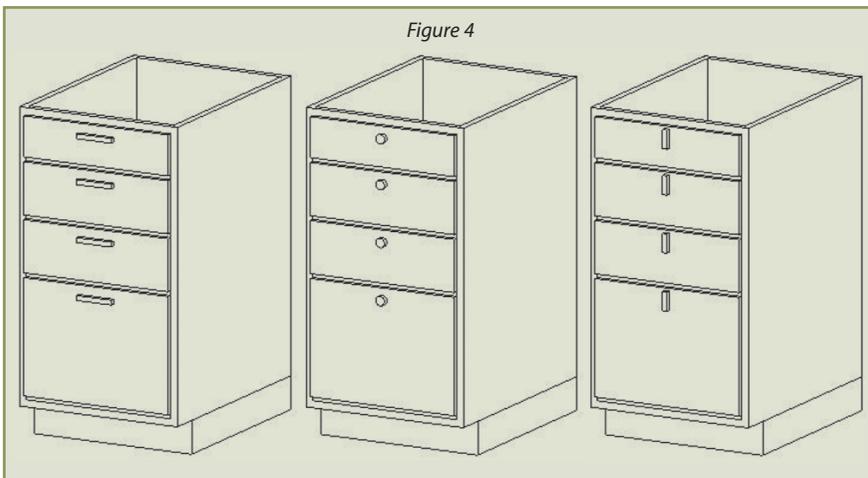


Figure 4



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Autodesk Raster Design: Is it Good for Everyone?

Almost everybody in any market receives faxed documents or has to deal with printed drawings. Whether it's a site plan, a sketch detail, or a floor layout we all get this kind of non-electronic information. How do we integrate that in our workflow process?

Autodesk has a solution called Autodesk® Raster Design. Raster Design enables you to integrate a raster file into your drawing inexpensively. Autodesk Raster Design works with any AutoCAD-based product and can handle almost any file type.

Workflow process

The goal with Raster Design is simple: eliminate wasted time reproducing something that already exists.

You simply re-use the information that you already have. Scan the image then integrate it in your drawings.

Then you correlate the image so that it's up to scale. You could then simply reprint from there if you want.

Next step is to clean up the image. This is the step where you get rid of little speckles that result from scanning an image. You will then prepare the image for vectorization, an easy step called processing the image. Finally, you will have the ability to transform the image pixels into AutoCAD entities such as lines, arcs, and circles.

Integrating the image

The first step in integrating the raster file (raster file being a bitmap image) in Raster Design is to insert the image. Just as you would with the AutoCAD Image command, you navigate to your Image menu and select Insert.

There you select the file that you want to insert and choose one of three options: #1 – Quick Insert, which will simply insert the image at 0,0 and a scale of 1 if no coordinates are built-in (some geo-referenced

images have coordinates built-in). #2 – Insertion Wizard will guide you through a series of questions regarding the correlation source, the correlation values and the Insertion Point. #3 – The last option is the Insertion Dialog, which is the same as the Wizard, but uses a single interface. See Figure 1 for Inserting the image Dialog Box.

Important note: Be sure to select the Zoom to Image option so that the image is displayed after the insertion.

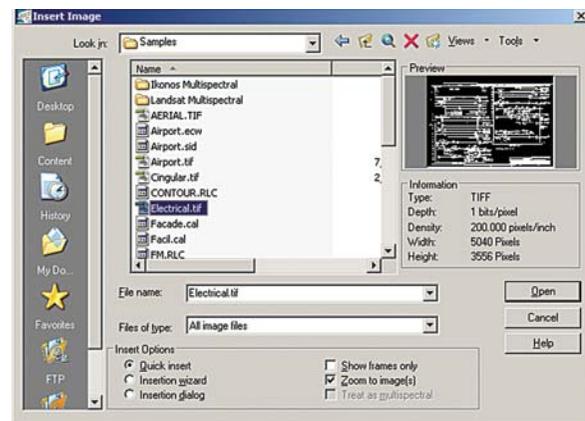


Figure 1

Sizing the image

After inserting the image there are some tools that allow you to properly scale the image. The simplest way is to draw a line segment of a known length, then use the “correlate match” command found in the menu below the image. Select a first point on the image, then select the corresponding point on the line you just drew. Select a second point on the image and finally select the corresponding point on the same line. Raster Design automatically fits the image to the line. Presto, your image is to scale.

Other commands are available for correlation, such as rubber sheeting, which allows you to correct image distortion due to an old drawing or a bad scan.

Raster Design allows you to use multiple points for alignment and make the necessary correction to the image.

Processing the image

The next step is to convert the image to a bi-tonal mode (which means the image has only two colors, white and black). This mode works best for cleaning up and vectorizing the information.

To do so, use the menu under the image and select the “Image Processing the Histogram” command. You will be prompted to select the portion of the image you wish to modify or the entire image, after which press “enter.”

In the Histogram dialog box there are five tabs. We will look at two of them, Histogram and Threshold.

The Histogram tab allows you to change the contrast and the brightness of the image, further allowing you to define

the entities that are lines. You can select the Apply button at any time during the process to visualize the changes on screen.

After you are satisfied with your tweaking, you should select the Threshold tab. This section allows you to convert your image to a bi-tonal image. See Figure 2 for Threshold.

Increasing the Threshold value will produce little points that will be removed later.

Now that you have changed the color depth of the image, you need to resave it. To do so, press Image – Save as, and resave the image.

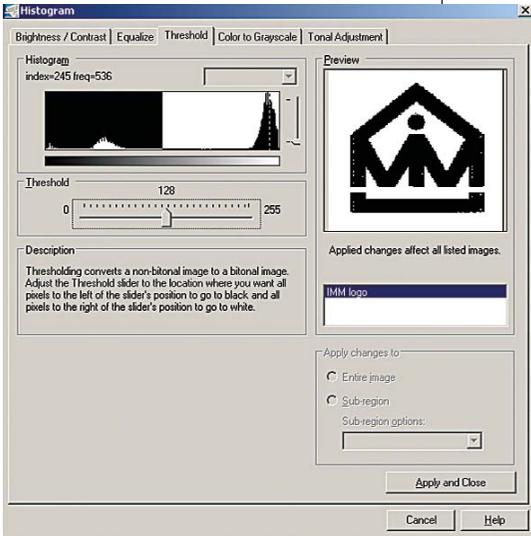


Figure 2

Cleaning up the image

Now that we have a bi-tonal image we can start cleaning it.

In the Image menu, select Cleanup – Despeckle.

You will again be prompted to select the image or a portion of the image, press enter. You now need to specify the size of the speckle you wish to remove. You can either choose AutoCAD units (default) or

pick, specifying a window or a pixel size.

The speckle that is about to be removed appears in red. You then need to confirm your deletion.

Finally using the Invert command under the Cleanup menu, change the color of every pixel so that the background of the image shows black and make the image “transparent.” See Figure 3 for Inverting the Image.

Vectorization

Our last step is to transform some of the data into an AutoCAD entity. To do so, select from the Image menu/Vectorization Tools/ Line.

Click on any line from the scanned image and a yellow arrow appears pointing you the direction of the line. Press enter to convert those pixels into an AutoCAD entity. You can do the same with polylines, arcs, or rectangle.

More to do

You can also simply copy part of the image by using the Raster Entity

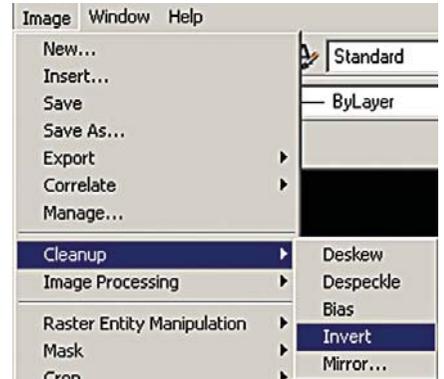


Figure 3

Manipulation Tools. Instead of vectorizing and copy, you can simply copy a portion of the image.

In a nutshell, Raster Design is a great tool and arguably the most underestimated application offered by Autodesk.



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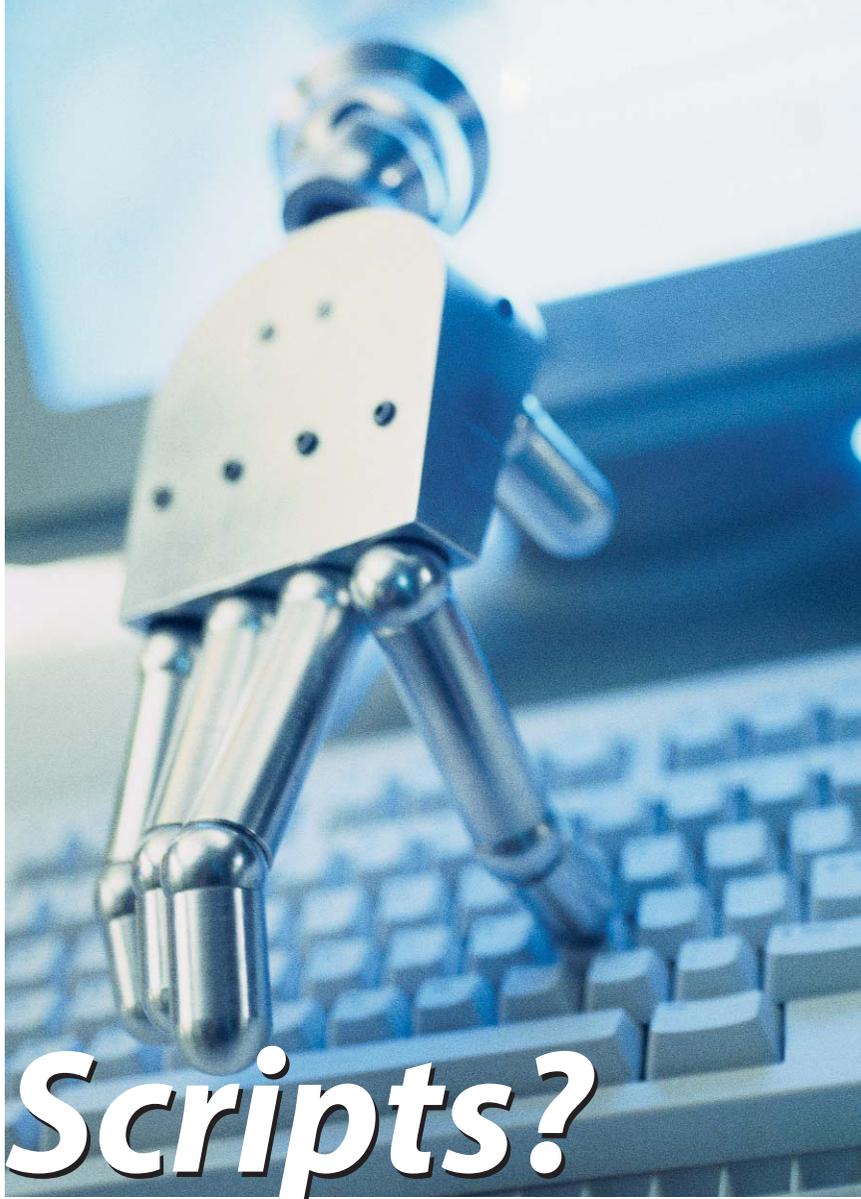
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Scripts?

What are Scripts?

For most of my career, any company I have had the joy to work for has not allowed me to use scripts. Most of the time it was because my “higher ups” didn’t want to implement something new, but now I will pass this valuable knowledge on to you so that maybe these very useful “routines” will no longer go unnoticed. In this article, I will attempt to give you, the user, an idea of what a script is, where scripts are useful, how to write a script, and how to run a script. I believe that by doing this you will be able to go on your own and create efficient scripts and ideally impress the right person with your new knowledge.

What is a script?

A script is a command or a set of commands that AutoCAD® executes with a minimal amount of user participation. In my case, I like to use a script, which we will be going over shortly, that will set the dimension style automatically. Script files can be widely used for anything from setting a dimension style to using existing commands to “create” new commands.

Writing a script

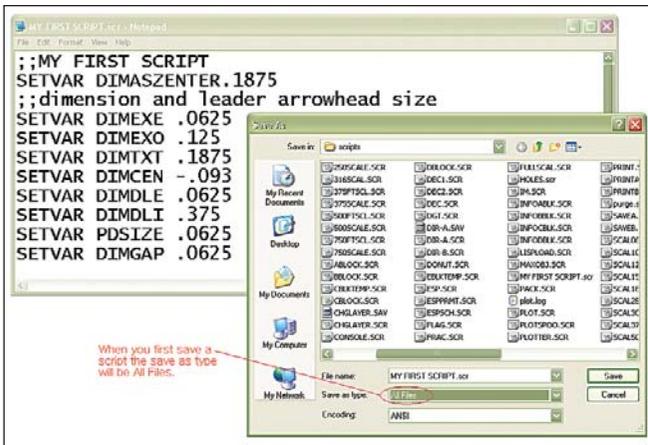
Scripts comprise commands that you normally use every day. The same command you type on the command line of AutoCAD will be in your script. Remember, scripts are nothing more than a group of commands that you want to run in sequence without user intervention!

So, let’s go ahead and give it a try. Open Notepad and type this code in just as you see it below.

```
;;MY FIRST SCRIPT  
SETVAR DIMASZ .1875  
SETVAR DIMEXE .0625  
SETVAR DIMEXO .125  
SETVAR DIMTXT .1875  
SETVAR DIMCEN -.093  
SETVAR DIMDLE .0625  
SETVAR DIMDLI .375  
SETVAR PDSIZE .0625  
SETVAR DIMGAP .0625  
SETVAR DIMSCALE 24
```

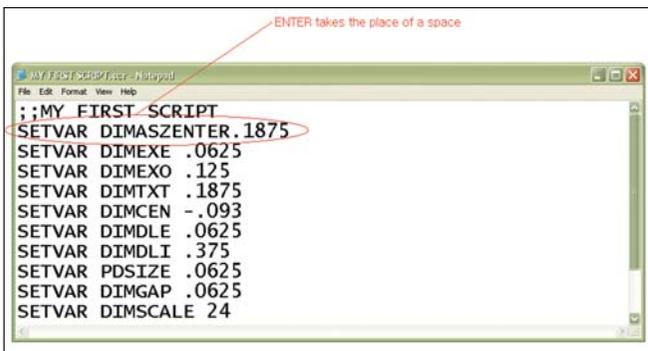
SETVAR TEXTSIZE 4.5
LTSCALE 24

Does any of this look familiar? It should—each one of the above variables is part of your dimension style or part of your drawing makeup. After typing this into Notepad, we need to save it. Personally, I have a script folder where I keep these kinds of things, but you can save it anywhere you like, as long as you remember where you put it. When you save this script, be sure to save it as a .SCR file with the name of “first script.”



Saving a script with the .scr extension

Scripts are written in an ASCII format with the above extension. You can write scripts in any program that can save the file in ASCII format, such as MS Word for example, but cannot be written in AutoCAD. When writing a script, you should pay special attention to the spaces between the variable and the value—this can also be replaced by typing ENTER, but I find that just the space is enough. This is very important because AutoCAD recognizes these spaces as the word “ENTER,” so SETVAR space DIMASZ ENTER.1875 is the same way that you would type it in from the command line. When writing scripts you have to think as if you were typing it in on the command line.



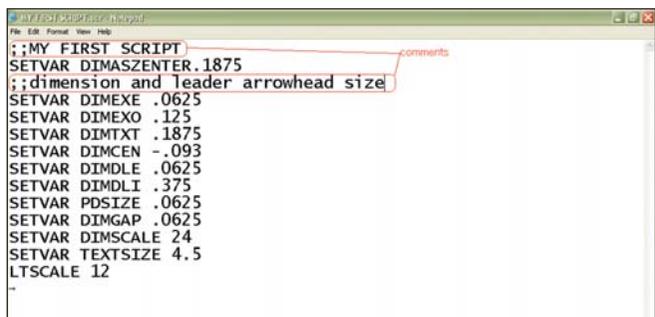
Enter takes the place of a space

This is the same as with each command being on a separate line. You cannot type two or three commands at one time on the command line and neither can you do this while writing a script.

Scripts are single-line commands that may go many, many lines depending on how many commands are needed to accomplish your goal. Depending on which release of AutoCAD you are running, the variable names may change. The best way I’ve found to find the variables and commands that you need is to go to the help menu by pressing F1 and click on command reference from here

you can find all of the commands, command alias, and system variables. When typing in just commands you would use the same name as if you were typing it on the command line. I have a script that I use to make chamfers that are set to a predetermined distance and the first line of this script is the command CHAMFER, then D for distance, then .0625 for my first distance, then .0625 for my second distance. This will work perfectly for any commands that you use repeatedly but have to set each time. In future articles we will go over how to make icons for each of your scripts, which will make this even easier to use!

Scripts can also contain comments, which are preceded by “;” which tell the computer not to try to read it. Generally, comments are used to tell the user what is going on in the script, who wrote it, copyright laws, and so forth. The script we have written has only the one comment, but there can be as many as you would like and can be placed anywhere in the script. For example open Notepad and type ;;dimension and leader arrow head size under SETVAR DIMASZ .1875 and overwrite your existing script with this one. It will work just as before, but now if someone who opens this script will know that this variable controls the dimension and leader arrowhead size.

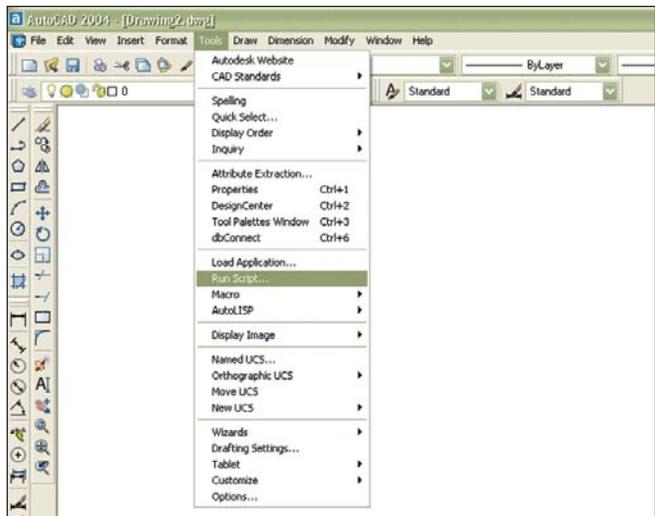


Comments placed into a script

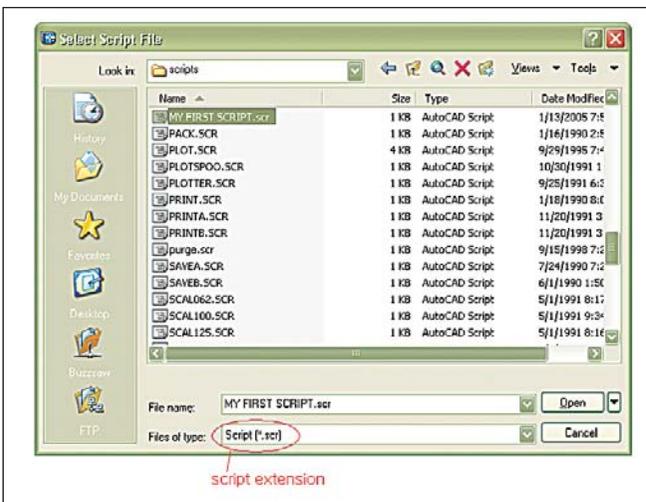
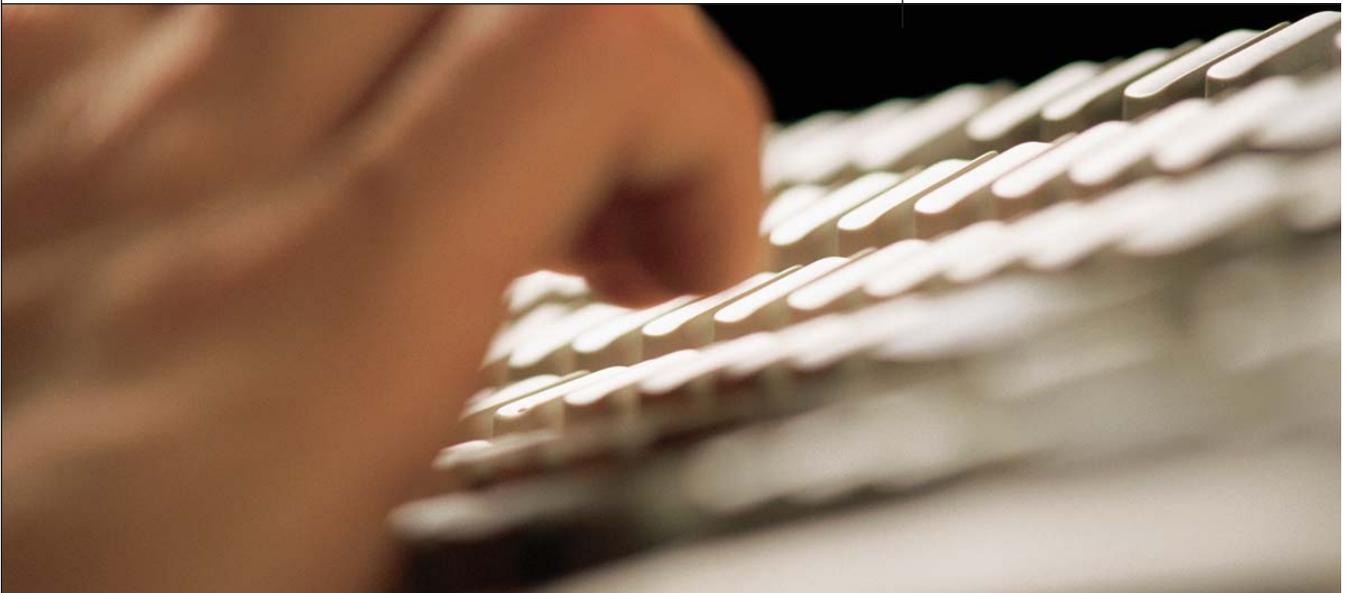
This will be especially helpful when you start writing scripts on your own; it’s an excellent way to make these scripts as user friendly as possible. In addition, it will help any new script writers decipher the code in which they will be learning.

How to run a script

Now that we have learned how to write a script, what to save as, and what a few of the variables mean, we need to know how to run it, right? Open AutoCAD to a new drawing so that we don’t over-



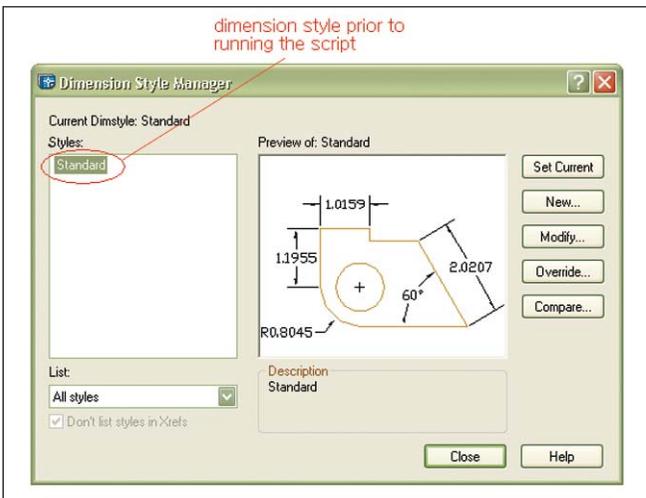
From the tools drop down menu select “Run Script



.scr extension when running a script

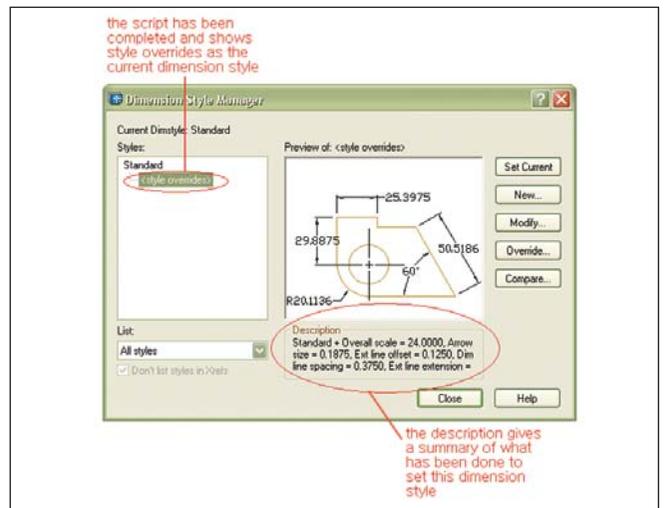
write any information that may already be there and look at the TOOLS pull-down menu. In this menu, choose the option labeled “Run Script...”

Then go through your files until you find “first script.scr” and click open. Did you catch it? The command line ran through a



The dimension style is set to the Auto CAD default

batch of commands. Now push the F2 button on your keyboard. This brings up the AutoCAD Text Window and from here you should see all of the variables that you typed in earlier. This is how a script works...easy, isn't it?



The dimension style is updated to reflect our changes

Where are scripts useful?

Scripts are useful for many common operations. About 90 percent of the scripts I use have to do with dimensions. I find that when I am finished drawing and ready to dimension I can bring in a title block (my current employer doesn't use paper space) and scale it up as much as needed and then run a script to set my dimension style, text height, and line type scale. It takes all of one minute and saves about five or six. Even if all you want to do is purge your drawing 15 times, you can write a script to do that (also one of my favorites). I hope that this article has given you the basic idea of scripts and that you will pursue writing them on your own!

Tommy Huckabee is a design draftsman for Oil States Industries, Houma, Louisiana, USA. He has extensive experience with AutoCAD 2005, AutoCAD Mechanical, and the Autodesk Inventor series, and has been an active volunteer at his local college. He can be reached at tommy.huckabee@oilstates.com

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On The Back Page



David Kingsley



The End of an Era

I did something this month that ended a personal historical era; I terminated my CompuServe account. That may not seem like a big deal, but as soon as the customer service representative called up my record, she asked, “Are you sure you want to cancel this? You’ve been a CompuServe subscriber since 1981!” I estimate that in total I have paid just over \$3,500 to CompuServe.

Non-volatile memory

I assume that most of you reading this are in the technical industry. We all know that to be successful in this field, you must possess an organized mind and a good short-, medium- and long-term memory for details such as numbers. Possessing this skill means that there are numbers from your life that get permanently burned into your brain, like the address of the house you grew up in and its phone number. Well, one of those numbers for me is my original CompuServe ID: 70274,3434, Password “Secret-Sheaves” (I can safely reveal that now, I think, since it requires you to run an archaic system to even address it).

In the 1980s CompuServe was THE online service. The hot setup was a 300 “baud” modem and a Commodore 64 (64 kilobytes of memory) with a color screen. CompuServe was the first to offer online chatting for the masses, for about \$10 per hour. Believe it or not, that was not far from being competitive with long-distance phone rates, especially for coast-to-coast communication. The downside was that only uber-geeks were online; no chatting with your Mom for sure.

When chatting, the arriving words often appeared slower than the normal rate of reading. The term “baud” refers to “bytes

per second.” We now know these rates as “56K” (56 kilobytes per second) or “broadband,” the umbrella term for any connection faster than a modem. To put baud rates into perspective, a 56K modem delivers 56,000 baud, 187 times faster than my 1981-era modem. My 3-megabit DSL connection is 10,000 times faster than the 300-baud modem.



Does anyone reading this own and use a typewriter?

Baud is a term now long retired from telecommunication lingo. Emile Baudot was a French telegraph engineer and a pioneer of telecommunication technology. In 1875 he developed a specification for modulating, sending, and demodulating text electronically. This modulation-demodulation process is the origin of the term “modem.” Baudot’s system was an evolutionary development on “Morse Code,” which had been in use for about 50 years. Baudot’s specification was later given the title “International Telegraph Alphabet No. 1” (probably when they came up with version 2...). We still use a successor to these technologies called ASCII. I love the French, and if I could, I would retire in Paris in a heartbeat, but I

have no doubt that some French telecommunication engineers are relieved that we no longer use the Americanized title of baud.

In the Morse system, the human served as the modem, mentally coding and decoding the messages on the fly. In the Baudot system, a remote-controlled typewriter replaced the human. More than 100 years

ago, the first “teleprinters” enabled people to type a single character on a keyboard. That character would then be “modulated” and sent down the wire. Miles away (or kilometers away in this case) it would be “demodulated” and strike the corresponding key on the teleprinter, creating a hard copy. Needless to say, there was no “edit text” feature. Once the message was complete on the receiving end, the technician would run off a few hundred copies on the Xerox 5700 for distribution to the village’s entire population. Several decades

later, this copying task would be outsourced to Kinko’s.

Instant messaging origins

In time, the Baudot design team developed a “duplex” mode (version 2?), meaning that signals could travel both ways and messages could be sent and received on the same machine. Essentially, this was the first “instant messaging” system. Many of us know the urgent first words sent over Alexander Graham Bell’s prototype telephone—“Watson, come here. I need you!”—reportedly screamed when Al accidentally spilled acid on himself.

What most people don’t know are the first words sent on the duplex Baudot instant messaging system more than a hundred years ago. Loosely translated from French, they were, “What are you wearing?”



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